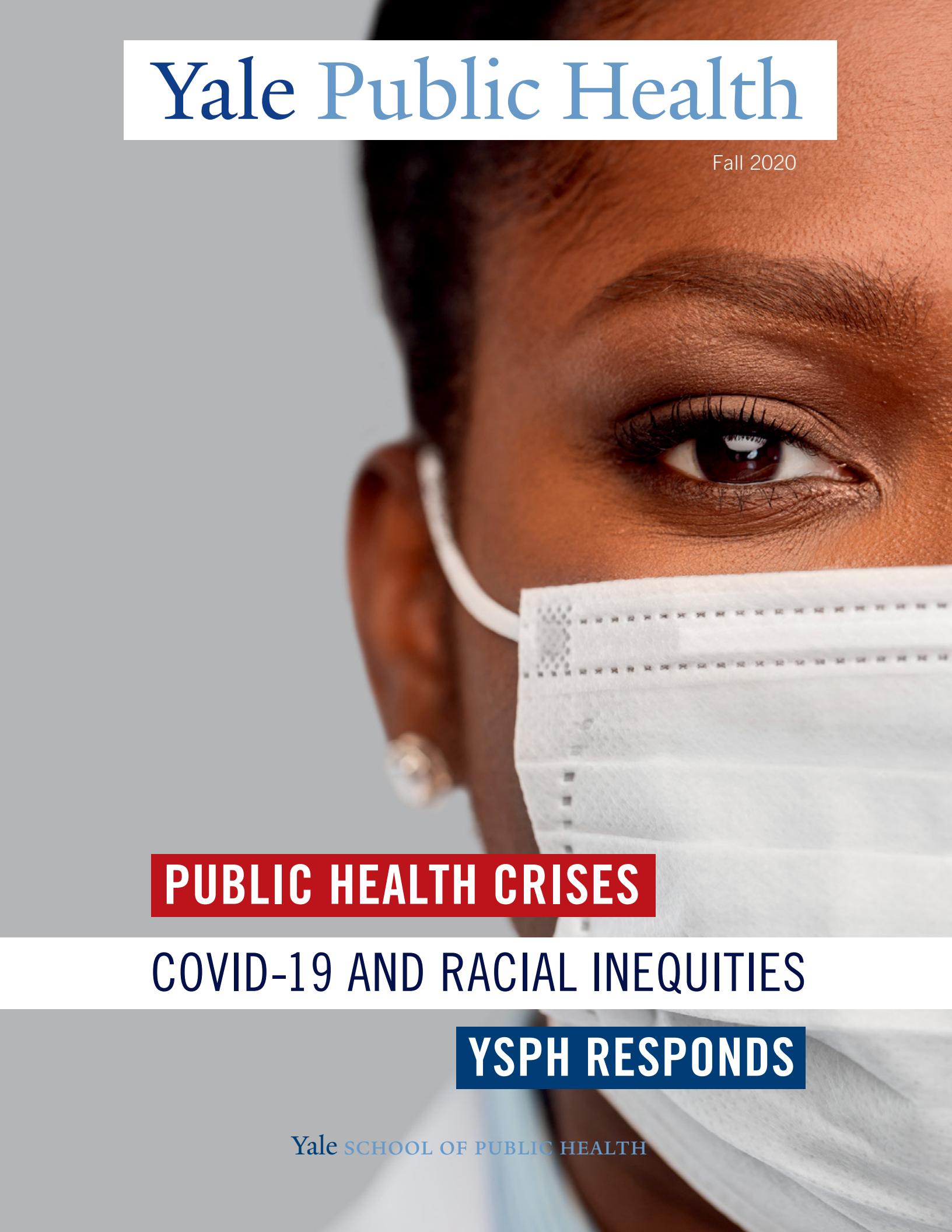


# Yale Public Health

Fall 2020



**PUBLIC HEALTH CRISES**

**COVID-19 AND RACIAL INEQUITIES**

**YSPH RESPONDS**

Yale SCHOOL OF PUBLIC HEALTH



# Yale Public Health

## PUBLIC HEALTH CRISES

Fall 2020

### CHINA REACTS TO COVID-19

YSPH researchers analyze China's initial response to the outbreak.



6

### THE OTHER PATHOGEN

Racism's toll on public health is increasingly recognized.



### 13 ORIGINAL ESSAYS

YSPH experts weigh in on dual pandemics.



### A COVID GAME CHANGER

Saliva-based testing method receives FDA authorization.



STUDENTS 50

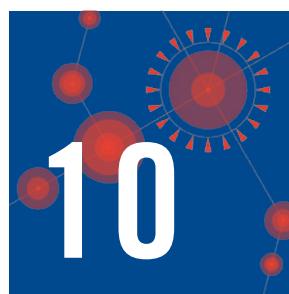
ALUMNI 54

YSPH NOTES 67

ELM CITY HEALTH 80

### 2 DEAN'S MESSAGE

### 3 ADVANCES



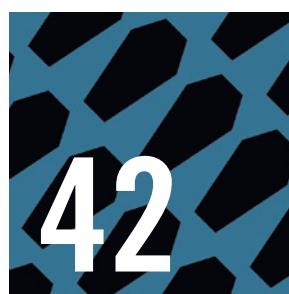
### HOW SARS-COV-2 CAME TO CT

Genomic sequencing tells the story of COVID-19's arrival in Connecticut.



### A VIGOROUS RESPONSE

YSPH steps up to help New Haven, the state and others during a health crisis.



### COVID'S TERRIBLE ARITHMETIC

The pandemic's death toll is much higher than originally believed.



### KO HELPS REOPEN CT

Professor is key figure in the state's efforts to reopen.

# DUAL PANDEMICS



Sten Vermund

The past year has been a momentous one for public health.

One might say that our profession has been challenged by dual pandemics. Growing rapidly from March through May, we had the novel coronavirus, SARS-CoV-2, that washed over the tri-state area and resulted in disease and death, notably in older and medically vulnerable persons. By responding with stay-at-home guidelines, facial masks, physical distancing, hand/face/surface hygiene, limiting group sizes, and air quality improvements, we controlled transmission in Connecticut with classic “old-fashioned” public health interventions. Yet large swaths of our nation and our world experienced new surges of transmission.

Facing markedly diminished economic circumstances, including mass unemployment, loss of small businesses, food insecurity, stress, and looming evictions, we were more acutely aware of the second pandemic, that of the centuries-old scourge of racism and economic disadvantage. We saw evidence in COVID-19. And we saw it even more starkly in the vigilante and police murders that brought many from our community into the streets to demand foundational and meaningful change in how

persons of color are treated in our society. Both events illustrate the vitality of public health in which better outcomes for all are built by addressing the inequities that drive the social determinants of disease.

