Bouncing back from war
Policy as a prescription
A new universe for public health
ON THE COVER: An American flag depicting members of the military as the stars. In this issue, we explore the topic of resilience and psychiatric health in war veterans.
CONTENTS

3 Publication highlights

FEATURES

9 Bouncing back: Is resilience possible?

12 Policy as a prescription

16 A new universe for public health

19 Symposium report: Getting to zero

23 In the news

26 Faculty publications
Colleagues,

Welcome to the Winter 2014 issue of 2x2.

Five years ago 2x2 was a small departmental newsletter aimed at keeping our internal constituents current on the work underway in the department. Since then it has become a vehicle for tackling some of the most pressing public health questions of our time and translating the science of epidemiology to a diverse audience. As we go to press on this issue, my last as department chair, I congratulate our faculty, students, and staff for their work in bringing 2x2 to its current form.

In these pages, as always, we continue to capitalize on synergies with the 2x2 project (the2x2project.org) and the Global Research Analytics for Public Health program (CUGRAPH.org) to shed light on new population health research and policy.

We look at resilience training for war veterans, at municipalities that are using policy to target fundamental health inequalities, and at the potential insights human microbiome research could provide to our understanding of health and nutrition. We report on the relevance of epidemiologic research to New York City’s new Vision Zero policy to reduce traffic deaths and also bring you new research and news items, including our faculty’s ongoing role in communicating information, advocating for intervention, and encouraging calm during the Ebola outbreak.

I am excited to watch the department’s ongoing trajectory of excellence under the leadership of Dr. Neil Schluger, and look forward to reading, and learning from, 2x2 over the coming years.

Warm regards,

[Signature]
Over 80 percent of breast cancer patients in the United States use complementary therapies following a breast cancer diagnosis, such as yoga or meditation, to go along with medical treatment. In the past, there has been little science-based guidance to inform clinicians and patients about their safety and effectiveness. Now, newly published guidelines from the Society for Integrative Oncology, Columbia University’s Mailman School of Public Health in Epidemiology and the Herbert Irving Comprehensive Cancer Center with colleagues at other institutions in the U.S. and Canada, rank the efficacy and safety of over 80 integrative therapies.

Meditation, yoga, and relaxation with imagery yielded the strongest evidence supporting their use, receiving an “A” grade when used routinely for anxiety and other mood disorders common to breast cancer patients and a “B” grade when used to reduce stress, depression, and fatigue. Acupuncture received a “B” grade for controlling chemotherapy induced nausea and vomiting and is recommended to most patients. More than 30 interventions, including some natural products and acupuncture for other conditions, had weaker evidence of benefit due to either small study sizes or conflicting study results and received a “C” grade. Seven other therapies were deemed unlikely to provide any benefit and are not recommended. One therapy was found to be harmful: acetyl-l-carnitine, which is marketed to prevent chemotherapy-related neuropathy, yet actually increased risk for the condition.

To conduct their analysis, the researchers used a set of nine biomedical publication databases to review randomized controlled clinical trials conducted from 1990 through 2013 among breast cancer patients. The trials tested complementary therapies together with standard cancer care — defined as surgery, chemotherapy, radiation therapy, and hormonal therapy. Based on a set of guidelines developed by the Institute of Medicine, the researchers considered the magnitude and type of benefit and harm along with trial quality and size. They made their grades using the U.S. Preventive Services Task Force grading system.

“Most breast cancer patients have experimented with integrative therapies to manage symptoms and improve quality of life. But of the dozens of products and practices marketed to patients, we found evidence that only a handful currently have a strong evidence base,” said Dr. Heather Greenlee, assistant professor of epidemiology and president of the Society for Integrative Oncology. Dr. Dawn Hershman, associate professor of epidemiology and medicine, was a co-author of the report.

A number of interventions did not have sufficient evidence to support specific recommendations. “This does not mean that they don’t work; this means that we don’t yet know if they work, in what form, or what dose is the most effective,” said Dr. Greenlee.

The researchers also found that many of the complementary therapies were low risk, and the lack of means to measure them may not greatly influence their clinical application.

“These guidelines provide an important tool for breast cancer patients and their clinicians as they make decisions on what integrative therapies to use and not use,” said Dr. Greenlee. “It is important to personalize the recommendations based upon patients’ clinical characteristics and values. What’s right for one patient, may be wrong for another.”

Public health scholars have paid scant attention to a 12-nation trade agreement that could pose a significant public health threat, say Dr. Henry Greenberg, associate professor of epidemiology and medicine, and Ms. Stephanie Shiau, a doctoral trainee, in a commentary in the *Journal of Public Health*.

If passed in its current form, the pact could lead to a rise in drug prices, loosened tobacco and food supply regulations, and more expensive medical procedures, the authors say. It “could, for the most part, override national guidelines and regulations in the corporate arena that pertain to health,” say Dr. Greenberg and Ms. Shiau.

“Given the magnitude of the threats, the response of the public health community has been paltry.”

The Trans-Pacific Partnership, or TPP, is a wide-ranging agreement between the Pacific Rim countries of Australia, Brunei, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, U.S., and Vietnam. The talks have been closed to members of the media and the Congress but have included corporate figures in various industries.

What is known about the treaty has come from leaks. Under one controversial provision, foreign investors could sue governments for harming their countries’ interests. Nations that regulate cigarettes, alcohol, and food supplies for public health reasons could face legal action. This is currently playing out in Australia, where Philip Morris has used a bilateral trade agreement with Hong Kong to challenge a law that imported cigarettes have to be sold in plain packaging to make them less appealing. Four tobacco-producing nations have also contested the law.

Under another TPP provision, companies will have an easier time extending their drug patents, which means it would take longer for patients to access cheaper generic drugs. Drug makers would be able to renew a patent even for minor changes to a medication. Diagnostic, therapeutic and surgical methods could also be patented.

Despite the sweeping ramifications of the TPP, American public health journals did not publish a single article on the issue between January 2013 and March 2014, according to the authors. The American public health community has been largely ignorant, they say, for a number of possible reasons. Public health professionals typically do not examine legal structures, trade, and patent regulations, the authors say. Grant funding to schools of public health incentivizes research into infectious diseases rather than chronic, usually non-communicable diseases such as heart disease, stroke, diabetes, and cancer that would be most affected by the trade agreement.

