



Northwestern Public Health Review

Public Health Matters

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About the Cover



Kate Lamy

When it came time to choose an article to illustrate for this issue, I was torn between several topics that were both intriguing and hit home on a personal level. I came across Nelly Papalambros' article, "Sleep as a Public Health Issue", and was interested in how the public health issue of sleep deprivation affects us on both an individual and biological level. While reading, I was surprised to

find harrowing statistical evidence for how sleep deprivation affects us on a social and economic level as well. I have struggled with insomnia for most of my life, and as I'm sure my classmates would agree, being a graduate student does not help to diminish this problem. Therefore, I decided to illustrate a sleep-deprived woman with emphasis on what our sleep affects the most – the brain. This article gave me the opportunity to understand this important organ's role in sleep, the effects of insomnia on our quality of life, and how this condition can dramatically affect society at large. Papalambros brings our attention to this public health issue, so that we may remedy other important public health concerns. Keeping public health in mind, a more informed audience may be the first step in curtailing sleep deprivation. With this valuable information, we can start leading healthier lives, one well-rested step at a time.

-Kate Lamy

Kate Lamy is an artist from the Chicago area. She graduated with a Bachelor of Fine Arts in Painting from the University of Illinois at Urbana-Champaign in 2010. She is currently working on a Master's of Science in Biomedical Visualization at the University of Illinois at Chicago, a program that brings together the communicative power of illustration and medicine. When she is not in class, doing research, or working on a project, you can usually find her sketching, reading fiction, or playing chess online.

You can see more of Kate's work at her website (<http://clamy2.people.uic.edu>) or her blog (<http://lamykate.wordpress.com>).

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About the NPHR

The Northwestern Public Health Review (NPHR) is a student-run academic journal. Our goal at the NPHR is to take you behind the scenes of public health and provide a simple platform for students and faculty to share their public health perspectives, ideas, and original research. We welcome you to share your comments, thoughts, research, and stories with us at www.nphr.org or on our blog (<http://nphr.wordpress.com/>).



Letter from the Editors

We are delighted to welcome you to the second edition of the Northwestern Public Health Review (NPHR). We have come a long way since our first issue, and it has been an exciting journey. Among other things, we have started a highly active public health blog (<http://nphr.wordpress.com/>), hosted the first 'Public Health Matters' reception, and started a growing public health bookshelf that highlights new and innovative public health works (<http://www.publichealth.northwestern.edu/nphr/bookshelf.html>). Perhaps most significantly, we have grown from two student editors to a diverse and dynamic editorial board consisting of 18 students and faculty members, drawn from various programs across the university. Working together, we pledge to continuously bring you the most insightful and engaging public health stories and perspectives.

We are thrilled that the Northwestern community has taken a strong interest in the publication, as manifested through recent contributions and partnerships between various programs across the University and the NPHR. We are deeply indebted to the Northwestern International Program Development, the Driskill Graduate Program, and the Program in Public Health, for providing the funds necessary for the printing of this edition. Specifically, we would like to thank Janka Pieper, Dr. Steven Anderson, and Maureen Moran for their constant and consistent support of the journal. This publication would not be possible without the overwhelming support we have received from the Northwestern community.

One of our major goals in founding the NPHR was to provide a common platform for the diverse array of fields that are involved in public health, and to share ideas and resources among these fields. In this edition of the NPHR, we are very pleased to expand our list of contributing authors and subject matter to include not only biologists and physicians but also engineers, economists, and neuroscientists.

In this current issue, we focus on *the untold stories in public health*, highlighting reflections, histories, and research on issues that are not publicized as widely as others in the field of public health. Specifically, we explore the role of jails as mental health institutions, the creation of the atomic bomb commission, the neuroscience of sleep and its impact on health, as well as a reflection on the public health problem of texting and driving. We hope you enjoy reading each of these unique pieces as much as we did.

Finally, we would like to personally thank each of the contributors in this issue for their patience and intellectual investment in the NPHR. We also want to thank every member of the NPHR board for their labor of love that has made this edition the richly rewarding collection that it has become.

Sincerely,

Celeste Mallama and Osefame Ewaleifoh
Editors-in-Chief

On behalf of the NPHR board



Elise Walker, BME Graduate Student, Northwestern University

Jails as Insane Asylums: The growing need for correctional centers to operate as mental health facilities

Arvin Akhavan

A year ago, I met a man at a psychiatric hospital in greater Chicago. He was pleasant, polite, well-groomed, educated, and seemed to have a strong will to fix a life that was derailed less than a decade earlier by the onset of mania in the context of bipolar disorder, and complicated by a slew of psychotic features. ‘Andy’ also had HIV, and had continuously refused treatment while in and out of jail for the past several years. His manic episodes expressed themselves as threats to the president and other elected officials, assaults on police officers, and harm to loved ones. Needless to say, these episodes landed him in jail multiple times throughout the past decade. ‘Andy’ reported little to no mental health treatment while in jail, and had now presented himself, while in remission, to get the help he needed.

The press has extensively documented the shift of our mentally ill from institutions to correctional facilities—and for good reason. The number of jail and prison inmates who are mentally ill is remarkable. Studies show that up to 15% of newly presenting inmates in county jails have severe mental illness [1]. Over half of all jail inmates can be classified as mentally ill [2]. These staggering numbers cannot be ignored. They demonstrate why Cook County Sheriff Tom Dart has called jails “the new insane asylums” [3]. These numbers show that jails are mental health institutions and they should have the ability to act as such.

Initial barriers

Many of the barriers to the implementation of mental health care in the jail system involve the identification of inmates or their illnesses

in central intake, when the arrested person is evaluated on initial presentation to the jail. The lack of health records is an obvious problem, as psychiatric evaluations are time-consuming and diagnoses may have been made previously. Records of such previous diagnoses would provide health care professionals with the opportunity to focus on acute exacerbations of illness as opposed to performing a redundant initial diagnosis. Electronic county health records go a long way towards solving this problem, especially when they are tied to the public hospital system. Furthermore, diagnostic codes for reimbursement are limited to fewer diagnoses in the public sector than they are in the private sector. This can affect the diagnosis and treatment of mentally ill individuals in places where these restrictions keep physicians or providers from practicing with a holistic biopsychosocial model, which takes into account the biological, psychological, and social factors that play a role in illness.

After mentally ill inmates present to the jail, their treatment is limited by the type of personnel available and qualified to provide care. Many successful institutions have found that having dedicated police personnel for the jail's psychiatric census is essential to providing a healing environment. As one jail psychiatrist remarked to me, police officers are rightfully trained to detain, not to heal. While this training is sufficient to work with inmates, it is not appropriate for working with patients. Dedicating personnel to mentally ill inmates allows for a shift in jail culture regarding mental illness, and reduces rates of incidents and accidents related to those illnesses. In one jail system, this new training was so successful in affecting cultural change that the program was extended to include all officers.

Hospital collaboration

Even if diagnosis and identification are made and if officers are trained to treat patients, jail

medication formularies are sometimes insufficient to cover severe mental illness. Most jails only have access to older psychiatric medications, as newer and more effective drugs take time to become generically available. For example, although selective serotonin reuptake inhibitors (SSRIs) are now present on most jail formularies, newer antipsychotic medications have yet to become generic, and inmates are given older antipsychotic drugs that are less effective and have more serious side effects. Similarly, hospitals and other

These numbers show that jails are mental health institutions and they should have the ability to act as such.

health care providers must be accredited by the Joint Commission in order to receive federal funding, including funding from programs such as Medicare and Medicaid. This means that they must meet national standards for medical and psychiatric care in order to get paid. County jails, on the other hand, have inspections from the Department of Justice, state oversight, and the National Commission on Correctional Health Care (NCCHC), but they do not have any mandate to follow the recommendations provided nor do they lose potential funding for not meeting certain standards. For example, the NCCHC provides recommendations, but has no legal power to penalize correctional facilities for not following them. Legally, the approach to psychiatric care in jails is closer to that of a correctional institution than a hospital.

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In speaking with psychiatric health workers at different jails, it became apparent that certain institutional frameworks seem to better approach these problems. The Dallas County Jail system, for example, was at one point a model of medical and mental health disaster, having failed seven state inspections in a row. The jail's screening and care process, along with non-medical issues of safety, was so poor that it led to a higher than usual number of inmate deaths that prompted a federal civil rights investigation [4]. In the middle of that seven-year stretch, the county jail made a drastic change in the way it runs its health care, and has now passed three county inspections in a row, likely saving hundreds of

millions of dollars in the process.

In 2006, this jail system partnered with its county's hospital system, tasking the hospital with providing all medical and mental health services. In doing so, the hospital was able to bring on staff, such as officers and health care workers, that were dedicated to mental health inmates only. All of these personnel, officers included, took courses on how to manage and handle psychiatric patients with treatment in mind, as opposed to detainment—a welcome change in culture at the jail. This program was so successful that the county now requires most of its officers to take this course. Furthermore, this dedicated staff inherently provides devoted care for the inmates that screen positive for mental health issues. Psychiatric faculty at the jail, who are also employees of the hospital system, have thus made great strides in obtaining dedicated psychiatric space and facilities. Since the hospital has full treatment responsibility for these inmates, the psychiatric and medical services at the jail now have full access to the county hospital's electronic medical record and medication formularies. This way, the jail can better identify repeat mental health inmates at intake and also treat them with the same resources that hospitals are required to have available under federal regulation.

Towards treatment

The paucity of resources that address mental health in correctional facilities is central to the problem with many current jail systems and their approach to the mentally ill. The question we have been asking is whether mentally ill inmates should have access to resources. Rather, we should be asking how to get them those resources in a way that keeps them safe and out of correctional facilities.

In a jail system more focused on mental health diagnosis and treatment, 'Andy' would never have made it three years without an aggressive plan for his condition. Once a successful, college-educated member of society, his life had been derailed by the strange and sudden onset of an illness over which he had no control. As a result, he ended up in the correctional system. Once there, the help he received and the resources available to him were insufficient. He stayed there for years, wedged into a situation

where it was impossible for him to right his life. In a system of detainment, 'Andy's' story is the rule rather than the exception. His tale represents the nearly one-third of detainees that present to major city jail systems in dire need of psychiatric help. Like 'Andy', many of them do not get that help. They are detained. As mental health service is made an integral part of correctional facility operations as opposed to a necessary adjunct, the rule should fortunately evolve from detainment towards treatment.

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The Affordable Care Act and Public Health

Neil Jordan, PhD, and Philethea Duckett, MPA

In March 2014, we marked the four-year anniversary of President Obama's signing of the Patient Protection and Affordable Care Act (PPACA), commonly known as the ACA. It is worth noting that the ACA is designed to realign and encourage collaboration between the public health and health care systems. With the legislation's focus on insurance reform and health system reform, the ACA includes several provisions that have important implications for public health. The ACA also directly influences public health through the creation of the Prevention and Public Health Fund, the nation's first mandatory funding for public health, and the first National Prevention Strategy, a sweeping development program that for the first time focuses on individual behavioral choices and the social determinants of health. In this article, we will highlight some of the features of the ACA that directly or indirectly target public health, though it is too soon to say what effect these measures will have on the health of Americans.

Preventive healthcare services under ACA

While the principal goal of the ACA is to improve access to the traditional health care system via expansion of affordable health insurance options, there are specific provisions that expand access to primary and secondary prevention services such as immunizations and regular disease screening. Most health plans are now required to provide preventive health services to plan members without charging a copayment or coinsurance (even if the annual deductible has not been met) as long as those services are delivered by a provider within the plan's network [1]. Preventive health services included on this guaranteed list are blood pressure and cholesterol screenings, cancer screenings such as colonoscopies and mammograms, and immunization vaccinations for adults and youth (e.g., flu, measles, and mumps). Several behavioral health interventions are also covered at no cost, including alcohol misuse screening and counseling, depression screening, and tobacco cessation counseling and interventions. The ACA also requires free provision of Food and Drug Administration-approved contraceptive methods, although this becomes more complicated for employers with a religious objection to contraception.

