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Primary goal: SDG 3 Good Health and Well-Being, SDG 6 Clean Water and Sanitation

Quantification of Mosquito Repellents and Sunscreens Released into Water from the Skin

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Abstract

Background: Reducing discharge of hazardous chemicals to improve water quality aids in the global endeavor of maintaining clean sources of drinking water, as promoted by the Sustainable Development Goals (target 6.3). There has been a rising concern of emerging water pollutants, including pharmaceuticals and personal care products (PPCPs). Applying mosquito repellents and sunscreens in the summer are important recommendations to reduce risk of mosquito-borne diseases (target 3.3) and skin cancers (target 3.4), but those PPCPs could be released into water while enjoying recreational water activities. The objective of this study was to quantify mosquito repellents and sunscreens released into water from the skin. **Methods:** A hand-rinsing experiment was conducted to simulate the amounts of PPCPs that could be released from the skin. Popular insect repellents with different DEET percentages and sunscreens with different SPF levels were used for this experiment. A known amount of each PPCP was applied on a hand surface, then the hand was placed into 1 L of deionized water after different drying times (e.g., <1, 15, and 120 minutes) and submerging periods (e.g., <1, 15, and 30 minutes). Hand rinsate samples were analyzed for N,N-Diethyl-meta-toluamide, titanium oxide, oxybenzone, and other organic chemicals. **Results:** It is hypothesized that larger amounts of target chemicals will increase as DEET and SPF levels increase and time spent submerged in the water increases. It is also hypothesized that amounts of chemicals released decrease as drying time increases. Study findings would improve our understanding of contamination of drinking water sources exposed to PPCPs.

Keywords: Public health, water quality, drinking water, sunscreen, DEET

Relevant goals: SDGs

Primary goal: SDG 11 Sustainable Cities and Communities

TransAsia Perspectives of Musicking and Environmental Health: Sustainable Communities Influencing Lives in Dynamic Spaces

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Abstract

Background: From the mountainous region in Southwest China to the urban city of Chiang Mai, Thailand, and across the ocean to Thai communities in the Midwest USA, musicking provides communities for lasting relationships and connectivity for sustainability for cultural and overall community health.

Sustainability in regard to music is often discussed in and around ecomusicology, which is the study of the relationship of music and the environment. This can include the preservation of musical cultures (Titon 2013, Schippers, and Grant 2016) and regarding music and environmental issues (Allen 2010). With an emphasis on community musicking, the proposed research observes TransAsia perspectives. This research is based on ongoing projects at different progress of where I observe three communities: the Zhuang (Tai) singers of antiphonal singing in Southwest China; Thai Americans musicking in religious spaces in Chicagoland; and various ethnic minorities such as Shan, Ahka, and Karen communities uniting and finding refuge through music in Chiang Mai.

The commonality of these proposed communities is SDG 11 – Sustainable Cities and Communities; it is through musicking that communities achieve viable sustainable futures both culturally and in everyday living. Through musicking, members are able to address the needs of the overall community. The differences in the TransAsia perspectives can provide further understanding on how communities engage various issues within their dynamic spaces. These approaches lead to addressing other community issues that align with other SDGs, such as environmental health.

These case studies show the status and future research goals of TransAsia's perspectives on musicking communities and sustainable development.

Keywords: Musicking, Community, Tai/Thai, TransAsia, Sustainability

Relevant goals: SDGs 3 Good Health and Well-Being, 4 Quality Education, 5 Gender Equality, 10 Reduced Inequalities, 13 Climate Change, 17 Partnership for the Goals