For now, it appears the TPP will not pass by the end of the year. But Dr. Greenberg and Ms. Shiau emphasize that public health scholars in general need to “travel much further upstream in the search for causes of disease, or ill health.”

“Trade agreements are one such example, but agriculture subsidies, water management, urban development, and oversight of television content are others,” they say. “Academic public health has been slow to adapt to these realities and pays a high price for courting irrelevance.”

New York City’s stop-and-frisk policing has generated significant controversy for alleged racism and unlawful search practices. A new study in the *American Journal of Public Health* suggests the policy might also have a negative effect on the mental health of those who are stopped.

“Our findings suggest that any benefits achieved by aggressive proactive policing tactics may be offset by serious costs to individual and community health,” say co-authors Dr. Bruce Link, professor of epidemiology and sociomedical sciences; Dr. Amanda Geller, a former sociomedical sciences faculty; Dr. Jeffrey Fagan, a professor of epidemiology and law at Columbia; and Dr. Tom Tyler, a professor of law at Yale Law School.

During a six-month period over 2012 and 2013, the researchers surveyed a racially, ethnically, and geographically representative sample of 1,261 men ages 18 to 26. Eighty-five percent of the men who participated said police had stopped them in their lifetime, and 46 percent reported being stopped in the last year.

Using three different models, the researchers found that young men who reported more contact with the police, particularly intrusive encounters, also reported higher levels of anxiety and trauma. Such encounters could include bag searches, frisks or pat downs, use of force, getting threatened with a weapon, or arrest. Twenty-five percent of people who took part in the survey said they experienced such encounters.

New York City recorded 4 million stops from 2004 to 2012, the vast majority of them leading to no convictions, according to a report by Dr. Fagan. Other large cities like Philadelphia and Los Angeles have seen similar policing practices. Separate studies have found that stops commonly include police violence, racial or ethnic insults, and homophobia. Approximately half of the recorded stops in New York City involved physical contact, while about 20 percent involved use of force, such as getting slammed against walls or thrown to the ground.

While the researchers acknowledge the search tactics may have a public health advantage, they conclude there is a significant public health risk as well. “Although proactive policing practices target high-crime, disadvantaged neighborhoods, affecting individuals already facing severe socioeconomic disadvantage, our findings suggest that young men stopped by the police face a parallel but hidden disadvantage: compromised mental health.”


---

**Stop-and frisk policing takes a mental health toll**

Intrusive searches linked to trauma and anxiety

[the2x2project.org](http://the2x2project.org)

[2x2.ph/stop-and-frisk](http://2x2.ph/stop-and-frisk)
We often fear that Facebook is weakening our social cohesion, but a new study finds that the popular social networking site served as a positive tool for a clinic treating young adults with HIV. The site’s group page function helped the clinic maintain engagement and create an environment of support for members.

The study comes amid news that Facebook is exploring plans to create a health care application that would allow users to connect in online “support communities” based on various ailments.

“The high volume of mostly voluntary and spontaneous activity observed on the page during the study period indicates that the young adults in the program are open to engaging with this technology and that they obtain benefit from using it,” say the study’s authors, Dr. Stephen Arpadi, professor of epidemiology and pediatrics, and MPH graduates in sociomedical sciences Ms. Anna Gayansky and Ms. Kathryn Romansky-Poulin.

While small, the study portrays an overwhelmingly positive and health-promoting experience for the teens and young adults who were members of the HIV clinic’s Facebook group. Not only did group members stay in better contact with the organization through the Facebook group, but it also served as a forum to support and encourage maintaining positive health behaviors such as taking HIV medication regularly. People who are satisfied with their level of social support are more likely to adopt healthy coping strategies and experience a slower onset of HIV-related symptoms.

The researchers studied 16 months worth of content posted on the clinic’s Facebook group page between 2011 and 2012—amounting to nearly 4,000 posts and comments. At the time of the study, the clinic had 75 people enrolled in its young adult program, 43 of who posted on the Facebook page at least once during the study period.

The study found that the page was most often used for facilitating the logistics of the young adult program such as event reminders, meeting announcements and feedback on different aspects of the program. The clinic staff also saw it as an effective way to get in touch when they could not reach group members through other means of communication.

Other popular uses of the site included seeking or giving support for adhering to difficult medication regimens, socializing, and “banter.”

According to previous research, people who are satisfied with their level of social support are more likely to adopt healthy coping strategies and experience a slower onset of HIV-related symptoms. A 2010 study found that social support played a key role in dealing with the stress of living with HIV and is related to a lower likelihood of depression.

There are however some concerns about using Facebook for public health purposes. Less educated, economically disadvantaged, and socially marginalized members of the population are less likely to use information technology. And although the clinic staff took measures to ensure the group’s privacy was protected, such as designating the group private, using agreed upon code words for HIV or AIDS, and requiring that members not show the page to people outside of the group, several members of the young adult program still did not wish to join because of privacy concerns.

“Although clearly not risk free, our experiences suggest that social media is an untapped and potentially potent means of support for young people living with HIV to tap into,” says Dr. Arpadi.

Gaysynsky A, Romansky-Poulin K, Arpadi S. “My YAP Family”: Analysis of a Facebook Group for Young Adults Living with HIV. AIDS Behav. 2014 Sep 4. [Epub ahead of print]
Injuries in the week after Hurricane Sandy

In the week after Hurricane Sandy hit New York City over two years ago, ten percent of residents in a city flood zone sustained injuries, 71 percent of whom had multiple injuries, principally to the arm and hand, followed by back strain or sprain, according to a cohort study of survivors of the 9/11 disaster by the New York City Department of Health and Mental Hygiene, co-authored by Columbia University professor of clinical epidemiology, Dr. Steven D. Stellman, a research director for the Registry. Injury risk increased with depth of floodwater in the home and was greatest in those who attempted cleanup or repair of heavily damaged homes. Disaster response policies need to be cognizant of injury risks associated with cleanup efforts, especially in the early days and weeks afterwards when organized cleanup response is not fully in place, say the authors.