New initiatives: The Prevention and Public Health Fund and the National Prevention Strategy

The ACA explicitly called for two initiatives to promote prevention and public health: the Prevention and Public Health Fund and the National

Prevention Strategy. The Prevention and Public Health Fund (PPHF) is a funding source established to provide expanded and sustained federal investments in research; surveillance and tracking; and public health infrastructure, workforce, and training. Dedicated funding helps ensure that public health and health care systems are not competing with other government departments for scarce resources. The PPHF contributes to a number of programs, including the National Prevention Strategy, and locally-based grants such as the Community Transformation Grants and the National Public Health Improvement Initiative.

The National Prevention Strategy was developed by the Surgeon General alongside multiple stakeholders, including the heads of seventeen federal agencies and the public, with the overarching goal of increasing the number of Americans who are healthy at every stage of life. The National Prevention Strategy identifies four strategic directions and seven strategic priorities (Figure 1) in order to increase the health of all Americans. The report provides recommended policy, program, and systems approaches for each strategic direction and priority.

One example of a strategic direction is Empowered People, which focuses on developing and implementing ways to support individuals in actively managing their own health [2]. The strategy takes into account many of the barriers to making informed health decisions, including overly complex health information and a lack

of health-supportive resources in the community. To address these concerns, the federal government is committed to supporting future research on health literacy and clearer communication with the public under the Plain Writing Act. Empowered People recommends that providers find new ways to share critical health information with patients and to confirm their level of understanding. Community partners are encouraged to support health education for adults and to help create healthy environments that make it easier to eat well and be active.

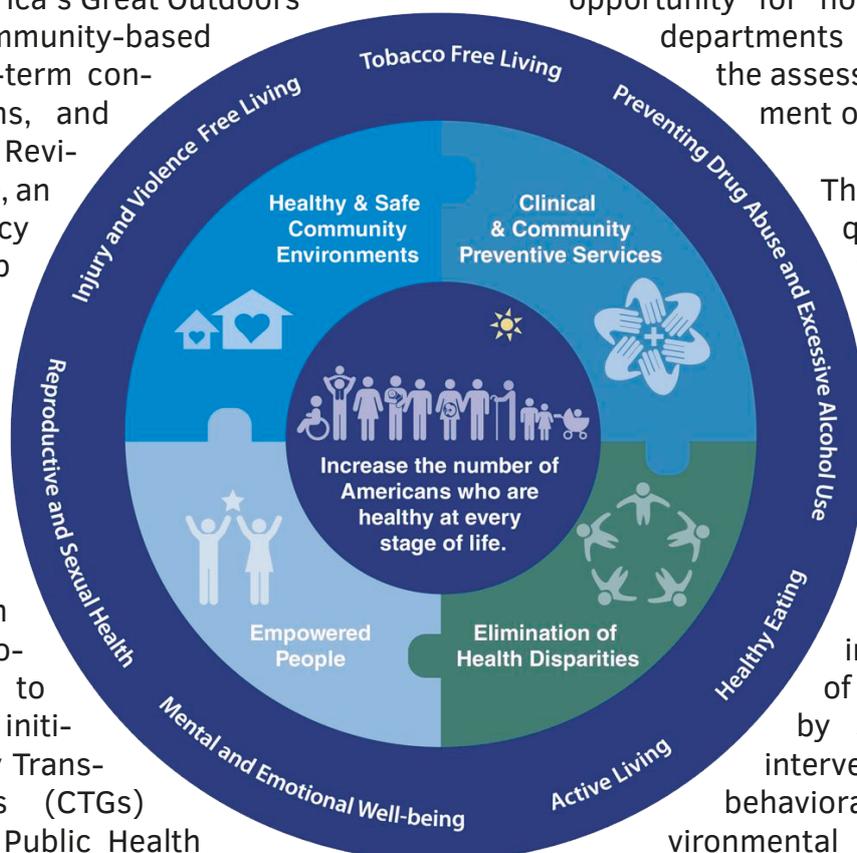
Efforts to achieve the goals outlined in the National Prevention Strategy are already underway, including the America's Great Outdoors Initiative, a community-based approach to long-term conservation solutions, and the Neighborhood Revitalization Initiative, an inter-federal agency initiative to help neighborhoods in distress transform themselves into neighborhoods of opportunity.

The Prevention and Public Health Fund has also provided resources to two other notable initiatives: Community Transformation Grants (CTGs) and the National Public Health Improvement Initiative (NPHII). CTGs, awarded via the Centers for Disease Control, give communities the resources to develop and implement initiatives to prevent chronic disease, and to support the dissemination of best practices. As one example, Maryland grantees are using CTG resources to reduce tobacco use, create more tobacco-free spaces, and reduce secondhand smoke exposure in the state [3]. The NPHII was created with the goal of improving care delivery and increasing system capacity. This initiative supports health departments across the country in improving performance and securing a new national accreditation. In

2013, NPHII provided \$32.4 million to fund 73 state, tribal, local, and territorial health departments [4].

Other ACA strategies for improving public health

There are other opportunities created by the ACA to improve public health. The Internal Revenue Service now requires non-profit hospitals to complete a community health needs assessment (CHNA) every three years and report annually the extent to which they are addressing identified needs. Though local public health departments have been conducting CHNAs for many years, this ACA requirement creates an opportunity for hospitals and health departments to collaborate on the assessment and improvement of public health [5].



The ACA also requires implementation of a National Quality Strategy. This strategy has three aims: better healthcare; affordable care; and “Healthy People, Healthy Communities,” which focuses on improving the health of the US population by supporting proven interventions to address behavioral, social, and environmental determinants of health. The National Quality Strategy also establishes six priorities to promote quality healthcare, and two of those six priorities have clear implications for improving public health: (1) promoting the most effective prevention and treatment practices for the leading causes of mortality, and (2) working with communities to promote widespread use of best practices to enable healthy living [6].

Conclusion

Although most of the press coverage and educational materials about the ACA have focused on health insurance coverage, there are sev-

eral facets of the legislation that address public health. Whether these initiatives ultimately improve public health remains to be seen, but there is no doubt that the ACA represents an unprecedented effort by the federal government to incentivize policies and practices that seek to improve the health of the entire US population.

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Further information

You can read more about the National Prevention Strategy at <http://www.surgeongeneral.gov/initiatives/prevention/strategy/report.pdf>.



Neil Jordan, PhD, is a health economist and health services researcher with faculty appointments in Psychiatry & Behavioral Sciences, the Center for Healthcare Studies, and Preventive Medicine. His research focuses on identifying

high value services and systems of care for persons with complex chronic illness. Dr. Jordan has taught the Health Economics & Healthcare Financing course in the Feinberg School of Medicine for nearly 10 years, and has a keen interest in understanding the implications of health insurance reform.



Philethea Duckett, MPA, is a first year doctoral candidate studying Health Services and Outcomes Research. She investigates the role health policy and health service design decisions play in mediating disparities in access to care, health

care quality, and health outcomes for vulnerable populations.



City of Toronto Archives, Fonds 1231, f1231_it0258

Milestones in Public Health:

Automobile safety

Osefame Ewaleifoh

There are no miracles in medicine. We live longer, healthier lives today because of the collective efforts of people working in diverse fields from medicine to health policy and safety engineering. These collective efforts have led to impressive “milestones” in public health. These milestones are noteworthy for several reasons. First they are remarkably simple and straightforward. Second they are often synergistic; resulting from symbiotic interactions between multiple players. Finally, these efforts that have led to progress in public health are cumulative and incremental. Understanding the actions and patterns that have driven past successes in public health can serve as an important framework and scaffold for developing new solutions to emerging public health challenges. Here I examine public health advances and inflection points that epitomize the impact of converging multi-disciplinary approaches to addressing public health challenges.

Life expectancy trends have come a long way

The average life expectancy of a child born in the US in 1900 was 50 years. By 2010, this number had increased 60% to 80 years (Fig.1).

This persistent upward trend in life expectancy can be attributed to several factors including, but not limited to, improvements in medical care, safety engineering and effective public health policy. While improvements in medical care have received most of the credit for increased life expectancy, safety engineering and effective public health policy have received less recognition. In this piece, I highlight the contribution of safety engineering and health policy in promoting public health, focusing on their impact on automobile safety.

Automobile safety

From the earliest experimentation with automobiles, this mode of transportation has been heavily associated with accidents and fatalities. The earliest recorded automobile accident was in 1869 when an Irish scientist, Mary Ward, fell off and was run over by the wheels of an experimental steam car built by her cousin [1]. At the height of the Second World War in 1943, the United States lost more soldiers to automobile accidents than to combat [2]. In the last 50 years, however, automobile safety has achieved major safety milestones driven primarily by

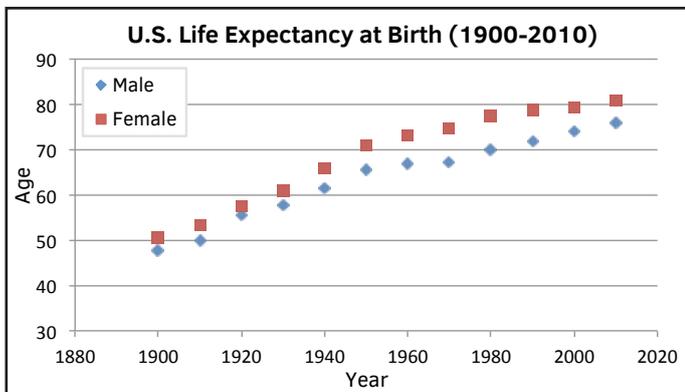


Figure 1: Data from National Vital Statistics Report Jan. 2014

safety engineering and progressive driving legislations, grounded in public health ideation. According to the Fatality Analysis Reporting System (FARS), in 1979 there were 51,093 motor vehicle associated accidents, and by 2011 this number was reduced by 41.7% to 29,757. More significant than the absolute decrease in fatalities statistics is the downward trend. The current measures in place are leading to a consistent decrease in fatalities over time. While the current number of fatalities remains unacceptably high, the trend line is certainly encouraging (fig.2). Clearly the safety engineering and automobile health policy measures that have been implemented so far appear to be effective. So what are these measures?

Engineering measures driving automobile safety trends

The ever increasing trends in automotive safety are perhaps the best testimony to the role of safety engineering in public health. From the early introduction of hydraulic brakes to current advances in autonomous parking and brake systems as shown in the timeline on the next page, innovations in engineering have reduced both the number of automobile accidents and the number of resulting fatalities.

Furthermore, innovations in engineering safety have gone beyond enhancing the safety features of cars, to redesigning terrains and roads. The objective of these road safety innovations has been to focus on the prevention and minimization of injury and death despite driver imperfection. According to the International Transportation Forum (ITF), the current goal is for effective safety measures to be put in place such that even “in the event of a crash, the impact energies remain below the threshold likely to produce either death or serious injury”.

This strategic focus on engineering safety is an important paradigm shift in public health and raises the bar on safety engineering from simply preventing crashes to minimizing the consequences of inevitable crashes [4].

A quintessential safety engineering measure born out of this new paradigm was designating ‘speed limits’. According to the ITF, the logic for speed limits is simple; “the chances of survival for an unprotected pedestrian hit by a vehicle diminish rapidly at speeds greater than 30 km/h, whereas for a properly restrained motor vehicle occupant the critical impact speed is 50 km/h (for side impact crashes) and 70 km/h (for head-on crashes)”. Thus while we cannot entirely prevent collisions, we can reduce the fatalities associated with accidents through safety engineering measures like speed limits.

At the height of the Second World War in 1943, the United States lost more soldiers to automobile accidents than to combat.

The current safety engineering focus on both preventing auto related accidents and reducing the consequence of such accidents has been directly responsible for innovations such as guard rails, detailed road warning signs, safety barriers that absorb impact and speed bumps. Advancements in road signage like zebra crossings, lane markers, gravel shoulders, and reflective mirrors with embedded small glass spheres intended to more efficiently reflect light from vehicle headlights back to the driver’s eyes, have been extremely effective in reducing automobile accidents and driving down associated fatalities.

