

Health and Medical Geography: Highlights of Research, Training and Practice

XVth International Medical Geography Symposium

Department of Geography
Michigan State University
East Lansing, Michigan, United States
July 7-12, 2013

PROGRAM AND ABSTRACTS



Photo Credit: Lake Michigan Sand Dunes, Michigan, U.S.A. (2007)
Courtesy of Alan F. Arbogast

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XVth International Medical Geography Symposium

East Lansing, Michigan, July 7-12, 2013

Hosted By:

The Department of Geography
Michigan State University
East Lansing, Michigan, U.S.A.

Organization Committee:

Sue C. Grady (Chair), Libbey Kutch (Coordinator), Alan Arbogast, Fatoumata B. Barry, Joe T. Darden, Richard Groop, Keumseok Koh, Sara McLafferty, Joseph P. Messina, Bruce Pigozzi, Mark W. Rosenberg, Kathi Wilson, Leo C. Zulu

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Judy Reginek, Becky Young

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XVth International Medical Geography Symposium

East Lansing, Michigan, July 7-12, 2013

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Dr. AkwasiKumi-Kyereme, Professor (University of Cape Coast, Ghana)

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Dr. Chikkarangaswamy, Professor (University of Mysore, India)

Mohammad Adam bin Adman, Ph.D. Candidate and Lecturer (University of Selangor, Malaysia)

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XVth International Medical Geography Symposium

East Lansing, Michigan, July 7-12, 2013

National Science Foundation: Global Travel Grant Awards (cont')

Dr. Raheem Usman A, Professor (University of Ilorin, Nigeria)

Dr. Fatima Munazza, M.Phil Student and Lecturer (The Islamia University, Bahawalpur, Pakistan)

Dr. Aminata Niang-Diene, Professor (Cheikh anta Diop University, Dakar-Senegal)

Dr. Fatou Maria Drame, Professor (University Gaston Berger de Saint-Louis, Senegal)

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Dr. Svetlana M. Malkhazova, Professor and Department Head (Lomonosov Moscow State University, Russia)

Dr. Natalia V. Shartova, Faculty (Lomonosov Moscow State University, Russia)

Mr. Dmitry Orlov, Ph.D. Student (Lomonosov Moscow State University, Russia)

SCHEDULE AT A GLANCE

SCHEDULE AT A GLANCE

Sunday	Monday	Tuesday
<p>Registration 4:00-8:00pm</p> <p>Welcome Reception 6:00-8:00pm</p>	<p>Continental Breakfast 7:30-8:30am</p> <p>Welcome Address 9:00-9:30am</p> <p>Open Plenary 9:30-10:30am</p> <p>Coffee Break 10:30-10:50am</p> <p>Open Plenary 10:50-11:30am</p> <p>Lunch 12:00-1:00pm</p> <p>Concurrent Sessions 1:00-3:00pm</p> <p>Coffee Break 3:00-3:20pm</p> <p>Concurrent Sessions 3:20-5:20pm</p> <p>Posters 12:00-5:00pm</p> <p>Annual General Meeting 5:30-7:00pm</p>	<p>Continental Breakfast 7:30-8:30am</p> <p>Concurrent Sessions 8:30-10:10am</p> <p>Coffee Break 10:10-10:30am</p> <p>Concurrent Sessions 10:30am-12:10pm</p> <p>Lunch¹ 12:10-1:00pm</p> <p>Health and Place Editorial Board Meeting 12:10-1:00pm</p> <p>Concurrent Sessions 1:00-3:00pm</p> <p>Coffee Break 3:00-3:20pm</p> <p>Concurrent Sessions 3:20-5:20pm</p> <p>Posters 8:30-5:00pm</p>

¹Lunch in recognition of Dr. John Hunter, Professor Emeritus,
Department of Geography, Michigan State University

Lunch Organizers:
Cathleen McAnneny and Michael Emch (Alumni)

SCHEDULE AT A GLANCE

Wednesday	Thursday	Friday
Continental Breakfast 7:30-8:30am	Continental Breakfast 7:30-8:30am	Continental Breakfast 7:30-8:30am
All Day Fieldtrip Depart: 8:30am	Open Plenary 8:30-9:30am	Concurrent Sessions 8:30-10:30am
Van Burean State Park and Beautiful Coastal Sand Dunes	Coffee Break 9:30-9:50am	Coffee Break 10:30-10:50am
Fenn Valley Vinyards Tour in Western Michigan	Concurrent Sessions 9:50-11:30am	IMGS 2015 10:50am-11:15pm
Dinner in Metropolitan Grand Rapids	Session² 11:40am-12:30pm	Conclusions & Prospects 11:15-12:30pm
Return: 6:30, 8:30 and 10:30pm	Lunch³ 12:30-1:30pm	Farewell
	IGU* Commission Meeting 12:30-1:30pm	Lunch 12:30-1:30pm
	Concurrent Sessions 1:30-3:10pm	
	Coffee Break 3:10-3:30pm	
	Concurrent Sessions 3:30-5:30pm	
	IMGS Banquet 6:30 pm	

² Pre-lunch Session in recognition of **Christchurch, New Zealand's** earthquake recovery

³ Lunch **Susan Elliot and Allison Williams** Ashgate Series "Geographies of Health"

*International Geographical Union (IGU) Commission on Health and Environment Meeting

TABLE OF CONTENTS

	Page
Program.....	1
Abstracts	
Session 1: Blue Space and Health I	33
Session 2: Infectious Diseases I	36
Session 3: Chronic Diseases I	40
Session 4: Spatial Behavior and Health	44
Session 5: Blue Space and Health II	48
Session 6: Infectious Diseases II	51
Session 7: Chronic Diseases II	54
Session 8: GIS and Quantitative Methods I	58
Session 9: Food (In)Security Around the World	62
Session 10: Children’s Places	65
Session 11: Aging and Vulnerability.....	68
Session 12: Neighborhoods and Community Health	70
Session 13: Author Meets Critics - "Weighing In: Obesity, Food Justice, and the Limits of Capitalism" by Julie Guthman	73
Session 14: Children’s Travel and Food Environments	74
Session 15: Aging Spaces	77
Session 16: Climate Change and Health	80
Session 17: Food Systems	83
Session 18: Smoking, Alcohol and Drug Abuse	87
Session 19: Vector-Borne Diseases	91
Session 20: Health Disparities I	95
Session 21: Primary Health Care	99
Session 22: Food Programs and Policy	103
Session 23: Violence and Health Geography	106
Session 24: Water-borne Diseases	109

Session 25: Health Disparities II	112
Session 26: Voluntarism and Telephone Triage – Health Care Integration	115
Session 27: Health Care Demand and Access I	119
Session 28: Environmental Health I	122
Session 29: HIV/AIDS I	124
Session 30: Migration and Health	128
Session 31: Mental Health	131
Session 32: Earthquake Recovery in New Zealand	134
Session 33: Health Care Demand and Access II	136
Session 34: Vulnerability and Health Geography	139
Session 35: HIV/AIDS II	142
Session 36: Indigenous Populations, Migration and Health	145
Session 37: Qualitative Health Geography	148
Session 38: Health Systems	151
Session 39: Environmental Health II	155
Session 40: Medical Tourism	159
Session 41: Therapeutic Landscapes	162
Session 42: GIS and Quantitative Methods II	165
Session 43: Gender, Care, Work and Health	170
Session 44: Place and Health	173
Session 45: Maternal and Child Health	177
Participant List.....	195
Maps-Directions.....	209

PROGRAM AND ABSTRACTS

PROGRAM, IMGS 2013

MONDAY, July 8, 2013

Continental Breakfast 7:30—9:00am *Lincoln Room*

Welcoming Remarks 9:00—9:30am *Auditorium*

Welcome and Introduction Sue C. Grady

**Acting Provost and Executive
Vice President for Academic Affairs,
Michigan State University** June Pierce Youatt

**Dean of College of Social Science
Michigan State University** Marietta L. Baba

Opening Session 9:30—10:30am *Auditorium*

Douglas Richardson, Executive Director, Association of American Geographers
Spatializing Health: Trends in Geography and Health Research

Plenary Speaker

Mei-Po Kwan, Professor, Geography, University of Illinois Urbana-Champaign
GIS Applications to Address the Uncertain Geographic Context Problem in Health Research

Morning Break 10:30—10:50am *Lincoln Room*

Opening Session (cont') 10:50—11:30am *Auditorium*

Plenary Speaker

Julie Winkler, Professor, Geography, Michigan State University; President, Association
of American Geographers
Climate Change in the Great Lakes Region of the United States: Public Health Impacts

Lunch 12:00—1:00pm *Big Ten Room B, C*

Session 1: *Blue Space and Health I*

[Monday]

- 1:00—2:40pm Room 103AB Chairs: Thomas Kistemann and Ronan Foley
Organizers: Ronan Foley, Robin Kearns, Thomas Kistemann
- 1:00—1:20pm Sebastian Völker (University of Bonn, Germany), Thomas Kistemann
The Prominence of Urban Blue Spaces for Health and Well-being Compared to Urban Green Spaces
- 1:20—1:40pm Robin Kearns (The University of Auckland, New Zealand), Damian Collins, David Conradson
Rotoroa: Transforming a Healthy Island Bluescape - from a Space of Detention to a Site of Sanctuary
- 1:40—2:00pm Ronan Foley (National University of Ireland Maynooth, Ireland)
Snámh: Affective Body-Water Engagements in Healthy Blue Space
- 2:00—2:20pm Allison Williams (McMaster University, Canada)
The Blue Ashram: A Case Study of Sivananda Ashram Yoga Retreat, Paradise Island, Bahamas
- 2:20—2:40pm Charis Lengen (Clénia Ambulatorium Wetzikon, Switzerland), Christian Timm, Martin E. Keck, Thomas Kistemann
Blue-Green Spaces and their Effect on Health and Well-being: Diversification, Periodicity and Borders Matter!

Session 2: *Infectious Diseases I*

- 1:00—3:00pm Room 104AB Chair: Michael Emch
- 1:00—1:20pm Jonathan D. Mayer (University of Washington, U.S.A.)
The "One Health" Movement: Something New, Or Something Old?
- 1:20—1:40pm Emmanuel Eliot (University of Rouen, France), Philippe Jeanne, Marion Amalric, Clélia Gasquet, Laurence Joselin, Nadia Lepastourel, Florent Baldini, Emmanuel Bonnet, Eric Daude
The 2009-2010 H1N1 Vaccination Campaign through the Lense of Media Information: A Methodological Approach
- 1:40—2:00pm Elisabeth Dowling Root (University of Colorado at Boulder, U.S.A.), James Gaensbauer, Eric A. F. Simoes
Evolution of Respiratory Syncytial Virus (RSV) Over Space and Time in Rural Filipino Children
- 2:00—2:20pm Chris Bowie (University of Canterbury, New Zealand), Edward Griffin, Simon Kingham
Will Disparities in Access to Vaccination lead to Inequalities in Rotavirus among New Zealand Children?

Session 2: *Infectious Diseases I (cont')*

[Monday]

2:20—2:40pm Christopher Dickey (Community Systems Foundation, U.S.A.), Haydee Izaguirre, Jeeveeta Soobarah Agnihotri, Arun Kapuria, Kris Oswalt
Mapping a Difference: Strengthening the Global Campaign for Polio Eradication through Subnational Mapping

2:40—3:00pm Svetlana M. Malkhazova (Lomonosov Moscow State University, Russia), Natalia V. Shartova, Dmitry S. Orlov, Varvara A. Mironova, Tatiana V. Kotova
Medico-Geographical Evaluation of Naturally Determined Diseases in Russia

Session 3: *Chronic Diseases I*

1:00—3:00pm Room 106 Chair: Debarchana Ghosh

1:00—1:20pm Cathleen McAnneny (University of Maine, U.S.A.)
Addressing the Oral Health Care Needs of Rural Populations: Maine as a Test Case

1:20—1:40pm Md. Mobarak Hossain Khan (University of Bielefeld, Germany), Oliver Gruebner, Patrick Hostert, Alexander Krämer
The Geography of Diabetes among General Adult Population in Bangladesh: Recent Evidence from a Cross-Sectional Survey

1:40—2:00pm Kelsey N. McDonald (University of Minnesota, U.S.A.), Steven M. Manson
Using Spatial Regression to Estimate the Effect of Neighborhood Education and Income on Overweight/Obesity, Type 2 Diabetes, and Smoking

2:00—2:20pm Sophia Giebultowicz (University of North Carolina-Chapel Hill, U.S.A.), Michael Emch, Douglas Morgan
The Ecology of an Epidemic: Chronic Kidney Disease in Nicaragua

2:20—2:40pm Grant Aitken (University of Southampton, United Kingdom), Graham Moon, Paul Roderick
Inequalities in Chronic Kidney Disease: Using Synthetic Multilevel Modelling to Derive Sources of Unmet Need

2:40—3:00pm Kevin Matthews (University of Iowa, U.S.A.), Anne Gaglioti, Barcey Levy, Gerard Rushton
Geographic Modeling of Colorectal Cancer Progression in Iowa

Session 4: *Spatial Behavior and Health* [Monday]

- 1:00—3:00pm Heritage Room Chair: Clive E. Sabel
- 1:00—1:20pm Camille Perchoux (Université de Montréal, Canada), Yan Kestens, Basile Chaix
Multi-Place Perspective for Improved Environmental Exposure Assessment: An Analysis of Individual Spatial Behavior in the RECORD Cohort Study
- 1:20—1:40pm Yan Kestens (Université de Montréal, Canada), Benoit Thierry, Martine Shareck, Basile Chaix
Integrating Activity Spaces in Health Research: Comparing Activity Locations Obtained from the VERITAS Activity Space Questionnaire with 7-day GPS Tracking and Prompted Recall
- 1:40—2:00pm Daniel J. Exeter (The University of Auckland, New Zealand), Clive E. Sabel, Grant Hanham, Pip Forer, Sue Wells
Movers and Stayers: The Geography of Residential Mobility and CVD Hospitalizations in Auckland, New Zealand
- 2:00—2:20pm Yong Yang (University of Michigan, U.S.A.), Ana V. Diez-Roux
Using an Agent-based Model to Simulate Children's Active Travel to School
- 2:20—2:40pm Andrew F. Clark (University of Western Ontario), Emily Bent, Jason Gilliland
Shortening the Walk to School: Examining how Children's Active School Travel are Influenced by Shortcuts in London, Canada
- 2:40—3:00pm Niamh Donnellan (University of Canterbury, New Zealand)
Measuring the Built Environment for Active Transport: A Review

Afternoon Break 3:00—3:20pm *Lincoln Room*

Session 5: *Blue Space and Health II*

- 3:20—5:00pm Room 103AB Chair: Robin Kearns
Organizers: Ronan Foley, Robin Kearns, Thomas Kistemann
- 3:20—3:40pm Tara Coleman (University of Auckland, New Zealand), Robin Kearns
Ageing-in-Place on Waiheke Island, New Zealand: The Role of Sea and Sky in Experiences of 'Place', 'Being Aged' and 'Wellbeing'
- 3:40—4:00pm Benedict W. Wheeler (University of Exeter Medical School), Sahran Higgins, Rebecca Lovell, Michael H. Depledge
Beyond Greenspace: Geographical Associations between Environmental Quality and Population Mental Health in Rural England

Session 5: *Blue Space and Health II (cont')* [Monday]

- 4:00—4:20pm Gavin J. Andrews (McMaster University, Canada)
Anatomy of a Moment: Wellbeing as a Transitory Feeling State
- 4:20—4:40pm Eric D. Carter (Macalester College, U.S.A.)
Making the Blue Zones: Public Health Marketing in a Neoliberal Era
- 4:40—5:00pm Philip Donovan (Massey University, New Zealand), Karen Witten
Musings on the Measurement of Bluescapes

Session 6: *Infectious Diseases II*

- 3:20—5:20pm Room 104AB Chair: Emmanuel Eliot
- 3:20—3:40pm Margaret Carrel (University of Iowa, U.S.A.), Michael Emch
Genetics: A New Landscape for Medical Geography
- 3:40—4:00pm Ingrid Luffman (East Tennessee State University, U.S.A.)
Spatial Regression Modeling: Risk factors for Sporadic Escherichia coli O157 Infection in East Tennessee
- 4:00—4:20pm Sarah Paige (University of Wisconsin, U.S.A.), Johanna Bleecker,
Jonathan D. Mayer, Tony Goldberg
*Quantifying Human-Primate Overlap in a Fragmented Landscape:
Implications for Conservation and Global Health*
- 4:20—4:40pm Richard O. Djukpen (Lindenwood University, U.S.A.)
*Trends in Geospatial Analysis of HIV/AIDS in Nigeria: Lessons for
Resource Management and Policy Development*
- 4:40—5:00pm Laura Lane (University of North Texas Health Science Center, U.S.A.),
Martha Felini, Elyse Ryan
*Spatial Variations of Temporal Trends and Geographic Risk Factors
Associated with Syphilis in Texas Counties, 2006-2009*
- 5:00—5:20pm Jody Decker (Wilfrid Laurier University Waterloo, Canada)
*A Mixed-Method Approach to Evaluating Infectious Disease
Transmission Risk for Students on a High Density Campus*

Session 7: *Chronic Diseases II* [Monday]

- 3:20—5:20pm Room 106 Chair: Theresa Garvin
- 3:20—3:40pm Ketan Shankardass (Wilfrid Laurier University, Canada), Vashti
Sharma, Courtney Jones, Colin Robertson
*A Geographic Analysis of Stress, Environmental Resources and Multiple
Chronic Diseases in Toronto, Ontario*

- Session 7: *Chronic Diseases II (cont')* [Monday]**
- 3:40—4:00pm Aldo Avina (University of North Texas Health Science Center, U.S.A.)
Spatio-temporal Analysis of Lymphoid Leukemia Mortality in Children Aged 0-4 in Texas Counties, 1999-2007
- 4:00—4:20pm Pierre Goovaerts (BioMedware, Inc., U.S.A.)
Space-Time Analysis of Late-Stage Breast Cancer Incidence in Michigan
- 4:20—4:40pm Jared Butler (University of Utah, U.S.A.), Kevin Henry, Antoinette Stroup
The Role of Early-Life Neighborhood Socioeconomic Status in Female Breast Cancer Risk
- 4:40—5:00pm Ogheneyovwinor Odjoji (University of North Texas, U.S.A.)
Racial Disparities and Spatial Distribution of Breast Cancer Mortality between African American and Caucasian Women in Texas
- 5:00--5:20am Holly Shulman (University of Leeds, United Kingdom), Mark Birkin, Graham P. Clarke
Need vs. Provision for the Location of Health Care Facilities
- Session 8: *GIS and Quantitative Methods I***
- 3:20—5:20pm Heritage Room Chair: Daniel J. Exeter
- 3:20—3:40pm Chetan Tiwari (University of North Texas, U.S.A.)
Adjusting Disease Maps for Population Differences in Race/Ethnicity
- 3:40—4:00pm Coline Dony (University of North Carolina at Charlotte, U.S.A.), Eric Delmelle
Modeling Spatial Accessibility to Public Parks in Mecklenburg County using a Variable Two-Step Floating Catchment Area Method, Comparing Potential Travel Modes
- 4:00—4:20pm Catherine L. Kothari (Western Michigan University, U.S.A.) Luz Carmen Sweezy, James Wiley, Kathleen Baker, Ben Dormitorio, Rajib Paul, Arthur James, Amy Curtis
The Relationship of Socioeconomic and Racial Factors, both Individual and Community-Level, to Infant Birthweight
- 4:20—4:40pm Aniruddha Banerjee (Indiana University Purdue, U.S.A.)
Wither GISc in Health Geography? A Need to Redefine Health-GISc using Systems Theory
- 4:40—5:00pm Lars Kroll (Robert Koch Institute, U.S.A.), Thomas Lampert
Small Area Estimation of Prevalences in Germany using Nationally Representative Health Surveys

Session 8: GIS and Quantitative Methods I (cont') **[Monday]**
5:00—5:20pm Sala Senkayi (U.S. Environmental Protection Agency, Region 6, U.S.A.),
Melanie L. Sattler
Using Micromaps to Analyze Environmental Epidemiological Data

Posters *12:00-5:00pm* *Lincoln Room*

Peter J. Anthamatten (University of Colorado Denver, U.S.A.), Erin Fiene, Eve Kutchman,
Melanie Mainar, Lois Brink, Ray Browning, Claudio R. Nigg
An Investigation of Mini-geographies of Play: Analysis of Physical Activity Behavior

Frank Houghton (Limerick Institute of Technology, Ireland), Sharon Houghton
Children's Voices: Examining the Health Status of Homeless Children in Limerick, Ireland

Yuxia Huang (Texas A&M University, U.S.A.), Pamela Meyer
Disparities in Neighborhood Food Environments in Nueces County, Texas

Karen D. Johnson-Webb (Bowling Green State University, U.S.A.)
Infant Mortality in Ohio: A Preliminary Analysis

Cameron Manche (Western Michigan University, U.S.A.), Rie Suzuki, Daniel J. Kruger
*Process Travel Time and Distance to Primary Health Care Providers in Flint, Michigan: A
Multi-Modal Network Based Approach*

Victoria Pantyley (Marie Curie-Sklodowska University in Lublin, Poland)
*Demographic and Children's Health Situation in Conditions of Economic Destabilization-
Case of Ukraine*

Hannah Reed (Colorado School of Public Health, U.S.A.), Elisabeth Dowling Root, Jill Litt
*Spatial Patterns of Resident Ratings of Neighborhood Quality and Environment in Denver,
Colorado*

Amanda K. Slaunwhite (University of Victoria, Canada)
Transcending Geography: Lived Experience and Mental Health Care Reform in Canada

Joanna Taylor (University of Southampton, United Kingdom), Graham Moon, Liz Twigg
*Estimating the Small-Area Geographies of Health Data from the UK Census: An Approach
using Multilevel Synthetic Estimation*

Michael J. Widener (University of Cincinnati, U.S.A.), Mary E. Northridge, Peng Wang,
Susan Kum Zhuo, Chen Stephen Marshall, Sara S. Metcalf
*Using Agent-Based Modeling to Develop Strategies for Maximizing Participation in an
Oral Health Screening Program for Older Adults in Northern Manhattan*

Posters (cont')

[Monday]

Allison Williams (McMaster University, Canada), Peter Kitchen, Jim Randall,
Nazeem Muhajarine, K. Bruce Newbold, Kathi Wilson

*Pan-Canadian Predictors of Immigrant's Quality of Life: Relationship to Adaptation in
Second and Third Tier Canadian Cities*

Heike Wittmann (Technischen Universität Berlin, Germany)

*Diabetic Foot in Germany - A Market Analysis towards Comprehensive Integrated Care of
Statutory Health Fund Members of AOK Nordost*

Annual General Meeting

5:30-7:00pm

Lincoln Room

TUESDAY, July 9, 2013

[Tuesday]

Continental Breakfast

7:30-8:30am

Lincoln Room

Session 9: *Food (In)Security Around the World*

8:30—10:10am Room 103AB

Chair: Ellen Flint

8:30—8:50am Lauren Kepkiewicz (University of Toronto, Canada)

*Structures, Constraint, and Diet: A Case Study of the Kikuyu in Colonial
Kenya*

8:50—9:10am Kaitlin Patterson (McGill University, Canada), Lea Berrang-Ford

Food Security of the Batwa in Uganda: An Exploratory Study

9:10—9:30am Md. Mobarak Hossain Khan (University of Bielefeld, Germany), Oliver
Gruebner, Patrick Hostert, Alexander Krämer

*Food Insecurity and its Association with Malnutrition and Anaemia in
Bangladesh: Geographical Disparities Across Divisions, Rural and Urban
Areas*

9:30—9:50am Ana Clara Duran (University of Sao Paulo, Brazil), Maria do Rosario DO
Latorre, Patricia C. Jaime

*Exploring the Role of the Food Environment on Fruits, Vegetables, and
Sugar-Sweetened Beverages Consumption in a Brazilian Urban
Population*

9:50—10:10am Thora Martina Herrmann (Université de Montréal, Canada), Marie-
Jeanne S. Royer, M. John Mameamskum, George Guanish, the Naskapi
Nation of Kawawachikamach

*Food Insecurity in the Context of Changing Socio-Environmental
Conditions in the Canadian Subarctic: Participatory Research with the
Naskapi First Nation.*

Session 10: Children's Places**[Tuesday]**

- 8:30—10:10am Room 104AB Chair: Jason Gillilan
- 8:30—8:50am Chris Bowie (University of Canterbury, New Zealand), Amber Pearson, Malcolm Campbell, Ross Barnett
Otitis Media Associated with Household Crowding in a Developed Country
- 8:50—9:10am Jeffrey Butler (District Office of Berlin Mitte, Germany)
The Geography of (Children's) Health "Examples from the Health and Social Reporting in the District of Berlin-Mitte"
- 9:10—9:30am Kirsten Beyer (Medical College of Wisconsin, U.S.A.), Beth Heller, Amy Kistner, Corey Zetts, Jessica Bizub, Erin Shawgo
More Than a Pretty Place: Preliminary Findings on Children's Nature Access, Exposure and Engagement
- 9:30—9:50am Karen Witten (Massey University, New Zealand), Penelope Carroll, Robin Kearns
Confronting Diversity and Learning Tolerance: Children's Accounts of Living and Playing on Inner City Streets
- 9:50—10:10am Philip Donovan (Massey University, New Zealand)
Improving the Measurement of Children's Neighbourhood Accessibility

Session 11: Aging and Vulnerability

- 8:30—9:30am Willy Room Chair: Claire Thompson
- 8:30—8:50am Werner Maier (Helmholtz Zentrum München - German Research Center for Environmental Health, Germany), Miriam Rottmann, Susan Vogt, Andreas Mielck, Annette Peters, Rolf Holle, Birgit Linkohr, Angela Döring, Kathrin Wolf, Eva Grill, Ralf Strobl, Ursula Berger, Anja Kerstin Zimmermann, Stephanie von Klot
Associations between Inner-City Deprived Areas, Urban Resources and Health In The City Of Augsburg In Southern Germany. Results from the KORA Study
- 8:50—9:10am Keltie Gale (Queen's University, Canada), Mark W. Rosenberg
Social Deprivation and Experiences of Aging in the Older Population in Kingston, Ontario
- 9:10—9:30am Kate Lester (University of North Texas, USA)
Calculating Rates of Change in an Unstable Population: The Case of Homelessness in Dallas, Texas

Session 12: *Neighborhood and Community Health* [Tuesday]

- 8:30—10:10am Heritage Room Chair: Yan Kestens
- 8:30—8:50am Helena Tunstall (University of Edinburgh, United Kingdom), Niamh K. Shortt, Elizabeth A Richardson, Jamie Pearce, Esther Rind, Richard Mitchell
Do Deprived Neighbourhoods Experience "Triple Jeopardy"? The Relationship between Inequalities in Health, Socio-Economic and Physical Environments in England
- 8:50—9:10am Julie Vallée (Université de Montréal, Canada), Guillaume Le Roux, Basile Chaix, Yan Kestens, Pierre Chauvin
The "Constant Size Neighbourhood Trap". Variability in Size of Resident Perceived Neighbourhoods and Geographical Accessibility to Local Health Resources in the Paris Metropolitan Area
- 9:10—9:30am Sarah Lovell (University of Otago), Andrew Gray
Developing and Validating a Measure of Community Capacity: Implications for the Concept
- 9:30—9:50am Kate Lester (University of North Texas, USA)
Calculating Rates of Change in an Unstable Population: The Case of Homelessness in Dallas, Texas
- 9:50—10:10am Vivienne Ivory (University of Otago, New Zealand), Marie Russell
What Determines "Scale" for Neighbourhood Physical Activity?

Morning Break 10:10—10:30am *Lincoln Room*

Session 13: *Author Meets Critics - "Weighing In: Obesity, Food Justice, and the Limits of Capitalism" by Julie Guthman*

- 10:30—12:10pm Room 103AB Chair: Sarah Wakefield
- Author: Julie Guthman (University of California Santa Cruz, U.S.A.)
Discussants: Tim Brown (Queen Mary University of London, United Kingdom), Steven Cummins (London School of Hygiene & Tropical Medicine, United Kingdom), Eric Carter (Macalester College, U.S.A.)

- Session 14: *Children's Travel and Food Environments* [Tuesday]**
 10:30—12:10pm Room 104AB Chair: Frank Houghton
- 10:30—10:50am Jason Gilliland (University of Western Ontario, Canada)
Do You Know the Way to School? Evaluating Methods for Observing the Spatial Patterns of Children's Neighborhood Activities
- 10:50—11:10am Daniel Lewis (London School of Hygiene & Tropical Medicine, United Kingdom) Neil Smith, Charlotte Clark, Stephen Stansfeld, Steven Cummins
Developing Context in the Spatial Definition of the Food Environment: Changes to BMI in Young People in East London, UK
- 11:10—11:30am Daniel Rainham (Dalhousie University, Canada), Chris Blanchard, Trevor Dummer, Sara Kirk, Renee Lyons, Laurene Rehman, Cindy Shearer
Activity Space Measures of Access to Residential and School Neighbourhood Food Environments, Diet and BMI among Youth
- 11:30—11:50am Kristin Brown (University of Waterloo, Canada), Susan J. Elliott
It's Not as Easy as Just Saying 20 minutes a Day: Understanding the Role of Place in the Implementation of a School-based Physical Activity Policy
- 11:50—12:10pm Jamie L Humphrey (University of Colorado at Boulder, U.S.A.), Elisabeth Dowling Root
Child Self-Rated Health: The Effect of Longitudinal Measures of Neighborhood Racial Composition
- Session 15: *Aging Spaces***
 10:30—12:10pm Willy Room Chair: Werner Maier
- 10:30—10:50am Janette Brual (Queen's University, Canada), Mark W. Rosenberg
Health, Place and Aging in Multicultural Toronto: The Case of Aging Filipinos
- 10:50—11:10am Theresa Garvin (University of Alberta, Canada)
Aging in Place in Aging Spaces
- 11:10—11:30am Jessica Finlay (University of Minnesota, U.S.A.)
Active Aging: Strategies to Redefine Later Life
- 11:30—11:50am Kaitlyn Gutteridge (University of British Columbia, Canada), Meghan Winters, Joanie Sims-Gould, Christine Voss, Callista Haggis, Anna Chudyk, Heather McKay
Learning from the "Ideal": Older Adult's Travel Behaviour in a Walkable Neighbourhood

Session 15: ***Aging Spaces (cont')*** **[Tuesday]**
11:50—12:10pm Neng Wan (University of Nebraska Medical Center, U.S.A.), Ge Lin
*Application of Mobile Technologies In Aging Research: A Case Study
Of Life-Space*

Session 16: ***Climate Change and Health***
10:30—10:50am Room 106 Chair: Korine N. Kolivaras

10:30—10:50am Michael J. Allen (Kent State University, U.S.A.)
*Seasons in Climate-Health Research: A Critical Evaluation of
Delineation Methods*

10:50—11:10am Iván J. Ramírez (The New School, U.S.A.), Sue C. Grady, Michael H.
Glantz
El Niño and the Cholera Epidemic in Peru: A New Paradigm?

11:10—11:30am Elisabete Freire (University of Lisbon, Portugal), Paula Santana,
Ricardo Almendra, João Vasconcelos
*Excess Winter Mortality Patterns and Regional Differences in
Portugal*

11:30—11:50am Yolanda J. McDonald (Texas A&M University, U.S.A.), Sara E.
Grineski, Timothy W. Collins, Young-An Kim
*The Incidence of Diseases Associated with Climate Change in Texas,
2008-2010: An Examination of Economic Impacts and Socio-Spatial
Disparities*

11:50—12:10am Allison Bradshaw (University of Connecticut, U.S.A.)
A Spatial Analysis of West Nile Virus in Texas, 2012.

Lunch (John Hunter Recognition) 12:10—1:00pm Big Ten Room B, C

Health & Place Editorial Board Meeting 12:10—1:00pm VISTA Room

Session 17: ***Food Systems***
1:00—3:00pm Room 103AB Chair: Steven Cummins

1:00—1:20pm Denise Goodwin (London School of Hygiene & Tropical Medicine,
United Kingdom), Steven Cummins, Elena Sautkina, Andy Jones,
David Ogilvie, Mark Petticrew, Martin White
*Is It Possible to Implement Complex Systems Approaches to Obesity
Prevention? Evidence from the English Healthy Towns Programme*

1:20—1:40pm Ellen Flint (London School of Hygiene & Tropical Medicine, United
Kingdom), Steven Cummins, Stephen A. Matthews
*Do Supermarket Interventions Improve Food Access, Fruit and
Vegetable Intake and BMI? Evaluation of the Philadelphia Fresh
Food Financing Initiative*

- Session 17: *Food Systems (cont')*** **[Tuesday]**
- 1:40—2:00pm Thomas Burgoine (University of Cambridge, United Kingdom), Pablo Monsivais
Are Fast-Food Environments Associated with Diet and BMI in a Sample of UK Adults?
- 2:00—2:20pm Debarchana Ghosh (University of Connecticut, U.S.A.), Katie S. Martin, Mengyao Zhang, Michele Wolf, Kate McMinimee, Martha Page
Do Residents of Hartford, Connecticut Live in a Food Desert? A Multidimensional Analysis of Grocery Stores
- 2:20—2:40pm Amirmohsen Behjat (University of Victoria, Canada), Mustafa Koc, Aleck Ostry
Divergence in Measuring Distance for Identifying Food Deserts in Toronto Neighbourhoods
- 2:40—3:00pm Leia M. Minaker (University of Waterloo, Canada), Susan J. Elliott
The Grey Triangle: Understanding Low Income Families Supermarket Choices through Triangulation
- Session 18: *Smoking, Alcohol and Drug Abuse***
- 1:00—3:00pm Room 104AB Chair: Geoffrey DeVerteuil
- 1:00—1:20pm Niamh K. Shortt (University of Edinburgh, United Kingdom), Catherine Tisch, Jamie Pearce, Richard Mitchell
Tobacco and Alcohol Environments and the Relationship with Adolescent Risky Behaviours in Scotland
- 1:20—1:40pm Amber L. Pearson (University of Otago, New Zealand), Frederieke S. van der Deen, Nick Wilson
Spatial Approaches to Evaluating Tobacco Outlet Reduction Interventions: Toward a Smokefree New Zealand/Aotearoa by 2025
- 1:40—2:00pm Katherine Frohlich (Université de Montréal, Canada), Rowena Agouri, Martine Shareck, Clément Dassa, Yan Kestens, Jennifer O'Loughlin, Geetanjali Datta, Bernard Simon-Leclerc, Mark Daniel
Studying Spatial Inequalities in Smoking in Montreal Neighborhoods: The ISIS Study
- 2:00—2:20pm Martine Shareck (Université de Montréal, Canada), Yan Kestens, Katherine L. Frohlich
Contextual Influences on Inequalities in Smoking: Accounting for Young Adult's Spatial Mobility

Session 18: *Smoking, Alcohol and Drug Abuse (cont')* [Tuesday]

2:20—2:40pm Ashley Howell (University of Auckland, New Zealand), Daniel Exeter, David Newcombe
Geography of Methamphetamine Manufacture and Harm in New Zealand, 2005 – 2008

2:40—3:00pm Rich Tyler (University of Portsmouth, Great Britain), Liz Twigg, Graham Moon
Tobacco, Cannabis and Smoking Identity: Micro and Macro Contexts

Session 19: *Vector-Borne Diseases*

1:00—3:00pm Room 106 Chair: Isaac N. Luginaah

1:00—1:20pm Sarah Dickin (McMaster University, Canada), Corinne Schuster-Wallace, Susan J. Elliott
Dealing with Endemic Dengue: Examining the Attitudes and Perceptions towards Dengue Control in Malaysia

1:20—1:40pm Kabita Ghimire (Kansas State University, U.S.A.)
Community Knowledge, Attitudes and Practices (KAP) on Malaria in Jhapa District Nepal

1:40—2:00pm Michael Emch (University of North Carolina at Chapel Hill, U.S.A.), Steve Meshnick, Margaret Carrel
Spatial Patterns of Malaria in the Democratic Republic of Congo: A Landscape Genetics Approach

2:00—2:20pm Korine N. Kolivras (Virginia Tech, U.S.A.), Liz Dymond, Yili Hong, Jie Li, Stephen P. Prisley, James B. Campbell, David N. Gaines, Randel L. Dymond
Environmental Variability and the Continued Emergence of Lyme disease

2:20—2:40pm Joseph P. Messina (Michigan State University, U.S.A.), Nathan Moore, Mark H. DeVisser
Tsetse Burden and Agricultural Activity in Kenya

2:40—3:00pm Mark H. DeVisser (Michigan State University, U.S.A.), Joseph P. Messina, Leah Dodge
National Control of Tsetse: Is Eradication in Kenya Feasible?

Session 20: *Health Disparities I*

1:00—3:00pm Willy Room Chair: Oliver Gruebner

1:00—1:20pm Candice M. Christmas (Queen's University, Canada), Mark W. Rosenberg
Unpacking Material and Social Determinants of Health and their Effect on Early Childhood Development in Kingston, Ontario Neighbourhoods

Session 20: *Health Disparities I (cont')* [Tuesday]

- 1:20—1:40pm Julie Vallée (Université de Montréal, Canada), Martine Shareck, Yan Kestens, Katherine Frohlich
Place Experiences and Well-being of Young Adults in Montreal, Canada
- 1:40—2:00pm Iain Lake (University of East Anglia, United Kingdom), Natalia Jones
The Combined Impact of Rural Residence and Socio-economic Status on Premature Mortality
- 2:00—2:20pm Viktoriya Pantyley (Marie Curie-Sklodowska University, Poland)
Health State of Eastern Poland's Residents in Conditions of Modern Socio-economic Transformations
- 2:20—2:40pm Madelaine Cahuas (University of Toronto, Canada), Sarah Wakefield, Yun (Annie) Peng
Investigating the Role of the Community Development Worker in Hamilton's Approach to Reducing Health Inequities
- 2:40—3:00pm Robert Stock (University of Winnipeg, Canada)
"The Healer: in the White Man's Grave: Representation of African Health Issues on Colonial-Era Missionary Postcards

Session 21: *Primary Health Care*

- 1:00—3:00pm Heritage Room Chair: Mark Skinner
- 1:00—1:20pm Anne Gaglioti (University of Iowa, U.S.A.), Kevin Matthews
The Marriage of Health Geography and Academic Family Medicine
- 1:20—1:40pm Soumya Mazumdar (Australian National University, Australia)
Bespoke Geographies for Evaluating Primary Care Services in New South Wales, Australia
- 1:40—2:00pm Joe Simanis (University of Illinois at Urbana-Champaign, U.S.A.), Sara McLafferty
Increasing Spatial Concentration of Primary Care Physicians in Metropolitan Chicago: Implications for Inequalities in Spatial Access to Care
- 2:00—2:20pm Catherine Holtz (University of Western Ontario; Children's Health Research Institute, Canada), Jason Gilliland, Amardeep Thind, Piotr Wilk, Karen Campbell
Neighbourhood Variation and Inequity of Primary Health Service Use by a Cohort of Mothers from London-Middlesex, Ontario
- 2:20—2:40pm Magali Coldefy (Institute for Research and Documentation in Health Economics, France), Véronique Lucas-Gabrielli
Measuring Accessibility to Primary Care in France: Toward an Integrated Model

Session 21: Primary Health Care (cont') [Tuesday]
2:40—3:00pm Pat M. Neuwelt (The University of Auckland, New Zealand),
TeKupengaHaoura Maori, Robin A. Kearns
*The Place Of The Receptionist And Waiting Room: Researching The
Space Between Community And Consultation*

Afternoon Break 3:00—3:20pm *Lincoln Room*

Session 22: Food Programs and Policy

3:20—4:40pm Room 103AB Chair: Denise Goodwin

3:20—3:40pm Jana Fried (University of Western Ontario, Canada), Veloshnee
Govender, Susan Cleary, Steven Birch, Natsayi Chimbindi, Vanessa
Daries
*"It Helps Me to Buy Food in the House" The Role of Disability Grants for
Access and Adherence to Antiretroviral Therapy and Tuberculosis
Treatment in South Africa*

3:40—4:00pm Keumseok Koh (Michigan State University, U.S.A.)
*Effect of State's Responsiveness to Adult Obesity in the United States:
Evidence from State-Based Obesity Interventions using a Quasi-
Experimental Approach*

4:00—4:20pm Richard Sadler (University of Western Ontario, Canada)
Behavioral and Structural Policy Interventions in Food Systems Planning

4:20—4:40pm Alisa Shockley (Temple University, U.S.A.)
Food Access in Local Food Retail Stores in Philadelphia

Session 23: Violence and Health Geography

3:20—5:00pm Room 104AB Chair: Fiona Mapp

3:20—3:40pm Geoffrey DeVerteuil (University of Southampton, United Kingdom)
Structural Violence and Health Geography

3:40—4:00pm Sandra Bogar (Medical College of Wisconsin, U.S.A.)
Green Space, Violence and Crime: A Systematic Review

4:00—4:20pm Addae Boateng Adu-Gyamfi (University of Cape Coast, Ghana)
*Suffering in Silence: Health Implications of Domestic Violence Against
Men in Rural Communities in the Komenda-Edina-Eguafo-Abrem
District, Ghana*

4:20—4:40pm Robert Lipton (University of Michigan), Jason Goldstick
*Violence, Alcohol Outlets and Drug Markets in Boston, Modeling Spatial
Adjacency*

Session 23: *Violence and Health Geography (cont')* [Tuesday]

4:40—5:00pm Claire Thompson (London School of Hygiene & Tropical Medicine, United Kingdom), Daniel Lewis, Stephanie Taylor, Steven Cummins
East London Resident's Views of Olympic Securitization after London 2012: Initial Qualitative Findings from the ORiEL Study

Session 24: *Water-borne Diseases*

3:20—5:00pm Room 106 Chair: Margaret Carrel

3:20—3:40pm Thomas Kistemann (Bonn University, Germany), Daniel Koch
A Weather-Based Prediction Model for Food and Waterborne Diseases in Germany

3:40—4:00pm Izabella Lecka (University of Warsaw, Poland)
Water and Water-Borne Diseases in Africa and Asia

4:00—4:20pm Raheem Usman Adebimpe (University of Ilorin, Nigeria)
Adaptation to Flood Induced Childhood Diarrhea by Mothers around Urbanized Drainage Basins of Ilorin, Nigeria

4:20—4:40pm Young Ae You (International Vaccine Institute, South Korea), Mohammad Ali, Suman Kanungo, Binod Sah, Byomkesh Manna, Mahesh Puri, G. Balakrish Nair, Sujit Kumar Bhattacharya, Jacqueline L. Deen, Anna Lena Lopez, Thomas F. Wierzba, John Clemens, Dipika Sur
A John Snow Map of Cholera in Eastern Kolkata

4:40—5:00pm Sarah L. Hession (Michigan State University, U.S.A.), Nathan Torbick, Elijah W. Stommel
Using Remotely-Sensed Water Quality Metrics to Model ALS Disease Cluster Membership

Session 25: *Health Disparities II*

3:20—5:00pm Willy Room Chair: Sara McLafferty

3:20—3:40pm Graham Moon (University of Southampton, United Kingdom), Grant Aitken, Paul Roderick, Simon Fraser, Gill Rowlands
Towards a Geographical Understanding of the Relationship of Functional Literacy and Numeracy to Health Inequalities

3:40—4:00pm Helena Tunstall (University of Edinburgh, United Kingdom), Jamie Pearce, Elizabeth A. Richardson, Richard Mitchell, Esther Rind, Niamh K. Shortt
Residential Mobility and Socio-Spatial Inequalities in Health between Neighbourhoods in Britain: Why do People Move to Unhealthy Areas?

4:00—4:20pm Neil Coffee (University of South Australia, Australia), Tony Lockwood, Catherine Paquet, Natasha Howard, Mark Daniel
Relative Property Value Wealth as an SES-Health Indicator

Session 25: *Health Disparities II (cont')* [Tuesday]

- 4:20—4:40pm Dan Harrington (University of Toronto, Canada), Kathi Wilson, Mark W. Rosenberg, Scott Bell
Waiting for Specialist Care: What are the Impacts on Patient's Lives? Are they Equitable?
- 4:40—5:00pm Oliver Gruebner (University of Bern, Switzerland), Jonathan Sachs, Tobia Lakes, Md. Mobarak Hossain Khan, Patrick Hostert
Identifying Health Disparities from Space? Mapping Recent Growth of Slums in the Megacity of Dhaka, 2006 to 2010

Session 26: *Voluntarism and Telephone Triage – Health Care Integration*

- 3:20—5:20pm Heritage Room Chair: Valorie A. Crooks
- 3:20—3:40pm Mark Skinner (Trent University, Canada), Alun Joseph, Rachel Herron
Placing Voluntarism within Public Discourse on Local Healthcare Integration
- 3:40—4:00pm Louise Ackers (University of Liverpool, United Kingdom), James Ackers-Johnson
Professional Mobile Voluntarism and International Development: The Critical Role of Relationships and Co-Presence
- 4:00—4:20pm Rachel V. Herron (Queen's University, Canada), Mark W. Rosenberg
Complex Geographies of Voluntarism in Caring for Persons with Alzheimer's Disease
- 4:20—4:40pm Edward Griffin (University of Canterbury; New Zealand and Ministry of Health, New Zealand), Simon Kingham, Roy Costilla
Methods to Explain Geographic Variation of Calls to a Free-Dial, Telephone Triage Line
- 4:40—5:00pm Yan Kestens (Université de Montréal, Canada), Benoit Thierry, Basile Chaix
Using GPS to describe Mobility in Health Research: Comparing Activity Locations and Trips obtained from Algorithms with GPS-Prompted Recall Data
- 5:00—5:20pm Ikuho Yamada (University of Tokyo, Japan)
Exploring Spatial Distributions of Medical and Health Expenses using Micro-Scale Geographic Data

Posters

8:30-5:00pm

Lincoln Room

Nelson Veiga Gonçalves(Universidade Federal Rural da Amazônia, Brazil), Alcinês da Silva Sousa, Junior, Alcione Ferreira Pinheiro, Sebastião Aldo S. Valente, Vera Regina M. da Cunha Palácios, Ricardo J.P.S. Guimarães
Environmental Analysis of Chagas disease in Abaetetuba and Barcarena Municipalities, Pará, Brazil

Posters (cont')

[Tuesday]

Nelson Veiga Gonçalves (Universidade Federal Rural da Amazônia, Brazil), Alcinês da Silva Sousa, Junior, Simone Beverly Nascimento Costa, Marcia do Socorro Veiga Gonçalves

Environmental Factors Spacial Analysis of the Malaria Impact in the Belo Monte dam Influence Area, at Pará State, Brazil, in 2010 and 2011

Nelson Veiga Gonçalves (Universidade Federal Rural da Amazônia, Brazil), Alcinês da Silva Sousa, Junior, Márcia do Socorro Veiga Gonçalves, Alcione Ferreira Pinheiro, Cileide G.M. Tavares

Spacial Analysis of Waterborne Diseases and their Risk Factors in One Location of Ananindeua, Para, Brazil

Nelson Veiga Gonçalves (Universidade Federal Rural da Amazonia), Simone Beverly Nascimento da Costa, Márcia do Socorro Veiga Gonçalves, Ricardo J.P.S. Guimarães, Vera Regina M. da Cunha Palácios

Spacial Analysis of the Distribution of Tuberculosis/HIV Coinfection Associated with Socioeconomic Indicators in Castanhal, Pará, Brazil

Koh Keumseok (Michigan Department of Community Health, U.S.A.), Lorraine Cameron
Communicating the Public Health Challenges of Climate Change: A New Framework for Presenting Downscaled Climate Change Projections

Tomasz Lecki (University of Warsaw, Poland), Karolina Kotecka
Successful Career of Bottled Water that is what tells us the Chemical Composition of Water?

Wahida Mejri (SidiDhrif Higher Institute of Touristic Studies, Tunisia)
Geographic Information System (GIS) and Management of a Health Risk in Tunisia: The Case of the Flu Epidemic for 2011-2012 Season

Roland Ngom (Institut National de la Recherche Scientifique, Canada), Pierre Gosselin, Claudia Blais, Louis Rochette
Adaptation to Climate Change in Environmental Health through Primary Prevention: An Applied Example with Green Spaces for Urbanized Regions in The Province of Quebec

Iván J. Ramírez (The New School, U.S.A.), KatrinRudge
ENSO and Society: Physical Dynamics, Disasters and Disease

Alcinês da Silva Sousa. Junior (Universidade Federal Rural da Amazônia, Brazil), Rodrigo da Silva Dias, Vera Regina M. da Cunha Palácios, Fabárcio Aleixo Dias, Nelson Veiga Gonçalves

Leprosy in Three Municipalities of Pará State, Brazil: An Epidemiological and Spatial Perspective

Minh Tran (Emory University), Lance Waller
Effects of Climate and Landscape Fragmentation on Lyme Disease Incidence in the Northeastern United States.

WEDNESDAY, July 10, 2013

[Wednesday]

Continental Breakfast

7:30-8:30am

Lincoln Room

All-day field trip (Depart 8:30am—Return 6:30pm, 8:30pm, 10:30pm)

The Great Lakes of North America collectively represent the largest body of freshwater in the world. Michigan lies within the core of the region and is the only state with shorelines on four of the Great Lakes, specifically Lake Erie, Lake Huron, Lake Michigan, and Lake Superior. As a result, Michigan has the second longest coastline (~3,300 miles) of any state in the United States. Only Alaska, with over 6,000 miles of shoreline has more. The Michigan coastline is quite beautiful, ranging from steep bluffs composed of glacial sediment, rocky beaches, and wide, expansive beaches of fine sand.

In addition to the wonderful beaches in Michigan, a variety of fantastic dune fields line the shore in many places. These landscapes have formed through the interaction of wind and sand to create one of the most dynamic landscapes in the American Middle West. The best developed dune systems occur along the eastern shore of Lake Michigan where wind, sandy beaches are found and prevailing westerly winds blow across the lake. These winds have built dunes up to 150 ft high that line the shoreline for many miles. Research demonstrates that the dunes began to form about 5,000 years ago and have grown and changed episodically since that time. This history is likely related to lake-level fluctuations and variations in storm frequency. We will visit the dunes at Van Buren State Park, which is one of the more accessible of the scenic parks along the coast. This park has a fantastic beach and large dunes that border the entire beach. It is a great place to observe the grandeur of Lake Michigan and the beautiful landscape associated with it.

THURSDAY, July 11, 2013

[Thursday]

Continental Breakfast

7:30-8:30am

Lincoln Room

Plenary Speaker

8:30-9:30am

Auditorium

Gerard Rushton, Professor, Geography, University of Iowa, U.S.A.

