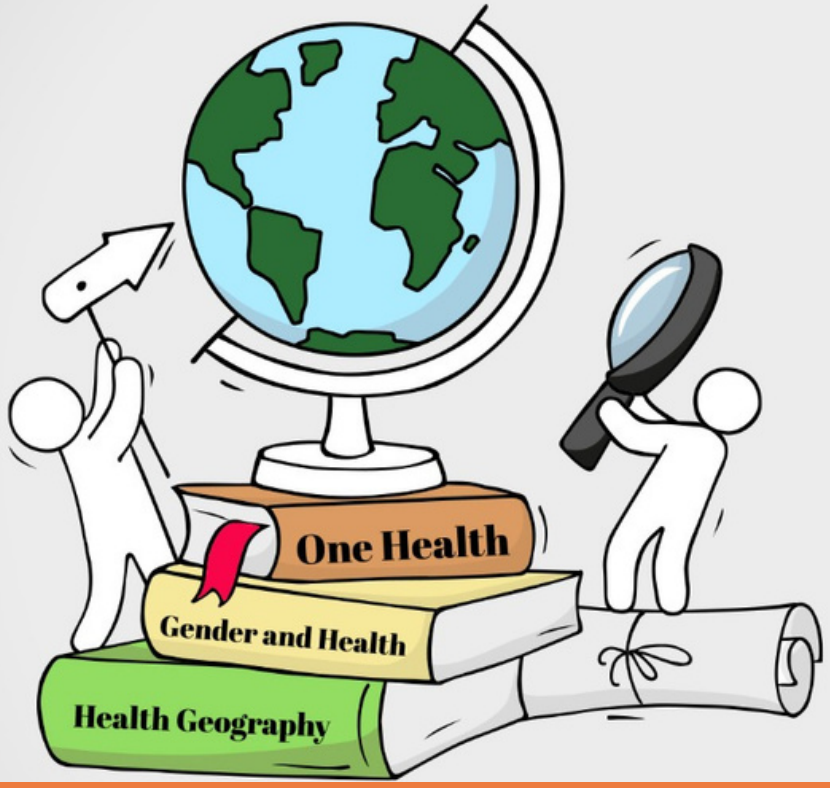
1st Annual online

Health Geography Symposium for PhD and Emerging Researchers

1st Annual Online **Health Geography** Symposium 2022



Date
15th of December

Time
11:00 – 15:30 CET

Venue
Zoom

Over 100 submissions from all continents in **9 Parallel Sessions and Poster Presentations**

ABSTRACT VOLUME

Organizers

IGU UGI International Geographical Union Commission on Health and the Environment (IGU CHE)

IGU Commission on Gender and Geography Commission Genre et Géographique

Maastricht University

U C Universidade de Coimbra

iguche2022@gmail.com

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Health Geography Symposium for PhD and Emerging Researchers

1st Annual Online Health Geography Symposium 2022

Organizing Committee

Alexandra Cioclu
University of Bucharest, Romania

Mariana Andreotti Dias
Getulio Vargas Foundation, Brazil

Asraful Alam
Serampore Girls' College, University of Calcutta, India

Narendra Kumar
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Sarah Lovell
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Sebastien Fleuret
University Angers, France

Susan Elliott
University of Waterloo, Canada

http://www.healthgeography.org/hgs.html

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15th DECEMBER 2022
11:00 to 15:30 (CET)

Health Geography: Building a digital space for emerging researchers

Guidelines & Programme Schedule for the Participants

The online symposium will have nine parallel sessions across diverse and related themes, including:

Health Geography / One Health / Climate Change and Health / Environment and Health

Urban Health / Infectious Diseases and Health Geography / Gender and Health

Migration and Health / Traditional Complementary Medicine

Welcome!

The COVID-19 pandemic is perhaps a painful reminder of the importance of health and wellness and its relationship with our geographical spaces. Hence, Health Geography has become a powerful field contributing to a better understanding of health and its assemblages.

Emerging researchers are often faced with numerous challenges in sharing their knowledge and research skills. With the continued growth of virtualization and digitalization in knowledge dissemination, this virtual space of knowledge exchange has emerged to bridge this gap. The 1st Annual Health Geography Symposium aims to create a free digital hub for PhD fellows and emerging researchers globally to help young researchers find their voice and contribute to the knowledge base in Health Geography.

Everyone is welcome. Feel free to share, listen to colleagues from other countries and continents, and plug into this new revolution. In this space, we encourage curiosity. So, ask those bugging questions!

Online Link: https://maastrichtuniversity.zoom.us/j/93900916407?pwd=ZktuekxrMDF1Vm52S2FWTDdHQ0hMdz09

Meeting ID: 939 0091 6407 / Password: 727096 - **Join the symposium 10 minutes before the start.**

Social Media: Twitter @HGS2022 @IGUhealthgeo or #HGS2022

Guidelines for presenters:

- Each presenter has 5 minutes for their presentation, followed by a 3-minute question and answers/comments session.
- Presenters (1st Author only) are encouraged to use their presentation time wisely as no extra time can be provided. It is imperative to respect the established time to guarantee a smooth operation during the symposium. Each session will have a chair to coordinate the session and a senior scientist to facilitate the discussions.
- Details of the presentations should include a **problem statement, research methodology, study findings/results/implications, and conclusion**.

- The organizers collected all presentations before the symposium and compiled them into one PDF to guarantee a smooth transition between the presentations.
- Certificates will be provided to oral presenters and poster submissions after the symposium. This will be sent to your designated email address.
- We would like to ask you to fill in the feedback forms provided at the end of the symposium. The idea is to run the symposium yearly, and we would like to learn from your experience to improve the event further.
- Should you have any questions, do not hesitate to contact us at iguche2022@gmail.com

We look forward to seeing you all soon!

Programme schedule		
Time	**Opening Session**	
11:00 - 11:25		
	Eva Pilot & Helen Gurgel IGU Commission on Health and the Environment	Welcome address and remarks on behalf of International Geographical Union (IGU) Commission on Health and the Environment
	Charles Egwuba	Introduction to the Conference
11:30 - 12:30	**Session 1**	
Room 1	Parallel Session 1: **Access to Healthcare I** Chairs: Alexandra Cioclu and Narendra Kumar Discussant: Ronan Foley *Maynooth University, Ireland*	**"Somewhere old, somewhere new, somewhere green": An exploration of health enabling places from the perspective of people ageing-in-place in Ireland during COVID-19** *Viveka Guzman, Royal College of Surgeons in Ireland- Ireland*
		Traditional Complementary Medicine in Brazil: Distribution and Use of Alternative Therapies in Unequal Territories *Mariana Andreotti Dias, Getulio Vargas Foundation - Brazil*
		Cross-border health in Global South: an approach from Northern Brazil *Adriana Dennise Rodriguez, University of Brasilia - Brazil*
Room 2	Parallel Session 2: **Gender and Maternity Health** Chairs: Nayara Belle and Shahnaz Basheer Discussant: Sarah Lovel *University of Canterbury, New Zealand*	**Continuity of care: An analysis of care providers' outlook on women's experiences of unplanned/emergency caesarean section within the New Zealand maternity system** *Dr Charles Egwuba, Massey University - New Zealand*
		The Reproductive Health Status of Muslim Women and its Challenges: A Case of North 24 Pargana District, West Bengal, India *MST Tania Parveen, University of North Bengal - India*
		Genealogy Tells: Informing Health and Aging Policies using East Tennessean Older Women's Family Histories, Perceptions, and Experiences of Health Inequity *Heather Davis, University of Tennessee, United States of America*

Room 3	Parallel Session 3: **Geographic analysis of health conditions** Chairs: Asraful Alam and Sara Lopes de Moraes Discussant: Sabrina Li *University of Nottingham, UK*	**Geographies of under five Malnutrition in Kano State, Nigeria** *Faiza Sheshe, Bayero University Kano - Nigeria*
		Spatio-temporal modelling of the five most prevalent cancers in Iran *Sharareh Faramarzi, Mashhad University of Medical Sciences - Iran*
		Risk factor variations of US county-level cancer mortality, a geographic random forest approach *Weichuan Dong, Case Western Reserve University - United States of America*
		Prevention and control of leprosy in microregion Garças/Araguaia *Romário de Sousa, CUA - UFMT - Brazil*
		Cardiovascular disease morbidity and mortality: a geographical-based state-of-art review *João Pedro Marques-Reis, University of Lisbon – Portugal*
12:30 - 12:35	Tea Break	
12:35 - 13:40	**Session 2**	
Room 1	Parallel Session 4: **Urban Health and Climate Change** Chair: Charles Egwuba and Narendra Kumar Discussant: Sebastien Fleuret *University Angers, France*	**Spatio-temporal analysis of urban growth and impact of green space on human health; a geospatial study** *Najib Ansari, Aliah University - India*
		The influence of population density in the access to urban green spaces in the city of Lisbon as a potential contribution to a healthier city *Ricardo Latoeiro, University of Lisbon - Portugal*
		Assessment of thermal comfort conditions as a factor influencing health problems *Tiago Silva, IGOT/CEG - Portugal*
		Heat vulnerability and its impact on public health in urban and peri-urban area *Nasir Ahammad, Central University of Tamil Nadu - India*
		The Urban Heat Island impacts on mortality during a specific heatwave event in São Paulo, SP, Brazil *Sara Lopes de Moraes, University of São Paulo - Brazil*
Room 2	Parallel Session 5: **Mental Health** Chairs: Shahnaz Basheer and Asraful Alam	**Education in relation to population dynamics and health, with a special focus on Kolkata as a district of West Bengal** *Mili Basak, Aliah University -India*
		Access to blue-green spaces and mental health: A case of NCT Delhi *Priyanka JHA, Jamia Millia Islamia (A Central University) - India*

Room 3	Discussant: Dumitrache Liliana *Bucharest University, Rumania*	**School well-being after the Covid- 19 Pandemic: intervention in the Francisco Miguel Gomes Municipal School, in Magalhães Barata** *Carolina Silva da Silva, Universidade Federal do Pará - Brazil*
		Ordinary least square based analysis and mapping of mental health susceptibility using exploratory regression model in GIS: A case study of Greater Chennai City *Thasmaiya Ganesan, Queen Mary's College – India*
		ACS: Mapping of the professional profile in the identification of situations of risk to COVID-19 *Xisto Serafim de Santana Souza Júnior, Universidade Federal de Campina Grande – Brazil*
	Parallel Session 6: **Infectious Diseases and Health Geography** Chairs: Adriana Dennise Rodriguez and Nayara Belle Discussant: Ricardo Almendra & Claudia Costa *Coimbra University, Portugal*	**Dengue Diffusion in Espirito Santo - first appointments** *Rafael Catão, Federal University of Espírito Santo – Brazil*
		Health risk among municipal waste management workers: A cross sectional study of Srinagar City, Uttarakhand, India *Shilpi Yadav, HNB Garhwal (A central) University – India*
		Spatio-temporal analysis of seasonal Influenza-Like Illness: a nationwide study in Iran from 2015 to 2019 *Atieh Sedghian, Mashhad University of Medical Sciences -Iran*
		Hot spot clustering of hospitalized patients with a PCR-confirmed influenza assay in Iran, 2016-2018 *Shahab MohammadEbrahimi, Mashhad University of Medical Sciences - Iran*
		A susceptibility index to COVID-19 infection in Portugal for geographical pandemic management *André Alves, IGOT-UL -Portugal*
		Towards a malaria-free world for children: Geographic patterns of paediatric malaria transmission in Nigeria (2008-2018) *Tolulope Osayomi, University of Ibadan - Nigeria*
13:40 - 13:45	Tea Break	
13:45 - 14:50	**Session 3**	
Room 1	Parallel Session 7: **Access to Healthcare II** Chairs: Narendra Kumar and Nayara Belle Discussant: Susan Elliot *University of Waterloo, Canada*	**Primary healthcare accessibility in the rural area of Western Development Region of Romania** *Cristian Cazacu, University of Bucharest – Romania*
		Analysis of Public Health Services in Rural and Intermediate Cities of Pernambuco, Brazil *José Roberto Henrique Souza Soares, Universidade Federal de Pernambuco, Brazil*
		GIS Based Healthcare Accessibility Approach at Firka level in Ariyalur District,India *Rajakokila Kaliyamoorthy, Bharathidasan University,Trichy – India*

Room 2		**Measuring spatial accessibility to hospitals in Southeast Iran** *Ahmad Raeesi, Mashhad University of Medical Sciences - Iran*
		The impacts of geographical distance, altitude difference and socio-economic status on utilisation of MCH services in Rudraprayag District *Shweta Singh, HNB Garhwal (A Central) University – India*
		Comparing the population coverage of catchment area using two methods in 2SFCA method on province/state scale in access to hospital *Ahmad Raeesi, Mashhad University of Medical Sciences - Iran*
	Parallel Session 8: **Environment and Health** Chair: Sara Lopes Moraes and Adriana Dennise Rodriguez Discussant: Adriaan Van Der Walt *University of the Free State, South Africa*	**Perception of malaria burden in irrigated and non irrigated farming communities of Garun Malam LGA. Kano State, Nigeria** *Jamila Garba Abdullahi, Bayero University, Kano - Nigeria*
		Evaluation of karst spring water quality using water quality index in northeast Tennessee USA *Lukman Fashina, University of Tennessee, Knoxville - United States of America*
		Physical access to municipal organic fairs in favelas of Belo Horizonte, Minas Gerais *Luana Rocha, Federal University of Minas Gerais - Brazil*
		Health Implication of Dam in Some Parts of Tafa Local Government Area of Niger State, Nigeria *Abdulmuakhkhir Bala Ishaq, Federal University of Technology Minna, Niger State - Nigeria*
		Effects of air pollution on population health: Geostatistical evidence from Pakistan *Munazza Fatima, The Islamia University of Bahawalpur - Pakistan*
Room 3	Parallel Session 9: **Health Geography** Chairs: Mariana Andreotti Dias and Asraful Alam Discussant: Pilkington Hugo *University Paris, France*	**Incorporating Geographic Context in Population Health Interventions: Case Study of Arsenic Mitigation Interventions for Drinking-water in Rural Bangladesh** *Varun Goel, University of Carolina Chapel Hill - United States of America*
		Socio-Economic Status and Health condition among the E-Rickshaw puller drivers: A Case Study *Dr MD Areful Hoque, St. Xavier's College – India*
		Association between geographical natural hazard and postnatal care utilization for new-born babies in India: A step towards full coverage using a spatial approach *Papai Barman, International Institute for Population science - India*
15:00 15:30	Closing Remarks by Eva Pilot & Helen Gurgel IGU Commission on Health and the Environment	

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POSTER LIST	
MENTAL HEALTH	
TITLE	**AUTHOR**
Child Abuse impacts on mental health	Harshika Singh, C. J. M. University - India
Prevalence of mental & emotional health issues during COVID-19 lockdown: study at ward number: 122, KMC WB	Satyajit Bhattacharjee, Sarsuna College - India
Mental Health with reference to spatial context	Anindita Dey, Indian Institute of Technology, Jodhpur - India
Longitudinal associations of neighbourhood environmental exposures with externalising and internalising problems throughout adolescence: Findings from the TRAILS study	Yi Zeng, Utrecht University - The Netherlands
ENVIRONMENT AND HEALTH	
TITLE	**AUTHOR**
Mapping of various vegetable crops in forest environment using hyperspectral image	Aarti Kumari - India
Vitória's mangrove: Ecosystem services and health benefits.	Rafael Aguilar Zamudio, Universidade Federal do Espírito Santo - Brazil
Environmental Justice and Urban Renewal: The limits of multiple burden maps	David Spenger, Friedrich-Alexander-Universität Erlangen-Nürnberg - Germany
COVID-19 syndemic: from global to local - health challenges in the environment of small cities in the Amazon, Brazil	Viviana Mendes Lima, UNIVAP - Brazil
An assessment of land potential analysis and impacts of Parandur airport in the village, Kanchipuram District	Priyanka N, Research scholar - India
Epidemiological characteristic of dengue and its patients perception: micro level study	Saravanabavan Vaithialingam, Assistant Professor - India
Analysis of GreenHouse Gas (GHG) Emissions in north Africa from 1990 to 2018	Mounia Tahri, National Center for Nuclear Energy, Sciences and Technology (CNESTEN) - Morocco
Impact caused by the COVID-19 pandemic on the generation of waste from health units in the municipality of Rebouças-PR	Jensen Paula Regina, UNICENTRO - Brazil
A mixed method study on the impacts of the flooding on physical health in Bongaigon District, Assam	Girimallika Borah, Cotton University - India