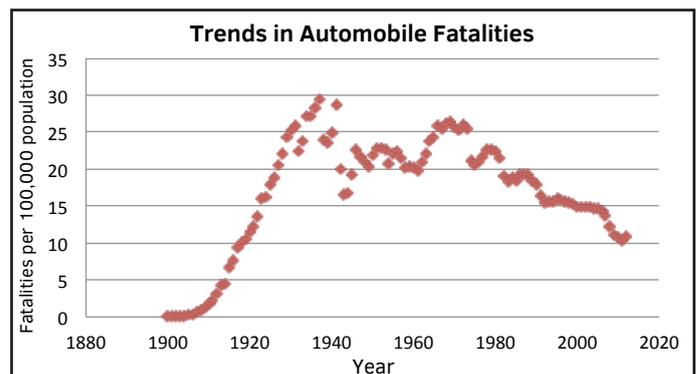


Figure 2: Data from NHTSA and FHWA (<http://www.saferoads.org/federal/2004/TrafficFatalities1899-2003.pdf>)

Evolution of automotive safety



Health Policy measures driving automobile safety trends

While safety engineering measures have been very instrumental in driving the trend of automobile safety, a powerful catalyst in this process has been strategic government policy on automobile safety anchored in public health. Although it was clear that seat belts were invaluable as a lifesaving tool after they were introduced in the 1930's and heavily promoted in 1955 by the U.S. surgeon general [5], their true efficacy was not discovered until it became mandatory to have seat belts in all cars. This effort was championed by the New York State legislation of 1984 that made it illegal to drive in the state without wearing seatbelts [6]. Since then, this law has been adopted by 49 states in the U.S. (NH abstaining) and many other countries around the world [6]. It is difficult to truly ascertain how many lives have been saved by seat belts, though conservative estimates by the National Highway Traffic Safety Administration (NHTSA) suggest that over 10,000 lives are saved annually by seat belts in the U.S. alone [7]. Thus, seat belts provide a concrete example of the power of legislation to leverage engineering safety in promoting public health and saving lives.

Seat belts provide a concrete example of the power of legislation to leverage engineering safety in promoting public health and saving lives.

The efficacy of legislation to promote public health through safety engineering has not been limited to seat belts. Although tail lamps and brake lights were introduced in 1915 and 1919 respectively, it was not until 1986 that it became mandatory for all cars in the U.S. to have brake lights [8]. The legislation to make it illegal to drive without brake lights moved the technological innovation of automotive lighting from a

nifty gadget to an essential safety-engineering tool that has saved millions of lives. The central brake light has been so successful as an engineering tool, that it is required by regulations worldwide to be centered laterally on the vehicle, through United Nations Regulation 48 [9].

Beyond promoting the application of life saving technological advancements, legislation and health policy have been important in promoting automotive safety in more direct and diverse ways. These efforts have included but have not been limited to introducing and enforcing driving age requirements, introducing and enforcing drunk driving laws and, most recently, introducing anti-texting while driving laws. While earlier legislation like anti-drinking and driving laws have been relatively more linear, the push for anti-texting while driving laws promises to be more challenging as mobile devices continue to become more deeply integrated into the fabric of our lives.

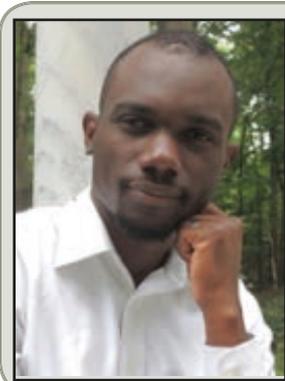
Automobile safety as a global concern

Just across the ocean however, the story of automotive safety remains rather bleak. The World Health Organization (WHO) has projected that by 2020 traffic accidents will become the third leading cause of death and disability [10]. Although only 20% of manufactured automobiles are driven in developing countries, 91% of worldwide auto accidents occur in developing countries [10]. According to the WHO, simple preventive measures can halve the rate of automobile related fatalities in most developing countries [11].

In 2012 the U.K. and the U.S. had 5.1 and 15 road fatalities per 100,000 motor vehicles on the road, respectively. By contrast, Liberia and Ethiopia had 10,967 and 11,666 road fatalities per 100,000 motor vehicles, respectively [12]. Clearly, automobile safety remains a grave public health concern in both developed and developing countries, however the greatest chance

to save the most lives through automotive safety now lies in developing countries.

The successful outcome of automobile safety in developed countries can provide a strategic blueprint for developing countries to follow. Given the astounding success in simple safety implementation methods and policy, there is no need to reinvent the wheel around the world. While the current global trend in automobile safety remains bleak, there is hope. By advocating and adopting safety legislative and engineering policies that have successfully driven automobile safety in the U.S., millions of lives around the world can potentially be saved.



Osefame Ewaleifoh is a PhD/MPH student studying herpes simplex virus neuroinvasion and transport in Greg Smith's lab. His public health interest focuses primarily on disparities in mental health access.

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Sarah Koch

Keep your Eyes on the Road Ahead:

Avenues to curb texting & driving in the US

Sarah Jane Quillin

It takes only a brief look around in a crowded public space to observe the intimate relationship we have with our mobile phones. While texting services in the US went relatively unused during their inception 20 years ago, today text messaging is the most widely used mobile data service and has become a worldwide cultural phenomenon [1]. Over the past decade, as texting became part of the daily lives of many Americans, texting and driving became a public health epidemic. While the question of why drivers do not wait to send or answer a text message is better left to the field of behavioral psychology, the question of how to prevent fatalities caused by drivers who text is one for public health officials, advocates, and researchers.

Primary research suggests that texting and driving is, by far, the most dangerous of a larger subset of distracted driving activities. A 2009 Virginia Tech Transportation Institute natu-

ralistic study, using kinematic observations of real drivers captured on videotape, is the main source of this data. Results showed that drivers were 23 times more likely to crash when texting than when not texting [6]. This number can be compared to drivers who were 6 times more likely to crash when dialing a phone call and 6.7 times more likely when reaching for a phone, while no observable risk was found for talking or listening to a cell phone. The likely reason behind the high danger associated with texting is the length of time a text draws the driver's eyes away from the road. In the Virginia Tech study, texting took the driver's eyes off the road for an average of 4.6 seconds [6]. At 55 miles per hour, this equates to driving the length of a football field blind.

Texting has resulted in an increasing number of motor vehicle casualties in recent years. From 2011 to 2012, injuries associated with distracted driving increased by nearly 9%, despite an

overall decline in the total number of motor vehicle accidents [2]. Of the total number of car crashes each year, the National Safety Council estimates that 100,000 additional crashes are caused by texting behind the wheel [3]. In 2011 the number of fatalities from distracted driving-related crashes totaled 3,328, with all being preventable deaths. Public health intervention is desperately needed to stop drivers who text because the problem is only expected to increase. In 2011, Americans sent 50% more texts than just three years prior, with 196 billion texts sent that year [4]. As the majority of mobile phone users that text daily are under the age of 34, it is predicted that as the population ages the number of people texting will continue to increase [5]. An increase in texting, coupled with an increase in the percentage of the population who text, may result in even more drivers who endanger the public by texting behind the wheel.

Efforts are underway to prevent further casualties. In the past decade, legislation against mobile phone use while driving has passed relatively quietly compared to similar public health legislation campaigns like seatbelt laws or laws designed to curtail tobacco use. While seatbelt laws have been opposed by those who argue the laws infringe on individual freedom, and tobacco taxes have been stymied in the commercial interest of tobacco companies, virtually no one is championing the right to text and drive. As of 2012, 39 states and the District of Columbia (DC) prohibit drivers from texting, 32 states and DC prohibit novice drivers from cell phone use, and 10 states and DC prohibit hand-held cell phone use by drivers [7]. The effectiveness of such legislation, however, is controversial [8, 9]. While existing laws set a foundation to prevent texting and

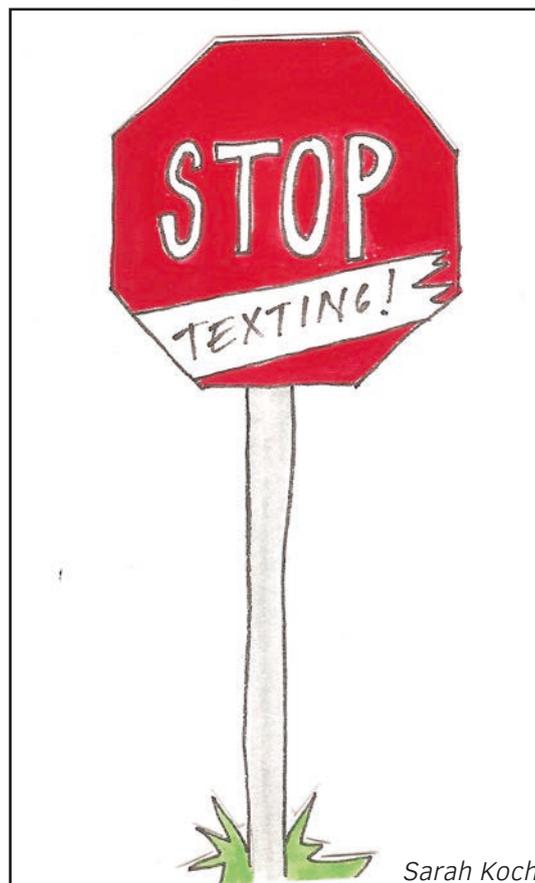
driving, law enforcement on the ground lack the resources and technology to detect drivers who text before an accident occurs. As such, public health media campaigns are being implemented to educate drivers of the risks and implications of the decision to text behind the wheel.

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Campaigns sponsored by mobile phone providers, the National Department of Transportation, the Centers for Disease Control and Prevention, and local public health institutions use different forms of media to educate the public on how dangerous it is to text and drive. In Chicago, an electronic billboard over the I-94 Expressway reads "1002 TRAFFIC DEATHS 2013 DON'T TEXT AND DRIVE." The most prominent national campaign utilizes the slogan, "It Can Wait," and seeks to make the problem of texting and driving as visible and unacceptable as driving while intoxicated [10].

The It Can Wait campaign is spearheaded by the AT&T service provider, and drivers who take a pledge to never text and drive then share this pledge across social media. It Can Wait advertises "The Last Text," across television and print media, displaying the kinds of texts that have preceded accidents, causing viewers to confront the non-urgency of their text messages. The It Can Wait campaign sponsored a short film, "From One Second to the Next," by documentarian Werner Herzog that links four personal stories to the texting and driving epidemic in America. Herzog's subjects

belong to both sides; some are the victims of an automobile tragedy caused by texting, some are drivers who live with the deep repercussions of the choice to text and drive. All come together to deliver the same message to viewers: It can wait.



History has taught public health scholars and officials that legislation and education alone are often not enough to make populations change their behavior. There is still a need for research into demographics most likely to text and drive, and development of technology to prevent drivers from texting. In 2012, the problem was reportedly worse with those drivers under the age of 20, with teens admitting more likelihood to text and drive in national surveys [11]. AT&T has developed DriveMode, a mobile app available on Android and Blackberry models, that sends automatic replies to texts and emails while the driver is on the road. The company also tours 380 national events annually with a virtual texting and driving simulator, designed to show participants how difficult it is for a person to text while driving responsibly; the simulator is also currently available online [12]. With education campaigns becoming more widespread and the It Can Wait campaign gaining widespread third party support, it is likely that the coming years will see more development of technology to both detect and prevent drivers who text.

The problem of texting and driving is being addressed on many public health fronts: legislation, education, research, and technological development. Still, at this juncture, as many as 75% of teens say that texting and driving is “common” amongst their friends [10]. One can advocate by taking the pledge to not text and drive at www.itcanwait.com/getinvolved and sharing the pledge across social media, or downloading an activation kit that prints texting and driving facts and posters for display in public spaces. Increased individual and institutional advocacy for anti-texting and driving campaigns are current ways in which public health-minded individuals and institutions are attempting to stop further preventable deaths and injuries.

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Sarah Jane Quillin is a PhD/MPH student studying microbiology in Dr. Hank Seifert's lab. Her research interests are infectious disease epidemiology, antibiotic resistance, and the way laboratory research affects public health policy. In addition, Sarah is interested in the way emerging technologies contribute to evolving public health issues.