Rational Locations of Health Resources

Morning Break

9:30-9:50am

Lincoln Room

Session 27: *Health Care Demand and Access I*

9:50—11:10am

Heritage Room

Chair: Jögen Schweikart

9:50—10:10am

Edward Griffin (University of Canterbury; Ministry of Health, New Zealand)

Population Change and its Effects on Health Service Demand: A Global Issue, A Spatial Problem

- Session 27:** *Health Care Demand and Access I (cont')* [Thursday]
- 10:10—10:30am Paul L. Delamater (Michigan State University, U.S.A.)
The Effects of Unmet Need and Supplier-Induced Demand on Health Care Planning and Regulation
- 10:30—10:50am Oliver Gruebner (University of Bern, Switzerland), Samuel Kipruto, Md. MobarakHossain Khan, Boniface Kiteme, Omari Mzirai, Urs Wiesmann, Michael Epprecht
The Spatial Epidemiology of Health Care: Availability and Affordability at Sub-location Level in Kenya
- 10:50—11:10am Amy B. Curtis (Western Michigan University, U.S.A.), Catherine Brooks, Rajib Paul, Kathleen M. Baker, Raju Chowdhary, Catherine Kothari
Mapping the Relationship between Diabetes Prevalence and Self-Management Education Access: Geographic Clusters of Need in the United States
- Session 28:** *Environmental Health I*
- 9:50—11:30am Room 106 Chair: Jamie Baxter
- 9:50—10:10am Raheem Usman Adebimpe (University of Ilorin, Nigeria)
Environmental Services and Multiple Health Disadvantage in Deprived Urban Neighbourhoods of Ilorin, Nigeria
- 10:10—10:30am Godson Rowland Ana (University of Ibadan, Nigeria), Adele Hemitrope Olowolade, Akinlolu Festus Abimbola, Olusoji Ige
Generator Emissions and the Lung Function Status of Persons Working within Selected Business Premises in Ibadan, Nigeria
- 10:30—10:50am Munazza Fatima (The Islamia University Bahawalpur, Pakistan)
Spatial Analysis of Environmental Health Risks: A Case of District Bahawalpur, Pakistan
- 10:50—11:10am Sarah A. Mason (University of Western Ontario, Canada), Jenna Dixon, Faith Mambulu, Andrea Rishworth, Paul Mkandawire, Isaac N. Luginaah
Science-Policy Boundaries in the Siting Of Biosolid Facilities: A Case Study from Southgate Township, Ontario
- 11:10—11:30am Lauren T. Smith (University of Exeter, United Kingdom), Clive E. Sabel, Luiz Eduardo Oliveira e Cruz de Aragão
Amazonia Drought Conditions: The Impacts on Children's Respiratory Health

Session 29:	<i>HIV/AIDS I</i>	[Thursday]
9:50—11:30am	Room 103AB	Chair: Elizabeth Dowling Root
9:50—10:10am	Joseph R. Oppong (University of North Texas, U.S.A.), Chetan Tiwari, Warankana Ruckthongsook <i>Vulnerable Places and Vulnerable People: The Geography of HIV infection in Harris County, Texas</i>	
10:10—10:30am	Warangkana Ruckthongsook (University of North Texas, U.S.A.), Joseph R. Oppong, Chetan Tiwari <i>Spatiotemporal Variation Of Modes Of Exposure Among Youth HIV/AIDS In Texas 1999-2011</i>	
10:30—10:50am	Leo C. Zulu (Michigan State University, U.S.A.), Ezekiel Kalipeni, Elizabeth Johannes <i>Analysis of Spatiotemporal Patterns of HIV/AIDS Prevalence in Malawi 1994-20 and Potential for Spatial Targeting of Interventions</i>	
10:50—11:10am	Jonathan Amoyaw (University of Western Ontario, Canada) <i>Reducing the Risk of HIV Infections within Marital Relationships: Safer Sex Knowledge, Behaviour, and Attitudes Of Women In Zambia</i>	
11:10—11:30am	Bimal Kanti Paul (Kansas State University, U.S.A.) <i>Knowledge of HIV/AIDS, Transmission, and Prevention Methods in Bangladesh: A Temporal Analysis of BDHS Data</i>	
Session 30:	<i>Migration and Health</i>	
9:50—11:30am	Willy Room	Chair: Kathi Wilson
9:50—10:10am	Lu Wang (Ryerson University, Canada), Min-Jung Kwak <i>Immigration, Health and Transnational Ties: A case Study of Korean Immigrants in Toronto</i>	
10:10—10:30am	K. Bruce Newbold (McMaster University, Canada), Dylan Simone <i>Prevalence and Incidence of Disability amongst Immigrants in Canada</i>	
10:30—10:50am	Melissa Gallina (McMaster University, Canada), Allison Williams <i>Variation in Sense of Place across Immigrant and Canadian-born Groups in Second and Third-Tier Canadian Cities</i>	
10:50—11:10am	Stephanie K. Lu (University of Waterloo, Canada), Susan J. Elliott <i>They Thought I was Just Joking About It: Experiences and Perceptions of Food Allergy in New Canadians from Asia</i>	
11:10—11:30am	Nathaniel Lewis (Dalhousie University, Canada), Kathi Wilson <i>Sexual Health Disparities and Interventions in Gay/MSM Immigrant Men</i>	

Session 31:	<i>Mental Health</i>		[Thursday]
9:50—11:30am	Room 104AB	Chair: Benedict W. Wheeler	
9:50—10:10am	Clive E. Sabel (University of Exeter, United Kingdom), Nick Bearman, Benedict W. Wheeler		
	<i>Mental Health in England: Small-Area Geographies</i>		
10:10—10:30am	Daniel Nutsford (University of Canterbury, New Zealand), Amber L. Pearson, Simon Kingham		
	<i>Urban Green Space: Does it Influence our Mental Health?</i>		
10:30—10:50am	Amber L. Pearson (University of Otago, New Zealand), Vivienne Ivory		
	<i>The Relationship between Neighbourhood Social Fragmentation and Three Measures of Mental Health: Self-Rated Depression, Calmness and MCS-12 among Adults in New Zealand</i>		
10:50—11:10am	Kate Lester (University of North Texas, U.S.A.)		
	<i>Using the Collaborative Psychiatric Epidemiology Surveys to Build a Neighborhood-Scale Risk Index for Mental Illness</i>		
11:10—11:30am	Paula Santana (University of Coimbra, Portugal), Cláudia Costa, Graça Cardoso		
	<i>The Risk of Dying by Mental Health in the Context of a Financial Crisis: The Case of Portugal</i>		
Session 32:	<i>Earthquake Recovery in Christchurch, New Zealand</i>		
11:40—12:30pm	Lincoln Room	Chair: David Conradson	
11:40—12:00pm	Daniel Hogg (University of Canterbury, New Zealand), Simon Kingham, Malcolm Campbell, Tom Wilson, Michael Ardagh		
	<i>Geographical Variation in the Health Impacts of Earthquake in Christchurch, New Zealand</i>		
12:00—12:20pm	David Conradson (University of Canterbury, New Zealand)		
	<i>Subjective Well-being and Place Attachment: Finding a New (Sense of) Home in a Post-Disaster City</i>		
12:20—12:30pm	Vivienne Ivory (University of Otago, New Zealand)		
	<i>Public Health Implications of Changing Neighbourhood Forms following the Christchurch Earthquakes (Poster)</i>		
<i>Lunch</i>		12:30—1:30pm	<i>Big Ten Room B</i>
<i>Lunch with Susan Elliot and Allison Williams</i>		12:30-1:00pm	<i>Big Ten Room C</i>
<i>Ashgate Series 'Geographies of Health'</i>			
<i>IGU Meeting Health and Environment</i>		12:30—1:30pm	<i>VISTA Room</i>

- Session 33: *Health Care Demand and Access II* [Thursday]**
 1:30—2:50pm Heritage Room Chair: Amy Daniel Lewis
- 1:30—1:50am JögenSchweikart (Beuth University of Applied Sciences Berlin, Germany)
Influence of Socio-Economic Conditions on the Location of Outpatient Medical Services in an Urban Environment using the Example of Berlin
- 1:50—2:10am Valerie Milne (University of Otago, New Zealand), Andrew Harrison, Robin Kearns
Connecting the Distribution of Health Resources and Access to Rheumatology Care for Patient with Inflammatory Arthritis in Wellington, New Zealand
- 2:10—2:30pm Véronique Lucas-Gabrielli (Institute for Research and Information in Health Economics, France), Pierre Coldefy
Access to Health Care in France: How do Patient Characteristics and Geographical Accessibility Interact?
- 2:30—2:50pm Anne-Cecile Hoyez (University of Rennes, France), Sébastien Fleuret, Clélia Gasquet-Blanchard, AnaïkPian
Immigration and Health: Analysing Local Variations in Healthcare Access for Immigrants in France
- Session 34 *Vulnerability and Health Geography***
 1:30-3:10pm Room 106 Chair: Iván J. Ramírez
- 1:30—1:50pm Mengzhu Fu (The University of Auckland, New Zealand), Daniel Exeter, Anneka Anderson
Rethinking Deprivation: Giving Social Justice a Better Chance
- 1:50—2:10pm Danae Daugherty (University of North Texas, U.S.A.), Joseph R. Oppong, ChetanTiwari
The Geography of Disabled Populations in Texas Counties and their Vulnerability in Natural Disasters
- 2:10—2:30pm Kate Lester (University of North Texas, U.S.A.)
Vulnerable People and Places in the Mental Health Geography Literature
- 2:30—2:50pm Tor H. Oiamo (Western University, Canada), Isaac N. Luginaah, Joy Parr, Alice Grgicak-Mannion, XiaohongXu, Hanna Moah, Colin Novak
Mind over Body?: Risk Perceptions and Stakeholder Attitudes as Moderators of Traffic Impacts on Community Health
- 2:50—3:10pm Marilyn O'Hara Ruiz (University of Illinois, U.S.A.), Arun Sharma
Trends, Challenges and Opportunities for Health Applications of Geographic Information Science in India: a Review

Session 35: HIV/AIDS II [Thursday]

1:30—3:10pm Room 103AB Chair: Joseph R. Oppong

1:30—1:50pm Poojitha Kondabolu (University of Connecticut, U.S.A.),
VandanaWadhwa
AIDS and Aid--A Sustainable Option? Lessons from PEPFAR-I, Uganda

1:50—2:10pm Jennifer L. Alexander (University of Texas at Austin, U.S.A.)
*HIV/AIDS and Co-Factors in Southern Africa: A Statistical and Spatial
Analysis*

2:10—2:30pm Fatou Maria Drame (Gaston Berger University, Senegal)
From Individual to Contextual Vulnerability to HIV/AIDS in Senegal

2:30—2:50pm Samantha E. Heuwagen (University of South Florida, U.S.A.)
Reproductive Rights in Argentina

2:50—3:10pm Mara Hedrich (University of North Texas, U.S.A.), Joseph Oppong,
ChetanTiwari
Wealth Gap-Health Gap: Impact on HIV/AIDS in Texas

Session 36: Indigenous Populations, Migration and Health

1:30—3:10pm Willy Room Chair: Bruce Newbold

1:30—1:50pm Marcie Snyder (University of Toronto Ontario, Canada), Kathi Wilson
*I'm So Used to Moving All My Life: Understanding Urban Aboriginal
People's Experiences of Mobility and Health*

1:50—2:10pm Kathi Wilson (University of Toronto Mississauga, Canada), Ashley Ning
*A Look through the Eyes of Aboriginal Youth: Using Photovoice to
Understand the Link between Social Support, Social Relationships, and
Health*

2:10—2:30pm Dr. Chikkarangaswamy (University of Mysore, India)
*Ingenious Medicinal Practices of Tribes and Health Sustainability: A Case
Study of Tribes of Chamrajnagar District of Karnataka, India*

2:30—2:50pm Rajendra Subedi (Queens University, Canada), Mark W. Rosenberg
Determinants of Healthy Immigrant Effect

Session 37: Qualitative Health Geography

1:30-3:10pm Room 104AB Chair: Susan J. Elliott

1:30—1:50pm Rick Fenton (Scensor Inc., Canada), Dawn Pollon, Nancy Fenton
Pre-coding in Grounded Theory with Computer-assisted Text Analysis

Session 37: Qualitative Health Geography (cont') [Thursday]

- 1:50—2:10pm Stephanie E. Coen (Queen's University, Canada)
Drawing as Research Method: What can it add to Health Geography's Qualitative Palette?
- 2:10—2:30pm Courtney Donovan (San Francisco State University)
Healing Arts: Military Veterans and the Role of Art in Managing PTSD
- 2:30—2:50pm Nancy Fenton (University of Waterloo, Canada), Rick Fenton, Susan J. Elliott
Exploring Public Opinion of Anaphylaxis in Ontario Public Schools using Social Media
- 2:50—3:10pm Michelle M. Vine (McMaster University, Canada), Susan J. Elliott
Exploring Sociocultural Factors Shaping Secondary Student's Health Eating Choices: A Qualitative Study in Ontario

Afternoon Break 3:10—3:30pm Lincoln Room

Session 38: Health Systems

- 3:30-5:30pm Heritage Room Chair: Mark W. Rosenberg
- 3:30—3:50pm Olatunji Babatola (University of Lagos, Nigeria)
Perception of the National Health Insurance Scheme among the Urban Poor in Lagos, Nigeria: Analysis of its Patterns and Correlates
- 3:50—4:10pm Aminata Niang-Diene (University Cheikh Anta Diop Dakar, Senegal)
Decentralization and Health System Reforms: Stakes and Practices in Senegal
- 4:10—4:30pm Melanie N. Tomintz (Carinthia University of Applied Sciences, Austria), Bernhard Kosar, Victor Garcia-Barrios
How simSALUD Supports Ensuring a Sustainable Health Care System in Austria by Modelling Small Area Health Issues
- 4:30—4:50pm V. Saravanabavan (Madurai Kamaraj University, India)
GIS Approach on Health Care System and Patient's Perception of Primary Health Care Centres—Micro Level Study
- 4:50—5:10pm Pagadala Hariram Anand (Bharathidasan University, India)
Progenitive Healthcare Distribution System in Kumbakonam, India: A GIB Based FAM to Resolve Women's Health-at-Risk Paradox
- 5:10—5:30pm Jacqueline Hellen (Tulane University School of Public Health and Tropical Medicine, U.S.A.), Vandana Wadhwa
To Their Health? The National Rural Health Mission in Action: Case Study, Jodhpur, Rajasthan

- Session 39: *Environmental Health II*** [Thursday]
 3:30-5:30pm Room 106 Chair: Yan Kestens
- 3:30—3:50pm Sarah Wakefield (University of Toronto, Canada), Erika Jerme, Hilary Gibson-Wood
Healthy Public Policy through an Environmental Justice Lens: Examples from Canada
- 3:50—4:10pm Jamie Baxter (Western University, Canada), Chad Walker
Living with Wind Turbines in Ontario: The Roles of Health, Rhetoric Conflict and Community Benefits
- 4:10—4:30pm Sala Senkayi (U.S. Environmental Protection Agency, Region 6, U.S.A.), Melanie L. Sattler
The Importance of Varying Spatial Levels in GIS Analysis of Environmental Epidemiological Data
- 5:00—5:20pm Natalia V. Shartova (Lomonosov Moscow State University, Russia), Svetlana M. Malkhazova, Dmitriy S. Orlov, Tatiana V. Kotova
Spatiotemporal Analysis of Mortality Rate as the Tool for Environmental Monitoring
- 4:50—5:10pm Stefania Bertazzon (University of Calgary, Canada), Rizwan Shahid
Exploring the Association of Neighbourhood Walkability with Childhood Overweight and Obesity Prevalence
- 5:10—5:30pm Raeesa Moolla (University of the Witwatersrand, South Africa), Chris J. Curtis
Health Risk Assessment of BTEX Emissions from Gas Stations in Johannesburg, South Africa
- Session 40: *Medical Tourism***
 3:30-4:50pm 103AB Chair: Louise Ackers
- 3:30—3:50pm Krystyna Adams (Simon Fraser University, Canada), Jeremy Snyder, Valorie A. Crooks, Rory Johnston
Developing a Guideline for Ethical Engagement in Medical Tourism
- 3:50—4:10pm Victoria Casey (Simon Fraser University, Canada), Valorie A. Crooks, Jeremy Snyder, Leigh Turner
You're Dealing with an Emotionally Charged Individual: An Industry Perspective on the Challenges Posed by Medical Tourist's Informal Caregiver-Companions
- 4:10—4:30pm Valorie A. Crooks (Simon Fraser University, Canada), Tony Gatrell
Medical Mobilities: Examining Canadian Medical Tourist's Transnational Care Network

- Session 40: *Medical Tourism (cont')*** **[Thursday]**
 4:30—4:50pm Rory Johnston (Simon Fraser University, Canada), Valorie A. Crooks, Meghann Ormond, Jeremy Snyder
Attracting International Patients to the “One Love” Country: Health Policy Implications of Jamaica’s Medical Tourism Ambitions
- Session 41: *Therapeutic Landscapes***
 3:30-5:30pm Willy Room Chair: Ronan Foley
- 3:30—3:50pm Fiona Mapp (London School of Hygiene & Tropical Medicine, United Kingdom), Martin White, David Ogilvie, Mark Petticrew, Elena Sautkina, Denise Goodwin, Andy Jones, Steven Cummins
Healthy Towns: A Descriptive Overview using the Behaviour Change Wheel to Characterise Interventions
- 3:50—4:10pm Frank Houghton (Limerick Institute of Technology, Ireland)
Edgelands as Therapeutic Micro Landscapes: A Thematic Analysis
- 4:10—4:30pm Rebecca Lovell (University of Exeter Medical School, United Kingdom), Kerry Husk, Chris Cooper, Ruth Garside
A Theory Led-Systematic Review of the Health and Wellbeing Impacts of Participating in Environmental Enhancement and Conservation Activities
- 4:30—4:50pm Jo Cairns-Nagi (Durham University, United Kingdom)
Bonding, Bridging and Division: A Call for a Third Dimension of Social Capital and its Multi-dimensional Impacts on Wellbeing
- 4:50—5:10pm Ronan Foley (National University of Ireland Maynooth, Ireland)
Ephemeral Spaces of Care: Auxiliary War Hospitals as Contingent Spaces of Recovery
- 5:10—5:30pm David Conradson (University of Canterbury, New Zealand)
SPRAHWELL: A New Conceptual Framework for Analyzing Landscapes of Healthcare Provision
- Session 42: *GIS and Quantitative Methods II***
 3:30-5:30pm Room 104AB Chair: Samantha Cockings
- 3:30—3:50pm Daniel J. Exeter (The University of Auckland, New Zealand), Jinfeng Zhao
Constructing Sensible Geographies for Auckland, New Zealand
- 3:50—4:10pm Samantha Cockings (University of Southampton, United Kingdom), David Martin
Spatiotemporal Population Estimates for Health

Session 42: GIS and Quantitative Methods II (cont') [Thursday]

- 4:10—4:30pm Liem T. Tran (University of Tennessee, U.S.A.), Robert V. O'Neill
Hierarchy Theory as a Bridge between Epidemiological Studies and Space-Time GIS
- 4:30—4:50pm Peter Kedron (Ryerson University, Canada), Sam Copeland
Developing an Integrated Understanding of Multi-Dimensional Etiologic and Spatial Exposures
- 4:50—5:10pm Roland Ngom (l'Institut national de santé publique du Québec and l'Institut national de la recherche scientifique, Canada), Alexander Siegmund
Automating the Prediction of the Socioepidemiological Component of Infectious Diseases in Urban Milieus: Statement of an Approach based on Social Ecology and Using Remote Sensing
- 5:10—5:30pm Véronique Bouzaglou (INRS-Centre Eau Terre Environnement, Canada), Erwan Gloaguen, Fateh Chebana, Pierre Gosselin, Diane Bélanger
A Novel Tool for Visualizing and Interpreting Spatio-Temporal Health Data

Banquet Reception 6:30—7:30pm *Huntington Club*

Banquet Dinner 7:30—9:00pm *Huntington Club*

FRIDAY 12 JULY 2013

Session 43: Gender, Care, Work and Health [Friday]

- 8:30-10:10am Willy Room Chair: Allison Williams
Organizer: Allison Williams, Christine Milligan
- 8:30—8:50am Allison Williams (McMaster University, Canada)
Gender, Health and Caregiver Friendly Workplaces: A Synthesis of Caregiver Friendly Workplace Practices
- 8:50—9:10am Rachel Bezner-Kerr (Cornell University, U.S.A.), Emmanuel Chilanga
Community-Based Participatory Nutrition Education, Gender Roles and Child Care in Northern Malawi
- 9:10—9:30am Gillian M. Joseph (University of Guelph, Canada), Alun E. Joseph
Employment and Eldercare: Engaging with Embodied Spaces of Resistance

- Session 43: *Gender, Care, Work and Health (cont')* [Friday]**
 9:30—9:50am Jody Decker (Wilfrid Laurier University Waterloo, Canada), Robin Slawson
Health Challenges for College and University Students Living on Campuses
- 9:50—10:10am Melissa Giesbrecht (Simon Fraser University, Canada), Faye Wolse, Valorie Crooks, Kelli Stajduhar
Understanding how the Socio-Environmental Context Facilitates Resilience among Canadian Palliative Family Caregivers: A Qualitative Case Study
- Session 44: *Place and Health***
 8:30-10:30am Room 106 Chair: Cathleen McAnneny
- 8:30—8:50am Kim Elmore (U.S. Centers for Disease Control & Prevention, U.S.A.)
Integrating Place into Public Health: Geospatial Activities at the US Centers for Disease Control and Prevention (CDC)
- 8:50—9:10am Anne-Cecile Hoyez (University of Rennes, France), Damian Collins, Sebastian Fleuret, Robert Huish
Which Place for Health in Geography? Which Health Geographies? Comparing the Francophone and Anglophone Contexts
- 9:10—9:30am Elizabeth Heller (Urban Ecology Center, U.S.A.), Kirsten Beyer, Amy Kistner, Corey Zetts, Jessica Bizub, Erin Shawgo
The Neighborhood Environmental Education Project: A Promising Public Health Intervention
- 9:30—9:50am Carol Hanchette (University of Louisville, U.S.A.), Margath Walker
Health, Homelessness and Hope in the Aftermath of HOPE VI Revitalization: A Grounded Visualization Approach
- 9:50—10:10am James R. Dunn (McMaster University, Canada)
Health Effects of Public Housing Redevelopment: A Natural Experiment in Toronto's Regent Park
- 10:10—10:30am Neil Hanlon (University of Northern British Columbia, Canada), Martha MacLeod, Trish Reay
Partnering for Primary Health Care Innovation and Sustainability in Traditionally Underserved Areas: The Role of Bricolage

Session 45: *Maternal and Child Health* [Friday]

8:30-10:30am Room 103AB Chair: Ketan Shankardass

8:30—8:50am Godfred Odei Boateng (University of Western Ontario), Mavis Odei Boateng, Emmanuel K. Srofenyoh
Symptomatic Patterns of Near Miss Maternity Cases in Ghana: Assessing Individual and Institutional Factors

8:50—9:10am Jenna Dixon (Western University, Canada), Eric Y. Tenkorang, Isaac N. Luginaah, Vincent Z. Kuuire, Godfred O. Boateng
National Health Insurance Scheme Enrolment and Antenatal Care Among Women in Ghana: Is There Any Relationship?

9:10—9:30am Ketan Shankardass (Wilfrid Laurier University), Patricia O'Campo, Linda Dodds, John Fahey, K.S. Joseph, Julia Morinis, Victoria M. Allen
A Method to Guide Resource Allocation to Address Health Inequalities: The Case of Small-for-Gestational-Age Birth in Nova Scotia

9:30—9:50am Sue C. Grady (Michigan State University, U.S.A.), Libbey Kutch
Evaluation of Perinatal Care Regionalization in Michigan

9:50—10:10am Jennifer Icton (University of South Florida, USA)
Agamben, Bare Life, and Reproductive Biopolitics

10:10—10:30am Clélia Gasquet-Blanchard (The École des Hautes Études en Santé Publique (EHESP), Sorbone Paris Cité, France)
Socio-territorial Inequalities of Health and Pregnancy: Prematurity and Low Birth Weight of Newborns in Three Parisian Hospitals

10:50—12:00pm **Conclusions and Prospects**
Mark W. Rosenberg, Sara McLafferty

Welcome 2015 IMGS

Valarie A. Cooks

Farewells

Lunch 12:00-1:00pm Lincoln Room

Official Closing

ABSTRACTS

Session 1: Blue Space and Health I

The Prominence of Urban Blue Spaces for Health and Well-Being Compared To Urban Green Spaces

Sebastian Völker (University of Bonn, Germany), Thomas Kistemann

Recently new potentially healthy urban open spaces have been suggested by the division of urban open spaces into different area types, like urban green and blue spaces. There has, however, been very little research into blue environments and their benefits for mental well-being. Using the therapeutic landscape concept, our comparative study asked which differences in well-being occur when visiting urban green and blue spaces in high-density areas of the inner city. In Düsseldorf and Cologne, Germany, predominantly green and blue urban spaces were chosen to conduct qualitative semi-standardised interviews (n=111), assessing the mental well-being of visitors. All interviews were entirely transcribed and coded. We used the enhanced therapeutic landscape concept by Völker & Kistemann (2011) for analysis. The attribution of interview codings to the four dimensions of appropriation (physical, symbolic, social, activity space) showed aspects of mental well-being specific for urban blue and green, urban green and urban blue space. We concentrate on the health beneficial aspects of urban blue, not observed in urban green. They covered the contemplation in the physical space dimension, the possibility for orientation, identity and emotional bonds in the symbolic space dimension or dynamic activities in the activity space dimension. The results suggest that urban blue as health promoting factor needs careful consideration in the formation of our cities in the future.

Rotoroa: Transforming a Healthy Island Bluescape - From a Space of Detention to a Site of Sanctuary

Robin Kearns (The University of Auckland, New Zealand), Damian Collins

While theorists have suggested that aquatic environments might have particular restorative potential, there is a dearth of case studies that trace how such a proposition has taken form in particular places. In this paper we examine the case of Rotoroa Island in Auckland's Hauraki Gulf which, for almost a century, was host to a Salvation Army alcohol treatment centre. As treatment ideologies and the role of the third sector have changed, so too has the function of the island. The move away from isolated (and in some respects carceral) institutional treatment saw the Salvation Army centre close in 2005. Then, in 2011, the island was opened to the public as a site for recreation, art, historic remembrance and wildlife rehabilitation. Hence the island's salutogenic history has shifted from bluespace marking isolation to signaling recreation. However, there is no clean break between these social constructions; rather signs and symbols related to the perils of alcohol offer reminders of previous notions of islandness. We draw on landscape observation, archival sources and media coverage to reconstruct the role of bluespace in defining the Rotoroa both as a site of detention and a contemporary sanctuary. In so doing we follow Volker and Kistemann's (2011) call to identify the

benefits of bluespace for well-being with regard to perception and preference, landscape design, emotions, and restoration and recreation.

Snámh: Affective Body-Water Engagements in Healthy Blue Space

Ronan Foley (National University of Ireland Maynooth, Ireland)

Drawing from recent work on healthy blue space and the affective histories of swimming (Parr, 2012), this paper explores a set of themes related to the social, cultural and embodied dimensions of swimming spaces. Using a mixed methods approach, the ongoing significance of swimming to physical and mental health is explored across a range of empirical Irish sites, both coastal and inland. Three specific aspects of body-water engagements are explored with a focus respectively on place, health and affect. Swimming places are culturally produced by the people who use those spaces, their complex and differentiated practices and the individual therapeutic stories associated with those spaces, wherein encounter, community and memory all have varying roles. A more explicit health focus is evident in the mixed sets of bodies who engage within that space in a range of pursuits, where exercise, fresh air, health and safety all promote a set of potentially therapeutic blue space encounters. Finally, the affective nature of body-water engagement provides a more emotional take on what it feels like to be above, on, in and under the water. This is reflected in more positive dimensions of illness recovery and affective therapeutic development across the life-course. The on-going appeal of the sea must be critically tempered by parallel non-healthy encounters and outcomes (Collins and Kearns, 2007) yet the ongoing appeal of blue space to human physical and mental health is traceable across a range of locations, performances and inhabitations that may potentially inform wider public health policy.

The Blue Ashram: A Case Study of Sivananda Ashram Yoga Retreat, Paradise Island, Bahamas

Allison Williams (McMaster University)

Using a range of qualitative methods, this case study employs the therapeutic landscape concept in examining how water and sky are abstracted, shaped, commodified and inhabited on the Sivananda Ashram Yoga Retreat, located on Paradise Island, Bahamas. The Sivananda Ashram Yoga Retreat offers specialized yoga training, as well as yoga vacation and residential study programs. In addition to housing, a Wellbeing Centre offers a range of therapeutic services. A wide selection of courses are offered regularly, including: Ayurveda lifestyle and nutrition, self-discovery and spirituality, healing arts, meditation, and social activism and the environment. Surrounded by calm sea and blue sky for the majority of the year, this Ashram characterizes itself as a place of retreat and rehabilitation in order to have visitors experience a range of possibly therapeutic outcomes. Simultaneously, the Ashram mandate and -healthful- philosophy is in constant tension with the often -unhealthy- tourism industry that surrounds it in every direction.

Blue-Green Spaces and their Effect on Health and Well-being: Diversification, Periodicity and Borders Matter

Charis Lengen (Clenia Ambulatorium Wetzikon, Switzerland), Christian Timm, Martin E. Keck, Thomas Kistemann

Völker and Kistemann (2011) defined “blue space” as “all visible surface waters in a space as an analogy to green space”. We address the question of which spaces mentally ill patients associate with health and well-being. The associations of 20 inpatients to the question “What is your place?” were discussed. However, taking notice of the blue versus green space approach, our results do not encourage the bisecting of blue and green spaces. If we acknowledge the effect of rocks and boulders in the mountains, sand and cliffs at the coast, as well as the effect of snow, we have to recognise that “grey” and “white” spaces also exist. Despite this, the participants mentioned the weather, the solar cycle, special times in their daily and yearly routine as having an impact on their mental and physical space experiences. Additionally, the participants often mentioned borders such as coastline, forest boundaries and tree groups, as well as the sky-earth, sky-sea or sky-mountain boundary. These results confirm our hypothesis that favourite places are often set along borderlines. Similarly to the borderlines of the Mandelbrot set, borderline zones are transitions and arouse our attention, interest and mindfulness. Humans can both breathe free and have an option for harbour and protection. Recognising the attention-restoration theory, these observations may contribute to a better understanding of stress reduction processes through open spaces. Processes of cognition and emotion, such as symbolism, self-reflection, distance to distress and feelings of freedom and satisfaction were activated through such therapeutic landscape borderlines.

Session 2: Infectious Diseases I

The "One Health" Movement: Something New, Or Something Old?

Jonathan D. Mayer (University of Washington, U.S.A.)

Research in the past decade has revealed that between 60 and 75 percent of new and emerging diseases in the human population is due to species transfer. Understanding zoonoses has long been a theme in the health sciences, including "medical geography" or "epidemiologic geography." However, there has been little integration of veterinary epidemiology and human epidemiology. As a result, a new trend of studying "one health" has come more into the limelight. While some of the concepts of this movement are old, it has resulted in close collaboration of the veterinarians and veterinary epidemiologists with those who study human disease. Meanwhile, the Ecolhealth movement has been complementary. I argue that while much of the component knowledge is not novel, the understanding that has come from this unity has begun to result in novel behavioral, environmental, and epidemiologic knowledge. One Health will become even more important as we attempt to understand the environmental influences of species transfer and emerging infections in general.

The 2009-2010 H1N1 Vaccination Campaign through the Lense of Media Information: A Methodological Approach

Emmanuel Eliot (University of Rouen, France), Philippe Jeanne, Marion Amalric, Clélia Gasquet, Laurence Joselin, Nadia Lepastourel, Florent Baldini, Emmanuel Bonnet, Eric Daude

The 2009-2010 Swine flu (H1N1) epidemic was one of the latest "health crisis". The vaccination campaigns that have been conducted by most of the world country officials can be considered as a major "moment" for the crisis management, in which government policies, market collusions, vaccine uses and perceptions of risk became objects of debate in public opinion. Media sphere played a major role, especially by spreading knowledge and highlighting controversies. Our analysis is based on a bilingual corpus (French and English) of 1,465 newspaper articles from different sources, coverages and types. We use a computer assisted text analysis methodology in order to examine and compare the spatio-temporal dynamic of the media information as well as the discourses and perceptions associated with the crisis management. In this presentation, we will focus on two points. Firstly, we will present the methodology used for tracing and comparing the different waves of information diffusion. Secondly, we will compare the discursive configurations and the socially constructed spaces of the vaccination campaign.

Evolution of Respiratory Syncytial Virus (RSV) Over Space and Time in Rural Filipino Children

Elisabeth Dowling Root (University of Colorado at Boulder, U.S.A.), James Gaensbauer, Eric A. F. Simoes

Very little is known about how spatial distance influences viral evolution or what local spatio-temporal patterns of evolution may look like. In this study, we use data from a randomized controlled efficacy trial of an 11-valent pneumococcal vaccine (PCV) undertaken in the Bohol province of the Philippines from July 2000 to December 2004. Viral culture and multiplex PCR were done on nasal wash specimens, collected from 1 in 3 children hospitalized during the vaccine trial. We performed a nested phylogeographic analysis of respiratory syncytial virus (RSV) positive samples and classified virus samples into distinct subgroups. The geographic coordinates of household of residence were obtained for study participants using GPS and used to link phylogenetic results to the geographic location of each patient. We then performed a retrospective space-time scan statistic to identify the spatial location and temporal extent of clusters of each subgroup and visualized geographic patterns using GIS. The spatio-temporal scan statistic identified several unique space-time clusters of RSV-A and RSV-B subgroups. The results show that RSV subgroups evolve in distinct localized areas at different points in time, suggesting that spatial distance and locational characteristics play an important role in viral evolution. Spatial analysis and geovisualization is the first step in exploring the effects of distance on viral evolution and potential ecological pressures that contribute to evolutionary pressures.

Will Disparities in Access to Vaccination Lead to Inequalities in Rotavirus among New Zealand Children?

Chris Bowie (University of Canterbury, New Zealand), Edward Griffin, Simon Kingham

This study builds on previous New Zealand research to examine the burden of rotavirus among young children. Gastroenteritis infections are the most common cause of morbidity among children worldwide with rotavirus causing the most severe diarrhoea and subsequent dehydration compared to diarrhoeal illness caused by other enteric pathogens. An estimated 90% of children will experience rotaviral infection by 3 years of age regardless of their race, level of hygiene, sanitation, access to clean water or socio-economic status. Since 2010 two vaccines for rotavirus have been made available however in New Zealand this comes at significant cost to families as they are not a part of the national immunization schedule. We examined long-term patterns in rotaviral and all-cause gastroenteritis hospitalisations to determine if differences in access to vaccines and healthcare have created social and geographic inequalities in rotaviral infection which previously did not exist.

Mapping a Difference: Strengthening the Global Campaign for Polio Eradication through Subnational Mapping

Christopher Dickey (Community Systems Foundation, U.S.A.), Haydee Izaguirre, Jeeveeta Soobarah Agnihotri, Arun Kapuria, Kris Oswalt

The Global Campaign for Polio Eradication has faced significant operational challenges, much of it due to a lack of accurate geographical data; among these challenges are densely populated urban areas, hard to reach rural areas and areas of insecurity. Community Systems Foundation has played a crucial role in addressing these challenges by strengthening communication for polio eradication, alongside UNICEF, through the creation of PolioInfo, an information dissemination and monitoring system developed to track Polio vaccination efforts in the at-risk countries. This system allows public health officials the ability to see, in near real-time, the areas that need resources and information services the most. Due to its advanced mapping features and emphasis on subnational maps PolioInfo profiles have been used by state and district level field staff to plan polio communications and monitor vaccination coverage. The use of these technologies, including SMS messaging, have placed a strong emphasis on data driven work. In Nigeria, these profiles have been adapted to help UNICEF identify clusters of missed children in “high risk” areas. After every IPD (Immunization Plus Day), data on vaccination coverage is collected, tabulated, mapped and then used to generate over 200 municipal level profiles and 11 state profiles. Using PolioInfo as a departure point, our presentation will discuss the increasing role of Information Communication Technology (ICT) in changing the way we address today’s most pressing global health issues and how they can be used to improve infrastructure.

Medico-Geographical Evaluation of Naturally Determined Diseases in Russia

Svetlana M. Malkhazova (Moscow State University, Russia), Natalia V. Shartova, Dmitry S. Orlov, Varvara A. Mironova, Tatiana V. Kotova Lomonosov

The present study represents the first attempt of aggregation and public presentation of diverse and multifaceted information about naturally determined diseases of Russia. The layout of the medico-geographical Atlas of Russia “Natural-focal diseases” that has been prepared constitutes the sole cartographical account on distribution of such diseases for the whole territory of Russia. The Atlas represents the modern situation as well as historical outlook. Maps of natural and socioeconomic determinants of diseases, including maps of more than 80 areals of disease vectors and vertebrate hosts, allow to characterize in detail peculiarities and actual conditions of the environment in which parasitic systems evolve and exist. A series of analytical, complex and synthetic maps reflect morbidity at national and regional levels over the last 15 years. There are maps of long-term annual average morbidity for certain infections, maps of long-term morbidity dynamics and nozological profiles of regions, which allow to provide in-depth analysis of the situation in each of 83 federal subjects of Russia. The level of epidemic hazard of various territories in the respect of naturally determined diseases is reflected in a synthetic medico-geographical map that shows the risk of a disease

manifestation in a given region. The final chapter is intended for analyzing public health territorial organization in order to provide disease prophylaxis and elimination measures. The presentation discusses the opportunities provided by the Atlas for evaluation of epidemic situation and sanitary monitoring of disease transmission.

Session 3: Chronic Diseases I

Addressing the Oral Health Care Needs of Rural Populations: Maine as a Test Case

Cathleen McAnney (University of Maine, U.S.A.)

Over the last several years the ability of rural residents to access health care of all types has been limited. In response to this states have come up with a variety of strategies to address the health care needs of this population. For instance, in Maine, health care centers have been placed in rural communities. Missing from this model is the ability to provide oral health care. Maine like many other states has addressed these issues with several strategies. Children have been provided with sealants and fluoride treatment in schools, and placing dentists in some community health centers. However, the distribution of dentists and other oral health professionals reflects the population density of Maine with the vast majority of these services available in “urban” centers. Far northern Androscoggin County has a dentist to patient ratio of 1:5,000 compared to southern Maine of 1:2500 and a national rate of 1:1600. This translates into months of waiting for appointments and sometimes a 200 mile round trip, challenging for elders and poor families. In 2012, the state made it possible for Dental Hygienists to open practices that are independent of dentists. These practitioners can perform basic care such as cleanings and fillings and of course fluoride and sealants. This paper examines whether this change in law has led to a change in the availability of services in rural areas and compares the situation in Maine to other states with large rural service areas.

The Geography of Diabetes Among General Adult Population in Bangladesh: Recent Evidence from a Cross-Sectional Survey

Md. Mobarak Hossain Khan (University of Bielefeld, Germany), Oliver Gruebner, Patrick Hostert, Alexander Krämer

Background and objectives: The rising prevalence of diabetes is a global concern for healthcare services. Particularly it is a growing problem in developing countries including rapidly urbanising Bangladesh. Since large-scale nationally representative studies lack the geographical perspective of diabetes, we aimed to analyse the data of general population aged 35-49 years (women) and 35-54 years (men) in Bangladesh. Specifically we hypothesized that there are significant geographical variations of diabetes between urban and rural areas at both national and divisional levels in Bangladesh. *Methodology:* The nationally representative data of the Bangladesh Demographic and Health Survey (BDHS) 2011 were used. We define diabetes as having either a fasting plasma glucose level above 7.0 mmol/L or medication for diabetes at the time of survey. Geographical variation of diabetes was analysed by urban versus rural areas at both national and divisional level. Multivariable regression analyses were also performed. *Results:* The overall prevalence of diabetes was 10.2% among women and 8.9% among men. The prevalence was significantly higher in urban than rural areas for both sexes, with highest prevalence in large cities. The prevalence also differed significantly at the divisional level. Multivariable analyses adjusted for various

potential factors also indicated significant spatial variation of diabetes in Bangladesh. *Conclusion:* A remarkable geographical variation of diabetes among general adults in Bangladesh underscores the necessity of area-specific public health strategies. Particularly more health-related interventions focusing on lifestyle and nutritional factors should be developed for rapidly urbanising large cities. Epidemiological studies to find the plausible causes of geographical variation should also be conducted.

Using Spatial Regression to Estimate the Effect of Neighborhood Education and Income on Overweight/Obesity, Type 2 Diabetes, and Smoking

Kelsey N. McDonald (University of Minnesota, U.S.A.), Steven M. Manson

Overweight/obesity, type 2 diabetes, and smoking are major public health problems which may benefit from neighborhood-level interventions. Spatial dependence between neighborhoods (i.e. spatial autocorrelation) is often ignored in neighborhood effects studies, despite its potential to bias estimates and affect estimate precision. Spatial lag models account for spatial dependence and allow estimation of spillover effects, but they usually require all data to be at the area level -a problem for multilevel analyses with individual and neighborhood data. We estimated the effect of increasing neighborhood education and income separately on overweight/obesity, type 2 diabetes, and current smoking in San Francisco adults surveyed in the 2005, 2007, and 2009 California Health Interview Surveys (CHIS) (n=2,511). We linked individual-level covariate and outcome data from CHIS with census-tract level education and income data from the American Community Survey (2006-2010) (n=194). Spatial mixed models were approximated by first running OLS models with individual-level covariates, and then using the predicted values in the spatial models. We found significant negative effects of increasing neighborhood education and income on type 2 diabetes and smoking, but not on overweight/obesity. Accounting for spatial dependence slightly reduced significant effect estimates and standard errors but did not change the magnitude, direction, or significance of estimates as compared to a non-spatial mixed model. The spatial lag models also provided evidence of spillover effects.

The Ecology of an Epidemic: Chronic Kidney Disease in Nicaragua

Sophia Giebultowicz (University of North Carolina-Chapel Hill, U.S.A.), Michael Emch, Douglas Morgan

Public awareness of a Chronic Kidney Disease (CKD) epidemic in Central America has recently increased, yet knowledge regarding the regional origins of CKD remains limited. Supported by initial volunteer-based studies, a major hypothesis includes agricultural labor and work conditions as the dominant pathways to disease occurrence. Potential exposure to pesticides and other environmental nephrotoxins could also affect not only laborers, but also populations residing within areas close to intense agricultural cultivation. We investigate CKD in western Nicaragua, where reported rates of CKD are significantly higher than expected. Furthermore, we improve upon solely population-based studies by considering how environment, behavior, and culture interact with the study population to cause the observed prevalence.

Participants were selected from a spatially-referenced health and demographic surveillance system in Leon, the second-largest city in Nicaragua. Using demographic and behavioral data coupled with remote sensing and GIS, we explore the relationships between locations of CKD cases and the surrounding environment. We also consider individual-level risk factors and area-level effects through multilevel analysis. Results indicate significant variation in the spatial patterns of CKD across rural and urban areas, with concentrations linked to residential proximity to agriculture. Furthermore, occupational history and individual behaviors are also predictive of one's risk for developing CKD, which poses a particularly significant public health threat in Central America's poorest nation.

Inequalities in Chronic Kidney Disease: Using Synthetic Multilevel Modelling to Derive Sources of Unmet Need

Grant Aitken (University of Southampton, United Kingdom), Graham Moon, Paul Roderick

The average prevalence of Chronic Kidney Disease (CKD) has been reported at 11% in the U.S. and Europe. In the U.S. the annual 2010 cost of treatment for end stage renal disease is expected to reach \$29bn (£17bn) and in China alone the number of people with CKD is estimated to be 120 million. CKD is thus a significant cause for morbidity and mortality among adult populations and also a major stress on health care budgets. Major risk factors for CKD include age, sex, diabetes, obesity, hypertension, smoking and socio-economic status (SES). As populations age and levels of obesity rise, the demand for treatment and Renal Replacement Therapy (RRT) is likely to increase.

This paper examines CKD prevalence in England using newly available data on biomarkers for CKD collected as part of the 2003-05 and 2009-10 Health Surveys for England (HSfE). An examination of the relationships between CKD and a range of covariates has been carried out using multilevel modelling, with outcome measures derived using the CKDEPI and MDRD mathematical equations commonly used to measure CKD severity in adults.

Results indicate strong associations between CKD and certain health/clinical measurement characteristics, even when adjusting for confounding and mediating variables. The CKDEPI equation indicates increased prevalence in older ages compared with MDRD but reduced prevalence at younger and middle age. Gender differences are lower for CKDEPI. Minimal variation of CKD by SES or deprivation is observed using either equation. Analyses show no evidence of significant regional level variation of CKD throughout England.

Geographic Modeling of Colorectal Cancer Progression in Iowa

Kevin Matthews (University of Iowa, U.S.A.), Anne Gaglioti, Barcey Levy, Gerard Rushton

Colorectal cancer is a preventable and curable disease. Yet, it is still commonly diagnosed and many people die from it every year. A primary reason for this discrepancy is that people are not following recommended guidelines such as engaging in healthy behaviors or being screened. One strategy to decrease these disease rates is

to identify the communities with the highest rates of disease and then use maps to communicate the disease risk to individuals in those communities. Current methods for mapping chronic disease result in maps that do not tell the entire story. These maps treat incidence, late-stage incidence or mortality as independent measures. However, a path-dependent relationship among progressive disease states is present wherein the probability of a CRC death is conditional on the severity of the disease at diagnosis. For this analysis, I followed each CRC case from their time of diagnosis until death (or end of study). This longitudinal study included all persons in Iowa diagnosed with colorectal cancer from 1997 to 2004. The geographic unit defining a small area is the spatially adaptive filter. Age-standardized incidence, late-stage, and mortality odds ratios were calculated for each small area using logistic regression. Each small area was classified according to whether it was significantly different from state-level rates. The resulting classification is a finite set of eight categories, each representing how the disease progressed. An interpretation of each category will serve as hypotheses for future analysis.

Session 4: Spatial Behavior and Health

Multi-Place Perspective for Improved Environmental Exposure Assessment: An Analysis of Individual Spatial Behavior in the RECORD Cohort Study

Camille Perchoux (Montreal University, Canada), Yan Kestens, Basile Chaix

Previous studies in health research have started to account for individual daily mobility and places regularly visited in the determination of environmental exposure. In order to overcome this so-called residential trap, our study examines the relationships between individual demographics, environmental features and spatial behavior. Using a sample of 2114 individuals from the Paris metropolitan area, the RECORD Cohort Study relies on an electronic survey of individual's regular activity locations and participant's perceived residential neighborhood to assess individual space-time behaviors and related exposures. Using spatial analysis methods and geographic information system, a set of indicators was created to qualify and quantify individual's space-time patterns of mobility. Principal component analysis and cluster analysis were applied to derive a typology of spatial behavior. Finally, multilevel linear regressions were conducted to determine the individual characteristics associated with each component of spatial behavior. The cluster analysis identified four contrasted types of mobility patterns: (1) large activity space with people traveling far from their residential neighborhood, (2) activity space of intermediate size with few activity places, (3) activity space of intermediate size with numerous activity places frequently visited, (4) small activity space with few activity places clustered in the residential neighborhood. Our results suggest that the location of the residence, transportation modes used, individual perception of mobility behavior, and educational status are associated with the components of spatial behavior. Our study suggests that there is a high social and spatial variability in individual spatial behavior, which should be accounted for in the assessment of environmental exposure.

Integrating Activity Spaces in Health Research: Comparing Activity Locations obtained from the VERITAS Activity Space Questionnaire with 7-day GPS Tracking and Prompted Recall

Yan Kestens (Montreal University, Canada), Benoit Thierry, Martine Shareck, Basile Chaix

Activity spaces are increasingly considered in health and place research, allowing assessment of multiple exposures. Activity space data can be collected in various ways. Questionnaires gather regular destinations, whereas GPS devices monitor continuous mobility over shorter periods. The objective of this study was to assess spatial congruence of activity locations obtained from VERITAS "a map-based questionnaire with a focus on regular destinations", and locations derived from GPS tracking and prompted recall. We analysed data from 200 RECORD study participants who completed the VERITAS questionnaire, wore a GPS for 7 days, and completed a GPS-prompted recall survey. We compiled measures of distance between VERITAS and GPS detected/recalled locations and compared activity space convex hulls of both sets. The

median distance between a location in one and the other dataset was 30 and 76 m for home and workplace respectively. 70% of other GPS destinations were within 120 meters of a VERITAS destination. Some 60% of participants had at least 35% of their GPS track within the VERITAS convex hull, one out of four over 90%. The median proportion of GPS convex hull falling within VERITAS convex hull was 47.23%. Finally, 45% of participants had a GPS/VERITAS convex hull ratio smaller than one and 30% a ratio above 4. With this study, we addressed the relative contribution of both data collection methods, and allowed quality control and improvement of data collection in the RECORD study.

Movers and Stayers: The Geography of Residential Mobility and CVD Hospitalizations in Auckland, New Zealand

Daniel J. Exeter (The University of Auckland, New Zealand), Clive E. Sabel, Grant Hanham, Pip Forer, Sue Wells

Numerous studies from New Zealand and elsewhere have demonstrated that residents living in the most disadvantaged communities experience a disproportionate burden of poor health conditions. Many of the studies that draw these conclusions use cross-sectional data and fail to account for the role that selective migration has on health. Every New Zealander has a unique national health identifier (NHI), which is used to record their journey in the public (centrally-funded) health system. The accuracy and completeness of the NHI in the past decade has enabled the development of 'cohorts' of patients by anonymously linking different routine datasets.

We used an encrypted NHI (eNHI) to link individual-level data recorded in routine national health databases (e.g. Primary Health Organization (PHO), pharmaceutical dispensing, hospitalisation and mortality) to construct a 'cohort' of approximately 800,000 adults aged at least 30 years old to investigate disparities in cardiovascular disease (CVD) in Auckland. We measured residential mobility using the census Meshblock of usual residence from the PHO database for every calendar quarter between 1/1/2006 and 32/12/2011.

In this study, we first report the geography of residential mobility in the Auckland Region, outlining the demographic differences between those individuals that remained living in the same neighbourhood (census Meshblock) and those that moved during our study period. Second, using a measure of area-level deprivation (NZDep2006), we investigate whether deprivation (im)mobility influences the likelihood, scale and directionality of CVD hospitalisation. We discuss the clinical and political implications of our findings in relation to disparities in ethnicity, deprivation and age.

Using an Agent-based Model to Simulate Children's Active Travel to School

Yong Yang (University of Michigan, U.S.A.), Ana V. Diez-Roux

Background: Despite the multiple advantages of active travel to school, only a small percentage of US children and adolescents walk or bicycle to school. Intervention studies are in a relatively early stage and evidence of their effectiveness over long periods is limited. The purpose of this study was to illustrate the utility of agent-based models in exploring how various policies may influence children's active travel to school. *Methods:* An agent-based model was developed to simulate children's school travel behavior within a hypothetical city. The model was used to explore the plausible implications of policies targeting two established barriers to active school travel: long distance to school and traffic safety. The percent of children that travel to school was compared for various scenarios. *Results:* To maximize the percent of children who walk to school the school locations should be evenly distributed over space and children should be assigned to the closest school. In the case of interventions to improve traffic safety, targeting a smaller area around the school with greater intensity may be more effective than targeting a larger area with less intensity. *Conclusions:* Despite the challenges they present, agent based models are a useful complement to other analytical strategies in studying the plausible impact of various policies on active travel to school.