As dean of this great institution, I am awed and humbled by the sacrifice and service that I witness every day by our faculty, students, alumni and staff. My colleagues stepped up seamlessly and quickly to apply their collective efforts to make a real difference in pandemic response. We share an ethos of helping others that has been particularly evident as the pandemics expose modern society’s many shortcomings.

Yale School of Public Health scientists, for instance, created a test using saliva that quickly, easily and accurately determines whether someone is infected with the novel coronavirus. Others, including 200 volunteers drawn largely from public health, nursing and medical students, spearheaded a model program for local contact tracing. Still others have served in key advisory roles at the international, national, state and local levels to help slow the rate of new infections. Transmission modelers have helped forecast the pandemic spread patterns and estimate the impact of interventions, informing crucial policy decisions. Environmental scientists and epidemiologists helped the Reopen Connecticut Advisory Group’s efforts for schools, arts organizations and health facilities. Behavioral scientists have mobilized efforts to help our most vulnerable to cope with the food and housing insecurities accompanying job loss and financial crisis. In the pages that follow, you will learn more about some of their work and the difference it has already made.

(continued on p. 63)

## **Yale Public Health**

The Journal of the Yale School of Public Health  
Fall 2020, Vol. 12

### **Dean**

Sten H. Vermund, M.D., Ph.D.  
*The Anna M.R. Lauder Professor of Public Health*

### **Managing Editor**

Michael A. Greenwood

### **Editorial Advisory Board**

John Curtis, Cornelia Evans, Gregg Gonsalves, James Hamblin, Tassos Kyriakides, Becca Levy, Colin Poitras

### **Design**

AH Design, Angie Hurlbut  
NYM Design, Nilou Moochhala

### **Contributors**

Sayuri Gavaskar, Colin Poitras

### **Address correspondence to**

Managing Editor, *Yale Public Health*  
47 College Street, Suite 104  
P.O. Box 208034  
New Haven, CT 06520-8034  
Phone: 203-737-5151  
Fax: 203-785-7296  
E-mail: [michael.greenwood@yale.edu](mailto:michael.greenwood@yale.edu)  
Web: [publichealth.yale.edu](http://publichealth.yale.edu)

*Yale Public Health* is published annually and is distributed to alumni, faculty, students and friends of the Yale School of Public Health.

### **Printer**

AM Lithography



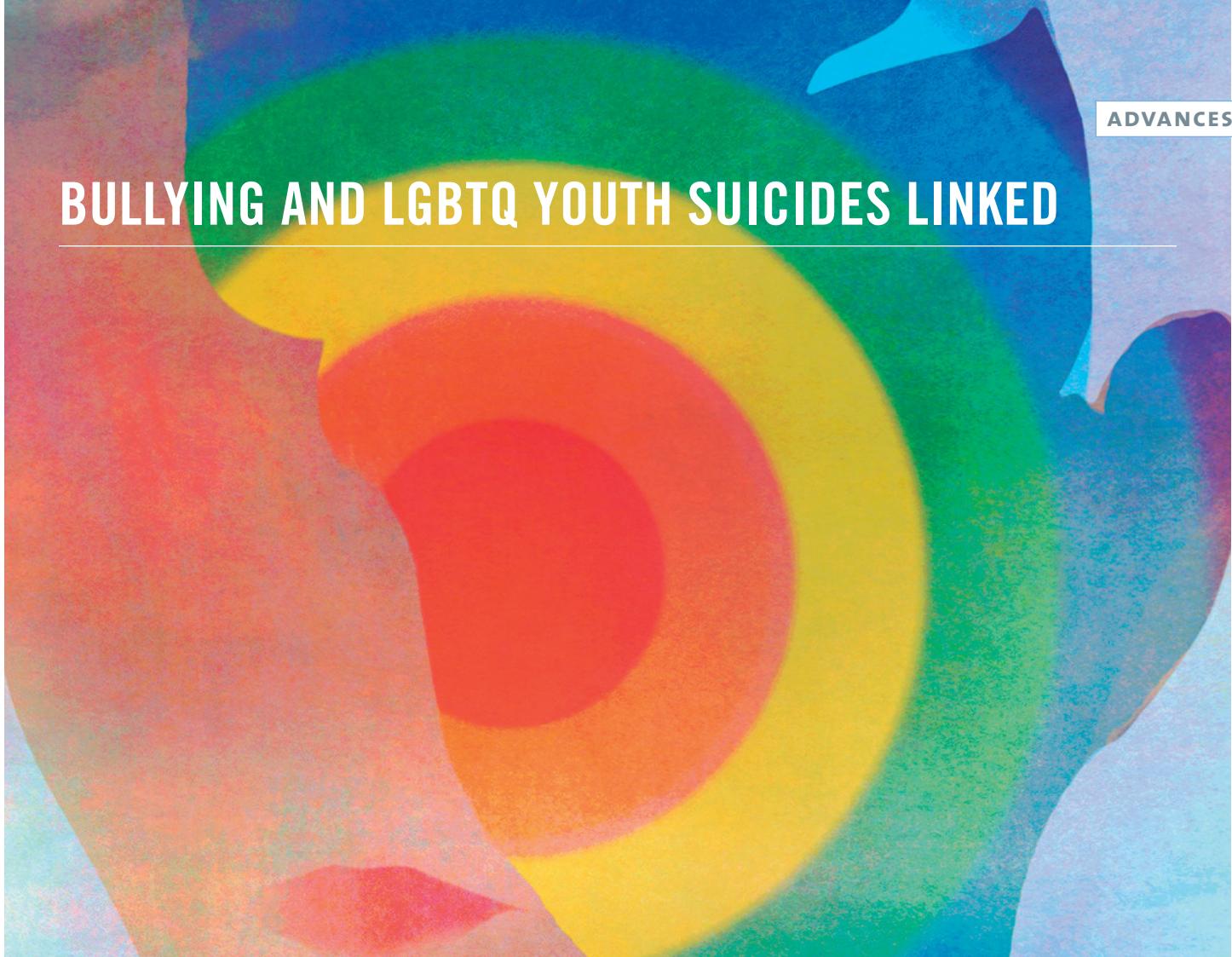
Printed on recycled paper with soy-based inks

Follow the Yale School of Public Health on Facebook, Twitter, Instagram and LinkedIn.



A digital archive of *Yale Public Health* is available at [publichealth.yale.edu/about/communications/publications/](http://publichealth.yale.edu/about/communications/publications/).