Sleep as a Public Health Issue

Nelly Papalambros

Sleep deprivation dramatically affects both our physical and mental health. We know sleep is important; after all, we spend one-third of our lives in the land of nod. When we do not get enough sleep, we feel terrible, are irritable, and make mistakes. And this is only scratching the surface of the problem. A poll conducted by the National Sleep Foundation (NSF) indicates that only 42% of adults report getting enough sleep [1]. For adolescents, the statistics are more sobering, with only 31% of students in grades 9-12 reporting getting at least 8 hours of sleep or more on an average school night [2].

While sleep itself is often in the limelight, its regulation is equally important. Evolutionarily, humans sleep at night and are awake during the day, so it makes sense that our bodies are influenced by exposure to light and darkness. The master circadian clock, a tiny structure in the brain called the suprachiasmatic nucleus or SCN, receives light cues from the environment and then signals regulated patterns of activities in the body [3]. The circadian rhythm, or biological clock, is a key regulator of our bodily functions. It regulates hormone secretion throughout the day, and thus controls involuntary processes such as sleep-wake cycles, appetite, alertness, and body temperature [3]. Changes in the amount of sleep we get and when we sleep can affect timely hormone release, which in turn can affect appetite modulation, sleepiness, and even proper cellular function. For example, shift workers, who make up about 15%-20% of the American work force, report chronic fatigue and on-the-job errors due to sleep loss and to circadian disruption [4].

In terms of public health, chronic sleep loss and circadian disruption have been tied to many problems including obesity, hormone regulation, mental health, and cognitive perfor-

mance—yet these findings have not been very well publicized. It is likely that addressing the sleep epidemic will help curtail other key public health issues.

Adequate sleep and hormonal balance

A major focus of public health is curbing the obesity epidemic. Obesity is the leading cause of a myriad of chronic health conditions. Further, at the national level, obesity costs the US about \$147 billion annually in health care alone [5]. Why not address obesity by fixing sleep patterns?

Sleep and circadian rhythms are often overlooked, and it is time for their debut as a public health issue.

There are two critical appetite-influencing hormones: leptin and ghrelin, which signal fullness and hunger, respectively. Interestingly, sleep

deprivation disrupts the concentration of these hormones by a two-fold value. When sleep deprived, leptin levels plummet (so we do not feel as satisfied after eating) and ghrelin levels spike (causing us to still feel hungry). There is strong evidence that this combination leads to weight gain [6-7]. With so many people not getting enough sleep, it is no wonder we also suffer from obesity. Sleep loss is, of course, not the sole cause of obesity, but its reversal is an inexpensive treatment for the condition.

The American Automobile Association estimates that one out of every six deadly traffic accidents are due to drowsy driving.

Another hormone involved in sleep and circadian rhythm is melatonin. Melatonin is released at night and plays a role in the onset of sleepiness. Research in the last 20

years has shown that chronic suppression of melatonin release by exposure to artificial light leads to development of cancer. This exposure affects women working night shifts in particular: for nurses and flight attendants, for example, the rates of breast and ovarian cancer are significantly higher [8-10]. Artificial light exposure in homes and from computer monitors also diminishes the amount and quality of sleep we get [11]. It goes without saying that before

the invention of commercial lighting, people tended to follow more of a natural sleep-wake cycle, settling down at sunset and often rising at dawn. After World War I, electricity became available widely, allowing people to fend off sleep with artificial lighting. While lamps lit with fire cast light, it is not nearly the lux level exposure of artificial light. These changes have moved us away from our natural circadian rhythm and sleep cycle, and the consequences are only now starting to be seen. So far I have only given examples of physical changes, but there are also mental changes associated with sleep and circadian disruption.

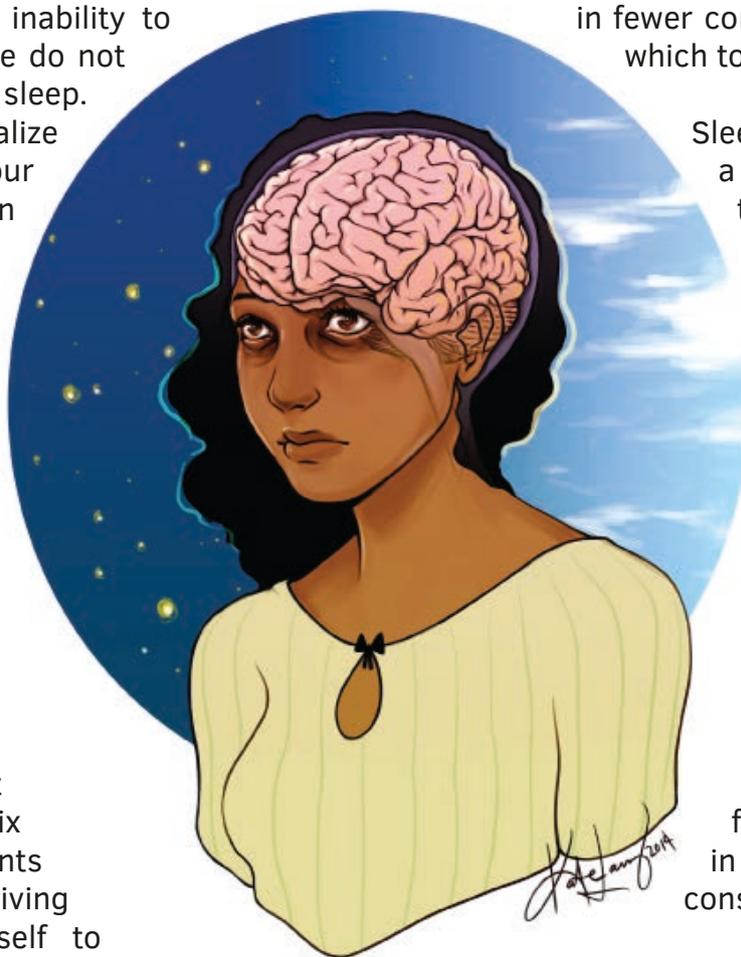
Cognitive consequences of sleep loss

We all recognize our inability to pay attention when we do not get a good night's sleep. What we may not realize is just how much our attention and reaction time are affected by sleepiness. A person who has not slept all night can be as incapacitated as someone who is legally drunk [12]—yet most of us will get in a car without a second thought after having slept less than five hours. The American Automobile Association (AAA) estimates that one out of every six deadly traffic accidents are due to drowsy driving [13]. “Willing” yourself to stay awake is impossible. When extremely sleepy, the brain undergoes microsleeps, brief blips of loss of consciousness lasting anywhere between a fraction of a second to 30 seconds. These microsleeps are just long enough for a driver to veer a truck off the road or for a train operator to miss a stop signal. About 25% of train operators and

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pilots admit that sleepiness has affected their job performance. Notably, one in five of them report that he or she made a serious error due to sleepiness [4]. Even in the health profession sector, many doctors and nurses work on few hours of sleep, creating an environment where medical errors are easy to make [14].

Devastating transportation accidents aside, sleep deprivation leads to problems with decision-making, learning, and memory [15-16]. As we sleep, our brain moves through a series of cycles termed slow wave and non-slow wave sleep. Slow wave sleep has been shown to be a particularly important stage for memory consolidation [17]; sleep deprivation results in fewer completed sleep cycles in which to process information.



Sleep deprivation is also a severe problem for teenagers, and one we should be concerned about in the public health field. The circadian rhythm of teenagers shifts after puberty, making them feel sleepy 2-3 hours later than adults, and preventing them from being able to wake up as early in the morning [18-19]. Combined with early school start times, often before 7:30 am, this shift in sleep pattern has dire consequences.

A poll conducted by the NSF indicated that 80% of teenagers went to sleep well after 10:00 pm, yet 54% woke up between 5:00 am and 6:30 am on school days [1]. In the past, youth did not always go to school so early. The modern start times for schools began in the early 19th century, when school became a place for day laborers to leave

their children. After the 1950's and 60's, there was a slow push for earlier start times as school boards tried to minimize busing and operating costs [20]. According to the U.S. Department of Education, 42% of schools now start before 8:00 am. Are we not setting up our youth for failure?

Students who do not get enough sleep often have trouble focusing, solving problems, and making decisions. Additionally, sleep-deprived teenagers are more likely to have behavioral and emotional problems that can lead to drug addiction and depression [21-22]. Students are also more likely to miss 1st and 2nd period classes due to difficulty waking up in the mornings [22]. When in school, these students' performance is compromised due to poor attention spans and less knowledge retention.

In the long run, poor academic achievement hurts both the individual and the community as a whole. Successfully educating future leaders, scientists, doctors, and teachers is an essential part of ensuring a positive public health outcome.

Sleep and depression

Teenagers are not the only group to suffer from emotional problems due to poor sleep. In the last few years, research into the relationship between sleep and depression has increased steadily. Depression affects about 1 in 10 adults in the United States [23] and can affect physical health, social life, work productivity, and community involvement. The costs of depression in terms of productivity loss is somewhere around 200 million missed workdays or between \$17-44 million, not to mention health expenses [23].

The issue is complex, as depression can cause sleep problems and sleep problems can cause depression. However, there is evidence to suggest that correcting sleep onset or maintenance, also known as "sleep therapy," improves the symptoms of depression [24]. Sleep therapy is a form of cognitive behavioral therapy that is relatively inexpensive, and could be used to combat what should be considered a major public health issue.

Conclusion

Our current approach to sleep has left us at odds with nature. Perhaps we should view our need for sleeping pills to induce sleep, and for coffee to keep us awake, as signs that we are headed down the wrong path. Sleep plays an important role in a range of different health issues. From mental health to obesity, the effects of sleep deprivation are concerning. Current attempts to "fix" obesity and mental health are relatively costly and seem to have mixed outcomes; pharmacological approaches in particular are very expensive. If we treat sleep as a preventative measure, we may be able to reduce some of the personal and financial burden of devastating accidents, cancer, and chronic health problems. Additionally, improving work productivity and academic success through sleep has numerous benefits to society. I am not suggesting that sufficient sleep is a cure-all, but it is a step in the right direction. Sleep and circadian rhythms are often overlooked, and it is time for their debut as a public health issue.

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is interested in using science to advocate for evidence based health policy.

The Atomic Bomb Casualty Commission

John Phair, MD

The Atomic Bomb Casualty Commission (ABCC) was established by President Harry Truman in 1945, shortly after the surrender of Japan at the end of World War II, with the goal of developing knowledge regarding the long-term effects of atomic radiation. However, the chaos in Japan immediately following the end of the war hindered the initial attempts to develop a scientifically useful study. Thereafter, Dr. Thomas Francis, a physician, virologist and epidemiologist at the University of Michigan, was asked to design an epidemiologic investigation. His committee's recommendations in 1955 stressed continuity and well-defined study groups, which George Darling, ABCC director from 1957 to 1972, applied quite seriously. The Francis Report proposed that the Japanese census ask where all citizens were on August 6th and 9th, 1945. With this information, ~100,000 individuals who had been in Hiroshima or Nagasaki on those dates respectively were asked to volunteer to participate in a long-term study, the Life Span Study (LSS).

Individuals were grouped according to the distance they had been from the hypocenter of the two atomic explosions. Although there is a lack of knowledge regarding the amount of radiation released by either of the two weapons, distance has been used as a surrogate measurement for radiation exposure. A subset of ~20,000 persons, including individuals close to and farther away from the blasts, was asked to participate in the Adult Health Study (AHS) which conducted biannual medical and laboratory examinations at the ABCC's Hiroshima and Nagasaki facilities. The remaining 80,000 persons were to be followed until death, at which time the cause of death was to be established by autopsy and/or death certificate. A

third study was initiated on children in utero at the time of the bombing, as was a fourth investigation on the health of the F1 generation consisting of children not in utero in August 1945 but subsequently born to parents who had been irradiated during the explosion. Similar to the AHS, subsets of participants in each of the studies on children were followed with regular clinical examinations.