Shortening the Walk to School: Examining how Children's Active School Travel are Influenced by Shortcuts in London, Canada

Andrew F. Clark (University of Western Ontario), Emily Bent, Jason Gilliland

The physical inactivity of children is a major problem in today's society. Instead of being regularly active, children are predominantly choosing more sedentary activities. A simple way to increase children's physical activity is by encouraging active school travel (AST) by walking or bicycling. Past research has found many determinants to decrease AST, including parental influence, socioeconomic status, community safety, and distance. Distance, which can be shortened or lengthened by the built environment, is the most important determinant to AST. This paper examines how the presence of shortcuts can facilitate AST by decreasing the distance between a child's home and school. Walking networks around schools are constructed after conducting site visits and identifying potential shortcuts using orthophotos. A comparison of the length of the road network to the length of the road network including shortcuts provides evidence as to the effectiveness of different shortcuts to AST. There are three main findings from this study: (1) shortcuts are far more effective in suburban areas with low street connectivity than urban areas with high street connectivity; (2) children living 1000-metres from school gain more benefits from shortcuts than children living 500-metres from their school; (3) children attending lower income schools have fewer opportunities to use shortcuts for AST. In conclusion, this study finds that shortcuts can significantly decrease the distance children have to travel to get to school and, if designed properly, have the ability to increase the number of children who use active modes.

Measuring the Built Environment for Active Transport: A Review

Niamh Donnellan (University of Canterbury, New Zealand)

There is increasing recognition of the role the physical environment, particularly in urban areas, plays in influencing health behaviours such as physical activity. With obesity rates steadily increasing worldwide and in New Zealand, where one in four are now identified as obese, health researchers, urban planners and health policy makers alike are interested in the potential ways we can modify the built environment to promote healthy behaviours and achieve better population and individual health outcomes. A recent trend in the literature is investigating the walkability of neighbourhoods or urban environments to understand physical activity patterns. However, research to date has largely been limited to understanding the urban environment in terms of its walkability, which is just one form of active transport. There has been limited research that has focused on the other modes of transport used in the daily routines of individuals, such as cycling, taking public transport or driving a car. The objective of this paper is to conduct a systematic review of the literature on the indices used that assess the influence of transport modes on physical activity in urban environments. The particular aspects of the urban environment that influence physical activity and the methods utilised will be compared and contrasted. The most important features that influence walking, cycling, public transport and car use will be identified, along with the most appropriate methods in order to allow the creation of a coarser set of indices for two urban centres in NZ.

Session 5: Blue Space and Health II

Ageing-in-Place on Waiheke Island, New Zealand: The Role of Sea and Sky in Experiences of 'Place', 'Being Aged' and 'Wellbeing'

Tara Coleman (University of Auckland, New Zealand), Robin Kearns

This paper considers how blue spaces inform experiences of 'place', 'being aged', and 'wellbeing' among seniors who are ageing-in-place on Waiheke Island, New Zealand. The study draws upon in-depth interviews carried out with 28 seniors aged 65 to 94, as well as photo elicitation interviews and participant research journals conducted with 11 of these participants. A phenomenologically-inspired conceptual framework is employed to examine Waiheke as a bounded space within reach of a metropolis. We argue that blue spaces shape metaphors of 'islandness', which reflect the open and closed nature of island life, and are central to senior's everyday lives and opportunities for wellbeing. We consider a range of metaphors of islandness that are informed by blue spaces, such as the sensation of the sea wrapping around the island, yet also connecting to places, people and ideas beyond the island context, thereby facilitating both connection and withdrawal. We further argue that blue spaces contribute to senior's opportunities for strong place attachments and place integration by generating metaphors of possibility, potential, and renewal. We conclude that Waiheke poses unique challenges for seniors, such as distance, potential isolation, and a lack of advanced care. Yet despite the unique challenges of living in an island environment, the majority of seniors in this research interpreted ageing-in-place on Waiheke as a therapeutic experience because they were able to draw on blue spaces to (re)construct a secure sense of self anchored in strong affective ties to place and a sense of wellbeing.

Beyond Greenspace: Geographical Associations between Environmental Quality and Population Mental Health in Rural England

Benedict W. Wheeler (University of Exeter Medical School, New Zealand), Sahran Higgins, Rebecca Lovell, Michael H. Depledge

Research investigating relationships between access/exposure to natural environments and health and wellbeing has primarily treated those environments as homogenous in character - usually considered generically as "greenspace". Relatively little attention has been paid to type or quality of environment, but it is plausible that any health benefits of exposure to nature could vary according to these factors. For example, there are suggestions that more biodiverse environments could be associated with better psychological wellbeing. This paper reports preliminary findings from the secondary data project "Beyond Greenspace" (funder: UK ESRC ES/K002872/1). Data were obtained and analysed for the 6,027 rural Lower-layer Super Output Areas (LSOAs, mean population ~1,500) in England. We used linear regression models to assess ecological associations between measures of environmental quality and an indicator of population mental health across these small areas. Findings were consistent with previous research, indicating a positive relationship between a simple greenspace density measure and better mental health. However, we also found positive

relationships for other indicators of environmental quality, including greater bat species richness, bird species richness and landcover diversity. These associations persisted following mutual adjustment, and adjustment for other environmental and population socio-economic factors. These results suggest that further investigation is warranted, and that a more nuanced consideration of the characteristics of natural environments could help to disentangle some of the complexities of nature-health relationships. We acknowledge the Rural Economy & Land Use programme SEIRA and SECRA projects, which produced the rural LSOA indicators used for this analysis.

Anatomy of a Moment: Wellbeing as a Transitory Feeling State

Gavin J. Andrews (McMaster University, Canada)

Like other social scientists, geographers have considered wellbeing primarily as a state of life (crudely speaking, what people have physically, emotionally and socially, what that means to them, and relationships with environments), or otherwise have focused on personal experiences and societal constructions of wellbeing in relatively specific places and situations. Despite this broad empirical coverage, their literature has not however engaged with the intimate processes through which wellbeing arises as a feeling, and thus considered how wellbeing might be an occasional (re)occurring part of the human condition and spatial life. To make a start on addressing these absences, this paper draws on data from a small qualitative observational study. The research supports the idea that wellbeing has an immediacy arising in relatively mundane, everyday situations. Theoretically speaking it might be initiated by 'affect'; the mobile energies that result from rapid and repeated interactions back and forth between human bodies and non-human things. These affects are experienced as pre-cognitive feeling states; somatically-registered positive (or negative) 'intensities' 'vibes' and 'passions' that arise and then pass. In turn, these feeling states might slide into more consciously grounded and expressible emotions.

Making the Blue Zones: Public Health Marketing in a Neoliberal Era

Eric D. Carter (Macalester College, U.S.A.)

Increasingly, US state governments are using public-private partnerships for public health provision and community health education. This paper examines one such public-private partnership, the Blue Zones Project, part of Iowa's "Healthiest State Initiative" launched in 2011. Based on a popular book of the same name, the Blue Zones Project is a partnership among the state of Iowa, private health insurance companies, hospitals, and other corporate partners. Its goal is to distill the "secrets" of living a long, healthy life (based on the experience of especially long-lived communities in Greece, Japan, Costa Rica, and California) and transplant these lessons into Iowa towns with chronic health problems, by promoting healthy lifestyle practices, preventive care, and community development. While it is too early to evaluate the success of the Blue Zones Project in population health terms, we can analyze the ideological roots, political purpose, and etiological assumptions of the program. Based on analysis of project materials, social media promotion, and interviews with key actors, we argue that the

Blue Zones Project presents a neoliberal model of community health promotion, by making Iowa towns compete against one another for public health resources and incorporating private-sector marketing practices, such as building a brand identity with cross-sector synergies. It also embodies a consumer-friendly version of the concepts of "social determinants" and "place effects" on health: lessons from "traditional" cultures are decontextualized from their places of origin in an individualistic discourse of care predicated on behavior modification rather than structural change.

Musings on the Measurement of Bluescapes

Phil Donovan (Massey University, New Zealand), Karen Witten

New Zealand is a mountainous, island nation where rivers, lakes and beaches are ubiquitous; however, urbanisation has severely impacted upon bluespace. For children, bluespaces can be play spaces and it is likely that time spent in or near water contributes to their physical activity in much the same way as time spent in greenspaces. Kids in the City is a study of children's use and experience of urban neighbourhoods and includes an investigation of neighbourhood attributes associated with children's independent mobility and physical activity. A measure of neighbourhood access to destinations commonly used by children, and to which proximity could plausibly increase physical activity, has been developed. The inclusion of bluespaces in such an index of destinations deserves consideration. In this paper we discuss the conceptual and practical difficulties of developing spatial and quality measures of exposure to bluescapes in urban neighbourhoods. Unlike greenspaces, bluescapes are poorly defined spatially, in constant movement and have quality attributes that are largely non-visual. Further, at the individual level we suggest children's recall of exposure to bluescapes in urban areas may be underestimated due to the co-location of green and bluescapes. Data sources, inclusion and exclusion criteria for different types of coastal and inland water spaces, both natural and modified by urbanisation will be discussed. We will also question whether the measurement of bluespaces warrants an attempt to overcome the difficulties posed.

Session 6: Infectious Disease II

Genetics: A New Landscape for Medical Geography

Margaret Carrel (University of Iowa, U.S.A.), Michael Emch

The emergence and re-emergence of human pathogens resistant to medical treatment will present a challenge to the international public health community in the coming decades. Geography is uniquely positioned to examine the progressive evolution of pathogens across space and through time, and to link molecular change to interactions between population and environmental drivers. Landscape as an organizing principle for the integration of natural and cultural forces has a long history in geography, and, more specifically, in medical geography. Here, we explore the role of landscape in medical geography, the emergent field of landscape genetics, and the great potential that exists in the combination of these two disciplines. Empirical work merging disease ecology and landscape genetics is presented. We argue that landscape genetics can enhance medical geographic studies of local-level disease environments with quantitative tests of how human-environment interactions influence pathogenic characteristics. In turn, such analyses can expand theories of disease diffusion to the molecular scale and distinguish the important factors in ecologies of disease that drive genetic change of pathogens.

Spatial Regression Modeling: Risk Factors for Sporadic *Escherichia coli* O157 Infection in East Tennessee

Ingrid Luffman (East Tennessee State University, U.S.A.)

Escherichia coli O157 is a bacteria present in the intestinal tract of animals, and while most strains of *E. coli* are harmless, one strain, *E. coli* O157 causes an estimated 73,000 illnesses in the United States each year, seventeen percent of which can require hospitalization (Rangel et al. 2005). *E. coli* O157 infection can be food-borne, water-borne, or contracted from the environment (for example by contact with agricultural animals or exposure to recreational water). Using publicly available environmental data and *E. coli* O157 cases in East Tennessee from 2000 through 2010, regression models were developed to identify the important risk factors for the disease. Street addresses for each case were geocoded to latitude and longitude coordinates and a database of environmental and socioeconomic risk factors for *E. coli* O157 was developed in a GIS. Spatial logistic regression models positively associated beef cattle and hog densities, developed land, and pasture land with disease. Dairy cattle density, geologic sensitivity and well permit density were negatively associated with disease. An understanding of the significant risk factors for disease can help to inform policies to combat disease prevalence by targeting resources toward public health regions and factors associated with disease. A background risk map generated from the regression model can be leveraged to develop a more focused epidemiological or microbiological study to examine specific pathways for disease.

Quantifying Human-Primate Overlap in a Fragmented Landscape: Implications for Conservation and Global Health

Sarah Paige (University of Wisconsin, U.S.A.), Johanna Bleecker, Jonathan Mayer, Tony Goldberg

Conservation goals and human activities are frequently found to be in conflict in environments of critical conservation importance. In western Uganda the landscape surrounding Kibale National Park (Kibale) is a mosaic of household compounds, trading centers, roads, fields and forest fragments. The remnant forest fragments surrounding Kibale epitomize this conflict as forest fragments are perceived both as spaces of conservation and resources for human livelihood. Taken together, the conservation and livelihood conundrum that is embodied by the 'fragment system' also has human and wildlife health implications. Pathogens are shared by indirect contact through ecological overlap and environmental exposure. In this paper, we present the fragmented Kibale landscape as a model for visualizing and quantifying human-primate overlap. These spaces of overlap have intertwined implications for conservation, human livelihood, and human and animal health- concepts embodied by the One Health movement. By depicting human activity spaces and primate habitat in sample forest fragments, we visualize how people and wildlife overlap in space. Further, by quantifying the extent of overlap through identifying significant clusters, we identify the micro-scales of overlapping spaces. Finally, we quantify the human livelihood drivers that underpin these spaces of overlap. The visualization and quantification process reveals the extent to which people and primates overlap in these areas in order to inform conservation and public health practice.

Trends in Geospatial Analysis of HIV/AIDS in Nigeria: Lessons for Resource Management and Policy Development

Richard O. Djukpen (Lindenwood University, U.S.A.)

HIV/AIDS is a global public health problem, and Nigeria is no exception to the peril of this disease. HIV/AIDS rates reached an alarming proportion of 5.8 percent of the adult population in 2005 (Federal Ministry of Health Nigeria, 2007). Since then, the national average HIV/AIDS rates have steadily declined. In spite of the declining trend, there are perceptible spatial disparities at the state level within the country (Federal Ministry of Health Nigeria, 2007). This study employs exploratory spatial data analysis (ESDA) techniques to explore the trends in HIV/AIDS spatial disparities in Nigeria from 1999 to 2007. The ESDA tools include Moran's I (local) and Getis and Ord's G_i^* , which determine the influence of neighboring areas on health phenomena in other surrounding places. In so doing, this study provides insightful geo-visualization of the HIV/AIDS epidemic. The results of the geospatial analysis (local Moran's I (LISA) and Getis and Ord's G_i^*) in this paper indicate that the North Central (middle belt) states of Nigeria have HIV/AIDS clustering throughout the period of analysis. An understanding of the cluster trend may highlight locations where limited resources be spent and policy development. Therefore, the geo-visual pattern helps policy makers and public health managers to prioritize resource allocation.

Spatial Variations of Temporal Trends and Geographic Risk Factors Associated with Syphilis in Texas Counties, 2006-2009

Laura Lane (University of North Texas, U.S.A.), Martha Felini, Elyse Ryan

From 2006-2009, Texas syphilis incidence rates increased at an alarming rate, outpacing the national average. In this study, we investigate spatio-temporal variations in syphilis distribution across Texas and identify potential risk factors associated with syphilis in Texas. We examine the county-level spatial variation of temporal trends of syphilis morbidity in Texas from 2006-2009 using spatial scan statistics. Spatio-temporal risk factors associated with syphilis were also examined employing a Poisson model to estimate relative risk per county. Preliminary results indicate an annual state rate increase of 14% over the four-year study period. Over that time period, a cluster of counties in east Texas experienced an annual rate increase of 111% in incident cases. This is a stark contrast to rates over the same time period for the rest of the state, which experienced an increase of 6% annually. Examining risk factors in addition to spatio-temporal variations allow public health practitioners to focus preventive measures on high-risk communities, which may be over-burdened by the disease.

A Mixed-Method Approach to Evaluating Infectious Disease Transmission Risk for Students on a High Density Campus

Jody Decker (Wilfrid Laurier University Waterloo, Canada)

This Canadian place-effect study looks at student behavioral response (such as vaccination and hygiene compliance) to disease transmission risk, while identifying high microbial deposition/transmission sites in student residences. Contaminated surfaces (ranging from desks to sinks to cell phones) play an important role in transferring pathogens. Cross-contamination (zig-zag transmission) potential is high in student populations due to place factors such as abundance of fomites, social network patterns, splash-and-dash hand hygiene and gendered behaviour. This information has high utility for universities looking at establishing evidence-based infection disease control plans.

Session 7: Chronic Disease II

A Geographic Analysis of Stress, Environmental Resources and Multiple Chronic Diseases in Toronto, Ontario

Ketan Shankardass (Wilfrid Laurier University), Vashti Sharma, Courtney Jones, Colin Robertson

Growing evidence suggests that chronic stress contributes to the onset of multiple chronic diseases (MCDs). One plausible mechanism is that unhealthy or healthy behaviours (e.g., tobacco use, physical activity or inactivity, high caloric intake) adopted to cope with chronic stress alter risk for MCDs. Thus, environmental characteristics of neighbourhoods can be viewed as resources affecting how communities deal with stress and their risk for MCDs. Data from the Canadian Community Health Survey (Cycles 2.1 and 3.1) were combined with data from Toronto Community Health Profiles and the City of Toronto Open Data Initiative to conduct an ecological analysis across neighbourhoods in Toronto, Ontario. We tested the hypothesis that neighbourhoods with more abundant resources across built, natural and service domains would be associated with lower risk for an age-adjusted index of MCDs including prevalent cardiovascular disease, diabetes, asthma, fibromyalgia, hypertension, chronic obstructive pulmonary disorder and cancer. We also hypothesized that this protective effect would be stronger for neighbourhoods with relatively high levels of chronic stress. Multiple multinomial regression was used to test these hypotheses controlling for socioeconomic differences between neighbourhoods. We found an inconsistent association between the abundance of environmental resources and the prevalence of MCDs where chronic stress was relatively low, but a consistently protective association where chronic stress was relatively high. The latter association was stronger with resources related to the built and service environment (e.g., walkability, public recreation facilities) compared to the natural environment (e.g., parks). Implications for future work and applications to urban planning will be discussed.

Spatio-Temporal Analysis of Lymphoid Leukemia Mortality in Children aged 0-4 in Texas Counties, 1999-2007

Aldo Avina (University of North Texas, U.S.A.)

Leukemia is the most common form of cancer in children. Previous studies have shown a potential association between race and leukemia mortality. Publicly available lymphoid leukemia mortality data by Texas county from 1999-2007 is used from VitalWeb. Space-time analysis of disease data using scan statistics allows us to delineate geographic areas of increased risk over a given time. The spatio-temporal trend of lymphoid leukemia mortality in children ages 0-4 will be investigated in Texas counties from 1999-2007 stratified by race/ethnicity. Stratification will allow us to examine the association between race and disease risk based on geographic location. Geographic location will give insight to potential environmental factors as well. Preliminary results indicate that Hispanic children aged 0-4 experienced an increased risk of lymphoid leukemia mortality over White and Black children in the same geographic area over this

time period. Interestingly, Hispanics aged 0-4 experienced a lower (1.4 per 100,000) age-adjusted death rate than Blacks and Whites (2.1, 2.4) during this time period. This type of global analysis of publicly available data allows us to quantify geographic risk, with the goal to determine the utility of this method at a finer geographic scale.

Space-Time Analysis of Late-Stage Breast Cancer Incidence in Michigan

Pierre Goovaerts (BioMedware, Inc, U.S.A.)

The major difficulty in the analysis of health outcomes is that the patterns observed reflect the influence of a complex constellation of demographic, social, economic, cultural and environmental factors that likely change through time and space, and interact with the different types and scales of places where people live. A suite of techniques is introduced for the visualization and spatial analysis of time series of health data, including 3D display in a combined time and geography space, binomial kriging for noise filtering, joinpoint regression to model temporal trends at the county level, and spatially-weighted cluster analysis to group counties with similar temporal trends. These techniques are used to explore spatio-temporal disparities in the incidence of late-stage diagnosis for breast cancer in Michigan Lower Peninsula over the period 1985-2007. Overall the proportion of late-stage diagnosis declined significantly at a rate of 3 to 5.3% per year until 1999 when it started rising again at a significant rate of 2.38% per year. Temporal trends greatly vary among counties and such differences peaked in the early 1990s when the number of mammography clinics in operation started increasing steadily. The first significant decline in proportion of late-stage diagnosis started much later on the Eastern border of the State along Lake Huron, in particular in the Thumb area where late-stage diagnosis has been more prevalent over the years and both access to screening and socio-economic status are less favorable.

The Role of Early-Life Neighborhood Socioeconomic Status in Female Breast Cancer Risk

Jared Butler (University of Utah, U.S.A.), Kevin Henry, Antoinette Stroup

Objectives: Examine the impact of early-life socioeconomic status (SES) on breast cancer risk later in life and explore the potential for geographic clustering of breast cancer based on residence at birth. **Methods:** A cohort of women born in Salt Lake and Weber counties in Utah from 1945-1959 (N = 60,497) were obtained from birth certificates linked to the Utah Cancer Registry in the Utah Population Database. Individual SES was based on father's Nam-Powers Socioeconomic Status Score (Np-SES) at the time of birth. Residential address at birth was geocoded and linked to 1960 census tract (CT) household income data to obtain neighborhood SES. Multilevel survival models were used to assess breast cancer risk and Bayesian generalized additive mixed models were used to explore possible geographic clustering of breast cancer. **Results:** A total of 1,763 (3%) cohort members were diagnosed with breast cancer from 1966-2009. Women born into families with low Np-SES were less likely to develop breast cancer than women born into the highest Np-SES group (HR=0.83 95%

CI: 0.72-0.97). Interaction models that included Np-SES and CT SES indicate that individual cancer risk may be modified by CT measures. We found that after controlling for Np-SES, women who lived in low SES CTs were significantly less likely to develop breast cancer in adulthood as compared to those who lived in the highest SES areas (HR=0.64, p=0.0147). Findings highlight the importance of socio-economic conditions in early life and breast cancer risk, and that area-based SES may modify individual risks.

Racial Disparities and Spatial Distribution of Breast Cancer Mortality between African American and Caucasian Women in Texas

Ogheneyovwinor Odjoji (University of North Texas, U.S.A.)

Background: Breast cancer is the second leading cause of death in Texas and eleventh leading cause of death in the United States. Despite advancements in early detection and treatment, African American women have disproportionately higher rates in Texas. This study examines and attempts to explain the geographic distribution of breast cancer mortality rates in Texas counties. Method: Breast cancer mortality data for women aged 45 years and above, covering 2000 through 2010 were obtained from CDC Wonder. Explanatory variables employed included socioeconomic status (defined by employment, income, health insurance) access to care and mammography screening rates. Statistical and spatial analysis were conducted. Results: There was a statistically significant negative correlation ($p = 0.027$, $R = -0.196$) between quality of care and overall mortality rates for both Black and White women, but not for Hispanics. Quality of care was associated with mortality rates ($p = 0.003$, $R = 0.399$) among Black women, specifically in the western part of Texas. Adjusting for associated confounding factors showed mammography screening rates were predictors of mortality rates. Conclusion: Quality of care was associated with the geographic distribution of breast cancer mortality rates in Texas, as the quality of care decreases mortality rates increases. Mammography screening was found associated with some co-founders as influencing the prediction of mortality rates.

Need vs. Provision for the Location of Health Care Facilities

Holly Shulman (University of Leeds, United Kingdom), Mark Birkin, Graham Clarke

Health care demand is one way to measure the pressure on health care services/institutions. Need for hospital treatment (latent demand) is often estimated in many studies relating to health care. Who within a population is in the greatest demand for health care services? Age, ethnicity, social class will all contribute to different definitions of need, hence a different output. Studies concerned with the geography of provision often evaluate the spatial variability of the amount of health care services in a region. Whilst need focuses on the proportion of people demanding/using services, provision examines the amount of health care services existing and their spatial location in relation to the population. The aim of this paper is to discuss a microsimulation model and the beginnings of a spatial interaction model that can be utilized to estimate morbidity at the household level for Yorkshire. In particular, two instances of morbidity will be analysed: heart disease and cataracts. The

microsimulation model will be based on survey data available in the Health Survey of England as well as census data. Hospital Episode Statistic data will be used for validation, as well as the basis of a spatial interaction model between GPs and secondary care provision. By examining the flows of patients between GPs and hospitals, inferences and conclusions can be made on the state of provision. This paper will explore a microsimulation model of population characteristics in relation to morbidity and will present key findings.

Session 8: GIS and Quantitative Methods I

Adjusting Disease Maps for Population Differences in Race/Ethnicity

Chetan Tiwari (University of North Texas, U.S.A.)

Racial and ethnic minorities are disproportionately affected by HIV/AIDS in the United States. Given known disparities in disease outcomes based on race/ethnicity, prevention efforts need to be more specific in terms of the populations and geographies that are targeted. While disease maps are invaluable tools towards such efforts, maps constructed without adjusting for race/ethnicity differences in population structures can either overestimate or underestimate HIV/AIDS rates, particularly in urban areas with diverse population characteristics. While adjustments for other covariates such as age and sex are routinely performed when computing disease rates or maps of those rates, adjustments for removing the effects of differences in race/ethnic distributions are uncommon. Additionally, adjusted rate maps are typically produced using Choropleth maps, which are known to be affected by the small numbers problem. This issue becomes particularly relevant when populations are further stratified by demographic variables such as age or race/ethnicity. Kernel density estimation methods are commonly used to account for the small numbers problem. In this paper, I present a method for adjusting disease maps produced using kernel density estimation methods for differences in the race/ethnic structures of urban populations. The method is applied to HIV/AIDS incidence data for the major metropolitan areas in Texas: Dallas-Fort Worth, Houston, Austin, and San Antonio.

Modeling Spatial Accessibility to Public Parks in Mecklenburg County using a Variable Two-Step Floating Catchment Area Method, Comparing Potential Travel Modes

Coline Dony (University of North Carolina at Charlotte, U.S.A.), Eric Delmelle

Access to parks, recreation facilities, and green space in an urban setting is linked to increased levels of physical activity and enhanced public health outcomes for residents. Given these benefits, a growing body of literature has emerged to assess the equitable distribution of parks across an urban area with varying results, often contingent upon the methodology used to measure access. This paper develops a new metric for evaluating the spatial accessibility to parks. It departs from a commonly utilized approach in access studies, the two-step floating catchment area method, by incorporating variable catchment areas to better reflect how parks are planned and intended to be utilized. The catchment areas, representing the supply and demand to each park vary with acreage and amenities. Additionally, the effect of different travel modes, namely driving, public transit, walking, and bicycling are taken into account. A case study of Mecklenburg County, North Carolina is used to illustrate the measure and to evaluate the equitable distribution of facilities by transport mode. Results indicate a large variability in relative accessibility according to mode. Apparent gaps in park coverage are identified in older suburban neighborhoods around the city's inner ring. This research improves our understanding on access to public parks and/or green

space per socio-economic group and holds the potential to further assess their effect on the health of citizens. Finally, it builds evidence for improving or adding on-site amenities at a number of existing public parks while points to areas in need for a new public park.

The Relationship of Socioeconomic and Racial Factors, both Individual and Community-Level, to Infant Birthweight

Catherine L. Kothari (Western Michigan University, U.S.A.), Luz Carmen Sweezy, James Wiley, Kathleen Baker, Ben Dormitorio, Rajib Paul, Arthur James, Amy Curtis

The study goal was to identify how community-level racial-segregation and neighborhood socioeconomic disadvantage interact with individual-level maternal Black-White race and socioeconomic status to predict infant birthweight. *Methods:* This spatial analysis study used GIS to link two secondary datasets from Kalamazoo County, Michigan: (1) 2008 individual-level birth certificate data (N=3,135), and (2) Y2000 census tract (N=60). Records of singleton births to Black and White women (N=2,876) were geo-coded using maternal address, and then linked to CT through ArcGIS10.2 spatial join. Multilevel regression analysis, using SPSSv.21, produced estimates of the variance in birthweight attributable to factors at each level, with two-tailed significance at $p < .05$. *Results:* The birthweight distribution had a mean of 3,361grams, median of 3,402grams and standard deviation of 587grams. Black and White women constituted 19.3% and 80.7% of the study population, respectively. Low and high maternal socioeconomic status was indicated in 48.2% and 51.8% of the study population, respectively. CTs varied widely on racial-segregation and socioeconomic-advantage/disadvantage indices. CT socioeconomic-advantage /disadvantage moderates the relationship of maternal race and birthweight: Both races living in advantaged CTs gain birthweight (CTses, $p < .001$), but White women gain significantly more than Black women (race* CTses, $p = .049$). However, once individual-level socioeconomic status is factored in, this differential benefit disappears (race*CTses, $p = .280$) and only socioeconomic status at the individual and the community level are significant (maternalSES, $p < .001$ / CTses, $p = .032$). CT racial-segregation is not associated with birthweight in any of the regression models. *Conclusion:* Socioeconomic factors, at both the community and individual-level, are stronger predictors of infant birthweight than race or racial-segregation.

Wither GISc in Health Geography? A Need to Redefine Health-GISc using Systems Theory

Aniruddha Banerjee (Indiana University Purdue, U.S.A.)

Since multivariate space-time models underpin most health geography analytics, GISc has increasingly played a crucial role in providing spatial weights for inherently auto-correlated health data. However, the nature of such analytics is to replace the dependencies and provide unbiased estimates of the phenomena of interest. We lose the interaction effects by statistical aggregation (summary) due to the elimination of dependencies. What is lost is the interactions between variables that, when subjected to

statistical tests, require stripping of such interactions. Such interactions are a vital part of the health ecology and provide insights into the phenomena of interest. GISc plays a secondary role to statistics. In fact, statistics strives to eliminate the spatial differences and destroys whatever “space”; or map dynamics have to offer. Examples are “spatially”; adjusted death rates, SMRs etc that are mapped initially to show spatial clustering and hence provide a reason to subject those rates to statistical analysis to remove spatial bias and then “remapped”; to show residual clusters that were excluded from the hypotheses. Applying the principles of systems theory, a branch of science dealing with complexity, it can be shown that a phenomenon can be understood based not only on aggregate (statistical) effects but also on the interactions of the individual components. Here, we propose a new kind of GISc, called “Statistical GISc”, to help capture all components of the model and their respective interactions effects at the local and global levels.

Small Area Estimation of Prevalences in Germany using Nationally Representative Health Surveys

Lars Kroll (Robert Koch Institute, U.S.A.), Thomas Lampert

Background: In Germany is an increasing need for small area data on illness prevalences, risk factors and health related behavior and attitudes. In our planned contribution we are going to present and discuss our methods and preliminary results for Germany in light of available reference data.

Data and Methods: We are using data of the study "German Health Update" for the years 2009 and 2010 (n=43.312). Small-Area-Estimation is performed using three level hierarchical regression models with additional governmental area data (approx. 250 variables) and best linear unbiased prediction of the prevalences. We used a core set of area level variables (unemployment rate, GDP per capita and mean household income) and a variable set that is chosen algorithmically. Reference data are obtained from several federal sources. *Results:* Our Estimation of Prevalences show large disparities regarding diabetes, obesity and flu vaccination rates in Germany. After controlling for age, gender and area level variables all small area models show no significant area level association for all three outcomes. Different sets of context variables out of the federal database are relevant for the prediction of each of the four outcomes. Our comparison with reference data lead to mixed results with correlations of predictions from $r=.3$ to $r=.8$. *Discussion:* We are investigating the best way of incorporating the results into regular health reporting for the federal and state level. The statistical properties of our preliminary models are promising but the lack of reference data is a challenge.

Using Micromaps to Analyze Environmental Epidemiological Data

Sala Senkayi (U.S. Environmental Protection Agency, Region 6, U.S.A.), Melanie L. Sattler

Linked Micromaps are a method for linking statistical summary information for regions to maps of those same regions. Visualizing relationships between spatial data can help in public planning. The relationships of interest in this study revolve around health effects and air emissions. A previous study presented at the Air and Waste Management

Association (AWMA) Annual Conference in 2012 (titled 'Proximity of Childhood Leukemia Cases to Airports within the State of Texas from 1995-2005') demonstrated 3 lines of evidence suggesting a relationship between airport emissions and cancer. This current study specifically looks at leukemia incidences for those 9 & under and their relationship to emissions from roads and airports; additionally, the observed-to-expected cancer incidence ratio was also analyzed versus the distance to roads and airports. The observed-to-expected ratio (calculated using data provided by the Texas Department of State Health Services) and the distance to each road or airport from each incidence was obtained at the county level using GIS. Additionally, the emissions data for both roads and airports was obtained from the EPA at the county level. (The entire study was described in the 2012 AWMA conference paper; however, this paper will focus on the issue of visualizing relationships using Linked Micromaps within R.) The micromap package in R was developed by Quinn Payton, Marc Weber, Michael McManus, Tom Kincaid and Tony Olsen of the U. S. Environmental Protection Agency and is available on CRAN (<http://cran.r-project.org/>). The spatial visualization of the relationships between the data sets using the micromaps approach could lead to better public planning with respect to the locations of the incidence, airport and road locations. Our study suggests that there is a relationship between the leukemia incidences for those 9 and under within the State of Texas and the emissions of airports (and may be roads as well); however, there is not a relationship between the observed to expected incidences for those with leukemia (9 and under) and the distance to airports and roads at the county level which mirrors the 2012 dissertation findings and journal submittals prior to this one. This method could easily be formatted to fit data for other areas (for example cities, states or even countries).

Session 9: Food (In)Security Around the World

Structures, Constraint, and Diet: A Case Study of the Kikuyu in Colonial Kenya

Lauren Kepkiewicz (University of Toronto, Canada)

Recent research has emphasized how diet and nutrition are shaped by policies and structures related to trade, agriculture, and land. Often, these policies and structures can affect place in a way that constrains people's choices in relation to the food they produce and consume. This paper explores factors affecting diet within Kikuyu communities during the colonial period in Kenya. Drawing on archival materials including medical journals and agricultural reports written under the British colonial administration, its findings suggest three main dietary shifts. These shifts each lessened Kikuyu community's access to foods that provided key sources of nutrition and diversity. They include the replacement of millet and bean staple crops by white maize, a severe decline in consumption of leafy greens and legumes, and drastically reduced consumption of animal products. This paper examines these shifts in relation to colonial policy that attempted to: introduce crops based on their suitability for export and ability to generate profit; incorporate Indigenous communities into the colonial monetary economy; promote surplus production; dismantle Indigenous trade and commerce; and constrain common use of and access to land. These policies prompted dietary shifts by altering Kikuyu economic, political, and social spaces in ways that interfered with the community's ability to sustain and organize itself in relation to agriculture, trade, land, and government. Examining how economic and political structures and policies played a central role in influencing diet and nutrition historically provides insight into how structural factors may continue to influence diet and nutrition today and into the future.

Food Security of the Batwa in Uganda: An Exploratory Study

Kaitlin Patterson (McGill University, Canada), Lea Berrang-Ford

Africa is expected to be particularly impacted by climatic events such as extreme drought, increased temperatures (2-4°C) and unpredictable precipitation. These will add additional pressures to groups that are already vulnerable to poverty and hunger. Indigenous peoples tend to face increased risk as a result of historical patterns of neglect by governments, colonialist legacies, lack of access to resources, ethnic discrimination, low employment, extreme poverty, and dependence on subsistence lifestyles. Due to the reliance on agriculture in Africa, there is concern for the future ability of Indigenous populations to sustain their livelihoods in the face of climate change. This article is an exploratory study of the Batwa Pygmies in southwestern Uganda examining the prevalence of food security within this indigenous African population. The study analyses their food security status through an adaptation of the USDA household food security survey module. A census survey was administered in January 2013 to 130 households. 91.46% of households interviewed were categorized as food insecure, 55.03% had very low food security. The Batwa rely primarily on

agricultural products for food, plantain and posho (boiled corn flour) comprise the majority of their diet. The analysis identified possible determinants of food security status but the population was homogeneously poor and little variation emerged between participants. Additional qualitative research is needed to identify local social security networks and wealth indexes to understand the patterns of wealth distribution in these communities.

Food Insecurity and its Association with Malnutrition and Anaemia in Bangladesh: Geographical Disparities Across Divisions, Rural and Urban Areas

Md. Mobarak Hossain Khan (University of Bielefeld, Germany), Oliver Gruebner, Patrick Hostert, Alexander Krämer

Background and Objectives: Although Bangladesh has already achieved a remarkable progress in food and nutrition sectors, food insecurity and associated health consequences are still prevalent. Additionally, a large segment of the population lives under the national poverty line and chronically suffers from malnutrition, which can lead to low productivity and increase the risk of e.g. maternal and child deaths. In this paper we analysed food insecurity disparities between seven divisions of Bangladesh and between urban and rural areas. We also postulated that food insecurity is strongly associated with malnutrition and anemia across areas. *Methodology:* Recently released nationally representative data of the Bangladesh Demographic and Health Survey (BDHS) 2011 (for women aged 15-49 years) were used. We developed a composite score to define food insecurity based on the BDHS final report. We analysed food insecurity and its associations with malnutrition and anaemia focusing on abovementioned hypotheses. Multivariable regression analyses were also performed. *Results:* The overall prevalence of food insecurity, malnutrition and anaemia were 10.1%, 23.4% and 42.4% among women. All these indicators also differed significantly between geographical areas with the highest prevalence in rural area, followed by other urban areas and large cities. Multivariable results adjusted for potential factors indicated significantly higher likelihoods of malnutrition and anaemia among food insecurity group, with the highest likelihood in rural areas. *Conclusion:* Briefly geographical disparities of food insecurity, malnutrition and anemia are remarkable with highest prevalence in rural areas. Therefore women of rural areas clearly need more food and nutrition protection efforts to minimize food insecurity-associated health consequences in Bangladesh.

Exploring the Role of the Food Environment on Fruits, Vegetables, and Sugar-Sweetened Beverages Consumption in a Brazilian Urban Population

Ana Clara Duran (University of Sao Paulo, Brazil), Maria do Rosario DO Latorre, Patricia C. Jaime

Though food environments have been shown to impact diet, studies exploring the associations between urban food environments and food intake are still scarce in low- and middle-income countries. This study examines the relationships between the

neighborhood food environment and the intake of fruits, vegetables, and sugar-sweetened beverages (SSB) in Sao Paulo city, Brazil. Cross-sectional study conducted in 2010-2011 of 1842 adults along with a reliable in-person audit of all food stores/restaurants from 52 different census tracts in Sao Paulo, Brazil. For each participant, the availability, variety, price and promotion of fruits, vegetables, and SSB were directly assessed by using 2 measures: in all food stores/restaurants within their census tract, and in all food stores/restaurants within 1 mile (1.6 km) of their residence. The dependent variables were fruit and vegetable consumption ≥ 5 times/week and SSB intake ≥ 1 time/week. Independent variables included stores density and observed fresh fruits, vegetables, and SSB neighborhood measures. Multilevel regression was used to analyze the data. After adjustment for age, gender, income, and education, a higher availability of SSB in the tract of residence was associated with a higher SSB intake ($p < 0.05$). Fruit intake was higher for participants who lived within 1 mile of stores with a high availability of fruits and vegetables ($p < 0.05$). Less consistent associations were observed for vegetable intake. Our findings suggest that neighborhood food environment influences fruit and SSB consumption. The extent to which the availability of healthy foods is associated with better diets deserves further investigation in urban middle-income settings.

Food Insecurity in the Context of Changing Socio-Environmental Conditions in the Canadian Subarctic: Participatory Research with the Naskapi First Nation

Thora Martina Herrmann (Université de Montréal, Canada), Marie-Jeanne S. Royer, M John Mameamskum, George Guanish & the Naskapi Nation of Kawawachikamach

The Canadian subarctic has experienced important climatic and socio-environmental changes over the last forty year, which has profound effects on local ecosystems and food security. Traditional Naskapi food systems rely on land based activities (hunting, trapping, and fishing) which are disrupted by these changes, and in turn increasing food insecurity. Although supplemented with store-bought foods, traditional foods are considered by the Naskapi of being of better quality and of higher nutritional value. Traditional subsistence activities also play an overall role in the well-being (physical, mental, and spiritual) of community members. This presentation draws on community workshops, interviews and questionnaires carried out in a collaborative research project with the Naskapi First Nation of Kawawachikamach in Subarctic Quebec, Canada in order to document Naskapi observations of changes in the local climate/environment, in hunting situations and in traditional animal and plant food species. It also analyses its impacts on nutritional health and food security. Naskapi members are witnessing changes in weather conditions, land use, flora and fauna which are affecting access and consumption of traditional foods and resulting in dietary changes at the society level.

Session 10: Children's Places

Otitis Media Associated with Household Crowding in a Developed Country

Chris Bowie (University of Canterbury, New Zealand), Amber Pearson, Malcolm Campbell, Ross Barnett

This paper presents the findings of an ecological study seeking to identify the independent association of household crowding and childhood hospitalisations for Otitis media (OM). One of the most common infectious diseases affecting children worldwide, OM is associated with a range of compositional and contextual risk factors. Household crowding in the home is a known risk factor on the transmission pathway for infectious diseases such as Meningococcal disease, Tuberculosis and Acute rheumatic fever. Recent studies have focused on the role household crowding may also play as a risk factor for OM. This paper presents findings of the independent association of OM hospitalisations among children in New Zealand with neighbourhood measures of household crowding. Poisson modelling was used to estimate the relationship adjusted for known individual and neighbourhood-level risk factors. Environmental tobacco smoke exposure in the home and median income were adjusted for at the neighbourhood level while the age, sex and ethnicity of individual cases were included in the final model. The paper presents evidence of a plausible, independent, association between OM and household crowding and adds weight to the potential benefits that social policy targeted at improving the quality and standard of housing available to deprived groups can play in improving population health. The paper concludes by providing scope to refine research methods to further investigate the extent of this effect.

The Geography of (Children's) Health "Examples from the Health and Social Reporting in the district of Berlin-Mitte"

Jeffrey Butler (District Office of Berlin Mitte, Germany)

A fairly new field of interest in Germany is the relationship between geography and health at the neighborhood level. Up until now it has been difficult to obtain small scale data for both health and for other influences. A further problem was also the lack of unified reference areas. The district of Mitte has a long tradition of analyzing data at a neighborhood level, but it was often necessary to use incompatible regions. One reason for the necessity of neighborhood analyses is the allocation of scarce resources. When the health department is forced to close offices it is useful to know where the problem areas are. Neighborhoods and schools are also important settings for carrying out health promotion measures for children and youths. Here it is necessary to be able to target health related problem constellations as precisely as possible. In 2005 Berlin was divided into unified life-world oriented regions (LOR) and all administrations were required to use them for data collection. This has led to a wide range of relevant statistics becoming available for the LOR: e.g data on the population, public assistance, environmental burdens, mortality and various indicators for children's health. Now it is possible to connect social, health and environmental information at the spatial level. In

an initial analysis we looked at possible correlations between the availability of playgrounds and parks and the prevalence of overweight in children. In ongoing projects we are looking for connections between mortality and specific environmental burdens.

More Than a Pretty Place: Preliminary Findings on Children's Nature Access, Exposure and Engagement

Kirsten Beyer (Medical College of Wisconsin, U.S.A.), Beth Heller, Amy Kistner, Corey Zetts, Jessica Bizub, Erin Shawgo

A growing body of evidence illuminates the broad benefits of access to and engagement with green space and nature. Environmental education is a promising approach to connecting children with nature to improve their social, emotional, physical and intellectual health. We present early work from a community-academic partnership designed to understand and improve children's engagement with nature through environmental education. We present results from a survey of urban Milwaukee youth eligible for environmental education programming from Milwaukee's Urban Ecology Center to describe their baseline levels of exposure to and engagement with nature. Our findings indicate that children are attracted to green spaces in their neighborhood and want to play outdoors but need more support in order to do so. Analysis of our baseline data reveals a strong need for parental support for children's outdoor play. While approximately three out of four students indicated that they knew a place in their neighborhood where they could go outside to play in nature and a majority of students believed that nature helps them to think more clearly (86%), be healthier (92%), learn new things (80%), and calm down (75%), fully 85% of students indicated that adults in their family did not actively encourage outdoor play in nature. While children often thought positively about their neighborhoods, they had lower levels of recognition that their neighborhoods are places to find nature. Our findings have implications for programs that intend to connect children with nature, particularly in urban and Hispanic/Latino communities.

Confronting Diversity and Learning Tolerance: Children's Accounts of Living and Playing on Inner City Streets

Karen Witten (Massey University, New Zealand), Penelope Carroll, Robin Kearns

As Auckland's inner city intensifies, families are moving into high and medium rise apartments in central and fringe CBD neighbourhoods; into dwellings and neighbourhoods that were not designed with children in mind. In the past, the wellbeing and sensibilities of children have not been a planning priority in the inner city but this is beginning to change with child-friendly and inclusive city discourses common in the recently published city plan. While families and children are becoming more visible at events and in public spaces in the central city, what of the everyday experiences of children living in inner city neighbourhoods? In this paper we report on findings from interviews and focus groups with inner city children 9-12 years conducted as part of the Kids in the City project. As the children talk about their lives,

and moving and playing around neighbourhood streets, many describe distress and discomfort as they confront the likes of homelessness, drunkenness, massage parlours and sex shops. A few children also describe strategies for coping with these encounters, an emerging tolerance to difference and pride in becoming streetwise. The findings highlight tensions in creating a city which seeks to advance children's wellbeing through taking account of their developmental needs and sensibilities while also valuing social diversity, tolerance and inclusiveness.

Improving the Measurement of Children's Neighbourhood Accessibility

Philip Donovan (Massey University, New Zealand)

Auckland is an increasingly auto-centric city with high levels of car ownership and declining rates of physical activity in adults and children. In our 'Kids in the City'; research we are investigating the relationship between access to destinations and children's levels of independent mobility and physical activity using a new, purposely designed spatial tool named Neighbourhood Destination Accessibility Index for Children (NDAI-C). NDAI-C was developed from empirical data from 7000+ trips recorded by 253 children in nine Auckland neighbourhoods. Creating this child-specific spatial tool enables us to more accurately measure the differences in the physical surroundings of urban neighbourhoods and analyse how these factors influence children's physical activity levels compared to more generalised measures. This paper will present the tools and methodology used to construct the NDAI-C, adding to the literature surrounding children's neighbourhood accessibility and physical activity.

Session 11: Healthy Aging

Associations between Inner-City Deprived Areas, Urban Resources and Health in the City of Augsburg in Southern Germany. Results from the KORA Study

Werner Maier (Institute of Health Economics and Health Care Management, Germany), Miriam Rottmann, Susanne Vogt, Andreas Mielck, Annette Peters, Rolf Holle, Birgit Linkohr, Angela Döring, Kathrin Wolf, Eva Grill, Ralf Strobl, Ursula Berger, Anja Kerstin Zimmermann, Stephanie von Klot

Introduction: Focusing on the city of Augsburg in Bavaria, our objective was to investigate associations between area socio-economic status, urban health resources and health status. *Data and Methods:* In 2 studies, we used data from cross-sectional studies of the KORA research platform: 1. N=1,888 participants of KORA S4 survey (25–74 years). We grouped inner-city districts according to their unemployment rate and included information on self-rated health (SRH), obesity, high waist-hip ratio (WHR) and hypertension. 2. N=1,711 respondents of the KORA-Age 1 study (≥ 65 years). We calculated Euclidian distances between home addresses and nearest health resources (e.g. green space) to assess associations with aspects of healthy aging (e.g. SRH). SAS 9.2 was used for multilevel logistic regressions and ArcGIS 9.3/10.0 for visualization resp. distance calculation. *Results:* 1. The risk of a high WHR increased in districts with high unemployment (OR 1.53; 95% CI 1.03–2.26). A similar association was found for obesity. 2. We found no evidence of a clear relationship between distances to nearest health resources and aspects of healthy aging. *Conclusions:* We could not find a clear relationship between green space and healthy aging. The presence of natural space (e.g. woods) could be one explanation, the size of the city (about 250,000 inhabitants) could be another one: is Augsburg simply too small to analyze these associations? In future analyses we will include additional health resources (e.g. availability of ambulatory care) and perform network analyses.

Social Deprivation and Experiences of Aging in the Older Population in Kingston, Ontario

Keltie Gale (Queen's University, Canada), Mark W. Rosenberg

Social deprivation is defined as a lack of access to typical social activities, interactions, and relationships as compared to the local community or wider society to which an individual, family, or group belongs. There is evidence to indicate that the older population is more likely to experience social deprivation and to live in areas that are more socially deprived. It is also known that health generally declines with age. Within this framework, the experiences of aging among women 75 years of age and older living alone in the community in Kingston, Ontario are analysed. Interviews were conducted with older women to understand better how levels of social contact change with age and the relationship between social contact and health. The paper concludes with a discussion of the importance of understanding the relationships among social

deprivation, health, and aging and of accounting for social deprivation when examining health status and health care services for the older population.

Calculating Rates of Change in an Unstable Population: The Case of Homelessness in Dallas, Texas

Kate Lester (University of North Texas, U.S.A.)

The homeless population is highly variable and mobile and notoriously difficult to track and count. Most data on this population comes from annual counts, which makes computing change through time difficult to compute and interpret. The annual Homeless Point-in-Time Count and Census conducted by the Metro Dallas Homeless Alliance, provides the most comprehensive picture of the state of homelessness in Dallas. Using surveys conducted between 2005 and 2012 this research analyzes the change in the rates of homelessness by police district. Mapping these rates across the City of Dallas will reveal important, long-term trends and patterns that are useful for service planning and evaluation. This paper will use kernel density estimation methods for mapping rates of change over space and time. Change rates will be computed by using a smoothing algorithm that avoids rate instability due to the small numbers problem, while ensuring that the spatial basis of support that is used in the calculation of rates for multiple time periods are kept consistent. These maps will be evaluated for stability and detail. Determining the best interval for comparing highly variable rates of homelessness will help incorporate temporal variations in future research on this population. Correlating these rates to demographic changes in the census can reveal clues about what factors steer the migration and settlement of homeless persons.

Session 12: Neighborhood and Community Health

Do Deprived Neighbourhoods Experience "Triple Jeopardy"? The Relationship between Inequalities in Health, Socio-Economic and Physical Environments in England

Helena Tunstall (University of Edinburgh, United Kingdom), Niamh K. Shortt, Elizabeth A. Richardson, Jamie Pearce, Esther Rind, Richard Mitchell

The poor health of low socio-economic status populations may reflect greater exposure to both socio-economically deprived environments and detrimental physical environments. The combined, and potentially reinforcing, risks of health, socio-economic and physical environment disadvantage have been termed 'triple jeopardy'. This analysis describes the spatial relationship between health, socio-economic and physical environment inequalities and considers whether populations living in socio-economically deprived neighbourhoods in England experience triple jeopardy. This analysis compares Census Area Statistics wards in England (N=7,842; mean population approximately 6,000). Neighbourhood socio-economic deprivation was defined by the Carstairs 2001 deprivation index. Physical environment disadvantage was measured using the multiple environmental deprivation indices (MEDIX) classification for the UK and the five sub-indicators that comprise it: air pollutants, climate, proximity to waste management or metal production/processing sites, UVB radiation and green space. Health disadvantage was indicated by poor self-rated health, life expectancy, 1996-2003, and cardiovascular and respiratory disease death rates, 1999-2003. This analysis finds, as expected, that wards in England with the worst health outcomes and physical environments are concentrated in areas with high socio-economic deprivation. However, when the most socio-economically deprived wards were compared there was greater poor self-reported health and cardio-vascular deaths and lower life expectancy in wards with less PM10, NO2 pollution and more green space. These results reflect variations between socio-economically deprived areas in different regions of England, with the poorest health wards concentrated in post-industrial northern regions and the most polluted areas with the least green space predominantly located in inner London.

The 'Constant Size Neighbourhood Trap' In Accessibilities Health Studies

Julie Vallée (Université de Montréal, Canada), Guillaume Le Roux, Basile Chaix, Yan Kestens, Pierre Chauvin

Geographical accessibility to neighbourhood resources is often measured from resources volumes in residential areas whose constant geographical delineations fail to account for personal neighbourhood experiences. The objective was here to highlight the 'constant size neighbourhood trap', i.e. the bias which occurred in accessibilities studies when neighbourhoods are conceptualized as areal units of constant size. Focusing on primary health care resources, the existence of a 'constant size neighbourhood trap' was empirically investigated from data collected in 2010 among 653 residents in the Paris metropolitan area. Respondent's perceived neighbourhoods were analyzed as one way of observing their neighbourhood experiences. Localization

of health resources and data about respondent's assessments of the volume of their neighbourhood practitioners were also considered. Investigating effects of the 'constant size neighbourhood trap' at individual level, we found significant difference between number of health resources included in resident's Perceived Neighbourhood Polygons (PNP) and in Constant Size Buffers (CSB) and we observed that respondent's assessments of their neighbourhood practitioners were more closely correlated with number of practitioners included in PNP than in CSB. Switching to area level using aggregate measures, populations of poor and peripheral urban areas were found to have a radically lower quantity of neighbourhood health resources when using PNP rather than CSB because their PNP size were significantly smaller. Neglecting variability in people's neighbourhood experiences lead to methodological bias when measuring individual measures of resources accessibility and when targeting underserved areas and to theoretical bias when exploring spatial injustice in access to urban resources.