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CLIMATE CHANGE AND HEALTH	
TITLE	**AUTHOR**
Climate change: an alarm for the future	Prachi Verma, CSJM University Kanpur (U.P) - India
Rescue our millet, save our climate	Deeksha Sahu, Csjm University Kanpur, Uttar Pradesh - India
URBAN HEALTH	
TITLE	**AUTHOR**
Climate change and urban flooding in Kolkata metropolitan region: vulnerability, health hazard affordable resilient measures	Sudip Dey, Asutosh College - India
Neighborhood-related mental health and space: The value of theoretical-conceptual sensitivity	Tom Meyer, Ruhr-University Bochum - Germany
Checking traffic signs-based google street view for road traffic accident on urban road intersection of Thailand	Yaowaret Jantakat, Rajamangala Univeristy of Technology Isan - Thailand
Poverty and inequality at the intra-urban scale in Vitória: the multiple layers of socio-spatial exclusion	Flora Ribeiro, Universidade Federal do Espirito Santo - Brazil
Do changes in cycling infrastructure, green space and tree canopy contribute to reducing social inequities?	Behzad Kiani, Department of Public Health, University of Montreal - Canada
Investigating the Effect of Urban Traffic Condition on Road Accident and Air Pollution with Sentinel-1 SAR imagery using Google Earth Engine	Pongpun Juntakut, Lecturer of the Chulachomklao Royal Military Academy - Thailand
GENDER AND MATERNITY HEALTH	
TITLE	**AUTHOR**
Gender and Child Malnutrition in Kano State	Faiza Sheshe, Bayero University Kano - Nigeria
Gender-related differences in physical activity of medical university students	Viktoriia Yasenok, University of Zurich - Switzerland
Effect of women's migration on urban children's health in India	Arti Bajpai, Csjmu Kanpur - India
INFECTUOS DISEASES AND HEALTH	
TITLE	**AUTHOR**
Geospatial analysis dengue risk zone in Dindigul District using analytical hierarchy process	Vimal Raj, Bharathidasan University - India
The Social Determinants of COVID-19: a look at social and health vulnerabilities in Presidente Prudente and Botucatu - São Paulo.	João Pedro Lima. Sao Paulo State University - Brazil
A descriptive study of post COVID-19 global health	Devashish Shukla - India

Global geographical distribution of mortality due to COVID-19	Ajay Kumar, Amity University Haryana - India.
Prevalence of water-borne disease in Doaba region of Punjab in India: A spatio–temporal analysis of Diarrhoea	Sajad Nabi Dar, Lovely Professional University - India
Spatio-temporal dynamic patterns of cutaneous leishmaniasis: A nationwide study in Iran from 2011 to 2020	Neda Firouraghi, Mashhad University of Medical Sciences - Iran
Socioeconomic drivers influence canine insecticide collars and protection against canine visceral leishmaniasis in low and high-income areas?	Patricia Matsumoto, Adolfo Lutz Institute, São Paulo - Brazil
Building and selecting specialized spatial-temporal AI Models for predicting dengue disease in Brazil	Raphael Saldanha, Inria - France
ACCESS TO HEALTHCARE	
TITLE	**AUTHOR**
Healthcare centres and population density in Kasaragod district	Sudha P., Mangalore University - India
Territory and vulnerability: The dimensioning of the workforce in primary health care in Vitória - Espírito Santo.	Júlio César Moraes, Universidade Federal do Espírito Santo - Brazil
Analysis of healthcare infrastructure in Himachal Pradesh	Shamaila Fatima, Indian Institute of Technology - India
GIS approach on health care system and patients perception of primary health care centers - a geo-medical study	Vinothini Chelladurai, Research assistant - India
Spatial inequalities in the availability and accessibility of healthcare services in the southeastern region of Romania	Alina Caloian, Faculty of Geography - Romania
Health regulations and geographic distribution in the manufacture of herbal medicines in Brazil	Marta Castro, Pontifícia Universidade Católica do Rio de Janeiro - Brazil
Social services of general interest, a factor in mortality values? A vision from the European regions	Pedro Franco, CEG/IGOT-ULISBOA - Portugal
HEALTH CONDITIONS	
TITLE	**AUTHOR**
Demography of aging and degenerative diseases among older adults in Imo State, Nigeria from 2012 to 2021	Ifeanyi Oduaro, Imo State University - Nigeria
The spatial dimension of lung cancer cases in Europe in relation to the percentage of smokers.	Ioan Adrian Toma, University of Bucharest - Romania
Describing participation in everyday activities outside the home for adults with obesity: a proposed focused ethnography using geospatial methods	Pam Hung, Faculty of Rehabilitation Medicine, University of Alberta - Canada
Overweight and food environment: a multilevel analysis in a Brazilian Metropolitan Region	Nathalia Barbosa de Aquino, Federal University of Pernambuco - Brazil

Decomposing SC-ST differences in nutritional status (BMI) among reproductive-aged women (15-49) in West Bengal	Sourav Biswas, International Institute for Population Sciences - India
Migration and child health and nutrition in India: Evidence from a large-scale cross-sectional survey	Prem Mishra Shankar, Institute for Social and Economic Change - India
Incidence of silicosis in Espírito Santo, Brazil	Roberta Guio Azevedo, Universidade Federal do Espírito Santo - Brazil

ORGANIZING COMMITTEE:

Alexandra Cioclu - University of Bucharest, Romania
Asraful Alam - University of Calcutta, India
Charles Egwuba - Massey University, New Zealand
Dennise Rodríguez - University of Brasília, Brazil
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Eva Pilot - IGU CHE, Maastricht University, The Netherlands
Ricardo Almendra - IGU CHE, Coimbra University, Portugal
Pilkington Hugo - University Paris, France
Ronan Foley - Maynooth University, Ireland
Sabrina Li - University of Nottingham, United Kingdom
Sarah Lovell - University of Canterbury, New Zealand
Sebastien Fleuret - University Angers, France
Susan Elliott - University of Waterloo, Canada

This symposium aims to create a warm and safe digital environment for emerging researchers in Health Geography. Each of our research paths has been different. We hope this symposium will help you gain more international experience and exposure!

Much success for everyone !

01

SESSION- 1

PARALLEL SESSION-1 ACCESS TO HEALTHCARE I

Chairs: Alexandra Cioclu and Narendra Kumar
Discussant: Ronan Foley
Maynooth University, Ireland

"SOMEWHERE OLD, SOMEWHERE NEW, SOMEWHERE GREEN": AN EXPLORATION OF HEALTH-ENABLING PLACES FROM THE PERSPECTIVE OF PEOPLE AGEING-IN-PLACE IN IRELAND DURING COVID-19

Viveka Guzman & Viveka Guzman1*, Frank Doyle1, Ronan Foley2, Peter Craven3, Noelene Crowe3, Penny Wilson3, Maria Pert1

1School of Population Health, Royal College of Surgeons in Ireland,123St Stephen's Green, Dublin, D02 YN77, Ireland; 2Department of Geography, Maynooth University, Maynooth, Co. Kildare, WE23 HW31, Ireland; 3Well-being, Interventions and Support during Epidemics (WISE) Study Research Advisory Group, Royal College of Surgeons in Ireland

Corresponding Email: vivekaguzman@rcsi.ie

As a global event with health, economic, and social consequences, the COVID-19 pandemic has largely disrupted and redefined the functions of everyday life-spaces. As a result, it could be argued that a (re) newed consciousness of the power of place has emerged across all generations and cultures. However, it is evident that we have not all been affected in the same ways. For older people and people with chronic health conditions, a higher risk of severe illness and even death was attached with a COVID-19 infection, which resulted in more stringent public health measures based on chronological age. Evidence highlighting the role of particular places in this context has been increasing. However, it remains unknown how the pandemic may have altered enabling places from the perspective of people aging-in-place, and how their affective ties to place(s) may have shifted during the pandemic. To fill the gap, this study seeks to characterize enabling places during COVID-19 according to the experiences of older community-dwellers based in Ireland, and to identify some of the opportunities and barriers that the pandemic has generated for ageing-in-place. Findings are drawn from a qualitative thematic analysis of written submissions (n=17), narrative interviews (n=44) and go-along interviews (n=5) with people ageing-in-place in Irish communities during the pandemic. A preliminary analysis of participants' responses showcases a spectrum of transitions in individuals' everyday geographies, including emplacement in residential and proximal spaces, and displacement from other places due to public health restrictions. These findings indicate that place-related experiences permeate individuals' physical, mental, and social well-being, which we illustrate across three themes: 1) Somewhere old, describes the role of familiarity with the physical and social resources available in a specific place; 2) Somewhere new, describes participants' development of adaptive strategies through revaluation, replacement and reinvestment of resources, which has led to the emergence of new supportive landscapes such as online communities; and, finally 3) Somewhere green, describes the role of outdoor and natural environments as health and well-being enablers during the pandemic. Our findings contribute to characterize enabling places for ageing-in-place and to build the evidence-base for developing interventions to support older people during emergencies and public health crises.

02

TRADITIONAL COMPLEMENTARY MEDICINE IN BRAZIL: DISTRIBUTION AND USE OF ALTERNATIVE THERAPIES IN UNEQUAL TERRITORIES

Mariana Andreotti Dias
PhD. Fellows, Getulio Vargas Foundation, Brazil
Corresponding Email: mariana_andreotti_d@hotmail.com

The historical imposition of colonial thought and power in the Brazilian territory reverberates processes and phenomena that formed society. Linked to modernity, they become agents of human illnesses, not only in the physical body, but in other dimensions that break with human balance. Medicine capable of operating on these others dimensions is traditionally carried out by the native peoples of Brazil and also by others who arrived here with European colonization. Due to the historical and cultural context a "therapeutic spirituality" - of complex spatial definition and institutional legitimation, but of extraordinary cultural richness and multiple cosmologies - was shaped in the Brazilian context, and so many others nations subalternate by the colonial power. Practiced in a popular/traditional/alternative way, and in an environment outside that of modern scientific medicine, the social actors of alternative medicine provide comfort, help, and significance for sick subjects. Thus, detailed studies were carried out to identify, map and diagnose "alternative" therapies to the biomedical model. Health policies for Traditional Complementary Medicine (TCM) are widely analyzed to understand the official context of therapeutic practices and the geographic distribution in the unequal territories of Brazil and its practitioners. The research methodology is based on Popperian's methods, hypothetical-deductive logic, and technical means of investigation. The research instruments followed enunciations supported in the therapeutic spaces, in the GIS mapping of socio-spatial elements and variables (spiritualist clinics, health equipment, socioeconomic variables from the IBGE), and theoretical references on the subject of the study (regulations and official documents/WHO, PICs - complementary integrative practices, the Health Geography). In possession of the cartographic products, the contextual analysis of the census tracts evidences contradictory spatial and phenomenological logics, either about the model of operating society, or by the marks of modernity, fragmentary and oppressive diversity, and by the colonial thought that even established in a territory Brazilian for centuries, continues to perpetuate the subalternation of peoples. As a proposition, it is attempted about more holistic perspectives and decolonial epistemologies for health and society, so that historical-cultural recognition allows sick individuals and society as a whole to self-reflect, directing us towards the harmony of bodies, and to think and act in solidarity.

CROSS-BORDER HEALTH IN GLOBAL SOUTH: AN APPROACH FROM NORTHERN BRAZIL

Adriana Dennise Rodriguez
University of Brasilia - Brazil
Corresponding Email: cyoux16@gmail.com

Definitions of health have become increasingly comprehensive since the end of World War II, when the World Health Organization was funded and it disrupted the construction of health as mere "absence of illness". The search for health and associated services is present in all societies; but in the globalization era, this phenomenon has increased in frequency and spread in multidirectional flows, going beyond national borders and being permeated by structural inequalities. Borders are spaces that offer a broad empirical possibility to address aspects that coexist thanks to their own international dynamics. Two main tendencies of international patient mobilities have been identified: the patients that search for cross-border health services (mainly in the public system of a neighboring country) and those patients who purchase medical services in other countries (mainly in

the private sector), the so-called medical tourism. Foreign patients searching for health public services may be an unexpected load for the national health systems, as not all countries have identified or even regulated this growing tendency. Bare examples of regulation of cross-border health relay on Global North... but what about a region that already has great inequalities, as the Global South? This study, that recently started the first stage of field trips, has the objective to understand the cross-border health dynamics in a forgotten border in Brazil, the Northern region, with the particular study case of the twin cities Oiapoque (Amapá, Brazil) – Saint Georges de l'Oyapock (French Guiana). Main characteristics of these particular region are: great presence of indigenous groups, a fragile economy (especially based on illegal mining), a partially-closed border and the belonging to Amazonas basin and ecosystem.

PARALLEL SESSION-2 GENDER AND MATERNITY HEALTH

Chairs: Nayara Belle and Shahnaz Basheer
Discussant: Sarah Lovel
University of Canterbury, New Zealand

CONTINUITY OF CARE: AN ANALYSIS OF CARE PROVIDERS' OUTLOOK ON WOMEN'S EXPERIENCES OF UNPLANNED/EMERGENCY CAESAREAN SECTION WITHIN THE NEW ZEALAND MATERNITY SYSTEM

1Dr Charles Egwuba, 2Dr Sarah Lovell & 3Dr Annabel Ahuriri-Driscoll
1Massey University New Zealand; 1&2University of Canterbury, New Zealand
Corresponding Email: drcharlesphd@gmail.com

Caesarean section (CS) rates continue to rise globally, with the current rate in Canterbury and New Zealand estimated at 25-30%, comparable to countries in the global north. Women who undergo CS commonly report increased negative birth experiences, specifically, more extended maternal recovery periods, lower breastfeeding rates, initial maternal bonding difficulties and increased risk of postpartum post-traumatic stress disorder. This qualitative study examined lead maternity carers' (LMCs) accounts of maternity care for women during and after unplanned/emergency CS. The aim is to better understand whether the maternity system is perceived to meet the needs of these women. Semi-structured in-depth interviews were conducted with 11 LMCs (seven midwives and four obstetricians) practising in Canterbury. Participants were recruited purposively, interviews were transcribed verbatim, and data was analysed using the Framework Approach. In this study, we find that dominant birth ideologies influence the way providers communicate with women serving to challenge or reinforce their birth expectations. The findings of this study demonstrate that while a midwife-led LMC model can support a culture of responsiveness in maternity care, caesarean section disrupts experiences of continuity of care for both the provider and the birthing woman.

THE REPRODUCTIVE HEALTH STATUS OF MUSLIM WOMEN AND ITS CHALLENGES: A CASE OF NORTH 24 PARGANA DISTRICT, WEST BENGAL, INDIA

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04

The historical imposition of colonial thought and power in the Brazilian territory reverberates processes and phenomena that formed society. Linked to modernity, they become agents of human illnesses, not only in the physical body, but in other dimensions that break with human balance. Medicine capable of operating on these others dimensions is traditionally carried out by the native peoples of Brazil and also by others who arrived here with European colonization. Due to the historical and cultural context a “therapeutic spirituality” - of complex spatial definition and institutional legitimation, but of extraordinary cultural richness and multiple cosmologies - was shaped in the Brazilian context, and so many others nations subalternate by the colonial power. Practiced in a popular/traditional/alternative way, and in an environment outside that of modern scientific medicine, the social actors of alternative medicine provide comfort, help, and significance for sick subjects. Thus, detailed studies were carried out to identify, map and diagnose “alternative” therapies to the biomedical model. Health policies for Traditional Complementary Medicine (TCM) are widely analyzed to understand the official context of therapeutic practices and the geographic distribution in the unequal territories of Brazil and its practitioners. The research methodology is based on Popperian's methods, hypothetical-deductive logic, and technical means of investigation. The research instruments followed enunciations supported in the therapeutic spaces, in the GIS mapping of socio-spatial elements and variables (spiritualist clinics, health equipment, socioeconomic variables from the IBGE), and theoretical references on the subject of the study (regulations and official documents/WHO, PICs - complementary integrative practices, the Health Geography). In possession of the cartographic products, the contextual analysis of the census tracts evidences contradictory spatial and phenomenological logics, either about the model of operating society, or by the marks of modernity, fragmentary and oppressive diversity, and by the colonial thought that even established in a territory Brazilian for centuries, continues to perpetuate the subalternation of peoples. As a proposition, it is attempted about more holistic perspectives and decolonial epistemologies for health and society, so that historical-cultural recognition allows sick individuals and society as a whole to self-reflect, directing us towards the harmony of bodies, and to think and act in solidarity.

GENEALOGY TELLS: INFORMING HEALTH AND AGING POLICIES USING EAST TENNESSEAN OLDER WOMEN’S FAMILY HISTORIES, PERCEPTIONS, AND EXPERIENCES OF HEALTH INEQUITY

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Older women face unique health inequities challenges. My dissertation study – Genealogy Tells: Informing Health and Aging Policies using East Tennessean Older Women’s Family Histories, Perceptions, and Experiences of Health Inequity – provides an understanding of older women’s perceptions and situated experiences regarding the gendered health inequities they face and the social determinants (SDH) thereof. It examines how these health inequities are situated in older women’s genealogical (familial) and geographical health and mortality outcomes histories and how their perceptions and experiences of health inequities and their familial mortality outcomes histories and how their perceptions and experiences of health inequities and their familial mortality outcomes histories are characterized by the geopolitical and social norms in which they live. The purpose of this project is to present policy and decision-makers with insights about and recommendations from older women on their needs and wants in order to mitigate those health inequities. The data for this study was collected through semi-structured interviews with twelve women in Appalachian East

Tennessee. Areas examined include: the women's perceived impact of federal, state, and local policies and interventions on the participants; the role of social norming and health narratives, particularly stigmatization and discrimination around ageism, sexism, and health marginalization of older women, and the resultant older women's internalization of health norms; the familial role in health inequities; the usage of family health histories and older women's genealogies of health and mortality outcomes; and the role of place and place-effects. This study also aimed to examine the place-based and temporal geopolitical, social and cultural norming and social conditioning of older women in relation to their perceptions, attitudes and beliefs. This study sought to determine if these norms impact the participants' awareness or lack of awareness of their family health histories. This study showed that internalization of these norms, and the replicating of beliefs, attitudes, and perceptions that older women have around health inequities and familial mortality outcomes may be reproduced in their own families. The women provided their own recommendations for ways to mitigate the health inequities they face. This has implications for policymaking and intervention design in co-production with older women in order to mitigate older women's health inequities.