My experience at the ABCC, 1962-1964

The department of medicine at Yale, where I was a resident in internal medicine, had agreed to supply both senior and junior staff to the ABCC. The University of California, Los Angeles (UCLA) was responsible for supplying senior and junior pathology staff. As I was eligible for the physicians draft and with no wish to perform physical examinations of inductees to the armed services, I volunteered with my wife's encouragement to do my national service as a member of the US Public Health Service (USPHS) at the ABCC. The two years in Hiroshima from 1962 to 1964 were delightful. Japan is a beautiful country that my wife and I had time to explore. In 1962 medical residents were paid roughly \$2000/year. As a



The Hiroshima Peace Memorial (Genbaku Dome) is the ruins of one of the only buildings left standing near the epicenter of the 1945 bombing. In modern, re-built Hiroshima it serves as a tribute to all the lives that were lost. Credit: Jen Klabis, Micro-Immuno Dept., Northwestern University

lieutenant commander in the USPHS my salary was approximately \$6000/year, in an economy that at the time was about half as costly as the US economy. Thus, we could afford to travel, which we did during vacations to Hong Kong, Thailand and India.

By 1962 Hiroshima and Nagasaki were rebuilt, thriving cities. Hiroshima had a population of about half a million, more than double the estimated population immediately following WWII [1]. The ABCC facility was built in Hijiyama Park overlooking the harbor and the Inland Sea. My duties consisted of supervising the Japanese physicians who conducted biannual examinations of the AHS participants. The participation of the Japanese population was amazing. Close to 90% of the selected individuals spent a half-day every two years undergoing tests at the ABCC facilities, and a large percentage of the families of 80,000 persons in the LSS agreed to postmortem examinations. Although these exams were the primary focus of the facility at Hijiyama Park, ABCC also maintained a 6-bed inpatient unit where we cared for patients with hematologic malignant disease, which, 17 years later, was the primary manifestation of radiation exposure [2].

Study findings and impact

The heavily exposed individuals closest to the hypocenter of the explosions showed higher incidences of cataracts and thyroid cancer as well as of hematologic malignancy [3]. Children in utero at the time of bombing had microcephaly but relatively few other congenital abnormalities. The F1 generation, those children subsequently born to irradiated parents, have not shown an increased propensity for any disease to date [4-5]. The entire investigation was jointly funded by the US and Japanese governments and continues today as the non-profit Radiation Effects Research Foundation (RERF) [6].

In addition to continuing the ABCC studies discussed above, RERF maintains multidisciplinary studies on radiation biology and epidemiology. However, the foundation's impact goes further than studying radiation and the survivors of radiation exposure. RERF collaborated with Russian scientists following the nuclear power plant disaster in 1986 at Chernobyl; in response to the 2011 nuclear disaster in the Fukushima

prefecture, too, RERF provided radiation advice to civilians and dispatched experts to measure radiation in the disaster area. The foundation also contributed knowledge and experts to the establishment of the Fukushima Health Management Study, currently operating from Fukushima Medical University in Japan. RERF, which began as the ABCC, is an excellent example of international scientific cooperation and of the value of a simple, well-designed epidemiologic investigation.

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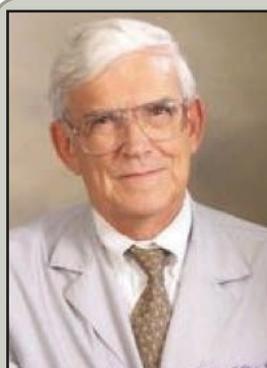
Further information on RERF and ABCC

RERF Publication List

http://www.rerf.or.jp/library/index_e.html

National Academy of Science, ABCC Archive List

<http://www.nasonline.org/about-nas/history/archives/collections/abcc-1945-1982.html>



John Phair, MD, joined the faculty of Northwestern Medical School in 1976 as director of the Division of Infectious Diseases. He led the Multi-center AIDS Cohort Study (MACs), an NIH-funded observational epidemiologic investigation of HIV infection and disease in men who have sex with men, from 1984 until 2012. From 1992 to 1994, Dr. Phair served as Chair of the Executive Committee of the AIDS Clinical Trials Group (ACTG), a network of academic centers evaluating antiretroviral therapy. In 2000 he stepped down as director of the Division of Infectious Diseases and assumed Emeritus status, but he continues to participate as an investigator in the MACs.

Northwestern's Project RISHI: Health interventions in Charnia

Srivarshini Cherukupalli

Project Rural India Social and Health Improvement (RISHI) was founded in 2005 at the University of California, Los Angeles. Since then, chapters of Project RISHI have been established at eight other US universities, each partnering with a rural community in India. Chapters are involved in a series of initiatives ranging from water sanitation to maternal and child health education. In conjunction with local physicians and non-governmental organizations (NGOs), members plan projects throughout the academic year and implement them during summer or winter break trips to their respective partnered villages in India.

The Northwestern University (NU) chapter of Project RISHI was founded in May 2011. My close friend Manisha Bhatia and I were discussing a talk that we had just attended by Joia Mukherjee, the Chief Medical Officer of Partners in Health, which inspired us to—as clichéd as it sounds—do something “good.” I had heard of Project RISHI from peers at other universities and I proposed the idea of bringing Project RISHI to NU. Manisha and I, along with two other friends, Apas Aggarwal and Shreya Agarwal, joined together for this initiative. Since those initial conversations nearly three years ago, our chapter has grown to an organization with

about 40 members, an executive board of nine undergraduates and two advisors at the Feinberg School of Medicine at NU, Dr. Mamta Swaroop and Dr. Anagha Loharikar.

Our partner community, Charnia

Apas, Shreya, and I first visited Haryana, India during the summer of 2011. We had contacts at the Param Seva Trust, an NGO based in the capital city of Chandigarh, that is dedicated to improving access to education and healthcare. Members of the Trust accompanied us as we visited several rural communities and conversed with the Panchayat, or governing council, of each village. Towards the end of the trip, we traveled about an hour from Chandigarh to Charnia, a rural area located against the breathtaking backdrop of the Himalayas.

Charnia is a stratified community made up of several brick manufacturing zones and constructed villages. Each brick zone has a privately owned factory. In each zone, 100-200 migrant brick manufacturing laborers live in makeshift brick stacks supported by mud. The laborers have access to water from nearby government-owned pumps, and occasional access to electricity in the evenings. When the monsoon season occurs each year (July through September), some laborers temporarily move to other states in search of employment, while others continue to live in Charnia. Thus, the population of brick laborers changes constantly. In contrast to the brick zones, Charnia also has areas that resemble the typical Indian village: small houses made of concrete are situated on winding streets in the midst of green fields. Most of the farmers and individuals who are employed in local cities live in these non-brick areas of Charnia. The difference between the brick and non-brick communities struck us as we walked through the village. Based on our discussions with various residents, we decided to focus NU Project RISHI's efforts in Charnia to improve access to high quality healthcare for the community members most in need.



The author assists a technician from the Postgraduate Institute of Medical Education and Research (PGI) with conducting hemoglobin testing in one of Charnia's brick manufacturing areas. *Credit: Edwin Park*

Determining Charnia's needs

The following summer (2012), we traveled to Charnia for the second time—this time, with eight new NU Project RISHI members. Our primary goal was to conduct in-depth needs assessments designed using World Health Organization (WHO) resources [1]. These household surveys covered a series of topics including demographics/education, sanitation, nutrition, general health, trauma/injury, and reproductive health. Every day, our team would divide up into pairs—one Hindi speaker and one recorder—and visit households to conduct the surveys. We were able to complete 190 surveys in two weeks.

The responses we received varied immensely by socioeconomic class and geographical area within Charnia. For instance, 75.8% of individuals in the brick communities reported that they had no formal education, as compared to 41.2% of the non-brick population ($p < 0.0001$). Only 19% of the brick laborers reported Hindi literacy versus 52% of the non-brick population ($p < 0.0001$). Moreover, we found that women from the brick laborer population visited the doctor fewer times on average during pregnancy than the non-brick population. Of all the individuals surveyed, 24.1% reported at least one household member suffered from anemia, 32.1% from hypertension, 18.2% from hypotension, and 23.5% from typhoid fever. Although the brick laborers were geographically proximate to the non-brick laborer population, they were generally of a lower socioeconomic class, which resulted in health disparities.

Towards the end of the trip, we organized a health camp with the support of two medical institutions, the Postgraduate Institute of Medical Education and Research (PGI) and Maharishi Markandeshwar University (MMU). Physicians provided free specialized care to the villagers, and we were thrilled that we could give them the medical attention they deserved.

Initial obstacles

During data collection, our team faced several challenges. Many of us did not speak Hindi, and it was frustrating when we were unable to understand the villagers' responses. However, we quickly learned to communicate with basic words, as well as through non-verbal gestures



Charnia's brick laborers reside in makeshift areas located around each factory. Credit: Sathwik Nandamuri

and facial expressions. Each day of surveying was unpredictable, and every evening, we revised the survey and discussed important issues we had observed. We were simultaneously exhausted and enlightened—inspired to make a difference but unsure of where to start.

The personal connections we formed with families in Charnia were our greatest sources of motivation. Each of us has memories surveying villagers who were overwhelmingly friendly and welcoming—the amount of chai we were offered reflected this hospitality. Upon returning from our trip that summer, we knew that we had to plan sustainable health interventions to encourage positive behavioral change in Charnia.

Moving forward: targeting anemia

The needs assessments indicated a potential need for a targeted anemia intervention and the small sample of hemoglobin measurements collected at our health camp supported this need. Anemia is currently recognized as one of the most widespread public health concerns globally, and is clinically characterized by decreased hemoglobin concentrations [2]. More than 30% of the world's population is anemic, and it is particularly prevalent in developing countries [3]. In Southeast Asia alone, 65.5% of preschool age children, 48.2% of pregnant women, and 45.7% of non-pregnant women are affected by anemia [3]. Addressing childhood anemia is of particular importance because it impacts

cognitive and psychomotor development [4]. Moreover, maternal anemia increases the risk of maternal mortality, low birth weight, and pre-term delivery [5]. In India, 89 million children are anemic, with most residing in rural areas [6].

Anemia is attributed to nutritional deficiencies of iron, folate, and vitamin B12 with infection potentially exacerbating the condition [2]. Iron/Folic-acid (IFA) supplementation programs are commonly utilized to reduce Iron-Deficiency Anemia (IDA). However, compliance and delivery systems are major issues with these programs. Side effects of the medication such as epigastric discomfort, constipation, or diarrhea discourage individuals from adhering to the daily IFA regimen. Community participation is necessary for successful IFA program implementation, along with diet-based approaches [7].

To analyze the prevalence of anemia in Charnia, we needed more hemoglobin data—specifically from the women and children of the brick manufacturing zones. This was our first goal when we visited Charnia during the summer of 2013. The team performed 113 hemoglobin tests on the women and children in the brick zones in August 2013, and physicians provided clinical diagnoses of IDA according to symptoms of conjunctival pallor, soreness of tongue, brittle nails, and pale palm or soles; cardiovascular signs of anemia; and pregnancy status of the women. The hemoglobin threshold for anemia in children, pregnant women, and non-pregnant women of reproductive age is between 11.0-12.0 g/dL, yet the mean hemoglobin level of the individuals tested in Charnia was 10.08 g/dL [7]. The prevalence of anemia in the brick zones was 78.8%. Of all of the 113 individuals tested, 89 had hemoglobin levels lower than 11.0 g/dL. The high rates of anemia warranted a need for a community-based IFA program. We presented our proposal to the local Civil Surgeon, who agreed to support our efforts. Thereafter, we mobilized Accredited Social Health Activists (ASHAs) from the Indian government's Reproductive and Child Health program to distribute IFA to the brick laborers. Because the brick laborers were frequently overlooked due to their migratory patterns, we purposefully directed the intervention towards their community. The brick factories' owners were skeptical and re-



Project RISHI members on the 2013 trip to Charnia.
Credit: Sathwik Nandamuri

luctant to implement our plan; they had heard of the side effects associated with IFA and did not want to be held liable for the laborers' health. After much convincing, however, the brick owners granted us their permission.