Developing and Validating a Measure of Community Capacity: Implications for the Concept

Sarah Lovell (University of Otago), Andrew Gray

Community capacity is the ability of a group to identify and act on problems (Labonte & Laverack, 2001). Dimensions of community capacity (including leadership, resources, sense of place) have been identified through qualitative studies but existing research has not examined the value of developing a quantitative measure of community capacity (Beckley et al., 2008; Gibbon et al., 2002; Jackson et al., 2003). A quantitative measure would assist public health practitioners to identify the strengths of a community and measure changes over time as they work to build community capacity. The goal of this research was to develop and validate a scale to measure community capacity in small towns. A mixed-methods study was undertaken in Matura, a high-deprivation industrial town in the South Island of New Zealand, in 2011. Key informant interviews and a review of existing literature enabled the identification of a priori item groupings to form meaningful subscales (dimensions) of community capacity for the survey. A random sample of 300 Matura residents was drawn and a 58% response rate (145 surveys) achieved. A demographically similar sample of 300 individuals from other South Island towns was surveyed for comparison purposes with a 54% response rate. The full scale was found to have strong internal consistency ($\alpha=0.87$) and community capacity was independently associated with time living in the town, religious beliefs, and volunteering in the community. We discuss how dimensions of community capacity hold together quantitatively and reflect critically on the value and limitations of quantifying the concept.

Calculating Rates of Change in an Unstable Population: The Case of Homelessness in Dallas, TX

Kate Lester (University of North Texas, U.S.A.)

The homeless population is highly variable and mobile and notoriously difficult to track and count. Most data on this population comes from annual counts, which makes computing change through time difficult to compute and interpret. The annual Homeless Point-in-Time Count and Census conducted by the Metro Dallas Homeless Alliance, provides the most comprehensive picture of the state of homelessness in Dallas. Using surveys conducted between 2005 and 2012 this research analyzes the change in the rates of homelessness by police district. Mapping these rates across the City of Dallas will reveal important, long-term trends and patterns that are useful for service planning and evaluation. This paper will use kernel density estimation methods for mapping rates of change over space and time. Change rates will be computed by using a smoothing algorithm that avoids rate instability due to the small numbers problem, while ensuring that the spatial basis of support that is used in the calculation of rates for multiple time periods are kept consistent. These maps will be evaluated for stability and detail. Determining the best interval for comparing highly variable rates of homelessness will help incorporate temporal variations in future research on this population. Correlating these rates to demographic changes in the census can reveal clues about what factors steer the migration and settlement of homeless persons.

What Determines "Scale" for Neighbourhood Physical Activity?

Vivienne Ivory (Department of Public Health; University of Otago, New Zealand), Marie Russell

Investigating neighbourhood/health relationships requires that research engages with the challenges posed by neighbourhood scale. The everyday nature of physical activity provides a means of observing engagement with places within and around residential areas and further afield. We investigate how the type of neighbourhood may affect the scale at which residents live their lives, and therefore what counts as "near". As part of the mixed methods Health Research Council-funded Neighbourhoods & Health research project, fourteen focus groups were held in four neighbourhoods contrasted by walkability and deprivation (two Waitakere and two Wellington, New Zealand), and with participants grouped by gender, ethnicity and employment status as proxies for different ways of engaging with their local neighbourhoods. Focus groups elicited discussion on where local residents go for physical activity, and their views on the opportunities for, and barriers against physical activity in their local area and beyond. Thematic analyses compared across neighbourhood and participant type for contrasts and similarities in the issues discussed. Residents across all neighbourhoods referred to places close by and further afield. Those in less walkable neighbourhoods spoke of more distal places, and were more widely spread. Further, the ways that places were talked about suggested that what counted as "near" was dependent on how sufficient the neighbourhood was for everyday life, and the ease of access to alternative, supplementary places (via motorways etc). We will discuss the extent to which the scale of neighbourhoods is a response to both the local built environment, and individual factors.

Session 13: Author Meets Critics - "Weighing In: Obesity, Food Justice, and the Limits of Capitalism" by Julie Guthman

Author: Julie Guthman (University of California Santa Cruz, U.S.A.); Discussants: Tim Brown (Queen Mary University of London, United Kingdom), Steven Cummins (London School of Hygiene and Tropical Medicine, United Kingdom), Eric Carter (Macalester College, U.S.A.)

In *Weighing In: Obesity, Food Justice, and the Limits of Capitalism* (2011, University of California Press), Julie Guthman tackles the "obesity epidemic," questioning mainstream beliefs about what causes obesity and how to combat it. In particular, *Weighing In* explores how possible explanations for the rise in obesity (including environmental toxins) have been neglected, and how class and race inequalities are reflected and reinforced by promoting food that is organic, local, and fresh from the farm. In this session, Julie will present some of the highlights of her work. Then, our panelists -Tim Brown (Queen Mary, University of London), Steven Cummins (London School of Hygiene and Tropical Medicine), and Eric Carter (Macalester College) - will weigh in on the ideas presented in the book, and their implications for health geography. There will also be time for question and answer and discussion.

Session 14: Children’s Travel and Food Environments

Do You Know the Way to School? Evaluating Methods for Observing the Spatial Patterns of Children’s Neighborhood Activities

Jason Gilliland (University of Western Ontario, Canada)

This paper compares methods for identifying the spatial patterns of children’s neighborhood activities, focusing on the journey to school. Subjects included >250 children aged 10-13, and their parents/guardians, in London, Canada. Children completed a survey including questions related to socio-demographic characteristics, travel mode, and environmental perceptions. Parents also completed a version of the survey. Children and parents also separately completed a mapping exercise which involved them tracing the child’s normal route between home and school on a neighborhood air photo. The children also participated in a week-long project during which the locations of their daily activities were logged using a GPS. The locations of children’s homes, schools, and the trajectory of the routes in between, was extracted from both mapping exercises, as well as the GPS tracks, and imported into GIS for analysis. Quantitative analyses involved comparing various route metrics for each of the differently-identified routes for each child. As the objectively-recorded GPS tracks were considered the “gold standard” for identifying routes, the goal was to evaluate the extent to which the perceptions of routes diverged from the GPS tracks, and how these divergences varied according to subject characteristics. GPS tracking is the most accurate, but also most obtrusive and resource-intensive method of those examined; it may be that simpler methods are sufficient for documenting children’s environmental behaviors. It is critical that effective methods of observing the environmental dimensions of health-related behaviors are established in order to make more effective, evidence-based interventions.

Developing Context in the Spatial Definition of the Food Environment: Changes to BMI in Young People in East London, UK

Daniel Lewis (London School of Hygiene and Tropical Medicine, United Kingdom), Neil Smith, Charlotte Clark, Stephen Stansfeld, Steven Cummins

A new generation of population studies in public health has the opportunity to rethink the way that ‘place’ is articulated. The absence of such thought will allow the question of whether place matters to go on unsubstantiated. Existing research seems to demonstrate that individual-level risk factors are much more important than environmental exposures in explaining health outcomes, however such sweeping generalisations are unfair because the relative empirical complexity set aside to capture individual-level factors far outweighs that accountable to many models of environmental exposure. It is important that we move beyond simple conceptualisations of place or neighbourhood in order to better capture the relative complexity of places in individual exposure for a range of environmental determinants of health. The ORiEL study (Olympic Regeneration in East London) provides a rich data resource for assessing young people’s (age 11-12) exposure to the neighbourhood food

environment both at home and at school. We look at associations between individual weight status (BMI: objectively measured by field researchers), a range of individual confounding factors, and several dimensions of exposure to food environment resources. The food environment is based on geocoded and classified municipal data listing registered food businesses. We operationalise conventional proximity and density metrics, as well as metrics intended to capture the diversity of neighbourhood food resources, and aspects of their distribution within the neighbourhood. We argue that this kind of multi-dimensional approach to capturing context are an important first step in developing better contextual measures of exposure in public health research.

Activity Space Measures of Access to Residential and School Neighbourhood Food Environments, Diet and BMI among Youth

Daniel Rainham (Dalhousie University, Canada), Chris Blanchard, Trevor Dummer, Sara Kirk, Renee Lyons, Laurene Rehman, Cindy Shearer

The food environment has been linked to diet. Greater access to convenience stores, fast food and sit-down restaurants is thought to promote overconsumption of food with low dietary quality; whereas, grocery stores encourage healthy eating. The influence of food environments for youth is not well understood, and access to food environments may be different for urban and suburban youth. This study explored how access to food environments vary when using travel-time buffers or GPS-based paths of youth neighborhood around residential and school locations. GPS and food quality data from 316 youth (aged 12-16 years) were collected from six schools in urban, suburban and rural communities. Food environments were represented as counts and proximities of food locations around residential and school neighborhoods, and categorized as fast-food restaurants, sit-down restaurants, convenience stores and grocery stores. Counts and proximities were calculated for areas within a 15-min walk (buffer) and for life pattern areas determined using up to 7 days of GPS location data. Measures of food environments were used to explain variation in diet quality, the frequency of food intake for healthy and unhealthy foods and body mass measurements. Access to food environments vary significantly between buffer and GPS-based approaches, as well as when using place of residence or school as location of origin. There is evidence that buffer-based approaches to modeling the food environment will misclassify exposure to food environments. No robust associations were found between measures of the food environment, dietary quality, and BMI.

It's Not as Easy as Just Saying 20 minutes a Day: Understanding the Role of Place in the Implementation of a School-based Physical Activity Policy

Kristin Brown (University of Waterloo, Canada), Susan J. Elliott

Rising obesity rates and low physical activity levels among children and youth are a global concern due to links to adverse health outcomes, poor quality of life, and an increased burden on the health care system. One response to the problem has been the implementation of school-based physical activity and nutrition policies. For example, the Ontario Ministry of Education's Daily Physical Activity (DPA) Policy mandates that

all elementary school students receive at least 20 minutes of physical activity per day. This exploratory study sought to understand the local-level factors shaping implementation of DPA, from the perspective of elementary school principals and teachers. Qualitative in-depth interviews were conducted with Ontario elementary school principals (n=5) and grade 1-8 teachers (n=14) regarding DPA implementation, facilitators, barriers, and perceived outcomes. Interviews were audio recorded (with permission) and transcribed verbatim for subsequent thematic analysis using NVivo. Preliminary findings were organized using the Analysis Grid for Environments Linked to Obesity (ANGELO) Framework in order to identify factors acting at four environmental levels (classroom, school, school board, and provincial). Although macroenvironment (i.e., provincial and school board) factors were identified, those within the microenvironment (i.e., school and classroom) were emphasized. By using the ANGELO Framework to organize factors influencing DPA implementation, potential areas for change were identified for class, school, school board, and provincial stakeholders. Thus, in addition to determining priority areas for interventions, the ANGELO Framework provides a valuable tool for evaluating policies and programs by identifying factors that shape local-level implementation.

Child Self-Rated Health: The Effect of Longitudinal Measures of Neighborhood Racial Composition

Jamie L. Humphrey (University of Colorado at Boulder, U.S.A.), Elisabeth Dowling Root

The literature on neighborhood context and health suggests that the life-course processes involved in building trajectories of health are not adequately captured in cross-sectional analysis, which has been the empirical focus of much of the research in this area. In this study we used data from the U.S. Early Childhood Longitudinal Study, Kindergarten Cohort (ECLS-K) to examine the impact of longitudinal measures of neighborhood racial composition on child self-rated health between kindergarten and 8th grade. We employed two-level multilevel longitudinal logistic regression models to examine variation in the initial status and trajectories of child good health. Since the ECLS-K tracked child mobility over time, we are able to model the impact of changes in neighborhood racial composition. We found that compared to children living in minority neighborhoods, children who lived in white neighborhoods had higher initial good health (OR=1.76; $p<0.001$ vs. OR=0.63; $p<0.001$). Likewise, children who subsequently moved into a white or minority neighborhood had the odds of good health increased by 76% or reduced by 37%, respectively. Cross-level interactions showed drastically different results for Hispanic children living in white versus minority neighborhoods. Hispanic children living in white neighborhoods had 179% better odds of good health (OR=2.79; $p=0.009$) where odds of good health were reduced by 58% for Hispanic children living in minority neighborhoods (OR=0.42; $p=0.05$). Moreover, Hispanic children who subsequently moved into a white or minority neighborhood had odds of good health increased by 179% or decreased by 58%, respectively.

Session 15: Aging Spaces

Health, Place and Aging in Multicultural Toronto: The Case of Aging Filipinos

Janette Brual (Queen's University, Canada), Mark W. Rosenberg

Quantitative research on immigrant health in Canada has pointed to the healthy immigrant effect (HIE) to describe the pattern where immigrants are healthier upon arrival than the Canadian-born population. Many researchers have noted that over time this health gap declines citing various social, economic and cultural barriers. However, few studies have tested this hypothesis among an older population and far fewer studies have engaged the HIE qualitatively and within an ethnoculturally specific group. This research explores experiences and meanings of health, place and aging in the ethnically diverse setting of the Greater Toronto Area. Findings from a case-study of aging immigrants, in particular the migration and aging experiences of Filipinos will be discussed. Transcripts from a sample of older Filipinos are analysed to reveal the ways in which health and aging are understood in a post-migration context. Taking note of the socially constructed and culturally informed perspectives on health and aging in an urban setting, this qualitative exploration on an older, ethnoculturally specific group offers insights as well as counters currently accepted notions of healthy aging and aging in place. We draw from literature in the geographies of older populations and health and aging in a global context to argue that age, migration, place, ethnic identity, health and cultural practices all intersect to shape the health and aging experiences of Canada's immigrant population that cannot be explained by the HIE.

Aging in Place in Aging Spaces

Theresa Garvin (University of Alberta, Canada)

The World Health Organization places considerable focus on supportive environments that enable older adults to age in place's in the communities of their choosing. Via the Age-Friendly Cities initiative, cities around the world are expected to adopt amendments to spaces and places that make it easier for older adults to negotiate their environments. However the aging in place approach contradicts many current neoliberal approaches to urban planning which focus on low taxes, reduction in social service provision, downloading of responsibilities, and a reliance on free-market initiatives and volunteerism to meet need. As a result of neoliberalism, many spaces face considerable deficits as cities, regions and neighbourhoods attempt to update and expand crumbling infrastructure originally built in the post-war era. Data from community-based work with seniors in Edmonton, Canada identifies the ways that aging in place initiatives become part of older adult's embodied realities as they attempt to negotiate and rationalize the collision of aging and place policies with neoliberalism. This collision creates tensions at the level of individual, family, and community.

Active Aging: Strategies to Redefine Later Life

Jessica Finlay (University of Minnesota, U.S.A.)

The aging body has been rendered a problem because of traditional biomedical associations with physical, economic, and social decline and deterioration. In response to the aging American population, a biopolitical mode of governance is developing to cultivate a useful, healthy, and more productive senior citizenry. The active aging movement has thus emerged to redefine later life. This movement encourages work (thereby minimizing employment shortfalls), and discourages retirement that is not funded on an individual privatized basis (thereby reducing the demand on public welfare). A series of disciplinary techniques and security mechanisms have emerged to control, supervise, and regulate aging bodies. Geriatric medicine has created a network of significations in which aging bodies can be diagnosed, monitored, and administered. Experts have used epidemiological data to construct problems of a sedentary senior lifestyle, while widely promoting the virtues of an active lifestyle to reduce morbidity and mortality from chronic disease. Constant busyness and activity in old age has been constructed as a positive force through which older people can defy or battle the negative forces of dependency, disability, and other risks of aging. Activities such as vigilantly walking each morning or moving to an active retirement area in Florida translate technologies of government control over the aging body into personal practices of risk management, consumption, discipline, and self-surveillance.

Learning from the “Ideal”: Older Adult’s Travel Behaviour in a Walkable Neighbourhood

Kaitlyn Gutteridge (University of British Columbia, Canada), Meghan Winters, Joanie Sims-Gould, Christine Voss, Callista Haggis, Anna Chudyk, Heather McKay

Background: There is a movement toward age-friendly design that enables older adults to remain mobile and live independently in their neighborhoods. However, little is known about older adults who reside in age-friendly neighbourhoods highly walkable, with supportive built environment features and in particular, about their travel behavior. *Methods:* We gathered demographic and travel behavior data for 191 older adults (age 60+) living in Canada’s two highest Walk Score ranked neighbourhoods, Vancouver’s downtown core and West End (Walk Score: 96 and 94/100). Participants recorded daily travel (location, mode, purpose) in 7-day travel diaries and wore a GPS device (BT-1000X) and accelerometer (ActiGraph GT3X+). We characterized the built form for street segments using the SWEAT-R audit tool. We summarize trips rates and destinations by socio-demographic characteristics, and compare these to population-based travel behavior surveys collected across a range of neighbourhood types. *Results:* In total, 185 of 191 participants completed 7-day travel diaries and objective travel behavior measurements. Participants recorded 5,752 trips, on average participants made 4.6 trips per day (SD 1.7) and 70% of trips were by active travel modes. Travel patterns and destination preference varied by socio-demographic characteristics. Trip rates and trips by active travel modes were higher in study participants when compared to population-based travel surveys. *Conclusion:* These results demonstrate

that older adults living within a high walkable neighbourhood are very mobile and commonly use active modes. This is evidence to support the premise that designing age-friendly neighbourhoods promotes older adult health and mobility.

Application of Mobile Technologies in Aging Research: A Case Study of Life-Space

Neng Wan (University of Nebraska Medical Center, U.S.A.), Ge Lin

Aging is a global challenge that faces a lot of developed and developing countries. In the United States, the rapidly increasing number of older adults has raised growing concerns about how to maintain their health statuses while simultaneously minimizing relevant health expenditures. This presentation reports a collaborated study that deploys smartphones to assess the health status of community-dwelling older adults and to implement clinical interventions. Specifically, we use the GPS and accelerometer of smartphones to continuously monitor older adult's location and acceleration. GIS and spatial modeling methods are used to infer characteristics of their physical activities such as trip purpose, location, duration, environment exposure, and physical intensity, which are then integrated into a life-space measure to represent individuals' health status. Our evaluations have proved the feasibility and stability of smartphones in measuring life-space. The developed GIS methods are also suitable for other geographic and environment/health studies that adopt GPS and accelerometer units.

Session 16: Climate Change and Health

Seasons in Climate-Health Research: A Critical Evaluation of Delineation Methods

Michael J. Allen (Kent State University, U.S.A.)

One focus of geographical inquiry is the study of temporal and spatial variability. Unfortunately, studies often fail to consider these differences when discussing seasons in health research. For example, the arbitrary designation of winter is often defined as some subset of November - March in the Northern Hemisphere. Primarily, seasons are aggregated to monthly scales to account for changes in solar declination. However, climatological variations exist as winter is not the same in a cold region such as Minneapolis, Minnesota as it is as in subtropical Miami, Florida. Additionally, the winter of 1984 may not be the same as the winter of 1997. Seasons are unique to both place and time. The presented study investigates seasonal delineation and evaluates the potential implications on climate-health research. Similarities and differences between delineation methods were examined in terms of length, start date, and trends for 51 U.S. cities. Regional patterns emerged. By considering the results of this research, future studies may further investigate the importance of atmospheric variability in climate-health research.

El Niño and the Cholera Epidemic in Peru: A New Paradigm?

Iván J. Ramírez (The New School, U.S.A.), Sue C. Grady, Michael H. Glantz

In the 1990s Peru experienced the first cholera epidemic after almost a century. The source of emergence was initially attributed to a cargo ship, but later there was evidence of an El Niño association. It was hypothesized that marine ecosystem changes associated with El Niño led to the propagation of the bacteria *Vibrio cholerae* along the coast of Peru, which in turn initiated the onset of the epidemic in 1991. Earlier studies supported this explanation by demonstrating a relationship between elevated temperatures and increased cholera incidence in Peru; however, other aspects of El Niño Southern Oscillation (ENSO) and their potential impacts on cholera were not investigated. In this study, the relationship between El Niño and cholera in Peru was examined from a holistic view of the ENSO cycle, taking into account the geographic characteristics and definition of an ENSO event. The findings revealed that ENSO may have been linked to the cholera epidemic through multiple pathways, including rainfall extremes, the cold phase La Niña and social vulnerability, with impacts depending on the geography of teleconnections within Peru. When the definition of an ENSO event was examined, cholera appears to have emerged during non-El Niño conditions. Furthermore, the analysis herein suggests that the impact of El Niño arrived much later, possibly in the austral summer of 1992. In conclusion, a modified hypothesis with these new insights on cholera emergence and transmission in Peru is presented.

Excess Winter Mortality Patterns and Regional Differences in Portugal

Elisabete Freire (University of Lisbon, Portugal), Paula Santana, Ricardo Almendra, João Vasconcelos

The mortality fluctuation over the year is associated with increases in both the warm and cold seasons. Portugal is often described as the European country with highest excess winter mortality. The main aim of this study is to identify the seasonal patterns of mortality within Portugal and to assess their geography. The chi-square goodness of fit test was used to identify the existence of a significant seasonal increase in mortality by cause of death. The number of excess winter deaths and the excess winter death index were calculated to measure the winter death toll. The main results shown important seasonal mortality increases in almost all causes of death, the mortality due to cardiovascular and respiratory diseases are the main responsible for the winter burden. The number of excess winter death is related to the overall incidence of the disease and their determinants, but the seasonal increase is related to other socio-economic and behavior factors.

The Incidence of Diseases Associated with Climate Change in Texas, 2008-2010: An Examination of Economic Impacts and Socio-Spatial Disparities

Yolanda J. McDonal (Texas A&M University, U.S.A.), Sara E. Grineski, Timothy W. Collins, Young-An Kim

Recently scholars have started to explore the human health effects of climate change, even though there is not a monocausal link between climate change and human health. Others have exposed that a socio-economic phenomenon called the “climate gap” exists whereby poor and minority communities are disproportionately and unequally impacted by climate change, which may extend to health impacts. It has been found that climate change exacerbates the lack of access to preventive health care that is faced by many who live at or below poverty. While climate change is global, researchers are considering health impacts at more finite scales as we do here by examining state and county-level statistics in Texas. Using the 2008 to 2010 Texas Hospital Inpatient Discharge Public Use Data Files we will quantify the numbers of cases of hospitalizations for climate change-related diseases in seven categories: cardiovascular, cerebrovascular, respiratory, heat, vector-borne, water-borne, and gastrointestinal; assess the economic impact, based on hospitalization dollar charges for climate change-related diseases; and determine if there are social (based on sex, race and insurance status) and spatial disparities in these diseases using Wilcoxon signed-rank tests, relative risk ratios, and cluster analysis. The findings from this study will serve as a baseline for possible impacts of climate change on human health and will help to establish future research priorities in this area.

A Spatial Analysis of West Nile Virus in Texas, 2012

Allison Bradshaw (University of Connecticut, U.S.A.)

The outbreak of West Nile Virus (WNV) in 2012 included over 1,880 reported cases in the state of Texas, and was a dramatic increase from the disease prevalence of previous years. Based on the framework of human ecology triangle, this investigation sought to test the validity of previously identified factors of West Nile Virus to this year's outbreak and investigate the broad range of incidence rates across zip codes in Texas. A selection of demographic, environmental, and weather-related risk factors was included in the analysis in order to examine areas of high and low incidence across a varied landscape. We used a combination of Geographic Information Science and spatial statistics to process, visualize, and explore the spatial variation of WNV infected human cases and the related risk factors. A regression model was then applied to identify important and significant risk factors at both the state and the two urban areas (Dallas and Houston) with differing incidence rates to further assess the robustness of the relationships between WNV incidence and the risk factors. Preliminary results anticipate a correlation between vegetation cover, precipitation, temperature, and age of population.

Session 17: Food Systems

Is It Possible to Implement Complex Systems Approaches to Obesity Prevention? Evidence from the English Healthy Towns Programme

Denise Goodwin (London School of Hygiene & Tropical Medicine, United Kingdom), Steven Cummins, Elena Sautkina, Andy Jones, David Ogilvie, Mark Petticrew, Martin White

Background: Traditional multi-component approaches to tackling population obesity have been criticized and instead a complex systems approach has been advocated. However, there is a lack of knowledge about how a systems approach could be implemented in practice. This paper investigates whether the Healthy Towns programme in England could be characterised as a complex systems intervention, and interrogates whether existing delivery structures are ‘fit for purpose’ in implementing a systems approach. *Method:* One hundred semi-structured qualitative interviews with stakeholders (programme managers, project managers and intervention staff) were undertaken. Transcripts were coded and thematically analysed. Analyses were guided by Kopelman’s (2009) interpretation of the core principles for a systems approach to tackling obesity. These were; system wide approaches, engagement of stakeholders, long-term sustained interventions, ongoing evaluation to aid intervention improvement, and cross-government involvement. *Findings:* A multi-component, rather than complex systems, approach was adopted by all except for one town, though elements of systems thinking were present. Stakeholders discussed existing facilitators such as capacity building, cross-sector engagement, and facilitative leadership, all of which could stimulate a systems approach. However, barriers such as local and national politics, economics and timescales need to be overcome before a true complex systems approach can be implemented. *Discussion:* Although elements of a complex systems approach were delivered, it was not fully implemented in the Healthy Towns case-study. Better stakeholder understanding of what a complex systems approach entails, coupled with improved coordination and programme management, may result in a more fully realized systems approach to obesity prevention.

Do Supermarket Interventions Improve Food Access, Fruit and Vegetable Intake and BMI? Evaluation of the Philadelphia Fresh Food Financing Initiative

Ellen Flint (London School of Hygiene & Tropical Medicine, England), Steven Cummins, Stephen A. Matthews

Background: Structural interventions to improve access to healthy food in deprived communities are a current policy priority. In 2010, the Obama administration unveiled the Healthy Food Financing Initiative to promote interventions that expand access to nutritious foods. The initiative provided more than \$400 million in funding to bring grocery stores and healthful food retailers to deprived communities. However no evidence for the effectiveness of such policy interventions exists. This paper is a first attempt to evaluate the effect of this intervention on perceptions of the food environment, fruit and vegetable intake and BMI in Philadelphia, USA. *Methods:* Data

from the Philadelphia Neighbourhood Food Environment Study were used. This study utilised a prospective quasi-experimental design comparing baseline and follow up data in an "intervention" community with a matched "comparison" community. The intervention was the introduction of a large food supermarket in an underserved area. Outcomes were BMI; weekly fruit and vegetable consumption (Block FFQ); and perception of the neighbourhood food environment. Difference-in-differences analyses assessed whether significantly different changes over time existed between intervention and comparison groups. Models were adjusted for age, sex, income, race, education, household composition and employment status. *Results:* No significant difference-in-differences in mean BMI and mean weekly fruit and vegetable consumption were detected. However, a significant improvement in perceptions of the neighbourhood food environment in the intervention versus comparison neighbourhood was found. *Conclusion:* Improvement in perceptions of neighbourhood food environment quality did not translate into improved dietary behaviour or reductions in BMI.

Are Fast-Food Environments Associated with Diet and BMI in a Sample of UK Adults?

Thomas Burgoine (University of Cambridge, United Kingdom), Pablo Monsivais

Policies designed to promote healthier eating by modifying the food environment ('foodscape') are predicated on an equivocal evidence base that has typically neglected the foodscape beyond the residential neighbourhood. Using a UK sample ($n=2351$, aged 26-60), this study examined the relationships between fast-food outlet exposure in home and non-home environments and fast-food consumption/body weight. Participants in the Fenland Study (Cambridgeshire, UK) reported home/work addresses, and commuting modes/frequencies. Using local authority data, we quantified domain (home/work/commuting) specific and cumulative fast-food outlet exposure using GIS, assuming shortest network routes for commuting. We used multiple linear regression to model this exposure (in quartiles) relative to two outcomes: 1) consumption of specific foods (pizza, burgers, fried foods, fries) reported in a food frequency questionnaire; 2) BMI. Fast-food exposure was positively associated with fast-food consumption in home and non-home environments. Relationships were strongest in work environments (exposure quartile four (Q4), relative to Q1, $\hat{\beta}=7.903(g)$, 95% CI 3.042-12.765). Relationships between cumulative fast-food exposure and consumption were greatest in magnitude and almost linear (Q4, relative to Q1, $\hat{\beta}=8.367(g)$, 95% CI 3.877-12.857). Cumulative fast-food exposure was associated with greater BMI (Q4, relative to Q1, $\hat{\beta}=0.89(kg/m^2)$, 95% CI 0.036-1.751), but this trend was not linear. Results support the notion of an environmental influence on diet/BMI. Individual-environment relationships were strongest and most significant/robust when considering cumulative fast-food exposure. Nevertheless, takeaway consumption trends relative to work exposure were particularly strong/linear, suggesting policies designed to promote healthier diets through fast-food planning restrictions may be most effective if focused on work environments.

Do Residents of Hartford, Connecticut Live in a Food Desert? A Multidimensional Analysis of Grocery Stores

Debarchana Ghosh (University of Connecticut, U.S.A.), Katie S. Martin, Mengyao Zhang, Michele Wolf, Kate McMinimee, Martha Page

The USDA labels one-third of the census tracts of the city of Hartford in Connecticut as food deserts, which, like other inner cities, has more medium to small sized groceries than supermarkets. This paper investigates whether Hartford is a food desert by analyzing the status quo of the grocery stores, following a robust four-dimensional analysis of accessibility to stores, and affordability, availability, and quality of food sold at these stores. Thirty-six grocery stores ranging from large, medium, to small sizes and located in and within 2-miles of the city were selected. GIS techniques were employed to measure and map the accessibility dimension. A survey instrument was used to collect data on affordability, availability, and quality of inexpensive food choices in the stores. The instrument included prices of 25 items, quality of fresh produce, and internal and external appearances of the stores. Data were analyzed using t-test and ANOVA. GIS functions were further used to delineate 0.5 and 1 mile areas around the stores to calculate resident demographics. Although accessibility varies significantly, no significant differences in availability and affordability between Hartford and suburban stores were found. Quality and store appearance were significantly lower in Hartford. Medium sized groceries had significantly lower prices than small stores or supermarkets. Improving the quality of food, store appearance, and increasing the selection of produce in medium sized stores where the prices are cheaper will improve healthy food access for low-income households at risk for obesity. These findings have implications for future store and food policies.

Divergence in Measuring Distance for Identifying Food Deserts in Toronto Neighbourhoods

Amirmohsen Behjat (University of Victoria, Canada), Mustafa Koc, Aleck Ostry

A number of studies conducted in Europe and North American have shown that poor access to healthy and affordable foods in urban low-income neighbourhoods known as food deserts are associated with adverse public health impacts. Most studies of urban food deserts identify neighbourhood food stores; characterize the types of foods they offer, and then attempt to estimate the extent to which local residents have access to them. In terms of the latter, most food desert studies calculate the acceptable walking distance from mainstream healthy food outlets using either Euclidian or Network distance methods. As there are still debates on the efficiency and applicability of each method in the literature, the purpose of this study is to compare Euclidian and Network distance methods to estimate acceptable walking distance around each healthy food outlet in order to identify food deserts in Toronto priority-disadvantaged neighbourhoods. We geocoded the addresses of major discount supermarkets. Two circular and network buffers of 1000m were drawn around each discount supermarket based on both Euclidian and Network distance methods. Our findings show that in neighbourhoods with complex and irregular street patterns, the use of Network rather

than Euclidian methods produce more reliable estimates of walking time for residents to local discount stores. The main implication of our findings is that previous food desert studies conducted in complex urban neighbourhoods with irregular street layouts, and using Euclidian estimates to calculate resident's walking distance from local stores under-estimate these distances. Therefore, more complex GIS methods such as network analysis may be a more precise approach to characterizing and identifying food deserts in geographically complex urban neighbourhoods.

The Grey Triangle: Understanding Low Income Families Supermarket Choices Through Triangulation

Leia. M. Minaker (University of Waterloo, Canada), Susan J. Elliott

Neighborhoods are settings in which access to health-promoting resources are often inequitably distributed. Many studies over the past two decades have examined geographic access to food; if reasons for supermarket choice differ between low- and high-income families, different solutions to inequitable food access may be indicated for different populations. This paper uses triangulation to explore reasons for supermarket choice across income levels. In a study funded by the Heart & Stroke Foundation, a population-based, stratified random sample of 2228 households in Ontario, Canada reported reasons for supermarket choices. One-way ANOVAs were used to determine if reasons varied between income levels. A qualitative study employed in-depth interviews (n=14) with low income families with additional food procurement restrictions (anaphylactic food allergies) to examine reasons for supermarket choice. ANOVA results revealed that low- and high-income families indeed differed significantly ($p < 0.001$ for all results) in reasons for supermarket choice: price was a more important consideration for supermarket choice among low-income families; proximity and food quality were more important considerations for higher-income families. Interviews were transcribed verbatim; analyses occurred within a social interactionist paradigm. Qualitative findings suggested that complex interactions existed between price and other determinants of supermarket choice, including food quality, specific foods available, and proximity. While quantitative findings revealed a fairly black-and-white picture of reasons for supermarket choice among low-income families, qualitative findings revealed shades of grey, indicating that policy responses to increase geographic access to nutritious food sources may be necessary but insufficient mechanisms for supporting the diets of low-income neighborhood residents.

Session 18: Smoking, Alcohol and Drug Abuse

Tobacco and Alcohol Environments and the Relationship with Adolescent Risky Behaviours in Scotland

Niamh K. Shortt (University of Edinburgh, United Kingdom), Catherine Tisch, Jamie Pearce, Richard Mitchell

It is well established that tobacco and alcohol use pose significant global public health challenges and are major determinants of preventable morbidity and mortality. Preventing tobacco and alcohol misuse in adolescence is a widely endorsed public health goal. Research has shown that those who start smoking at a younger age are more likely to become regular smokers in adulthood and those who start drinking before the age of 15 are more than twice as likely to become substance-dependent, contract sexually transmitted diseases, drop out of school and have criminal records. These connections between adolescent behaviour and adult health outcomes emphasise the importance of tackling risky health behaviours before they become habitual. Pathways to smoking and alcohol consumption are multiple, intertwined and multiscalar (Frohlich et al., 2002) with previous studies overwhelmingly demonstrating that environment is an important determinant of such pathways. This paper explores these pathways focussing on place-based regulation and policy, which shape opportunities and constraints for the availability of tobacco and alcohol products. In the first national study of its kind, this paper examines the density of all tobacco and alcohol retail outlets throughout Scotland. We have created a national kernel density exposure measure at a small area level (postcode) and joined this to a survey of health related behaviours in secondary school pupils ($n = 37,307$). We present results of this analysis, exploring the association between outlet density and smoking/alcohol consumption alongside attitudes towards such behaviours in a sample of school aged children.

Spatial Approaches to Evaluating Tobacco Outlet Reduction Interventions: Toward a Smokefree New Zealand/Aotearoa by 2025

Amber L. Pearson (University of Otago, New Zealand), Frederieke S. van der Deen, Nick Wilson

This research aimed to study various spatial interventions to reduce demand for tobacco products and hence to help achieve New Zealand's smokefree nation goal. Using a range of New Zealand data, geographic analyses were conducted to estimate travel time and distance for the population by area-level deprivation. Costs were then calculated for return trip car travel and time spent and costs for each intervention were compared with the current outlet distribution of tobacco outlets, estimated at $n=5979$). Price elasticity data from tax/pricing studies was used to estimate the reduction in tobacco demand from increased travel/time costs. A total of five tobacco outlet reduction interventions were specified, based on the underlying constructs: (i) Reduction of existing tobacco retail outlets by 80% and 95%; (ii) Tobacco sales at designated facilities only; and (iii) Reduction in density of tobacco outlets. The highest net increase in travel costs (over baseline) was found for the 95% reduction intervention which was estimated to reduce demand by 41% (range: 41%-165%). However, reductions in outlet density (either generally or near schools) resulted in the most equitable (but smaller) net cost increases and demand decreases across deprivation tertiles (0.1%-6%). If policy makers were to choose between legislation to require tobacco licensing and sales at designated facilities (bottle stores) or to not allow tobacco sales near schools, restrictions near schools produced the greater decrease in demand (low estimates 0.1% vs 2%). This plausible range of tobacco outlet reduction interventions can thus inform strategies to reach this country's national smokefree goal.

Studying Spatial Inequalities in Smoking in Montreal Neighborhoods: The ISIS Study

Katherine Frohlich (Université de Montréal, Canada), Rowena Agouri, Martine Shareck, Clément Dassa, Yan Kestens, Jennifer O'Loughlin, Geetanjali Datta, Bernard Simon-Leclerc, Mark Daniel

Despite the fact that the overall population prevalence of smoking in North American populations is declining, smoking outcomes are displaying an increasingly steep social class gradient. Such social class differentials are also increasingly apparent in residential neighbourhoods. This presentation will describe a field study that seeks to address two questions about social inequalities in smoking: 1) Why is it that lower socio-economic smokers are not following the secular trend at the same rate as the rest of society?; and 2) What are the attributes of neighbourhoods that contribute to social inequalities in smoking? ISIS is a cross-lag panel study using multi-level linear and nonlinear models to jointly analyse individuals nested within neighbourhoods. At the first level of analysis our sample involves 2098 young adults aged 18-25. The second level of analysis is Montreal neighbourhoods ($n = 35$). Within the ISIS study we have developed a theoretical framework to guide analyses of the environmental and

individual factors implicated in shaping these social inequalities in smoking. Our framework characterises neighbourhoods as unique configurations of five domains (physical, economic, institutional, local sociability and community organizations) through which health-related resources can be accessed. We view this configuration of domains as being shaped and reproduced by the neighbourhood residents'; individual resources, conceptualised as capitals (specifically, economic, cultural, social and biological capitals). This framework and preliminary findings from our first year of data collection will be presented for their relevance to medical geography and the study of spatial justice.

Contextual Influences on Inequalities in Smoking: Accounting for Young Adult's Spatial Mobility

Martine Shareck (University of Montreal, Canada), Yan Kestens, Katherine L. Frohlich

Smoking is increasingly concentrated among young adults and in lower social classes. Various contextual attributes such as area deprivation and tobacco product availability in the neighbourhood are associated with these inequalities. Most studies have focused on the residential context. However, individuals are mobile and experience multiple places in the course of their daily activities. Since mobility patterns vary with socio-economic status (SES), mobility might play a role in shaping social inequalities in health and health behaviours. This presentation will use measures of activity spaces, i.e., the combination of places where people undertake regular activities, to: 1) explore the influence of residential and non-residential environments on smoking; and 2) test whether these associations vary with individual SES. We will present analyses based on 1,938 young adult participants in the Interdisciplinary Study of Inequalities in Smoking (Montreal, Canada, 2011-2012). Socio-demographic, smoking and activity location data were collected using a validated questionnaire. Reported activity locations were geocoded and used to define 800-meter road-network buffer zones. Census and commercial databases were used to describe area-level deprivation and tobacco-selling outlet density. With generalized estimating equation models we will examine associations between contextual indicators measured within the residential and activity space areas and smoking (status and intensity), and test for interactions with individual SES. This presentation will contribute to current discussions on the relevance of integrating people's mobility into place and health inequalities research. Specifically, this mobility perspective can help nuance the more traditional view of residential neighbourhood's influence on social inequalities in health.

Geography of Methamphetamine Manufacture and Harm in New Zealand, 2005 - 2008

Ashley Howell (University of Auckland, New Zealand), Daniel Exeter, David Newcombe

Background: Methamphetamine, like other illicit drugs, is recognized internationally as a threat to public health. However, unlike cocaine and heroin, domestic production of methamphetamine extends the risk beyond the individual user through the improper handling and disposal of hazardous chemicals involved in the manufacturing process.

Extensive surveillance of the methamphetamine market is carried out in New Zealand by governmental agencies, but less attention is paid to the public health burden stemming from production of the drug. This research describes the prevalence and distribution of methamphetamine production in New Zealand, and explores the distribution of methamphetamine-related health harms reported by New Zealanders. *Methods:* A mixed-methods study design utilized interviews with local experts and a database of health harms associated with methamphetamine assembled from secondary data sources including clandestine laboratory seizures, hospitalizations, deaths, poisonings, and fires. Regression models were used to explore potential socioeconomic determinants of clandestine laboratory presence, and GIS were used to identify clusters of high clandestine laboratory activity. *Findings:* Expert participants expressed concern for the health threat posed by environmental exposure to methamphetamine by-products, and by the producers/users themselves. The area most affected by clandestine laboratories was Auckland, even after adjusting for population size. Health harms attributable to methamphetamine production largely mirrored the distribution of clandestine laboratories. This research demonstrated the utility of GIS in drug surveillance and the potential for future monitoring of methamphetamine trends, contaminated sites, and the impact of current and future interventions in New Zealand.

Tobacco, Cannabis and Smoking Identity: Micro and Macro Contexts

Rich Tyler (University of Portsmouth, Great Britain), Liz Twigg, Graham Moon

In the UK, cannabis is almost invariably smoked with tobacco. Cannabis consumption complicates efforts to reduce smoking amongst young people with narratives often describing how mixing tobacco and cannabis brings down the cost of getting “high” and makes cannabis supplies last longer. It has also been suggested that tobacco cigarettes offer an acceptable substitute when cannabis is unavailable. In addition, the literature suggests additional prevention and cessation challenges as cannabis smokers may also fail to identify themselves as tobacco smokers. This paper explores the neglected issue of the role of cannabis in the dynamics of tobacco smoking amongst young people. Data are drawn from a cross-sectional sample (n=5700) of pupils, aged between 11 and 16 in schools in southern England. We specifically focus on the influence of household and family context on self-identity as a tobacco smoker and/or cannabis smoker, considering beliefs about tobacco and cannabis and consumption practices associated with both substances. We also investigate how wider, geographical contexts impact upon these relationships focusing on the role of socio-economic deprivation and local variations in the supply of tobacco and cannabis. Results suggest that nearly one third of regular users of “tobacco-added” cannabis do not identify themselves as tobacco smokers. However, in areas where cannabis is perceived to be easily available, young consumers of cannabis are more likely to identify themselves as smokers. Our results have implications for smoking cessation work amongst young people, pointing to the need to consider the nuanced impact of cannabis on smoking identity.

Session 19: Vector-Borne Diseases

Dealing with Endemic Dengue: Examining the Attitudes and Perceptions Towards Dengue Control in Malaysia

Sarah Dickin (McMaster University, Canada), Corinne Schuster-Wallace, Susan J. Elliott

Malaysia is one of many tropical countries where dengue is endemic and a major public health concern. At a local scale dengue prevention and control is a cooperative effort, as favourable mosquito vector breeding sites may be found across residential, industrial and public spaces within a community. However, many top-down vector control initiatives do not take into account local understandings of dengue transmission and control, and how these impact resident's actions to protect themselves and their families. This understanding is necessary in order to ensure that community-based vector control activities are both effective and sustainable. In this qualitative study, data were collected via focus groups with participants (n=61) from two different communities with high dengue rates. Focus groups were divided by gender to encourage open discussion and equitable participation. Key informant interviews (n=5) with public health staff and community leaders were also completed. Using an ecosystem approach to health framework, discussion focused on knowledge, perceptions, attitudes, and behaviours relating to dengue transmission and local level control activities. These were analysed thematically both within and across the two communities, and by gender. Results were later discussed with vector control staff in the public health departments to obtain additional insight. Findings reveal obstacles to community involvement in dengue control such as differing views on where mosquitoes breed and who is responsible for these breeding sites. These suggest that community input into prevention strategies in Malaysia could improve top-down public health efforts to control mosquito larval populations in the home and neighbourhood.

Community Knowledge, Attitudes and Practices (KAP) on Malaria in Jhapa District Nepal

Kabita Ghimire (Kansas State University, U.S.A.)

A cross-sectional study has been recently conducted in Jhapa district of Nepal investigating knowledge and beliefs of local community on malaria, its transmission process, symptoms and medication. The study is also evaluating perception of cause, preventive measures practices and treatments seeking pattern of the community. The preliminary analysis of the data shows that about 88% of the respondent had heard of malaria, Electronic media (46%) were the popular sources of malaria information, 69% associated mosquito bites with malaria. More than 90% of the household owned bed nets and Majority (80%) were self purchased. Almost 52% reported incidence of high fever in their household in last one year and less than 3% reported malaria incidence in the household. Only 2% of the respondent knew about malaria medication, however, more than 90% knew where to go for treatment in case of high fever. More than half of the respondent (57%) showed the willingness to travel more than one day for

treatment of high fever and about 60% were willing to pay NRS 500 or more (about \$5) for immediate treatment.

Spatial Patterns of Malaria in the Democratic Republic of Congo: A Landscape Genetics Approach

Michael Emch (University of North Carolina at Chapel Hill, U.S.A.), Steve Meshnick, Margaret Carrel

How does malaria spread from place to place? Malaria parasites can be carried over short distances by mosquitoes and over any distance by people. Geographic spread (diffusion) can lead to outbreaks in previously malaria-free areas and the introduction of drug resistance into zones where drug resistance had not previously existed. This project uses a landscape genetics approach to understanding malaria diffusion. Landscape genetics incorporates methods of population genetics, ecology and spatial statistics. Population movements are inferred from the measurement of movement of genetic markers (gene flow). The goal of this paper is to measure the movement of genetic markers (gene flow) to understand the factors which prevent transmission (barriers) or promote it (corridors). Barriers can be caused by humans such as malaria control programs or they can be natural such as mountains that restrict mosquito vector habitat because of cool temperatures. Corridors can also be created by humans such as roads or they can be natural such as rivers used for transportation. To achieve the goals of this project we use data and specimens from the Democratic Republic of the Congo (DRC), a country with high but spatially variable malaria endemicity. The project takes advantage of existing DNA samples from the large population-based 2007 Demographic Health Survey (DHS), which includes >10,000 people in 300 geocoded survey clusters. We measured 7 neutral microsatellite markers for 82 *P. falciparum* infected patients in 7 sample clusters from the 2007 DRC DHS using nested PCR. Genetic relatedness between DRC parasites was analyzed using measures of genetic distance including Nei's genetic distance (Gst) and Rst. We also compared the genetic distance of the DRC parasites to West African (Ghanaian) East African (Kenyan) parasites. Findings show that the genetic distance was greater when clusters were further apart in Euclidean distance. Samples to the West and South are more related to West African parasites, while the clusters in the North are more related to East African parasites. DRC Sites along the Congo River genetically cluster suggesting there might be a corridor.

Environmental Variability and the Continued Emergence of Lyme Disease

Korine N. Kolivras (Virginia Tech, U.S.A.), Liz Dymond, Yili Hong, Jie Li, Stephen P. Prisley, James B. Campbell, David N. Gaines, Randel L. Dymond

Lyme disease, the most common vector-borne disease in the United States, continues to emerge along the East coast of the U.S. An infection with *Borrelia burgdorferi*, the bacterium that causes Lyme disease, has a significant public health burden, and an improved understanding of the disease's emergence pattern will enhance diagnosis and

reporting efforts, and ultimately decrease the number of human cases. In the past decade, Virginia, on the front line of that expansion, has seen a quadrupling in the number of human cases. Many studies examining potential environmental links with Lyme disease have been conducted in endemic areas. In this study, we quantified the emergence pattern of Lyme disease in Virginia and found that the disease has spread in a southwestwardly direction. Additionally, we explored the potential role of environmental variability as the disease emerged in Virginia using GIS analysis and a spatial Poisson regression model with Virginia census tracts as the unit of analysis. Independent variables included demographic, land cover, and forest fragmentation data. The results highlighted the importance of scrub-related fragmented landscapes, the percentage of census tracts devoted to developed and scrub land cover, and demographic variables including population density, median age, and median income in the continued emergence of Lyme disease. Future work will incorporate these results into a predictive model that can be used by the Virginia Department of Health to target surveillance and preventative efforts in areas at high risk for emergence.

Tsetse Burden and Agricultural Activity in Kenya

Joseph P. Messina (Michigan State University, USA), Nathan Moore, Mark DeVisser

African Trypanosomiasis otherwise known as sleeping sickness in humans and nagana in animals is a zoonotic, parasitic disease widely blamed for hindering development across sub-Saharan Africa. As the numbers of cases of the human infection have declined, the disease has become a much lower priority for international health and aid organizations. In this paper, we argue that tsetse burden is significantly underestimated due to the spatial and temporal sorting of agri-economic activities largely the product of local knowledge of tsetse dynamics. We hypothesize that people choose to move from high tsetse burden zones that were historically unidentified in static, presence only models. A disconnect exists between local activity and most national or international tsetse mapping and control projects. We present the results from a dynamic spatial simulation model (2001-2010) of tsetse presence highlighting endemic tsetse as fundamentally distinct from ephemeral burden. We discuss the importance of these endemic zones as vector source pools and offer control and development solutions to reduce the disease burden at both local and regional scales.

National Control of Tsetse: Is Eradication in Kenya Feasible?

Mark H. DeVisser (Michigan State University, U.S.A.), Joseph P. Messina, Leah Dodge

Tsetse flies (genus *Glossina*) are the primary vector for African trypanosomiasis, a neglected tropical disease that affects both humans and livestock across the continent of Africa. Efforts to control the disease have historically focused on the vector, but have been hampered by a lack of information on tsetse population dynamics and frequent re-invasion from nearby populations. In October 1999, the 25th International Scientific Council for Trypanosomiasis Research and Control (ISCTRC) recommended the creation of a pan-African initiative to address tsetse eradication. As a result, the Organization for African Unity established the Pan African Tsetse and Trypanosomiasis

Eradication Campaign (PATTEC) in October 2001. PATTEC is the latest in a very long list of international organizations established with the express goal of controlling or at least mitigating the disease in Africa, however, we argue PATTEC has been and will remain constrained by a historically flawed conceptualization of space and time. In this presentation we reconceptualize how tsetse (re)occupy space through the application of a dynamic simulation model and national eradication efforts in Kenya.

Session 20: Health Disparities I

Unpacking Material and Social Determinants of Health and their Effect on Early Childhood Development in Kingston, Ontario Neighbourhoods

Candice M. Christmas (Queen's University, Canada), Mark W. Rosenberg

Life course literature states that early childhood development (ECD) can influence most aspects of health throughout the life-cycle. Canada ranked last among 25 wealthy nations in meeting ECD objectives. Less than 5% of children born have clinically detectable shortcomings in developmental health, increasing to 26% by school age with emerging socioeconomic associations. Understanding how social determinants of health (SDH) influence ECD at the household and neighbourhood scales would help identify conditions for optimal developmental outcomes. The effects of SDH on ECD in the Kingston, Ontario area were studied. SDH were classified via marginalization (ONMarg) and deprivation (Pampalon) indices. ECD was measured via 2006 Early Development Instrument (EDI) scores for children most at risk. The basic spatial unit of analysis was 2006 Census Canada Dissemination Areas, subdivided into quintiles of deprivation. EDI results from each of the quintiles within the two indices were compared, then combined. The socioeconomic health gradient assumes that EDI scores will directly correlate to material and social deprivation. Social deprivation had a slightly greater impact than material deprivation on children's developmental vulnerability, with Q5 being the most vulnerable in all competencies. Surprisingly, emotional health and social competence were significant areas of vulnerability for children in Q1 and Q2. Policy should focus on mitigating avoidable risks within this critical time to avoid future deleterious health effects and costs. Mapping the effects of SDH at the neighbourhood level generates knowledge that informs intersectoral action by policy makers and public health to provide the supports needed to foster healthy children.