Autism related to shorter and longer birth intervals

Children who were conceived either less than one year or more than five years after the birth of their prior sibling were more likely to be diagnosed with autism than children conceived following an interval of two to five years, according to a study of a 7,371-person Finnish cohort.

“It is important to realize that we can’t say from this study that spacing of pregnancies per se is a cause of ASD [an autism spectrum disorder]—this is most likely a proxy of other factors that are more directly related to the chance of the child’s developing ASD,” said senior author Dr. Alan Brown, professor of epidemiology and professor of psychiatry at Columbia University Medical Center and the New York State Psychiatric Institute.

This study provides further evidence that environmental factors occurring during or near the prenatal period play a role in autism, a serious and disabling condition that affects millions of individuals and that is increasing in prevalence,” said senior author Dr. Alan Brown, professor of epidemiology and professor of psychiatry at Columbia University Medical Center and the New York State Psychiatric Institute.


Access to generics may help breast cancer patients adhere to therapy

Breast cancer patients who have access to generic hormone therapy are more likely to stick to their drug treatment, according to a study by Dr. Dawn Hershman, associate professor of epidemiology, and colleagues including Dr. Al Neugut, Myron Studner Professor of Cancer Research and professor of epidemiology, and Dr. Grace Hillyer, assistant professor of epidemiology.

The study included more than 5,500 women ages 50 or older who had surgery to remove their breast cancer and were prescribed drugs called aromatase inhibitors. Although these drugs significantly reduce the risk of recurrence of breast cancer, many women don’t take their medications as directed, the researchers said. Women who took generic aromatase inhibitors were 50 percent more likely to adhere to their drug therapy than those who took brand-name versions, which are much more expensive. “Cost is not the only reason. But it can intensify other factors such as side effects. Up to 40 percent of women taking [aromatase inhibitors] experience joint stiffness. If you add a high co-payment to the mix, that’s often enough to make them discontinue therapy,” Dr. Hershman said.

**Genetic variation associated with PTSD risk in National Guard**

A genetic variation may predict a greater likelihood of post-traumatic stress disorder (PTSD) in National Guard veterans of the wars in the Middle East, according to a new study by Dr. Sandro Galea, Mr. Gregory Cohen, a doctoral candidate in epidemiology, and colleagues. Analyzing results from 810 Ohio National Guard soldiers, the investigators found that for individuals with two or more experiences of childhood trauma, such as abuse, a single nucleotide polymorphism in the ADRB gene was associated with risk for adult PTSD symptoms. The results suggest that this gene “interacts with childhood adversity and either results in a vulnerability or resilience to developing PTSD symptoms following adult trauma,” says Dr. Galea. Lifetime trauma exposure was also a strong predictor of PTSD symptoms, regardless of genotype.

View an infographic of this study on the 2x2 project 2x2.ph/PTSD-infographic


**Skipping college makes young people more likely to abuse pain pills**

Young adults who do not attend college are at particularly high risk for nonmedical prescription opioid use and disorder, according to a study by Dr. Silvia Martins, associate professor of epidemiology; Dr. Magdalena Cerdá, assistant professor of epidemiology; Dr. Katherine Keyes, assistant professor of epidemiology; Mr. June Kim, a doctoral trainee; and colleagues. In contrast, the nonmedical use of prescription stimulants is higher among college-educated young adults.

Among non-college-attending young adults with at least a high school degree, 13.1 percent reported using prescription opioids for non-medical reasons. The figure rose slightly to 13.2 percent for those who did not graduate from high school, and declined to 11.3 percent among college attendees.

“Our findings clearly show there is a need for young adult prevention and intervention programs to target nonmedical prescription drug use beyond college campuses,” said Dr. Silvia S. Martins.


**People conceived during Dutch WWII Famine have altered regulation of growth genes**

Individuals conceived in the severe Dutch Famine, also called the Hunger Winter, may have adjusted to this horrendous period of World War II by making adaptations to how active their DNA is.

During the winter of 1944-1945 the Western part of The Netherlands was struck by a severe 6-month famine. During this Hunger Winter the available rations provided as low as a quarter of the daily energy requirements. Extensive research on the DNA of these Hunger Winter children shows that the regulatory systems of their growth genes were altered, which may have helped them survive famine conditions but also may explain why they appear to be at higher risk for metabolic disease in later life.

“Looking at the human genome we see systematic changes in gene regulation during early human development in response to the environment. The epigenetic revolution has given us the tools to investigate these changes and look at the impact for later life,” said Dr. L. H. Lumey, associate professor of epidemiology and senior author.

Bouncing back from war

Is resilience too much to expect from veterans?

BY SHATHA EL-NAKIB

Soldiers rehearsing for “Army Strong,” a song-and-dance production meant to highlight resiliency of members of the military.
Designed to train military families to cope with traumatic events of war and the transition back to civilian life, FOCUS has helped Crystal, Anthony, and their children deal with her husband’s injury through open and honest communication. “We were given the tools to see events from our children’s perspectives, how to use the “feeling thermometer” so we don’t let feelings fester and boil over, how to relate more kindly to each other, and to bond more as a family,” writes Crystal.

FOCUS is one of many government interventions designed to help veterans transition back to civilian life. Forever changed by their experiences of war, some veterans come home with physical injuries sustained during combat and psychiatric disorders like posttraumatic stress disorder (PTSD), anxiety, and major depression. A recent Institute of Medicine report chaired by Dr. Sandro Galea, chair of the Columbia department of epidemiology, estimates that around 8 percent of veterans who have served in Iraq and Afghanistan have been diagnosed with PTSD.

However, not all veterans go on to experience psychiatric disorders. Research shows that “resilient” individuals—those who according to the American Psychological Association “adapt well in the face of adversity and tragedy, threats, or significant sources of stress”—are less likely to develop psychiatric illness from exposure to trauma.

Evidence of resilience comes from a study by the Department of Veterans Affairs’ National Center for PTSD and the Yale University department of psychiatry. The researchers administered a survey to 272 war veterans that assessed combat-related stress, psychological functioning, and social support. While some veterans saw significant combat and subsequently experienced high PTSD symptoms, another group of individuals with high combat exposure had minimal or no PTSD symptoms and were considered resilient. (The researchers compared both groups to controls who had low combat exposure and low PTSD symptoms).