Primary goal: SDG 3 Good Health and Well-Being

Child Tobacco Use and Smoking Risk Perception in South Sulawesi, Indonesia

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Abstract

Background: Approximately 21.4% of Indonesian boys and 1.4% of Indonesian girls between the ages of 13 and 15 are current cigarette smokers, statistics that fail to include children unenrolled in formal education. **Methods:** This observational study surveyed knowledge, practice, and attitudes (KAP) of N = 1,016 youth 13 – 18 years of age in South Sulawesi regarding cigarette use, knowledge of tobacco health risks, and attitudes toward smoking. N=64 urban street children (Makassar) and N=58 rural island children (Saugi, Satando, and Sepuli islands) completed KAP surveys, and their responses were statistically analyzed using chi-squared (χ^2) and logistic regressions in SAS. These results were compared to those of students enrolled in formal education (n=894) in urban Makassar. **Results:** Sex, age, schooling and environment, and friend group smoking status had significant effects on youths' decisions to smoke. Female youth were less likely to smoke than male youth (OR 0.45, p = 0.0002), and those who reported some, most, or all of their friends smoked were more likely to smoke than those who indicated that none of their friends smoked (OR 5.10, p<0.0001; OR 16.19, p<0.0001). Current or former smokers were more likely to have insufficient knowledge of smoking risk compared to those who were non-smokers (OR 0.39, p = 0.0002) and were also more likely than non-smokers to view smoking behaviors and tobacco use favorably (OR smokers 6.54, p<0.0001). **Conclusion:** More than 225,000 Indonesians die each year from cigarette-related illnesses (14.7% of all deaths). Understanding the motivations that encourage youth to smoke is vitally important to develop prevention programming.

Keywords: Cigarette, Smoking Cessation, Child Smoking, Tobacco Risk Perception, Street Children

Relevant goals: SDGs 4 Quality Education, 10 Reduced Inequalities

Primary goals: SDG 11 Sustainable Cities and Communities, SDG 8 Decent Work and Economic Growth, SDG 10 Reduced Inequalities

Perception of Potential Impacts from the Maya Train in Puerto Morelos, Mexico.

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Abstract

The Maya Train Project (MTP) is a new national megaproject in Mexico, meant to connect the perimeter of the Yucatan Peninsula and facilitate easier transportation for tourism, industry, and agriculture. Given the region's dependence on tourism, the train will accelerate the growth, as well as the social and environmental impacts of tourism in the region. Globally, the tourism industry has resulted in inequitable social and environmental impacts for the local communities, and there is concern that this new Maya Train project will serve to accelerate uneven development in the region. This project focused on the coastal tourist city of Puerto Morelos, which is a small town in the state of Quintana Roo, is about an hour south of highly urbanized Cancún City. This project used surveys, qualitative interviews with local residents and key informants, and document analysis to understand the potential impact of the MTP on Puerto Morelos. Findings from this project demonstrate the need to consider diverse impacts on local communities to sustainably plan major infrastructure projects.

Keywords: Tourism, Sustainability, Transportation, Maya Train, Puerto Morelos

Relevant goals: SDGs 9 Industry, Innovation and Infrastructure; 12 Responsible Consumption and Production

Primary goals: SDG 6 Clean Water and Sanitation, SDG 11 Sustainable Cities and Communities, SDG 8 Decent Work and Economic Growth

The Importance of Cenotes for Local and Tourist Populations. The case of the Northeastern Yucatan Peninsula

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Background: Sources of nutrient contamination, like sewage and runoff, have an impact on the Yucatán Peninsula's main source of drinking water: freshwater aquifers exposed to the surface as cenotes. Cenotes are popular tourist sites, and they are places where pollution can easily infiltrate the aquifer. The amount of nutrient pollution entering the karst aquifer, primarily from nitrogen (N) and phosphorus (P), may increase as the local and tourist populations grow. For them, access to clean water and sanitation is critical. Our research will investigate how cenotes respond to nutrient input and depth profiles of nitrate, nitrite, ammonium, and phosphate. **Methods:** Three different cenotes were studied: one that is primarily used by tourists, one that is primarily utilized by locals, and one that is not used recreationally. Based on the measured chemical and physical parameters (pH, total dissolved solids, oxidation-reduction potential, temperature, and dissolved oxygen) of the cenotes, we will compare the estimated equilibrium values. **Results:** We will be able to construct a thermodynamic model that determines whether nutrient intake is driving the chemical system out of equilibrium concerning N & P. These cenotes will be compared to pre- and post-COVID-19 measurements to see how variations in tourism due to the pandemic have affected nutrient concentrations. **Conclusion:** It is critical to assess the potential detrimental effects of tourism on cenotes, as they play an important part in maintaining human health, providing water supply, and sustaining the local economy and communities.