PARALLEL SESSION-3 GEOGRAPHIC ANALYSIS OF HEALTH CONDITIONS

Chairs: Asraful Alam and Sara Lopes de Moraes
Discussant: Sabrina Li
University of Nottingham, UK

GEOGRAPHIES OF UNDER FIVE MALNUTRITION IN KANO STATE, NIGERIA

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The Sustainable Development Goal (SDG) number two is to end hunger, achieve food security and improved nutrition and promote sustainable agriculture by the year 2030. This is because good nutrition is important to the wellbeing of people, especially under-fives. Malnutrition is a key contributing factor to child mortality and morbidity and developing countries share a disproportionate share of malnutrition and sub-Saharan Africa in particular and the ultimate aim is for children to be free of malnutrition in all its forms (UNICEF, WHO and World Bank, 2020). The study used quantitative data of the reported cases from the admission cards of all the 30 out-patient therapeutic treatment (OTP) centres and admission register of the 3 inpatient stabilisation centres in the state for a period of 10 years from 2009-2018. Data on individual case relating to sex and treatment outcome, month and year were extracted for analysis. Descriptive statistics (percentage) was used in the form of a frequency table to show treatment outcome and pie chart was used to show sex distribution of child malnutrition. The study finds that throughout the years of the study, male children are malnourished than female children and this can be attributed to the religious and cultural practices in the study area of taking good care of a female child more than a male child but also there are more males than females in the State. This is in line with the findings of NDHS (2018) and in contrast with the findings of Choudhury, Hanifi, Rasheed and Bhuiya (2000) that female children were more likely to be severely malnourished than males and in South East Asia where female children are malnourished than male children. Also males have higher case fatality than females meaning the number of males that die of child malnutrition is higher than females and is in

line with the sex distribution of malnourished children in the state but in contrast to the findings of Mitra, Al-Sabir, Cross and Jamil (1997) in Bangladesh where there is higher female childhood mortality than males. It is recommended that attention should be given to male children as they constitute the largest productive workforce of the state.

SPATIO-TEMPORAL MODELLING OF THE FIVE MOST PREVALENT CANCERS IN IRAN

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Cancer is a worldwide public health issue that is recognized as a primary cause of death. It is anticipated that the incidence of cancer will increase fivefold by 2030. This study aimed to model Spatio-temporal patterns of most common cancers in Iran, between 2014 and 2017. At the county level, the number of 482,222 cancer patients identified by the population-based cancer registry between 2014 and 2017 was studied. Using spatial scan statistics, the spatial, temporal, and Spatio-temporal patterns of each gender's most prevalent malignancies were found. Out of 482,222 new cancer cases between 2014 and 2017, of which 255,165 (53%) were men. The most common cancers in men were stomach (89.22%), non-melanoma skin cancers (84.38%), prostate (78.87%), bladder (61.08%), and trachea, bronchus, lung (TBL) (55.07%), respectively. Also, the top five cancers in women were breast (181.42%), non-melanoma skin cancer (52.81%), thyroid (48.94%), stomach (44.11%), and colon (42.64%). In terms of spatio-temporal analysis, the north and north-western areas were identified as most likely clusters for stomach (in both genders), colon in female and TBL cancer in male. Also, south and central areas of country were recognized as high-risk areas for non-melanoma skin cancers in both genders, thyroid in female, prostate in male. The cancer of bladder in male was concentrated in the northwestern and central part of Iran and the breast cancer, as the first common cancer in women, was concentrated in the north of country. Spatiotemporal analysis of cancer incidence showed geographical variation of disease occurrence in different counties of country. Future research might be conducted to identify associated factors with high-risk areas of each cancer in the study area. Also, policymakers can use these results to implement more tailored screening and preventive measures.

RISK FACTOR VARIATIONS OF US COUNTY-LEVEL CANCER MORTALITY, A GEOGRAPHIC RANDOM FOREST APPROACH

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The association between cancer mortality and risk factors may vary by geography. However, conventional methodological approaches rarely account for this variation. This geospatial cross-sectional study included individuals who died from cancer during 2008-2019 in the US, aggregated at the county level. We applied conventional random forest models nationwide and by US region, and the geographical random forest model (accounting for local variation of association) to assess

07

The association between cancer mortality and risk factors may vary by geography. However, conventional methodological approaches rarely account for this variation. This geospatial cross-sectional study included individuals who died from cancer during 2008-2019 in the US, aggregated at the county level. We applied conventional random forest models nationwide and by US region, and the geographical random forest model (accounting for local variation of association) to assess associations between a wide range of risk factors and cancer mortality. Based on the variable importance measure, the random forest models identified multiple risk factors highly associated with cancer mortality, including smoking, receipt of food stamps, and obesity. The geographical random forest model further identified risk factors that varied at the county level. For example, receipt of food stamps was a high-importance factor in the Appalachian region, North and South Dakota, and Northern California; smoking was of high importance in Kentucky and Tennessee; female-headed households were high-importance factors in North and South Dakota. Geographic areas with certain high-importance risk factors did not consistently have a corresponding high prevalence of the same risk factors. The associations between cancer mortality and risk factors vary by geography in a way that does not correspond strictly to risk factor prevalence. The degree to which other place-specific characteristics, observed and unobserved, modify risk factor effects should be further explored. This work suggests that risk factor importance may be a preferable paradigm for selecting cancer control interventions compared to risk factor prevalence.

PREVENTION AND CONTROL OF LEPROSY IN MICROREGION GARÇAS/ARAGUAIA

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The general objective of this study was to identify cases of leprosy and health of individuals in the territory of the city of Barra do Garças - MT, and evaluation of the prevention service. Thus, to achieve the proposed objective, the methodology developed was based initially on the preparation of the research project and sent to the Research Ethics Committee CUA – UFMT; next, a literature review was conducted on the theme addressed, concomitantly with the primary data collection we used the Outpatient Records of the Health ReferenceCenter/CECAP/Municipal Health Secretary of Barra do Garças - MT. Secondary data collection was done using data from SINAN - Information System for Notifiable Diseases and from theDepartment Informatics of the Unified Health System / DATASUS Department of Informatics of the Unified Health System. In a geoprocessing environment, thematic maps of location, spatialization of case numbers. During the period investigated, there were 4,142 notified cases of this amount, 3,473 referring to new cases of leprosy distributed in the municipality of Barra do Garças and surrounding municipalities.

CARDIOVASCULAR DISEASE MORBIDITY AND MORTALITY: A GEOGRAPHICAL-BASED STATE-OF-ART REVIEW

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08

Cardiovascular diseases (CVD) are the leading cause of death worldwide, and their occurrence is primarily associated with individual lifestyle, social/economic and environmental factors. Our research aims to analyze the state-of-art of cardiovascular disease morbidity and mortality, identifying the main policies and analyzing studies regarding data used, methods/techniques and limitations. Our methodology is twofold: a scope review on institutional documents, retrieved from Portuguese governmental, and European and global non-governmental organizations websites focused on health and territory; a systematic review of articles, using the Scopus bibliographic database. From 2011 to 2022, based on a query with keywords associated to CVD and potential risk factors, and with a geographical approach, the scientific articles content was analyzed using an adapted PRISMA 2020 methodology. Only 28 articles - out of 267 -show scientific evidence and statistical and/or spatial analysis to CVD. Published research fall short in several subjects, such as: justifying variables used for analysis; applying spatial and/or sensitive analysis methods; referencing ethical issues and gender ratio between authors. Demographic and socioeconomic variables were present in most of the articles, indicating a relationship between high incidence of CVD and individuals with certain characteristics-e.g., elderly, unemployed, low income and low education; oppositely, environmental and physical variables, such as noise pollution and greenspaces, are practically nonexistent. Additionally, the scarcity of information concerning individual lifestyle — or the gathering of this data through interviews —, along with aggregation of data in larger scales, were the main limitations highlighted by some of the authors. Regarding institutional documents, we found that strategic goals and policies have been defined at environmental, spatial planning and individual health levels, through promotion of physical activity, integration of green and blue spaces in cities, and creation of monitoring/awareness-raising systems associated with extreme temperatures, noise and air pollution. However, despite existing, these documents are poorly represented in scientific articles. The adopted methodology reveals, based on scientific evidence, the existence of relationship between CVD and some factors associated with demographic and socioeconomic indicators, as well as others of environmental and physical nature. However, the absence of studies regarding noise pollution, the scarcity of articles that contemplate spatial analysis in their methodologies and/or documents by governmental and non-governmental organizations documents that pointed-out target goals, and the absence of data with high granularity were the main gaps identified. They contribute negatively to informed and more geographically tailor-made decision-making; simultaneously, they set future research pathways, making it possible to overcome these weaknesses.

09

SESSION- 2

PARALLEL SESSION-4 URBAN HEALTH AND CLIMATE CHANGE

Chair: Charles Egwuba and Narendra Kumar
Discussant: Sebastien Fleuret
University Angers, France

SPATIO-TEMPORAL ANALYSIS OF URBAN GROWTH AND IMPACT OF GREEN SPACE ON HUMAN HEALTH; A GEOSPATIAL STUDY

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Currently, urban areas are home to more than half of the world's population, and this number is predicted to rise. Although there have been many reviews of empirical studies on the relationship between nature and human health, few studies have concentrated on empirical observation, and most have studied almost quantitative research. This study aims to examine the spatio-temporal urban expansion pattern and its impacts on green space on human health. In the past, urban green space was considered one of the most crucial components of a healthy city. This study was conducted to assess landuse/landcover dynamics in the Kolkata district and selected three wards from Kolkata Municipal Corporation for an impact assessment on human health. Because green space is considered the city's lungs, it has significant health advantages, mainly for the old age population. Moreover, regular physical activity in parks and other green areas significantly lowers the risk of non-communicable diseases (NCD) like cardiovascular disease, respiratory problems, high blood pressure, paralysis, diabetes, and other chronic diseases. Furthermore, it has also been noticed that lack of open space, better economic opportunities, and proper green space availability play a push factor in the core city's suburban migration. As a result of these factors, there has been a decrease in urban greenery from 2006 to 2016. It has been observed that most persons who frequently visit green spaces have diabetes, high blood sugar, obesity, and hypertension.

THE INFLUENCE OF POPULATION DENSITY IN THE ACCESS TO URBAN GREEN SPACES IN THE CITY OF LISBON AS A POTENTIAL CONTRIBUTION TO A HEALTHIER CITY

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The population density of urban agglomerations has generated concerns about the preservation of health since the Anthropocene. Several investigations over decades have sought to find the ideal density for cities, with perspectives in various areas, from geography, sociology, medicine and urbanism. However, the concern for environmental sustainability in the permanent growth of cities is accentuated by the annual increase in world population, the result of technological progress in

favour of medicine in the fight against and prevention of disease. Currently, more than half of the world's population is in urban settlements, with an expected growth to close to one third by 2050 (UN Habitat, 2020). In Europe, more than 75% of the population currently lives in urban settlements (UN, 2018). The 2015 UN convention in Paris (UNFCCC, 2016) thatpromoted ecological awareness with a view to an agreement that would restore environmental balance has sparked global interest. A continuous deterioration of the natural ecosystem has been verified, with global evidence, with special emphasis on the emergence of several climatic events that have collated in destruction and several deaths. This research addresses the relationship between urbanism and health in cities as a social space, in a vision of conception of population density through its influence on access to Urban Green Spaces, with the city of Lisbon as a case study. Coverage of the resident population within 200m of Urban Green Spaces with an area greater than or equal to 0.5ha (EEA, 2021) is considered as the basis for the investigation, in the proportion of 8m2/inhabitant (Ordinance 216-B/2008 of 3 March of the Ministry of the Environment, Spatial Planning and Regional Development, 2008). Finally, we identify the areas of the city that allow access to more than one urban green space under the conditions described above. The conclusions contribute to public policies in the reformulation of territorial management instruments with a view to urban planning in favour of public health and environmental balance.

ASSESSMENT OF THERMAL COMFORT CONDITIONS AS A FACTOR INFLUENCING HEALTH PROBLEMS

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Human interaction with the thermal environment happens on a daily basis [1], mostly in the urban environments where the majority of the world's population live [2]. Since the climate of urban areas is modified by several elements and structures which promote energy concentration and it is sensitive to climatic phenomena, its population might have a greater risk of exposure to events that cause thermal stress (heat or cold related) [3–6]. Due to multiple factors, thermal comfort is a complex issue to assess, therefore, the employment of new tools, methods and data is required. This way, two projects were conceived in Lisbon to assess thermal comfort conditions both indoor and in outdoor environments. The first one, IN-HALE project, a monitoring network was installed in an external environment using data loggers and, simultaneously, thermohygrometers were installed inside 20 selected dwellings during summer. During this period, a nine-week follow-up survey was conducted to assess the following dimensions: indoor thermal perception; thermal attitudes against heat; sleeping disorders and quality of life. The output of IN-HALE is a policy brief on promoting thermal comfort indoors, a communication plan for municipal actions to promote environmental health centred on thermal comfort, and a training program aimed at raising awareness among the elderly population about the importance of thermal comfort for health. The second one, a Doctoral project, aims to assess outdoor thermal comfort conditions through an approach labelled as Climatewalks [7]. This experiment is developed to observe, collect, and evaluate environmental, physiological, and psychological variations, through roving missions at the street level. The environmental data will have a dominant role, namely UTCI as a way to assess the outdoor human thermal comfort the thermal stress conditions. This index will be analysed according to the local

climate zones, so as to detect the spatiotemporal variations of outdoor thermal comfort in an urban environment. This methodology (or a similar one) was used in several papers [8–13]. Further variables such as HW, urban volumetry, compactness, urban density, shading models will be used in a Linear Mixed Model in order to identify how the different urban morphology characteristics influence thermal stress conditions. The ultimate objective of these projects is to produce climate knowledge in an urban context through a georeferenced method able to monitor and map urban microclimate variations. This new microclimatic knowledge, with the assessment of natural-based solutions, may be helpful for heat stress mitigation policies.

HEAT VULNERABILITY AND ITS IMPACT ON PUBLIC HEALTH IN URBAN AND PERI-URBAN AREA

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Heat wave disasters are becoming more common in urban and peri-urban areas because of rapid urbanization. It is urgent to identify the factors that contribute to heat waves' harmful effects on human health, as well as areas that are most vulnerable. The main objective of this study is to describe heat wave vulnerability environments using multi-source geographic data and evaluate how accurately these vulnerability environments reflect actual human health from downtown area to suburban in the National Capital Region (NCR) of Delhi. It will plan to integrate indices associated with heat wave vulnerability based on meteorological observation data, remote sensing data and point of interest (POI) data; analyze the trends and patterns of heatwave hazard and urban heath island (UHI) during 1990 to 2020 and examine the impact of heat vulnerability on human health and socio-economic environment. There will be four steps methodology to achieve your objectives. In first step, temperature and satellite data will be used to understand trends and patterns of heat waves and the urban heat island (UHI) respectively. In the second step, a suitable model will be developed for heat hazards index. From the heat hazards index it will compare the spatio-temporal patterns and trends of heat hazards and its relation with urban expansion and selected some indicators related to socio economics and health from secondary literature to prepare a heat vulnerability index. In the third step, a questionnaire for a field survey will be prepared to understand the impact of heat hazards on human health and developed a sampling technique to collect the primary data. In the final step, it will link the field data with the heat hazards index and socioeconomic vulnerability result.

THE URBAN HEAT ISLAND IMPACTS ON MORTALITY DURING A SPECIFIC HEATWAVE EVENT IN SÃO PAULO, SP, BRAZIL

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Heat wave events have been associated with high hospital admissions and mortality rates world

worldwide, especially in large cities. Previous studies have attributed the excess of heatwave-related mortality to the Urban Heat Island (UHI) effect. Therefore, we quantified the UHI intensity and the heat-related mortality for all-cause and stratified by age (all ages and ⩾65 years), during a specific heatwave event (26 th January – 9th February 2014) in São Paulo. In addition, we assessed the contribution of the UHI effect to the attributable deaths, and used temperature projections (1º to 4ºC) to estimate potential health impacts in the future, assuming no mitigation or changes in the population structure and adaptation to heat. In this study, the Weather and Research Forecasting (WRF) model was used to simulate the temperature based on two modeled scenarios, 'urban' and 'rural', at the height of 2m with a horizontal grid of 1km resolution. We used the Local Climate Zones map as an urban canopy parameter input to the WRF model. The model was validated against 31 ground weather stations to guarantee the best mean air temperature estimation performance across the domain. Taking this into account, we bias-corrected the 'urban' scenario by applying a linear regression with two different methods to calculate the health impact assessment. Our results show that comparing the 'urban' and 'rural' simulations, almost all deaths for all ages and the elderly, could be attributable to the UHI intensity. We also found that for the UHI-related mortality considering the bias-corrected scenarios, all the deaths were attributable to the UHI effect. When added the temperature projections to the urban simulation models, our findings suggest a significant increase in the number of deaths. These results contribute to understanding the negative impacts of the UHI intensity on health in urban areas.