Place Experiences and Well-being of Young Adults in Montreal, Canada

Julie Vallée (Université de Montréal, Canada), Martine Shareck, Yan Kestens, Katherine Frohlich

The objective of this exploratory research is to investigate the potential interplay between experiences of places and well-being in a young adult population in a large metropolitan area. Data are issued from the ISIS project (Interdisciplinary Study of Inequalities in Smoking) carried out in 2011-2012 among a representative sample of 2,098 individuals aged 18-25 residing in Montreal, Canada. With the objective of analyzing the variability in people's place experiences, we combine individual survey data about spatial cognition (perceptions of their residential neighbourhood), spatial practices (descriptions of their daily activity space) and individual attributes relating to (im)mobility (e.g. modes of transportation, functional limitations). We also evaluate environmental resources regarding availability of transportation and presence of shops and leisure activity opportunities. Using classifications methods we identify various patterns in individual place experiences and observe how residents living in close

proximity do not necessarily share the same place experiences and, similarly, how similar place experiences may be shared by residents scattered across the city of Montreal.

In a second research step, we investigate if and how people's self-reported well-being reflects, and is reflected in, patterns of people's place experiences. Some ways of experiencing places may indeed promote well-being through higher accessibility to social and material resources and stronger social integration. Reciprocally, well-being may also impact how people decide to engage (or not) in places. Empirical findings in Montreal city will be discussed in accordance with the potential reciprocal relationship between place experiences and well-being.

The Combined Impact of Rural Residence and Socio-economic Status on Premature Mortality

Iain Lake (University of East Anglia, United Kingdom), Natalia Jones

The health of rural and urban populations differs, with those living in rural areas appearing healthier. The main reason for this is that individuals living in rural areas tend to be less deprived, and less deprived individuals experience better health. However, most previous studies have relied on aggregate health data to examine differences in health between urban and rural residence. Therefore it is unknown whether the benefit of living in rural areas is felt by individuals in all levels of deprivation, or whether some suffer a disadvantage of rural residence. This study overcame these issues using individual level mortality and deprivation data. For England and Wales 2001-2003 premature mortality rates were calculated, subdivided by individual deprivation and gender, for areas with differing rurality characteristics. Premature mortality data (aged 50-retirement) and a measure of the individual deprivation (National Statistics Socio-economic Classification 1-7) was obtained from death certificates. Three measures of rurality were examined; road travel time to nearest large hospital; access to general practitioners; and an urban-rural classification based upon population density. Overall premature mortality was examined as well as premature mortality subdivided by major cause (Cancer, Circulatory disease, Respiratory disease, Digestive disease and External causes). Male premature mortality rates (aged 50-64) fell with increasing rurality for individuals in all socio-economic status classifications. The most deprived individuals benefitted most from residence in increasingly rural areas. Similar trends were observed across the three different measures of rurality, and when premature mortality was subdivided by the major causes of death.

Health State of Eastern Poland's Residents in Conditions of Modern Socio-economic Transformations

Viktoriya Pantyley (Marie Curie-Sklodowska University, Poland)

The work was completed in the framework of National Science Centre project no NN 306700940. The influence of socio-economic transformations on the demographic potential in Eastern Poland's diagnosis and predictions. The aim of the presentation is

to scrutinize health problems among the residents of Eastern Poland in the light of the available statistical data and resident's self-evaluation. The work was based on the following research methods: systemic approach, selection and analysis of statistical data, developing a questionnaire concerning the level and quality of demographic potential in the studied area, field research with an interview questionnaire conducted between September 2011 and January 2012 (after verification of 1200 questionnaires, 1103 were qualified for the analysis), statistical and substantive development of the survey. The analysis of basic indicators reflecting the health state of population allows claiming that the residents of Eastern Poland are undergoing an epidemiological transformation in a specific manner. An increasing incidence of civilization diseases coincides with relatively high incidence of social diseases, particularly active tuberculosis. The results of statistical surveys in the studied area with the use of chi-square test and contingency quotients indicated a correlation between the health state and the following independent variables: age, life quality, social position and financial situation (C-Pearson's coefficient over 0.300); statistically significant, yet weak correlation, was recorded for gender, household size, place of residence and the amount of free time.

Investigating the Role of the Community Development Worker in Hamilton's Approach to Reducing Health Inequities

Madelaine Cahuas (University of Toronto, Canada), Sarah Wakefield, Yun (Annie) Peng

Local governments, in partnership with community agencies and groups across Canada, are increasingly turning to Community Development (CD) approaches to address health inequities. Many CD initiatives are place-based and seek to engage community members so that they may identify local health concerns and make decisions on how to solve problems collectively. Few studies, however, have critically investigated how power operates within the CD process, or examined the mechanisms through which particular individuals and groups may be included or excluded from decision-making and action. This paper presents findings from a study examining a comprehensive CD initiative called Neighbourhood Action, launched by the City of Hamilton and community partners in 2010. This initiative seeks to tackle widening health disparities - as reflected in the city's 22-year gap in age at death between the wealthiest and poorest Hamiltonians - through resident-led neighbourhood planning processes facilitated by Community Development Workers (CDWs). This paper draws on semi-structured interviews with CDWs analyzing their experiences and their role in navigating power hierarchies during the planning phase of Neighbourhood Action. Findings demonstrate that CDWs employ various strategies to facilitate resident engagement and participation, but face challenges in navigating power relationships shaped by class, race and gender, internally within communities and externally, between communities, service providers and city officials. The implications of this research for reducing health inequity and taking meaningful actions on the social determinants of health will be discussed.

"The Healer: in the White Man's Grave: Representation of African Health Issues on Colonial-Era Missionary Postcards

Robert Stock (University of Winnipeg, Canada)

In the early decades of the 20th century, picture postcards were a popular means of everyday communication and highly prized as collectible items. Many tens of thousands of these cards showing scenes from Africa were published. The images on these cards played a pivotal role in shaping the perceptions of ordinary people in the West about Africa and Africans. For missionary organizations, postcards were a valued and heavily-utilized medium for publicizing their work abroad. Postcards were used to tell stories about the challenges missionaries faced and the triumphs they claimed for themselves. This paper examines ways in which missionary organizations used postcards to frame their health-related work in Africa, and to win public support in the West for their efforts. Mission postcards portray Africa as a dangerous place where diseases such as leprosy and sleeping sickness, wild beasts, and the "pagan practices"; of witch doctors posed everyday threats to health. The cards show missionaries responding with compassionate care, but it is also made clear that the ultimate objective of health interventions was the conversion of Africans to Christianity. Postcard images of the African environment as pathological and of missionaries as caregivers and healers helped to establish and reinforce stereotypical images of Africa. Illustrative examples of missionary postcards showing health themes will be incorporated into the presentation.

Session 21: Primary Health Care

The Marriage of Health Geography and Academic Family Medicine

Anne Gaglioti (University of Iowa, U.S.A.), Kevin Matthews

Family Medicine has had a geographical perspective since the inception of the discipline. Their founding documents highlighted the geographic dimensions of health. Since that time, Family Medicine research has utilized methods that both medical and health geographers would recognize as geographical analysis. Family Medicine has employed GIS as a tool for realizing the inherently spatial nature of their discipline. Despite our mutual understanding of health and place, and their adoption of our tools, the two disciplines otherwise have relatively little interaction. This article assesses the current opportunities for enhancing geographic analysis and GIS in the development of evidence-based approaches to population and community health and primary care practice. Family Medicine values the maintenance and restoration of an individual's balance within their physical, built, social and relational environment. Caring for an individual requires an understanding of each patient's unique life circumstances. This philosophy, conceptualized as the bio-psycho-social model, is a synthesis of evidence-based medicine, and qualitative social theory. It is based on the basic tenant that where we live has a direct impact on our health as individuals and communities. Health Geography can offer Family Medicine a complementary philosophic and analytical approach to articulate the intellectual basis for geographic analysis in their field. A marriage of the fields could yield several offspring: the spatial epidemiology of wellbeing, utilization of the health landscape as a therapeutic intervention, and evolution of the bio-psycho-social model into a multifactorial place-based concept of health: the bio-geo-psycho-social model.

Bespoke Geographies for Evaluating Primary Care Services in New South Wales, Australia

Soumya Mazumdar (Australian National University, Australia)

An effective primary health care system is key to optimal utilization of health care. Primary health care services are often targeted and evaluated along geographical boundaries. However, pre-existing administrative boundaries may not reflect patterns of existing use of primary health care services and thus may not be suitable for this purpose. For example, if a large fraction of patients in a given geography travel across its boundary for accessing health services, maps of disease outcomes for this geography could reveal spurious patterns. This motivates the need for bespoke geographies of self-sufficient primary health care use, where the majority of health services accessed in these geographies are from people living within them. Variation of access related outcomes across such geographies can be then utilized to target appropriate policy interventions. In the United States such geographies are extant and are known as Primary Care Service Areas (PCSAs). In Australia, where the importance of primary health care to the overall health system is well understood such geographies, paradoxically do not exist. In this paper I describe the process of creation of Primary

Care Service Areas in the Australian state of New South Wales using information from a large survey linked to General Practitioner service use data. These geographies are useful to policymakers and may be expanded to other states in the future.

Increasing Spatial Concentration of Primary Care Physicians in Metropolitan Chicago: Implications for Inequalities in Spatial Access to Care

Joe Simanis (University of Illinois at Urbana-Champaign, U.S.A.), Sara McLafferty

Socio-structural pressures in the U.S. health care system are fueling the growth of primary care-based medical groups, often owned by hospitals, in order to manage costs and spread physician's workloads and financial risks. Such processes result in changes in the spatial organization of primary care physicians that in turn re-shape people's spatial access. We examine the changing numbers and locations of primary care physicians (PCPs) in the Chicago metropolitan region from 2000 to 2008 and the implications for socio-economic inequalities in spatial access. Using data from the AMA's Physicians Masterfile, for physicians specializing in family practice, general practice and internal medicine, we analyze the changing spatial clustering of primary care physicians. Kernel density estimation and k-function methods reveal the increasing spatial concentration of physician office locations. To determine if the increase in clustering exceeds that which would be expected based on the overall growth in the number of PCPs, we utilize a Monte Carlo method that simulates the locations of new and mobile PCPs, to evaluate the significance of observed changes. In the final section, we assess the differential effects of the increasing spatial clustering of PCPs on socioeconomic differentials in spatial access. The results show that neighborhoods in the lowest and highest quintiles of median income experienced the largest improvement in spatially-smoothed physician to population ratios. However, low-income neighborhoods continue to experience significant disadvantages in terms of spatial access to primary care. Heightened spatial concentration of PCPs caused by growth of shared medical practices is having little impact on socio-economic differentials.

Neighbourhood Variation and Inequity of Primary Health Service Use by a Cohort of Mothers from London-Middlesex, Ontario

Catherine Holtz (University of Western Ontario; Children's Health Research Institute, Canada), Jason Gilliland, Amardeep Thind, Piotr Wilk, Karen Campbell

Primary health service use (P-HSU) may be influenced by predisposing and enabling factors measured at individual- and contextual-levels but is equitable when driven by need factors. The first objective was to determine if maternal P-HSU varies between the neighbourhoods in which mothers reside, and to estimate the effects of contextual characteristics on P-HSU. The second objective was to determine whether the effects of maternal need characteristics on P-HSU are dependent on predisposing and enabling factors. The study population of 1432 participants was from a prenatal cohort recruited from London, Ontario between 2002 and 2004, with follow-up until children were

preschoolers. Maternal characteristic data were linked to contextual characteristic data from a second database. Multilevel logistic regression modeled maternal and contextual characteristics associated with P-HSU, and interactions of need factors with predisposing and enabling factors. P-HSU varied between neighbourhoods ($p=0.018$). Obesity's effect on P-HSU was different for rural mothers living in low-income households ($OR=0.26$, $p<0.05$) and in middle-income households ($OR=0.15$, $p<0.05$), and for urban mothers living in high-income households ($OR=2.82$, $p<0.05$). Results indicate that differences in maternal P-HSU exist between neighbourhoods, partially explained by urban/rural residence. The enabling factors household income and urban/rural residence influenced maternal need factor's effects on P-HSU, identifying subgroups of mothers who of mothers who are potentially disadvantaged in their use. This research has the potential to inform Canadian health policy with regards to contextual effects and inequity of maternal P-HSU.

Measuring Accessibility to Primary Care in France: Toward an Integrated Model

*Magali Coldefy (Institute for Research and Documentation in Health Economics, France),
Véronique Lucas-Gabrielli*

In France, despite a high level of physician-population ratio compared to other countries, the question of geographical disparities in access to health care has raised an crucial debate. Both the planned reduction of the number of physicians and the increasing demand due to the ageing of the population make that certain areas already have to deal with problem in access to care. To improve the spatial distribution of health supply, French national authorities have defined shortage areas and developed incentives for physicians to set up practices there. The method to designate these shortage areas is now criticized by some actors such as local elected representatives, who question the relevance of such spaces. Very few studies have directly questioned the definition of potential spatial accessibility to health care in France, because availability and accessibility have mostly been studied separately. We deal with this issue using concepts such as the two-step floating catchment area (2SFCA) method which makes it possible to combine density and distance and to solve some of the identified problems. Its application in the French context led us to improve the 2SFCA method in several directions: 1) the quantification of available supply; 2) the inclusion of health care needs; 3) the measure of distance and travel impedance. Spatial and non spatial factors of accessibility are finally combined in an integrated model of accessibility to health care, aiming to better define shortage areas.

The Place of the Receptionist and Waiting Room: Researching the Space between Community and Consultation

*Pat M. Neuwelt (The University of Auckland, New Zealand), Te Kupenga Haoura Maori,
Robin A. Kearns*

At the point of entry to the health care in New Zealand sit general practice receptionists (GPRs), a seldom studied group. The receptionist literally 'receives' those who phone or

come through the door, and is a critical influence in their transformation from a 'person' to a 'patient'. We report on a study that contends that the identities of the patient and receptionist need to be mutually acceptable in order for the person who walks into a practice to become a patient has adequate access to a clinical appointment. The research aims to explore the role of GPRs in relation to known inequities in access to primary care. It asks *What role do GPRs play in access to primary care for members of disadvantaged populations?* Preliminary findings have identified that people sometimes move practices after experiencing moral judgment or perceptions of racism from GPRs. Yet GPRs can contribute to people's positive experiences of primary health care. In contrast, some GPRs perceive the waiting room as a positive social space and not primarily a clinical setting. We conclude that the character of both the people and the décor/dynamics of the waiting area can, in combination, influence the degree to which people/patients feel at-ease when experiencing disease. Hence, the engagement between the receptionist and the patient is more than simply an interpersonal encounter; it is a structural determinant of access to care.

Session 22: Food Programs and Policy

"It Helps Me to Buy Food in the House" The role of Disability Grants for Access and Adherence to Antiretroviral Therapy and Tuberculosis Treatment in South Africa

Jana Fried (University of Western Ontario, Canada), Veloshnee Govender, Susan Cleary, Steven Birch, Natsayi Chimbindi, Vanessa Daries

The right to a healthy and economically-secure life for all South Africans is one of the fundamentals enshrined in South Africa's 1996 constitution. However, advancements in achieving these rights for all are hampered by high unemployment and poverty levels and by the inter-related impacts of the HIV/AIDS and TB epidemics. The expansion of the social security system and free service provision within the public health care sector are meant to address some of these issues. In this paper, we discuss the interplay between access to social security, especially the disability grant, and access to TB and HIV/AIDS care, focusing on achievements and challenges of the current system from the perspective of patients and providers. We present results of a 3-year project conducted in four South African provinces, analysing both quantitative (n = 2469 patients) and qualitative data (67 in-depth interviews with patients and providers). We analyse access to disability grants for different patient groups to reveal inequalities, and present implications of (lack of) access to disability grants on access to health care. We conclude that, on a policy level, collaborative efforts between the Departments of Social Development and Health should aim to inform and prepare health care providers who are at the interface between social security and potential recipients. In the absence of such efforts, poor knowledge of the grants process and eligibility criteria on the part of patients and health care providers will continue to lead to inequalities and the inability of patients to afford access to effective treatment.

Effect of State's Responsiveness to Adult Obesity in the United States: Evidence from State-Based Obesity Interventions using a Quasi-Experimental Approach

Keumseok Koh (Michigan State University, U.S.A.)

Since 2000 the Division of Nutrition, Physical Activity, and Obesity (DNPAO) in the Centers for Disease Control and Prevention (CDC) in the United States has funded 37 state health departments to address the obesity epidemics in their states. The program aims to promote healthy life styles through obesity interventions designed to impact human behaviors within multiple levels of society. The purpose of this study is to investigate the impact of CDC-DNPAO programs on adult overweight and obesity prevalence from 1998 to 2010. Using unadjusted quasi-experimental design before and after the program implementation, this study compare state's the obesity prevalence rates. This study found that there are mixed effects of the CDC-DNPAO programs on the mean BMI change by states in those Census Regions and the duration. In the Northeast and the West, the increase in mean BMI is least in states over seven years of implementations. In the Midwest, the least mean BMI increase is observed in states

with 4-6 years of implementations. In the South, all CDC-DNPAO states experience more mean BMI increase than non-CDC-DNPAO states. In sum, this study provides limited evidence of the protective effects of CDC-DNPAO. Future study should provide an in-depth study to thoroughly evaluate the effectiveness of the CDC-DNPAO programs on adult obesity in the U.S.

Behavioral and Structural Policy Interventions in Food Systems Planning

Richard Sadler (University of Western Ontario, Canada)

Contemporary built environment research favors the ecological approach, a holistic, community-oriented view of health. But within research employing the ecological model, there is a lack of consensus over the relative of influence of structure versus agency. Food environment interventions tend to concentrate on structural determinants of health which may inhibit the procurement of nutritious food. Many researchers recommend the storing of food deserts, making the assumption that access to food-retail is a primary inhibitor to healthy eating. While structural inequalities such as a lack of nutritious foods are undoubtedly present, behavioral factors also shape disparate health outcomes. Recognizing the complexity of devising effective interventions, this research applies Giddens structuration theory to the issue of healthy eating. This is related to Bourdieu's concept of habitus, which suggests a world-view regulated by external influences (social inequality) but modifiable by the agent (individual choice). Results of this research show that a food-retail intervention in a highly socioeconomically polarized community did not have a significant effect on healthy eating. Further discussion with community stakeholders indicates that residents are aware of healthy eating options, and few are physically prevented from accessing these options, yet many still do not consume a nutritious diet. This result concurs with research on behavioral economics, which suggests that consumers frequently do not choose optimally even when presented with all possible choices. Given the variable results of structural interventions, behavioral interventions focused on education and empowerment may present a viable alternative to food-retail interventions.

Food Access in Local Food Retail Stores in Philadelphia

Alisa Shockley (Temple University, U.S.A.)

Food deserts are areas in which residents have limited access to healthy foods. The purpose of this study is to examine food access in local food retail environments. Food variety in retail stores is determined by neighborhood characteristics; low-income residents have poorer access to healthful foods; and physical presence of supermarkets does not mean residents have full access. This is a mixed method study that uses quantitative, spatial analysis and qualitative, observational analysis. Demographic data are from the U.S. Census. Addresses from two business directories are used to perform hot spot analysis (LISA), and density estimates of the stores and population. The results of this study indicate that supermarkets in Philadelphia are more geographically available in neighborhoods with high concentrations of white population, whereas

corner stores are more available in predominately black neighborhoods. Food deserts are located in disadvantaged neighborhoods that are predominately minority, low-income and most often segregated areas. Local chain supermarkets do not provide similar services or offer the same products depending on location. Disadvantaged populations do not get the full benefit of having a supermarket in their neighborhood if the supermarket decides to sell only certain items. The findings reflect the literature on food deserts and the location of supermarkets in predominately, suburban, middle-high income areas.

Session 23: Violence and Health Geography

Structural Violence and Health Geography

Dr Geoffrey DeVerteuil (University of Southampton, United Kingdom)

Health geography has rarely engaged with concepts of violence, while medical geography has treated it more as a neighborhood hazard and/or something gratuitous. I wish to critically introduce notions of structural violence and its spatiality to health geography. Structural violence is always in the service of wider societal goals, and acts as a vehicle to implicate the state's crucial role in health denial and neglect, and sometimes outright extermination. Intentional structural violence involves spaces of exception (Agamben 1998) and repression, while non-intentional structural violence can be associated with the current social structure of market-centered neoliberalism, and can include the overarching governance of populations deemed non-producing and non-consuming. Moving beyond a think-piece, two case studies will be offered to examine how the calculation of life varies over time and across space, and how this is linked to structural violence and health geography - the case of genocide under totalitarianism (Ukrainian terror famine of 1932-33), and urban homeless geographies under current neoliberalism, showing a range from disavowal and neglect to premeditated murder on an industrial scale.

Green Space, Violence and Crime: A Systematic Review

Sandra Bogar (Medical College of Wisconsin, U.S.A.)

Research demonstrating relationships between urban green space, violence and crime remains complex and inconclusive. Following, a systematic literature review of published, peer-reviewed studies demonstrating empirical evidence of relationships between urban green space, violence and crime in the United States was conducted. Major databases were searched for studies meeting inclusion criteria and additional articles were cultivated through citations of selected studies. Collectively, the literature reveals conflicting results. Some studies demonstrate that green space contributes to health promoting environments with corresponding decreases in violence and crime. Other studies suggest that green spaces can foster violence and crime, while still other studies found no significant relationship between green space violence and crime. Differences in outcomes related to green space, violence, and crime, are complicated by numerous study variations. However, all studies speak to the potential for green space to serve as cost effective, place based interventions to improve health and alleviate violence and crime, albeit with certain variables present which, as of yet, are not fully understood. Future research priorities include standardizing methods of measurement, separating units of analysis to understand how green space operates on numerous levels, further controlling of variables to better understand causality, and collaborations between researchers of different disciplines to better shape understanding of complex relationships between urban green space, violence and crime. Increased numbers of rigorous studies will increase the potential for more

effective, systematically deployed green space interventions and supportive policies to improve population health.

Suffering in Silence: Health Implications of Domestic Violence Against Men in Rural Communities in the Komenda-Edina-Eguafo-Abrem District, Ghana

Addae Boateng Adu-Gyamfi (University of Cape Coast, Ghana)

Domestic violence has been a phenomenon in Ghana for decades as it is entrenched in the culture of many ethnic groupings. This has led to several health implications and in some cases death. While the Domestic Violence and Victim Support Unit (DUVVSU) of the Ghana Police Service has been established to educate Ghanaian residents report cases of domestic violence and also seek medical attention, a greater number of victims do not report domestic violence against them. This paper examined cases of domestic violence against men in a rural setting and its implication on their health in the Komenda-Edina-Eguafo-Abriam district. Using a qualitative research methodology, the study purposively selected five women accused of causing domestic violence and ten men who have fallen victims. It was found that men in rural communities suffer persistent domestic violence, including physical, psychological and emotional abuse leading to ill health, injuries and deformities, but most of them fail to report and/or seek medical attention at hospitals. Respondents are aware of the need to seek medical attention but resort to self medication and purchase of drugs from quack drug peddlers due to fear that the cases would be referred to the police by the health staff and their wives arrested and also due to perceived stigmatization. It is recommended that DUVVSU and the Ghana Health Service should intensify campaigns to educate people especially rural dwellers on health consequences of domestic abuse and the need for victims to seek medication from authorized health care facilities.

East London Resident's Views of Olympic Securitization after London 2012: Initial Qualitative Findings from the ORiEL Study

Claire Thompson (London School of Hygiene & Tropical Medicine, United Kingdom), Daniel Lewis, Stephanie Taylor, Steven Cummins

Crime and security are major factors impacting upon health and wellbeing, especially in areas of high deprivation. East London contains some of the most deprived neighbourhoods in England. The Olympic bid described how local residents would enjoy the economic, health and cultural benefits of hosting the Games. By contrast, the potential for marginalising vulnerable and local groups has been emphasised by researchers and activists. There is still relatively little research examining how residents of Olympic cities experience security and securitization as social determinants of health. This qualitative longitudinal study aims to locate perceptions of Olympic securitization within community narratives of neighbourhood security, and investigate how residents link these to health-related behaviours. Semi-structured interviews, video focus groups and go-along interviews with a total of 45 adult and adolescent respondents are being used at both waves of data collection. A narrative

approach to data analysis is being used to identify episodes of comparison across time and cases and to highlight resident's explanations of causality. Wave one revealed unexpectedly positive narratives. Respondents explained that securitization made them feel safer, improved the area, and reinforced the importance of the Games. Although some were critical, there was a widely held assertion that security measures were not a personal imposition because the intended subjects were unspecified and undesirable "others". This runs counter to academic and political discourses of (Olympic) securitization as militaristic fostering of insecurity and suppression of dissent. It suggests that securitization may have some positive outcomes for health and wellbeing.

Violence, Alcohol Outlets and Drug Markets in Boston, Modeling Spatial Adjacency

Robert Lipton (University of Michigan, U.S.A.), Jason Goldstick

Objectives: We examine the relationship between alcohol outlets, drug markets (approximated by arrests for possession and trafficking) and violence in the city of Boston, for 2006. We determine what geographic/environmental and individual factors are related to the production of violence. Further, we identify high decile areas of violent crime. *Methods:* Data from the Boston Police Department (BPD), the census, and Massachusetts state data on alcohol outlet type and location are used. Spatial modeling is employed at the block group level (n=544), and maps of violent crime, alcohol outlets and drug markets are produced. *Results:* Highest decile block groups (n=55) of violent crime, compared to all other block groups (n=489) were found to have higher percentages of most socio-demographic, alcohol outlet and drug arrest measures. Using parametric modeling, alcohol outlets and drug possession and trafficking arrests were found to significantly contribute to the prediction of violent crime. Further, we found that adjacent area outlets and drug arrests were significantly related to violent crime. Differences in weekend and weekday rates were also found. *Conclusions:* Alcohol outlets, both the density and type, were found to be related to violent crime in a differentiated and complex way, including weekend/weekday differences for outlets. In addition, we found that spatial effects due to the environment of neighboring block groups were significantly related to violent crime: The inclusion of drug possession and trafficking arrests, using two different sources of data, as a proxy for drug markets is a relatively novel addition to research attempting to disentangle spatial relationships between alcohol outlets and violence.

Session 24: Water-borne Diseases

A Weather-Based Prediction Model for Food and Waterborne Diseases in Germany

Thomas Kistemann (Bonn University, Germany), Daniel Koch

Food and waterborne diseases are still a public health concern worldwide and are held responsible for high morbidity rates and create a financial burden. The most commonly identified bacterial, parasitical and viral causes of acute gastroenteritis in Europe are *Campylobacter* spp., norovirus and *Salmonella* spp. The incidence of infections with these pathogens is characterized by highly seasonality. Our study aimed to analyze potential associations between standard meteorological variables and disease incidences, to design a short-term weather-based forecasting model and to test the model for Germany. Weekly disease surveillance and weather data were used to assess the relationship between disease notifications and minimum, maximum and average temperatures in addition to precipitation during the period from 2001 to 2011. A regression analysis using generalized linear models (GLM) was performed to obtain a regression equation, which was then utilized to calculate prospective disease notification counts based on current weather, as well as weather forecast data. The incidence of campylobacteriosis, norovirus infections and salmonellosis turned out to be almost linearly associated with the seasonality and magnitude given by the mean weekly ambient temperature of the previous 3 to 5 weeks. The short-term forecasting model showed strong results at both national and regional observation levels. It was included in an easily accessible graphical interface. Our findings demonstrate that weather variations have a significant impact on the transmission of gastrointestinal diseases and can be used to forecast incidence peaks and to prompt appropriate prevention measures.

Water and Water-Borne Diseases in Africa and Asia

Izabella Lecka (University of Warsaw, Poland)

The subject of this study is one of the most controversial side effects of water projects - spread of waterborne diseases. There are several environmental and social factors that might modify process and the rate of incidence of waterborne parasitic diseases. So in order to take into consideration most of this modifying elements Author choose to investigate such factors like: - type of hot climate, where water project are localized; - environmental attributes like, in ex. water chemistry, temperature of water and air, etc., which may affects existence of vectors; - hygienic habits and cultural practice; - type of occupation; - migration. In the study are analyzed more than 30 water projects in several African and Asian countries. Results are as follows: 1. Construction of water projects might be conducive to spread of waterborne diseases but it's not obligatory; 2. Dam construction (and man-made lake) may introduce the disease few and far between for the first times on the water investment area; 3. Type of hot climates (dry or wet) affects prevalence of malaria only. 4. Schistosomiasis and malaria start to be a bigger problem around large and old water projects than small and new; 5. Occupation,

cultural customs and habits play visible role in case of schistosomiasis, malaria, filariasis: Bancrofti and malayi; 6. In a spreading of water-borne diseases hygienic habits are not so much important like it is mention in the literature; 7. Labor decision has impact on incidence rate only in case of schistosomiasis and malaria; 8. Migration is very modifying factor that can affect prevalence of all examined diseases and is very hard to control.

Adaptation to Flood Induced Childhood Diarrhea by Mothers Around Urbanized Drainage Basins of Ilorin, Nigeria

Raheem Usman Adebimpe (University of Ilorin, Nigeria)

Flood water is a serious threat to human health and children are more vulnerable because of their inability to select food and drink. This study examines the adaptation practices of mothers to the health impacts of urban flood and the diarrhea that may be induced. It adopts an environmental epidemiologic approach to analyze the potential exposure pathways. Data were obtained through a structured questionnaire administered to purposively sampled nursing mothers in 250 households on both sides of the five urbanized drainage basins in Ilorin. The analysis used simple non-parametric descriptive statistics. Major causes of urban flooding identified by respondents include narrow and shallow pathways, building houses on or close to river channels, and disposal of solid waste along roads on river courses; however, the study found no significant statistical variation in perceived causes of flood in the five basin areas. The immediate risks during floods include injuries from water borne debris and elevated rates of diarrheal diseases in children. Variation in the nature of health impact in the basin areas was statistically significant with overwhelming evidence that diarrhea was the most serious concern in all basin areas. Majority of the mothers classified diarrhea in their children as mild; therefore treated children at home. Mothers also believed that it was safer to drink from unpolluted water sources whereas only 8% of mothers changed water sources. Difficulty in restraining children to safer areas and mother's inability to take decisions on health seeking and change of residence were major constraints to successful adaptation.

A John Snow Map of Cholera in Eastern Kolkata

Young Ae You (International Vaccine Institute, South Korea), Mohammad Ali, Suman Kanungo, Binod Sah, Byomkesh Manna, Mahesh Puri, G. Balakrish Nair, Sujit Kumar Bhattacharya, Jacqueline L. Deen, Anna Lena Lopez, Thomas F Wierzba, John Clemens, Dipika Sur

Background: In March-April 2010, there was a large cholera outbreak in the slums of eastern Kolkata, India. Like John Snow, we plotted the outbreak cases in our study area and determine the cluster of risk in space and time using longitudinal time series data. *Methods:* In 2003, we conducted a census to register the residents and the geographic coordinates of their residences in Ward 29,30, and 33 in eastern Kolkata. A cholera vaccination campaign was conducted in 2006. We evaluated the data from one-year pre-vaccination and five-year post-vaccination periods, and used the generalized

additive model (GAM) to detect high and low risk clusters. We used generalized estimation equation to evaluate the differences in socio-environmental characteristics between these clusters. *Results:* During the pre-vaccination and post-vaccination periods, 95 and 670 cholera cases were detected in 111,863 and 137,718 study participants, respectively. The results of the GAM model yielded a high risk cluster in the western part of the study area where the outbreak was observed. We observed a shift of the high risk clusters during the post-vaccination period. The high risk clusters were characterized by low economic status, use of unsafe toilet, and close proximity to the canal which is used as main drainage for rain and waste water. *Conclusions:* The study identified the outbreaks and the high risk areas for cholera were in the same area, indicating a high-risk area based intervention would be effective in controlling the risk for both outbreak and endemicity of cholera in the slums of Kolkata.

Using Remotely-sensed Water Quality Metrics to Model ALS Disease Cluster Membership

Sarah L. Hession (Michigan State University, U.S.A.), Nathan Torbick, Elijah W. Stommel

Public health concerns regarding the effects of water quality on human health are on the rise. Water quality is under stress from land use, pollution, population demands, and climate change. Traditionally, water quality in inland lakes has been quantified through costly and time-consuming techniques, such as collection of discrete samples at limited times and locations. Satellite remote sensing can be used to develop a strategic suite of water quality metrics that are more spatiotemporally complete. This presentation focuses on statistical methods to identify linkages between disease clusters of amyotrophic lateral sclerosis (ALS), the most common adult onset motor neuron disease, and remotely-sensed measures of water quality and cyanobacteria toxicity. Initial findings suggest that the odds of belonging to disease clusters correlate with three remotely-sensed water quality indicators.

Session 25: Health Disparities II

Towards a Geographical Understanding of the Relationship of Functional Literacy and Numeracy to Health Inequalities

Graham Moon (University of Southampton, United Kingdom), Grant Aitken, Paul Roderick, Simon Fraser, Gill Rowlands

Health literacy skills are known to be associated with poorer health outcomes. Health literacy is highly correlated with general literacy and numeracy skills. What is not well understood are the relative contributions of literacy and numeracy to health disparities. This study explores this gap in knowledge using the 2011 English Skills for Life survey (SfL; n=7230). “Health” was assessed by self-report, dichotomized into “very good/good” and “moderate/poor/very poor”. “Illness” was assessed by reported absence or presence of a long-term physical or mental condition. Literacy and numeracy were dichotomised into those achieving ‘functional literacy (FL)’ or ‘functional numeracy (FN)’ i.e. the level required to function and achieve one’s potential in society and those failing to achieve these levels. Multilevel modelling with logistic outcomes was undertaken using Markov chain Monte Carlo (MCMC) estimation. The factors entered into the model were age, sex, socio-economic status, ethnicity, whether English was a first language, nativity, home tenure, rurality and area deprivation. Multilevel modelling of self assessed health showed that FL and FN were both independently associated, even after taking account of key confounders and mediators, with FL appearing to be stronger than FN. Conversely for “illness” models the associations were stronger for FN, and in the full model FN remained significant whilst FL attenuated to non-significance. The independent effect of area deprivation on the health and illness outcomes varied significantly in the face of controls for literacy and numeracy.

Residential Mobility and Socio-Spatial Inequalities in Health between Neighbourhoods in Britain: Why do People Move to Unhealthy Areas?

Helena Tunstall (University of Edinburgh, United Kingdom), Jamie Pearce, Elizabeth A Richardson, Richard Mitchell, Esther Rind, Niamh Shortt

Analyses of migration have suggested that residential mobility can reinforce andacerbate socio-spatial inequalities in health. However, the reasons that people in poor health move to deprived areas have not often been assessed. This study analyses causes of residential moves in UK to explore the processes underlying health and socially selective migration. The analysis describes patterns of mobility, characteristics of movers, the reasons for their moves and the impacts of their moves on spatial inequalities in self-rated health. The aim of the analysis is to understand better how people in poor health become resident in neighbourhoods with socio-economically and physically disadvantaged environments. This analysis uses data from the longitudinal survey the British Household Panel Survey (BHPS) which has collected data 1991-2011 and contains around 10,000 respondents at each of 18 Waves. BHPS responses were used to describe self-rated general health, age, socio-economic status, changes of

residential neighbourhood and reasons for moves. The neighbourhoods analysed were Census Area Statistics wards in Britain (N=10,654; mean population approximately 5,500). Neighbourhood socio-economic deprivation was defined by the Carstairs 2001 deprivation index. The physical environment of the wards was described using the Multiple Environmental Deprivation Index (MEDIx), based upon indicators of air pollutants, climate, proximity to waste management or metal production/processing sites, UVB radiation and green space. The analysis finds that selective mobility moderately increased the concentration of people in poor health in the most deprived environments in most age groups but selection processes varied substantially with age.

Relative Property Value Wealth as an SES-Health Indicator

Neil Coffee (University of South Australia, Australia), Tony Lockwood, Catherine Paquet, Natasha Howard, Mark Daniel

There is a vast literature supporting the association between low socio-economic status (SES) and poor health. The significance of 'place' in SES-health associations is also emerging. The use of residential property value as a wealth SES indicator (the nexus between place and health) is a developing research focus. Wealth as an indicator of SES can complement the widely accepted SES measures (income, education and occupation) and area-level census indices, such as the United Kingdom Index of Deprivation or the Australian Socio-Economic Indices for Areas (SEIFA). While 'place-health' research is increasing, the impact of the modifiable areal unit problem (MAUP) is seldom addressed. As a contribution to understanding the potential for the MAUP and to progress the use of property value as an SES indicator, we developed a residential property relative location factor (RLF). RLF was calculated using a hedonic regression model and selected residential sales transaction data deliberately 'blinded' to location. The difference between the predicted and actual sales price was assumed to be the impact of location. The ratio of the actual to predicted sale price was interpolated across the metropolitan area using ArcMap geographic information system (GIS). The RLF surface could then be associated with any household in the metropolitan area. The relative nature of RLF overcomes the problem of classifying neighbours with significantly different absolute property values into the same SES class and illustrates the within spatial unit SES variation that is lost when using area-level SES indices which can result in the MAUP.

Waiting for Specialist Care: What are the Impacts on Patient's Lives? Are they Equitable?

Dan Harrington (University of Toronto, Canada), Kathi Wilson, Mark Rosenberg, Scott Bell

Wait times are at the forefront of the Canadian policy agenda, and are recognized as leading barriers to specialist care. This research explores factors associated with patient's lives being affected by time spent waiting for specialist care. We utilize data from the 2010 Canadian Community Health Surveys sample of respondents living in Ontario that required a visit to a specialist for a new condition in the 12 months. Multivariate logistic regression was used to predict the likelihood that life was affected

during the time spent waiting to visit a specialist. A subsequent analysis based on frequency of response was also used to determine how wait times affected respondent's lives. Of the respondents requiring specialist care for a new condition, 21% reported that their life was affected by wait times. Females, middle-aged respondents, new immigrants, and those with lower income were more likely to report that their life was affected, as were those with poorer health status. Other covariates included waiting over one month for access, and perceived acceptability of the time spent waiting. Worry, stress, and anxiety were the most frequently reported impacts (69.1%), followed by pain (42.1%), stress of family and friends (25.2%), deterioration of health (24.3%), and loss of work (21.7%). This research suggests that wait time lengths do not have equitable impacts. These results have implications for policies aimed at improving healthcare delivery and attenuating these impacts for vulnerable groups.

Identifying Health Disparities from Space? Mapping Recent Growth of Slums in the Megacity of Dhaka, 2006 to 2010

Oliver Gruebner (University of Bern, Switzerland), Jonathan Sachs, Tobia Lakes, Md. Mobarak Hossain Khan, Patrick Hostert

Background: Rapid urban growth in developing countries is frequently characterized by informal developments and a lack of administrative planning. Resulting segregation and slums show disparities in health outcomes for the population. To address these health challenges, information on the spatial distribution of slums in megacities of the developing world is necessary, yet still rare. The goal of this study was to use a remote sensing based approach to map urban slums in Dhaka, the second fastest growing megacity in the world. *Methods:* Slums were mapped through the visual interpretation of Quickbird satellite imagery from the years 2006 and 2010. Ancillary references included the 2005 Census and Mapping of Slums, Google Earth, and geo-located photographs. The 2006 slums were first delineated and filtered of small, isolated slums in GIS. For 2010, modifications to the 2006 slums were defined over the latter's polygons to retain border consistency. Subtracting polygon areas produced slum change maps. *Results and Conclusions:* Total slum area was found to have increased by 668 acres over the four years under investigation, an area equal to the size of 250 soccer fields. Changes were unequally distributed across the city, with highest slum growth towards the north. We provide a simple methodology to identify slums as an initial screening procedure to offer information for allocating scarce resources. Given that the city will continue to grow at this pace, our findings are not only crucial for local health policy advice in Dhaka, but also for comparable settings worldwide.

Session 26: Voluntarism and Telephone Triage – Health Care Integration

Placing Voluntarism within Public Discourse on Local Healthcare Integration

Mark Skinner (Trent University, Canada), Alun Joseph, Rachel Herron

The role of volunteers and voluntary sector organizations in shaping community responses to structural changes in healthcare systems such as the regionalization of services has long been recognized. Influenced by the “voluntary turn” in policy and research, health geographers have sought to highlight the different forms that this voluntarism can take, including outright resistance to structural change. However, very little attention has been directed towards understanding the local dynamics of such voluntarism, especially as it is reflected in public discourse. Drawing on local print media as a key source of information on public discourse, this paper addresses this gap in understanding the public view of voluntarism by analyzing newspaper coverage of voluntary sector reaction to a recent healthcare restructuring initiative in Ontario, Canada - the introduction of Local Health Integration Networks (LHINs). Focusing on the regional urban centre of Peterborough, we document and characterize a decade of articles on the LHINs in *The Peterborough Examiner*, the local daily newspaper. The findings reveal a series of concerns with the impact of the LHINs on the availability of local services and on the communities they serve, with threats to local autonomy, jobs and identities all invoked in encouraging resistance from the voluntary sector. Implications for the development of informed healthcare policy that is sensitive to the evidently complex and dynamic local geographies of voluntarism are discussed.

Professional Mobile Voluntarism and International Development: The Critical Role of Relationships and Co-Presence

Louise Ackers (University of Liverpool, United Kingdom)

This paper considers mobility-knowledge transfer processes in the context of professional voluntarism. Health Partnerships have existed for some time at an informal level. They involve links between hospitals or universities in the North with similar organisations in less developed countries. Crisp outlines the strategic role that Global Health Partnerships can play in strengthening health systems through the massive scaling-up of training, education and employment of health workers (2007:2). Building on the author’s research on mobility and knowledge transfer combined with her experience of working with Health Partnerships in Uganda, the paper promotes understanding of knowledge transfer processes to inform policy and practice in the deployment of professional voluntarism. It proposes more structured and conditional human resource management partnerships grounded in reciprocity to improve relationship-building, effective knowledge translation and ensure that we avoid reproducing what Moyo calls Dead Aid (2009).

Complex Geographies of Voluntarism in Caring for Persons with Alzheimer's Disease

Rachel V. Herron (Queen's University, Canada), Mark W. Rosenberg

The constancy and specificity of caring for persons living with Alzheimer's Disease and Related Dementias (ADRD) has received considerable attention in public and academic discourse over the past two decades. Much of this attention has been propelled by the education and advocacy of voluntary organizations such as the Alzheimer Society in Canada. However, little attention has been directed towards understanding the distinct challenges faced by voluntary organizations in delivering services for persons living with ADRD, including their support networks. Drawing on the findings of a provincial survey of Alzheimer Society chapters across Ontario, Canada, this article seeks to address this gap. The findings reveal a series of challenges related to the complexity of providing services for persons living with ADRD in general, balancing the needs of caregivers with those of persons with dementia, and responding to local urban and rural geographies. We discuss the implications of these challenges for the development of more informed policy and programming that directly supports the needs of persons living with ADRD in a community setting.

Methods to Explain Geographic Variation of Calls to a Free-Dial, Telephone Triage Line

Edward Griffin (University of Canterbury; New Zealand and Ministry of Health, New Zealand) Simon Kingham, Roy Costilla

This study examines the use of Healthline, New Zealand's free, nationwide telephone triage service, and suggests ways to identify and interpret area level variations. We use individual calls data between 2010 and 2012 to measure and display service use variability by geography for Healthline. Funnel plots were used to visualise the unadjusted raw rates between electoral wards, and Poisson regression was used to adjust for variables and display the adjusted rates. Lastly geographic distributions were displayed by mapping standard deviations. Healthline use across New Zealand varied by area, by up to 12%. Variation can largely be accounted for by differences in high deprivation, pacific population and very young people less than 5 years of age between areas. Factors such as gender, availability of telecommunications, and to a less extent rurality, appeared to have little influence on Healthline use. Some areas in New Zealand, for example those with the most deprived populations and areas with high concentrations of pacific population were not accessing the Healthline service. Areas with high amounts of very young children are effectively over utilising the Healthline service. These factors need to be considered for future improvements to Healthline. The methods in this paper provide a sound base for other telephone triage services to be assessed appropriately.

Using GPS to describe Mobility in Health Research: Comparing Activity Locations and Trips obtained from Algorithms with GPS-Prompted Recall Data

Yan Kestens (Université de Montréal, Canada), Benoit Thierry, Basile Chaix

Use of GPS offers new possibilities to document daily mobility and understand the link between geographic life environments, multiple exposures, and health. Yet, raw GPS data need to be transformed to identify specific and meaningful activity locations and routes. Processed GPS data can further be used to prompt recall of complementary information including nature of activities or to confirm travel modes. Using data from some 200 participants of the RECORD GPS study (Paris, France), we compared activity locations and trips extracted from raw GPS data with travel diaries obtained through GPS-prompted recall. Comparing these two datasets allows evaluation of (i) the performance of the GPS and the algorithm to detect activity locations, trips and transportation modes and (ii) the contribution of prompted recall surveys to obtain a complete travel history. GPS data covered 7 days with 16:04:30 of raw GPS data per day (SD 07:19:54). In fine, over 4,500 distinct activity location visits were documented. Over 90% of time spent at an activity location after the prompted recall survey was correctly classified as such by the algorithm. Rules could also be developed to infer locations or trips in some situations of missing GPS data. This procedure, part of the stringent control that was applied in the RECORD Study to ensure quality of collected data, allowed to identify potential survey errors that were addressed by the field study coordinator. It also provided key data to improve calibration of GPS algorithms and of prompted recall survey tools.

Exploring Spatial Distributions of Medical and Health Expenses using Micro-scale Geographic Data

Ikuho Yamada (University of Tokyo, Japan)

Increasing national health expenditure has been a serious public health and economic problem in Japan. The national health expenditure currently accounts for over 10 percent of the national income and its ratio to GDP has almost been doubled during the 20 years from 1989 to 2009. This increasing trend is doomed to continue due to the rapid shift to a super-ageing society, which is a distinctive characteristic of the modern Japanese society. It is thus important to grasp the actual state of expenses related to medical and health care so as to deploy effective countermeasures against the trend. The present study focuses on a spatial aspect of the issue and explores spatial distributions of medical and health expenses in relation to the availability of medical and health services. More specifically, this study examines potential inequality in medical and health costs that are caused by spatially unbalanced provision of the services. Since official statistics on household consumption expenditure published by the Statistics Bureau of Japan are available only at the regional scale, this study utilizes estimated micro-scale data for census geographic units distributed by Japan Planning Systems Co. (<http://www.jps-net.com/>). The data provide estimates on about 600

commodity and service categories, including 22 medical and health related ones. Micro-scale geographic data, called Micro Geo Data, have been increasingly available these days, and this study also aims to assess their potential usefulness in health-related geographic studies.

Session 27: Health Care Demand and Access I

Population Change and its Effects on Health Service Demand: A Global Issue, a Spatial Problem

Edward Griffin (University of Canterbury; Ministry of Health, New Zealand)

Many developed countries are experiencing low fertility rates and accompanying population aging, some are in population decline e.g. Russia, Germany and now Italy. Almost all countries in the world, developing and developed are experiencing urbanisation. The impact of demographic change on healthcare delivery is an important consideration for health planners. The prediction of future demand for health services as populations age, migrate and change in composition is a critical tool for future planning and for managing growth in health spending. Last year New Zealand experienced its lowest population growth for 11 years; births declined from the previous year and annual deaths exceeded 30,000 for the first time. This research uses national hospital data, Statistics New Zealand population estimates, spatial regression and Geographical Information Systems (GIS) to simulate demand and accessibility for future New Zealand populations. This results in a forecast for future health services by demand and geography out to the year 2026. The research provides an assertion that demographic change will cause health service demand to change and shift, placing different pressures on current urban and rural health services in New Zealand. The results of this research can be used to inform long term service planning at a national, regional and local level. In particular, the methods can be adopted by a wide variety of health planners and used to plan and inform the future capacity and location of the health service's potentially giving rise potential cost savings for health systems.

The Effects of Unmet Need and Supplier-Induced Demand on Health Care Planning and Regulation

Paul L. Delamater (Michigan State University, U.S.A.)

Health care planning and regulation efforts aim to balance the supply of health care resources such that it is in accordance with the population's need for health care services. These efforts operate under two well-established premises, 1) an under-provision of health care resources will lead to unmet health care needs, increasing the potential for detrimental effects on public health and 2) an over-provision of services will lead to unnecessary use, also known as supplier-induced demand, which is generally understood to increase the overall costs of health care. Planning and regulation efforts require that the population's health care needs and the resources available to the population be quantified in a manner such that they may be comprehensively compared. Although a number of approaches are employed, a highly significant but often overlooked problem pervades the entire process: the population's true need for health care services is not accurately expressed via measures of actual utilization. Because utilization data only contain events where need has been met, any unmet need for services is not represented. Further complicating this process, measures of utilization do not readily distinguish demand considered medically-

appropriate from demand due to an oversupply of resources. This research explores the relationship among supply, demand, and the population's true need for health care resources. The first portion of the work identifies inefficiencies in health care utilization: geographic regions that have unmet needs or supplier-induced demand. The second portion will consider the effects of these inefficiencies on health care planning and regulation efforts.

The Spatial Epidemiology of Health Care: Availability and Affordability at Sub-location Level in Kenya

Oliver Gruebner (University of Bern, Switzerland), Samuel Kipruto, Md. Mobrak Hossain Khan, Boniface Kiteme, Omari Mzirai, Urs Wiesmann, Michael Epprecht

Background: In developing countries like Kenya the provision of health care services is often limited and unequally distributed between urban and rural areas; thereby causing a major constraint in achieving equitable healthcare. Moreover, socio-economic factors have been found to influence access to health care. However, planning instruments for health care provision are often lacking the spatial dimension; and knowledge about the spatial distribution of health care affordability is still lacking especially in developing countries. This paper aims to identify spatial inequalities in health care service provision in Kenya and to identify the main factors influencing health care affordability at the sub-location level. *Methodology:* We used information on health facilities from 2012 and the Census of 2009 to map the distribution of health care availability in relation to population density at sub-location level. Associations of availability of health care with the socio-economic status and contextual factors were assessed with multivariable regression models. *Results and Discussion:* We found that health care provision is unequally distributed across the country reflecting also the socio-economic status of the regions. Poorer health care provision was found in rural areas and towards the border of Somalia. Our findings are crucial for local policy advice and the allocation of scarce resources helping to achieve equitable health care in Kenya and comparable countries worldwide.

Mapping the Relationship between Diabetes Prevalence and Self-Management Education Access: Geographic Clusters of Need in the United States

Amy B. Curtis (Western Michigan University, U.S.A.), Catherine Brooks, Rajib Paul, Kathleen M. Baker, Raju Chowdhary, Catherine Kothari

Background: Due to its chronic nature and complicated management needs, diabetes self-management education (DSME) is recommended for all those with this condition. Given limited resources, it is essential to ensure diabetes education resources are accessible to all those in need, and particularly in those areas with the greatest need. We analyzed geographical distributions of diabetes and distance to DSME programs. *Methods:* We collected, mapped and analyzed U.S county- and individual-level DSME data from secondary sources using ArcGIS 10 and r software. Age-adjusted U.S. diabetes county prevalence rates and number of adults with diabetes was obtained from the

County Health Rankings website (2009) and U.S. certified DSME programs were geocoded from the American Diabetes Association website (2011-12). Distance to DSME was calculated as the distance from the county's population centroid. Demographic information was also collected from the Census website (2006-9), including income, population density, and percent minority and aged over 65. Spatial cluster analysis is performed using Bayesian hierarchical models and Markov Chain Monte Carlo algorithms to confirm visual findings. *Results:* Clusters of low access-high rate counties were found particularly in the South, while a cluster of counties in the Midwest had closer proximity to DSME and low diabetes. In the West, the distance to DSME was generally further, but rates were also generally lower than average. *Conclusions:* There is currently a lack of relationship between access to DSME and rates of diabetes in the U.S., counties with high rates-less access to education resources should be targeted for diabetes education.