Keywords: Karst system, cenote, nutrient analysis, Mexico, Yucatan

Relevant goals: SDG 12 Responsible Consumption and Production

Primary goals: SDG 6 Clean Water and Sanitation, SDG 7 Affordable and Clean Energy

Sustainable Water Supply System in Illinois

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Abstract

Background: Providing clean and safe water to communities is essential in protecting the public's health. People depend on water for various functions such as hydration, cooking, and proper sanitation. Access to safe water is critical for reducing global diseases and enhancing the population's health and well-being. The United Nations General Assembly lists access to clean drinking water, as well as sanitation, a human right that is vital for good quality of life and is the foundation for meeting all human rights. The conventional centralized public water system has been widely employed to provide access to safe drinking water. However, there are concerns regarding the sustainability of the water supply. Sustainable water management refers to the ability to meet current water needs without jeopardizing the future generation's ability to do so. To improve the scientific understanding of sustainable water management, this project's objective is to analyze existing findings regarding the sustainability of public water systems in the U.S., specifically within Illinois, to learn about the public water systems that are currently being utilized. **Methods:** Data will be collected from various public water systems in Illinois and will be analyzed to determine how sustainable the current practices are and how they can be improved. **Results:** This study will provide quantitative data on water conservation, greenhouse gas emissions, energy efficiency, public health risks, and cost-effectiveness that indicate the sustainability of public water systems. The project's goal is to improve knowledge for implementing more sustainable water management practices by stakeholders in Illinois and beyond.

Keywords: Clean and safe water, public's health, sustainability

Relevant goals: SDGs 11 Sustainable Cities and Communities, 12 Responsible Consumption and Production

Primary goals: SDG 11 Sustainable Cities and Communities, SDG 8 Decent Work and Economic Growth, SDG 10 Reduced Inequalities

Studying the Social Impacts of the Maya Train Project in Puerto Morelos, Quintana Roo, México

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Abstract

The Maya Train Project (MTP) is a megaproject in México that will provide improved transportation for tourism, industry, and agriculture along the perimeter of the Yucatán Peninsula. Due to the dependence on tourism in this region, the MTP will catalyze economic and populational growth, which in turn will lead to an increase in social and environmental impacts for local communities, especially by accelerating uneven development. This study focused on Puerto Morelos, a beach town in Quintana Roo, México, is located approximately a one-hour drive south of the heavily urbanized city of Cancún. To study the potential social impacts of the MTP on Puerto Morelos, mixed methods, including qualitative interviews with local residents and key informants, surveys, and document analysis, were implemented. It was found that the MTP will likely result in numerous social impacts in Puerto Morelos. These findings suggest that to be sustainable, major infrastructure projects should consider the perspectives of local people and impacts on communities. Relevant United Nations Sustainable Development Goals for this project include promoting development-oriented policies that support decent job creation; achieving full and productive employment and decent work for all women and men; reducing the proportion of youth not in employment; devising and implementing policies to promote sustainable tourism that creates jobs; providing access to safe, affordable, accessible, and sustainable transport systems for all; expanding public transport; and strengthening efforts to protect and safeguard the world's cultural and natural heritage (source: UN SDGs).

Keywords: Maya Train Project, Puerto Morelos, social impacts, local community, transportation

Primary goal: SDG 3 Good Health and Well-Being

Prevalence, Policies, Practices and Norms Surrounding Antibiotic-Resistant Diseases in Myanmar

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Abstract

Background: The overuse of antibiotics globally jeopardizes their effectiveness by increasing selection for and prevalence of antibiotic-resistant strains. A range of practices and misuse leads to the overuse of antibiotics for human and animal health globally and leads to the expansion of antibiotic resistance. Although data on AMR in Southeast Asia (SEA) does exist, the data is largely fragmented across a range of different studies over several decades and countries or regions. *Methods:* A multifaceted approach involving surveys and focus group discussions with key stakeholders will be used to adequately assess usage and prevalence in both rural and urban settings of Myanmar and/or Indonesia. *Results:* This study is ongoing, but we expect based on existing comparable regional data to find improper antibiotic usage, knowledge gaps, and prevalent antibiotic resistance. The goal of this study is to use new data to build capacity within the nations and push for development, budgeting, and effective implementation of policy and surveillance plans to control both antibiotic usage and antimicrobial resistance (AMR) prevalence in Myanmar. In this comprehensive study, we aim to examine 1) AMR disease prevalence, 2) common practices or uses, 3) social norms surrounding AMR and antibiotic use in Myanmar, and 4) existing and absent policies. *Conclusion:* Without sufficient, country-specific data to support the breadth of this issue, it is unlikely that the necessary political preventative actions will be taken. If we are to avoid the catastrophic effects of losing this vital class of drugs, urgent investigation and preventative action are required.