# BULLYING AND LGBTQ YOUTH SUICIDES LINKED



MICHAEL WOLOSCHINOW

Death records of LGBTQ youths who died by suicide were substantially more likely to mention bullying as a factor than the death records of their non-LGBTQ peers, according to a new study. Researchers led by the Yale School of Public Health based their finding on a review of nearly 10,000 death records of youths ages 10 to 19 who died by suicide in the United States from 2003 to 2017.

While LGBTQ youths are more likely to be bullied and to report suicidal thoughts and behaviors than non-LGBTQ youths, the study is believed to be the first to show that bullying is a more common precursor to suicide among LGBTQ youths than among their peers.

"We expected that bullying might be a more common factor, but we were surprised by the size of the disparity," said lead author Kirsty Clark, YSPH postdoctoral fellow.

Death records of LGBTQ youths were about five times as likely to mention bullying as non-LGBTQ youths' death records, the study found. Among 10- to 13-year-olds, over two-thirds of LGBTQ youths' death records mentioned that they had been bullied.

Bullying is a major public health problem among young people, and it is especially pronounced among LGBTQ

youths, the researchers said. Clark and her co-authors used data from the National Violent Death Reporting System, a Centers for Disease Control and Prevention database that collects information on violent deaths, including suicides, from death certificates, law enforcement reports, and medical examiner and coroner records.

Death records in the database include narrative summaries from law enforcement reports and medical examiner and coroner records regarding the details of the suicide as reported by family or friends, the youth's diary, social media posts, and text or email messages, as well as any suicide note. Clark and her team searched these narratives for words and phrases that suggested whether the individual was LGBTQ. They followed a similar process to identify death records mentioning bullying.

"This study urgently calls for interventions that foster safety, belonging and esteem for all young people," said John Pachankis, the Susan Dwight Bliss Associate Professor of Public Health and study co-author.

The study was published in *JAMA Pediatrics*.

*Michael Greenwood*



## WIDELY USED CHEMICALS ASSOCIATED WITH MISCARRIAGE

Maternal exposure to synthetic chemicals widely used in food packaging and commonly found in drinking water supplies is associated with a woman's risk for miscarriage in the second trimester, a new study found.

All women in the Danish cohort studied by the Yale School of Public Health had detectable and multiple types of per- and polyfluoroalkyl substances (PFAS) in their pregnancy serum. The study estimated increased risk of nearly 80% to 120% for miscarriage in women with the highest level of two common PFAS compounds, compared with those in the cohort with the lowest PFAS levels. Some positive associations, though in smaller magnitudes and less consistent, were also reported for exposure to other types of PFAS compounds evaluated.

The association was strongest among women who had already borne children. The researchers said that the results need to be replicated.

PFAS, introduced in the 1940s, are widely used in the manufacture of everyday products around the globe – from cookware, to clothing, carpets and firefighting foam. PFAS are also used in industries such as aerospace, automotive, construction and electronics, as well as in the military. Production of the two most common types of PFAS has

been phased out by U.S. manufacturers over concerns about their impact on the environment and human health, but other compounds in the PFAS family are being produced as replacements. PFAS usage in commercial products is not currently regulated in the United States.

"Policy regulation of PFAS exposure should consider adverse effects on maternal and child health, which have repeatedly suggested that these are vulnerable populations that need to be protected from exposure to these widespread chemicals," said Zeyan Liew, the study's lead author and an assistant professor in the Department of Environmental Health Sciences.

Miscarriage is rather common, affecting 10% to 20% of all clinically recognized pregnancies.

Previous toxicological studies have suggested that high doses of PFAS exposure can cause pregnancy loss and infant deaths in rodents. However, whether PFAS exposure affects the risk of miscarriage in the general population was unclear.

The study was published in the journal *Environmental Health Perspectives*.

*Michael Greenwood*

# REOPENING SCENARIOS EXAMINED IN CONNECTICUT

As Connecticut reopened in late May after a two-month shutdown, a report by the Yale School of Public Health warned that if people resume normal activities and contacts too quickly, there will be a “sharp resurgence” in hospitalizations and deaths related to COVID-19.

Associate Professor Forrest W. Crawford, Ph.D., and postdoctoral fellows Olga Morozova and Zehang “Richard” Li created a mathematical model to predict COVID-19 transmission, hospitalization and deaths in the state under several different reopening scenarios.

If the state had reopened too quickly, a second wave might have been unleashed, the effects of which could have been worse than what had already happened. It could have resulted in an estimated total of over 8,100 deaths in Connecticut by Sept. 1. More than 3,500 residents had died of coronavirus as of late May, when the report was first issued.

“If contact rates return quickly to levels seen in early March, the number of new cases could rise dramatically over the summer,” said Crawford, the report’s lead author. “Connecticut decision-makers need to closely monitor data on new cases and hospitalizations, as well as transmission model projections, in order to reopen the state safely.”

Under a slow reopening scenario (defined as relaxing restrictions so that contact increases at a rate of 10 percentage points each month) the incidence of the disease could increase slightly in the initial weeks but taper off and stay at lower levels, the report predicted. Hospitalizations for the disease will continue to decline, rising slightly in August, and the number of coronavirus-related deaths will rise slowly, with an estimated total of 4,600 to 7,100 by Sept. 1.



MICHAEL WOLDSCHINOW (2)

Under the fast scenario (defined as increasing contact at a rate of 10 percentage points every two weeks), Crawford and colleagues found that the number of new infections is likely to spike throughout the summer, potentially exceeding hospitalization capacity and resulting in anywhere from 5,400 to 13,400 total deaths by Sept. 1.

Yale School of Public Health Professor Albert Ko co-chaired Gov. Ned Lamont’s Reopen Connecticut Advisory Group, which strongly advised a cautious and conservative schedule as the state starts to return to normal (see full story on page 48).

“These model projections of the future risk of COVID-19 resurgence directly informed the recommendations made to mitigate this risk,” Ko said.

*Michael Greenwood*



# CHINA'S COVID-19 RESPONSE ANALYZED



YSPH researchers find that Beijing's actions slowed the virus's spread internally.

BY COLIN POITRAS

The international response to the COVID-19 pandemic will be studied by scientists for years.

But an early analysis by researchers at the Yale School of Public Health shows that China's aggressive approach to the outbreak, while far from perfect, significantly slowed virus transmission and likely saved thousands of lives.

The findings reinforce how a prompt and coordinated public health response can be effective in controlling the spread of a highly infectious disease.

In all, YSPH investigators led three separate studies looking at different aspects of China's response in the early days of the COVID-19 outbreak. Their findings, published in peer-reviewed journals in the spring of 2020, were some of the first scientific reports addressing the novel coronavirus and provided important insight for countries grappling with containment of the disease.