Session 28: Environmental Health I

Environmental Services and Multiple Health Disadvantage in Deprived Urban Neighbourhoods of Ilorin, Nigeria

Raheem Usman Adebimpe (University of Ilorin, Nigeria)

The most striking difference between houses and neighbourhoods in deprived and non-deprived areas of African city is the availability of-and access to- environmental services. This paper examines the association between access to environmental services and the health status of urban residents in Ilorin metropolis. A structured questionnaire was administered for a survey of environmental services in households sampled through a multi-stage sampling technique. Access to deprivable environmental services was examined using nine indicators which were aggregated to obtain an index of multiple deprivations. Health indicators were selected to capture Self rated health status, child health and health seeking behavior. These indicators were also aggregated to obtain an index of multiple health disadvantages. The associations of deprivation in environmental services on multiple health disadvantages were examined using a multiple regression technique through a model built on nine variables made up of housing quality and residential services. This enables the identification of the critical proximate determinants of multiple health disadvantages in the study area. The result shows that the contribution of the independent variables on the explanation of the variation in multiple health disadvantage was high ($R^2 = 0.95$). Four variables were found to possess positive and significant contributions. These are rooming density, ownership of separate bathroom, household size, and dwelling type. This study allows conclusions on the overall impact of environmental services on household health and the Index of Multiple Disadvantages enables us to derive a quantitative measure of household health in the study area.

Generator Emissions and the Lung Function Status of Persons Working within Selected Business Premises in Ibadan, Nigeria

Godson Rowland Ana (University of Ibadan, Nigeria), Adeolu Temitope Olowolade, Akinlolu Festus Abimbola, Olusoji Ige

The proliferation of generators and its wanton use as substitutes for power supply occasioned by the current energy crisis in Nigeria has resulted in gross environmental and health effects. This study characterized emissions arising from generator use in selected business centres and correlated the level of emission with the lung function status (FEV_1) of persons working in the selected business centers in Ibadan. Three locations viz Highly Exposed Group (HEG), Moderately Exposed Group (MEG), and a Less Exposed Group location with sparing use of generators were purposively selected for this cross-sectional survey based on magnitude of business activities and intensity of generator use. Respirable Suspended Particulate Matter (RSPM) was collected using a calibrated gravimetric sampler. Gaseous Emissions (GE): [Carbon monoxide (CO), Nitrogen dioxide (NO_2) and Sulphur dioxide (SO_2)] were measured. Lung function status (FEV_1) of participant was measured using a calibrated spirometer. Data were

analyzed using descriptive statistics and t-tests at 5% level of significance. The mean RSPM for HEG and MEG were $513.4\mu\text{g}/\text{m}^3 \pm 186.7\mu\text{g}/\text{m}^3$ and $524.7\mu\text{g}/\text{m}^3 \pm 133.5\mu\text{g}/\text{m}^3$ respectively and were significantly higher than NGL of $250\mu\text{g}/\text{m}^3$ ($P < 0.05$) while LEG recorded $167.1\mu\text{g}/\text{m}^3 \pm 98.2\mu\text{g}/\text{m}^3$ and was significantly lower than NGL. Mean CO was: 39.0 ± 29.7 and 10.7 ± 1.2 ppm for HEG and MEG respectively and were above NGL of 9 ppm ($P < 0.05$) while LEG had 0.3 ± 0.1 and was below NGL. Mean SO₂ for HEG and MEG were 1.0 ± 0.7 and 0.3 ± 0.1 respectively and were above NGL of 0.14 ppm. The SO₂ for LEG 0.1 ± 0.01 was below NGL. Mean NO₂ for HEG and MEG were the same (0.8 ± 0.1) and was higher than NGL of 0.053 ppm and LEG recorded 0.03 ± 0.01 which was significantly lower than NGL. The levels of air pollutants were found to be highest in the locations with an increased intensity of generator use.

Spatial Analysis of Environmental Health Risks: A Case of District Bahawalpur, Pakistan

Munazza Fatima (The Islamia University Bahawalpur, Pakistan)

The key to mans health lies largely in his environment, in fact much of mans ill health can be traced to adverse environmental factors. Keeping in view various environmental health problems of Pakistan, the main objective of this research article is to analyze the spatial distribution of environmental risk factors in the District Bahawalpur. Data for the current research is taken from the last report of Multiple Indicator Cluster Survey (2007-2008) of District Bahawalpur, which is compiled by the Bureau of Statistics, Punjab. First the paper describes the geographical and demographical setting of study area including all its sub administrative units, Ahmadpur East, Khairpur Tamewali, Yazman, Bahawalpur Sadar, Hasilpur and Bahawalpur City. Next to it, number of environment health indicators which were selected for the current research is discussed in detail. These indicators include, use of improved water sources, household water treatment, physical access to source of water, bacteria concentration in water, excreta disposal, sanitation, waste water disposal, solid waste disposal and hand washing habits. Results pertaining to these indicators were compared, described and shown on the maps for the spatial distribution analysis using Arc GIS 9.3 among all six administrative units of district Bahawalpur. Finally, the paper provides the set of sustainable strategies and policies addressing the local environmental issues and to minimize the health risks through administrative environmental management and community participation.

Science-Policy Boundaries in the Siting of Biosolid Facilities: A Case Study from Southgate Township, Ontario

Sarah A. Mason (University of Western Ontario, Canada), Jenna Dixon, Faith Mambulu, Andrea Rishworth, Paul Mkandawire, Isaac N. Luginaah

Secondary treatment and disposal of municipal sewage is emerging as another area of controversy in the waste management process. With increasing technology local governments are looking to capitalize on large urban centre's waste disposal issues by finding ways to dispose of and manage biosolids. However, like most waste disposal

issues, this frequently brings tensions among opposing coalitions during the siting of such facilities. This paper examines narratives around the siting of a regional biosolids processing facility in the rural community of Southgate, Ontario. The claims and counterclaims by the proponent and opposing groups to the establishment of the facility are also examined. We situate the debate within the relationship between science and policy literature. We conducted content analysis of public debates as reflected in newspaper sources, environmental registry comments and other print sources between August 2011 to December 2012. The results of the study show a tendency for claims and rebuttals to straddle the presumed divide between science and politics. In addition, current scientific uncertainty around potential environmental and health impacts of biosolids waste disposal did not only foster polarization of views between opposing policy coalitions, but also contributed to regard scientific evidence as having similar status as other epistemic perspectives. The study concludes by making relevant recommendations relating to relative role of scientific evidence under conditions of uncertainty and ways of facilitating mutual political and social adjustment between coalitions in community waste disposal siting processes.

Amazonia Drought Conditions: The Impacts on Children's Respiratory Health

Lauren T. Smith (University of Exeter, United Kingdom), Clive E. Sabel, Luiz Aragao

On average Amazonia experiences an extreme climatic event once every ten years. In a recent five year period however two mega droughts have struck Amazonia - the 2005 and 2010 droughts. Advances have been made in understanding how these events affect the physical system of the forest; however, research on their impact on human health is lacking. We examine the impacts of these events on respiratory diseases in children aged under-five. Satellite observations of rainfall, active fires, aerosol and deforestation were used to assess the extent of the drought, and population density and Human Development Indexes (HDI) were used as broad social variables. We identified critical areas of the two droughts, and established that over a ten year period (2001-2010) respiratory diseases for the under-fives peaked at the end of the wet season. During the drought events the peak of respiratory diseases shifted to later in the year corresponding with the peak of the drought. Geographically Weighted Poisson Regression (GWPR) analysis shows deviance is higher in 2005 in the municipalities corresponding to the main drought affected areas. Local parameter estimates show aerosol and HDI are the main drivers influencing respiratory disease hospitalizations during the July, August, September period of 2005. The 2010 drought did not show such strong results which could be attributed to fewer fires and fewer locations of anomalous aerosol loads compared to 2005. Understanding the health impacts of extreme climatic events will enable health departments to plan for demand on services during drought periods.

Session 29: HIV/AIDS I

Vulnerable Places and Vulnerable People: The Geography of HIV infection in Harris County, Texas

Joseph R. Oppong (University of North Texas, U.S.A.), Chetan Tiwari, Warangkana Ruckthongsook

Considerable effort in HIV/AIDS research has focused on vulnerable populations, identified pathways to vulnerability, and determinants of vulnerability. However, the role of vulnerable places in HIV infection has received less attention. Vulnerable people create vulnerable places and, regardless of status, people who live in vulnerable places have much higher risk. For example unprotected sexual behavior in an area with high HIV prevalence carries much higher risk than similar behavior elsewhere. Drawing on HIV case data from Texas Department of State Health Services from 1999-2011, this paper examines place vulnerability for HIV infection in Harris County, Texas. After hotspot analysis, the HIV and socio-demographic characteristics of these hotspots are used to characterize these as vulnerable places. This serves as a platform to discuss the spatial determinants of place vulnerability for HIV infection.

Spatiotemporal Variation of Modes of Exposure among Youth HIV/AIDS in Texas 1999-2011

Warangkana Ruckthongsook (University of North Texas, U.S.A.), Joseph R. Oppong, Chetan Tiwari

Newly diagnosed HIV/AIDS rate in Texas remained stable, but young population age-groups (ages 13-24) are persistently high, especially among minority race/ethnicity. Previous research has studied the spatial distribution of HIV/AIDS characteristics among youth and has indicated that bisexual and men who have sex with men (MSM) are the risk groups. However, although critical for targeted intervention, the spatiotemporal changes of young HIV characteristics remain unclear. Using statistical and spatial analysis and zip code level data, this study maps and examines spatiotemporal changes in HIV/AIDS rates among the 13-24 age groups. This study also investigates how the demographic characteristics of HIV/AIDS cases, modes of exposure, and HIV late diagnoses vary in space and time in Texas. The results show that higher HIV/AIDS rates among youth mostly occur in the vicinity of metropolitan areas and major cities, but race/ethnicity and mode of exposure change through time. The percentage of late HIV diagnoses is higher in the last period, 2007-2011. This indicates HIV/AIDS among youth tends to increase in the near future. These results provide insights for planning and geographically targeting interventions. Consequently intervention strategies are required in different locations and need to be reviewed periodically to ensure continued effectiveness.

Analysis of Spatiotemporal Patterns of HIV/AIDS Prevalence in Malawi (1994-2010) Using GIS, and Potential for Spatial Targeting of Interventions

Leo C. Zulu (Michigan State University, U.S.A.), Ezekiel Kalipeni, Elizabeth Johannes

Despite dramatic decline in HIV/AIDS incidence and deaths in Malawi 2001-2011, its HIV prevalence remained among the highest globally. Given the limited use of spatial analysis to enhance understanding of HIV epidemics in Africa, this study uses spatial analysis, Geographic Information Systems (GIS), and HIV prevalence data from surveillance centers to: 1) examine spatiotemporal trends in HIV prevalence (1994-2010) among pregnant women in Malawi, and 2) identify socio-demographic, behavioural, socio-biological and geographic factors associated with HIV prevalence at district level and map their spatial variation/clustering. Results revealed several geographically defined “epidemics” at national, regional, urban/rural, and district levels. HIV prevalence exhibited statistically significant global spatial dependence for most study years. Prevalence declined significantly after 1999, with evidence of spatial evening of HIV prevalence within/across ‘epidemics. Clustering analysis showed a core HIV hotspot consisting of 5-10 Southern Region districts/cities and a core “coldspot” of 1-6 Central Region districts. Preliminary multiple regression and correlation analysis of HIV prevalence for 2010 identified four significant explanatory variables ($R^2=0.688$): mean distance to main roads, travel time to nearest transport (30-44 age group), percentage of respondents who had taken an HIV test ever, and percentage of those attaining senior primary education . Spatial variation (clustering) of some of the variables closely matched sub-sets of HIV hotspot districts, opening the way for spatially targeted interventions. Findings suggest that intervention strategies should also emphasize improved access to health/HIV services, and basic education in rural hotspot districts, as further research is done on underlying drivers at finer scale.

Reducing the Risk of HIV Infections within Marital Relationships: Safer Sex Knowledge, Behaviour, and Attitudes of Women in Zambia

Jonathan Amoyaw (University of Western Ontario, Canada)

The HIV/AIDS epidemic still remains a challenge in Zambia. Recent evidence suggests that Zambian women, in particular, face a greater risk of contracting HIV within marital relationships, given their inability to control and regulate their own sexual behaviour. Using the 2007 Zambia Demographic and Health Survey data from 4,306 married women, this paper examines how married women’s perception about their own sexual rights, besides other empowerment indicators, influences their ability to refuse their husbands sex or ask them to use condom during sex intercourse. Results from the logistic regression models reveal that married women who protest wife beating on the grounds of sex refusal were more likely to be able to refuse their husbands sex. Likewise, married women who know they have the right to refuse their husband sex if he has other women or to ask him to use condom if he has any sexually transmitted infection were more likely to report they can negotiate safer sex. Those who have

factual knowledge about HIV transmission and prevention, and those who have tested for their HIV-serostatus were also more likely to report they can ask their husbands to use condoms during sex. Similarly, educated married women were more likely to report they can exercise their sexual agency, compared to their uneducated counterparts. These results indicate that policies aimed at empowering married women to gain control of their sexual behaviour and preferences are crucial to the control and prevention of HIV infections.

Knowledge of HIV/AIDS, Transmission, and Prevention Methods in Bangladesh: A Temporal Analysis of BDHS Data

Bimal Kanti Paul (Kansas State University, U.S.A.)

Bangladesh is a country with a low prevalence of HIV infection. Yet, the country remains extremely vulnerable to an HIV epidemic because of its dire poverty, overpopulation, gender inequality, presence of relatively large numbers of sex workers, and bridge population. With a low level of awareness, it is possible for the HIV virus to rapidly spread among the general population. Therefore, the objective of this study is to gain an in-depth understanding of knowledge of HIV/AIDS, its and transmission, and appropriate prevention methods in Bangladesh. The data for this study come from six nationally-representative demographic and health surveys conducted in Bangladesh since 1993. This study finds that the awareness about HIV/AIDS has increased consistently over time.

Session 30: Migration and Health

Immigration, Health and Transnational Ties: A Case Study of Korean Immigrants in Toronto

Lu Wang (Ryerson University, Canada), Min-Jung Kwak

The paper brings together two largely separate research areas on immigrant health and transnationalism by focusing on Korean immigrant's experiences of using health care services available in both Canada and South Korea. A mix-method approach is used to combine statistical analysis of Canadian Community Health Survey (CCHS) data and focus groups. Key health indicators are extracted from the pooled 2005-10 CCHS datasets and Z-test is performed to contrast the Korean to native-born and foreign-born populations. Eight focus groups are conducted to explore the in-depth individual experience in utilizing primary, alternative and home country health services and changes in post-migration health status. The transnational behaviour of Korean immigrants as evidenced by their strategic utilization of health care services back in home country adds a new dimension to transnationalism and new knowledge to ethnicity and health status. The various transnational health ties maintained by Korean immigrants provide insights in understanding how transnational migrants utilize social capital and health care resources in host and home countries. The paper has implications for evaluating the role of the health care system in facilitating immigrant integration in the domain of health.

Prevalence and Incidence of Disability amongst Immigrants in Canada

K. Bruce Newbold (McMaster University, Canada), Dylan Simone

While immigrants are typically healthy at the time of their arrival in Canada, the so-called "healthy immigrant effect" this advantage is quickly lost over time. New arrivals, for example, are more likely to report better health and less likely to report chronic conditions or disabilities than the Canadian-born, attributed to the fact that those in good health are more likely to immigrate to Canada along with the screening process at the time of entry that disqualifies those with serious medical conditions. With time, the health advantage is lost, and their health status declines toward levels observed within the broader population. While the healthy-immigrant effect has also been observed with respect to disability, it may be that incidence of disability is different within the immigrant population, and/or that immigrants may lack the sources and types of care to cope with disabilities relative to non-immigrants. Using data from Statistics Canada, this paper presents an initial analysis that compares and contrasts prevalence, type, and severity of disability between immigrants and non-immigrants, accounting for age, sex, duration of residence effects and other correlates of disability.

Variation in Sense of Place across Immigrant and Canadian-born Groups in Second and Third-Tier Canadian Cities

Melissa Gallina (McMaster University, Canada), Allison Williams

Past research in Hamilton, Ontario has found that age and longevity of residence are positively associated with sense of place perceptions; further, sense of place perceptions between immigrants and Canadian-born individuals have shown no clear pattern (Williams et al., 2010; Williams & Kitchen, 2012). This paper builds on this work by further examining sense of place perceptions among both immigrants and Canadian-born residents, while expanding the study to other second and third-tier cities: Saskatoon, Saskatchewan and, Charlottetown, Prince Edward Island. The paper addresses the following research question: How does sense of place vary according to: immigrant status; city of residence; length of residence in Canada; age; income, and; longevity of neighbourhood residence? In order to answer this research question, telephone survey data (n=1131) was used to construct a linear regression model. Results suggest that Canadian-born residents tend to rate their sense of place higher than their immigrant counterparts. Charlottetown residents were found to rate their sense of place highest, followed by Saskatoon residents and, finally, Hamilton residents. The above results held true when analyzing by both immigrant status and city site. It was determined that: age; income, and; longevity of neighbourhood residence are significant predictors of evaluations of sense of place. Older individuals, those with higher income levels, and those with longer residency in the second and third-tier Canadian cities concerned tend to have higher evaluations of sense of place. This research suggests that greater attention is needed to nurture immigrants' connection with their new home.

They Thought I was Just Joking about It: Experiences and Perceptions of Food Allergy in New Canadians from Asia

Stephanie K. Lu (University of Waterloo, Canada), Susan J. Elliott

Studies on food allergy in Asia are reporting an increase in prevalence, particularly in economically developed regions like Hong Kong. Increased prevalence and awareness of food allergy has become a global phenomenon, making it a major public health concern. Although little is known about its etiology or occurring changes in prevalence, substantial variation in prevalence on a global scale is evident. Interestingly, risk perception studies have found that Canadian's perceived prevalence of food allergy surpasses systematic estimates. Moreover, Canadian immigrants are more likely to rate the risk of food allergy as "high" compared to non-immigrants. To explore this further, qualitative interviews were conducted with key informants (n=3) and allergic individuals of Asian descent (n=18). Interviews lasted 30 minutes on average and they were tape recorded and transcribed verbatim for subsequent thematic analysis using NVivo. Preliminary results are organized around three themes: prevalence, perception, and experiences. With respect to prevalence, there was no consensus as to whether rates are lower, higher, or consistent with Canada's. In terms of perception, participants agreed that having a food allergy is more manageable in Canada than in Asia because of

the policy environment (e.g. food labelling and school board policies). With respect to experiences, participants had dealt with skepticism and unbelief about their allergy; their support system was limited to their immediate family. These results demonstrate the need to recognize the varied impacts and experiences of food allergy among new Canadians, given that immigrants represent a large and growing proportion of the Canadian population.

Sexual Health Disparities and Interventions in Gay/MSM Immigrant Men

Nathaniel Lewis (Dalhousie University, Canada), Kathi Wilson

Despite evidence of a 'healthy immigrant effect' in Canada, much of what we know, however, is based on very general studies of immigrant populations and standard measures of health (e.g., self-reported, chronic conditions). Less is known about post-migration changes in health behaviours and even less on sexual health practices, especially among sexual minority-identified immigrants. In addition, gay men and men who have sex with men (MSM) experience depression, anxiety, stigma, substance abuse, and other risk factors for poor sexual health more frequently than their heterosexual counterparts. This paper systematically reviews the research on immigrant men who identify as gay or MSM and suggests that this population may have riskier sexual health practices and poorer outcomes due to (1) marginalization and lack of sexual health education in their home networks, (2) racism, stigma and a lack of culturally sensitive services in new homes, (3) informal prejudices from family, religious, or ethnic groups, and (4) transitions and stressors surrounding migration in general.

Session 31: Mental Health

Mental Health in England: Small-Area Geographies

Clive E. Sabel (University of Exeter, United Kingdom), Nick Bearman and Benedict W. Wheeler

Geographical variations in population mental health are relatively unexplored, partly due to a lack of geographically referenced data. In England, population data on some mental health outcomes are available referenced to the location of the patient's National Health Service general practitioner (GP), where the majority of the population are registered to receive primary care. The c.8,000 GP surgeries across England have mean registered population c.6,600, a useful scale for geographical analysis of health outcomes. However, GP catchments overlap substantially in urban areas, and many patients do not live close to their GP. We applied two techniques to estimate geographies for several mental health outcomes with data by GP. Hospital admissions data were used to calculate indirectly standardised rates for depression and self-harm. We compared two techniques to map the standardised morbidity ratios (SMRs). The first adjusted rates using Spatial Empirical Bayes smoothing, and then interpolated using inverse distance weighting. The second, using kernel density estimation, provided an alternative, potentially more realistic analysis. Striking geographical variations in admissions are likely driven by differences in both disease incidence and healthcare provision. Preliminary analyses suggest admission rates to be associated with area socio-economic status (SES) and Primary Care Trust (PCT, partly responsible for local referral policies from GP to secondary care). We will report findings of regression analyses of small area predictor variables (including SES and PCT) associated with these estimates of population mental health. Future research will refine smoothing procedures using registered patient postal codes to disaggregate GP data before recombining.

Urban Green Space: Does it Influence our Mental Health?

Daniel Nutsford (University of Canterbury, New Zealand), Amber Pearson, Simon Kingham

As urbanization escalates globally, urban features which improve or hinder physical and, more recently, mental health are of growing importance. One area of interest explores the health benefits of urban green spaces. This study investigated the relationship between six different measures of green space access and anxiety/mood disorders in Auckland, New Zealand's largest and fastest growing urban centre. Anxiety/mood disorder treatment counts by three age groups were aggregated to 3149 small area units in Auckland. Six measures of green space access were derived using GIS techniques involving total and useable green spaces. Negative binomial regression models were used to test the relationship between access to green space and area-level anxiety/mood disorder, adjusted for age and area-level deprivation. Anxiety/mood disorders were associated with three green space measures. No health benefits were associated with the proportion of green space within 300 meters, however the proportion within 3km and distance to nearest useable green space both indicated a

protective effect of increased access on decreased anxiety/mood disorders. Proximity to useable green space and the proportion of green space within the larger neighbourhood was positively associated with decreased anxiety/mood disorders in an urban environment. This suggests benefits of green space on mental health may be derived through the ability to participate in activities in parks near to the home and from the visualization of green space in the neighbourhood environment.

The Relationship Between Neighbourhood Social Fragmentation and Three Measures of Mental Health: Self-Rated Depression, Calmness and MCS-12 Among Adults in New Zealand

Amber L. Pearson (University of Otago, New Zealand), Vivienne Ivory

Increasingly, researchers are examining the ways that neighbourhood social context promotes or hinders supportive relationships, feelings of belonging, and cohesion. Positive social contexts may be less stressful environments for residents, resulting in mental wellbeing and calmness; whereas negative social contexts increase stress and poor mental health. In theory, higher neighbourhood social fragmentation weakens social norms and spurs opportunism and individualism. Stress levels of residents are thus elevated, with mental health consequences. To examine these relationships, we used national survey data from New Zealand (2011/2) and a previously created Index of Neighbourhood social Fragmentation. First, we measured the relationship between fragmentation and overall mental well-being (using a composite index (MSC-12)) by population and by sex strata. Next, we examined two components of mental health: depression and calmness, to determine whether fragmentation was more strongly associated with one component. We found that as fragmentation increased, overall mental health and depression worsened. Fragmentation was not significantly associated with calmness. Sex-stratified analyses indicated that for females, fragmentation was associated with MCS-12, but not for males, echoing previous findings. Fragmentation was associated with depression for both sexes. Findings indicate that depression rather than calmness may contribute to the observed association between fragmentation and overall mental health. This suggests that groups who are vulnerable to stressful social contexts may be prone to depression in fragmented neighbourhoods. To expand our understanding of pathways through which social context influences mental health, we recommend further exploration of specific aspects of living in fragmented neighbourhoods which may increase depressive feelings.

Using the Collaborative Psychiatric Epidemiology Surveys to Build a Neighborhood-Scale Risk Index for Mental Illness

Kate Lester (University of North Texas, U.S.A.)

In the United States rates of mental illness and suicide are rapidly increasing, but the public behavioral healthcare system continues to shrink. In states like Texas very low funding has created the need to better target services to areas of greatest need. However, the best way to measure need for mental healthcare remains elusive, since

data is sparse and often aggregated at scales that make them essentially useless for planning purposes. An urgent need exists for a model to estimate the prevalence of mental illness using demographic variables. The Collaborative Psychiatric Epidemiology Surveys conducted through the National Institute of Mental Health captures data on mental-health status and wellbeing including neighborhood and social variables, such as the presence of parks, crime rates, employment, and education. A principal component analysis is used to extract the most important factors predictive of mental illness. Using these factors and a regression model, we estimate the expected rates of mental illness in census tracts in Texas. The results provide input for estimating need for mental health services.

The Risk of Dying in the Context of a Financial Crisis: The Case of Portugal

Paula Santana (University of Coimbra, Portugal) Cláudia Costa, Graça Cardoso

Background: Portugal is one of the European countries where suicide increased in the last five years. However, there is no evidence of this phenomenon on the local scale or of the impact of socioeconomic deprivation. This knowledge will underpin preventative measures. *Methods:* Cross-sectional ecological design. The data concerning death by suicide and intentional self-harm (ICD9: E950-E959; ICD10: X60-X84) (1989-1993, 1999-2003, 2007-2011) and the Socioeconomic Deprivation Index (illiteracy rate, manual workers rate, population living in houses without toilet, 1991, 2001 and 2011) exist at municipal level (n=278). In order to control the variability of small numbers in estimating the Standardized Mortality Ratio, a Hierarchical Bayesian model, proposed by Besag, York and Mollié, was used, obtaining smoothed SMR (sSMR). The Relative Risk (RR) of mortality by SMD, introduced as continuous, was also calculated, with a 95% credible interval (95%CI). The existence of a urban-rural pattern was also analysed. *Results:* Geographical distribution of suicide and self-harm showed a North/South divide, with a markedly rural incidence. Between 1989-93 and 2007-2011, the mortality rate increased more rapidly in rural areas, with a reduction of sSMR in urban areas. In the periods under analysis, it was found that socioeconomic deprivation increased the RR of sSMR by suicide, with an association that was significantly greater than 1, both for the total (RR: 1.08; 95%CI: 1.05-1.10) and for each gender (women - 95%CI: 1.03-1.12; men - 95%CI: 1.05-1.11) in 2007-2011. *Conclusions:* The effects of the crisis may be exacerbating the risk of suicide in Portugal.

Session 32: Earthquake Recovery in New Zealand

Geographical Variation in the Health Impacts of Earthquake in Christchurch, New Zealand

Daniel Hogg (University of Canterbury, New Zealand), Simon Kingham, Malcolm Campbell, Tom Wilson, Michael Ardagh

This research will test whether there is a spatial relationship between the extent of physical damage from natural disasters and non-injury psycho-social stress related health outcomes over space and time. The hypothesis is that adverse stress-related health outcomes (e.g. cardiovascular risk, stress and/or anxiety) are greater among people who have experienced greater physical damage to their communities and homes than other those who have experienced less damage, but who also live in the city. The research will focus on the 2010/2011 Christchurch earthquakes as the location of interest and geospatial methods will be used to estimate exposure to physical damage and community disruption. This is complex as the effects of living in an area with damage to the physical built environment, disruption to services and the temporary as well as the longer term breakdown of social networks are not known. Furthermore spatial statistical methods will be developed to model exposure indicators to health data at a fine spatial scale. Therefore point level health data sources will be acquired to measure stress related health outcomes. Additionally mobile populations will be tracked to take the time factor into consideration and estimate exposure on an individual level. This is important as many people will have been displaced from their homes and will not necessarily live in the same community. Once accurate exposure assessment has been carried out, relationships between exposure and health will be examined. The results should then help further our understanding of links between environmental hazards and health.

Subjective Well-Being and Place Attachment: Finding a New (Sense of) Home in a Post-Disaster City

David Conradson (University of Canterbury, New Zealand)

This paper explores the connections between subjective well-being and disrupted place attachments in Christchurch, a New Zealand city impacted by major earthquakes during 2010 and 2011. In addition to deaths and widespread damage in the city center, thousands of suburban residents have had to relocate permanently. The assumption that the land beneath their homes would be steady and reliable -rather than restless and unstable- has been profoundly challenged. Drawing on surveys and interviews with residents in one particular neighborhood, I examine the implications of disrupted place attachments for subjective well-being, as well as the challenges faced by those seeking a new (sense of) home in a post-disaster city. The research seeks to contribute to our understanding of well-being, place attachment and processes of home-making.

Public Health Implications of Changing Neighbourhood Forms Following the Christchurch Earthquakes (Poster)

Vivienne Ivory (University of Otago, Canada)

While the spatial distribution of community resources and amenities normally evolves over the longterm, recent earthquakes in Christchurch, New Zealand, have dramatically contracted the timescale. As well as shifts in business activity from the central business district, local suburban centres are in a state of change as surrounding businesses and amenities are relocated and buildings are demolished or rebuilt. Further, there have been significant population movements. This poster will bring together Natural Hazards Platform-funded longitudinal research conducted at Opus Research on the spatial dynamics of economic recovery with the Health Research Council-funded University of Otago Neighbourhoods & Health project mapping health-related neighbourhood characteristics across Christchurch pre-earthquake. What will these shifts in business activity and population movements mean for neighbourhood form and wellbeing in Christchurch? Following ongoing engagement with city council, earthquake recovery authorities, health authorities, and public health and urban science disciplines we apply a social determinants of health framework to examining post-earthquake changes. Pre-earthquake mapping identified variations in neighbourhood resources known to be associated with health outcomes such as mental health and physical activity. Post-earthquake mapping identified changes in business locations and economic activity that contribute to neighbourhood-level resources, such as cafes, convenience stores and pharmacies. Before and after comparisons suggest some neighbourhoods may have poorer access to health-promoting resources, either from reduction in services and amenities, or because increased population in low resource areas. Particular attention will be paid to the public health implications of a transitional city over the prolonged rebuild stage.

Session 33: Health Care Demand and Access II

Influence of Socio-Economic Conditions on the Location of Outpatient Medical Services in an Urban Environment using the Example of Berlin

Jürgen Schweikart (Beuth University of Applied Sciences Berlin, Germany), Jonas Pieper

Spatial disparities of medical doctors treating outpatients are seen all over the world. There are no differences looking on the scale. It can be detected on large-scale as well as on small-scale level. How can those disparities be explained? The processes and patterns that are generating the distribution of doctors in space are largely similar. For example in all countries of the world, and there is no differences between developed and less developed countries, a higher density of physicians is reported in urban and wealthier areas. The present study examines the spatial disparities in an urban environment. The investigation area is Berlin. The city embodies the centre of the metropolis region Berlin/Brandenburg. With 3.4 million inhabitants Berlin is the most populated and with 892 km² also Germany's largest city. About 8,700 of Berlin's doctors are active in ambulant medical care. The study examines the hard locational factors influencing the location of medical doctors in the city. It is assumed that a favorable social structure is associated with a relatively higher density of medical doctors. It is also assumed that the strength of the influence is stronger if we are looking to the medical specialists. The small-scale study shows that people living in areas with a poor social structure, have a much worse accessibility to medical care compared to well-situated areas. They have relatively longer distances to the nearest doctor, a comparatively smaller number of different physicians can be achieved and in most groups of medical specialists also relatively low levels of small-scale are identified.

Connecting the Distribution of Health Resources and Access to Rheumatology Care for Patient with Inflammatory Arthritis in Wellington, New Zealand

Valerie Milne (University of Otago, New Zealand), Andrew Harrison, Robin A. Kearns

Inflammatory Arthritis (IA) is a painful and disabling immune disorder. Prompt medical treatment can limit the effects of the disease, with the best outcomes occurring when disease modifying drugs are used within three months of symptom onset. Qualitative research in Wellington, New Zealand has shown that patient delays can vary from a few months of symptoms onset until several years before a primary healthcare practitioner refers a patient to rheumatology services. Interviews with 22 patients and nine primary healthcare practitioners undertaken in 2009 and 2010 provide a basis for understanding the interactions between the utilisation of unevenly distributed health services and decisions that result in sub-optimal care. Uneven distribution of resources is found in measures such as that variable cost of primary care and long patient lists that lead to consultation delays in primary care, and long waiting lists that adversely affect areas least served by the rheumatology service. The perceptions and attitudes of patients and healthcare practitioners regarding IA and its treatment effect referral and

these perceptions and attitudes interact with patient resources and the accessibility of both primary care and rheumatology resources. Patients and primary health care professionals take these factors into account when making decisions on accessing more expensive or alternative care, or forgoing care all together. The delays for patients where the provision of local services is sub-optimal show that the distribution of services needs to be taken into account, alongside patient and practitioner factors, to optimise care for patients with IA.

Access to Health Care in France: How do Patient Characteristics and Geographical Accessibility Interact?

Véronique Lucas-Gabrielli (Institute for Research and Information in Health Economics, France), Pierre Coldefy

In France, the possibility to choose health care is greater in comparison to others western countries. Very few French studies have directly explored the links between potential care delivery and patient preferences and their abilities to use resources in their environment. The aim is to better understand the circumstances which lead patients to consult health professionals situated further than the closest one, substituting convenience by choice. Furthermore, distance to healthcare provider is recognized as a significant barrier to healthcare access in some regions, so their study aim is to check whether spatial behaviors increase or not inequities amongst patients. This requires dealing with different dimensions which can impede the progression from potential to effective access. Several authors (Penchansky and Thomas, Guarigliardo) distinguished spatial factors (availability and accessibility of healthcare) or aspatial factors (affordability, acceptability and accommodation). In such, we focus on the interaction between individual criteria and the local supply including barriers such as waiting times and costs. The French national health care survey “ESPS” provides regular information on health status, access to health care and insurance coverage by socio-economic status. It is linked with consumption data of the National Health Insurance Fund. The representativity of the survey allows us to explore spatial practices of healthcare use in urban and rural spaces and different sizes of towns.

Immigration and Health: Analysing Local Variations in Healthcare Access for Immigrants in France

Anne-Cecile Hoyez (University of Rennes, France), Sébastien Fleuret, Clélia Gasquet, Anaiik Pian

This paper presents key research issues on immigrant’s access to healthcare in France. At the national level, recent works underline the presence and persistence of inequalities in health and healthcare access for immigrant populations. However, we know little about the specificities and issues of such questions at the local level. Aiming to fill this gap, the MIGSAN program is based on an interdisciplinary, multi-sited, collective, pooled and shared research methodology. We made a census and mapped key-structures in accessing healthcare (social and medical services) and we conducted ethnographic fieldwork with populations and professionals. We focus on immigrants

who live in 3 French regions. We combine two approaches: a spatial approach (how the characteristics of neighborhood can constitute or not a favorable determinant of health and healthcare access?) and a social approach (how the individual and/or collective experience of migration interacts with health, healthcare access, care and consumption). Therefore, the paper presents results relating to different mechanisms and factors that, at the local scale, play a major role in variations in healthcare access for immigrants: (1) experience and practice of health and healing for ageing migrants and (2) changes in familial structures with a focus on pregnant women. This paper ends with a discussion on the modalities of accessing healthcare for immigrant population, combining ideas on the various resources (economic, social and spatial) mobilized by different individuals and groups for they own health, and the ruptures/continuities/negotiations taking place at various stages of life course and in various locations.

Session 34: Vulnerability and Health Geography

Rethinking Deprivation: Giving Social Justice a Better Chance

Mengzhu Fu (The University of Auckland, Daniel Exeter, New Zealand), Anneka Anderson

'Deprivation' is generally used within social and health sciences to identify, measure, and explain forms of inequality in human societies particularly in the 'developed world'. Deprivation-related studies typically assess the relationship between deprivation and health, crime or intellectual ability/performance. However, there is no consistent inter-disciplinary meaning or measurement of deprivation. This study investigates how the concept of 'deprivation' is used and treated across a range of disciplines and identifies gaps within the academic literature, particularly in relation to inequalities and inequities in health and social outcomes. In this thematic literature review, the inter-disciplinary scope of deprivation is critiqued, outlining the key concerns related to the theoretical underpinnings of deprivation, its measurement and interpretations. In particular, we provide a critical analysis of the advantages and disadvantages of current approaches to measuring deprivation. We argue for more qualitative research to respond with more certainty to some of the complexities of defining deprivation. A critical analysis of deprivation will lead to a more thorough and more effective solutions to the harms associated with social stratification, to achieve social justice.

The Geography of Disabled Populations in Texas Counties and their Vulnerability in Natural Disasters

Danae Daugherty (University of North Texas, U.S.A.)

The frequency of natural disasters such as hurricanes and tornadoes in Texas makes emergency planning crucial. Typical emergency response plans often overlook those with functional disabilities and ADA protected classes such as the blind, deaf and wheel-chair bound. Accommodating this population requires an awareness of the composition, location, and number of disabled populations at selected spatial scales. Unfortunately, a composite disability database for Texas counties does not exist. This research lays the foundation for such a comprehensive system by analyzing how disability prevalence varies across race/ethnicity and poverty and by creating a risk map that identifies counties that have the highest vulnerability levels based on disability and additional risk heightening factors. The results suggest that disability is not uniformly distributed across Texas, but clustered. Using these insights may improve the effectiveness of emergency response planning in Texas.

Vulnerable People and Places in the Mental Health Geography Literature

Kate Lester (University of North Texas, U.S.A.)

Mental illness is particularly rampant among who live in economically and socially deprived environments. Using the lens of vulnerable place theory this research reviews the literature on the geography of mental health in North America. The results show a complex, highly interactive, and coupled relationship between vulnerable places and

vulnerable people. Severely ill persons are more likely to move to hyper-vulnerable areas, people who stay in vulnerable areas are less likely to beat addiction than those who leave, and this vulnerability is replicated and reinforced by the behavioral healthcare system by placing group homes for recovering addicts in drug-riddled neighborhoods. Considered as a comprehensive body of work, the research of North American mental-health geographers strongly reinforces the vulnerable place theory, and future research should dig deeper into what environmental factors increase psychological vulnerability.

Mind over Body?: Risk Perceptions and Stakeholder Attitudes as Moderators of Traffic Impacts on Community Health

Tor H. Oiamo (Western University, Canada), Isaac N. Luginaah, Joy Parr, Alice Grgicak-Mannion, Xiaohong Xu, Hanna Moah, Colin Novak

Previous research on environmental risk perceptions of air pollution found that society and culture can influence levels of perceived risk significantly. Examples include agency, the ability to affect change, and sense of place. Complementing this research is a body of literature that relates risk perceptions to stress and coping mechanisms, which suggests that social and cultural determinants of perceived risk can affect health indirectly through risk appraisals and consequent physiological stress-response mechanisms. This paper examines the relationships between risk perceptions of traffic pollution, determinants thereof, and their influence on health outcomes related to stress and air pollution. The study is based on a traffic impact survey (n=1000) of residents in two neighbourhoods of Windsor, Ontario, Canada. One neighbourhood contains transportation infrastructure that supports the busiest border crossing in North America, while the other provides a control for the effects of heavy traffic. The study is part of a larger study that examines the policy and practice of community health for a transportation megaproject to modernize the border infrastructure. The survey is complemented by high resolution environmental data on nitrogen dioxide concentrations throughout the city as predicted by land use regression modeling. Structural equation modeling is used to identify latent constructs of social or cultural influences on perception, and furthermore the causal framework connecting perceptions to health and exposure.

Trends, Challenges and Opportunities for Health Applications of Geographic Information Science in India: a Review

Marilyn O'Hara Ruiz (University of Illinois, U.S.A.), Arun Sharma

A comparative review of the scientific literature highlights India's relatively slow adoption but recently increasing use of GIS and spatial methods for public health applications. With one fifth of the world's population, a strong history of support for technology, and a rapidly expanding system of higher education, India is well positioned to make efficient and effective use of geographic information science as the nation also addresses significant and complex issues in public health. Here, we discuss the results of our review of 114 papers from a structured PUBMED search, highlighting

each article's year of publication, author's affiliations, spatial analysis methods, regional focus, and health domain. Our evaluation of the trends, challenges and opportunities includes a quantitative analysis of the paper review parameters, solicited observations from selected authors of the papers, strategic comparisons with other Asian and African nations, and a synthesis of observations provided in the papers under review. The particular difficulties identified include lack of technology, software and training for health personnel, little coordinated spatial data development and sharing among municipal, district, state and national agencies, and tenuous communication and transportation networks. We conclude with a summary of the particular technical and policy challenges that have hindered a more complete adoption of geographic methods and the advantages of using GI Science to address India's complex and ongoing public health challenges.

Session 35: HIV/AIDS II

AIDS and Aid--A Sustainable Option? Lessons from PEPFAR-I, Uganda

Poojitha Kondabolu (University of Connecticut, U.S.A.), Vandana Wadhwa

Uganda was one of the first and most severely affected countries by the HIV/AIDS epidemic in the 1980s. However, HIV/AIDS prevalence declined sharply since the 1990s, largely due to strong national political will. Phase-I of the United State's President's Emergency Plan for AIDS Relief (PEPFAR-I) began in 2003, aiming to further curtail the epidemic by focusing on funding HIV/AIDS care and treatment in Uganda. The present qualitative field study comprising in-depth interviews across a spectrum of key stakeholders was conducted in 2011 after PEPFAR-I had ended. The purpose was to examine the promise and caveats of PEPFAR as a viable and sustainable model for reducing the HIV/AIDS burden. Analysis suggests that PEPFAR-I was successful in connecting thousands of patients with life-saving treatment, augmenting Uganda's domestic absorptive capacity, and creating much-needed information systems. However, the study also highlights major concerns with PEPFAR-I that reflect the inherently complex and sociopolitical nature of international aid. These concerns include slippages in earlier gains made in suppressing HIV/AIDS prevalence levels and threats to the overall sustainability of HIV/AIDS prevention and treatment programs. The study concludes with policy implications that may enable greater effectiveness of future phases of the program and the Ugandan health care system at large, as well as lessons for other similar foreign aid programs.

HIV/AIDS and Co-Factors in Southern Africa: A Statistical and Spatial Analysis

Jennifer L. Alexander (University of Texas at Austin, U.S.A.)

According to the 2010 UNAIDS Global Report, HIV/AIDS prevalence rates have decreased in many areas of the world over the 2001 to 2009 period. However, the report also notes that "gains are real but still fragile". HIV/AIDS prevalence rates in the countries of southern Africa still comprise nine of the world's ten highest rates, despite persistent efforts to control and reduce the effects of the epidemic. These efforts focus primarily on behavior change, particularly abstinence, monogamy, and condom use. Research suggests that the global HIV/AIDS medical and health communities may be overlooking areas of risk, as well as health, social, and environmental factors that may be contributing to these persistently high rates. This work will explore these issues through analysis of the epidemic in parts of southern Africa from a spatial and statistically analytical perspective. Notably, this research will address potentially contributing co-factors: disease and chronic health conditions, migration pressures and their effects, and inequalities in sexual relationship control. Analysis will be based on Demographic and Health Surveys (DHS) data from 2007 through 2011. Statistical analysis will use logistic and linear regression to analyze individual and cluster-level data, and geographically weighted regression will be used for spatial analysis of data at both scales. Data from Malawi, Zambia, and Zimbabwe will be analyzed individually and

as a group. Results will exhibit correlations between co-factors and HIV prevalence rates, demonstrating patterns similar to those of known correlative co-factors, such as pregnancy and income levels.

From Individual to Contextual Vulnerability to HIV/AIDS in Senegal

Fatou Maria Drame (Gaston Berger University, Senegal)

HIV/AIDS is one of the major health problems Africa is facing. The global response to the epidemic has circulated broad analytical frameworks and tools. In Senegal, epidemiology revealed a low epidemic in the general population (HIV prevalence less than 1%), while the burden of the epidemic is on some key populations, such as sex workers or men having sex with men. The prevalence in these groups can reach 30% depending on the region. A recent study by the Joint United Nations Program on HIV/AIDS in West Africa however, showed that the incidence of HIV/AIDS was higher in so called "stable couples". This finding challenges HIV response in Senegal: What are the strategies that need to be developed to address populations with risky behaviors but not identified in any vulnerable group? This study utilizes Geographic Information Systems (GIS) to identify vulnerable populations and also improve our understanding of the holistic aspect of vulnerability beyond known risk groups. The findings from this analysis leads to sustainable and actionable results for HIV practitioners in West Africa.

Reproductive Rights in Argentina

Samantha E. Heuwagen (University of South Florida, U.S.A.)

This research is intended to help educate and begin a move toward reproductive rights for women and men in Argentina. This piece will focus on the education of the population in regards to sexually transmitted diseases, HIV/AIDS, and overall sexual health, as well as how to teach sex education using feminist pedagogical strategies since Argentina does not have a sexual education curriculum in place. This piece will focus on the themes of sexual education, choices regarding diseases/unplanned pregnancies and women's rights as way to view activism in Argentina. The intention is to bridge the gap of the research of women's rights in Argentina and what can be done to further aid in their fight towards reproductive rights and freedoms.

Wealth Gap-Health Gap: Impact on HIV/AIDS in Texas

Mara Hedrich (University of North Texas, U.S.A.), Joseph Oppong, Chetan Tiwari

The housing bubble of 2006 and the subsequent recession increased America's poverty rate to 15.1% in 2011, the highest in two decades. Decreased health insurance coverage, cuts in Medicare and Medicaid and the resulting increased patient costs have severely hindered access to affordable healthcare. In effect, the recession's wealth gap created an even wider health gap. Unfortunately, HIV/AIDS is not in recession. In Texas, newly diagnosed HIV/AIDS rate declined before the housing bubble from 33 to 21.6 per 100,000 between 1999 and 2006, but it increased to 25 per 100,000 from 2007 to 2011. How exactly the increase in unemployment, poverty, and uninsured has impacted the characteristics of Texans with HIV/AIDS remains to be addressed. Pre and Post

recession demographics including race/ethnicity, gender, unemployment, poverty and insurance were investigated using statistical and spatial analysis to determine the geographical variance on HIV/AIDS rates. The results suggest that minority adults with HIV/AIDS among the middle class may have curtailed access to services due to the recession. Increasing access and benefit programs for this targeted population is critical to prevent further spread of HIV.

Session 36: Indigenous Populations, Migration and Health

I'm so Used to Moving All My Life: Understanding Urban Aboriginal People's Experiences of Mobility and Health

Marcie Snyder (University of Toronto Ontario, Canada), Kathi Wilson

Indigenous peoples around the globe face a disproportionate burden of ill health as compared to non-Indigenous populations. These disparities are reflected across the life course, and are intimately tied to socio-economic and political inequities. In settler nations in particular, these inequities stem from colonial legislation that dispossessed Indigenous communities from their lands and culture. While investigating these disparities is increasingly becoming a priority for health geographers, it remains that little is known about the complexities of Indigenous health in the urban setting. Given that in recent years, Indigenous peoples have become increasingly urbanized and have experienced a growing mobility between rural and urban areas, as well as within cities, this gap remains a pressing matter of concern. In response, this research uses a critical population health approach, coupled with a holistic understanding of health (i.e., physical, mental, emotional, spiritual) to investigate the link between urban Indigenous mobility and health. Using in-depth interviews that took place in Winnipeg, Manitoba, Canada with urban Indigenous movers, this research reveals that mobility importantly impacts holistic health across generations. Driven largely by the influence of colonial assimilation strategies, the impacts of intergenerational mobility reveal a degradation of health over time. This research makes an important contribution to the nascent urban Indigenous health literature and serves to demonstrate that mobility is indeed connected to movers health.

A Look through the Eyes of Aboriginal Youth: Using Photovoice to Understand the Link between Social Support, Social Relationships, and Health

Kathi Wilson (University of Toronto Mississauga, Canada), Ashley Ning

Aboriginal peoples are the youngest and fastest growing population group in Canada with approximately 50 percent of the population under 24 years of age. Despite their youthfulness, Aboriginal peoples experience a disproportionate burden of health disparities that are evident at the earliest stages of life. Although community and supportive networks are known factors shaping individual health, little research has examined the impact of social support and social relationships on Aboriginal health, particularly for Aboriginal youth. To address this gap, this research, using a community-based research approach, focuses on the links between social support and health for a group of highly mobile Aboriginal youth living in Winnipeg, Manitoba Canada. Specifically, the Aboriginal youth participated in a series of photographic assignments and six weekly photovoice sharing sessions. The results of the photovoice sessions illustrate how social support is mediated at the level of the individual, family, and community and how it shapes both positive and negative health outcomes at these

three levels. The results are discussed with respect to policy and future research recommendations.

Ingenious Medicinal Practices of Tribes and Health Sustainability: A Case Study of Tribes of Chamrajnagar District of Karnataka, India

Dr. Chikkarangawamy (University of Mysore, India)

The medicinal practices of tribal people still not decoded to understand completely and bring it into the main practice of medication as in English medicine practice. In pre-modern period the tribal settlements were totally disconnected from the main society and the government, hence they were stick on to their indigenous medication practice by using flora and fauna resources in their domain without destructing the natural resource and their health was also good. But in the post-modern periods especially in India the most basic service were tried to provide for tribal people in which government medical service is also one. Since the English medication is not effective in service for them in many ways their health care system found totally disturbed. Hence this paper has been thought of to prepare to make their health and health care system sustainable. The poverty in India is one of the major issues for the comprehensive development in India. Under the public welfare aspect the primary agenda in front of the state is on tribal health service to its people. In Chamrajnagar district the living conditions of tribal people is in bad state. The district has tribal population of 85,000 live in 45 tribal audies (Villages). Soliga (one of the tribes name) is the major tribal group who dwell in forest there is no proper infrastructure in terms of housing, potable water, transportation and communication. In these condition people of this region are living in a miserable condition. The tribal people collect honey, gum, medicinal plants and several other forest products. But they do not have any provision for preserve, storing and use them. The medicinal practice of tribe which is vanishing in the present days is one of the significant aspects to be considered. Hence providing necessary service strategy to take care of their health and health care system is becoming inevitable to rethink under the dimensions of indigenous health practice.

Determinants of Healthy Immigrant Effect

Rajendra Subedi (Queens University, Canada), Mark W. Rosenberg

Canada admits more than 250,000 immigrants every year, and about one fifth of the total populations in Canada now are foreign born. The introduction of point system has made the immigration system highly selective that facilitates the entry of young, healthy and economically active population. Studies have shown that immigrants normally have a better health condition on arrival compared to their Canadian counterparts. However the health condition of new immigrants deteriorates after few years of their arrival in Canada. This phenomenon has also been observed in the United States, Australia and several countries of Western Europe, and is popularly termed as - healthy immigrant effect (HIE). Literature suggests that the HIE occurs after few years of arrival and most commonly seen among visible minorities and non-European population. Although different hypotheses have been proposed to understand the HIE,

the causes are subject to an ongoing discussion. This study will explore the possible causes behind HIE using the data of Canadian Community Health Survey (CCHS) 2001 and 2010. Immigrants with less than 10 years of residence will be selected from CCHS 2001 database whereas those with more than 10 years of residency in Canada will be selected from CCHS 2010 database to make a comparison of self-rated health status. The quantitative data analysis technique will be used to understand the possible determinants of HIE. The findings of the research will be presented as a poster at the 15th International Symposium in Medical/Health Geography (IMGS 2013) in Michigan State University, East Lansing, Michigan, USA.