PARALLEL SESSION-5 MENTAL HEALTH

Chairs: Shahnaz Basheer and Asraful Alam
Discussant: Dumitrache Liliana
Bucharest University, Rumania

EDUCATION IN RELATION TO POPULATION DYNAMICS AND HEALTH, WITH A SPECIAL FOCUS ON KOLKATA AS A DISTRICT OF WEST BENGAL

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Quality education empowers children and young people, safeguards their health and well-being, and breaks cycles of poverty. Education has positive impact on population dynamics such as population growth rate and population density, fertility, life expectancy, sex ratio etc. The study's major goal is to establish a connection between a region's population dynamics and health state and its educational status by using secondary and primary data (collected from sampled wards of Kolkata Municipal Corporation). Kolkata a district of West Bengal along with increasing literacy rate is also characterized with negative population growth rate, rise in sex ratio, remarkably low total fertility rate thus increasing elderly population. Health statistics of West Bengal indicates that mothers education level have a positive impact on having number of child but the primary survey reveals that regardless of their level of education, Kolkatan mothers tend to have only one or two kids. The primary data demonstrates the influence of level of educational development in age sex

structure of a region. The study also discussed about some specific health related problem among students that are affecting them to achieve quality education. The study will encourage researchers to investigate about the astonishing change in demography of Kolkata and will also help Government to bring upgraded population and health policies to improve the health and well-being of our population.

ACCESS TO BLUE-GREEN SPACES AND MENTAL HEALTH: A CASE OF NCT DELHI

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Rapid urbanization and the densification pattern of metro cities threaten the mental health of urban dwellers. There should be detailed information on the better mechanism to promote better mental health in such cities. In the post-2019 coronavirus disease outbreak, the need is more as most of the urban dwellers went through such concerns during the lockdown. The pandemic has negatively impacted the psychological effects, including post-traumatic stress symptoms, confusion, and anger. Furthermore, restrictions on outings and inaccessibility to green spaces have made the situation grimmer. The COVID-19 pandemic and the actions implemented to contain it present an opportunity for a natural experiment to study the relationships between nature exposure and mental health under extreme conditions. In addition, rising evidence shows that ecosystem services may significantly improve humans' mental health and well-being, particularly exposure to the natural environment (blue-green spaces). In the above framework, this study looks into how the accessibility to urban green and blue spaces has impacted the mental health of residents of Delhi during and post-Covid situations. The authors have tried to model the relationships between blue-green space accessibility and mental health during and after the Covid-19 pandemic in the NCT of Delhi using online survey data. It was found that the lockdown severely impacted mental health. However, when individuals are in contact with green spaces, it helps them to cope. People under rigorous lockdowns perceived that nature helped them deal with lockdown measures; emotions were more favorable among individuals with accessible outdoor spaces and green elements in their views. These results may assist decision-makers in devising possible future policy strategies to minimize the adverse effects, helping individuals become more resilient and retain better mental health by using the ecosystem services provided. In addition, it was observed that increasing residential distance to green space directly correlates with health benefits.

SCHOOL WELL-BEING AFTER THE COVID- 19 PANDEMIC: INTERVENTION IN THE FRANCISCO MIGUEL GOMES MUNICIPAL SCHOOL, IN MAGALHÃES BARATA

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By opening the debates on the Geography of Health with an emphasis on the school environment, the present work brings a practical result of research on the impacts of the Pandemic and on the social well-being of students in schools in Belém - Pará, with an emphasis on the opportunity of the Affective Cartography project at the Francisco Miguel Gomes Municipal School, in Magalhães Barata, in the rural area of Pará. It is necessary to emphasize that only in April 2022 did classes in

the municipality of Magalhães Barata return, with that the City Hall of Magalhães Barata in partnership with UFPa, invited the students of Degree in Geography of the year 2019 to be present in some schools in that municipality to carry out interventions in the teaching of Cartography. Aiming at the needs of active and affective intervention, without the need for individual activities, we applied a collective activity by creating a map of the region where the school was located. construction of the map, the main objective of the project was to rekindle the feeling of belonging to its space and respect for what was lost during the period of removal, aiming that the school space had become an unpleasant space after so much time isolated and the activity in a group, in a warm way, redid bonds. It is up to all, teachers and professors, to redirect work in classrooms towards critical and affective education, as a way of seeking to recover the time that social training lost during isolation. In a geographic bias, it is understood that the innumerable possibilities provided by globalization were what brought EaD as a response to these demands, however, the competitive logic extinguishes affectivity, extinguishes the notion of solidarity between individuals and encourages students in the process of character formation the primitive ideology of “Every man for himself”; in the capitalist and so unequal world, an individualistic being puts several others at risk, as important as discussing methodological practices is discussing the affective space, techniques that motivate, encourage and involve students beyond the capitalist teaching-learning relationship.

ORDINARY LEAST SQUARE BASED ANALYSIS AND MAPPING OF MENTAL HEALTH SUSCEPTIBILITY USING EXPLORATORY REGRESSION MODEL IN GIS– A CASE STUDY OF GREATER CHENNAI CITY

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The study explores the responsible factors affecting the mental health status of the construction workers which is unnoticed by government or themselves. The study also attempted to create mental disorder susceptibility map for depression and anxiety. Initially frequency ratio model has been implemented with dependent variable of Depression and anxiety and independent variable of LST, NDVI, Insomnia/Sleeplessness, Fatigue/Feebleness, Restlessness, isolation & Carelessness, Tension/Hypertension, Personal Protective Equipments, Sexual Harassments, Physical health, and Risk. Unfortunately, frequency ratio model have an area under curve (AUC) value of 55.3% and 67.7 % for depression and anxiety. Frequency ratio model explained Physical health and Land Surface Temperature (LST) shows high responsible factor for causing depression whereas Personal Protective Equipment (PPE) and LST shows high influence for causing anxiety among the construction workers in Chennai city. The variable has further analyzed using high level of statistical tools like exploratory regression (ER) and ordinary least square (OLR). The susceptibility map of depression and anxiety based on ER and OLR shows high AUC value of 92.6% and 86.8% for the depression and anxiety susceptibility map respectively. LST and PPE has high influencing factor for depression based on ER and OLS in Chennai city. Tension and LST followed by PPE has high influencing factor for anxiety based on ER and OLS among the construction workers in Greater Chennai. The hotspot analysis from susceptibility map shows that 50 wards are vulnerable towards mental health disorder of Depression and 46 wards are vulnerable towards mental health disorder of anxiety. Finally, 38 wards are identified as most vulnerable wards of Chennai city for construction workers. The overall conclusion of the study is that, LST plays major role in creating

mental ill health followed by PPE, physical health of the construction workers. The government has to take steps to provide proper PPE during construction so that they feel secure while working in the dangerous situation.

ACS: MAPPING OF THE PROFESSIONAL PROFILE IN THE IDENTIFICATION OF SITUATIONS OF RISK TO COVID-19

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The text presented here corresponds to an account of experiences resulting from an extension activity carried out with Health Agents in the city of Campina Grande between March and December 2020. The work was developed in a Virtual Learning Environment (Moodle Geoconexões) and included the participation of students and professors at the Federal University of Campina Grande (UFCG) with the objective of mapping social strategies to be developed by health agents to combat the dissemination of Covid-19. The team met virtually to define action strategies. Meetings were held through Google Meet which was attended by all team members. In the Moodle environment, through interactive tasks, agents were able to share their experiences in their daily work, reporting adverse situations. From their reports, we were able to learn a little about the difficulties and challenges of working as a health agent, these results being recorded through a booklet prepared in partnership with the Health Agents.

PARALLEL SESSION-6 INFECTIOUS DISEASES AND HEALTH GEOGRAPHY

Chairs: Adriana Dennise Rodriguez and Nayara Belle
Discussant: Ricardo Almendra & Claudia Costa
Coimbra University, Portugal

DENGUE DIFFUSION IN ESPIRITO SANTO - FIRST APPOINTMENTS

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In the last four decades, dengue has re-emerged in Brazil and consolidated as the most important arbovirus in activity. The main vector of this disease, Aedes aegypti, is currently ubiquitous in the national territory, adapted to the urban space and with a narrow relation with human beings. In addition to Dengue Fever, this mosquito can also transmit Zika Virus and Chikungunya Virus, already present in the country with a high incidence rate, among other viral diseases. Dengue diffusion occurs mainly hierarchal, using the urban network, where the cities with the highest centrality has the main role of propagation, exacerbating the local transmission context to broader geographical scales.These cities, by the particular combination of determinant factors in the local

scale,have the capability of unleash epidemics in regional scale and even in the national scales.In Espirito Santo state dengue emerged in 1995, almost ten years after reemerged in Brazil, and propagated fast to all cities, causing large epidemics and deaths. The aim of the research is to understand the path of the disease in the territory, analyzing the main drivers and the ways that the disease expanded. To achieve this objective, we collected monthly municipality data of dengue cases, deaths and the predominant serotype since the emergence, in 1995 to 2019. The data was mapped in a Geographic Information System software and produced thematic maps and index associating time, such as Permanence index (number of years with dengue cases), Intensity index (average incidence rate in the period), Epidemic Index (number of epidemics in the period) and Perseverance index (consecutive years with dengue cases). In addition, we have also used Spatial Analysis to understand the path of diffusion, by interpolating with Inverse Distance Weight the year of the first case by municipality. As result we understand that the areas with higher incidence, higher permanence, perseverance and epidemics are the areas that the disease first emerged, and holds more condition to host and maintain dengue cases, i.e. large populations, hubs in the transports systems and hotter temperatures.

HEALTH RISK AMONG MUNICIPAL WASTE MANAGEMENT WORKERS: A CROSS SECTIONAL STUDY OF SRINAGAR CITY, UTTARAKHAND, INDIA

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In Srinagar, the net volume of Municipal Solid Waste (MSW) generated is 15 tonnes per day (TPD). As compared to 2011 the waste generation is 5 tonnes per day which has increased with the increasing population. This raises considerable concerns about the potential occupational health risks that MSW professionals may encounter. Due to rising occupational concerns, manual handling of municipal solid trash is a major source of worry as it is widely practiced among the workers in Srinagar city due to the lack of technology-based management of waste. In consideration of this, the health risks of municipal solid waste workers engaged in street sweeping, garbage collection, waste processing, and rag picking in Srinagar were assessed using an interview, schedule as a data collection method. After the collection of data, statistical tools like correlation and regression were used to find out the probability of occurrence of health risk in MSW workers. The findings suggest that the garbage handling profession is dominated by men, and they have a lower literacy rate. According to the age distribution 52% of waste handling workers are between the ages of 29 – 38 years. Waste employees earn between 300 and 1133 per day, depending on whether they work on a contract or a permanent basis. Due to their casual attitude and unavailability, it was discovered that 92% of waste collectors.., 89% of street sweepers, and 99% of rag pickers do not utilize any form of protective gear, resulting in numerous types of accidents. Respiratory diseases (36%), Cuts and lacerations (84%), Muscle and ligament Sprain (88%), Bruises Abrasion and Burns (53%), Skin/ Nail Infection (94%), Eye Irritation (53%), and water-borne diseases (20%) were the most common occupational health conditions reported by various groups of garbage workers. The Workers in the waste industry are susceptible to occupational health risks, and as a result, there is an urgent need to modernize the waste management system by adopting scientific waste management techniques.

17 SPATIO-TEMPORAL ANALYSIS OF SEASONAL INFLUENZA-LIKE ILLNESS: A NATIONWIDE STUDY IN IRAN FROM 2015 TO 2019

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Lower respiratory tract infections, including Influenza-Like Illness (ILI), have been identified as the fourth leading cause of death worldwide. Given that adjacent areas significantly impact each other due to the similarity of their characteristics, Spatio-temporal clustering of ILI would help policymakers prioritize the High -risk areas. This retrospective study was conducted on data retrieved from "The Iran Influenza Surveillance System (IISS)" from 21 March 2015 to 22 March 2019; Data of 109,167 ILI patients were analyzed at the county level (n= 398). Spatial scan statistics using SaTScan™ software with Poisson probability model was used to identify ILI spatial, temporal and Spatio-temporal clusters. Finally, the maps were depicted using ArcGIS 10.8.2. The purely spatial analysis reveals that the significant concentration of ILI is in the center to the south and southeast. As well, northern parts of Iran were spotted as hotspot areas. The spatial analysis confirmed that an elevated small tourism city (Shemiranat) near Tehran had experienced many cases. On the contrary, the significant Low-clusters were spotted in the western counties. The purely temporal analysis depicts that the ILI High-rate clusters mainly occurred from November to February in all years (LLR = 21294.77, p = 0.001). Conversely, the lowest burden of ILI developed Low-rate clusters from April to August (LLR = 14076.76, p = 0.001). According to the annual Spatio-temporal analysis, the two most likely clusters (High and Low) have been detected. The High clusters were mainly distributed from the center to the east and developed during cold months (November to February) during the study period (LLR = 14421.41, p < 0.001). Besides, the Low clusters were distributed opposite, from the center to the west, from May to September (LLR = 6323.70, p < 0.001). Based on the Spatio-temporal analysis conducted in this study, we have seen High -rate clusters in elevated and lowland areas. In this regard, the High-rate and Low-rate clusters were observed mainly in the cold and hot months of the year, respectively. Detecting the High -risk areas of seasonal ILI as a High contagious disease can help health policymakers to prioritize the limited resources, especially in developing countries.

HOT SPOT CLUSTERING OF HOSPITALIZED PATIENTS WITH A PCR- CONFIRMED INFLUENZA ASSAY IN IRAN, 2016-2018

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Seasonal influenza is a significant public health challenge worldwide which can cause a devastating socio-economic burden to the communities. Identifying high-risk clusters of influenza could help countries' monitoring and therapeutic measures. This study aimed to investigate the spatial patterns of severe hospitalized influenza cases confirmed by polymerase chain reaction

(PCR) in Iran. Data were obtained from Iran's Ministry of Health and Medical Education and included all hospitalized lab-confirmed influenza cases from January 1, 2016, to December 30, 2018 (n=9146). The data were geocoded at the county level. The cumulative incidence of influenza infections was calculated using the average population of each county, according to Iran's population and housing censuses data (2016). The Getis-Ord Gi* and Local Moran's I statistics were used to explore the hotspot areas and spatial cluster/outlier patterns of influenza. ArcGIS software, version 10.8, was used for spatial analysis. Cumulative incidence and mortality rate were estimated at 11.44 and 0.49 (per 100,000), respectively, and case fatality rate was estimated at 4.35%. The patients' median age was 40 (interquartile range: 22-63) and 55.5% (n=5073) were female. Based on the monthly progression of disease incidence, influenza occurrence was higher from the end of autumn (November) to the beginning of spring (March). The hotspot analysis (Getis-Ord Gi*) revealed high-risk areas in northern parts of Iran, including Tehran, the most populous county of Iran, and the areas neighboring this district and the Caspian Sea. The monthly-based cluster/outlier analysis (Local Moran's I) shows that in the cold months (December to April) High-High clusters were detected in the northern part of the country. Moreover, Low-Low clusters were spotted in the hot months and the highest frequency of these clusters was observed in July, the hottest month of the year. Overall, influenza hotspots were more common during the colder months of the year, especially in high-elevated regions. We characterized the spatial heterogeneities of lab-confirmed hospitalized influenza cases in Iran. Detecting influenza hotspot clusters could inform prioritization and geographic specificity of influenza prevention, testing, and mitigation resource management including vaccination planning in Iran. Therefore, targeted influenza programs and preventative interventions such as immunization, screening, and treatment, are warranted.

A SUSCEPTIBILITY INDEX TO COVID-19 INFECTION IN PORTUGAL FOR GEOGRAPHICAL PANDEMIC MANAGEMENT

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The global spread of COVID-19 has resulted in the biggest pandemic of the 21st century, forcing the implementation of containment policies all over the world. Its spatial determinants, particularly those related to the economic and social elements of the territories, as well as the characteristics of the population and its mobility behaviours, have been the subject of several ecological studies using multivariate methods and geographic information systems (GIS). Few research, however, have been able to systematise this geographical knowledge in order to aid in disease containment through geographically based containment measures. For example, in mainland Portugal, non-pharmacological interventions (NPI) were mainly based on epidemiological indicators and ignored the spatial variation of susceptibility to infection. This work contends that NPI should take into account the uneven distribution of susceptibility to infection among Portuguese municipalities. Therefore, this study developed a spatial-based susceptibility index to COVID-19 infection in mainland Portugal using a GIS-multicriteria analysis that combined a linear regression, to identify spatial determinants of incidence, and a Bayesian change point analysis, to infer thresholds in the

relationships between incidence and determinants. The results corroborate that the expansion of COVID-19 in mainland Portugal had strong associations with factors arising from socio territorial specificities. The high accuracy of the susceptibility map supports the classification of muncipalities for tailored NPI depending on geographical contexts. The findings are informative for public health and a contribution to COVID-19 epidemiological research in Portugal.