In a study appearing in the *Journal of Population Economics* in May, YSPH Associate Professor Xi Chen, Ph.D., found that some of the first steps taken by the national Chinese government in January — swift isolation of infected patients, stringent quarantine policies and citywide lockdowns — significantly decreased the transmission rate of SARS-CoV-2, the virus that causes COVID-19.

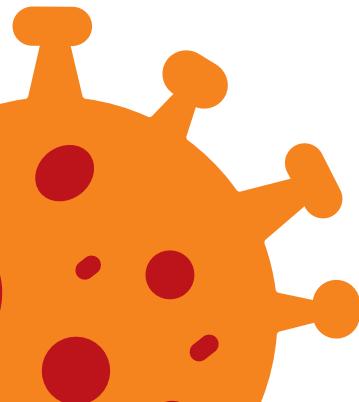
Provincial measures mandating face masks and physical distancing and limiting social activities further reduced the rate of infection. By mid-February, the spread of the virus in China was largely contained.

Policy simulations created by Chen and colleagues suggest that, by the end of February, over 1.4 million infections and 56,000 deaths may have been averted outside the virus's epicenter in China's Hubei Province because of the national and provincial public health measures Beijing imposed.

"The response of the Chinese government, while far from perfect, had a measurable effect on slowing the pandemic [in China]," Chen said. "Many, many lives were saved within densely populated areas of China, and these measures also bought the world some time in their preparation for the pandemic."

## Missed opportunity

While these public health interventions effectively slowed transmission of SARS-CoV-2 in China, they were not enough to stop the highly infectious virus from spreading around the globe, according to another YSPH study.



**76,000 34 MILLION**

THE NUMBER OF GLOBAL CASES  
RECORDED ON FEBRUARY 21, 2020

THE NUMBER OF GLOBAL CASES  
RECORDED BY END OF SEPTEMBER 2020



By the time China enforced regional travel bans and airport screenings in an effort to contain the coronavirus, international transmission was well underway, the researchers said.

"We estimated that the first importation event occurred roughly three weeks before the government enforced travel restrictions," said Chad R. Wells, the study's lead author and a postdoctoral associate at the Yale School of Public Health's Center for Infectious Disease Modeling and Analysis (CIDMA).

The virus moved fast. The first cases of COVID-19 were recorded in Wuhan, China, in December 2019. Within just a few weeks, the disease had spread to 24 countries across the globe. By Feb. 21, just two months later, more than 76,000 cases were recorded globally. Even that number may be low as it does not account for silent carriers, people who did not present for testing, or those who tried to get tested but were refused.

Published in *Proceedings of the National Academy of Sciences* at the end of March, the CIDMA study used daily incidence data for COVID-19 within mainland China and airline network data to model the number of exported cases with and without travel restrictions and screenings.

The study found that the airport screenings that were in place in many countries were not fully effective. The researchers estimated that the majority of travelers with the disease were in the presymptomatic phase when they deplaned, so it would have been difficult or impossible to prevent disease importation through screening alone.

Still, the travel bans and airport screenings did manage to slow international spread of the virus and gave countries more time to aggressively prepare for an outbreak—if they chose to do so.

"Unfortunately, the United States squandered the time that the travel restrictions gave us," said the study's senior author, Alison Galvani, Ph.D., director of CIDMA and the Burnett and Stender Families Professor of Epidemiology. "We should have been preparing for this outbreak."

## An unexpected benefit: cleaner air

China's strict quarantines and citywide lockdowns had an unanticipated public health benefit, YSPH researchers found.

Restrictions on personal and public transportation that were put in place from mid-February to mid-March dramatically lowered automobile emissions and, as a result, may have prevented thousands of premature deaths due to a sharp decline in the country's often severe air pollution, according to a study YSPH researchers released in May.

"The pandemic continues to be a terrible thing for China and the rest of the world, but the decrease in

**THE RESPONSE OF THE CHINESE GOVERNMENT, WHILE FAR FROM PERFECT, HAD A MEASURABLE EFFECT ON SLOWING THE PANDEMIC [IN CHINA]."**

~Xi Chen

emissions that accompanied it has actually conferred some positive health results," said Assistant Professor Kai Chen, Ph.D., the study's lead author.

Published in *The Lancet Planetary Health*, the study reported that more premature deaths were avoided by cleaner air (an estimated 12,125) than lives lost from the pandemic (4,633 as of May 4).

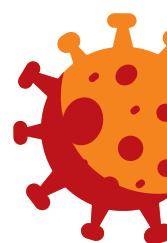
Although other regions were not part of the study, reduced air pollution levels were also detected in other Asian and European countries as well as the U.S. while COVID-19 travel restrictions were in place.

The study by Kai Chen and colleagues found that ground-level air pollution levels dropped remarkably throughout China. Levels of nitrogen dioxide, a byproduct of fuel-burning vehicles and power plants, decreased by 37% and fine particulate matter (PM<sub>2.5</sub>), which includes such things as dust, soot and smoke, dropped by 30% across 367 Chinese cities. The decline in nitrogen dioxide across the vast country during the quarantine period was so dramatic that it was detected by satellites.

In calculating the number of avoided deaths attributable to lower air pollution levels, the authors found that about two-thirds were from avoided cardiovascular diseases (hypertensive disease, coronary heart disease and stroke) and chronic obstructive pulmonary disease.

The findings illustrate the substantial human health benefits related to cardiovascular disease morbidity and mortality that can be achieved when aggressive air pollution control measures are put in place, the authors said.

"If we were to address the climate crisis as aggressively as we are combating the COVID-19 pandemic with strong political will and urgent action, we could prevent the enormous health burdens associated with climate change," said YSPH Professor Paul T. Anastas, Ph.D., a co-author, the Teresa and H. John Heinz III Professor in the Practice of Chemistry for the Environment and director of the Center for Green Chemistry and Green Engineering at Yale. **YPH**



# HOW SARS-COV-2 CAME TO CONNECTICUT

YSPH epidemiologists sequence the genomes of nine early virus samples and find a match—from Washington state.

BY COLIN POITRAS

Shortly after the novel coronavirus first appeared in the United States, researchers at the Yale School of Public Health urged states across the country to step up local testing and disease surveillance if they wanted to stop the virus's spread.

At the time, much of the country's prevention efforts were focused on international travel bans and increased screening at local airports. But researchers with Nathan Grubaugh's lab warned that interstate transmission of SARS-CoV-2, the virus that causes COVID-19, posed a much greater threat.