With the support of government physicians and the ASHAs, we provided IFA along with deworming medication to the anemic women and children (deworming prevents parasitic infections that can exacerbate anemia) [7]. Each ASHA oversees 1000 individuals in her resident community. To ensure the brick zones had representatives who understood the IFA medication at a more local level, we selected two motivated laborers, Meena and Rakesh, to serve as community health promoters. The health promoters were given the responsibility of encouraging compliance among their peers and maintaining contact with us.

Overcoming challenges: future directions

We traveled to Charnia again in December 2013 to determine the efficacy of the health promoter system that we had implemented. Most of the brick laborers fervently believed that anemia was not a problem; we were aware that local perceptions of healthcare would be difficult to change. The brick laborers were insulted when we informed them that they were anemic. Several severely anemic pregnant women even ran away from the clinic when a local physician notified them that they had to be transported to the government hospital for further treatment. On this trip, we learned that most of the laborers had stopped taking IFA because one individual had experienced side effects. Some children

had perceived the IFA to be candy and had consumed too many tablets, which caused them to also experience side effects. Other laborers simply did not want to associate with the medicine.

We realize that it will not be possible to reverse the situation in Charnia in the span of a few months, but continued efforts will eventually give rise to increased awareness and medication adherence. We have partnered with the Chandigarh Rotaract club (the youth branch of Rotary) to better ascertain the ongoing local situation with the health promoters and ASHAs, organize more community events, and potentially implement educational programs into Charnia's schools. Educating the younger generation of Charnia would further promote sustainable change. Moreover, we have opened a clinic in Charnia with the Param Seva Trust, and we hope to use this facility as a center for health education and discussions. On our next trip, we will investigate the community's nutritional patterns and cultural perceptions of anemia in greater depth, as well as conduct focus groups with the ASHAs.

Another plan of ours is to collaborate with The George Institute for Global Health, based at Oxford University, the University of Sydney, and Peking University Health Science Center, to bring mobile technology to Charnia. Our needs assessments indicated that nearly 80% of the brick laborers owned mobile phones. Therefore, mobile health technology could be used for compliance reminders and electronic medical records with the local Primary Health Center. As such, we need to first gauge how receptive the villagers and ASHAs would be to this type of initiative. If we receive positive feedback, we aim to provide ASHAs with a smartphone application that will help them work alongside the health promoters to target anemia and malnutrition in Charnia, and help the community members better understand their diagnoses.

The NU experience

As an undergraduate organization, we continually attempt to stay connected to Charnia while propelling our initiatives forward, organizing on-campus programming and fundraising events, finding sponsorship and networking opportunities, and promoting a sense of camaraderie within our own group. Many of our mem-

bers have not yet traveled to Charnia, so they learn about it from those of us who have had the opportunity to go. Unquestionably, the key challenges that we face as a chapter are funding and communication. We strive to hold unique fundraisers that will attract donors and raise awareness about our initiatives. Also, from learning the language to maintaining contact with health promoters in India who only have access to the most basic mobile phones, our team has to constantly find novel ways to communicate with each other and the people in Charnia.

Fortunately, the first conversation I had with Manisha is still vivid in my mind. Now, I am able to enrich that memory with the experiences I have had over the past three years. To paraphrase social media visionaries Robert Scoble and Shel Israel, sometimes, the best way to understand how far something can go is to look back and see how far it has come. I am excited to see where Project RISHI heads next.

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Social Networks and Text Messaging in Public Health: At the frontier of prevention interventions

Ekkehard Beck and Benjamin Armbruster, PhD

Social network analysis is increasingly used to describe, visualize and model existing real-world networks in order to better understand various structural and relational aspects in public health [1]. For example, Figure 1 shows a cell-phone network of Indian men who have sex with men (MSM). Data about social, commuter, and transportation networks allows one to more accurately simulate the spread of a disease outbreak and to evaluate different intervention scenarios to determine an optimal strategy for disrupting disease transmission. A recent example using this method is a model predicting the H1N1 outbreak in the US in 2009 [2].

Social network analysis and public health interventions

One example of a network-based public health intervention is contact tracing [3], which involves finding and testing the contacts of newly diagnosed individuals (a.k.a. the index case). Contact tracing is a common tool used for human immunodeficiency virus (HIV) and sexually transmitted diseases (STD) case tracking, as well as for controlling tuberculosis (TB) outbreaks. While these cases may be hard to identify, contact tracing is useful here because contacts of an index case are at high risk of infection [4, 5].

Using online social networks such as Facebook [7], interventions promoting physical activity [8] and targeting STDs [9] can quickly reach a broad audience at a low cost. Social networks allow for 'viral'-like spread of the intervention among the target population, leading to a wider reach of the intervention and greater effectiveness due to peer-influence [7, 10]. Messages, pictures, and videos can spread virally through a community e.g. by word-of-mouth referral and forwarding of text messages (SMS) and emails, which mimics the spread of a virus from person to person.

Social network analysis is also useful for identifying opinion leaders to target for behavior change campaigns [6]. After surveying community members to construct a social network matrix, opinion leaders can be identified using network centrality measures. These centrality measures include degree (the number of social contacts and a measure of popularity), closeness centrality (those in the center of the network, with few 'hops' between them and everyone else in the target population), and betweenness centrality (those playing a 'broker' or 'bridge' role by connecting different parts of the network) [3, 6].

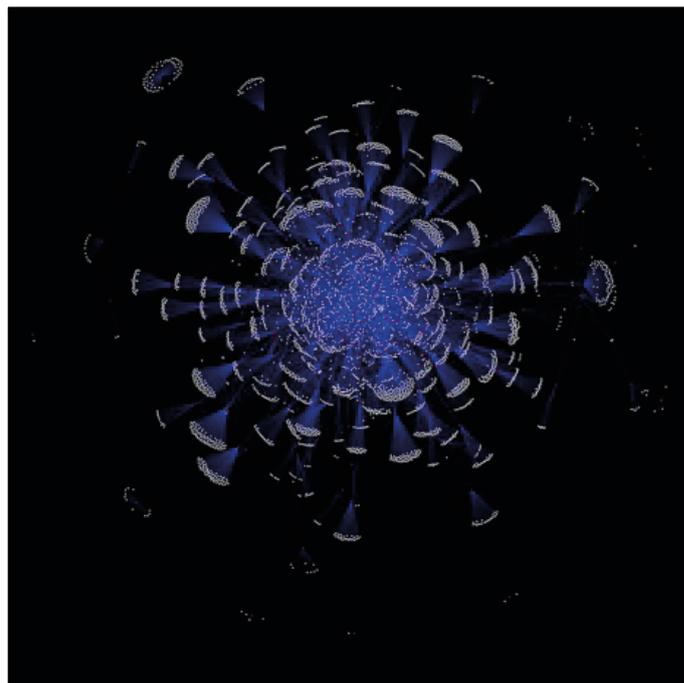


Figure 1: Network of cell-phone contacts among 4891 Indian men who have sex with men (MSM), Hyderabad, India. 241 Indian MSM were interviewed (red) and named their cell-phone contacts (white) [31, 32]. This figure was created using Gephi [33].

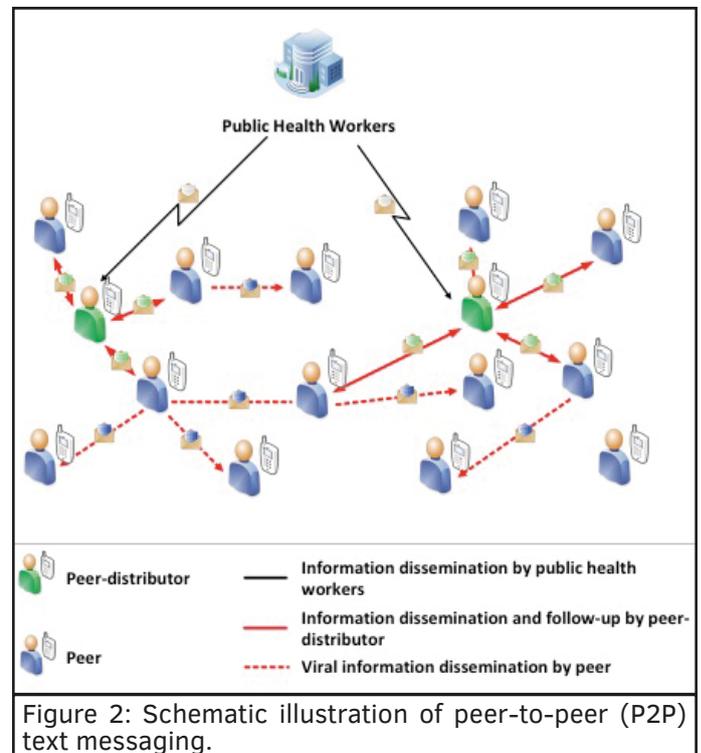
Our current research aims to show how actual social networks and social network analysis can be incorporated into the design of behavioral prevention interventions using text messaging. Mobile phones have a penetration of 96% globally [11] and text messages (SMS) are the most popular non-voice application [12]. Text messages are increasingly used as a primary means

of communication for promotion and education about sexual and reproductive health [13, 14], physical activity [15, 16], smoking cessation [17, 18] and mental health [19]. These interventions either push out bulk messages to a large number of users [20, 21] or require public health workers to recruit participants who then receive individually tailored text messages [22]. Both types are challenged by either 'reach' or 'richness', i.e. the number of participants reached or the quality of information transmitted [23], where low quality information impacts acceptance and retention rates [24, 25].

Peer-to-peer text messaging and peer education

Peer-to-peer (P2P) text messaging is a new mobile-phone based intervention designed to increase the reach and richness of behavioral prevention interventions, by having participants directly communicate with and educate peers via text messages. Public health workers recruit and train peer-distributors among the target population. Peer-distributors receive prevention content from public health workers and text the intervention messages to their peers by leveraging their cell-phone network. Text messages are tailored to the individual characteristics and needs of each peer. Peers can follow-up with the peer-distributor and can in turn forward the received messages to their peers. See Figure 2.

In our current research, we use a simulation framework and network datasets, such as in Figure 1, to compare the proposed P2P text messaging design against other intervention designs currently used, such as bulk message interventions and personalized interventions. We reason that leveraging the peer-distributor's social network and phone contacts, with the ability to tailor messages individually and then follow-up on these messages with his peers, will increase the richness of the information conveyed, resulting in a higher acceptance of the messages [26, 27]. Additionally, this approach will, especially for targeted campaigns, reach more individuals at lower cost than public health workers recruiting participants for individually tailored text messaging studies; this effect is being observed in peer-driven interventions among HIV-infected injection drug users [28, 29]. Simulating the spread of information and behavior change in social networks



allows us to determine how to best tailor such a text message based intervention in different contexts [30]. P2P text messaging also allows for the dissemination of information and awareness to become viral; a recent idea in marketing whose full impact has not yet been explored by the public health community. Social networks and text messaging are becoming more important for prevention interventions and there is much to be gained by utilizing social network data and analysis in the design of existing prevention interventions.