TOWARDS A MALARIA-FREE WORLD FOR CHILDREN: GEOGRAPHIC PATTERNS OF PAEDIATRIC MALARIA TRANSMISSION IN NIGERIA (2008-2018)

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Pediatric malaria account for nearly about 80% of malaria related in deaths in the African region. In addition, Nigeria has the largest proportion of malaria morbidity on the continent. This paper thus examined the geographical patterns of pediatric malaria in Nigeria with a view to understanding the nature of its pattern as well as identifying its risk factors. Data on pediatric malaria cases in Nigeria for the years 2008, 2013 and 2018 were obtained from the Nigeria Demographic and Health Survey (NDHS) reports while information on risk factors were obtained from other published sources. Global Moran's I and Local Moran were applied to measure the degree of geographic clustering and identify the location of disease clusters respectively. A linear regression model was estimated to determine the effect of socioeconomic, climatic and environmental factors on the spatial pattern of pediatric malaria. There was evidence of positive spatial autocorrelation in the distribution of pediatric malaria cases while hotspots were found in different parts of the country across the years. Poverty was the most significant factor affecting the pattern of infection. It was suggested that intensive campaign awareness and poverty alleviation programmes should be pursued so as to eliminate malaria among children.

SESSION- 3

PARALLEL SESSION-7 ACCESS TO HEALTHCARE II

Chairs: Narendra Kumar and Nayara Belle
Discussant: Susan Elliot
University of Waterloo, Canada

PRIMARY HEALTHCARE ACCESSIBILITY IN THE RURAL AREA OF WESTERN DEVELOPMENT REGION OF ROMANIA

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In this paper we are trying to overlap the primary healthcare infrastructure with the accessibility to it at the scale level of rural areas in the Western Development Region of Romania. The data are collected for all the administrative-territorial units and processed by GIS methods. In general, Romania has a lack of primary healthcare units and a truly gap between the urban and rural areas in terms of healthcare accessibility and infrastructure. But even at the level of the rural environment, the disparities seem to manifest themselves, depending on the demographic size and associated with the phenomenon of metropolisation, around the bigger cities. Rural areas in Romania are still the subject of many problems and lack of utilities (whether we are talking about primary health utilities, or whether we are talking about other typologies) among the population, correlated recently with an increase in the number of elderly people and also an increase in the percentage of vulnerable people. Results will show that despite the fact that Western Development Region is one of the most economically well-ranked regions in the country, in terms of health services, there is an acute lack of primary healthcare units for the rural areas, which also consist of more favored or less favored areas, that will be discussed down below.

ANALYSIS OF PUBLIC HEALTH SERVICES IN RURAL AND INTERMEDIATE CITIES OF PERNAMBUCO, BRAZIL

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In Pernambuco, as in other states in the Northeast of Brazil, there are physiographic divisions - Mata, Agreste, and Sertão - that associates physical-natural and social historical characteristics. These territorial differentiations impose high complexity in the planning of any public policy aimed at serving the population in a universal and equitable way. This is the case of public health policy, structured through the Unified Health System (SUS). The organization of the SUS requires the implementation of a diffuse territorial structure, especially in relation to Primary Health Care (PHC), since it is the main action developed by the Cities Health Secretaries (MHS) of the smaller cities in

the state, through the Family Health Strategy as the program with the greatest capillarity in PHC. In this sense, an analysis and description of the current stage of implementation of PHC in rural and intermediate cities of Pernambuco becomes emergent. The spatialization of these services emerges as a tool to be used by municipal managers of the health sector, in order to initially diagnose the demands and needs of each part of the territory, generating an indicator of conditions of access and availability of services. Therefore, the rural and intermediate cities of Pernambuco will be selected according to the methodology developed by the Brazilian Institute of Geography and Statistics (IBGE, 2017), and classified according to the information available in the National Register of Health Establishments (CNES), which is an online open access platform of the Federal Department of Health. These data will be georeferenced in Google Earth and subsequently plotted in the free geoprocessing software Quantum Gis (Qgis), classifying the establishments by the level of complexity in health informed in the CNES. This research seeks to elucidate an applied understanding of the public policies developed by the CHS in partnership with the State Health Secretary of Pernambuco, demonstrating how cities with rural and intermediate characteristics are organized to offer and meet the demands of basic services. It is, therefore, a basic instrument for decision-making used by public managers in the organization and regulation of the supply and demand for health services in rural and intermediate cities of Pernambuco.

GIS BASED HEALTHCARE ACCESSIBILITY APPROACH AT FIRKA LEVEL IN ARIYALUR DISTRICT, INDIA

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India's healthcare facilities due to alarming increase in population comes under lack in complacency in number of hospitals. Though India has well-developed and co-ordinated system of transport that plays a crucial role in the development of economic activities which in turn promotesfair distribution of goods and services all over India leading to fair movement of people, still spatial accessibility needs to be given more attention in terms of health accessibility . In the present study the healthcare hospitals were considered and analyzed for the simplicity in the access within the district. The spatial accessibility is measured using the gravity model. The finding shows that all hospitals are currently found to be collectively located near northern part and southern part having comparatively low spatial access to healthcare facilities. Delineating the healthcare over-served areas and deprived areas within the district at firka level is done in order to improve the capability and ease of access to the prevailing healthcare facilities. Delivery of information of suitable healthcare facilities and its awareness to the layman is needed one to ensure improved and rapid access to health services in case of emergencies. Multi-criteria analysis using GIS will be very helpful in framing the study, in this context an attempt is made to find out the spatial accessibility, quantification of access to health centres along with other parameters, with the help of both spatially and statistically collected data to find out the gap areas needed to be concentrate. This study will provide worthy vision on the access to Health centres and will help in policy decisions for policy developers.

MEASURING SPATIAL ACCESSIBILITY TO HOSPITALS IN SOUTHEAST IRAN

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The most important goal of each country's healthcare system is to reduce disparities in access to healthcare services. Identifying areas with poor access to hospitals and healthcare services could help plan to improve accessibility in these areas. This study aims to measure spatial accessibility to hospitals in Sistan and Baluchistan province in Southeast Iran. We used the two-step floating catchment area (2SFCA) approach for measuring spatial accessibility to the three types of general hospital beds (licensed, inpatient, temporary) and six types of specialized beds (emergency, ICU, CCU, internal medicine, surgery, and psychiatry) hospital beds. Almost 29% of the population did not have access to any hospital beds within 30 minutes drive time. In addition, roughly 30% of the population did not have access to emergency beds, 37% to ICU, 37% to CCU, 29% to internal medicine, 36% to surgery, and 65% to psychiatry beds within 30 minutes. The detailed accessibility maps are provided. This study showed disparities in access to hospitals among counties and different types of hospital beds in the Sistan and Baluchistan province. Policymakers and local health planners might select priority locations according to the accessibility score for allocating additional beds and establishing new hospitals.

THE IMPACTS OF GEOGRAPHICAL DISTANCE, ALTITUDE DIFFERENCE AND SOCIO-ECONOMIC STATUS ON UTILISATION OF MCH SERVICES IN RUDRAPRAYAG DISTRICT

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Equality in access to health care services is an important aspect in improving and maintaining the health and wellbeing of individuals. Health and well-being are crucial components in achieving the objectives of sustainable development goals. In order to achieve maternal and child healthcare (MCH) it is most important to ensure that all women have access to respectful and high-quality maternity care, it is critical to address inequities that affect health outcomes, particularly in the areas of reproductive health. Geographical accessibility from household to health facilities is considered a major challenge obstructing the use of appropriate MCH services. Rudraprayg, is a hilly district located in north-western Himalayan state of Uttarakhand, India. The hilly region required special consideration due to its difficult geographical location. Accessibility to Adequate health services is required in order to insure safe and healthy reproductive health for the women and their children. The present study attempts to access the impacts of geographical accessibility, altitude differences and socioeconomic status on the utilisation of MCH services in the study area. The study is based on a cross sectional study design, where we adopted the interview schedule method for primary data collection and geographical distance, euclidean distance and road network distance to the nearest MCH service centre were calculated by using GPS and GIS software. A total of 36 villages were surveyed to conclude the impacts of above-mentioned variables on MCH service utilization. The multivariate regression analysis reveals that the longer distance (AOR)=0.57; 95% CI: 0.34 to 0.96) and larger difference in altitude (AOR=0.34; 95% CI: 0.19 to 0.59) was associated with lower proportion of antenatal care. A higher wealth index was associated with a higher odd of receiving antenatal care (AOR=1.67; 95% CI: 1.02 to 2.75) and health facilities AOR=2.11; 95% CI: 2.11 to 6.48 for women. There is no significant association found between the distance, altitude and wealth index with children immunization status or seeking primary health care for sick children. Achieving universal access to maternal and child health care services will require not only

strategies to increase coverage but also needed targeted efforts to address the geographic and socioeconomic differentials in utilisation of these services, especially for maternal health.

COMPARING THE POPULATION COVERAGE OF CATCHMENT AREA USING TWO METHODS IN 2SFCA METHOD ON PROVINCE/STATE SCALE IN ACCESS TO HOSPITAL

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There are two main methods to determine the catchment area in the two-step floating catchment area (2SFCA) method for measuring access to healthcare centers. 1) circular buffer with fixed distance, and 2) service area by road network analysis. This study aims to compare the population coverage of the circular buffer with the network analysis service area for the catchment area of the 2SFCA method on the province/state scale to measure access to hospitals in Sistan and Baluchistan (SB) province in the southeast of Iran. The spatial data of this study were obtained from www.openstreetmap.org. The hospital data were obtained from SB province's three medical sciences universities. We considered inpatient hospital beds the capacity of the hospital in the 2SFCA method. We used the lowest rural and urban administrative subdivisions of Iran. We considered the time in the network analysis service area 30 minutes, and for the circular buffer, we considered the catchment area 40 km, assuming the constant speed on the provincial road is 80 km/h. Based on the network analysis service area results, almost 30.7%, and based on the circular buffer, nearly 29% of the total population didn't have hospital access within 30 minutes in SB province. Almost 11% based on the circular buffer and 10.6% with network analysis service area have access to the hospital between 0 to 1 bed per 1000 people within 30 minutes. Approximately 52% based on the circular buffer and 51.7% with network analysis service area have access to the hospital between 1 to 2 beds per 1000 people within 30 minutes. Almost 8% based on the circular buffer and 7% with network analysis service area have access to the hospital between 2 to 2.5 beds per 1000 people within 30 minutes. This study demonstrated nearly a one percent difference between the population coverage of these two methods. The network analysis service area is the most appropriate and suitable method. However, in large scales such as the province or state, the circular buffer method can be approximately an actual estimate of the network analysis service area of access to healthcare.

PARALLEL SESSION-8 ENVIRONMENT AND HEALTH

Chair: Sara Lopes Moraes and Adriana Dennise Rodriguez
Discussant: Adriaan Van Der Walt
University of the Free State, South Africa

PERCEPTION OF MALARIA BURDEN IN IRRIGATED AND NON IRRIGATED FARMING COMMUNITIES OF GARUN MALAM LGA. KANO STATE, NIGERIA

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This study analyses the burden of malaria in Garun Mallam Local Government area. Data were generated through interview schedule to obtained people's perceptions in both irrigated and non-irrigated communities. It was analysed using frequencies and percentages to ascertain the malaria effect on the livelihood of condition. It was revealed that both communities opined that malaria affects individual level of income with 69% in irrigated and 57% in non-irrigated area. It was envisaged that the disease affects agricultural output as the farmer are too ill to put on their best in the farm. It restrains individual mobility and affects ones working productivity; and lowers household's budget Malaria has a significant relationship with other diseases prominently typhoid fever. The result base on the people's perception shows that non-irrigated communities have the highest occurrence of malaria with a total of 97% than irrigated area with 87%. This contrast is perhaps attributed to better socio-economic condition of the farmers that practice irrigation agriculture; facilitating relatively more use of anti-malaria and bed nets for their families.

PHYSICAL ACCESS TO MUNICIPAL ORGANIC FAIRS IN FAVELAS OF BELO HORIZONTE, MINAS GERAIS

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Favelas are regions that have not been prioritized by public policies, reflecting in the food environment and, consequently, in the difficulty of access to food, especially those produced sustainably. This research aimed to characterize the physical access to municipal organic fairs in the favelas of Belo Horizonte, Minas Gerais, identifying food deserts and swamps and making a comparison with availability, distance, and travel time of establishments that offer conventional food in these areas. The distribution of municipal organic fairs, Public Equipment for Food Security and Nutrition, and establishments providing food registered in the Treasury Department of the State of Minas Gerais for 2019 were analyzed in the 192 census sectors in the favelas of Belo Horizonte. For the Closest facility and commuting distance analyses, the buffer network of 500 meters was used. The analysis of commuting time using public transportation was also performed.

The municipal organic markets are fewer and farther from the favelas centroids. In addition to the greater distance to access the markets on foot, accessing them by public transportation generally takes longer. Thus, programs and public policies that encourage opening organic fairs and other types of establishments that offer fresh and minimally processed foods that adopt the sustainable production model in favelas areas are needed to reduce inequities of access to healthy and sustainable food in this territory.

HEALTH IMPLICATION OF DAM IN SOME PARTS OF TAFA LOCAL GOVERNMENT AREA OF NIGER STATE, NIGERIA

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Although dams have beneficial effects, they are also acknowledged as having serious environmental repercussions if they are not properly managed. The aim of this research was to examine the impact of Kofa dam in Niger State on the health status of a riparian community downstream (Kofa) against a control community (Karfe). The objectives of the study are to assess the health implications of proximity to Kofa dam and to investigate the perception of the community members located near the dam on its health implication. A convenient 3% sample size was adopted resulting to 130 respondents and questionnaires, focus group discussion and personal observation were used to elicit data. The result unveiled that communicable water-related diseases are more common in the catchment area, which were identified as malaria, water related diseases (bilharzias, diarrhea, rashes measles) and cholera among others which are mostly associated with water. Case-control study was then conducted in one community (Karfe) which is about 5km away from the experimental community in other to ascertain the health status of the communities with regards to the function of the dam. Most of the diseases identified in the control community are conventional diseases in Nigeria such as: Malaria, Ulcer, Diabetes, which invariably signifies that the diseases identified there has no correlation what so ever with the waterborne diseases found in the experimental community. The study therefore shows some degree of association between the presence of the dam and poor health status of the downstream community in close proximity to it. However, it was recommended that Government should assist in providing the community with safe drinking water so as to prevent the community from using the untreated dam water for their domestic use and provide the community with health education, mosquito netting, medical facilities and drugs to promptly diagnose and treat infected persons in the communities particularly Kofa as it is the community located in close proximity to the dam and is mostly affected by waterborne disease.

EFFECTS OF AIR POLLUTION ON POPULATION HEALTH: GEOSTATISTICAL EVIDENCE FROM PAKISTAN

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Air pollution both ambient and indoor has serious health impacts around the globe mainly in developing countries. This study aimed to provide evidence of the worse air pollution situation and its health effects on the population of Pakistan. Data for this descriptive research article is taken from IQAir and Institute for Health Metrics and Evaluation. Monthly data of PM 2.5 μg/m³ of ten different localities across Pakistan is used to show spatial distribution through the geospatial technique of Interpolation via the Inverse Distance Weighted method in the ArcMap environment. However, the rest of the historic data about main pollutants and health effects are represented with the help of charts and graphs in Microsoft Excel. The spatial distribution of PM2.5 showed a high PM2.5 μg/m³ value in most of the cities of Punjab and Khyber Pakhtunkhwa, especially Lahore and Peshawar. Air pollution remained persistent between November to February. Results revealed that the proportion of the population using solid fuel decreased but the average annual weighted PM was 2.5 and the average seasonal proportion weighted ozone kept on increasing since 1990. As a result, the mortality and morbidity attributed to solid fuel declined in comparison to PM2.5 and ozone which increased massively, causing the overall health burden due to air pollution in Pakistan. COPD has the highest mortality and morbidity burden attributed to air pollution. Lower respiratory infections, lung cancer, ischemic heart diseases, ischemic stroke, diabetes, and neonatal outcomes are the main health issues related to Pakistan air pollution. Hence, a strong air pollution monitoring system is needed, to raise public awareness and implementation of clean and sustainable policies to regulate this environmental health issue.