Working in shifts nearly around the clock, a team of epidemiologists in Grubaugh's lab sequenced the genomes of nine early Connecticut virus samples and found that most of them matched a virus cluster from Washington state. Coupling those results to

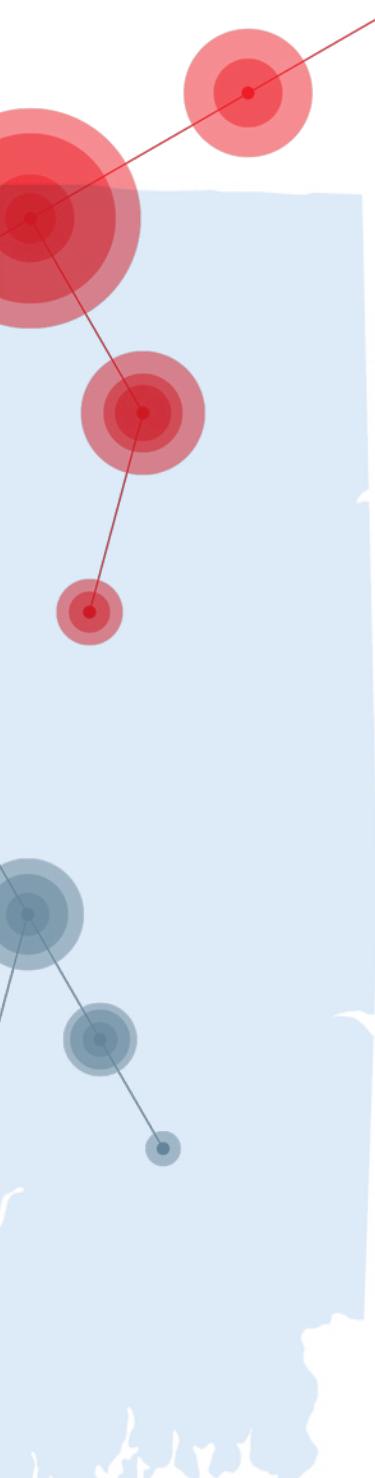
domestic and international travel patterns, the researchers determined that Connecticut's early cases of COVID-19 were most likely driven by interstate transmission of the virus rather than international travel.

That meant that the highly contagious coronavirus was not only present within the continental U.S. by mid-March, it was on the move.

"The large volumes of daily travel within the U.S. indicate that domestic spread of SARS-CoV-2 has become, and will likely continue to be, the primary source of new infections," postdoctoral fellow Joseph Fauver and doctoral student Mary Petrone said as the lead authors of what would become the first high-profile paper on COVID-19 issued by Yale. "We suspect that this transition from international to domestic dominance ... will happen elsewhere in the country as more

**“VIRUSES DON’T RECOGNIZE MUNICIPAL AND STATE BOUNDARIES.”**

*~Nathan Grubaugh*



states start experiencing higher burdens of COVID-19 disease.”

The findings, first released in a preprint format in early April, were later published in the journal *Cell*.

By early summer, as states in the South and West struggled with emerging major outbreaks of COVID-19, that report from Grubaugh’s lab – and the urgent warning that went with it – seemed prescient. With testing rates and surveillance systems still far below where they need to be in many parts of the country, COVID-19 continued exacting its deadly toll, just as Fauver and Petrone said it would.

“If interstate introductions [of the virus] are not curtailed in the United States with improved surveillance measures, more robust diagnostic capabilities, and proper clinical care, quelling local transmission within states will be a Sisyphean task,” the scientists wrote.

In the months since the initial findings were released, the work in Grubaugh’s lab hasn’t eased. By July, the team had sequenced an astounding 231 SARS-CoV-2 genomes from Connecticut and 10 from New York.

Sequencing a virus’s genome is an important tool in tracking its spread. Viruses need to replicate to survive. But that replication process is not always perfect. In the millions of replications that take place, errors sometimes occur in a replicated virus’s genetic code. These genomic typos are largely insignificant but serve as important markers allowing scientists to track a virus’s lineage similar to how people use their distinct genetic code to trace their family tree.

In the case of COVID-19, updated analysis by Grubaugh’s lab shows that Connecticut’s initial SARS-CoV-2 transmissions were seeded by virus introductions from the West Coast and New York. But before long, a cluster of virus genomes from New York that the researchers call a “clade” emerged as the predominant form of SARS-CoV-2 being transmitted in Connecticut. In June, the lab was starting to see virus transmission occurring between municipalities in Connecticut.

Grubaugh’s lab continues to generate detailed weekly reports through its case surveillance website [covidtrackerct.com](http://covidtrackerct.com) on what’s

happening with the virus in Connecticut. The reports provide a fascinating in-depth look at how SARS-CoV-2 is evolving and spreading over time. The lab also regularly contributes to Nextstrain, an open-source project where scientists around the world share pathogen genomic data to further understanding and research.

In order to quickly identify where Connecticut’s first cases of COVID-19 were originating, the initial research study involved a massive collaborative effort. Contributors included researchers from the Yale School of Medicine, and the Departments of Molecular Biophysics and Biochemistry, Ecology and Evolutionary Biology, Immunobiology, Pediatrics and Internal Medicine. Scientists from the Yale School of Nursing and the Yale Institute for Global Health also contributed as well as researchers from labs in Washington state, Maryland, Switzerland, Canada and the United Kingdom.

During the summer of 2020, Grubaugh’s lab continued to monitor national events as states struggled with a persistent initial wave of COVID-19 and braced for an expected second wave in the fall.

Petrone said the advice she and her peers provided in March hasn’t changed. If anything, she said, it’s become even more important.

“Now that the virus is well established in the U.S., future outbreaks are even more likely to arise from domestic transmission chains as opposed to international introductions,” Petrone said. “For these reasons, public health and political leaders should focus on developing robust, local surveillance systems and increasing testing capacity.”

As the prevalence of COVID-19 increases over time, Grubaugh, an assistant professor of epidemiology (microbial diseases), said it is critical that states and even municipalities work together on setting policies for travel, testing, contact tracing and social distancing to curtail its spread.

“Viruses don’t recognize municipal and state boundaries,” he said. “States and municipalities need to understand that the policies they set have implications for their neighbors.”



# THE OTHER PATHOGEN



**" RACISM IS A PATHOGEN."**

~Richard Murray Trostle

## Racism, police brutality and health disparities are ingrained in American society and are mounting public health issues.

As the United States is gripped by two crises that are disproportionately affecting people of color, it is becoming clear that racial injustice is as much of a public health crisis as COVID-19.

Discrimination against people of color, a practice as old as the United States itself, has increased the rate of violence in minority communities and has been shown to be a root cause of health disparities as well.