Session 37: Qualitative Health Geography

Pre-coding in Grounded Theory with Computer-assisted Text Analysis

Rick Fenton (University of Waterloo, Canada), Dawn Pollon, Nancy Fenton

There is growing interest in qualitative analysis of large volumes of text. In particular, Grounded Theory is a methodology widely used to explore unstructured data. The first step of Grounded Theory involves line-by-line analysis of data to identify first impressions; usually early ideas documented as handwritten notes or underlined phrases. In our work, such lines are called pre-codes, and the process of their identification, pre-coding. The purpose of our present study was to examine the usefulness of computerized-assisted text analysis in pre-coding. Pre-codes were generated from 530 pages of verbatim transcriptions from 38 semi-structured interviews. The transcripts were also manually coded using conventional Grounded Theory methodology. We used a computer program based on the Distribution Hypothesis; words with similar distributions have a similar meaning. We analyzed patterns of word co-occurrence to identify terms that were used most often to construct meaningful phrases -the pre-codes. Data preparation and parameter selection was typically 2 hours for a complete data set; analysis was less than 2 pages per second. Comparatively, results demonstrated a reasonable level of agreement between manual and computer identification of pre-coded paragraphs (50%); the level of (missed codes) and additional codes in the computer analysis varied considerably. Overall, the use of computer-assisted pre-coding helped to shape an analytic framework from which to build the analysis and significantly decreased the overall time to analyze large volumes of data. Our findings point to the need for further study of computer-based pre-codes without comparison to their manual counterparts.

Drawing as Research Method: What can it add to Health Geography's Qualitative Palette?

Stephanie E. Coen (Queen's University, Canada)

In this paper, I consider the utility of drawing as a visual research method in health geography. While drawing has somewhat moved away from the methodological margins in other areas of qualitative health research, it has not been engaged to any great extent in health geography "with the exception of participatory mapping. This is somewhat surprising given what, I argue, is a strong alignment between the kinds of knowledge that drawing can help to produce and the types of topics that many geographies of health seek to understand. Through a methodological appraisal of one vein of drawing -what I categorize as "draw and describe" techniques-I demonstrate what drawing has to offer to health geography. Specifically, I argue that drawing can be a way to tap into experiential dimensions of health and place by: comprising a medium for emotions that are not easily articulated or are ineffable; providing a means for reflection that can enrich the scope of data generated; and affording space to interrogate potential contradictions and similarities among different sensory modes of expression and experience (e.g., verbal, visual, physical). My analysis is grounded a

critical review of existing methodological and empirical work on drawing in health research, and in my own research on gender and exercise behaviour in gym environments. I conclude that the methodological advantage of drawing may lie not only in advancing what we know, but in how we do health geography research, and that this may be an added benefit for those working from critical perspectives.

Healing Arts: Military Veterans and the Role of Art in Managing PTSD

Courtney Donovan (San Francisco State University, U.S.A.)

Over the years, health geographers have looked into the methods that best capture and represent individual health experiences. This paper looks to build on and extend the existing discussion on methods. In particular, I consider the role of art in helping military veterans in the San Francisco manage symptoms of PTSD. Specifically, I explore how local veterans arts groups in San Francisco help military veterans communicate and make sense of the effects of trauma experienced while in the military. Moreover, I also consider how art therapy provides an opportunity through which veterans can focus on the embodied experience of PTSD as they transition between the distinct spaces and places of the military and civilian worlds.

Exploring Public Opinion of Anaphylaxis in Ontario Public Schools using Social Media

Nancy Fenton (University of Waterloo, Canada), Rick Fenton, Susan J. Elliott

In previous research, we explored the experiences of children at risk of anaphylaxis in Ontario public school environments. This work moved beyond policy responses by privileging affected children to understand their risk experiences. Findings from this work revealed the relational-spatial dynamics of emotion among and between children and their environments, and highlighted the interrupted emotional spaces between children at risk and their environments resulting in social exclusion. This research was featured in a newspaper article that attracted a range of social media responses, which provided the opportunity to explore a broader range of public opinion. We used a novel computerized text analysis approach to study the social media responses in order to better understand the sentiment expressed towards anaphylactic allergy in the school environment. The data included 45 responses generated from the newspaper articles on Facebook and blogs, collected over a 4-day period. Data were analyzed using a technique based on distribution of co-occurring words. The results showed both strong positive and negative sentiments; negative sentiment did not appear to be associated with lack of knowledge regarding anaphylaxis, but rather linked to factors such as opinion relative to personal life circumstances. The implications of this small study point to the need to explore legislated policy environments from a diverse range of perspectives and to develop comprehensive educational strategies related to safe school practices that take into account the issues and concerns of all stakeholders. Future studies should seek to analyze the negative sentiments shaping social vulnerability and exclusion that may predispose children at risk to bullying.

Exploring Sociocultural Actors Shaping Secondary Student's Healthy Eating Choices: A Qualitative Study in Ontario

Michelle M. Vine (McMaster University, Canada), Susan J. Elliott

Rising rates of obesity are a major public health concern. Having doubled worldwide since 1980, in Canada, 13.1% of children and 10.2% of adolescents were obese in 2011. Excess weight in children and adolescents is linked to high blood pressure, glucose intolerance, pre-diabetes, and psychosocial factors including weight bias, and body image disturbance. Obesity develops as a result of a complex set of interrelated factors - biological, behavioural and environmental. Nutrition is an important determinant of obesity, and is shaped by behavioural and environmental change. The environment (e.g., political, economic, physical, sociocultural) acts as a potentially modifiable pathway to health; however, there is a lack of research linking the social environment, nutrition and obesity. This is part of a larger research program examining the school nutrition environment in Ontario, Canada. The objective was to explore how local level factors shape the healthy eating choices of high school student's vis-à-vis a new school nutrition policy. Three focus groups were conducted with secondary school students (n=20), in two Ontario boards. Schools were recruited to represent low socio-economic neighbourhoods. Open-ended questions explored healthy eating, nutrition policy, and purchasing behaviours. NVivo 8.0 software was utilized to thematically analyze data. Preliminary findings illustrate that the sociocultural environment shapes student's eating choices. For example, student input into nutrition policy is needed. Economic barriers to healthy eating (e.g., high cost of healthy food), particularly within vulnerable populations, mean that students eat outside the school cafeteria (e.g., hallways or off-campus), compromising their sense of belonging and school community.

Session 38: Health Systems

Perception of the National Health Insurance Scheme among the Urban Poor in Lagos, Nigeria: Analysis of its Patterns and Correlates

Olatunji Babatola (University of Lagos, Nigeria)

The primary goal of the 1978 and 1998 declarations on global health, is to improve on the degree of access of different socio-economic groups to sustainable health service provision globally, and more specifically in the under-served areas of the world. The National Health Insurance Scheme (NHIS) was introduced in 2006 as partial step towards realizing the global goal of enhanced access to health. The conception of the programme was narrow, targeting only those in the formal employment sector. The initial impression that the programme would pursue periodic and systematic expansion to embrace more health-marginalized groups may be jettisoned, except research evidences convince the government to do otherwise. It is against this background that this study analyzes the perception of the health scheme in selected marginalized neighbourhoods in Lagos, Nigeria. The paper which employed stratified random sampling method to draw its respondents from two poor suburbs of Lagos, among others (i) characterizes the socio-economic make up of the study population (ii) determines the current pattern of formal-informal health service patronage among the study population; (iii) determine the level of awareness, perception, interest and expressed goodwill in the NHIS project by the study population (iv) determines the maximum indicated cost-burden that respondents are willing to bear; and (v) determines the correlates of the expressed interest in HIS and their cost-bearing readiness. The various findings form the basis of suggestions on how to systematically embark on the obligatory responsibility of enlarging the scope of HIS for sustainable health development in Nigeria.

Decentralization and Health System Reforms: Stakes and Practices in Senegal

Aminata Niang-Diene (University Cheikh Anta Diop Dakar, Senegal)

The Decentralization process in Senegal is in a phase of consolidation with the promulgation of the regionalization act since 1996. Local authorities have been entrusted the responsibilities of decision making, construction of health facilities as well as organization and financing of health and social services. The central government has taken several measures in support of the devolution process. The most important of these measures is related to the establishment of planning and funding mechanisms for the implementation of health policies. The outcome of the study shows that, despite the devolution option taken, the central government continues to take the laws and regulations that determine the implementation of decentralized policies (including planning and resource allocation). The study builds on the analysis of the funding allocated to local councils (for the period 2006-2010). It also takes into account the outcome of the survey of 354 municipal and rural council members. Decentralized technical services of the State continue to replace the rural and municipal councils in

developing strategic planning and operational documents, as the latter are still yet to have competent human resources as well as access to technical knowledge in programming and financing. Consequently, the mechanisms of resource allocation, which are often guided by political patronage does not help to reduce the structural health inequalities among the 14 regions and the 485 rural and municipal councils of Senegal.

How simSALUD Supports Ensuring a Sustainable Health Care System in Austria by Modelling Small Area Health Issues

Melanie N. Tomintz (Carinthia University of Applied Sciences, Austria) Bernhard Kosar, Victor Garcia-Barrios

The Austrian health care system is known as an efficient system with high life expectancy rated above average by the OECD, however, alarming is the fact that healthy life expectancy is below average. Further, Austria has lost its top ranking in different surveys, e.g. from rank 1 in 2007 down to rank 11 in 2012 at the Euro Health Consumer Index, pointing out that Austria seems to move into the wrong direction with problems including less transparency and missing data. This paper proposes simSALUD, a Web-based Spatial Microsimulation Framework for modelling small area health issues to support local policy decisions in Austria. This is especially important as small area health data are not available and accessible but this is a key factor to improve local planning. The current first prototype of simSALUD uses a deterministic reweighting approach by matching different Austrian surveys with small area census data. From literature it can be seen that current spatial microsimulation models are tailored to specific application areas, therefore often not very flexible and neither Web-based. The aim of this paper is to investigate the flexibility, reusability, usefulness and efficiency of the simSALUD solution approach to model different health issues, in this case obesity and smoking. Another highlight of the user-interface of this Web application is the provision of map-based and statistical interaction elements to efficiently support decision makers for future local policy decisions. The research project SALUD is funded by the Federal Ministry for Transport, Innovation and Technology and the Austrian Science Fund.

GIS Approach on Health Care System and Patient's Perception of Primary Health Care Centres–Micro Level Study

V. Saravanabavan (Madurai Kamaraj University, India)

The promotion and protection of health of people is essential for a sustained economic and social development, thus contributing for a better quality of life. The health care services cover a wider range of activities like medical care, sanitation, immunization, counseling health education, and social security rehabilitation etc. Distance is an important factor of consumer travel pattern between different locations thus affecting the special interaction of consumers who usually have their choice for shorter distance. The major objectives of the sample study are 1. To analysis the spatial distribution of primary health centers and the patient's satisfaction level who avail these health care

services 2. To analyze the travel pattern and movement pattern of patients from their residence to the PHC with respect to their age and sex indicators 3. To derive a conceptual frame work towards strengthening the foundation for integrated health care system. The sample study area Vadipatti block is located in Tamilnadu, India. The study was based on both primary and secondary sources. The data collection was made by using the method of stratified Random sampling and a total of 600 Questionnaire samples were drawn. Graphic techniques such as overlay, and buffer analyzing using GIS and suitable statistical techniques were used. The data were analyzed with the help of Multivariate statistical techniques known as Factor analysis. Factor analysis is used to identify the statistical associations between diseases, socio-economic characteristics, and health care and transportation variables, among the patients.

Progenitive Healthcare Distribution System in Kumbakonam, India: A GIB based FAM to Resolve Women's Health-at-Risk Paradox

Pagadala Hariram Anand (Bharathidasan University, India)

In the tropical sub-continent of India, the prospect of maternity has ever been, and is at its optimum. Any girl, wed in due season, is just a mensum away from chances of immediately turning gravid. The fabulous Vedic injunction for women reads: Woman, born are you to bear and breed many as you can and look after your bharta (husband) as one more child. Anand Kumarasamy's celebrated essay "The Status of Women in India" speaks on the great regard the land had showed to the woman of India who has been adored as the creatrix. In the late 1950s of the previous century, as a population alert maxim, a journalist quipped: the women in India are more fertile than the land in India. Historically the populous sub-continent has proved a high degree of fertility despite planning and other odds of the women of the land. In the southern plateaus and plains and in all riverine delta regions with conducive limnological environment the rate of breeding and pullulation has been remarkably high down the decades. In the midst of abundant possibilities of fertility, on its very count a parallel neglect and oversight or inattention have created a paradox. There is no correspondence between the abundant women resource and adequacy of medi-care extendable as Women-care, Mother-care, Baby-care and Guarded Maternity. The Government of India has appointed a commission to inquire into the status of women and pointed out this contra indication: fertility at risk. Proper women health care during their cycles is a must and duty for the health of families for perpetuation and proliferation. The paper underwritten by the proper awareness of this paradox in India, attempts a case study on a Rurban (rural plus urban) region, Kumbakonam (N 10° 57, E 79° 22) on river Cauvery's alluvial delta, with a dense population of 140,113 (2011 Census) and females numbering to 70,763. This region has 18 gynecologists and 22 pediatricians, rendering service distribution. This paper studies the sustainability of Women Health Care service distribution patterns and records them in Geographical Information Base (GIB) to analyze the existing distribution pattern, its range and to detect the lacunae. The study includes analysis of user awareness of the distribution system, for it affects the utility co-efficient of the system. Systemically speaking the GIB data can be appropriated to ensure adequate reciprocity. The need based objectives are: to frame a GIB for the

Reproductive healthcare centers (RHC) to analyze the distribution pattern using Global Positioning System (GPS); to estimate women's healthcare provisions to catalogue the spatial dimensions based on a Factor Analytic Model (FAM). The major factors that are derived from the FAM are: Selection and establishment of Reproductive HealthCare centre, maternity related gynecological general check up, dietary council during pregnancy, evolving measures at par with the socio-economic conditions of the women beneficiaries, recommended planning and parental health, and selective and directive immunization for the child. The study suggests that care proper can be taken to revise the distribution pattern such that optimum health care services can be extended to the women of the region resolving the stated paradox namely: fertility at risk. It, also by indirection, shall show the favorable limnological surroundings in this region which favor guarded fertility and ensure the prospect of healthy maternity to all those concerned. In this process, the put-forward suggestions may point out certain hindering administrative restive regulations. By careful adjustmental re-regulation, the same may be got over. To prioritize the prospect of maternity health care and to remedy the maladies in the implementation, the FAM factors shall be reckoned through a questionnaire schedule of 180 samples, plus 51 related questions.

To Their Health? The National Rural Health Mission in Action: Case Study, Jodhpur, Rajasthan

Jacqueline Hellen (Tulane University School of Public Health and Tropical Medicine, U.S.A.), Vandana Wadhwa

At least 70% of the Indian population resides in rural areas, making rural health planning a particular imperative. The National Rural Health Mission (NRHM) was launched in 2005 to address this concern, of which some primary goals are reducing infant and maternal mortality, increasing public health access, and preventing and controlling non-communicable and communicable diseases. This case study examines the on-ground impact of the NRHM in the traditionally medically underserved area around Jodhpur, Rajasthan. The purpose was to identify NRHM's successes and challenges in order to contribute to a more knowledgeable, grounded debate on actionable policies. Conducted in 2009, the field research included semi-structured interviews with health stakeholders in 23 villages, supplemented by a survey of 393 women from eight villages. The study found some NRHM successes such as increased availability of community-based healthcare workers and higher utilization rates of prenatal care and immunization services. However, vulnerability to disease and high infant and maternal mortality persist, largely due to unaddressed issues of low health education and low socioeconomic status. In fact, many households in rural Jodhpur not only face financial barriers, but often also endure geographical, normative, and institutional barriers to healthcare, such as strenuous travel distances, harmful cultural beliefs and taboos, and apathy and low attendance among health personnel. Moving forward, we hope that insights from this and future studies will help highlight contextual opportunities and impediments to help meet the goals of effective and accessible community-based care in rural India.

Session 39: Environmental Health II

Healthy Public Policy through an Environmental Justice Lens: Examples from Canada

Sarah Wakefield (University of Toronto, Canada), Erika Jerme, Hilary Gibson-Wood

More than ever, planners and public health practitioners are using broad, policy-based interventions to alter the physical and social environments where we live, work and play, with the end goal of enhancing public health. In these contexts, however, health equity is rarely a top-of-mind concern. Drawing on two case studies - a pesticide bylaw in Toronto and a community garden bylaw in Hamilton, Ontario - this paper illustrates how an environmental justice framework can be used to evaluate the extent to which healthy public policy initiatives are able to contribute to health equity. Results suggest that, while public health may be increased overall by broad, policy-based interventions, a lack of explicit attention to difference and marginalization in the development of these policies can in fact lead to greater health inequality in communities. The paper concludes with a discussion of how greater inter-departmental and community collaboration in policy development, as well as the more routine application of an environmental justice lens, could lead to the development of policy that more effectively mitigates the ill effects of the inequitable distribution of environmental and other resources.

Living with Wind Turbines in Ontario: The Roles of Health, Rhetoric Conflict, and Community Benefits

Jamie Baxter (Western University, Canada), Chad Walker

There is scant mention of health risk perception as a predictor of turbine opposition in a literature that suggests visual aesthetics trump such concerns or that anticipatory fears abate once the turbines are built and become operational. We explore some of these ideas through two comparative Ontario case studies involving both surveys and interviews. One study compares data from a drop-off mail-back survey of 112 residents living near turbines in Melancthon/Amaranth with 104 residents from a nearby 'control' community (West Perth); while in the second study 16 interviews and 82 questionnaires in Port Burwell are compared with 8 interviews and 70 questionnaires in Clear Creek. Consistent with some of the European findings there is majority support for turbines and lack of concern about health impacts from nearby residents, but this is combined with lack of majority support in the control community - which is contrary to the idea that there is general support for turbines. Lack of support is tightly linked to health concerns. Yet, all of the communities share high levels of concern about Ontario policy - particularly the siting process, community conflict and unfair benefits sharing. We will use the social amplification and attenuation of risk framework to help make sense of these and other findings in the two case comparisons to explore policy alternatives.

The Importance of Varying Spatial Levels in GIS Analysis of Environmental Epidemiological Data

Sala Senkayi (U.S. Environmental Protection Agency, Region 6, U.S.A.), Melanie L. Sattler

Geographical Information Systems (GIS) are powerful tools for analyzing spatially related data. GIS has many potential applications in environmental epidemiology, because contaminant exposure is often spatially related. For example, persons living close to a source of toxic air emissions would likely be exposed to higher concentrations, resulting in greater likelihood of developing sickness. In using GIS to analyze environmental epidemiological data, a spatial scale must be chosen. A large scale, such as that of a metropolitan region, requires less data, and is thus quicker and easier. It may not provide, however, a fine enough resolution to detect patterns of disease due to an emission source. A smaller scale, such as a block group, can provide finer resolution. A smaller scale requires more data, time for analysis, and computing power; however, it is also more likely to uncover relationships between individual emission sources and populations with higher incidence of disease. This paper will discuss the issue of spatial scales in the context of a case study, involving proximity of childhood leukemia cases to airports. (The entire study was described in a 2012 AWMA conference paper; this paper will focus on the issue of spatial scales.) Using data provided by the Texas Department of State Health Services, observed/expected cancer ratios were calculated in GIS. Scatter plots of observed/expected ratios were then generated as a function of distance from airports. Similar analyses were performed at the levels of block group, census tract, and county, including counties with large and small populations. At the scale of large counties, no relationship was observed between leukemia cases and proximity to airports. However, at the block group level, a relationship became apparent. The case study thus illustrates potential advantages of analyzing smaller areas when teasing out relationships between diseases and pollutant emission sources.

Spatiotemporal Analysis of Mortality Rate as the Tool for Environmental Monitoring

Natalia V. Shartova (Moscow State University, Russia), Svetlana M. Malkhazova, Dmitriy S. Orlov

Mortality is considered as one of the key indicators of public health and sustainable development of the territory. The comparative spatiotemporal analysis of urban population mortality rate for the 1998-2010 is carried out for various territorial levels of Russia. At the national level it is realized in the context of 83 administrative units and at the regional level - for the Moscow region, the most important financial, political and social center of the country. Infant mortality, total population mortality, and mortality by cause of death such as cardiovascular diseases, malignant neoplasms, respiratory diseases, diseases of digestive system, infectious and parasitic diseases are analyzed. A series of created medical-geographical maps allow to differentiate territory on death rate and use public health indicators for environmental monitoring. It is identified, that the death rate in Russia has a negative trend to change for the analyzed

period. There are significant differences in mortality among men and women due to historical reasons as well as impact on public health of modern socio-economic and environmental factors. The death rate among men is in the several times higher than among women practically by each of the analyzed cause of death. It is more occurred in Moscow region where injuries death rate is in 4.5 times higher for men than for women. At the same time it's noted the significant reduction of infant mortality rate in the last decade, which is one of the main indicators of public health and quality of environment.

Exploring the Association of Neighbourhood Walkability with Childhood Overweight and Obesity Prevalence

Stefania Bertazzon (University of Calgary, Canada), Rizwan Shahid

The obesity epidemic has become a grave concern, with prevalence rates increasing in adults and children. This paper explores the relationship of overweight and obese children with neighbourhood walkability in Calgary, Canada. Neighbourhood walkability is considered an indicator of physical activity of residents. It is measured by Walkscore, a free web tool that uses a weighted distance from amenities. Results indicate that over 47% of Calgary communities are car dependent, with nearly 65% of children living in those communities. Geographically weighted regression analyzes the spatial pattern of the relationship of walkability with childhood overweight and obesity. Significant associations with Walkscore are found locally, in several North and East communities: most of those communities are car dependent. Walkability is generally desirable, but our analysis provides no evidence that car dependence is associated with higher risk of child overweight or obesity. Nonetheless, local analysis results highlight specific communities where poor walkability is significantly associated with child overweight and obesity. Our study therefore suggests that simply increasing walkability may not be effective in mitigating child overweight and obesity. Instead, it suggests targeting poorly walkable neighbourhoods where walkscore has a significant impact on childhood overweight and obesity. The suggested alternative is more cost effective, and has greater potential to reduce the risk of overweight and obesity in children. The study further indicates Walkscore, despite some limitations, as an inexpensive, flexible, and time saving option for public health research and planning.

Health Risk Assessment of BTEX Emissions from Gas Stations in Johannesburg, South Africa

Raeesa Moolla (University of the Witwatersrand, South Africa), Chris J. Curtis

Petrol and diesel fumes are known to emit anthropogenic sources of air pollutants that have a negative impact on both environmental and human health. In developing countries attendants are still employed to pump fuel for customers. In South Africa petrol pump attendants refuel vehicles with various octane unleaded petrol, lead-replacement petrol (LRP) and diesel on a daily basis. Attendants are particularly at risk to adverse health effects associated with inhalation of hazardous air pollutants (HAPs), such as volatile organic compounds (VOCs) released from these fuels. The VOC's released include benzene, toluene, ethyl-benzene and xylenes (BTEX), which are

important to analyse due to the high level of toxicity associated with them. Furthermore, regular air quality monitoring and hazard risk assessments are significant within a developing context as relevant information is limited. In this study an environmental health risk assessment of BTEX was conducted at four petrol stations in Johannesburg. Preliminary results indicate that with an increase of temperature, increases of benzene emissions were noted. These emissions are above South African, US EPA and WHO recommended guideline standards. Additionally, seasonal precipitation changes can significantly influence concentrations of VOCs. Benzene and Toluene for example, are removed from the atmosphere via wet deposition. Thus concentrations of Benzene and Toluene were lower during periods of high precipitation in summer (Nov-Jan). It can thus be inferred that employees are at a significant risk to adverse health effects associated with inhalation exposure to these HAPs. Further analysis is imperative.

Session 40: Medical Tourism

Developing a Guideline for Ethical Engagement in Medical Tourism

Krystyna Adams (Simon Fraser University, Canada), Jeremy Snyder, Valorie A. Crooks, Rory Johnston

Increasing media attention has focused on medical tourism, the term used to describe patients traveling with the intent of receiving non-emergency medical procedures. While there is a lack of empirical data on impacts of medical tourism on individuals and destination and departure communities, researchers have discussed concerns about negative impacts stemming from medical tourism on global and national public health and health equity. Despite this media and academic attention, research indicates that medical tourists are often unaware of potential safety and ethical concerns of medical tourism, especially as they impact third parties. To address this knowledge gap, this research project intends to develop an information tool for Canadians that may be considering traveling as medical tourists. The purpose of the tool is to increase awareness of these potential safety and ethical concerns so that they can factor into Canadian's decision-making around medical tourism. To develop this tool, an iterative methodology was utilized which drew upon existing ethical guidelines intended to promote social responsibility in the global community. Using ethical values drawn from these guidelines, a draft tool was developed and subsequently revised according to formative research methods, including focus groups with stakeholders and interviews with former Canadian medical tourists. Feedback from this research was utilized to revise the tool in preparation of dissemination. This paper describes the process of developing this tool according to this iterative methodology and the potential for adapting this methodology to other contexts.

You're Dealing with an Emotionally Charged Individual: An Industry Perspective on the Challenges Posed by Medical Tourist's Informal Caregiver-Companions

Victoria Casey (Simon Fraser University, Canada), Valorie A. Crooks, Jeremy Snyder, Leigh Turner

Patients engage in medical tourism when they intentionally travel outside of their home country to obtain medical care that is not part of an established cross-border care arrangement. Medical tourists are sometimes accompanied by friends or family members, referred to here as caregiver-companions, who provide them with support and practical assistance. Although they are often helpful, the presence of caregiver-companions can pose some challenges to medical tourists, health workers, and health care facilities. Here, we present an overview of an industry perspective of those challenges. We examine interviews conducted with 21 international patient coordinators who offered professional, non-clinical assistance to patients and their caregiver-companions at medical tourism destination facilities across nine countries. Participants noted, for example, that caregiver-companions can burden patients with additional travel costs or inadequate care provision. Caregiver-companions can also

create additional work for facility staff because they introduce new needs and sometimes refuse to comply with established organizational rules, routines, and expectations. Furthermore, caregiver-companion's abilities to assist medical tourists can be compromised from stress as well as health and safety risks. Despite these challenges, caregiver-companions can collaborate with international patient coordinators to enhance care and offer meaningful support to medical tourists.

Medical Mobilities: Examining Canadian Medical Tourist's Transnational Care Networks

Valorie A. Crooks (Simon Fraser University, Canada), Tony Gatrell

When people travel between countries for privately purchased health care they are engaging in medical tourism. An array of medical procedures is available for purchase in a growing list of destination countries. Canadians are among those who are engaging in this global health services practice. In this presentation we focus on articulating the ways in which Canadian medical tourists form and draw upon a transnational care network's in order to support their journeys abroad for surgery. Using qualitative interviews conducted with this group, we identify three network typologies: (1) the diaspora family led transnational care network; (2) the patient led transnational care network; and (3) the industry led transnational care network. Each typology characterizes a common entry point into the practice of medical tourism by Canadians, wherein the entry point is key to determining who and what is included in a patient's transnational care network. Using a case study approach, we detail the breadth and depth of three Canadian medical tourists' transnational care networks, one from each typology. We use these case studies to draw out the key elements of the transnational care networks operating within the three typologies. These elements include: family doctors, former medical tourists, support groups, websites, surgeons, and partners. Talking across the case studies, we highlight the complex nature of Canadian medical tourist's transnational networks, their spatial dimensions, and the ways in which different elements are mobilized at different points in the journey.

Attracting International Patients to the "One Love" Country: Health Policy Implications of Jamaica's Medical Tourism Ambitions

Rory Johnston (Simon Fraser University, Canada), Valorie Crooks, Meghann Ormond, Jeremy Snyder

Medical tourism describes the phenomenon of patients leaving their home countries to privately purchase medical care abroad. The global medical tourism industry is expanding as health care providers seek to attract profitable international clientele. Such providers are often aided by government policy that seeks to use medical tourism as a means to earn foreign exchange, develop health system infrastructure, and expand national economies. While Asian nations such as Thailand and India have dominated discussions of the global medical tourism industry over the past decade, many Caribbean countries are cultivating their own medical tourism sectors. Jamaica, for example, is aiming to develop a reputation as a leading medical tourism destination in

the Caribbean region. In this presentation we draw on fieldwork conducted in Jamaica in October, 2012. We contrast what we learned about the factors driving Jamaica's medical tourism sector against an existing conceptual policy-impact model developed from the Southeast Asian context by Pocock and Phua. We show that while this model is useful in explaining some of the factors driving medical tourism in Jamaica and their potential impacts on the country's health system, it does not account for the pivotal roles that the Jamaican diaspora, "offshore" medical schools, and international aid agencies are expected to play in sector growth. We conclude by offering a revised version of Pocock and Phua's conceptual model based on what has been gleaned about the Jamaican experience.

Session 41: Therapeutic Landscapes

Healthy Towns: A Descriptive Overview using the Behaviour Change Wheel to Characterise Interventions

Fiona Mapp (London School of Hygiene & Tropical Medicine, United Kingdom), Martin White, David Ogilvie, Mark Petticrew, Elena Sautkina, Denise Goodwin, Andy Jones, Steven Cummins

Healthy Towns (HT) is a UK Department of Health funded initiative to tackle the obesigenic environment using a whole-towns approach. Nine 'Healthy Towns' were selected and developed a total of 305 interventions. The Behaviour Change Wheel (BCW) is a framework for categorising interventions centred on a defined behaviour system; HT data is used as an empirical test of the framework to determine appropriateness for using it as an evaluative tool for complex public health interventions. We coded 228 HT interventions and 77 community led projects by intervention function and policy category according to the BCW using appropriate coding tables. Interventions that were unclassifiable were extracted and second coded followed by discussion on interpretation and use of codes to achieve a consistent approach. Healthy Towns is a complex and heterogeneous programme dominated by 'service provision' and 'environmental/social planning' categorised interventions. Intervention functions were more evenly distributed amongst BCW categories with 'training', 'enablement' and 'environmental restructuring' the most commonly coded categories comprising two-thirds of the programme. 18% of interventions were unclassifiable due to multiple outcomes, alignment with BCW categories and insufficient detail. Two emergent themes were identified within unclassifiable interventions: intervention preparedness and collective action. The BCW can be used to categorise complex public health interventions but there are limitations in its application to categorise HT as this was not an exclusive behaviour change programme. The heterogeneity of interventions reflects local interpretations of national policy and refinement of the BCW categories and definitions would facilitate wider framework applications.

Edgelands as Therapeutic Micro Landscapes: A Thematic Analysis

Frank Houghton (Limerick Institute of Technology, Ireland)

The concept of therapeutic landscape, as introduced to Geographers by Gesler, has not only had a significant impact on what has become a reformed geography (or geographies) of health, but has also ignited research on this topic. Burgeoning research in this field has developed the number and type of sites that have been characterised as therapeutic landscapes. However, although there have been significant developments in this field, the types of environments identified through the lens of the "therapeutic landscape" have been rather traditional and for the most part unsurprising. It is important in the context of developing our understanding of therapeutic landscapes to note Gastaldo et al's focus on the relational aspect of such environments, as well as Wilson's admonishments to note obverse views. This research therefore focuses on

Edgelands as therapeutic micro landscapes. Although Garreau has popularised the term Edge Cities, the topic of Edgelands has received little attention in comparison. Using thematic analysis, this research examines three key sources: Richard Mabey's *The Unofficial Countryside*; Marion Shoard's *Edgelands*; and Michael Symmons Roberts and Paul Farley's joint work also titled *Edgelands*. This research identifies that these overlooked, neglected and frequently abused landscapes are in fact vibrant, resilient and enthralling environments teeming with life, renewal and re-birth.

A Theory Led-Systematic Review of the Health and Wellbeing Impacts of Participating in Environmental Enhancement and Conservation Activities

*Rebecca Lovell (University of Exeter Medical School, United Kingdom) Kerry
Husk, Chris Cooper, Ruth Garside*

There is interest in whether the outdoor environment could be utilised as a health promotion tool or context to address the increasing burden of health problems such as chronic disease. Outdoor environmental enhancement and conservation activities provide participants with opportunities for physical activity, social contact and improved self-esteem through achievement. Improving the condition of the locality may have further impacts on wider personal, community and environmental wellbeing. We aimed to assess the impacts of outdoor environmental enhancement activities in order to understand whether these programmes benefit health, but also to understand how and why and where these impacts occur. We conducted a systematic review, registered with the Cochrane Collaboration Public Health group, of existing evidence. Evidence was identified through formal searches of multiple databases and through contact with over 200 organisations. Studies were included if they met pre-specified criteria detailed in the published protocol. We synthesised evidence using a narrative approach, results informed the creation of a conceptual model of how benefits were achieved. Thirty-two papers referring to 23 unique interventions from the UK, USA, Australia and Canada met the inclusion criteria. Quality of the evidence was low with self-selected samples, little use of control groups, short-term follow-up, and limited detail regarding participant, programme or activity. However our analysis suggests that participation in these activities can have a positive impact on health with increases in quality of life and certain dimensions of physical or mental health and wellbeing observed. Sustained participation appears to allow for an accumulation of benefit.

Bonding, Bridging and Division: A Call for a Third Dimension of Social Capital and its Multi-dimensional Impacts on Wellbeing

Jo Cairns-Nagi (Durham University, United Kingdom)

This paper discusses the complexity surrounding social capital and how it has often been used in an unproblematic way in health promotion initiatives. Social capital has typically been viewed as positive and protective for population health with the potential for reducing health inequalities. Based on research findings from a qualitative case study of health resilience in the North East of England (UK), there was a clear divide in both level and type of social capital present within this locality. Bonding social

capital (homogeneous) appeared to be strong whereas bridging social capital (heterogeneous) was relatively weak. An “othering” discourse was apparent in the research, which marginalised some of the newer residents and made it difficult for them to integrate with a tight-knit cohesive ex-mining community. Therefore, this paper calls for a more critical engagement with social capital and the equivocal effects it may have on communities and their sense of wellbeing. It argues that there may be a divisive dimension that needs to be recognised by those working in health promotion.

Ephemeral Spaces of Care: Auxiliary War Hospitals as Contingent Spaces of Recovery

Ronan Foley (National University of Ireland Maynooth, Ireland)

While fixed points of care have traditionally framed health service geographies, there has been a recent shift to more domestic/contingent settings. This paper explores historic examples of such settings, specifically the Auxiliary War Hospital. In discussing these ephemeral spaces of care, or borrowed buildings; (Adams, 1999), a number of wider relational geographies emerge. The complex network of spaces and settings started at the war fronts but the impacts involved the spatial re-assembly at home of previously non-medical spaces to cope with the war-wounded. Taking sample sites from Ireland, Scotland and England, a range of spaces, from paramedical to public and domestic buildings were developed as temporary hospitals. Using the theoretical notion of a therapeutic assemblage the wider relational networks and local operations of these hospitals are explored to reveal a range of actants and structural alignments within which damaged bodies, selfless volunteers and a wider military need were all intertwined. The complex routes by which soldiers were evacuated from spaces of violence to the more contemplative settings of the auxiliary hospital were also important components, both in terms of the two-way traffic of such mobilities, but also in the embodied responses to those changing spaces. The wider impact of the sites in terms of the dissemination of medical knowledge was also a factor in a set of spatial transformations wherein space, gender and recovery all had additionally important roles.

SPRAHWELL: A New Conceptual Framework for Analyzing Landscapes of Healthcare Provision

David Conradson (University of Canterbury, New Zealand)

In this paper I outline a new conceptual framework, provisionally entitled SPRAHWELL (Settings and Practices for Health and Well-Being), to support the analysis of landscapes of healthcare provision. The landscape of healthcare provision in many western cities is now often highly pluralistic, encompassing biomedical clinics and family physicians as well as naturopaths and energy healers. The SPRAHWELL framework invites us to pay attention to the diverse settings and practices which constitute a particular healthcare landscape, and to consider the power/knowledge dynamics which render some forms of healthcare practice and knowledge within it as ‘mainstream’ whilst others are considered marginal or alternative. In any cultural

setting, the status of a healthcare practice will be influenced by the evidence for its efficacy, and how this evidence relates to dominant norms. Many biomedical interventions are supported by data from randomized controlled trials (RCTs), for instance, while the relative absence of such data for some CAM interventions contributes to their peripheral status. At the same time, some forms of 'alternative' healthcare practice, such as mindfulness-based meditation, are now gaining acceptance within western psychology and psychiatry precisely because RCT and neuroscientific evidence attests to their efficacy. Using a range of examples, I illustrate how the SPRAHWELL framework can be used to analyze the shifting nature of landscapes of healthcare provision, but also to support an examination of the micro-geographies of specific treatment settings, as sites where practices and knowledges (both 'experts' and 'lay') coincide with bodies and minds.

Session 42: GIS and Quantitative Methods II

Constructing Sensible Geographies for Auckland, New Zealand

Daniel J. Exeter (The University of Auckland, New Zealand), Jinfeng Zhao

Historically, researchers and policy analysts have used the geographical boundaries constructed for the national census to report small-area, or “neighbourhood” statistics. In New Zealand, we commonly use Meshblocks (MB) or Census Area Units (CAU) in our analyses. Although MBs had a mean population of 87 residents at the 2006 Census, the highest population was 1431. Similarly, the maximum population for CAUs 9027, but the mean was 2100. Although users can easily associate MBs with “a street” and CAUs with “suburb”, the considerable variation in the population distributions can be problematic for small area research. Many MBs are too small to publish statistical analyses reliably and CAUs with larger populations may skew distributions and/or results. This situation is not isolated to New Zealand. In the United Kingdom, for example, neighborhood geographies with relatively stable populations are constructed from Census boundaries to be an intermediary level between Output Areas (c.f. MBs) and Wards (c.f. CAUs). In this study, we describe the construction of two intermediary geographies developed for Auckland, New Zealand using semi-automated zone-design software, expert local knowledge and visually and interactively zone generation. Our “Lower Zones” are an intermediary between MBs and CAUs and have populations ranging from 500-1,000 (mean 750), while the “Upper Zones” range in size from 12,000 to 18,000 (mean 15,000), designed to nest between CAUs and higher geographies (i.e. Electoral Districts, Territorial Authorities). We demonstrate the application of these new geographical boundaries in relation to measuring deprivation and disparities in blood lipid testing in Auckland.

Spatiotemporal Population Estimates for Health

Samantha Cockings (University of Southampton, United Kingdom), David Martin

Health research requires accurate estimates of the geographical distribution of population e.g. for resource allocation, epidemiological investigations or emergency planning. Most studies rely on routine datasets such as censuses, surveys or registration data for population locations but the majority of these datasets place people at their night-time residential address. In reality, most people spend much of their time at other locations, such as work, school, retail or leisure venues or travelling between such locations. Further, many datasets are updated infrequently, whereas health studies ideally require data at a much higher resolution e.g. on hourly, daily, weekly or seasonal timescales. Over recent years, the Pop24/7 programme of research at the University of Southampton has been developing a novel framework and methods for producing spatiotemporal population estimates. Using publicly available datasets and based on gridded density estimation techniques, the method uses a library of origin and destination locations, together with associated time profiles, potential capacities, user activity data and catchment areas to redistribute census population estimates from census centroids on to more realistic locations for a specified date and time.

Outputs from the model are population estimates (total or broken down by age) for the specified date and time at the modeled spatial resolution (e.g. 200m grid squares). The methods are generic, flexible and extensible to other applications, countries and datasets. This paper explains the framework and methods behind the Pop24/7 approach, presents illustrative modelled outputs and discusses their potential usefulness for health applications.

Hierarchy Theory as a Bridge between Epidemiological Studies and Space-Time GIS

Liem T. Tran (University of Tennessee, U.S.A.), Robert V. O'Neill

While being commonly used in epidemiological studies as an aid to public health decision making, the “hierarchy of evidence”, which lists a range of epidemiological study designs, remains a source of debate. This paper looks at the “hierarchy of evidence” from a scaling perspective. Then it proposes the use Hierarchy Theory, which is a theory of scaled systems developed primarily in the context of general systems theory, as a framework to bridge epidemiological studies and space-time GIS analyses.

Developing an Integrated Understanding of Multi-Dimensional Etiologic and Spatial Exposures

Peter Kedron (Ryerson University, Canada), Sam Copeland

Complexities surrounding geographic contexts of disease exposure have received growing attention in the recent geographic and epidemiological literature. Etiologically, our understanding of disease has expanded from one of limited causal factors to one considering a wide range of risk factors such as genetics, behavior, and multiple environmental, dietary, and social risks. Concurrently, our understanding of spatial contexts of disease has shifted to a multi-dimensional understanding where exposures are dependent upon dynamic individuals in the context of a dynamic environment (UGCoP). Typical geographic research relies on static measures of exposure and context; however, exposure is a dynamic process occurring across multiple spatial extents and scales – individual activity spaces constantly shift between indoor and outdoor environments, home and work, day and night. Such dynamic contexts make it difficult to select variables appropriate for establishing clear relationships between health and place. This paper reviews challenges associated with integrating etiological and spatial understandings that are both inherently multi-dimensional. These challenges are explored in a study of an established spatial cluster of elevated asthma incidence near a major international border crossing in Buffalo, NY. A mixed methods approach combining mobile wearable sensing technologies, survey data, and geographic indicator data is used. Opening up our understanding of how spatial complexities interact with etiological complexities has implications for our clinical understanding of disease, study design, and policy interventions.

Automating the Prediction of the Socioepidemiological Component of Infectious Diseases in Urban Milieus: Statement of an Approach based on Social Ecology and Using Remote Sensing

Roland Ngom (l'Institut national de santé publique du Québec and l'Institut national de la recherche scientifique, Canada), Alexander Siegmund

The province of Quebec, as many other jurisdictions, is concerned with the probable dramatic effects of climate change on its population health. Beyond emergency preparedness, one of the main challenges of public health institutions is to implement preventive actions that are adequate in terms of their efficiency in the reduction of morbidity and mortality, but also in terms of their financial costs. Promoting urban green spaces conservation and expansion is one such preventive action with multiple beneficial impacts for health and other co-benefits. We present here a research project related to the positive effect of green spaces on population health in urbanized regions in the province of Quebec. We developed green spaces attractiveness models based on multiple qualitative variables. We used a retrospective population cohort of 16-years follow-up with 10,631, 587 individuals to develop spatial models relating the relationship between green space and cardiovascular morbidity and mortality at zip codes and lowest census division levels. We analyzed the effects of green space's quality and accessibility on cardiovascular diseases while controlling for key environmental and social factors such as pollution, urban heat, and proximity to enclosed sports facilities, poverty, age and gender. We then assessed the pertinence and possibilities to implement the result into existing Geographic Information System-based surveillance tools and prevention systems already implemented for climate change in the province. Results are presented and highlight the effects of the systemic relationships of green spaces with other environmental factors and therefore the complexity to implement primary prevention related models with very high robustness for applied applications.

A Novel Tool for Visualizing and Interpreting Spatio-Temporal Health Data

Véronique Bouzaglou (INRS-Centre Eau Terre Environnement, Canada), Erwan Gloaguen, Fateh Chebana, Pierre Gosselin, Diane Bélanger

Interesting spatio-temporal patterns may emerge in health data, making space-time studies of health data extremely relevant. However, the existing methods to treat spatio-temporal data, such as map animations, are usually limited both in terms of visualization and interpretation. It is known that spatio-temporal data can be assimilated to three-dimensional data in a two dimensional space with time as the third dimension. Many tools to analyze and model 3D data have been developed in geosciences. These tools also allow working with data on different scales. This can be particularly useful in the case of health data, as, for confidentiality reasons, data may not be available at the finest (individuals) scale. In this project, we used health data available from the database of the Institut national de santé publique du Québec from 1996 to 2011 for the city of Montreal, Quebec. For confidentiality reasons, this data is

only available at the 3 digit postal code scale. Yearly age-adjusted rates were calculated for every postal code. We created a 3D block-model with the adjusted data. Each block corresponding to a postal code with the corresponding spatial limits (x (latitude) and y (longitude)). The z (depth) value corresponds to time. This rate is then visualized and interpreted as any conventional well data with time replacing depth. Three-dimensional geostatistical analysis of the data is then possible to compute, such as spatio-temporal trends, non-stationary variogram. This approach permits a better handling of the data set and allows better control of the model parameters.

Session 43: Gender, Care, Work and Health

Gender, Health and Caregiver Friendly Workplaces: A Synthesis of Caregiver Friendly Workplace Practices

Allison Williams (McMaster University, Canada)

There are more than 2.3 million employees in Canada alone with adult/elder care responsibilities. Lack of workplace support can result in: caregiver-employees (CEs) leaving the workforce, and/or; missed work days, early retirements, reduced productivity and avoidable costs to employers. Workplaces need to step up to the challenge of managing a workforce which is, due to health care restructuring, increasingly expected to provide unpaid caregiving to family members. Recognizing that all workplaces will be affected by these caregiving demands, given the changing and dynamic nature of families (i.e. greater proportion of females in the workforce, smaller family sizes, increased mobility), together with the changing nature of caregiving (i.e. growing number of male caregivers, fewer publically-provided community services), it is incumbent upon workplaces to examine caregiver friendly workplace practices (CFWPs) to appropriately accommodate CEs. Within the research literature, a variety of CFWPs have been identified as either: currently in use by selected employers across the globe, or as proposed beneficial policies that could be implemented. Given the context of the gendered nature of works both paid employment and informal caregiving work, CFWPs exists at the intersection between sex/gender, work and health. Through a review of academic and grey literatures, this paper presentation will provide a sex/gender based analysis of CFWPs in Canada and internationally, while further exploring particular employment sectors.

Community-Based Participatory Nutrition Education, Gender Roles and Child Care in Northern Malawi

Rachel Bezner-Kerr (Cornell University, USA), Emmanuel Chilanga

Under-five child malnutrition is a public health challenge in Malawi. Programs such as promotion of optimal early feeding, control of Vitamin A deficiency and anemia have been initiated to address child malnutrition. Although some progress has been made, close to 49 percent of children are still malnourished. In Malawi, the majority of child care and feeding is done by women who have high workloads and little control over household economic resources. Scholars are striving to find strategies that can motivate and empower fathers to be involved in housework and childcare activities, which can mitigate the underlying causes of child malnutrition. The paper draws on feminist and gender theories, transformational educational approaches and the concept of care to assess whether participatory community-based nutrition education can promote a more equal household gender division of labour and sharing of childcare practices in northern Malawi. The findings draw upon qualitative research conducted in an agrarian community. In-depth interviews and participant observation data were collected from 30 couples before and after a participatory nutrition education program over a 4 month period in 2012. The results show that there are highly unequal gender roles in

household work, which are justified with various socio-cultural explanations, but a participatory nutrition educational approach shows potential for involving husbands in some childcare and household domestic work.

Employment and Eldercare: Engaging with Embodied Spaces of Resistance

Gillian M. Joseph (University of Guelph, Canada), Alun E. Joseph

The geography of eldercare is shaped by a number of factors, some of which are associated with the care recipient, others with the caregiver and yet others with the process of caregiving itself, including strategies for respite. Both place and space dimensions and gendered assumptions regarding work and eldercare have been extensively theorized and critiqued in the literature. In this paper, we extend this critique by considering “spaces” of work and home as embodied locations of resistance in which men and women act in opposition to societal expectations concerning their responsibilities in employment and eldercare. For example, we draw attention to how some employed women resist the pressure to return to the home as a caregiver and view and use paid work as a space of respite. We illustrate these and other new insights on spaces of resistance by reporting on a preliminary qualitative study involving employed male and female family caregivers. We conclude with a series of observations about the implications of the findings for research on the gendered geography of eldercare and for the development of informed policy in support of the well-being of employed caregivers.

Health Challenges for College and University Students Living on Campuses

Jody Decker (Wilfrid Laurier University, Canada), Robin Slawson

Numerous studies have shown that post-secondary students carry a heavy burden from a variety of health challenges that strongly impact use of health services, absenteeism and lost productivity, as well as individual health and well-being. These health challenges range from alcohol-related issues, to mental illness to a variety of infectious diseases.

Within communities, post secondary institutions form a continuum with many public institutions such as transportation systems, shopping malls, food and beverage facilities, and health services. Students have extensive social networks and unique mixing patterns that extend into the broader community so that the transmission dynamics of infectious diseases, influenza-like illness (ILIs) in particular, cannot be considered in isolation. Yet the role post-secondary students play as transmission risk groups within communities has been understudied. One recent Canadian study has emphasized young adults as potential drivers of epidemic waves of seasonal and the H1N1 pandemic influenza. Another recent study has shown how student behaviour, combined with microbial surface studies in university residences, identified numerous “hot-spots” for disease transmission that place both students and the communities in which they live at higher risk for infection.

Understanding how the Socio-Environmental Context Facilitates Resilience among Canadian Palliative Family Caregivers: A Qualitative Case Study

Melissa Giesbrecht (Simon Fraser University, Canada), Faye Wolse, Valorie A. Crooks, Kelli Stajduhar

Canadian family caregivers are increasingly responsible for providing palliative care in the home. Providing such care is a highly complex task, often bringing both positive feelings of meaning as well as high levels of stress and considerable health and financial burden. Much research is focused on exploring such caregiver burden; however, recent studies are pointing to the significant role of resilience during caregiving experiences. While commonly understood as a complex, dynamic, and multi-dimensional concept, empirical research on resilience tends to focus solely on individual-level variables (e.g., psycho-social coping). As such, the broader socio-environmental factors that simultaneously shape resilience among caregivers are being ignored. Drawing from ethnographic fieldnotes and interviews, this exploratory analysis aims to identify the socio-environmental factors that influence palliative family caregiver's capacities for resilience against caregiver burden in the Canadian homecare context. Using an intersectionality lens and a case-study approach that examines, in-depth, the experiences of two palliative caregivers, findings indicate that resilience is shaped by numerous socio-environmental factors, such as: access to social networks, employment status, housing status, geographic location, and life-course stage. Such findings emphasize the importance of employing a multi-dimensional understanding of resilience and point to how the socio-environmental setting can influence the foundations from which individual-levels of resilience can be developed. We contend that a more nuanced understanding of caregiver resilience can help to inform best homecare nursing practice, including the need for nurses to facilitate resilience among palliative caregivers so they are able to fulfill this valuable role with minimal exposure to burden.

Session 44: Place and Health

Integrating Place into Public Health: Geospatial Activities at the U.S. Centers for Disease Control and Prevention (CDC)

Kim Elmore (U.S. Centers for Disease Control & Prevention, U.S.A.)

While the importance of place to health has been known since the time of Hippocrates, consistent efforts to integrate geospatial knowledge and analysis into public health investigations is more recent. For the past 20 years, the US Centers for Disease Control and Prevention (CDC) has been developing expertise in geospatial analysis of disease. In this presentation we will highlight key application areas (e.g., environmental health hazards, HIV prevention, chronic diseases, infectious diseases, and others [time permitting]) to illustrate the progress that has been made. For example, the National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP) has developed an atlas that went live in 2012; the geospatial team at the Agency for Toxic Substances and Disease Registry (ATSDR) recently released a national-level social vulnerability index (SVI), which includes sociodemographic attributes to identify the relative social vulnerability of populations to the effects of natural or anthropogenic disasters; and, ATSDR recently conducted a network analysis of transportation barriers to mammography facilities in Atlanta, GA. We will also discuss efforts to promote the integration of geospatial subject matter experts into the workforce at CDC, including our efforts to develop a set of competencies for geospatial scientists working in public health. Attendees will gain an appreciation of how technology, as embodied in GIS, can be used with spatial thinking and analysis to solve the United State's most challenging public health problems.