Keywords: Antibiotic resistance, Public Health, Global Health, Southeast Asia, Agriculture

Relevant goals: SDGs

Primary goals: SDG 6 Clean Water and Sanitation, SDG 3 Good Health and Well-Being, SDG 8 Decent Work and Economic Growth, SDG 10 Reduced Inequalities

Behind the Scenes of Sustainable Tourism: Access to Public Water Systems and Related Health Concerns in a Popular Tourist Suburb.

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Abstract

Background: Cancun is one of the most popular tourist destinations in the world. The Mexican government aims to promote economic growth by 2024 through investment in infrastructure and sustainable and inclusive tourism (SDG 8.9) that creates jobs and promotes local culture and products. While many people migrate to Cancun areas from all over Mexico for better job opportunities, there is a rising concern that some domestic migrants have limited access to public water systems and quality drinking water. The objective of this study is to evaluate accessibility to the public water system, its water quality, and health effects in tourist and non-tourist areas in the suburbs of Cancun. **Methods:** Two methods including an epidemiologic survey and water testing have been used in this study. The survey questionnaire included socioeconomic data, access to drinking water, and health symptoms. Water samples were collected from wells (pozos), pumping stations (estacion de bombeo, carcamo), chlorine stations (estacion de clorinacion), and household and business water access points. The samples were analyzed for chlorine residuals and total organic carbon based on the spectrophotometer and *E. coli* based on the membrane filter method and compartment bag test. **Results:** It is hypothesized that access to public water systems and health conditions would be different depending on socioeconomic factors, geographic locations, and water quality. This study will address the importance of achieving universal and equitable access to safe and affordable drinking water for all (SDG target 6.1), which has been potentially neglected behind the rapid growth of tourism.

Keywords: tourism, water contamination, chlorine, total organic carbon, *E. coli*

Relevant goals: SDGs 11 Sustainable Cities and Communities, 1 No Poverty, 2 Zero Hunger

Primary goals: SDG 10 Reduced Inequalities, SDG 3 Good Health & Well-Being, SDG 4 Quality Education

Quality of Life of Children with Disabilities in Myanmar

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Abstract

Due to increased vulnerabilities, children with disabilities experience reduced access to services and barriers to attaining quality of life. Quality of life is defined as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns. Quality of life is affected by physical and psychological health, beliefs, relationships, and environment. This study aims to form a deeper understanding of the struggles and triumphs of children with disabilities in Myanmar by focusing on the intersection of public health, medicine, education, and culture. By utilizing surveys, interviews, and focus groups of professionals who work directly with this population, our work will uplift the voices of the people on the ground. One survey will be distributed among health professionals working with children with disabilities as well as teachers and parents in schools with students with disabilities. The same survey will be distributed to health professionals, teachers, and parents of children without disabilities to serve as a comparison group. The ultimate goal of this study is to enact positive change for children with disabilities in Myanmar and around the world. The objective is to assess the current state of children with disabilities in Myanmar: their quality of life, access to healthcare, and access to education. Ultimately, this work seeks to elucidate the barriers and inequalities children with disabilities face as well as to uplift a vulnerable population that is too often silenced and forgotten.

Keywords: disability, quality of life, education, healthcare, access

Relevant goals: SDG 16 Peace, Justice, and Strong Institutions

Primary goals: SDG 13 Climate Action, SDG 12 Responsible Consumption and Production, SDG 7 Affordable and Clean Energy

The Application of Green Office Standard in Reduction of Greenhouse Gas Emissions and Resource Utilization in Thailand

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Abstract

This research aimed to evaluate the emission of greenhouse gases (GHGs), in terms of carbon dioxide equivalent (CO₂e), from the resource utilization at the registered green offices in Thailand, such as private sectors, state enterprises, universities or institutions, and government organizations, among 104 registered green offices in Thailand. The problem statement of this study is to study how much a green office can reduce resource utilization and greenhouse gas emissions by implementing the green office standard. This study aims to compare the resource efficiency by implementing the green office by the activities of the sample green office registered organization in Thailand and observing the greenhouse gas generation reduction by using the resource consumption measures.