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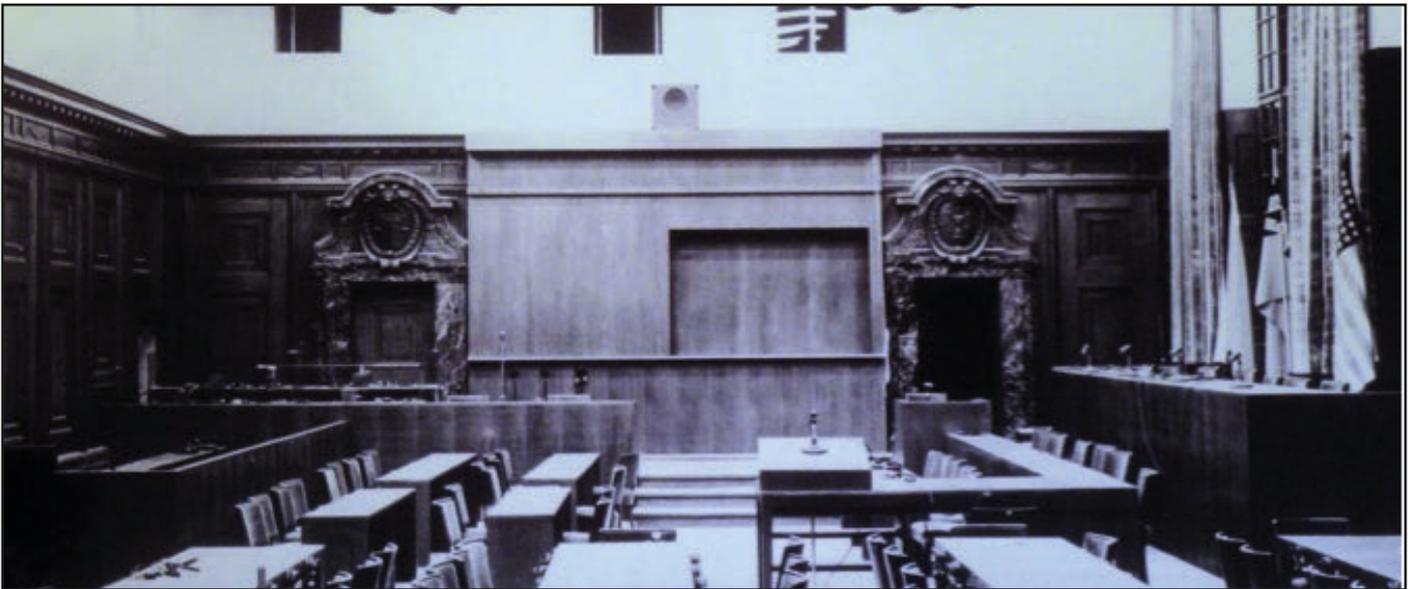
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Nuremberg court room. Image Credit: Damian Erstweile

Responsible Conduct of Research Involving Human Subjects: Historical lessons and public health implications

Lewis M. Smith, MD

Human subjects are used in research to gain scientific and medical knowledge that can help others, and for collecting data that cannot be obtained using other means such as in vitro or animal experiments. In the research setting, human subjects are defined as living individuals from whom an investigator obtains data through intervention or interaction with the individual, or identifiable private information [1]. The potential consequences of research involving human subjects impact both the volunteers as well as society. The subjects may take on physical, emotional and financial risks but may also increase their access to counseling, medical care, medications and devices. Provided the study is scientifically sound, society benefits from increased medical knowledge. When deciding whether to pursue research with human subjects, a determination must be made as to whether the potential benefits to the subject and society exceed the potential risks, which are mostly borne by the subject (Figure 1).

Health care providers (e.g., physicians) engaged in human subjects research need to recognize that providing patient care and performing research on that same patient, are two different responsibilities. Patient care focuses on the individual and not doing harm; research focus-

es on generating generalizable knowledge and doing good. When involving human subjects in research, a research team must adhere to a set of regulations and guidelines that are based on several ethical and scientific principles.

What principles underlie clinical research?

Emanuel and colleagues listed several principles they considered to be central to clinical research (Table 1) [2]. First, the research must have value; providing enhancements of health or knowledge. Second, the research must have scientific validity, and thus must be methodologically rigorous. Third, there must be fair subject selection. This means that scientific objectives and the distribution of potential risks and benefits, but not vulnerability or privilege, should determine the inclusion and exclusion criteria for individual subjects. Fourth, there must be a favorable risk-benefit ratio that minimizes risks and maximizes potential benefits. Fifth, the research must go through independent re-

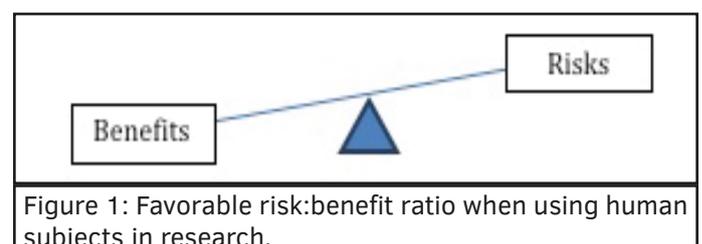


Figure 1: Favorable risk:benefit ratio when using human subjects in research.

view in which unaffiliated individuals review the research proposal in order to approve, amend or terminate it. Sixth, there must be informed consent, which is truly informed and voluntary. And last, there must be respect for enrolled subjects. This includes protection of individual privacy, the opportunity to withdraw from the research at any time and for any reason, and careful monitoring of the well-being of research participants.

Fulfilling these principles requires trained, experienced research teams composed of investigators, coordinators, technicians, data managers and more. Additional requirements include scientific review of the proposed research as well as review by an ethics committee. In the United States, the ethics committee is called the Institutional Review Board (IRB). An IRB must have at least five members, including a person not affiliated with the institution and a non-scientist, who collectively have the expertise to evaluate the proposed research. Northwestern University (NU) currently has six panels; five that review predominantly biomedical research, and one that reviews mostly social and behavioral research. These IRB panels review the human subjects research performed at the University and its clinical affiliates, including Northwestern Memorial Hospital (NMH), the Northwestern Medicine Group (NMG), and the Rehabilitation Institute of Chicago (RIC). Agreements also exist with Lurie Children's Hospital (LCH) and oth-

er institutions to review human subject research performed at NU, and for NU to review research done elsewhere.

Once a project is approved by the IRB, researchers must adhere to the approved protocol. If unanticipated harm or risk to subjects arises during the study, the IRB must be informed immediately so that it can re-examine the protocol and review its previous risk-benefit determination. If an investigator modifies an approved protocol, IRB approval is required before the change is implemented.

How did we arrive at these principles: A brief history of Good Clinical Practice

The ethical principles noted by Emanuel et. al. are derived from a series of documents (Table 2) dating back more than 60 years, starting with the Nuremberg Code in 1947 [3] and followed by the Declaration of Helsinki in 1964 [4], the Belmont Report in 1979 [5], the Common Rule in 1991 [6], and the International Conference on Harmonization – Good Clinical Practices guidelines in 1996 [7]. These documents were created in response to an event or series of events that involved unethical or questionably ethical research practices. Some examples and a brief description of the regulations and guidelines follow.

During the Nazi medical experiments, Nazi physicians performed multiple, high-risk research studies on political prisoners and persons in concentration camps. One example is the hypothermia experiments designed to identify how best to decrease mortality in German aviators whose planes were shot down and were successfully rescued from the cold waters of the North Sea and North Atlantic, but then died from hypothermia. To identify the best method of rewarming, the Nazi doctors took individuals, put them in ice baths to produce severe hypothermia, and subjected them to various types of warming. Many of the individuals died during the experiments. These and other studies performed on human subjects by the Nazis during World War II led to the famous “Doctors Trials”, which culminated in the conviction of several physicians and death penalty for several of them.

1. Ethical Principles of Clinical Research

- Value
- Scientific validity
- Fair subject selection
- Favorable risk-benefit ratio
- Independent review
- Informed consent
- Respect for participants

2. Guidelines and Regulations for Human Subjects Research

- Nuremberg Code (1947)
- Declaration of Helsinki (1964 and multiple revisions)
- Belmont Report (1979)
- Common Rule (CFR 50, 56, 312 and more; 1991)
- International Conference on Harmonization – Good Clinical Practices (1996)

The lessons learned from the Nuremberg Trials led to the Nuremberg Code. About 15 years later, the Nuremberg Code was the basis for the Declaration of Helsinki, an internationally recognized set of principles that still serves as a framework for research involving human subjects. Subsequent revelations about other research studies including, but not limited to, the Willowbrook Hepatitis Studies [8] and the Public Health Services Syphilis Study in Tuskegee [9] led to the Belmont Report and the Common Rule.

The Belmont Report is a seminal publication that articulates three essential ethical principles: *respect for persons*, including individual autonomy, protection of vulnerable populations, and informed consent; *beneficence*, meaning favorable risk-benefit assessment, quality of the study design, and qualifications of the investigator and associates; and *justice*, or the equitable distribution of risks and benefits. Yet, even after the Belmont Report was published and federal regulations implemented, examples of unethical research continued to appear on a regular basis. The Breast Cancer Studies in South Africa [10] is one example. A South African physician presented and published data in the 1990s indicating that adding an autologous bone marrow transplant to high-dose chemotherapy in women with metastatic breast cancer was superior to high-dose chemotherapy alone [11]. The initial reports were publicized widely and led advocacy groups to demand that this novel therapy be approved and covered by medical insurance in the United States. Under intense pressure, some insurance companies provided coverage, while others did not because they believed there was insufficient data to support this treatment. A large, multi-center study was initiated in this country to address the issue, but recruitment was slow as many women with metastatic disease were unwilling to be randomized to an arm lacking bone marrow transplantation. In the end, the investigator was cited for failing to obtain approval of the study before it was initiated, and for misrepresenting his findings. Subsequent studies showed that for most women the outcome was worse in those who received the bone marrow transplant.

Another example is that of Dr. Fiddes [12]. Dr. Fiddes was the president of a clinical research

3. Key Elements of Informed Consent

- Consenting to research
- Purpose of the research
- Likelihood of being assigned to one or another group
- Study duration
- Procedures to be followed and the ones that are experimental
- Participant responsibilities
- Anticipated risks and benefits
- Alternative(s) to participating in the research
- Compensation if injured

company in California. He conducted over 200 studies for scores of pharmaceutical companies beginning in the early 1990s. Many of the studies were used to support New Drug Approval applications (NDA) to the FDA. In 1997 he pleaded guilty to a felony charge of conspiracy to make false statements to the FDA in connection with the drug approval process. He was sentenced to federal prison, fined, and disqualified as a clinical investigator by the FDA because he made up fictitious research subjects, fabricated lab results by substituting clinical specimens and manipulating laboratory instrumentation, and manipulated clinical data by prescribing prohibited medications. None of these fraudulent practices were identified by either the company study monitors or the FDA inspectors that visited his research facilities multiple times. When the fraud was discovered, FDA inspectors asked Dr. Fiddes if the external study monitors and inspectors could have detected the fraud in some way. His response was they never would have detected the fraud had it not been for a disgruntled employee! Such a response highlights the importance of ethical conduct at all levels of a research team.

About this time the Good Clinical Practice (GCP) guidelines were published by the International Conference on Harmonization. This group established international, ethical scientific standards for designing, conducting, recording, and reporting trials that involve human subjects. By adhering to these standards the public could be assured that the rights, safety, well-being and confidentiality of trial participants are protected, consistent with the Declaration of Helsinki, and that clinical trial data are credible and accurate.

The birth of “informed consent”

A major focus of the Declaration of Helsinki, GCP guidelines, and the federal regulations is informed consent. Informed consent is a formal, voluntary process. It is not merely a form to be read quickly and signed. The elements of informed consent (Table 3) include the following: that the individual is consenting to participate in a research study, the purpose of said research, the likelihood of being assigned to one or another group if there is more than one group, the duration of the study, and the approximate number of participants to be studied. It also describes the procedures to be followed including the participants' responsibilities, any aspects of the research study that are experimental, and the anticipated risks, benefits and alternatives. Informed consent outlines payment and any expenses for participation as well as compensation in case of injury, and the person to contact for general information or study-related injury. It makes clear that participation is voluntary and that one can withdraw at any time without penalty or loss of benefits. Potential subjects must be aware that access to research records is available to monitors, auditors and regulatory authorities, but that confidentiality must and will be maintained. New information about continued participation is promised and provided in a timely fashion and volunteers must be made aware when their participation can be terminated.

Even after decades of experience with the informed consent process, a number of issues continue to be discussed and debated. Some examples are how to provide information that is understandable across a broad spectrum of individuals from diverse educational, economic and race/ethnicity backgrounds; how to preserve privacy and maintain confidentiality of the research information; how to recruit research participants; and when and how much to compensate them for their involvement.

Conclusion

There is a great deal more that can be written about the responsible conduct of research involving human subjects, but the intent of this communication was to highlight key concepts and issues that continue to engage researchers, ethicists and others. Hopefully, this has been achieved. In summary, clinical research is

essential to our ability to better understand disease and improve human health. Consequently, everyone involved in research with human subjects must do the research thoughtfully and as carefully and safely as possible.