PARALLEL SESSION-9 HEALTH GEOGRAPHY

Chairs: Mariana Andreotti Dias and Asraful Alam
Discussant: Pilkington Hugo
University Paris, France

INCORPORATING GEOGRAPHIC CONTEXT IN POPULATION HEALTH INTERVENTIONS: CASE STUDY OF ARSENIC MITIGATION INTERVENTIONS FOR DRINKING-WATER IN RURAL BANGLADESH

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There are several overlooked challenges in accurately assessing the effectiveness of population health interventions such as 1) potential for unintended consequences (spillovers), 2) spatial variation in the effectiveness of an intervention, and 3) impact of factors at multiple spatial scales. Health geographers are well-situated to address these challenges, and not only measure spatial ‘ ‘patterns’, but also uncover the ‘processes’ underlying intervention impact, and subsequently determine the ‘context’ under which such interventions work best. By integrating theory and method

By integrating theory and methods from health geography with traditional impact evaluation frameworks, we address these challenges using a case study of large-scale arsenic mitigation interventions for drinking-water in Bangladesh. Thousands of deep tubewells have been installed in rural Bangladesh to reduce mass arsenic poisoning. While these tubewells are effective at preventing arsenic ingestion, they can have other unintended health consequences, and differential health impacts across space. We integrated groundwater and drinking-water microbial data, health and demographic surveillance data, and spatial data from over 19000 households across 142 villages in Matlab, Bangladesh to analyze health impacts of deep tubewells. Using statistical models that account for spatially-varying relationships, we found that overall, household deep tubewell use was associated with lower childhood diarrhea incidence (Odds Ratio (OR) 0.81, 95% Uncertainty Interval (UI) 0.68, 0.96). However, geographic context mattered, and environmental factors such as seasonality, being located in flood control areas, behavioral factors such as sanitation, and social factors such as tubewell ownership influenced how effective such interventions were across the study area. Additionally, there was significant heterogeneity in effect sizes, with deep tubewell use being protective in northwestern and southwestern Matlab, but not in other areas. Upon further examination of factors underlying this pattern, it was found that in addition to household-level factors, spatial variation in deep tubewell effectiveness was associated with the density of neighborhood-level deep tubewell use. Children in households using tubewells in neighborhoods where more than 60% of households used deep tubewells had significantly lower odds of diarrhea compared to neighborhoods with lower deep tubewell use (OR = 0.72, 95%UI (0.57-0.92). These results suggest that although deep tubewell use may have additional positive health benefits, those benefits are not equally distributed, and targeted distribution can further reduce childhood diarrheal disease burden in rural Bangladesh and beyond. This study highlights the importance of incorporating geographic context in designing drinking-water interventions in rural Bangladesh, and provides insights on how future population health intervention research can incorporate spatial context.

SOCIO-ECONOMIC STATUS AND HEALTH CONDITION AMONG THE E- RICKSHAW PULLER DRIVERS: A CASE STUDY

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Health has been a matter of universal concern in all times of history and have attracted to the attention of the academicians, planners, policy makers and researchers. The future of the nation lies with its healthy population and the sick population is liability. There is an important saying that 'health is wealth' and food and quality of life is considered one of the most significant pre-requisites for good health. An E-Rickshaw or Battery Rickshaw vehicle is the boon to the common man. Overall, India is the home of 1.5 million battery operated electric rickshaw, catering to over 60 million commuters users every day especially in and around metro routes and highly populated pockets. The three wheeled battery operated Electric Rickshaw or E-Rickshaw has emerged in public road transport in India and West Bengal like many parts of the country recently 4-5 years ago. The E-Rickshaw is environment friendly and has the potential to reduce the carbon foot-print. This paper is an attempt to assessment the socio-economic strength of the E-Rickshaw drivers, to

know the health status of the E-Rickshaw drivers and to know the problems faced by the E-Rickshaw drivers in the study area. The Malda district of West Bengal has been selected as the study area, known as Gateway of North Bengal, famous for mango and raw silk production. The entire research work is based on both primary and secondary sources of data. The results of the study shows that 51.23 per cent of the respondents are income daily INR 501-1000 from E-Rickshaw services, 23.45 per cent of the E-Rickshaw drivers are facing the debt problems to recovery the financial loan. The researchers find out that most of E-Rickshaw drivers are suffered from Backache, Cough and Cold (Allergy), Asthma, Rheumatic Problems, Eye irritation problems, Lungs Problems, Headache due to outdoor nature of works and continuous sitting at one place. The researchers suggested that Central as well as State Government should given the subsidized loan from public and private sector banks and other financial institution for buying new E-Rickshaw the drivers. The E-Rickshaw has the potential to reduce the fuel oil consumption for passenger transportation which may lead to both economic and environmental benefit. Mahatma Gandhi Ji says “It is Health that is real wealth and not pieces of gold and silver”.

ASSOCIATION BETWEEN GEOGRAPHICAL NATURAL HAZARD AND POSTNATAL CARE UTILIZATION FOR NEW-BORN BABIES IN INDIA: A STEP TOWARDS FULL COVERAGE USING A SPATIAL APPROACH

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Postnatal care is crucial to prevent the child mortality. Despite the improvement in the PNC coverage for new-born baby, it is still away from the universal health coverage. Along with, some specific pockets mostly are natural hazard prone area of India show very under coverage of PNC for new-born baby. Considering the substantial spatial variation of PNC coverage and natural hazard prevalence, present study aimed to examine spatial variation of PNC coverage and its association with natural hazard at the district level. Postnatal care within 42 days for new-born baby born within five years of preceding survey was taken as the outcome variable using National Family Health Survey secondary data (NFHS-5) carried out during 2019-21. Building Materials, Technology Promotion Council (BMTPC) published the third edition of Vulnerability Atlas of India (VAI) in the year 2019. This study uses the given map in the report for measuring whether a region was affected by any natural hazard (flood, earthquake, and landslide). Spatial univariate and bivariate, logistic regression, and geographically weighted regression were employed. The univariate spatial analysis showed some specific pockets such as north, east, and north-east India of India had a high concentration of natural hazard and low access of PNC coverage. Bivariate analysis also showed that PNC coverage was low in the area effected of flood (75.9 per cent), earthquake (68.3 per cent), and landslide (80.6 per cent). Compared to the national PNC coverage (81.1 per cent), all these geographical natural hazards effected areas showed low coverage. Further, logic regression showed that these hazard prone areas were less (OR:0.85 for flood, 0.77 for earthquake, and 0,77 for landslide) likely to get PNC coverage than their counterpart. LISA cluster maps significantly showed low PNC and high disaster concentration in these disaster-prone areas. Geographic weighted regression result also showed similar result. The current study highlights the significant variation of PNC coverage and low concentration to the hazardous area. The study recommends the need of intervention on these specific pockets corresponding to flood, earthquake, landslide.

29

POSTERS

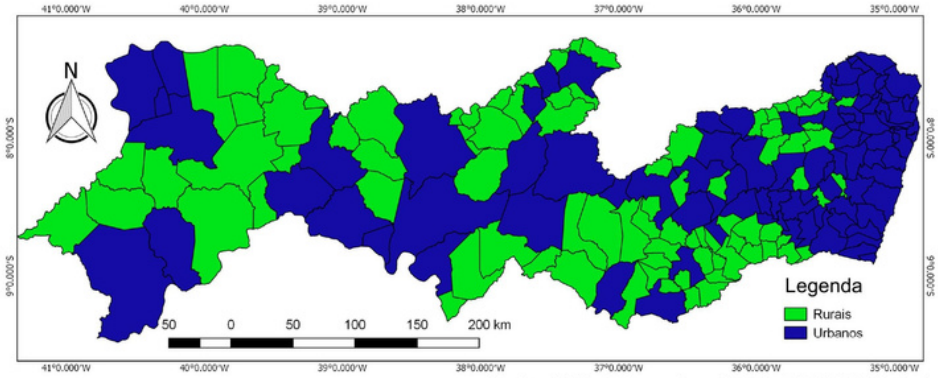
ANALYSIS OF PUBLIC HEALTH SERVICES IN RURAL AND INTERMEDIATE CITIES OF PERNAMBUCO, BRAZIL

1st Annual Online Health Geography Symposium 2022

SOARES, José Roberto Henrique Souza; BEZERRA, Anselmo César Vasconcelos; BITOUN, Jan.

This research seeks to elucidate an applied understanding of the public policies developed by the Cities Health Secretaries (CHS) in partnership with the State Health Secretary of Pernambuco, demonstrating how cities with rural and intermediate characteristics are organized to offer and meet the demands of basic services. It is, therefore, a basic instrument for decision-making used by public managers in the organization and regulation of the supply and demand for health services in rural and intermediate cities of Pernambuco, a Northeast province of Brazil.

Classification typology of spaces in Pernambuco, according to IBGE 2017



Brazilian Institute of Geography and Statistics (IBGE, 2017). Adapted.

This is the case of public health policy, structured through the Unified Health System (SUS). The organization of the SUS requires the implementation of a diffuse territorial structure, especially in relation to Primary Health Care (PHC), since it is the main action developed by the Cities Health Secretaries (MHS) of the smaller cities in the state, through the Family Health Strategy as the program with the greatest capillarity in PHC. In this sense, an analysis and description of the current stage of implementation of PHC in rural and intermediate cities of Pernambuco becomes emergent. The spatialization of these services emerges as a tool to be used by municipal managers of the health sector, in order to initially diagnose the demands and needs of each part of the territory, generating an indicator of conditions of access and availability of services.

Metodologie

Therefore, the rural and intermediate cities of Pernambuco will be selected according to the methodology developed by the Brazilian Institute of Geography and Statistics (IBGE, 2017), and classified according to the information available in the National Register of Health Establishments (CNES), which is an online open access platform of the Federal Department of Health. These data will be georeferenced in Google Earth and subsequently plotted in the free geoprocessing software Quantum Gis (Qgis), classifying the establishments by the level of complexity in health informed in the CNES.

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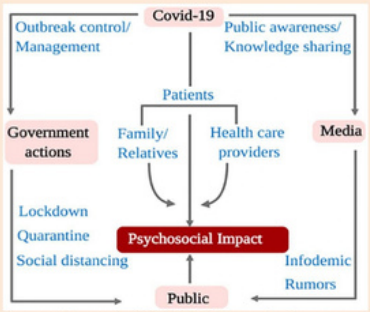
30

PREVALENCE OF MENTAL & EMOTIONAL HEALTH ISSUES DURING COVID-19 LOCKDOWN: STUDY AT WARD NUMBER 122, KMC WB

SATYAJIT BHATTACHARJEE

1st Annual Online Health Geography Symposium 2022



Source: Impact of COVID-19 pandemic on socioeconomic and mental health aspects in Nepal:
By Kritika Poudel and Pramod Subedi

The factors we can see in this diagram is a perfect stage of where we were in that lockdown time. The actions from government & Media are also creating mental illness indirectly. From that note, I can say Covid-19 Lockdown harmed badly our mental & emotional health. People of 18-30years & 30-60years, the higher study students & working groups are mentally highly vulnerable in this lockdown time, than most younger peoples & older peoples.

Objectives

- To know the Mental Health condition of people during covid-19 lockdown period.
- To understand the psychological & socio-economic problems of the residents of ward no. 122.

Methodology

Study Area Selection: My study area KMC ward no. 122 is a miscellaneous area from the concept of religion & peoples with poor to moderate economic profile live here .

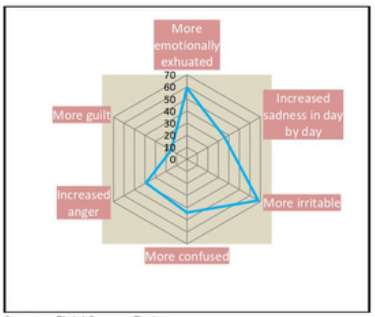
Sampling Method: I used the Purposive technique for the samplings. It is a non-random technique, what does not need any theories or set a number of participants.

Preparation of Questionnaire: Online survey questionnaire prepared on the basis of some WHO recommended questions used in previous surveys with some of self administrated questions divided in 6 sections.

Data Collection: An online survey in goggle form conducted for nearly 40 days, in June & July 2021 at KMC ward 122 via whatsapp personal, group chats & E-mails.

Statistical Analysis: I analysed the tabulated data in Cartographic representation & with their Interpretation. Statistical tools like composite index.

Different Symptoms of Mental Health Problems



Source: Field Survey Data

PREVALENCE OF MENTAL & EMOTIONAL HEALTH ISSUES DURING COVID-19 LOCKDOWN

The recent pandemic of COVID-19 acutely affected the mental as well as emotional health of people around the globe. Likewise, people of Kolkata were also suffered from the issue aforesaid. The present paper has pointed out the prevalence of mental & emotional health symptoms of KMC ward 122 peoples with some associating factors during COVID-19 lockdown period. As door-to-door survey was not possible at that time of 2nd wave lockdown period, The information has been collected using google form. The whole work is done through purposive sampling techniques.

Peoples felt more Worried, Bored, Frustrated respectively 34.47%, 30.54% & 22.17% during the COVID-19 lockdown period. 48.21% respondents were unemployed at that time, from the employed persons, 44.64% were faced economic loss & 42% of them were faced <10000 Rs. of economic loss. 65% of the respondents agreed that this lockdown period and its measures affected their mental health negatively. 69% of the youth who wants to go outside & explore their life with their works & enjoyment, surely are not in a good mental condition in their words.46% of the participants are extremely concerned about their family in this covid-19 pandemic.

Composite Index of Different Age Groups According to Different Mental Health Symptoms like Boredom, Frustration, Worries, Anxiousness & Anger issues, gave an important result of the study. People from the age group of 18-30 years have a high mental health vulnerability. the 30-60 years age group has moderate vulnerability, <18 years peoples have low vulnerability & >60 years are very low vulnerable. From this index it's very clear that the target group of prevention & treatment of mental health symptoms were the 18-30 years age group.

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Effect of COVID-19 pandemic on mental health of the health care workers By Shilpi Ghosh & Shatabdi Ghosh.

Impact of Covid 19 on Mental Health: Whether India is prepared to handle the crisis? By Sahoo, Harihar & Biswal, R. K.

The Effect of COVID-19 on Youth Mental Health: By Leilei Liang & Hui Ren & Ruilin Cao1 & Yueyang Hu1 & Zeying Qin & Chuanen Li &Songli Mei.

The Effect of Social Support on Mental Health in Chinese Adolescents During the Outbreak of COVID-19: By, Meng Qi, M.S., Shuang-Jiang Zhou, M.S., Zhao-Chang Guo, Li-Gang Zhang, Hong-Jie Min, Xiao-Min Li, M.S., and Jing-Xu Chen, M.D.

Impact of COVID-19 pandemic on socioeconomic and mental health aspects in Nepal: By Kritika Poudel and Pramod Subedi.

Mental ill-health during COVID-19 confinement: By Eva Jané-Llopis, Peter Anderson, Lidia Segura, Edurne Zabaleta6, Regina Muñoz, Gemma Ruiz, Jürgen Rehm, Carmen Cabezas and Joan Colom.

Prevalence and Factors Associated with Mental and Emotional Health Outcomes among Africans during the COVID-19 Lockdown Period—A Web-based Cross-Sectional Study: By Raymond Langsi, Uchechukwu L Osuagwu, Piwuna Christopher Goson, Emmanuel Kwasi Abu, Khathutshelo P Mashige, Bernadine Ekpenyong, Godwin O Ovenseri-Ogbomo, Timothy Chikasirimobi G, Chundung Asabe Miner, Tanko Ishaya, Richard Oloruntoba, Obinna Nwaeze, Deborah Donald Charwe and Kingsley Emwinyore Agho.

The Social Isolation Triggered by COVID-19: Effects on Mental Health and Education in Mexico: By Ana Karen Limón-Vázquez, Gabriel Guillén-Ruiz and Emma Virginia Herrera-Huerta.

Quantifying the Effects of COVID-19 on Mental Health Support Forums: By Laura Biester, Katie Matton, Janarthanan Rajendran, Emily Mower Provost, Rada Mihalcea.

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31

Social services of general interest, a factor in mortality values? A vision from the European regions

Pedro Franco e Eduarda Marques da Costa

1st Annual Online Health Geography Symposium 2022

The social services of general interest (SSGI)

are characteristic of the Welfare State, following its pillars: social benefits, education, health, housing, and labor market services (Humer, 2014). In the context of a European Union concerned with the economy and society, the reality is that regional disparities exist and are difficult to overcome. These services are a vector to combat these disparities, however, they can also aggravate them through their absence or inadequate provision (Wiśniewski et al., 2021). So, and in the context of an aging Europe, it is necessary to analyze regional inequalities in health, while including the SSGI aspect.

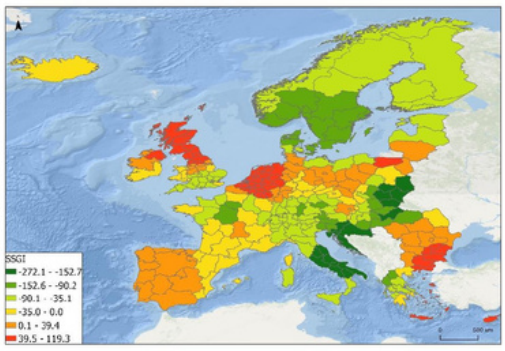

Figure 1: Regional regression coefficients for the predictor SSGI.