A number of additional studies have documented evidence for resilience. Fueled by such findings, several programs have been established to promote resilience not only after a soldier returns but before he or she is even deployed.

However, some have questioned whether it is reasonable to expect veterans and other trauma survivors to “bounce back” after experiencing violence, seeing fellow soldiers die, or sustaining an injury. The use of resilience-building may be “ineffective and perhaps even harmful,” says an article published in the Annual Review of Clinical Psychology by Dr. George Bonanno, professor of clinical psychology at Columbia University’s Teacher’s College. Speaking to the aims of some resilience-building programs, Dr. Bonanno cautions that “while the idea of preventing the development of trauma-related psychopathology in individuals exposed to high-stress situations such as combat has obvious merit, it is important to anticipate potential adverse consequences of these interventions.” He cites the lack of evidence for the effectiveness of resilience-building interventions and refers to studies that have shown that groups receiving these interventions in many cases have actually ended up reporting higher PTSD symptoms.

Dr. Bonnano notes that resilience building can increase stigma attached to mental health problems: if people can be “trained” to be resilient, their inability to achieve resilience could be attributed to their own personal failure. Additionally, asking a group that has faced the most horrific aspects of war to find meaning and purpose in life—a goal of some resilience programs—may backfire, causing them to feel defeated and helpless if they do not feel resilient in the face of inevitable violence and destruction.

Moreover, the view that resilience is a skill that can be taught is not without contention. Protective factors associated with resilience begin accumulating early—from as far back as early childhood. Researchers have found that resilient people have several strengths both as individuals and in their living environment that are believed to buffer and moderate the impact of stress and trauma. They typically have personal characteristics such as secure self-esteem, effectiveness dealing with stress, and self-efficacy, which is a positive perception of one’s ability to perform actions necessary for desired outcomes, according to a classic longitudinal study that began in 1955 by Dr. Emmy Werner, a professor...
emerita of human development and family studies at the University of California, Davis, and Dr. Ruth Smith, a psychologist. Their study, which followed all of the children born on the Hawaiian island of Kauai over the course of a year, provided some of the earliest evidence for protective factors involved in resilience.

Resilient individuals also have strong family and extended ties. An individual’s ability to capitalize on existing social networks and seek out family and friends for support during times of need improves the likelihood that he or she can recover from trauma, according to a 2008 study from the Journal of Epidemiology and Community Health. Family cohesion and “a child’s experience with his caretakers... has both direct effects on risk for bad life outcomes...and indirect effects such as buffering the impact of other risk-protection factors,” according to Dr. Elaine Blechman, professor of psychology at the University of Colorado, Boulder. Psychologists believe that as children, resilient individuals often have caretakers who are accepting and warm and families that are cohesive and stable.

In the same study conducted by the Department of Veterans Affairs’ National Center for PTSD and the Yale University department of psychiatry, researchers looked at a number of demographic and psychosocial factors associated with resilience in the group that reported high combat exposure and minimal PTSD symptoms. They found that resilient individuals were more likely to be married or living with a partner, felt they had greater control and purpose in their lives, and had social networks from which they could seek support.

Can resilience programs be effective if factors that build resilience accumulate from various life stages and are often outside of an individual’s control? According to Dr. Catherine Mogil, assistant clinical professor at the University of California, Los Angeles, who is director of the FOCUS project, they can. “We have evidence from our program that it can work. You can’t immunize people from adversity, but you can build in some factors that can help strengthen their resilience and the way they respond to stress. We have indeed noted that the health of our military parents are improving.”

Dr. Mogil and her colleagues have identified behaviors that military families can modify to improve their resilience, such as better communication: “Military families are so careful around each other, which may create communication silos. We help them talk about the elephant in the room. Sometimes children will be concerned over the well-being of their parents, who may have a hard time answering questions like ‘have you killed someone?’” Such questions can be a source of stress for service members, but working on enhancing communications around these issues helps the entire family.

For now, it appears the “tide of war” is not receding, and deployment-related trauma will continue to be a problem for returning service members. Whether resilience programs can play a role in transitioning them back into society remains unclear.
Policy as a prescription

“Upstream” policies target fundamental causes of health inequalities

BY PATCHES MAGARRO

the2x2project.org

2x2.ph/upstream-health-policies
Misty was suicidal the last time she went to the emergency room, with high blood pressure, hernias, depression, post-traumatic stress disorder, and addictions to both drugs and alcohol. It was not her first visit to the E.R. in recent months, but it was on this visit that she met Kimberly. Kimberly is officially a community outreach specialist for PrimaryHealth, a managed care provider for Medicaid patients in Oregon. But in practice, Kimberly has been so much more to Misty: hospital visitor, transportation coordinator, and art teacher, to name a few of her roles.

Before she was enrolled in PrimaryHealth, Misty says, “I didn’t care whether I was living or dying. I’m the type of addict that I knew my medications would interfere with getting loaded... and I didn’t want that to happen.” But she eventually accepted help and went through detoxification, inpatient treatment for both mental health issues and addiction, and a stay in a women’s group home, all with Kimberly’s support.

The idea behind PrimaryHealth specialists like Kimberly is to go beyond clinical treatment to provide social support and remove barriers to health that exist because of the patients’ socioeconomic situation or where they live. PrimaryHealth allows Kimberly access to funds to solve clients’ nonmedical obstacles to treatment, which she used to buy Misty’s bus pass and taxi fare so that Misty could travel to a training program that was 30 miles away. Kimberly also taught Misty how to paint as a way to calm her and distract her from cravings. “I never heard of people doing what Kim does, going to these extremes... I feel really good now. I feel better than I’ve ever felt,” says Misty.

Today Misty is four and a half months sober, on her way to completing a program that will allow her to mentor peers with addiction problems, in her own apartment, and able to manage her medical conditions.

The determinants of the determinants

Social determinants of health “including the effects of poverty, education, the treatment of women, employment opportunities, and limited access to medical care for some are as important in promoting health, if not more so, than the direct medical determinants of health. Focusing on these determinants make more sense than waiting until people become sick and seek...
care, and it often costs much less,” World Health Organization commissioners Drs. Gail Wilensky and David Satcher write in Health Affairs. 