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New Rationale for Treatment as Prevention: Cost-effective HIV management strategies from the HIV Prevention Trials Network (HPTN)

Adina Goldberger

An analytical review of the “Cost-effectiveness of HIV treatment as prevention in serodiscordant couples”. Walensky RP et al. N Engl J Med. 2013; 369:1715-25.

Primary disease prevention is a hallmark of our contemporary healthcare culture. From immunizations to prophylactic medication dosing to behavior counseling, researchers and healthcare providers have developed a host of interventions to thwart disease before it strikes, with the rationale that it is often easier to prevent disease than it is to treat it. This concept has been particularly important in the field of HIV therapy. Though numerous medications have been developed to treat HIV over the course of the last two decades, it is a virus with frighteningly disastrous potential outcomes that requires extremely complex antiretroviral therapies, making it an ideal target for a primary prevention strategy.

While a vaccine for HIV immunization has yet to be developed due to the rapid mutagenicity of the virus, various observational studies have suggested the potential viability of a “treatment as prevention” approach since 2009 [1-4]. Essentially, this approach entails that HIV-positive individuals receive HIV therapy early in their disease progression in order to reduce the risk of their HIV-negative partners contracting the virus. Antiretroviral therapy can reduce the HIV load in body fluids in an HIV-positive individual and can thus render him/her less likely to transmit the virus during sexual activity. While this notion is compelling in theory, observational data is limited in its ability to demonstrate reduction in HIV transmission as a result of early treatment. Reduction in transmission in these studies might instead be

attributed to confounding variables, such as the higher likelihood of people receiving early treatment to use condoms regularly.

Until recently, there was only observational data to support the efficacy of “treatment as prevention” in HIV, but the HIV Prevention and Trials Network (HPTN), an international association of clinical trials focused on the prevention of HIV transmission, was the first to demonstrate “gold standard” evidence for early HIV treatment as prevention in a randomized controlled trial [5]. Conducted across nine different countries, HPTN’s study enrolled 1763 serodiscordant couples (one partner HIV-positive and one partner HIV-negative) to receive antiretroviral therapy either immediately after a decline in CD4 count (early therapy) or at the onset of HIV symptoms

Antiretroviral therapy can reduce the HIV load in body fluids in an HIV-positive individual and can thus render him/her less likely to transmit the virus during sexual activity.

(delayed therapy) in the HIV-positive partner. The end point with respect to primary prevention in this study was demonstration of seroconversion in the formerly HIV-negative partners, while the clinical end point in the

study was the development of a severe HIV-related complication such as pulmonary TB, other severe bacterial infection, or death. In other words, the study stopped following patients if the HIV-negative partner became HIV-positive or if the HIV-positive partner developed a severe HIV-complication or died. After finding that of the 28 virally-linked transmissions, only one occurred in the early-therapy group (hazard ratio, 0.04; 95% CI, 0.01 to 0.27; $p < 0.001$)—and that subjects receiving early therapy experienced fewer clinical end points (hazard ratio, 0.59; 95% CI, 0.40 to 0.88; $p = 0.01$), the study concluded that early antiretroviral therapy reduced the rates of HIV transmission and adverse clinical endpoints.

While this HPTN study was foundational in shaping the current thinking about HIV prevention strategies on a theoretical level, a very obvious barrier to its implementation—particularly in developing countries where HIV is most prevalent—is cost. In low-resource environments, healthcare economics do not seem to justify the expense of antiretroviral medications to facilitate a “treatment as prevention” strategy at face value. However, a recent elaboration on the original HPTN early antiretroviral therapy study by the Cost-Effectiveness of Preventing AIDS Complications (CEPAC) International Group demonstrated that qualms about cost-effectiveness of treatment as prevention may be unfounded and simply erroneous [6].

In this recent cost-effectiveness study, Walensky and colleagues used the data from the original HPTN study as well as a micro simulation model of HIV progression and therapy to project the economic implications of early antiretroviral therapy in two of the original nine countries: India and South Africa. They compared early initiation of treatment with delayed treatment for HIV-infected partners in serodiscordant couples. Five-year and lifetime outcome measures included cumulative HIV transmission, life-years, cost, and cost-effectiveness. Early therapy was defined as “cost-saving,” “cost-effective,” or “very cost-effective.” “Cost-saving” denoted a decrease in total costs and an increase in life-years compared with delayed antiretroviral therapies. “Cost-effective” constituted an incremental cost-effectiveness ratio (ICER) that was less than three times the GDP. The ICER is an equation for cost-effectiveness analysis that represents the ratio of change in cost to incremental benefit—in other words, the increase in benefit from baseline—of an intervention. “Very cost-effective” constituted an ICER below the annual GDP per capita in that country.

It is especially interesting to examine the specific results in South Africa compared to those in India, as these countries represent high population loads of HIV amidst very different economic conditions: South Africa is a middle-income country (GDP \$8,100 USD) and India is a low-income country (GDP \$1,500 USD). The study found that in South Africa, early treatment prevented opportunistic disease and was

“cost-saving” over five years, while it was “very cost-effective” (\$590 per life-year saved) over a lifetime. In India, where healthcare costs are lower at baseline, early treatment was “cost-effective” (\$1,800 per life-year saved) over five years, and “very cost-effective” (\$530 per life-year saved) over a lifetime. Thus, in both South Africa and India, early antiretroviral therapy represents a cost-effective utilization of resources for HIV prevention, indicating that the results of this study can be applied to countries with non-identical economic profiles. In conclusion, Walensky and colleagues highlight the importance of supporting early antiretroviral therapy for serodiscordant couples even in low-resource settings, thereby lending strong support to the “treatment as prevention” concept.

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Adina Goldberger is a third-year MD/MPH student and lifelong women’s and reproductive health enthusiast. Her role on the NPHR is staff writer and she is excited for the opportunity to tell the Northwestern community about the frontiers of public health research and practice.

Alumni Spotlight:

Discovering what it means to work in “public health”

An Interview with Karen Sheehan, MD, MPH



Karen Sheehan, MD, MPH, is a Professor in Pediatrics-Emergency Medicine and Preventive Medicine at Northwestern University. She is a distinguished alumna of the Northwestern Medical School Class of 1989 and earned her MPH from the University of Illinois-Chicago in 1996. Her work in public health has spanned many interests, and she currently is the Medical Director of the Injury Prevention and Research Center at the Ann & Robert H. Lurie Children’s Hospital of Chicago. Additionally, she is a founding volunteer of the Chicago Youth Programs, the Medical Director of Strengthening Chicago’s Youth, the Associate Chair of Advocacy for the Department of Pediatrics, and the Interim Co-Director of the Mary Ann & J. Milburn Smith Child Health Research Program.

Kristen Unti (right) is a third-year MD/MPH student at Northwestern University. Desiring to become a pediatrician, her public health interests are focused around public policy and advocacy surrounding issues affecting children. Additionally, she has growing experience in patient safety and quality improvement.



Kristen Unti: Dr. Sheehan, what originally got you interested in public health?

Dr. Karen Sheehan: Well, for a long time, I didn’t even know what public health was. I stumbled across it when I started medical school at Northwestern [University]. I heard about a new program that Joseph DiCara, MD, MPH, and several other medical students were starting called the Cabrini Green Youth Program, which would later become the Chicago Youth Programs (CYP). I thought it was really terrific that we’d go to Cabrini Green, bring kids back to Northwestern on Saturday mornings, and play in the gym with them at the Lake Shore Dorm. I ended up spending a lot of time in the community, and I went on to become a pediatrician because I wanted to help make kids healthy so they could reach their full potential. It became apparent that a once-a-year, well-child visit was not enough to improve the health of children, and that you had to address social and physical environments if you real-

ly wanted to improve their health. The Cabrini Green Youth Program was my introduction to public health. We went on to build CYP with the thought that the only way to really improve a child’s health is to get him or her out of poverty. For most, education is the surest route out of poverty.

KU: What is the biggest barrier that you faced in building CYP or any of your other public health endeavors, and what did you do to overcome it?

It became apparent that a once-a-year, well-child visit was not enough to improve the health of children, and that you had to address social and physical environments if you really wanted to improve their health.

KS: Well, I always hate these questions because I never really think of anything as a barrier. People tell me “no” all the time, but I get creative and think of another way around it. But one time occurred with my first big coalition, the

Stop the Falls Campaign. Susan Avila, RN, MPH, who is a trauma nurse at the John H. Stroger, Jr., Cook County Hospital, came to me saying that many kids in their ER had fallen from windows, and we had to put a stop to it. We got all of the pediatric hospitals and the Chicago Dept.

of Public Health to work together. We wanted the Chicago Fire Department to endorse the campaign as well. However, the commissioner refused, out of fear that the installation of releasable window guards would be a problem in terms of people being able to get out if there was a fire. It was an especially touchy topic since historically Chicago has this thing about fire. They refused to meet with us; they wouldn't talk to us or return our phone calls. So we pursued other strategies until eventually a new commissioner was appointed who liked the campaign and now advertises our campaign on the Chicago Fire Department website. I couldn't get the endorsement of the Mayor of Chicago without the Chicago Fire Department, but we just kept going and it worked out eventually. I think that if something is the right thing to do, then you either find another path or take a smaller step, but you will always move forward. That's the whole thing about public health and advocacy. You just have to be patient. And it all adds up. I mean, CYP is 30 years old this year! It's incredible that it has survived without going bankrupt or having any scandals. And in the clinic we now have second-generation patients, which is very cool.

KU: Certainly! For those of us considering multidisciplinary careers, how do you balance your roles in advocacy, policy, research, and being a practicing physician?

KS: Well, it was adding up to be too much to do primary care, pediatric emergency medicine, my research, and so forth. For the last couple of years, I have only been in the ER once or twice a month. But what I think is great for people involved in both health care and advocacy is that it all works together! One role doesn't end, you just see the big picture, and it helps inform your ways. That's why I am doing injury prevention. I was working in ERs, and I was dumbfounded to see kids falling out of windows. So I thought, "Let's prevent it."

And what I've found taking care of the second generation of kids is that I didn't always do a

very good job as a pediatrician. I tried to be a good pediatrician, but we just didn't have the knowledge back then. For example, I'd ask how kids were doing in school and they were passing, so I assumed they were doing just fine. But in reality, the Chicago Public Schools at the time were instead just passing students along. There are some kids with learning disabilities that slipped through the cracks. Now with children of their own, the parents are super bright people, but they can't get good jobs because they can't read. I am trying to get them into adult literacy programs, but if I could have picked that up sooner by

I never really think of anything as a barrier. People tell me "no" all the time, but I get creative and think of another way around it.

asking better questions earlier on, I could have made a huge difference. I can see intergenerational influences that will be hard to overcome. On the other hand, I no longer see the families of kids who succeeded and are living happy lives. It's the ones who had the harder times who are still coming to us—which is good. It still gives us a chance to intervene. And we understand so much more about early childhood adverse experiences and the effects on health in adulthood. In medicine and public health, you keep learning. I guess that's why they call it the "practice of medicine." I'm a better pediatrician now than I was 20 years ago.

KU: As students just starting in our public health and advocacy careers, what advice would you give in terms of how to begin to make an impact in the field of public health?

KS: I think you need to find what you are passionate about, and it will follow. And be patient. You often feel like you are starting below ground and digging and digging to try to climb up. It takes forever to get going, but then things start to snowball. One activity builds upon the other and you get mini-successes. And it just takes off! So have patience, perseverance and passion. And then it doesn't seem like work. My job is so much fun! That is when you know you've found a balance in your career—when it's fun and you do good things as well. It makes it worthwhile.

Interview conducted on January 31, 2014 in Chicago, Illinois.

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In 1854, John Snow persuaded one of London's local councils to disable the Broad Street pump. By proving that London's cholera epidemic was being spread through the water supply and then cutting off that source, Mr. Snow became one of the founders of public health. He changed the way we study and think about health and its all-encompassing grasp on a population. Today, we seek to protect public health through research, environmental programs, policy development, and system regulation. This journal encompasses the continuing research of a group of individuals inspired by Mr. Snow and his work to improve the health of many.



By Ashley Cenicerros, designer NPHR logo

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