What we found

In this work, an analysis of regional disparities in health in Europe was developed. For this purpose, indicators referring to socioeconomic, territorial and SSGI provision characteristics were used. The results, obtained through the execution of a PCA followed by GWR, show that all factors, in general, contribute to the reduction of mortality. However, those involving Socioeconomic Conditions and SSGI note a higher regression coefficient, especially the first. Thus, it is possible to conclude that SSGI, despite not having the greatest effect on mortality, are an important factor to consider in explaining regional disparities in health.

Objective: this research aims to assess the existence of any causal relationship between the provision of SSGI and mortality.

Methodology: First, a Principal Component Analysis (PCA) was performed, where the components were extracted based on their eigenvalue (>1). Then, a Geographically Weighted Regression (GWR) was developed, where the components entered as independent variables and the mortality rate for all causes of death was the dependent variable.

Indicators: Indicators capable of reflecting the dimensions that interfere in the provision of SGI, demography, economy, politics, society, and environment (Marques da Costa et al. 2013), were collected on Eurostat for the NUTS 2, referring to 2016. These can be divided into two groups:

- **Territorial characteristics –** regional GDP (PPP) per capita; unemployment rate; household disposable income; population at risk of poverty and social exclusion (%); population density; population residing in cities with more than 500.000 inhabitants (%);
- **Provision of SSGI –** physicians per 100.000 inhabitants; nurses per 100.000 inhabitants; long-term care beds in nursing or residential units per 100.000 inhabitants; population aged between 25 and 64 with higher education (%); population aged 17 enrolled in some level of education (%); local autonomy index.

Results: The PCA showed a KMO of 0.730. Three factors were extracted, explaining about 63% of the total variance, the factor 1 Socioeconomic Conditions (28.7%), factor 2 Urbanization (21.4%) and factor 3 SSGI (12.8%).

Indicator	1	2	3
Regional GDP (PPP) per capita	**0.554**	**0.646**	0.122
Unemployement rate	**-0.696**	0.045	0.230
Household disposable income	**0.741**	0.396	0.142
Population at risk of poverty and social exclusion (%)	**-0.798**	-0.001	-0.167
Population density	-0.011	**0.853**	-0.107
Population residing in cities with more than 500.000 inhabitants	-0.050	**0.818**	0.164
Physicians per 100.000 inhabitants	-0.106	0.326	**0.689**
Nurses per 100.000 inhabitants	**0.742**	0.097	0.138
Long-term care beds in nursing or residential units per 100.000 inhabitants	**0.753**	-0.010	0.083
Population aged 17 enrolled in some level of education	0.104	0.024	**0.735**
Population aged between 25 and 64 with higher education	0.479	**0.608**	0.053
Local autonomy index	0.315	-0.337	**0.577**

Table 1: Extracted components, 1 – Socioeconomic Conditions, 2 – Urbanization and 3 – SSGI.

As figure 2 shows, residuals are not autocorrelated, so, any spatial dependencies have been removed with geographic weighting, highlighting the GWR pertinence.

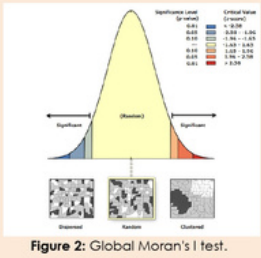

Figure 2: Global Moran's I test.

From the GWR, the predictor with the greatest effect on limiting deaths is Socioeconomic Conditions, averaging -56.4 deaths for an increase of 1 in scores. The Urbanization predictor, with an average of -22.8 has the least influence. The SSIG, with an average of -30.0 is relevant in the Nordic regions and some South and Eastern regions, as presented in Figure 1.

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32

Spatio-temporal dynamic patterns of cutaneous leishmaniasis: A nationwide study in Iran from 2011 to 2020

1st Annual Online Health Geography Symposium 2022

Neda Firouraghi, Robert Bergquist, Davidson H Hamer, Behzad Kiani

Background:

Cutaneous leishmaniasis (CL) is a wide-reaching infection of major public health concern. Iran is one of the six most endemic countries in the world.

This study was performed to provide a spatio-temporal visualization of CL cases in Iran at the county level from 2011 to 2020, detecting high-risk zones, while also noting the dynamic movement of high-risk clusters.

Methods:

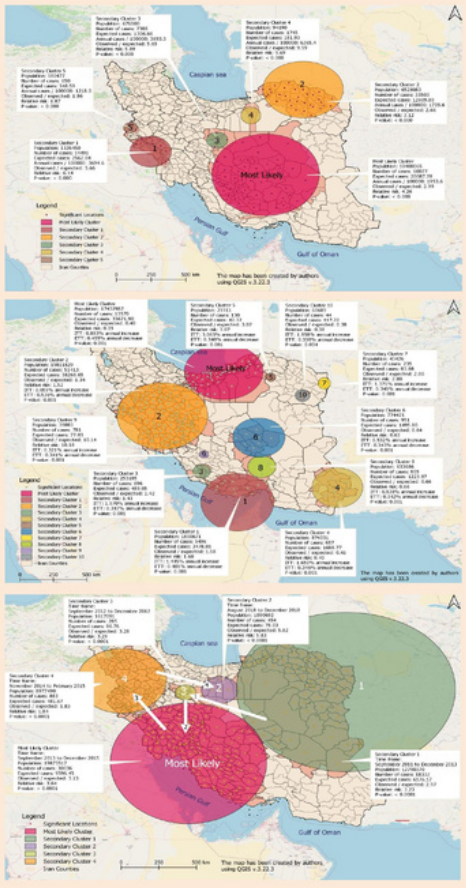
On the basis of clinical observations and parasitological tests, 154,378 diagnosed patients were included in the analysis. The patient data were aggregated at the county level. Utilizing spatial scan statistics, we investigated the disease's purely spatial, spatial variation in temporal trends and spatio-temporal patterns. At p=0.05 level, the null hypothesis was rejected in every instance.

Results:

In general, the number of new CL cases decreased over the course of the nine-year research period. In terms of location, six significant high-risk CL clusters covering 40.6% of the total area of the country were observed, with the relative risk ranging from 1.87 to 9.69. In addition, spatial variation in the temporal trend analysis found 11 clusters as potential high-risk areas that highlighted certain regions with an increasing tendency. Finally, five space-time clusters were found. The geographical displacement and spread of the disease followed a dynamic pattern over the nine-year study period affecting many regions of the country.

Conclusions:

CL can spread from endemic to non-endemic regions, especially in potential high-risk areas. These results might be considered when planning targeted interventions, such as resource allocation models, control strategies, and enhanced surveillance systems.



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This paper is being peer-reviewed at the journal of "Infectious Disease of Poverty"

33

Analysis of GreenHouse Gas (GHG) Emissions in North Africa from 1990 to 2018

1st Annual Online Health Geography Symposium 2022

Mounia Tahri, Abdelfettah Benchrif and Fatiha Zahry

Figure 1. North Africa Region (Source: https://d-maps.com/.

Conclusion

This study reports the GHGs concentrations and their emissions sectors in North Africa from 1990 to 2018. The data were collected online from the following platforms: EDGAR (Emissions Database for Global Atmospheric Research), Climate Watch, Our World in Data, and the World Bank. The analysis of data indicated that North Africa's total GHG emissions (including LUCF) grew from 384 MtCO2e in 1990 to 781 MtCO2e in 2018, which corresponds to an increase of approximately 103%. The energy sector is the primary emission sector representing 43% of total GHG emissions, followed by Electricity (13%), Fugitive emissions (11%), Transport (9%), Electricity (11%), and Agriculture (6%). The largest emitter of total GHG in North Africa (averaged over the period 1990-2018) is Egypt with 38%, followed by Algeria (25%), Libya (21%), Morocco (10%), and Tunisia (5%).

Introduction

Current global concentrations of greenhouse gases (GHGs) far exceed pre-industrial values, determined from ice cores spanning several thousand years. Between the end of the 18th century and today, the concentration of carbon dioxide (CO2) in the atmosphere has thus increased by 40%. If, however, carbon dioxide is the main gas emitted (76% of emissions), it is not the only one. Methane (CH4), nitrous oxide (N2O), and fluorinated gases also have a significant warming power, respectively 16%, 6%, and 2% of emissions.

GHG emissions in North Africa are extremely low. North Africa produces less than 2% of the world's GHG emissions despite having about 3% of the worldwide population. The total economic GHG emissions from North Africa in 2016 were 876.5 million metric tonnes of carbon dioxide equivalent. However, the region's energy consumption as well as GHG emissions have been rising since the 1990s.

Methodology

This study reports the GHGs in North Africa from 1990 to 2018. The data were collected online from four different online data platforms: Climate Watch, and Our World in Data.

- Climate Watch is an open and online data platform. Users can use the platform to access historical emissions data, and the latest historical greenhouse gas emissions data, track net-zero targets and explore nationally determined contributions (NDCs) and long-term strategies to reduce GHG emissions. (https://www.climatewatchdata.org/).
- Our World in Data (https://ourworldindata.org) is a data portal produced by the Oxford Martin Programmed on Global Development at the University of Oxford and is made available as a public good. It serves as a helpful tool for researchers, making it easy to explore data sources and analyses on a variety of topics. This meta-database is open source.

Total GHG Emissions in North Africa

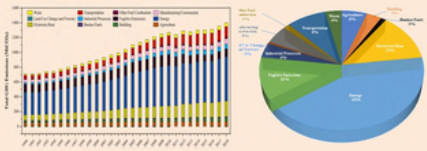

Figure 2. Annual changes in total greenhouse gas emissions by sector, and The share of each sector in total greenhouse gas emissions in North Africa, over the period 1990-2018.

CO2 emissions

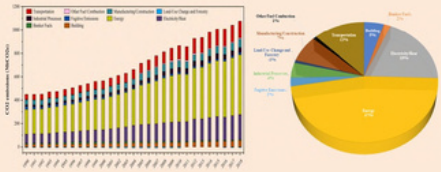

Figure 4. Annual changes in CO2 emissions by sector, and The share of each sector in North Africa averaged over the period 1990-2018.

- Egypt is responsible for 43% of the total CO2 emitted in North Africa, Followed by Algeria (27%), Libya (13%), Morocco (11%), and Tunisia (6%).

CH4 emissions

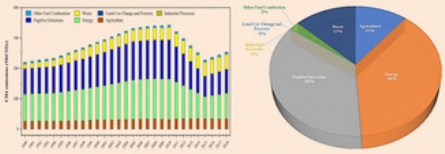

Figure 5. Annual changes in CH4 emissions by sector, and The share of each sector in North Africa averaged over the period 1990-2018.

- Libya is the largest emitter of CH4 in North Africa and constitutes 38% of the total CH4 emitted in North Africa averaged over the period 1990-2018, followed by Egypt (27%), Algeria (23%), Morocco (8%) and Tunisia (3%).

N2O emissions

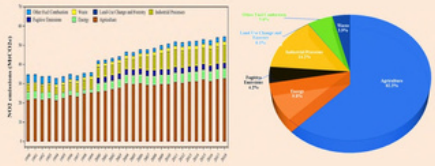

Figure 6. Annual changes in N2O emissions by sector, and The share of each sector in North Africa averaged over the period 1990-2018.

- Egypt is the main emitter of NO2 in North Africa and generates 60% of the total NO2 emissions, followed by Morocco and Algeria (19%), Tunisia (7%) and Libya (4%), averaged over the period 1990-2018.

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34

Overweight and food environment: a multilevel analysis in a Brazilian Metropolitan Region

1st Annual Online Health Geography Symposium 2022

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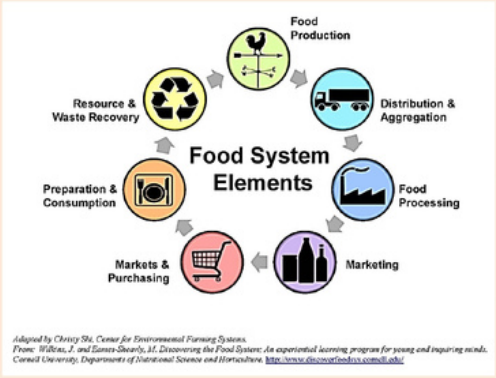

The image above shows a food system elements.
From: Wilkins, J. and Eames-Sheavly, M. Discovering The Food System. Cornell University.

Introduction

- The food system involves all processes related to food, going far beyond the act of eating.
- It is related to the results that consumption generates in the health and nutrition of people, impacting human and environmental health.
- An unhealthy food environment, in a context of high social vulnerability, can impact eating practices, increasing the risk of adverse health outcomes, such as overweight and food insecurity.

Objective

To evaluate the association of the food environment, community and consumer, on overweight among adults in the Metropolitan Region of Recife (RMR), Brazil.

The image above shows the map of the state of Pernambuco and in red the cities of the metropolitan region of Recife. From: Brazilian Institute of Geography and Statistics.

Methodology

Cross-sectional study, with individual, food environment, and neighborhood level data, in RMR/2019. Information was collected from 446 individuals, both sexes, 20 and 59 years of age; 231 food stores located in the 1.6km buffer. And census data (average income and number of people with education). Measures of the community (type and density of stores) and consumer (availability and location of in natura and ultraprocessed foods at check-stand) food environment were considered.

Results

The frequency of overweight was high, 70.9%. Each participant had, on average, 20.64±5.78 food stores in their food environment, with the highest density of stores selling predominantly ultra-processed foods (UPF).

People living in an environment with the highest density of stores selling predominantly UPF (OR=1.92; p<0.05), with the highest mean UPF sold at checkout (OR=2.19; p<0.05), with the highest mean number of soft drinks available in stores (OR=1.68; p<0.05) and availability of stuffed cookie (OR=2.26; p<0.01), were most likely to be overweight.

Conclusion

The food environment showed an association with overweight, after controlling for individual factors, requiring regulatory measures to improve the food environment and, consequently, promote greater consumption of healthy and quality food.

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35

Gender-Related Differences in Physical Activity of Medical Students

1st Annual Online Health Geography Symposium 2022

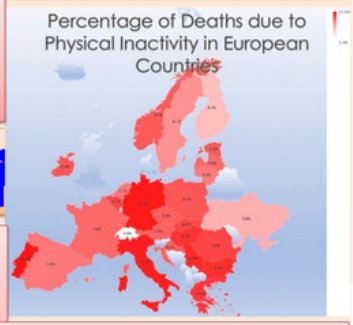
Milo Alan Puhan, Susi Kriemler, Anja Frei, Viktoriia Yasenok

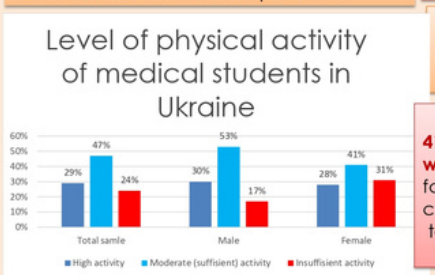
Objective of the study is to identify level of physical activity (PA) among medical students in Ukraine with talking into account the gender.

Insufficient physical activity is the 4th leading risk factor for mortality in the world. Approximately **3.2 million deaths each year** are attributable to **insufficient physical activity.**

The level of PA of the students was assessed based on a short version of the International Physical Activity Questionnaire (IPAQ). The individual value of the body mass index (BMI) was calculated for each respondent.

In European countries Physical Activity Prevalence is 63 %, but the activity of women is significantly .

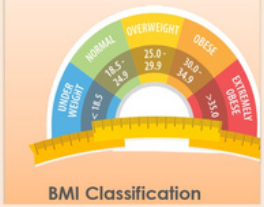




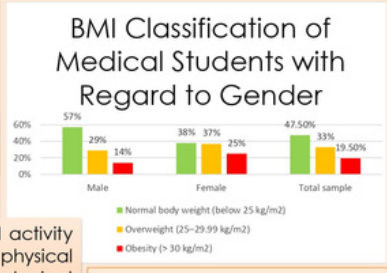
41% of students **do not walk** or use a bicycle for at least 10 minutes continuously to get to and from places.

An insufficient level of activity was found **in 31 % female students** and it is significantly higher compared to men

Less than half of the respondents have a normal body weight (47,5% without considering gender), but the **average value of the BMI is significantly higher for female students** compered to men (26,5 kg/m² to 25,4 kg/m² respectively), (p <0.01) (including cases of obesity).



BMI Classification



Findings demonstrate the need for universities to tailor physical activity promotion efforts, and to consider how gender may influence to physical activity participation. Further research should identify barriers of physical activity as well as reasons for high amounts of sedentary behavior in university students with implementation of prevention and intervention programs. The contribution of walking to get to and from places in students' physical activity and its effect on being overweight should also be explored.