In America, these disparities have become more pronounced as the wealth gap has widened. In his book *Capital in the Twenty-First Century*, Dr. Thomas Piketty, a professor of economics at the École des hautes études en sciences sociales and at the Paris School of Economics in France, writes that income inequality in the U.S. is “probably higher than in any other society at any time in the past, anywhere in the world.” From 1947-1979, the share of income going to the top 1 percent declined by over 26 percent, but from 1979-2012 that trend reversed, and the share of income among the wealthiest rocketed up by 119 percent. White families with above-average incomes were the only households to see their mean income rise from 2010 to 2013 according to the same report.

That society’s less advantaged members have more illness and higher mortality rates has been documented for decades. Those on the lowest rungs of the socioecononic ladder have an age-adjusted risk of death two to three times greater than those in the highest level, according to a 2010 paper by Dr. Jo Phelan, a professor of sociomedical science, Dr. Bruce Link, a professor of epidemiology and sociomedical sciences, and Dr. Parisa Tehranifar, an assistant professor of epidemiology, all at Columbia University’s Mailman School of Public Health.

In their article, the authors write that socioeconomic status “embodies an array of resources, such as money, knowledge, prestige, power, and beneficial social connections that protect health.”

According to a growing body of social epidemiologic research, social inequality, whether due to low wages or race and gender discrimination, also creates a physical stress response that leads to health problems.

Social epidemiologists refer to social, economic, and racial factors as “upstream” causes of health, or “the determinants of the determinants.” The analogy is to a literal stream in which people are floating by, on the verge of drowning. A bystander on shore jumps in to rescue victims but quickly becomes exhausted after a couple of saves. Hiking upstream to find out how people are falling in the water, he discovers a hole in the bridge. To prevent anyone else from falling, he fixes the bridge or puts up a warning sign, showing it is much more effective to prevent deaths upstream than downstream.

Similarly, upstream policies in health are fundamentally about preventing or pushing back the onset of illnesses. A patient who has heart disease can take a number of drugs, but to prevent heart disease in the first place, doctors recommend practices like eating a healthy diet with many fruits and vegetables and staying active. But what if there is no grocery store or safe place to play because a neighborhood does not have many resources? Barriers to healthy behaviors that occur for economic reasons are increasingly the targets of policies and interventions that are designed to improve health.

“Social and economic forces that are often outside of the control of individuals powerfully shape health and life opportunities,” says Brian Smedley, executive director of the National Collaborative for Health Equity, and lead author of a seminal 2003 Institute of Medicine report “Unequal Treatment”. His organization’s Place Matters initiative aims to reverse the heavy concentration of health risks in minority communities in Baltimore, where there is a 30-year difference in life expectancy among some residents. Examining a 1930s era Federal Housing Authority map, Place Matters found that neighborhoods with the lowest life expectancy were redlined 80 years ago. “Redlining” refers to the practice of denying federal mortgage insurance in predominantly black neighborhoods, regardless of the credit history of any individual applying for a mortgage.

Just as redlining created inequities, Smedley is optimistic that other policies can reduce them. “People can undo these policies and ensure that every neighborhood is a neighborhood where people can enjoy opportunities for economic mobility and for better health,” he says.
“Changing behavior is hard, changing policy is even harder, and changing basic social structure is the hardest of all, but the alternative is to do nothing.”

Redressing inequality

In 2010, King County in Washington state passed an ordinance requiring that county policy decisions consider how to correct inequities. After the ordinance took affect, the county allocated more transportation funds to an underserved neighborhood and enhanced youth programs in a low-income community.

Cincinnati’s health commissioner Dr. Noble Maseru speaks passionately about the high infant mortality rate in his city, which for many years, was more than double the national average. One area of the city had 32 deaths per 1,000 births, five times the national average, and on par with countries like Kyrgyzstan and Zimbabwe.

In 2013, the city launched a “First Steps” program under a city health department partnership with area hospitals, known as the Infant Vitality Surveillance Network. First Steps focuses on upstream interventions like early childhood education, social service support, and home visits to new mothers in the 17 Cincinnati zip codes where infant mortality rates had hit the double digits. Since First Steps began in 2013, the infant mortality rate dropped to a historic low, from 20.2 to 14 percent in those zip codes and from 13.3 to 9.9 percent city-wide.

“Surveillance visits” the program provides to mothers after they have given birth are a critical factor to this success, says Dr. Maseru. During these home visits, the mother receives information on federal programs for women, infants, and children, is screened for depression, trained in breastfeeding and safe sleep education, and receives goods like clothing and playpens. “The surveillance piece is extremely powerful, and in terms of replication, I think that can have a similar impact in other cities,” says Dr. Maseru.

As for research in this area, Dr. Lisa Bates, assistant professor of epidemiology and population and family health at Columbia University’s Mailman School of Public Health, believes social epidemiologists will increasingly turn their attention to evaluating and getting involved in programs that reduce health disparities. She sees her peers increasingly working “to be engaged in interventions to try to mitigate [disparities], which I think is very important and admirable, and it’s appropriate.”

Dr. Rachel C. Shelton, assistant professor of sociomedical sciences at Mailman, is conducting research on the National Witness Project, a program where African-American women who have survived cancer provide outreach and education on breast-cancer screenings to fellow African-American women. Dr. Shelton’s research looks at what makes a successful adviser and what keeps certain programs alive. Programs affiliated with academic institutions have a better chance at success, according to a study that she will publish soon.

Dr. Bruce Link, who with Dr. Jo Phelan was among the first contemporary academics to emphasize social forces as fundamental causes of health disparities, is with assistant professor of epidemiology at Mailman Dr. Dana March, studying how factors like race and socioeconomic status play out from gestation to age 50 based on data from Child Health and Development Studies. “We can see: how do these health inequities emerge over the life course, and how are they transmitted from one generation to the other—if they are transmitted,” Dr. Link says.

Despite all this activity, going upstream is a challenge. “Changing behavior is hard, changing policy is even harder, and changing basic social structure is the hardest of all,” said Dr. Jeff Niederdeppe, an associate professor of health communication and social policy at Cornell University at a recent talk he gave at the Mailman School. “But the alternative is to do nothing.”