"Whether institutional, interpersonal or internalized, racism is the principal disease taking the lives of people of color, especially Black people," said Adjunct Assistant Professor Tekisha Dwan Everette, Ph.D. In the wake of the killing of George Floyd and in remembrance of other victims of police brutality including Ahmaud Arbery, Breonna Taylor and Rayshard Brooks, and the ensuing protests across the country, YSPH faculty, alumni and students contributed to a series of essays on the issues of race and racism in the United States.

Racism as a public health crisis is evident in data. Police violence kills Black Americans at close to three times the rate of white Americans. Black people make up only 13% of the U.S. population but represent 40% of the homeless population.

Health inequalities are also well documented. "Disproportionately, Black and Latinx people have limited access to affordable or adequate housing, live in areas with poorer air quality, have limited access to supermarkets and experience higher rates of poverty and lower educational attainment," said Modupeore Shenbanjo, M.P.H. '16, chair of the Association of Yale Alumni in Public Health's Emerging Majority Affairs Committee.

As a result, these groups experience higher risk for diabetes and other chronic diseases, higher infant mortality rates and chronic stress. This repeated exposure to racism in its many forms, both large and small, is known as "weathering," and is the cause of health deterioration,

the onset of chronic conditions and premature aging at the cellular level. "Weathering is thought to be the primary cause of pronounced inequalities in morbidity and mortality between Black and white individuals," said Associate Professor Danya Keene, Ph.D.

Weathering may also partly explain high rates of COVID-19 infection among minority communities. Crowded and unstable housing conditions make social distancing nearly impossible, and U.S. counties with a majority of Black residents have rates of infection three times those of counties with predominantly white residents; the death rate is nearly six times as high.

"Racism is a pathogen," Richard Murray Trostle, M.P.H. '78, Dr.PH., wrote in an essay for the Yale School of Public Health.

The question now becomes how social justice will be incorporated into the way public health is taught. Public health education has typically not placed social injustice and health disparities on equal footing with other disciplines in the field. "Public health has too many times failed to explore and embrace adequate social paradigms that would explain the inequities leading to unequal health status because of racism," Trostle said.

"It is no longer sufficient to just focus on developing technical skills in the core public health disciplines of biostatistics, environmental health, epidemiology, health policy and management, and social and behavioral sciences," said Mayur M. Desai, M.P.H. '94, Ph.D. '97, associate professor and associate dean for diversity, equity and inclusion at YSPH. "It is no longer sufficient to simply document inequities in health outcomes among those with marginalized identities and from underserved communities."

Trostle added that public health "must use the tools it possesses to bring an honest and honorable examination to every health matter it confronts. It means placing the

**“DISPROPORTIONATELY, BLACK AND LATINX PEOPLE HAVE LIMITED ACCESS TO AFFORDABLE OR ADEQUATE HOUSING, LIVE IN AREAS WITH POORER AIR QUALITY, HAVE LIMITED ACCESS TO SUPERMARKETS AND EXPERIENCE HIGHER RATES OF POVERTY AND LOWER EDUCATIONAL ATTAINMENT.”**

*~Modupeore Shenbanjo*

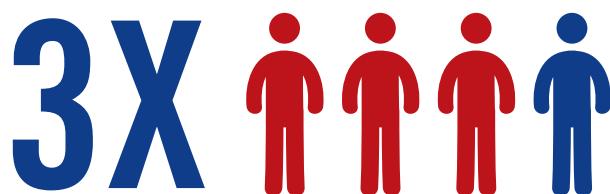
problem in its historical, economic, cultural and political context. It means having the bravery to define the issue regardless of the consequences and the wisdom to see the impact of proposed interventions from multiple perspectives.”

To augment the study of social justice at the core of its mission, YSPH launched a new concentration, U.S. Health and Justice, in the fall. Courses and practical experiences will focus on race and other identities such as class, gender and sexual orientation. In the concentration, led by Keene, students will examine how historical and current systems of privilege and power create and perpetuate unequal, avoidable and unjust burdens on health. They will learn how to analyze public health research in the context of social justice. Students will also develop organizing, advocacy and policy skills.

“First, the concentration seeks to help students understand these issues with analytic rigor,” Melinda Pettigrew, Ph.D. ’99, professor and senior associate dean for academic affairs, and Sten H. Vermund, M.D., Ph.D., dean of the school, wrote in a joint essay announcing the concentration. “Then it will empower students with the diverse skills needed to tackle, intervene and correct injustices.”

Meanwhile, members of the YSPH community are already contributing their skill and expertise to exploring social justice issues. Faculty are studying relationships between mass incarceration and the impact on health, making innovative links between eviction as a form of housing instability and risk of sexually transmitted diseases, and developing interventions to prevent asthma in children of color, among other topics.

Alumni are also putting the YSPH mission to work in endeavors that address racial injustice. Marina Marmolejo, M.P.H. ’19, has launched DreamKit, an app that directly supports young people at risk of homelessness. “All of our



**THE NUMBER OF TIMES MORE THAT POLICE VIOLENCE KILLS BLACK VS. WHITE AMERICANS**

members are experiencing insecurity of basic needs, and in their fight for daily survival, they do not have the time or resources to build lasting and meaningful relationships with the community,” she said. “DreamKit attempts to address these issues by connecting youth with virtual activities, rewarding their growth and sharing their progress with the community.” DreamKit members are paid for activities they complete through the app, which introduces them to new skills around employment and education readiness, emotional intelligence and personal development.

“We must not shy away from discussing racism as the root cause of health inequities and inequalities,” Shenbanjo said. “By acknowledging this truth, we will create a platform to discuss and address the age-old institutions, laws and policies that are murdering people of color and holding them back. Institutions such as YSPH must join the table, educate the next cohort of public health leaders and policymakers, and equip these leaders to discuss racism and develop solutions.” **YPH**

# U.S. HEALTH AND JUSTICE CONCENTRATION

New academic program launched at YSPH.

The Yale School of Public Health has launched a U.S. Health and Justice Concentration for students to address the vast, persistent and systemic health inequities in the United States.

It is well documented that health inequalities associated with race, geography, class, gender identity and sexual orientation contribute to the burden of disease in different populations across the United States. Advancing health justice and equity is a vital component of the Yale School of Public Health's mission.

The concentration will begin enrolling students in spring 2021, said Associate Professor Danya Keene, Ph.D., director of the new program, which is open to all students pursuing an M.P.H.

Keene and Tekisha Dwan Everette, Ph.D., an adjunct assistant professor who will be teaching one of the concentration's core courses, discussed some aspects of the concentration with *Yale Public Health*.

## What are the goals of this new concentration?

**DK:** This cross-departmental YSPH concentration will prepare students to analyze and address systems and processes that perpetuate health injustice in the United States. Students will examine how historical and current systems of privilege and power, related to race, class, gender, sexual orientation and other identities, create unequal burdens on health that are avoidable and unjust.