The results show that the maximum GHG emissions from the sampling green offices were highest from electricity consumption, followed by water consumption, waste consumption, and fuel consumption in 2019 and 2020. There are significant changes in the decreasing percentage before and after the application of the green office standard. From statistical analysis, as the significance level was set at 0.05, it was found that the season was a significant factor that affected the volume of GHG emissions from activities of fuel consumption, tap water use, paper consumption, and quantity and quality of wastewater at the offices on 2019 and 2020. The finding of the study of GHG emissions can be used for proposing energy-saving measures to reduce GHG emissions.

Keywords: green office, carbon footprint, resource utilization, greenhouse gas

Relevant goals: SDGs 6 Clean Water and Sanitation, Sustainable Cities and Communities

Primary goals: SDG 6 Clean Water and Sanitation, SDG 11 Sustainable Cities and Communities

Open-source controlled environment agriculture, including development of water quality system

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With the rise of urbanization and an increasing scarcity of fresh water, the world is looking towards other means to address growing food insecurity issues. Hydroponic-based controlled environment agriculture (CEA), such as some greenhouses and vertical farms, utilizes significantly less water to grow in comparison to traditional cropland. A key concern in utilizing such growing methods and in general overall around the world is water quality. In many developing countries, if water quality is checked, it is on a limited basis, requiring manual methods. In response, this presentation will present on the development of a vertical farming system, including the development of a low-cost water quality system that continuously measures temperature, pH, dissolved oxygen, electrical conductivity, and oxidation-reduction potential while also maintaining nutrient concentrations. The system is based around the Raspberry Pi microcomputer and open source software and components. Results from continuous operation of the vertical farm, including the water quality system, and lessons learned will be discussed. The water quality system could be developed into a portable water testing system and/or set up to be remotely accessed through wireless communication systems.

Keywords: Water quality, low cost, controlled environment agriculture

Relevant SDGs: SDGs

Primary goals: SDG 3 Good Health and Well-Being, SDG 13 Climate Action

Research Climate Change and Farmer Mental Health: A Community-Based System Dynamics Approach

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Abstract

Background: Ensuring the mental health and well-being of all populations within the context of a changing climate represents a global priority, as illustrated by the Sustainable Development Goals. Because of their closeness to and dependence on the land, climate change will disproportionately impact farmer mental health. However, despite global reliance on the well-being of farmers, there are few studies elucidating these impacts. This study addresses this gap by leveraging qualitative data from stakeholders and applying a systems perspective in two phases. Methods: The study is part of the investigator's dissertation and is currently taking place in farming communities in rural southeastern Iowa, which recently experienced record flooding linked to climate change. Semi-structured interviews with farmers and local mental health providers will explore varied impacts of these weather events on farmers' livelihoods. Findings from these interviews will inform later group model building (GMB) sessions, which will be conducted with farmers and mental health providers to map varied pathways and mechanisms between flooding and mental health. GMB sessions will also generate action ideas for potential interventions to mitigate adverse mental health outcomes. Expected Results: The final product will be a preliminary qualitative model that will serve as a concept-raising step that sets the scope of future agent-based and dynamic models. Conclusion: Climate change-related mental health impacts will not occur in a vacuum, and the proposed study recognizes this and the multiple systemic drivers of farmer mental health and answers calls from prominent researchers for systems-based and participatory approaches to map these linkages.

Keywords: climate change, mental health, farmer mental health, community-based system dynamics.