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1. https://new.globalphysicalactivityobservatory.com/countrycards/
2. https://www.who.int/data/

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36

Health regulations and the geographical distribution of herbal medicines in Brazil

Marta Rocha de Castro

NATIONAL POLICY OF MEDICINAL PLANTS AND PHYTOTHERAPEUTICDRUGS (PNPMF) BRAZIL, 2006 RECOMMENDS:

- **SUSTAINABLE USE OF BIODIVERSITY BRAZIL**
- **APPRECIATION OF TRADITIONAL KNOWLEDGE**
- **STRENGTHENING OF THE NATIONAL HERBAL MEDICINES INDUSTRY**

Objectives

- Discusses the impact of the changes imposed on the regulated sector adoption of this regulatory framework elaborated by Anvisa. One of the hypotheses investigated

is that scientific and technological development establishes standards or models of health programs territories which, in turn, do not consider regional characteristics.

- investigate the geographical distribution of herbal therapy in Brazil

Metodology

A survey was conducted on the records available for the class "herbal medicines", in which a spreadsheet containing the following information was generated.

- registration number, product name, botanical name of the species, company name, federative unit in which the company is located, main activity described in the Legal Entity Register (CNPJ) and the current situation of the registration (if valid or expired/cancelled).
- From the botanical name, the origin of the species was identified in order to categorize them into native or exotic, based on information arranged in flora do Brasil (http://floradobrasil.jbrj.gov.br/). All information was arranged in an Excel Program spreadsheet® to assist in the analysis of the listed categories.

Use images

The poster should act as an ad, not a report. Do not try to bring in everything! Many posters are too text heavy. You want to attract attention and make people curious. Illustrative images allow you to remove unnecessary text and capture interest. The higher quality images the better.

Always write explanatory captions. 28pt regular (the image above shows a collaboration between women scientists)

Findings:

RESGISTROS DE 1185 PHYTOTHERAPEUTICS AT ANVISA

- 849 (72%) CADUCOS OR CANCELLED
- 336 (28%) VALID
- PRODUCT WITH THE OLDEST REGISTRATION DATE OF 2000 LOGO

AFTER THE CREATION OF ANVISA)

PHYTOTHERAPEUTICS ARE PRODUCED BY FARMACEUTICAS INDUSTRIES

ALLOPATHIC PRODUCTS THAT INCLUDE PHYTOTHERAPEUTIC PRODUCTS AS PRODUCTS

SECONDARY IN YOUR PRINCIPA ACTIVITY

MAIOR PARTE CONCENTRADA NA REGIÃO SUDESTE × ESTADO DE SÃO PAULO 37,8 % × NORTE E NORDESTE 7,4% × SUL 20% × CENTRO- OESTE 7,3%

Conclusion:

- Companies focus on the largest industrial hub in the country (largest collection)

Standards and requirements imposed by ANVISA make it difficult to stay companies producing herbal medicines in Brazil, which are sold to multinational companies or medical products companies

- Medical class resists the use of non-industrialized herbal medicines
- Exotic species mainly produced by transnational scans, such as Ginko Biloba case has more confidence for

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37

Poverty and inequality at the intra-urban scale in Vitória: the multiple layers of socio-spatial

1st Annual Online Health Geography Symposium 2022

Flora Antonia Soares Ribeiro

Introduction

Vitória is the capital of Espírito Santo, in the southeastern part of Brazil, the region with the largest population and with the largest national metropolises. Associated with large urban agglomerations, inequality makes up the landscape and everyday life in several states, as well as in Espírito Santo and specifically in Vitória.

Methodology

In this study, we seek to map and analyze the inequalities in the VMR and the layers of inclusion and exclusion from the most recent data from the Demographic Census (2000, 2010 and 2022), in which the exclusion maps serve as a scope for the construction of this analysis

Discussion

From an estructuralist perspective, we understand spatial segregation as a way of understanding the unequal and contradictory processes of capitalist urbanization, not only as a finding of inequalities and their location, but as an understanding that segregation has a social component resulting from contradictions in social relations and this reflects directly on the urban space. We start from an analysis of spatial discontinuities and heterogeneities to read intra-urban inequality as a fundamental element in understanding the current reality of the city in the Vitória Metropolitan Region (VMR) of Espírito Santo and its internal specificities, production of space and processes of organization and use of territories.

Conclusion

Through the analysis of demographic, environmental, economic, and educational dimensions, we used four indicators: housing, infrastructure and basic sanitation, economic and social. Such indicators aim to establish the absence or presence, without overlapping rights or hierarchy of importance between the elements reflected.

Picture of Vitória – ES, Brazil. 2022.

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The Social Determinants of COVID-19: a look at social and health vulnerabilities in Presidente Prudente and Botucatu - São Paulo.

1st Annual Online Health Geography Symposium 2022

João Pedro Pereira Caetano de **LIMA**

The results obtained at the end of the master's dissertation will comprise a cartography of synthesis of the vulnerabilities of COVID-19 in the cities studied and will also allow the advancement of the debates on Geography, Cartography and Health, especially in the social production of COVID-19 from the Social Determinants of Health, comprising several products that can help health and epidemiological surveillance teams in urban health planning for COVID-19 or other phenomena that can benefit from these spatial analysis methodologies.

COVID-19 reached Brazil in February 2020 and quickly spread throughout the country, reaching medium and small cities, thus, cities of great regional influence, but that are not metropolises (i.e. Presidente Prudente and Botucatu - two regional capitals), suffered great impacts with the worsening of COVID-19, because the largest amount of health equipment and professionals are concentrated in their cities, as well as the high complexity services of the health service, therefore, studying two cities in the interior of São Paulo State becomes relevant.

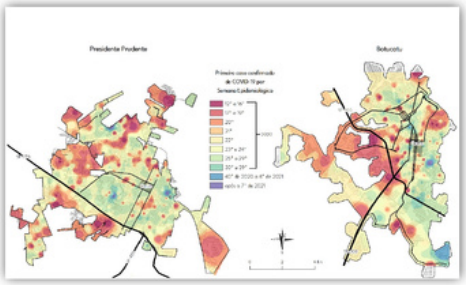

Figure 1. Spatial Diffusion of COVID-19 in Presidente Prudente and Botucatu.

In understanding the spatial diffusion of disease, clarity is needed for disease processes within cities. For this, some maps with epidemiological indicators were elaborated (Prevalence, Mortality and Lethality). In these, we already begin to observe some patterns of concentration of cases and deaths by COVID-19, but this still needs to be evidenced and crossed with some information that supports the thesis that COVID-19 reached, differently, the diverse populations (white and non-white people, the poor, the elderly, among others).

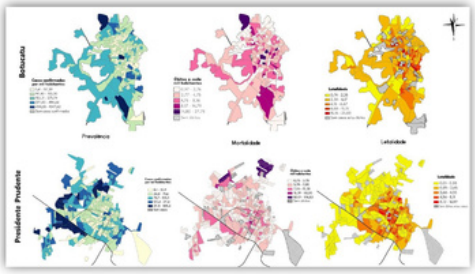

Figure 2. Epidemiological indicators from COVID-19

From this, some variables were analyzed from the 2010 demographic census in an attempt to begin to understand the possible social determinants of COVID-19 in the two cities of São Paulo. Thus, it is observed below:

Figure 3. Three Sociodemographical variables in Presidente Prudente and Botucatu

Thus, through this master's degree, I seek to understand these and other relations of COVID-19 with population characteristics, with the help of geoprocessing and spatial analysis, using spatial statistics and also the theoretical basis of Health Geography to support this hypothesis.

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A Geopackage construction in QGIS for the RIDE-DF in Brazil

COELHO, GIOVANNA*; PAES, BRUNA** and BRANT, JONAS***

Keywords: Health Geography, Public Health, Georeferencing, Geopackage.

CONCLUSIONS

The creation and availability of the RIDE-DF Geopackage will provide agility in the exchange of information and data to assist in the planning, prevention and monitoring of public health events, facilitating intersectoral and multidisciplinary action in decision-making by health surveillance managers and professionals.

BACKGROUND

The regionalization is one of the principles of the Unified Health System (SUS) of Brazil[1]. The Economic Development Integrated Region of the Federal District and Surrounding Areas (RIDE-DF) configures a geographic area that covers the Federal District, 29 municipalities in Goias, and 4 municipalities in Minas Gerais. The EPI-RIDE Project at the University of Brasilia aims to support the development of professional skills in the area of public health surveillance and response in RIDE-DF. The georeferencing as one of its fronts of the EPI-RIDE Project.

AIMS

- Simplify the compression, storage and sharing of georeferenced files such as vector and raster data;
- Provide speed in the exchange of information and data to assist in the planning, prevention and monitoring of events in Public Health;
- Facilitate intersectoral and multidisciplinary action in decision-making by health managers and professionals;
- Join the Brazilian Directory of Geospatial Data (DBDG) as a producer or provider of geospatial data, from the National Infrastructure for Spatial Data (INDE).

METHOD

A RIDE-DF Geopackage was developed using the open source geographic information system (GIS): QGIS. Geopackage is a portable and compact repository and its fundamental attribution is the transfer of geospatial information. The data sources used are the Brazilian Institute of Geography and Statistics (IBGE) and the health information systems of the SUS.

RESULTS

(the image above shows use of the RIDE-DF Geopackage. In the example we have the file "SDS_Ride", in the Browser tab of QGIS, where it is possible to observe all the data available for plotting and analysis in the software).

The creation of the geopackage included the development of data memory documentation containing the description, feature, scale, sources, and date of the last update of the years and technical information that aggregates and results in the plotting of spatial data in QGIS.

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[2]Chiaravalloti-Neto, F. (2017). O geoprocessamento e saúde pública. Arq Ciênc Saúde, 23(4), 01-02.

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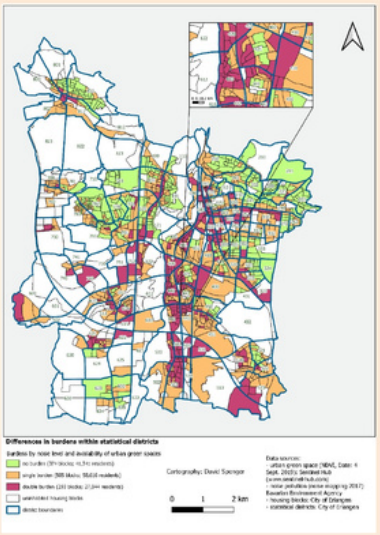
Environmental justice and urban renewal: The need for a new methodology

David Spenger

1st Annual Online Health Geography Symposium 2022



Key messages

The use of multiple burden maps in environmental justice research has proved a highly useful tool for showing areas with priority need for action but cannot capture current processes of environmental micro-segregation.

- In the course of urban renewal and redensification, a form of environmental micro-segregation occurs that takes place below the statistically measurable level and thus cannot be adequately represented with multiple exposure maps.
- We need higher-resolution survey instruments, like qualitative methods and ground-truthing, if we are to counter this effect and the concomitant invisibility of micro-scale processes.
- Thus, this study raises questions of a political ecology of health that understands health as a resource that is politically contested.

Aims of the study

Taking the city of Erlangen as an example, this study aimed at illuminating the inherence of environmental microsegregation to processes of urban renewal such as redensification and the design of new neighbourhoods.

Methodology

For analysing the distribution of environmental goods and environmental bads throughout the administrative area of Erlangen, the study first used *multiple burden maps*, combining the indicators of urban green (NDVI) and noise pollution. Also, via *ground-truthing*, local specificities could be taken into account. After that, in order to investigate the processes of environmental microsegregation, 12 *qualitative interviews* with planning actors, tenant associations and residents were conducted in two different neighbourhoods.

Results

The processes of distribution of environmental "goods" and "bads" that our study recorded take place at a scale far below any statistical unit in common use. They happen within neighbourhoods, at the level of individual blocks of houses, and they are of such a small scale that conventional analyses of social space or multiple-burden maps cannot identify them. On the contrary, as inequality increases, a levelling statistical effect occurs. When the social mix is achieved in areas with residents with high socio-economic status, the statistical key figures are depressed; in areas of greater socio-economic deprivation, they are raised. We need higher-resolution survey instruments if we are to counter this effect and the concomitant invisibility of micro-scale processes.

Insights from qualitative Interviews

"They breathe away the exhaust fumes for us" (group interview with residents, 26 June 2018).

"For economic reasons, affordable housing is often built along streets with heavy traffic. This [housing] must not exceed a certain cost, as land also has its price" (interview with Erlangen urban planning staff member, 24 May 2018).

→ Planning authorities tolerate or indeed actively envisage the resulting health burden on social housing residents

Outlook and recommendations for future research

Microscale processes of environmental injustice can be traced back the profit orientation of actors in the housing and real estate sectors; it is therefore possible, to anticipate these effects and observe areas of urban development accordingly. Multiple-burden maps can serve as a preparatory tool for identifying areas with priority needs for action. Exploratory techniques such as observations, site visits, interviews, and analysis of local media can subsequently capture specific social configurations and environmental benefits and burdens at a scale smaller than the neighbourhood level. It is recommendable to use this methodological mix in future studies on local environmental injustice and microsegregation.

Find more:
Geiselhart, Klaus and David Spenger (2023). Environmental Microsegregation: Urban Renewal and the Political Ecology of Health. Urban Planning 8(1).
https://doi.org/10.17645/up.v8i1.6057

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41

Understanding how adults with obesity participate in daily activities outside the home:

a proposed focused ethnography using geospatial methods

Pam Hung, MScOT, OT, PhD Candidate, Douglas Gross, PhD, Kate Storey, PhD, RD, Mary Forhan, PhD, OT

BACKGROUND

- Obesity is a complex, chronic disease, associated with increased rates of disability and difficulty managing everyday activities.
- Aspects of the social and built environment such as interpersonal interactions and accessibility can restrict participation in daily activities, and can negatively impact health.

Figure 1. Social-ecological model

The purpose of this study is to describe participation in everyday activities outside the home for adults with obesity and identify factors in the social and built environment that influence participation.

FOCUSED ETHNOGRAPHY

Focused ethnography	Geospatial methods
In-depth description of experiences and activities	GPS maps of activities and travel patterns outside the home.

Identify barriers and facilitators to participation by connecting locations and travel patterns to experiences.

Participants: Up to 30 community-dwelling adults (age 30-55) with BMI >35kg/m² in Edmonton, Canada

- have accessed treatment for obesity
- experience participation restrictions due to weight

This research project will be supported in part by funding from the AbSPORU Graduate Studentship in Patient-Oriented Research and the SSHRC Doctoral Fellowship.

DATA GENERATION

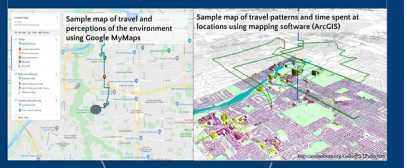
DATA ANALYSIS

Content analysis of interviews, field notes and travel diaries

Consideration of participant experiences in the context of the places and spaces that they access outside their home.

Descriptive statistics of participant characteristics, time spent outside the home and distance travelled from home.

Map visualizations of GPS data.



Anticipated results: In-depth description of perceptions and experiences of participation for adults with obesity, including activities and life roles, locations of activities, travel patterns, barriers and facilitators in the social and built environment that impact participation.

IMPLICATIONS

Increased awareness of barriers and facilitators to participation

Development of clinical practice tools and resources

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Analysis of healthcare infrastructure in Himachal Pradesh

1st Annual Online Health Geography Symposium 2022

Shamaila Fatima1*, Pennan Chinnasamy1

Conclusion:

Health is an essential component of human well being. The provision of accessible healthcare services is an essential element in the process of societal advancement. There are significant variations in the provision and accessibility of health services between rural and urban, tribal and non-tribal, and other locations throughout the many Indian states. Himachal Pradesh is a state in the north-western part of India. It is located in the Himalayan mountain range. The State's rural population accounts for around 90 percent of the total population. The mountainous terrain across the State acts as a barrier to the accessibility of healthcare institutions. As a result, the provision of health facilities in Himachal Pradesh is unevenly distributed, making inter-district variability in the State a significant challenge. The present study aimed to analyze the spatial distribution of healthcare services, including: number of healthcare institutions, number of beds, number of healthcare workers and number of patients treated, across various districts in the state. The study also aimed to analyze the state of healthcare service by preparing a composite index of various healthcare services and analyzing its spatial distribution. The datasets used for the study included the Census data and Statistical Abstract of the district. Statistical analysis has been done of the datasets and the spatial analysis has been done to visualize the spatial distribution. The study indicates that Lahaul & Spiti District performs the best in availability of healthcare services whereas Kullu, Sirmaur and Shimla district lack an adequate number of healthcare facilities.

Objective:

To analyze the spatial distribution of healthcare institutions and services across the state of Himachal Pradesh in India.

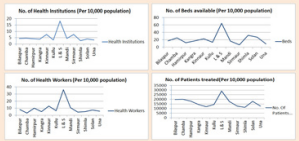
Motivation:

The availability of healthcare services is a critical component of social development. The mountainous terrain across the State acts as a barrier to the accessibility of healthcare institutions. As a result, the provision of health facilities in Himachal Pradesh is unevenly distributed, making inter-district variability in the State a significant challenge. Therefore, a study needs to be done to analyze the spatial distribution of healthcare services across the state.

Methodology:

Healthcare Institution and Services Statistics → Indicator wise Index Value Calculation → Calculation of Health Index → Spatial Visualisation

Results:



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