Students will also develop organizing, advocacy and policy skills that prepare them to advance health justice. Finally, students will develop tools to analyze public health research methods, discourse and practice using a health justice framework. Though not limited to Connecticut, the concentration will emphasize local health needs and will involve sustained partnerships with local organizations that are working to advance health justice.



Danya Keene

**The concentration's launch coincidentally comes shortly after the killing of George Floyd by Minneapolis police and widespread protests around the country ever since. Describe the need for this scholarship.**

**DK:** The launch of the concentration is certainly timely, not only given the recent attention to police violence, but also given the ways that COVID-19 has intersected with systemic racism to disproportionately affect Black and brown communities. However, despite this apparent timeliness, the concentration has actually been in the works for a while. The planning process was initiated by the Department of Social and Behavioral Sciences chair, Trace Kershaw, in late 2018, and continued throughout the 2019 calendar year. This was a collaborative effort that involved students and faculty from across YSPH, as well as community partners.

The concentration was developed, in part, as a response to student requests for more coursework that addressed health inequalities within the United States. Students and faculty voiced a particular need for coursework focused on racial justice and for opportunities to examine and address the role of systemic racism as a determinant of health in the United States.

## What are some of the ways that racism, discrimination and police brutality affect health outcomes?

**DK:** The ways that racism affects health are too numerous to fully describe here. Racism, and in particular anti-Black racism, is embedded in virtually every U.S. institution. It shapes how our neighborhoods, schools and universities are structured. It is a fundamental aspect of our criminal justice system that disproportionately incarcerates Black Americans and of our policing system that disproportionately kills Black Americans through persistent violence. Racism is also present in interpersonal interactions in the form of implicit and explicit biases as well as through persistent 'racial abuse' (a term that historian Ibram Kendi uses to describe what is often referred to elsewhere as micro-aggressions). Furthermore, repeated exposure to racism in



Tekisha Dwan Everette



its many forms, acts as a form of toxic stress that chips away at the body, contributing to premature aging, early onset of chronic health conditions and inequalities in morbidity and mortality. This process, referred to in the literature as “weathering,” is one of the many ways that racism contributes to racial inequalities in COVID-19 morbidity and mortality.

**More and more, racism is being discussed (and embraced) as a public health issue. The connection seems clear. Why didn't this happen sooner?**

**TDE:** The connection between racism and public health has long been known, but the awareness of the connection we are recently seeing can be attributed to a few things:

- The overt racial tension that is palpable in the United States in the past decade. It has been an undeniable reality that anti-Black, anti-Indigenous, and anti-immigrant sentiment in this country has intensified.
- The ground organizing of people of color and allies who are demanding recognition, reparation and change related to the racism and xenophobia in the United States. Public health has definitely been a part of this.
- The more public discussion of the health effects of racism and discrimination in the United States (i.e., Black maternal mortality rates, stress levels directly related to the multiple murders of Black men and women, increased stress levels in immigrant communities related to the detention centers).

**You will be teaching a new course in the spring: “Advocacy and Activism.” What will the course encompass?**

**TDE:** This course will center on the important role of advocacy in public health and how public health practitioners, teachers and students should use their expertise and learnings to advocate for systems change. The course will provide both the theoretical underpinning for advocacy and practical strategies for engaging in advocacy in different settings.

**How unique is this type of concentration among universities in the United States? Among schools of public health? How is YSPH’s program different?**

**TDE:** Other schools of public health have concentrations that focus on equity, social justice and human rights. Our planning process began by looking at some of these models and then working to create something unique in our focus on the integration of history, activism and intense reflection on our own public health research and practice.

**How has COVID-19 influenced public activism?**

**TDE:** With the combined impact of police brutality and COVID-19, there has been some heightened activism in the United States. COVID-19 has definitely created a different format for activism with so much being virtual. However, this has not stopped people from protesting with masks on, testifying or giving public comment at hearings or meetings. It has also created the opportunity to use social media platforms for activism and advocacy.

**What do you see as the most encouraging results so far from the advocacy and activism that have taken place? Has the needle moved?**

**TDE:** A few examples come to mind: It was the advocacy of the students and faculty at Yale that produced the new U.S. Health and Justice Concentration. We have seen resolutions around racism as a public health emergency move forward in 128 jurisdictions across 22 states. We saw the arrests of George Floyd's killers. These are just a few recent examples where we are seeing change as a result of advocacy and activism. We still have work to do as we need ensure health equity in all policies, health access in all policies, and we need to see arrests in the murder of Breonna Taylor. We need the needle to move forward on eliminating racism and its impact on the health of people in the United States. We are hopeful that our students and faculty will be a part of this change. **YPH**

# A VIGOROUS RESPONSE

Yale School of Public Health steps up to assist New Haven, Connecticut and beyond in time of crisis.

When the coronavirus arrived in Connecticut, it seemed to spread as quickly as light.

By mid-March the situation was dire and growing more so. Hospitalizations were rising sharply, as was the death rate. Little was known about the virus, and fear and uncertainty were palpable.

Members of the Yale School of Public Health community—its students, faculty, staff and alumni—quickly pivoted to assist those in need in the Elm City and beyond. They've been working ever since.

Student volunteers began compiling weekly reports with case numbers, precaution advisories and other important information on the disease to help keep the community informed. Others began contact tracing to help prevent the spread of the disease. Still others started food shopping for the elderly, who are particularly vulnerable to COVID-19, to lessen their chances of infection.

Meanwhile, faculty researchers with infectious disease expertise served as advisers helping to set global health policy, collaborating with government agencies on emergency responses, developing diagnostic tests and potential treatments for COVID-19, and crafting plans to help vulnerable populations in New Haven and beyond. Throughout the health crisis, many of them have also provided science-based guidance to the general public through scores of media interviews about the health threats posed by COVID-19.

"This crisis demanded a sustained and multifaceted response," said Dean Sten H. Vermund, M.D., Ph.D., "I continue to be amazed and humbled by the energy and commitment that I see happening all around me as people rush to help in myriad ways. These actions are making a difference and represent the ethos of what academic public health is and needs to be."

The pandemic was a unique opportunity for public health students to apply the training that they had studied in the classroom.

"This is a rare, real-world experience to demonstrate what we have learned and contribute to the community," said M.P.H. student COVID-19 epidemiology reporters Jeannette Jiang and Emily Peterson. "Being involved in such a quickly developing project has given us better insight into what our future careers as public health practitioners may hold."

Professor Linda Niccolai, Ph.D., who, with James Meek of the YSPH Emerging Infections Program and doctoral student Tyler Shelby, oversaw the contact tracing initiative spearheaded by the school, witnessed the spirit of volunteerism that pervaded the YSPH community as scores of people came forth with a shared goal: to help the community in its time of need.