As Dr. H. Jack Geiger, a medical professor emeritus at the City College of New York who was recently awarded public health’s highest honor, the Frank A. Calderone Prize, said in a Time interview from 1968: “The poor are likelier to be sick. The sick are likelier to be poor. Without interventions, the poor will grow sicker, and the sick will grow poorer. And that has troubling consequences for all of us.”
A new public health universe

How the human microbiome could change our understanding of nutrition and disease

BY KATHLEEN BACHYNSKI

the2x2project.org

2x2.ph/microbiome-health
Each of us hosts hundreds of trillions of bacterial cells. These microbial ecosystems live in many places: the surface and deep into the skin, on the tongue, and in the gastrointestinal tracts. This collection is known as the human microbiome. We rely on these organisms every day for help in digesting food, synthesizing vitamins, and regulating our immune systems. But only recently have researchers begun to uncover the importance of the microbiome for public health. Their research could complicate how we understand public health issues such as obesity, oral health, and diabetes.

“For a long time in epidemiology and other medical research disciplines, there’s been the view that most diseases are caused by interactions between genes and the environment,” says Dr. Noel Mueller, a postdoctoral research fellow in the department of epidemiology and the Institute of Human Nutrition at Columbia University. “[Microbiome] research suggests there’s a third component that interacts with the genes and the environment: the microbiota that live within us. We’re leaving out this third component by not considering how these organisms that live within us play a role in health and disease.”

In recent years, new technology has made studying the microbiome more feasible and less expensive. With high throughput sequencing techniques, which allow researchers to rapidly sequence large quantities of microbial DNA, scientists can look at hundreds and even thousands of organisms instead of just examining a few at a time. In fact, as gastroenterologist Dr. Ilseung Cho, an assistant professor of medicine at New York University, told the New York Times, “Interpreting the volume of data being generated is as much a challenge as the scientific questions we are interested in asking.”

Dr. Mueller’s research into this third component of health focuses on our earliest introduction to our microbiome: the bacteria we get from our mothers when we are born. When babies are born vaginally, they are covered in bacteria from their mothers while they pass through the birth
canal. Some of these bacteria even help babies digest their first meal.

Researchers have found that babies born by caesarian section are exposed to different kinds of bacteria than babies born vaginally. In one study, babies born by C-section lacked Bacteroides and Bifidobacterium, types of bacteria that may benefit the human immune and metabolic systems. A recent study published in the *International Journal of Obesity* by Dr. Andrew Rundle, associate professor of epidemiology, Dr. Mueller, and colleagues, recently found that babies born by C-section who had a higher exposure to antibiotics in the second or third trimester of pregnancy were more likely to be obese later in life. More research is needed to determine if the neonatal microbiome has anything to do with this observation.

Researchers are seeking not only to identify the key bacterial players but also to understand how these microbes interact with each other. The microbial world is diverse and complex. Some bacteria are harmful, whereas others help protect our health. And yet other organisms may not actively help or harm us but may be essential for laying the groundwork for other microbes that affect human well-being.

Another research challenge is examining how the microbiome interacts with environmental and behavioral factors, such as diet and exercise, which affect risk for chronic diseases such as diabetes. Because gut bacteria are involved in digestion, the microbiome might influence the relationship between diet and obesity. “Differences in gut bacteria challenge the notion in nutrition that a calorie is the same for every person, because humans metabolize nutrients differently depending on the bacteria that are living within them,” says Dr. Mueller.

In addition to studying the bacteria that live in our guts, researchers have examined the bacteria that live in our mouths, known as our oral microbiome. Dr. Ryan Demmer, an assistant professor of epidemiology at Columbia University’s Mailman School of Public Health, is studying whether the oral microbiome influences our risk for developing diabetes. Previous research has shown that people with diabetes are at increased risk for periodontal disease, an infection of the gum and bone that hold the teeth in place. Changes in the oral microbiome might be a mechanism that explains this increased susceptibility, but researchers are not yet certain when and how these changes happen.

Dr. Demmer and colleagues are looking to see whether certain oral bacteria are present at higher levels in people who go on to develop diabetes. They will start by studying the oral microbiome of people who do not have diabetes. They will then monitor changes in participants’ oral microbiome and their health, including whether they go onto develop diabetes. Researchers also hope to learn whether these bacteria are the same organisms that cause oral infections.

The study of the human microbiome has ramifications for the use of antibiotics, which kill a wide range of bacteria. In an interview, Dr. Martin Blaser, professor of medicine and microbiology at New York University and director of the school’s human microbiome program told NPR that in order to minimize collateral damage to beneficial organisms, “I think we need to develop narrow-spectrum antibiotics, not just broad-spectrum antibiotics, but really focused antibiotics.”

And if changes to the oral microbiome prove to be a useful indicator of diseases like diabetes, this might argue for changes to our health system, such as improving coverage for basic oral hygiene earlier in life.

While research into the human microbiome holds promise for public health, scientists still have much to learn about the bacteria that live within us, and how to incorporate new knowledge into current public health approaches. “The human microbiome is a new and incredibly interesting dimension that could help explain variation in disease that has been previously unexplainable,” says Dr. Demmer. “I don’t think it’s going to be a silver bullet. Nothing ever is. But there’s a lot to be learned and I think human health will improve.”

related media coverage

*New York Times’ Well Blog*
nyti.ms/1ySpy20

*Medical Xpress*
bit.ly/1xA1Ghl
Zero is not a number that gets thrown around very often in public health. Even the most ambitious efforts shy away from it. Yet the goal of Vision Zero, New York City’s new, Swedish-imported traffic program is to have not a single traffic death on city streets by the year 2024.

“No level of fatality on city streets should be considered inevitable and acceptable,” said former acting U.S. Surgeon General Dr. Kenneth Moritsugu, summing up the philosophy behind the program. Dr. Moritsugu spoke at a Columbia University Seminar on the new traffic policy, which was sponsored by Columbia University’s Center for Injury Epidemiology and Prevention and the Department of Epidemiology. The event brought together representatives of some of the disparate agencies and organizations charged with carrying out Vision Zero: the New York City Departments of Health and of Transportation, the New York City Police Department, and the New York City Council, to share research and strategize about the path to zero.