Relevant goals: SDGs 8 Decent Work and Economic Growth, 15 Life on Land

Primary goal: SDG 6 Clean water and sanitation, SDG 12 Responsible consumption and production

Research The Impact of Cenotes on Water Resources in the Yucatán Peninsula

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Abstract Background: Both tourist and local populations rely on the Riviera Maya's karst aquifer for fresh water. These waters can be easily contaminated due to the system's interconnecting conduits and cenotes, especially as inland tourist activities at cenotes become more popular. The Riviera Maya's coastal ecology, water resources, and economic development are all dependent on the well-being of cenotes. However, little is known regarding groundwater flow and major ion profiles in specific locations of the Yucatán Peninsula's northeastern region. Consequently, the aim of this study was to understand the flow pathways and hydrogeochemical processes within the aquifer by looking into the major ion geochemistry of three cenotes that are believed to span the Yalahau fracture zone. Methods: We examined water quality parameters and major ion profiles in three cenotes to study how groundwater chemistry varies between locations and groundwater flow regimes. Piper diagrams, stiff diagrams, and plots of major ion ratios were used for the purpose of the analysis. Results: We expect to characterize each of these cenotes in terms of their geochemistry and determine how they are connected to the primary coastal aquifer that underlies most of the region. Conclusion: An understanding of the region's hydrogeochemistry adds to the knowledge related to groundwater flow of the Yucatan Peninsula. This will provide a clue into the potential impacts of tourism, patterns of potential contamination, groundwater withdrawal, wastewater injection, and access to freshwater, contributing to issues of clean water and sanitation, as well as responsible consumption of resources in the region.

Keywords: groundwater resources, Mexico, cenote

Relevant Goals:

Primary goals: SDG 6 Clean Water and Sanitation, SDG 10 Reduce Inequalities

Role of Data in the Provision of Accessible Toilet

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In Indonesia, approximately 25 million people do not use toilets; the condition may worsen in disaster-prone areas. With the fragile structure of the building, many of the survivors lost their houses, including toilets. Without a toilet, many choose to go to the mosque or public toilet, and some do open defecation in the fields. It exposes individuals to greater sexual exploitation as well as being a public health concern. The provision of sanitation to populations affected by natural disasters is one of the most urgent and indispensable forms of aid. Unfortunately, not all groups in the community have access; vulnerable groups such as women, the elderly, and especially people with disabilities are often left behind. The main reason is that they are not recorded in the database, and this situation increases their vulnerability.

The Sphere standard is a common reference point in humanitarian response, where sex-, age-, and disability-disaggregated data (SADD) are collected. Additionally, to improve efficiency and accountability, all of the data were gathered with a digital questionnaire. The questions asked don't just stop at "Do you have a disability?" but a deeper exploration is carried out by asking the type of disability and their preferences in relation to the toilet. Responding to human needs and differentiating risk within affected populations is important, as different segments have different needs and face different barriers. SADD allows agencies to target assistance more efficiently and to provide programming that is more specific and effective to particular populations, especially people with disabilities.

Keywords: Accessibility, Toilet, Sanitation, Household, Post-disaster

Relevant goals:

Primary goals: SDG 1 No Poverty, SDG 3 Good Health and Well-Being, SDG 10 Reduced Inequalities, SDG 11 Sustainable Cities and Communities

Harm Reduction Practices to Address SDGs 1, 3, 10, and 11

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Narrative

This presentation will present evidence that harm reduction practices are effective in addressing Sustainable Development Goals 1 (no poverty), 3 (good health and well-being), 10 (reduced inequalities), and 11 (sustainable cities and communities). Harm reduction practices are based on the philosophy that people who use drugs deserve respect and consideration in health policy. These practices aim to reduce potential negative consequences of drug use in any form, whether by intravenous injection, smoking, snorting, or oral ingestion. Some forms of harm reduction practice are needle, pipe, and naloxone distribution, education for and by drug users, equal healthcare access, and safer injection sites. As a primary prevention public health strategy, harm reduction improves health outcomes by reducing skin and soft tissue infections, reliance on emergency room services, communicable disease transmission, and death from overdose.

I will present data from my field work among unhoused people who use drugs in Chicago alongside international studies. There is ample qualitative and quantitative evidence that harm reduction practices improve drug users' health and well-being, reduce inequity in healthcare access based on income, and increase safety in urban areas. The criminalization of specific drugs has worsened inequality and poverty among racialized communities in urban centers. Harm reduction practices are an important example of how primary prevention strategies are necessary to reduce poverty and social inequalities while improving cities' health and sustainability. Opioid and street drug use has no national borders. Therefore, the SDGs must take into account the needs of people who use drugs in urban areas.