Which Place for Health in Geography? Which Health Geographies? Comparing the Francophone and Anglophone contexts

Anne-Cecile Hoyez (University of Rennes, France), Collins Damian, Fleuret Sebastien, Huish Robert

This paper considers issues related to the place of health in geography, with a focus on the ways in which health geographies are constructed in different academic, political and social contexts. Specifically, it compares knowledge coming from the Anglophone and Francophone contexts, with an epistemological approach. The overarching idea is to underline differences and similarities, temporalities and 'moments' in the literatures on health geography and the succession of debates and positions taken here and there. Epistemological comparison facilitates assessments of the 'state of knowledge' in French and English health geographies, which have developed in different and plural academic cultures. We highlight 3 key areas of differentiation between the Francophone and Anglophone approaches to health in geography: the importance of the critical turn; the differences of debates on public health; the nature of debates on post-colonialism. These important differences notwithstanding, we also find geographers of health in both contexts sometimes building on the same theoretical foundations (from Sorre, May, Canguilhem, Foucault, Bourdieu, Lefebvre..., and

sometimes participating in the same debates: the paradigm of mobility, the critical turn (relations of power and domination, including issues on post-colonial studies), the local turn (local construction of health), the evolution and changes regarding the place of the researcher (fieldworks and activism). We therefore question the emergence of health geography as a field/discipline/subdiscipline at different moments, and suggest focusing instead on more general debates within human geography and the social sciences. We will especially discuss the inclusion, by health geographers, of larger debates and theoretical positions.

The Neighborhood Environmental Education Project: A Promising Public Health Intervention

Beth Heller (Urban Ecology Center, USA), Kirsten Beyer, Amy Kistner, Corey Zetts, Jessica Bizub, Erin Shawgo

While in cities people often live in apartment buildings and school grounds are often covered in cement, evidence mounts to support an understanding of exposure to nature as beneficial to health. Environmental education programs have a long tradition of bringing children into natural environments to explore, learn, and play. Given the links between nature and health, could these environmental education programs be reconsidered as public health interventions for urban children? We present the Neighborhood Environmental Education Project (NEEP) of the Milwaukee-based Urban Ecology Center for consideration as a public health intervention. NEEP brings groups of students from partnering schools into their neighborhood park during the school day for hands on, outdoor, environmental education that engages them in both physical activity and scientific inquiry. NEEP works with the Milwaukee Public School (MPS) system, charter schools, private, and parochial schools within a two-mile radius of each of each of the Urban Ecology Center's three locations. This two-mile radius makes transportation to and from the school easy, and exposes participants to a neighborhood park with which they can begin to form an ongoing relationship. Rather than arranging for single field trips, each participating school signs up for an entire year, providing them with multiple visits to the park throughout the school year. NEEP's potential as a public health intervention stems from its engagement of children in activating and caring for their neighborhood green spaces, offering them direct exposure to nature, while also connecting them to their community and the land.

Health, Homelessness and Hope in the Aftermath of HOPE VI Revitalization: A Grounded Visualization Approach

Carol Hanchette (University of Louisville, U.S.A.), Margath Walker

In 1992, the U.S. Department of Housing and Urban Development initiated its neo-liberal HOPE VI program, with the goal of transforming distressed public housing communities into mixed-income developments. While lauded as successes for revitalizing poverty- and crime-ridden neighborhoods, several negative aspects of HOPE VI housing projects have been documented. They include high residential turnover, worse health outcomes for relocated residents, lower academic achievement,

a refocus of criminal activities, relocation of some residents to other high-poverty areas, loss of social networks and a diminished sense of place. In 2003-04, Louisville, Kentucky received funding for its second HOPE VI project, which replaced Kentucky's first and largest public housing community, Clarksdale. A grounded visualization approach (Knigge and Cope 2006) was used in this study to examine Clarksdale residents' experiences in the years following Clarksdale's demolition. Qualitative data were collected in 2011-12 via focus groups, semi-structured interviews, and drive-by photography. Multiple interviews were carried out with each study participant, using an iterative process that incorporated multiple geographic scales. Study results include negative and positive health impacts of HOPE VI housing and are embedded into GIS applications as maps, photographs, and audio files.

Health Effects of Public Housing Redevelopment: A Natural Experiment in Toronto's Regent Park

James R. Dunn (McMaster University, Canada)

Much has been claimed about the benefits of socially-mixed communities, but there is relatively little evidence from interventions that assesses the impacts on mental health. Regent Park, in Toronto Canada, is one of Canada's oldest and largest public housing developments and it is in the process of complete demolition and rebuilding into a mixed-income community. The original development was built using Garden City design principles, and consisted of 100% public housing before the redevelopment. In addition to one-to-one replacement of public housing units, and the construction of new condominium units, the project also includes re-introduction of through streets, mixed land uses (commercial, retail) and the addition of significant new amenities (aquatic center, cultural center). Residents living in Regent Park at the start of redevelopment were entitled to return to the new community, creating an opportunity for a quasi-experimental study. This paper presents the findings of a study examining the impact of the redevelopment on adult mental health (sub-clinical anxiety and depression) and a number of other determinants of health. Questionnaire-based methods and a longitudinal cohort design (with a comparison group) were used. The results show a number of positive impacts on housing and neighborhood outcomes, and some modest effects on health.

Partnering for Primary Health Care Innovation and Sustainability in Traditionally Underserved Areas: The Role of Bricolage

Neil Hanlon (University of Northern British Columbia, Canada) Martha MacLeod, Trish Reav

The challenges of delivering health care in rural, remote and small town environments are well documented. Yet there is at least one sense in which the realities of rural practice may offer an advantage in supporting new and innovative ways of providing care. That is, the conditions that lead to underservicing may of necessity motivate practitioners to pursue health care innovation through non-traditional partnerships (e.g., interdisciplinary teams, group consultations). In this paper, we examine the

concept of bricolage 'or making do with the resources, institutions and individuals at hand' as it relates to efforts of various health care agents (e.g., private practitioners, health authorities) to overcome sectoral, disciplinary, and bureaucratic barriers. We examine case studies of primary health care transformation and integration in three communities in northern British Columbia, Canada. We conclude by outlining a conceptual means to account for the efforts of health professionals, regional health administrators, and community groups in establishing the basis for primary health care transformation at the community level, drawing in particular on the concept of social entrepreneurship.

Session 45: Maternal and Child Health

Symptomatic Patterns of Near Miss Maternity Cases in Ghana: Assessing Individual and Institutional Factors

Godfred Odei Boateng (University of Western Ontario), Mavis Odei Boateng, Emmanuel K. Srofenyoh

The quest to reduce maternal morbidity and child mortality in Ghana has been hampered by factors that put the lives of unborn babies at risk of death and create severe-life threatening obstetric complications for the mothers. To understand the factors that account for this, a study was conducted at a regional hospital in Ghana over a two year period. The study found a number of individual and institutional factors associated with near miss maternity cases. Expectant mothers with primary education and with incomes below the poverty line were more likely to be at risk of either losing their babies, their lives, or both. Further, delays in seeking and receiving appropriate health care had a significant effect on the lives of these women. Haemorrhage was found to be one of the leading causes of near-miss cases. However, institutional factors played an infinitesimal role in risking the lives of these mothers. The study highlights the need to improve antenatal care through the identification of high risk pregnancies, the intensification of education provided to expectant mothers during antenatal sessions and through the state media, the training of health care professionals to manage infrequent, but fatal conditions during child delivery sessions, and an urgent review of the referral system and obstetric care in Ghana. The decentralization of requisite equipments and specialized human resources to polyclinics and other healthcare centers is highly recommended.

National Health Insurance Scheme Enrolment and Antenatal Care Among Women in Ghana: Is There Any Relationship?

Jenna Dixon (Western University, Canada), Eric Y. Tenkorang, Isaac N. Luginaah, Vincent Z. Kuuire, Godfred O. Boateng

Antenatal care, contact with a health professional during pregnancy, is a proven and important part of the maternal care continuum. The World Health Organization recommends women see a health professional on at least four different occasions throughout pregnancy and starting in the first trimester. Ghana's introduction of the National Health Insurance Scheme (NHIS) in 2003 was believed to increase access and usage of health care for all citizens, especially the poor. Despite this, there has yet to be a national level study on the influence of NHIS enrolment on health care usage of any kind. Using data from the 2008 Ghana Demographic and Health Survey we test the relationship between NHIS enrolment and antenatal care usage (both in the timing and number of total visits) in women in Ghana (n=1610). After controlling for both socio-economic and demographic variables, enrolment in NHIS was found to be statistically associated with the number of times Ghanaian women attend antenatal care but not statistically associated with the timing of the first antenatal visit. Results also demonstrate that rural residents and those of low socio-economic status are

disadvantaged both with number and timing of visits, challenging the mandate of the NHIS as a tool to increase the poor's utilization of health care. We suggest various explanations for these results and the policy implications for Ghana going forward.

A Method to Guide Resource Allocation to Address Health Inequalities: The Case of Small-for-Gestational-Age Birth in Nova Scotia

Ketan Shankardass (Wilfrid Laurier University), Patricia O'Campo, Linda Dodds, John Fahey, K.S. Joseph, Julia Morinis, Victoria M. Allen

Resources to address health inequalities are limited. Two broad types of intervention have unique implications for program design and implementation. A targeted approach focuses resources on those with greater need, while a proportionate universal approach aims for health improvement in the whole population with greater relative gains in more needy populations. Methods are needed to guide strategic allocation of clinical and public health resources in subpopulations of interest. We present a method using the example of inequalities in small-for-gestational-age birth (SGA) in Nova Scotia, Canada, a setting with universal access to health care. Analyses are facilitated by confidentially linking a birth registry, the Nova Scotia Atlee Perinatal Database, to income tax and related information for the year in which delivery occurred, including 117734 singleton births between 1988 and 2003. This method compares the relative importance of characteristics that mediate inequalities in terms of their potential impact on leveling health gradients at the family and neighbourhood levels separately (i.e., what are the most important drivers of inequalities in SGA at each level?). Mediating characteristics are also compared in terms of their population attributable fractions (i.e., what are the most important drivers of SGA risk in the Nova Scotia population at-large?). Finally, the relevance of mediating characteristics is compared across specific population subgroups of interest, including by parental composition of family (i.e., lone mother versus two-parent family) and by urban versus rural residential setting. Implications for using this method to guide resource allocation for inequalities in other health outcomes are discussed.

Evaluation of Perinatal Care De-regionalization in Michigan

Sue C. Grady (Michigan State University, U.S.A.), Libbey Kutch

Background: During the 1970s, the State of Michigan had a fully operational regionalized system of perinatal care funded by the Michigan Department of Community Health (MDCH). Within the decade neonatal mortality (death < 28 days of birth) in Michigan declined from 15.6 to 9.0 deaths per 1,000 live births, demonstrating the success of the system. In 1979 funding from MDCH ended and perinatal care deregionalization ensued as market forces dominated the flow of patient care and managed care encouraged the triage of patients within managed care systems. Neonatal specialty care units (NSCUs) emerged in non-tertiary managed care hospitals, marketing at-risk mothers and infants who might otherwise have been triaged to tertiary hospitals with neonatal intensive care units (NICUs). The purposes of this study were (a) to evaluate the mortality outcomes of high-risk infants, defined as

extremely low birth weight (ELBW) (< 1,500 grams) and/or extremely preterm (EPT) (< 28 weeks gestation) born and retained in NSCUs compared to similar infants born and triaged or born in NICUs; and (b) to identify NSCU hospitals at increased odds of infant retention. *Methods:* First, a statewide linked-infant death birth cohort (2008-2009) was input into ArcGIS to geo-reference and visualize the spatial patterns of hospitals with NSCUs and/or NICUs and the mortality outcomes of high-risk infants within those units. Second, odds ratios were calculated using generalized estimating equations (GEE) logistic regression analysis in SAS to estimate the direct effects of NSCU vs. NICU hospitals on predischarge mortality among high-risk infants, controlling for intra-hospital clustering, birth volume, method of delivery and known maternal and infant risk factors. Third, log odds ratios were calculated by hospital cluster to identify hospitals with elevated retention. *Results:* Seventeen percent of births (n=38,859) occurred in 14 hospitals in Lower Michigan who self-reported NSCU services during the time period of this study. Of these, 7.3% of infants (n=282) were ELBW and/or EPT (range, n=5 to 51). Thirty percent of these infants (n=87) were triaged to hospitals with NICUs and 195 were retained. Of those infants retained, 67 (317.9 per 1,000) died pre-discharge, with most deaths due to prematurity. Importantly, analytical results were inconclusive, because of the range in neonatal services provided across self-reported NSCUs. The level of high-risk infant retention and inconsistency in service standards led to the formulation of NSCU standards by the Certificate of Need (CON) program, to regulate future NSCU's in the State of Michigan. This evaluation was one within a larger project to assess the need for improved perinatal care regionalization in Michigan.

Agamben, Bare Life, and Reproductive Biopolitics

Jennifer Icton (University of South Florida, U.S.A.)

Sovereignty over the body is a contested space, especially for women (Rich, Ashby and Methot, 2012, 1, Naffine and Richards, 2012, 49). The line between women's rights to choose what occurs inside their bodies and the State's desire to take that choice away is blurry and yet conversely is at times actually written in into State law (Heriot 1996, 177-179). As abortion is a common, legally available medical procedure, the reality of who controls the decision making process - and the body itself - is highly provocative. Giorgio Agamben, a contemporary Italian philosopher, wrote a book in 1998 titled *Homo sacer: Sovereign Power and Bare life*, the intent of which was to illustrate what Agamben saw as the politicization and control of the body by the State. The question under consideration in this article is whether Agamben's political theory can be expanded to include the disputed territory of women's bodies. Can Agamben's theory of homo sacer and bare life be reimagined to include the spaces inside female bodies where the fetus resides? I argue that although Agamben does not specifically speak of women's bodies within his concept of bare life, his theory of state control of bodies can be extrapolated to include questions surrounding the political and legal rights of women and the unborn fetus, as asserted by Deutscher and Cerwonka & Loutfi.

Socio-territorial Inequalities of Health and Pregnancy: Prematurity and Low Birth Weight of Newborns in Three Parisian Hospitals

Gasquet-Blanchard Clélia (The École des Hautes Études en Santé Publique (EHESP), Sorbone Paris Cité, France)

This paper presents key research issues on socio-territorial constructions of health inequalities, regarding pregnancy and health status of newborn, in Paris. Health inequalities are especially marked in France, particularly concerning severe prematurity, we know that prematurity is higher among workers than among managers: 0.7% against 2.2%. We observe the same phenomena with low birth weight (respectively 4.7% and 9.9% for the same profession). However, we know little about the specificities and issues of such questions locally. To understand the mechanisms at work at the local level, the research project TIP - Therapeutic Itineraries related to use Pregnancy care - questioned the role of the care pathways in health inequalities. More specifically, we want to question processes (knowledge, practices, mobility and behavior) and mechanisms which influence trajectories of seeking care during pregnancy and the arrival of the newborn and may lead to prematurity or low birth weight. We conducted ethnographic interviews with populations and professionals which aim to raising determinants that influence the care pathways of pregnant women who may be at risk to their unborn child. Therefore, the paper presents a selection of results relating to different mechanisms and factors which play a major role in variations in healthcare access for pregnant women: (1) experience and practice of health (access to health care facilities and presence of these structures in the neighborhood) (2) quality of the living environment. This paper ends with a discussion on the modalities of care pathways and their roles in the outcome of pregnancy.

Posters (Monday)

A Study of Geographies of Play: Spatial Analysis of Physical Activity Behavior within Elementary School Grounds

Peter Anthamatten (University of Colorado Denver, USA), Erin Feine, Eve Kutchman, Melanie Mainar, Lois Brink, Ray Browning, Claudio Nigg

There is little scholarship on physical activity among children within outdoor spaces and work is needed to advance the design of these spaces from 'best practices' towards evidence-based design. This project examined how playground feature density relates to children's physical activity, and contributes to evidence that design features of play spaces may influence children's behavior within school grounds. We observed children during school recess on 24 school grounds in the Denver Metropolitan area of Colorado, in Spring of 2010 and 2011, using the System for the Observing Play and Leisure Activity in Youth to observe children's physical activity. A total of 31,069 observations were made from an estimated 9,900 children aged five to twelve. These were aggregated and analyzed in 397 playground zones. We examined utilization, the number of children present in a particular activity zone during an observation, and the percentage of children engaged in moderate-vigorous physical activity as they relate to the density of constructed features on school playgrounds. Ordinary least-squares linear regression model assessed the relationship between playground feature density and the utilization and moderate to vigorous physical activity. Significant positive associations were observed between utilization and feature density among all children (Beta = 0.20; $p < .001$) and a statistically significant but small association between moderate to vigorous physical activity and feature density for girls (Beta = 0.12; $p = .013$), but not for boys. PA in schoolyards seems to be associated with structure density which should be considered in school building and renovation projects.

An Investigation of Mini-geographies of Play: Analysis of Physical Activity Behavior

Peter J. Anthamatten (University of Colorado Denver, U.S.A.), Erin Fiene, Eve Kutchman, Melanie Mainar, Lois Brink, Ray Browning, Claudio R. Nigg

There is little scholarship on physical activity among children within outdoor spaces and work is needed to advance the design of these spaces from "best practices" towards evidence-based design. This project examined how playground feature density relates to children's physical activity, and contributes to evidence that design features of play spaces may influence children's behavior within school grounds. We observed children during school recess on 24 school grounds in the Denver Metropolitan area of Colorado, in Spring of 2010 and 2011, using the System for the Observing Play and Leisure Activity in Youth to observe children's physical activity. A total of 31,069 observations were made from an estimated 9,900 children aged five to twelve. These were aggregated and analyzed in 397 playground zones. We examined utilization, the number of children present in a particular activity zone during an observation, and the

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Children's Voices: Examining the Health Status of Homeless Children in Limerick, Ireland

Frank Houghton (Limerick Institute of Technology, Ireland), Sharon Houghton

It is widely acknowledged that the health needs of homeless populations are becoming more complex. Although there is a plethora of research in Ireland examining the health of homeless adults, research examining child homelessness has tended to focus almost exclusively on young people leaving care, who are often in their teens, and separated from their family. There is a dearth of current research on the health status of children in homeless family units. This research primarily investigated the mental and physical health needs and developmental status of homeless children in Limerick City. This research was approved by the Ethics Committee of the Health Services Executive- West Regional General Hospital Limerick (Ireland). 14 family groups were included in this research, which was conducted over four separate week long periods in four homeless centres between September and December 2011. A variety of health status measures were used, including: the Connors Early Childhood Measure; the SF-10; the Strengths & Difficulties Questionnaire; the Kidscreen 27; and the Centre for Epidemiological Studies- Depression in Children Questionnaire [Short Version]). The results gathered in this study are alarming, particularly in relation to young homeless children. Evidence suggests that there are particular developmental difficulties in the domains of play, communication and pre-academic/ cognitive skills. It is also clear that there are higher than expected reports of problems in relation to ADHD, conduct disorder, social functioning, sleep and physical problems among young homeless children.

Disparities in Neighborhood Food Environments in Nueces County, TX

Yuxia Huang (Texas A&M University, U.S.A.), Pamela Meyer

Diabetes is a serious growing health problem in Nueces County, TX. IN 2009, 14.9% of persons aged eighteen years and older have been diagnosed with diabetes. This is significantly higher than Texas, which is 9.8% of the population. Neighborhood food environment plays an important role in diabetes prevalence, care, and management. In this paper, spatial access to food stores in Nueces County is measured with the utilization of geographic information systems (GIS). Food stores, such as supermarkets, convenience stores and fast-food restaurants, are obtained from InfoUSA, and they are

categorized as healthy or unhealthy. For each block group, two accessibility values, one for unhealthy stores, and the other for healthy stores, are calculated using the gravity-based approach by taking travel impedance (e.g., travel time) of food stores into account. Network analysis is used to calculate travel time between food stores and block groups/blocks that are within the block groups. The overall neighborhood food environment for each block group is then calculated by dividing the accessibility to unhealthy stores by the accessibility to healthy stores. A higher index value indicates that a person lives near to access to unhealthy stores relative to healthy stores. Further, the association between the food environment index and socioeconomic status (e.g., ethnicity/race, income etc.) is also examined. The results will help community leaders, health care providers and those suffering from diabetes to identify areas providing poor food choices and the location of organizations offering better food choices.

Infant Mortality in Ohio: A Preliminary Analysis

Karen D. Johnson-Webb (Bowling Green State University, U.S.A.)

The USA is ranked 35th in infant mortality. Within the USA, the state of Ohio is ranked eighth among the fifty states in terms of the highest rate of infant mortality. This study analyzes 2010 census and vital statistics in Ohio counties to discern patterns of infant mortality as they relate to socioeconomic status, race and ethnicity, urban/rural status. Preliminary results show associations with each of these variables. Policy implications of these results are presented.

Process Travel Time and Distance to Primary Health Care Providers in Flint, Michigan: A Multi-Modal Network Based Approach

Cameron Manche (Western Michigan University, U.S.A.), Rie Suzuki, Daniel J. Kruger

Transportation barriers to primary health care providers are one of the major health concerns in Flint, MI. Generally, Geographic Information Systems (GIS) has been used extensively as a method to examine spatial relationships between transportation and access to primary health care providers. Unfortunately, the Mass Transit Authority (MTA) did not have the complete directionality incorporated in their bus routes on the GIS data. Closest facility layer analysis is often used in health and spatial properties; however, lack of information in MTA data, limits accurate estimations. Route layer analysis is the additional estimation technique to correct this limitation to obtain absolute values without errors. The purpose of this study was to compare between the utilization of the closest facility layer analysis alone and the integration of both the closest facility layer and the route layer analysis to estimate the travel distance and time for patients to access primary health care providers. The ArcGIS 10 was used for these analyses. The results indicated that the closest facility layer analysis alone could not detect directionality on some bus routes. These estimation errors occurred when the locations of the primary health care providers were closer than transfer bus stops. In order to correct this error, the route layer analysis was implemented to correct the directionality of the MTA bus routes. The differences between corrected and

uncorrected errors were 3.22 km and 4 minutes. Complexity of utilizing the multi-modal network to assess the barriers with access to care will be discussed.

Demographic and Children's Health Situation in Conditions of Economic Destabilization-Case of Ukraine

Victoria Pantyley (Marie Curie-Skłodowska University in Lublin, Poland)

Introduction and Objective. In new conditions of socio-economic development in Ukraine, the health of the population of children is considered as the most reliable indicator of socio-economic development of the country. The primary goal of the study was analysis of the effect of contemporary socio-economic transformations, their scope, and strength of effect on the demographic and social situation of children in various regions of Ukraine. The methodological objectives of the study were as follows: development of a synthetic measure of the state of health of the population of children, based on the Hellwig's method, and typology of regions in the Ukraine according to the present health-demographic situation of children. *Material and Methods.* The study was based on statistical data from the State Statistics Service of Ukraine, Centre of Medical Statistics in Kiev, Ukrainian Ministry of Defence, as well as Ministry of Education and Science, Youth and Sports of Ukraine. The following research methods were used: analysis of literature and internet sources, selection and analysis of statistical materials, cartographic and statistical methods. *Results and Conclusions.* Basic indices of the demographic and health situation of the population of children were analysed, as well as factors of a socio-economic nature which affect this situation. A set of variables was developed for the synthetic evaluation of the state of health of child population. The typology of the Ukrainian regions was performed according to the state of health of child population, based on the Hellwig's taxonomic method. Analysis of the basic demographic and health characteristics of child population allows the presumption that there is a serious health crisis among children in Ukraine. Considerable spatial disproportions in the state of health were observed in children from various regions of Ukraine. The most unfavourable situation is noted in the central administrative units – most affected by the Chernobyl nuclear disaster, as well as southern areas – highly urbanized and ecologically degraded. It was found that in Ukraine, the new conditions of socio-economic development, manifested with the breakdown in the material standard of the population, increase in unemployment, especially unregistered one and among adolescents, decrease in social safety, growing psycho-social tension caused by the lack of faith and hope for the future – result in a considerable deterioration of the quality of health potential of the child population.

Spatial Patterns of Resident Ratings of Neighborhood Quality and Environment in Denver, Colorado

Hannah Reed (Colorado School of Public Health), Elisabeth Dowling Root, Jill Litt

Rising rates of obesity and the concomitant rise in related chronic diseases are transforming current perspectives on the role of the environment and lifestyles in shaping health behaviors and health status. The way in which the built environment is

designed can affect residential communities in profound ways. A healthy design can shape how long people stay in their neighborhoods, how they move through their neighborhoods (e.g., walk, bike, public transit, personal automobile), and the ways in which people interact with neighbors and bond with where they live (place attachment). There is increasing evidence that structural attributes of the neighborhood environment (e.g., availability of sidewalks, proximity to food outlets) influence health behaviors, but little is known about the intermediate processes which shape individuals' perception of place. Neighborhood perceptions such as neighborhood aesthetics and place attachment are key levers in shaping social processes, which are associated with health behaviors and self-rated health. This project examines the spatial patterns of perceptions of neighborhood qualities which, in turn, motivate them to engage with structural aspects of their neighborhoods that promote healthy behaviors. We use data from the Neighborhood Environment and Health Survey, the Neighborhood Street Audit, and other geospatial data to determine whether spatial patterns in resident ratings of neighborhood quality and environment exist in a sample of neighborhoods in Denver, CO. We use the GIS to map the outcomes of interest (e.g., collective efficacy, social involvement, aesthetics, attachment, perceived and objective incivilities) and apply local spatial cluster methods to determine if respondents who live near each other have statistically similar ratings of these outcomes. We will present findings and discuss the implications of this exploratory analysis.

Transcending Geography: Lived Experience and Mental Health Care Reform in Canada

Amanda K. Slaunwhite (British Columbia University, Canada)

Mental health has become an increasingly popular public policy issue in Canada due to new government and private sector investments in mental health promotion and treatment, and the growing visibility of the consumer and caregiver movement. From 2005-2012, seven provinces and one territory introduced mental health strategies, and the first Mental Health Strategy for Canada was released in 2012. These developments have heightened the public profile of mental health across Canada, and have provided renewed momentum for provocative public education campaigns led by persons with lived experience, such as Partners for Mental Health that work to reduce the stigma associated with mental health problems and accessing mental health care. This poster will summarize the conclusions of a recent publication in *Health Science Inquiry* with reference to the importance of engaging persons with lived experience, including consumers, caregivers and family members in mental health related policy development and research. It will also describe some of the barriers to authentic engagement, including stigma towards persons with mental health issues and redistributing power in the policy development process. The poster will conclude by describing how social media outlets such as Twitter, Facebook, and YouTube have been used to transcend geographical challenges to mobilizing persons with lived experience to build momentum for mental health reform in Canada, and provide an online 'space'

for persons with lived experience to exchange stories, ideas, and provide support to one another.

Estimating the Small-Area Geographies of Health Data from the UK Census: An Approach using Multilevel Synthetic Estimation

Joanna Taylor (University of Southampton United Kingdom), Graham Moon, Liz Twigg

The 2011 UK Population Census was almost certainly the last to be undertaken using traditional methods of survey completion. The end of the census poses a threat to the provision of small area data, including relevant to the study of localised variations in health. Post 2011 census debates have focused on the potential for record linkage arguing that much present census data is available, in some form, in other databases. An alternative, less-explored approach is small area synthetic estimation entailing the integration of secondary data from survey sources and subsequent statistical or mathematical modelling. This poster outlines the overall aims, objectives and methodologies of a newly funded ESRC project researching the potential for multilevel synthetic estimation (ML-SASE) as a census replacement strategy. It builds on ESRC's extensive investment in access to secondary data and its managed access to microdata from a range of national surveys. It also builds on earlier work by the authors developing multilevel small area estimation techniques. Its substantive focus is in the development of synthetic estimates of the four census health questions included in the 2011 UK Census at a neighbourhood level: limiting long term illness, self-assessed health, involvement in career roles, and absence from work as a result of disability. We are comparing and contrasting different approaches to ML-SASE, generating estimates for the four health indicators all constituent parts of the UK using survey data collected at the same time as the Census.

Using Agent-Based Modeling to Develop Strategies for Maximizing Participation in an Oral Health Screening Program for Older Adults in Northern Manhattan

Michael J. Widener (University of Cincinnati, U.S.A.), Mary E Northridge, Peng Wang, Susan Kum Zhuo, Chen Stephen Marshall, Sara S. Metcalf

Maintaining oral health is a critical factor in sustaining overall health and well-being, and consequently has an important role in the successful aging process. With this in mind, the ElderSmile program has operated in socioeconomically disadvantaged neighborhoods in northern Manhattan with a goal of monitoring and maintaining oral health among older adults. The program organizes oral screenings at local retirement communities and neighborhood centers, where older adults learn about best practices, receive a free screening, and if necessary are referred for further medical or dental treatment. The scheduling and locations of these screenings are dependent upon the resources of the ElderSmile program, the availability of educational and medical personnel, and the availability of space at participating community centers. This research utilizes agent-based modeling (ABM) with geographic and demographic data to explore spatial and temporal strategies for administering oral health screenings

throughout northern Manhattan. The model employs a spatially explicit social network model, derived from census data that drives older adult's screening participation. Data collected through the ElderSmile program on the past participation, dates, and locations of screenings are used to calibrate the ABM. Next, an optimization problem is run to determine the most effective combination of screening center scheduling and locations for encouraging participation in the program given the spatial distribution of older adults in the study area, while minding the aforementioned resource and availability constraints. Trends in the location and timing of screenings are then analyzed, and recommendations are made for future scheduling strategies.

Pan-Canadian Predictors of Immigrant's Quality of Life: Relationship to Adaptation in Second and Third Tier Canadian Cities

Allison Williams (McMaster University, Canada), Peter Kitchen, Jim Randall, Nazeem Muhajarine, Bruce Newbold, Kathi Wilson

Canada remains a popular immigrant destination, welcoming approximately 250,000 permanent residents each year (CIC, 2011). To date, the majority of research on immigration in Canada has focused on immigrant experiences in Canada's three largest cities: Toronto, Vancouver, and Montreal (Frideres, 2006; Radford, 2007). Approximately 75% of immigrants in Canada reside in one of these first-tier cities; however, a growing number of immigrants are choosing to settle in second and third-tier cities (Frideres, 2006; Radford, 2007). Consequently, further research is needed to understand the integration, adaptation and acculturation of immigrants in these areas (Radford, 2007). Via a SSHRC Metropolis grant, this sequential mixed-methods study explores immigrant experiences in three smaller reception centres: Charlottetown, Prince Edward Island; Hamilton, Ontario; and, Saskatoon, Saskatchewan. In this poster presentation we identify significant pan-Canadian predictors of quality of life among immigrants in the three cities of concern, while determining if differences exist in these predictors across the three cities, as well as between the general and immigrant populations. Findings are based on a sequential mixed method approach, where a telephone survey with both the general and the immigrant populations across the three cities (n=1113) preceded the implementation of qualitative focus groups, where data was collected from various immigrant groups (n=10).

Diabetic Foot in Germany - A Market Analysis towards Comprehensive Integrated Care of Statutory Health Fund Members of AOK Nordost

Heike Wittmann (Technischen Universität, Germany)

Diabetic foot syndrome (DFS) is one of the most neglected complications associated with diabetes. 1989 the WHO has called upon the world community for lowering the rate of lower limb amputations as a consequence of diabetic gangrene by half within 5 years. In the state of Brandenburg, like in many other German states, the DFS care still shows substantial inadequacies. Applying evidence-based multidisciplinary treatment results in reduction of lower limb amputations. Several studies show that a cross-sectoral and multidisciplinary approach, which includes prevention, patient education

and multi-factorial care in the treatment of the foot ulcers reduce amputations by 45 to 85%. Since the introduction of Statutory Health Insurance Modernisation Act, sickness funds in Germany are required to initiate effective programs by so-called integrated health care contracts. In order to offer efficient programs it is necessary to identify diabetics with foot problems by different grades of injury and select adequate providers accordingly. Analysing the internal claims data enables the sickness funds to monitor the numbers of lower limb amputations, define priorities, deduce correctional measures and develop optimal strategies which could guarantee a qualitatively higher-grade and simultaneously cost-efficient comprehensive DFS health care. The geographic software allows the user to analyse and visualize health care situations by maps. The geographical analysis reveals the distribution of service providers, shows demographic and regional factors, presents the collected data and shows clearly where care is deficient.

Posters (Tuesday)

Environmental Analysis of Chagas' Disease in Abaetetuba and Barcarena Municipalities, Pará, Brazil

Nelson Veiga Gonçalves (Universidade Federal Rural da Amazônia, Brazil), Alcínês da Silva Sousa Junior, Alcione Ferreira Pinheiro, Sebastião Aldo S. Valente, Vera R. C. M., Ricardo J. P. S. Guimarães

Chagas' disease is a big public health problem in the Brazilian Amazon region. In general, the deforestation of large rural areas interferes in the infection rates of *T. cruzi* in humans and mammalian reservoirs. The variability of the vector can be measured by their distribution in houses and in the wild. The main purpose of this study was to demonstrate the relationship between environmental degradation processes, that occurs in different geographic environments, with the incidence of Chagas' disease, in the municipalities of Abaetetuba and Barcarena, Pará, Brazil, in the period 2000 to 2012. A model of neural classification from satellite imagery was used for the analysis of the spatial distribution of ecotopes. The result showed that the characteristics of the spatial distribution of the vector collection areas and possible ecotopes were more expressive in areas with floodplains vegetation, where it was observed trees of Buriti, Açaí e Inajá, in both municipalities. In Barcarena was observed the spatial dependence of the disease incidence with the possible spatial distribution of the identified ecotopes. It was also observed the relationship between capoeirão vegetation type, in the area of influence of ecotopes, and the propagation of the disease vectors, suggesting the possibility of disease incidence have been influenced by human-induced changes in the environment. In Abaetetuba it was also observed the incidence of the disease in downtown, indicating another process of infection, the oral one. The use of geotechnologies allowed understanding the systematic process of the disease, subject of this study.

Environmental Factors Spatial Analysis of the Malaria Impact in the Belo Monte dam Influence Area, at Pará State, Brazil, in 2010 and 2011

Nelson Veiga Gonçalves (Universidade Federal Rural da Amazônia, Brazil), Alcínês da Silva Sousa Junior, Simone Beverly Nascimento Costa, Marcia do Socorro Veiga Gonçalves

This work presents an integration model between Artificial Neural Networks and geotechnologies applied to ecoepidemiological studies of malaria, in localities contained in the influence area of the Belo Monte Dam, located at Pará state, Brazil, in the period of 2010 to 2014. The model implementation aimed the generation of environmental information using classification of digital satellite images. Next, a Geographic Information System for Malaria Scenarios was constructed to integrate and analyze data, which served to support the understanding of changes in the indicators of this disease, according to relative importance of environmental and epidemiological variables of its breeding sites, plasmodium type and demographics. The preliminary results analysis of the two first years shows intense original vegetation loss process,

mainly in the municipality of Vitória do Xingu, where dense forests and floodplains showed deforestation rates of 1.96 and 4.74 respectively. The most endemic species of vectors were *A. darlingi*, *A. albitarsis* and *A. aquasalis*. The infection by *Plasmodium vivax* was more intense, with an increase of 17% in the region. The area least disturbed was Paquiçamba Indian village, which although being a protected area is under pressure of invasions, generating a tendency of changing of the epidemiological and environmental indicators, in this area. The accuracy of the information generated and expressed on digital maps, consolidated the use of geotechnologies applied to Medical Geography to analyse relations between risk factors of malaria incidence, on specific situations, in the Amazonic region, such as vegetation characteristics and deforestation rate, vector types and dissemination.

Spacial Analysis of Waterborne Diseases and their Risk Factors in One Location of Ananindeua, Para, Brazil

Nelson Veiga Gonçalves (Universidade Federal Rural da Amazônia, Brazil), Alcinês da Silva Sousa Junior, Márcia do Socorro Veiga Gonçalves, Alcione Ferreira Pinheiro, Cileide G. M. Tavares

Environmental and socioeconomic issues are related to intervening variables of ecopidemiological scenarios. These problems are observable in the Park Club community's health conditions, in the municipality of Ananindeua, Pará, Brazil, where the exposition to garbage dumps and consumption of contaminated water become risk of illness. This study aimed to characterize risk factors of waterborne diseases, in this area, which was divided in four microareas, in 2011 and 2012. It was used patient's secondary data from Ananindeua Health Department. It was done physico-chemical and microbiological analyses of the water consumed, georeferencing of cases using the Garmin GPS receiver and analytical applications of fuzzy logic, which probabilistically did spatial inferences of variables relationship. The analysis showed that 45.5% of total population does not receive treated water, 55.6% of IV and 44.4% of II microareas respectively let garbage the open. In the analysis of water 57.1% and 39.3% was positive for total coliforms and for *Escherichia coli* respectively. Nitrate showed alteration on Peace Village and Alpha streets and ammonia was observed on San Antonio and Samaria streets. The analysis also showed high correlation of water-borne diseases such as hepatitis A, diarrheas and dermatitis with the physico-chemical and microbiological characteristics of the water consumed. The use of fuzzy logic and Geotechnologies was satisfactory to express the relation between sanitary and epidemiological conditions. The production of digital maps was useful for the governmental decision-making process to eradicate these diseases and record this ecoepidemiologic scenario, in Amazon region.

Spatial Analysis of the Distribution of Tuberculosis/HIV Coinfection Associated with Socioeconomic Indicators in Castanhal, Pará, Brazil

Nelson Veiga Gonçalves (Universidade Federal Rural da Amazonia), Simone Beverly Nascimento da Costa, Márcia do Socorro Veiga Gonçalves, Ricardo J.P.S. Guimarães, Vera R.M.C. Palácios

The human immunodeficiency virus (HIV) is related to the increasing epidemic of tuberculosis (TB), making difficult its control in the world, especially in low-income populations. In Brazil, both diseases are concentrated in areas of poverty, where there are minimal resources for diagnosis, treatment and infection control. The public health services do not meet the requirements for the control of epidemics, despite major achievements in the treatment, of both diseases. In this context, this work aimed the spatial analysis of the distribution of tuberculosis/HIV coinfection associated with socioeconomic indicators in Castanhal, Pará, Brazil, from 2006 to 2011. To this end, new TB/HIV coinfection cases were georeferenced and incidence coefficients were calculated for spatial units. Moran's index was used to evaluate spatial associations of incidences. Multiple regressions selected variables that could best explain the spatial association of incidences. The local indicator of spatial association was used to identify significant spatial groupings. Moran's index was 0.0635 ($p=0.0000$) indicating that the incidence association occurred. The variable that best explained the spatial association of incidence was the percentage of families who earn up to one minimum wages. The LISA cluster map for TB/HIV coinfection incidence coefficients showed groups with high incidence rates in the outlying areas of the municipality, where numerous families with low income and education were observed. The study elucidated the spatial geographic distribution of TB/HIV coinfection and determined its association with socioeconomic variables, thus providing data for oriented planning, prioritizing socially disadvantaged regions that present this serious public health problem.

Communicating the Public Health Challenge of Climate Change: A New Framework for Presenting Downscaled Climate Change Projections

Peter Koh Keumseok (Michigan Department of Community Health, U.S.A.), Lorraine Cameron

Although some political and scientific disputes continue, almost all scientists accept that Earth's climate is changing. Its impact is expected to pose challenges to almost all subareas of society, especially environment, economy, education, and public health. Climatologists have developed a number of models to predict future climate changes on a global and regional scale, and there is great interest in creating downscaled climate change projections to provide geographically detailed climate information suitable for enhancing preparedness by local governments and communities. A variety of downscaled climate information has been disseminated via websites designed by governments, research institutions, and non-profit organizations. However, many users have difficulty in fully understanding and utilizing the climate change information these websites provide. The purpose of this project is to develop a new framework for presenting such information at websites for informing the public of the health impacts

of climate change. This study starts by identifying four important principles for creating communication websites for public health: (1) accessibility: the website should be easily accessible to the public by providing user-friendly environments from the technical perspectives; (2) comprehensibility: the contents should be described using plain language that is easy to understand; (3) interactivity: the websites should provide users with responsive tools for summarizing user-oriented information or requesting assistance and (4) completeness: the websites should have enough information as users need to accomplish their purpose with the minimum visit to websites. These principles could act as standards for creating climate change/public health websites.

Successful Career of Bottled Water that is what tells us the Chemical Composition of Water?

Tomasz Lecki (University of Warsaw, Poland), Karolina Kotecka

Years ago, the idea of selling bottled water could be interesting only for them who living in a desert area. Today arise pubs with mineral water, mineral water list is arranged as a list of wines. In many shops you can see the entire section devoted waters, including the queen of ecologically pristine waters of Fiji island areas (known as Fiji water). Aircraft consume fuel to come from the other end of the world for Fiji water. The fact is: we need water to live. What's more, we are able to pay for it. A lot. The water, however is not equal. The worst is often regarded as the tap. The main task is to look for chemical answers to the question what is in the best waters in the world?

Geographic Information System (GIS) and Management of a Health Risk in Tunisia: The Case of the Flu Epidemic for 2011-2012 Season

Wahida Mejri (SidiDhrif Higher Institute of Touristic Studies, Tunisia)

GIS provides excellent means for visualizing and analyzing epidemiological data, revealing trends, dependencies and inter-relationships Public health resources, specific diseases and other health events can be mapped in relation to their surrounding environment and existing health and social infrastructures. Such information when mapped together creates a powerful tool for monitoring and management of epidemics. Therefore, GIS helps generate thematic maps that depict the intensity of a disease or vector. But in Tunisia this tool is rarely used in the field of health, nor by geography nor even by doctors. Our work will be the first work that uses a GIS tool, in our case the software Arcview, to study an epidemic that has high spatial and temporal component, such as the case of seasonal influenza in 2011/2012. Recent advances in geographical information and mapping technologies created Have New Opportunities for public health administrators to Enhance planning, analysis, monitoring and management of health systems. This decision was made in three axes: Monitoring the spatial-temporal evolution of the epidemic (flu) - Detection of risk factors sociology-environmental - Plan a strategy of treatment and care and the health risk of confrontation. We go into our work limited to two first axes. Description and Understanding of the outbreak of the flu epidemic and its spread spatial-temporal during the year 2011/2012, with the precision of Gateway of influenza virus. And we will look for an explanation of this

trend by some environmental parameters (meteorological parameters) we will be limited for a few parameters.

The Adaptation to Climate Change in Environmental Health Through Primary Prevention: An Applied Example With Green Spaces For Urbanized Regions In The Province of Quebec

Roland Ngom (Institut National de la Recherche Scientifique, Canada) Erwan Gloaguen, Claudia Blais, Louis Rochette, Véronique Bouzaglou, Pierre Gosse

The province of Quebec, as many other jurisdictions, is concerned with the probable dramatic effects of climate change on its population health. Beyond emergency preparedness, one of the main challenges of public health institutions is to implement preventive actions that are adequate in terms of their efficiency in the reduction of morbidity and mortality, but also in terms of their financial costs. Promoting urban green spaces conservation and expansion is one such preventive action with multiple beneficial impacts for health and other co-benefits. We present here a research project related to the positive effect of green spaces on population health in urbanized regions in the province of Quebec. We developed green spaces attractiveness models based on multiple qualitative variables. We used a retrospective population cohort of 16-years follow-up with 10,631, 587 individuals to develop spatial models relating the relationship between green space and cardiovascular morbidity and mortality at zip codes and lowest census division levels. We analyzed the effects of green spaces' quality and accessibility on cardiovascular diseases while controlling for key environmental and social factors such as pollution, urban heat, and proximity to enclosed sports facilities, poverty, age and gender. We then assessed the pertinence and possibilities to implement the result into existing Geographic Information System-based surveillance tools and prevention systems already implemented for climate change in the province. Results are presented and highlight the effects of the systemic relationships of green spaces with other environmental factors and therefore the complexity to implement primary prevention related models with very high robustness for applied applications.

ENSO and Society: Physical Dynamics, Disasters and Disease

Iván J. Ramírez (The New School, U.S.A.), Katrin Rudge

This poster presents the climate capacity building activities and results in Sarasota, FL associated with "My Community, Our Earth" (MyCOE), a global to local diversity engagement program sponsored by the Association of American Geographers (AAG), Esri, the U.S. Department of State, and the U.S. Department of Agriculture. The main goals of MyCOE were to improve geographic knowledge among secondary school youth and to foster mutual understanding and respect for diverse populations globally. A series of activities entitled "Climate Knowledge for Sustainable Education and Development" were conducted with Marine Science 1 and 2 classes at Riverview High School in south Sarasota from February to May of 2013. They included El Niño-Southern Oscillation (ENSO) and Society 1: Physical Dynamics and ENSO and Society 2: Disasters and Disease. Student activities included mapping climate teleconnections,

viewing a disaster film, discussing societal and health impacts, and lastly, an international exchange via SKYPE with students in La Paz, Bolivia. Approximately 120 students participated in these activities. Furthermore, a cross-mentoring exchange was facilitated with Riverview High School at the annual Brookside Middle School Earth Day event.

Leprosy in Three Municipalities of Pará State, Brazil: An Epidemiological and Spatial Perspective

Alcinês da Silva Sousa Junior (Universidade Federal Rural da Amazônia, Brazil), Rodrigo da Silva Dias, Vera Regina M. da Cunha Palácios, Fabárcio Aleixo Dias, Nelson Veiga Gonçalves

Currently, 130 countries report leprosy. Brazil has the second highest number of cases in the world, behind India. Pará state has the fifth highest detection coefficient (DC) of the country, and the fourth in individuals under 15 years old, indicating active transmission. The objective of this work was to analyze the spatial distribution of leprosy in Ananindeua, Cametá and Marabá, in the period of 2007 to 2010. To analyze sociodemographic and epidemiological variables relations was developed a spatial distribution of the cases, using digital images of satellites and geostatistics analysis of the data, collected in the field with Global Positioning System receptors. The amount of occurrence of the disease was estimated, using a two-dimensional Kernel function, with correction of edge effect. There was a relationship between male gender and low education with the disease. Most (76.5%) patients had 15 to 49 years old. There were more cases of Virchowian form in the three counties. Cameté and Marabé were hyperendemic in the period. In the three counties, the distribution of cases is related to low socioeconomic conditions, denser on the periphery. There is connection between the spatial distribution of leprosy and the process of land occupation, with non-homogeneous distribution in Ananindeua, and homogeneous in the others. It was possible to identify priorities areas for leprosy control programs, by sociodemographic vulnerability, high concentration of cases, and verification of active transmission. The accuracy of the informations of the spacial distribution of leprosy consolidated the importance of Medical Geography, for the Amazon region.

Effects of Climate and Landscape Fragmentation on Lyme disease Incidence in the Northeastern United States

Minh Tran (Emory University), Lance Waller

Lyme disease is the most frequently reported vector borne illness in the United States and incidences of it are increasing steadily year after year. This study is an exploration of the influence of landscape (e.g., land use pattern and landscape fragmentation) and climatic factors (e.g., temperature, and precipitation) at a regional scale on Lyme disease incidence. The study area includes thirteen states in the Northeastern, United States. Lyme disease incidence at county level for the period of 2002-2006 was linked with various climatic and landscape variables in a negative binomial regression model. Results show that Lyme disease incidence has a relatively clear connection with

landscape fragmentation and temperature. For example, the more fragmentation there is between forests and residential areas results in a higher Lyme disease incidence. This study also indicates that, for the same landscape, some landscape variables derived at a particular scale show a clearer connection to Lyme disease than do others. In general, the study was able to shed more light on the connection between Lyme disease incidence and climatic and landscape variables at a regional scale. These insights would not be found at a local scale. Integrating findings of this regional study with studies at a local scale would yield a better understanding of the pattern of Lyme disease as well as increase our ability to predict and prevent disease.

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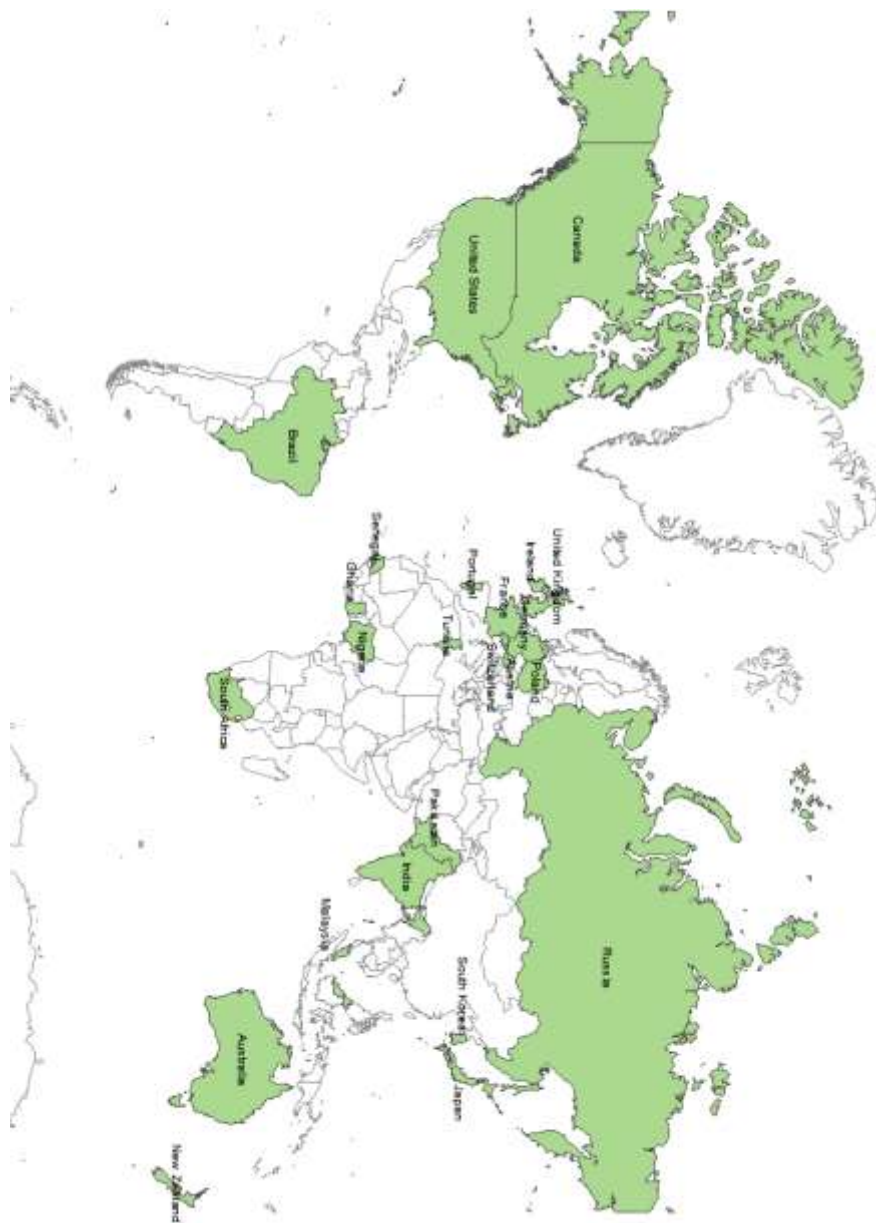
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XVth IMGS Participant Country (World Map)



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