Rolled out early this year by Mayor Bill de Blasio, Vision Zero arrives at a complicated time for New York City. While on the one hand traffic fatalities here have declined significantly over the last 15 years and are lower than every major U.S. city except Boston, the numbers have been on the rise since 2009. (In 2013, 286 people died in car crashes in New York).

Several recent pedestrian and cyclist deaths at the hands of cars have shined a spotlight on the danger that many New Yorkers feel on their city’s streets. Pedestrian injuries comprised 52 percent of deaths in New York City, compared to 14 percent nationally, and car crashes are the number one cause of death for children and young teens in the city. In the last five years, 70 percent of traffic fatalities were outside of the pedestrian’s control, often a result of drivers speeding or failing to yield, according to a report from the city government.

Begun in Sweden in 1997, Vision Zero is premised on the fact that one of the biggest causes of traffic crashes is human error. Many of the laws the de Blasio administration and the city council have set more limits on drivers, as Ydanis Rodriguez, a city councilman from Washington Heights who chairs the committee on transportation, explained at the seminar. This includes a city speed limit of 25 miles per hour, which went into effect in November; more speed cameras; and greater authority for the Department of Motor Vehicles to suspend or revoke taxi driver licenses.

Thomas Chan, NYPD transportation bureau police chief, said the agency has in the last year dramatically stepped up its enforcement of bad traffic behavior including speeding, failure to yield, and cell phone use, by giving local precincts better tools and more authority to hand out violations. “In the past, it hasn’t been practice of local precincts to catch speeders,” said Chan.

The police have issued 27,329 speed enforcement summonses on local city streets, up from more than 90 percent from the same time last year, and 26,482 tickets—a 147 percent jump, Chan said at a press conference earlier in the day announcing the new citywide speed limit.

According to Dr. Guohua Li, Finster Professor of Anesthesiology and Epidemiology at Columbia’s Mailman School and director of the Injury Epidemiology Center, the same principles epidemiologists draw on to eliminate diseases from populations can be applied to traffic injuries: reducing the “exposure”—in this
“In the past, it hasn’t been practice of local precincts to catch speeders.”

case the traffic, reducing the occurrence of injury when one is exposed, and reducing the likelihood an injury will result in death or serious disability.

One area where these principles could be applied is drunk driving. Alcohol still plays a role in many of the city’s traffic fatalities. Forty-two percent of drivers killed in a car crash had alcohol in their system, and few of them were under the legal limit for intoxication, according to a study by Lawrence Fung of the Department of Health’s Bureau of Environmental Disease & Injury Prevention and the Department of Transportation’s Office of Research, Implementation, and Safety.

Another area where improvement is possible is calming New York City’s aggressive and chaotic traffic stew of impatient drivers, bikers, and pedestrians. So-called “traffic calming” measures, which aim to make the streets safer for pedestrians, include, in addition to lowering the speed limit, narrowing streets and adding speed bumps, new traffic and pedestrian signals, and high visibility crosswalks, according to Dr. Charles DiMaggio, associate professor of epidemiology at Columbia’s Mailman School of Public Health and a faculty member at the Injury Epidemiology Center.

Mayor Michael Bloomberg’s administration under Transportation Secretary Janette Sadik-Khan used some of these strategies to create bike lanes and more pedestrian-friendly spaces, the most visible of which are the plazas in several of the city’s busiest thoroughfares: Time, Herald, and Union Square. This was a significant change from when the agency’s goal was simply to move traffic, said Anne Marie Doherty, director of research implementation and safety for the city’s Department of Transportation.

The city received millions of dollars during the Bloomberg years from a federal program called Safe Routes to School to make modifications which made it safer for kids to walk or bike to school. Although the program’s original purpose...
was lowering child obesity, pedestrian injuries in the re-designed school zones declined by 44 percent, according to a study by Dr. DiMaggio and his team. The program saved $230 million and 2,055 quality adjusted years of life as a result of reduced health and school bus expenditures, according to an analysis led by Dr. Peter Muennig, an associate professor of health policy and management at Columbia’s Mailman School of Public Health.

Yet there is still a wide disparity in neighborhoods. While some of the city’s well-off areas enjoy walkable conditions—lower and mid-Manhattan, west Brooklyn, and west Queens; Staten Island and eastern Queens are far less pedestrian friendly, according to Dr. Jennifer Norton of the Department of Health’s Bureau of Environmental Disease and Injury Prevention.

Over one-third of children in three “low walkability” zip codes do not walk or bike to school, even though 40 percent of them live within five blocks from school and 70 percent live within 20 blocks, according to a study by Philip Noyes, the director of research, evaluation, and planning in the Department of Health’s Brooklyn District Public Health Office. Less than half of students think it is safe to walk, and only one-third think it’s safe to bike.

“If we don’t have that commitment to changing all neighborhoods and not just responding to those neighborhoods that are able to self-advocate, we’ll likely see that gap maintained or possibly increase,” said Noyes.

Reducing traffic injuries and deaths is not only a city goal but a national and international priority.

Traffic injuries are the eighth leading cause of death around the world and could become the fifth by the year 2030. In many fast-developing middle-income countries, motorized vehicles flood the streets while infrastructure improvements lag. Responding to the risk to their employees abroad, Together for Safe Roads—a diverse group, including AIG, Columbia, Google, Facebook, and the World Bank—have teamed up to reduce traffic injuries across the world.

Reducing injury mortality and morbidity from motor vehicle crashes is one of the U.S. Centers for Disease Control and Prevention’s “winnable battles.” The agency is focused on increasing use of seatbelts and childhood protection seats, reducing alcohol impaired driving, and preventing injuries among high-risk populations like teenagers, the elderly, and Native Americans, according to Dr. Arlene Greenspan, associate director for science at the CDC’s National Center for Injury Prevention and Control.

If these initiatives need a model for success, they can look to America’s airline industry and regulators. Commercial airline crashes, which were not uncommon in the mid-twentieth century, have become nearly nonexistent as a result of a slew of changes in plane engineering, air traffic regulation, and management styles, according to Roger Cox, the senior air safety investigator at the National Transportation Safety Board.