Keywords: harm reduction, drug use, health promotion, opioids, health equity

Relevant goals:

Primary goals: SDG 6 Clean Water and Sanitation, SDG 10 Reduced Inequalities, SDG 16 Peace, Justice, and Strong Institutions.

Sustainability From a Complexity Lens

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Narrative

My motivation to pursue sustainability-related work comes from my experience working on several engineering projects as a research assistant in the engineering department and an MA student in the sustainability program at Wake Forest University. I have studied the accompanying societal impact of this process that is often neglected in the undertaking of major engineering projects. More specifically, I am interested in projects that have the potential to have a positive impact on the living standards and development of any given community, illustrating the critical bond between human beings and their environment. Exploring and implementing drinking water and wastewater treatment technologies to reduce the harmful impacts associated with the ingestion of water having chemical and/or microbial contaminants helped to acknowledge how technology-driven solutions can become a means to implement social equity. Furthermore, concepts such as social justice drift to environmental justice, and new perspectives appear that redefine our way of understanding fundamental issues of community development. Such understanding could lead to the transition from an Anthropocentric Era to a more Biocentric Era that recognizes all the biotic and non-biotic organisms that compose the Earth Ecosystem, and that work in concert with each other to make life sustainable. If we began by establishing the social and environmental impacts of major engineering projects, instead of just the economic effects, we could provide a shift toward an integration of economic, social, and ecological facets of society and away from the more singular focus of an economy-based system.

Keywords: environmental justice, Earth ecosystems, economy-based system, biocentrism, and anthropocentrism.

Relevant goals:

Primary goals: SDG 3 Good Health and Well-Being, SDG 10 Reduced Inequalities, SDG 1 No Poverty, SDG 9 Industry, Innovation and Infrastructure

Assessing the Outlook: A Review on the Global Burden of Blindness

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Narrative

Vision impairment is often a severe toll on quality of life; however, many causes of visual impairment can be prevented or treated. With age being a primary risk factor³ for several ophthalmic conditions, the demands for global eye care will continue rising with the aging of the population, and populations will shift towards predominantly non-communicable diseases. ¹ An estimated 38.5 million people are currently blind globally¹, with greater than 50% of cases being due to treatable causes such as uncorrected refractive error or cataracts. ^{1,3,5} Trachoma, from *Chlamydia trachomatis*, persists as the leading cause of infectious blindness worldwide, with an estimated 21 million people with active disease and over 2 million individuals who are blind from this disease.⁶ This disease is preventable with improved sanitation and antibiotic distribution. Many countries throughout the world, particularly Africa, are still plagued by endemic trachoma. However, some Asian countries, such as Myanmar, have been heralded for nearly eradicating disease.⁹

It has been well documented that blindness not only impacts the individual, but it also impacts entire families as family members are also forced to adapt—often sacrificing lost wages.⁴ One study even found that most of the costs associated with being blind are due to increased costs of residential care. ⁸ Cataract surgery and lens distribution remain among the top interventions for return on investment strategies to implement in low- and middle-income countries. ^{2,7}

There remains a need for further intervention and international outreach to address avoidable vision loss, improve overall health, and reduce inequalities and access to care.

Keywords: global, outreach, ophthalmology, cataract, trachoma

Relevant goals: SDGs

Primary goal: SDG 3 Good Health and Well-Being

Promoting Health and Wellbeing of Infants and Medical Staff in the Neonatal Intensive Care Unit (NICU) by Reducing Noise

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Narrative

In hospital systems, sound levels in neonatal intensive care units (NICUs) can negatively impact neonatal health as well as hospital staff well-being. Many hospitals in the United States surpass recommended average noise levels, fail to monitor noise levels, and do not have noise monitoring protocols. Noise levels in the NICU can result in physiologic responses and an alteration of infant health stability. High noise can also contribute to fatigue among staff, as well as decreased accuracy and productivity. The risk factors for noise in the NICU are discussed, including medical equipment, the built environment, behavioral and social risk factors, and policy factors. Environmental, behavioral, and policy solutions for noise levels are presented. The ideas created through this report may be used to reduce and monitor sound output in the NICU, which will encourage healing and recovery in neonates and promote reduction of medical mistakes and wellness in hospital staff. Future endeavors include implementing these noise protocols in the NICU environment in a stepwise fashion to determine the impact of each protocol step in reducing noise and promoting staff productivity.