Participants agreed that Vision Zero is a “gift” as Dr. DiMaggio put it, one that will benefit from population health insight. “The public health approach and Vision Zero are perfectly aligned,” said Dr. Moritsugu. “Through planning, through process, through measurement, through outcomes.”
The percent of insured Americans from 2008-2014

This line graph shows the percent of Americans that have had some form of health insurance over the past seven years. Along the y-axis is percent insured, ranging from 0 to 100%. Along the x-axis is the time frame in which Americans were surveyed, which is quarterly. In the second quarter of 2014, April to June 2014, the highest percentage of Americans reported having insurance, 86.6%, since Gallup first started collecting survey data on insurance, which was January 2008. The previous high was in the second half of 2008 when 85.6% of Americans reported having insurance. During the third quarter of 2013, July to September, the lowest percentage of Americans reported having health insurance with only 82% of Americans reporting some form of health insurance. The current high in the percentage of Americans with health insurance appears to be the result of the Affordable Care Act.


Originally published on the GRAPH website, at cugraph.org
Covering the Ebola crisis

Over the past year, faculty members spoke frequently with the media about the Ebola outbreak in West Africa and several cases in the U.S. They helped us understand how Ebola is transmitted (Dr. Stephen Morse on WNYC: bit.ly/1pahubR), why it spread so quickly in three West African nations (Dr. Morse on PBS: to.pbs.org/1xyVbO), and what can be done to fight Ebola in West Africa (Dr. Ian Lipkin in the New Yorker: nyr.kr/ZQrLze). At the height of public concern in the U.S., faculty members served as voices of calm (Dr. Sandro Galea and Dr. Abdul El-Sayed in New York Magazine: sciof.us/ZMvNrK), helping to clarify the minimal threats to Americans (Dr. Dana March in Al Jazeera: alj.am/1wmtWbG), the importance of protecting health workers, and questioning a quarantine that could threaten progress in West Africa (see Dr. Scott Hammer in the New York Times: nyti.ms/1yHYrH4, Dr. Wafaa-El-Sadr in the New York Times: nyti.ms/1WyKRp1, and Dr. March in the New York Times: nyti.ms/1wyKRp1). Read more faculty in the media coverage of Ebola on our website. epi.is/13piXCq
“The South African HIV scientist who gave girls back control of their bodies”

Those are the words of the Guardian, which features a profile of Dr. Quarraisha Abdool Karim’s HIV prevention research and her recognition as the first woman to receive the TWAS-Lenovo Science Prize from the World Academy of Sciences. Dr. Abdool-Karim was also elected as a foreign associate to the Institute of Medicine this year. Read more in the Guardian. › http://bit.ly/1rS30tG

Oh, rats! New York City’s rats are disease ridden

New York City’s rats are hosts to a variety of pathogens, including those that cause food poisoning, others that have never been seen in New York City, and still others that are new to science, according to a study by Dr. Ian Lipkin and colleagues at the Center for Infection and Immunity. Read more in the New York Times › nyti.ms/1oCZK9M, New York Magazine › nym.ag/1xkT13z, Science › bit.ly/1wwJXu5, Gothamist › bit.ly/ZQse49, and the Washington Post. › wapo.st/1nD0w5X

Latina women may not trust the grocery store

Grocery stores may not be the only solution to the food desert problem, according to a new study by Dr. Andrew Rundle that found that Latina immigrant women prefer shopping at local markets and slaughterhouses for fresher produce and meat. “It’s odd, if you read the entire literature on this topic, there are almost no studies where people just sat down with immigrant families and asked them what they want or what they believe is healthy food,” says Dr. Rundle. Read more on Latino USA. › bit.ly/12kKX8S

Tech companies’ egg freezing benefit sidesteps real issues

In a letter to the editor, co-author Linda Kahn, a doctoral candidate wrote in response to Apple and Facebook’s decision to offer employees egg freezing benefits: “Providing egg freezing as a corporate benefit sidesteps the far more substantial investments in family leave, child care, and flexible work hours needed to truly support workers who wish to be parents.” Read more in the New York Times. › nyti.ms/1nCZ8An
Should we be worried about arsenic in rice?

In response to a Consumer Reports report warning of arsenic in rice, Dr. Habibul Ahsan says: “Food in arsenic is a relatively new phenomenon.” Unlike with water “the harm is a little bit more complex with food, and it may not be as dramatically bad as you expect.” Read more in Take Part. › bit.ly/1rUghCk

Problems with medical publishing

Dr. Philippe Ravaud talks about a problematic practice of researchers listing one set of results on a clinical trial registry site and another, more positive set of results in a journal article about the study. Read more on efforts to regulate publishing transparency in the Ottawa Citizen. › bit.ly/1sZ7lxV

Measuring years of life differently

Dean Linda Fried talks about “a third age” as a way of measuring years of life differently than we have in the past. “The newly enhanced later years of life provide an opportunity unlike anything previously experienced in history, and they can lead to a new way of measuring those years, further enhancing the value of older Americans and the legacy that they generate,” she says. Read more in the Huffington Post. › huff.to/1sxMqVy

Advice for frequent business travelers on staying healthy

Dr. Andrew Rundle co-authored an article about how to stay healthy on business travel. “Frequent travel can be a rewarding experience with a tremendous upside to your career. But if you don’t make sure to minimize the health risks, frequent travel can actually have the opposite effect,” the say. Read more in Psychology Today. › bit.ly/1pVvFgR

Don’t nitpick about science in movies

Scientists shouldn’t be so nitpicky about films, says Slate. The writer mentions that scientists often advise on movies nowadays, like Dr. Ian Lipkin did for the outbreak thriller Contagion. Read more in Slate. › slate.me/1roGxod


Pesch B, Bruenning T, Vineis P. Cancer Epidemiology Biomarkers Prev. 2014;23(10):2379-88. [Epub ahead of print]


Willey JZ, Moon YP, Ruder R, Cheung YK, Sacco RL, Elkind MS, Wright CB. Physical Activity and Cognition in the Northern Manhattan Study. Neuroepidemiology. 2013 Dec 3;42(2):100-106. [Epub ahead of print]