Keywords: NICU, noise, sound levels, hospital, neonatal health

Relevant goals: SDGs 8 Decent Work and Economic Growth, 9 Industry, Innovation and Infrastructure

Primary goals: SDG 12 Responsible Consumption and Production, SDG 13 Climate Action

Recycling in the Operating Room

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The Sustainable Development Goals that will be discussed are goal 12, responsible consumption and production, and goal 13, climate action. These goals will be discussed through recycling of medical plastics in the operating room (OR). While the larger overarching problem is the impact plastics have on our environment, the implementation of recycling in the OR is a small, yet instrumental, step in bettering the health of our environment. This implementation would provide enormous benefit if implemented nationwide. The health care sector is the second leading contributor to waste in the United States, producing more than 4 billion pounds of waste annually, which equates to about 30 lbs of waste a day per patient (Martin, D. M., 2017). Operating rooms specifically have a large environmental impact; in fact, they account for 20 to 30 percent of all hospital supply costs. A large majority of the products used in the operating rooms are single-use disposable plastics, for which many are eligible for recycling. A few examples of medical plastics that can be recycled are sterilization wrap and blue wrap, irrigation bottles, IV bags, flexible clear packaging, basins, and pitchers.

The excessive consumption and production of plastics have become a major public health issue. Plastic is composed of synthetic organic polymers that are used in a wide variety of items such as water bottles, clothing, food packaging, medical supplies, and electronic goods (OA, *Public and environmental health effects of plastic waste disposal: A review*). Once these plastics have served their purpose, they are thrown out; in the best-case scenario, they end up in a landfill where they take decades to break down. Unfortunately, this is not the case. A large quantity of plastics finds its way into our environment, such as the oceans, where it has detrimental adverse effects on marine life and other living systems.

Recycling of medical plastics is a great step to begin greening the operating room and becoming more environmentally responsible. It is evident that large corporations must implement initiatives that promote the well-being of the environment in order to see major changes take place. Additionally, it is important to examine the way in which one lives and implement sustainable living habits where necessary.

Keywords: Medical plastics, operating room, consumption, environment, sustainable

Relevant goals: SDGs 14 Life Below Water, 3 Good Health and Well-Being, 15 Life on Land

Primary goals: SDG 16 Peace, Justice and Strong Institutions; SDG 17 Partnerships for the Goals

Practice: Incorporating the Basics of International Humanitarian Law and Humanitarian Aid in MPH Curriculums

Katrina Jacoby

Health care professionals often respond during times of distress and disaster to deliver humanitarian aid. These disaster scenarios may mean natural disasters such as floods or earthquakes but may also include other threats to human life such as armed conflict. Most American Master of Public Health programs have a variety of concentrations such as epidemiology, biostatistics, environmental health, and health administration. Each intends to send students into the world with the ability to contribute to creating a healthier global population. I chose global health as my concentration because I wanted to understand health from an international perspective. However, I feel that my curriculum is lacking and not teaching me how to appropriately handle international crises—work that I intend to partake in post-graduation. After evaluating several of the top MPH programs in the country with global health as a concentration, I believe that MPH students are not prepared to work effectively in challenging environments where aid is necessary. No university evaluated offered or required coursework on the development and implementation of the basic principles of humanitarian aid and/or international humanitarian law. Though not technically health topics, they give students an understanding of how to effectively operate as both a health professional and humanitarian aid worker. In addition to creating a lack of efficacy among responders, this gap in knowledge can land workers in situations that can prolong or contribute to current conflicts, disasters, social issues, and inequalities. This can put their lives and the lives of other aid workers in danger. Providing and requiring at least one class on the fundamentals of humanitarian aid will create more versatile and prepared future health professionals.

Keywords: Humanitarian, Aid, International Humanitarian Law, Global Health, Disaster, Conflict

Relevant goals:

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