"I have been so impressed with the commitment of the YSPH community to step up and volunteer for this effort," said Niccolai. "Their collective desire to contribute to controlling this pandemic is truly amazing."

Associate Professor Xi Chen, Ph.D., did numerous interviews with Chinese media and other outlets, including one of the first YSPH interviews on the impending pandemic with a local television station. A flood of interviews by Xi and other YSPH experts soon followed, on CNN, MSNBC, CBS, NBC and the BBC, as well as in *The New York Times*, *The Atlantic*, *The Wall Street Journal* and *The Washington Post*, among many other outlets.

"I consider it my duty," Chen said of the interviews. "As countries are going through various stages of this unprecedented crisis, mutual learning and international coordination in the battle against such a pandemic have never been more important. Through communicating with global media, I sincerely hope to help bridge this gap."

The following timeline provides a sampling of the ways that the Yale School of Public Health rose to the challenge of COVID-19 and helped to soften its blow. **[YPH]**

*Michael Greenwood*



DECEMBER 2019

Novel coronavirus (COVID-19) identified in Wuhan, China.

JANUARY 23, 2020

Visiting lecturer Daniel Bausch tells capacity audience at YSPH that novel coronavirus threatens to “be big.”

MARCH 8, 2020

First case of COVID-19 is reported in Connecticut.



JANUARY 21, 2020

Centers for Disease Control and Prevention announces first case of novel coronavirus in the United States in the state of Washington.

FEBRUARY 6, 2020

YSPH hosts panel discussion organized by the Yale Institute for Global Health on the rapidly emerging threat posed by novel coronavirus. Event is livestreamed.

MARCH 12, 2020

YSPH issues statement pledging support to New Haven as the city closes its public schools and implements distance learning.

2019

JANUARY

FEBRUARY

MARCH

2020

JANUARY 20, 2020

Xi Chen gives the first YSPH media interview on COVID-19 with local television station NEWS8. Hundreds of media interviews with Chen and other YSPH faculty ensue over the following months.

JANUARY 30, 2020



The World Health Organization declares coronavirus outbreak a global health emergency.

MARCH 2, 2020

U.S. Surgeon General Jerome Adams visits the Yale School of Public Health and departs from prepared remarks to discuss COVID-19.



MARCH 10, 2020

Over 500 public health and legal experts and organizations sign an open letter to Vice President Mike Pence and other government officials on achieving a fair and effective COVID-19 response. YSPH's Gregg Gonsalves helps organize the effort.

Albert Ko issues general do's and don'ts on steps people can take to protect themselves against novel coronavirus. Durland Fish issues other guidelines a few days later.

Yale University announces that students will not return to campus after spring break and will resume classes through distance learning.

## MID-MARCH 2020

YSPH creates the Rapid Response Fund in the early days of the pandemic to financially support the most promising research by faculty and students who are in the front lines of the public health response. Approximately \$750,000 granted by September.

## MARCH 16, 2020

Semiweekly e-newsletter (COVID-19 Update Data & Developments) with the latest facts and data on growing COVID-19 pandemic launched by Yale School of Public Health students Emily Peterson and Jeannette Jiang and Professor Robert Heimer.



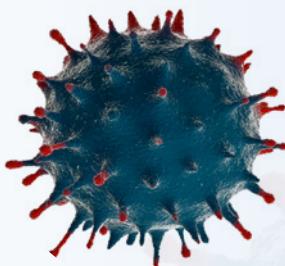
## MARCH 26, 2020

YSPH launches “COVID-19 Right Now,” a weekly broadcast on Facebook Live and YouTube moderated by James Hamblin and featuring YSPH and Yale experts.

Yale establishes a \$5 million Yale Community for New Haven Fund to support local businesses, families and nonprofit programs assisting people who are food insecure or homeless and others in need during the COVID-19 crisis.

# 2020

## MARCH



## MARCH 14, 2020

University announces first confirmed case of COVID-19 within the Yale community and says online instruction is to be extended through the semester.

YSPH volunteers begin COVID-19 contact tracing for the Yale community to slow the spread of the disease.

YSPH partners with United Way of Greater New Haven to launch a website for emergency volunteer needs in the Greater New Haven community. The Office of Public Health Practice assists in drafting safe volunteer practices that are then adopted by the city of New Haven.

## MARCH 18, 2020

Gregg Gonsalves hosts a virtual town hall with seven Yale and New Haven experts to address pandemic and answer questions.

## MARCH 25, 2020

Yale President Peter Salovey announces that all May commencement activities are postponed and the university will seek alternate ways to honor graduates.



## MARCH 22, 2020

The IMPACT (Implementing Medical and Public health Action against Coronavirus, ConnecTicut) Team is formed in response to the impending COVID-19 epidemic and establishes diagnostic platforms, inpatient and health care worker cohort investigations and biorepository at YSPH.

## MARCH 28, 2020

YSPH responds to request from Connecticut Department of Public Health to assist with COVID-19 surveillance in long-term care facilities.

APRIL 3, 2020

A large collaboration of Yale researchers led by Nathan Grubaugh announces that inter-state transmission of SARS-CoV-2 is a much greater public health threat in the United States than cases coming into the country via international travel. The study is later published in *Cell*.



APRIL 1, 2020

Scores of YSPH volunteers begin COVID-19 contact tracing for city of New Haven.

APRIL 9, 2020

What is believed to be the first worldwide study on the economic consequences of COVID-19 pandemic is published by Xi Chen and colleagues in the *Journal of Population Economics*.

APRIL 2020

Saad Omer chairs a WHO working group on COVID-19 vaccine safety assessment and is a member of WHO's Global Advisory Committee on Vaccine Safety.

Joan Monin and the Social Gerontology and Health Lab at YSPH produce a report on long-term care during a pandemic, exploring how families are communicating with older adults in assisted living facilities and how this affects the residents' mental health.

MID-APRIL 2020

The Public Health Modeling Unit at YSPH creates, tests and makes available an array of computer-based tools to assist the public health response to COVID-19.

APRIL 21, 2020

**PNAS**

Study by Alison Galvani and others in *Proceedings of the National Academy of Sciences* finds that self-isolation dramatically reduced bed demand in intensive care units.

APRIL

2020

APRIL 2, 2020

Research on the effectiveness of travel bans, screenings and lockdowns in slowing spread of COVID-19 is published in *Proceedings of the National Academy of Sciences*. The study by Alison Galvani and others is the first on COVID-19 published by YSPH.

APRIL 8, 2020

YSPH's Emerging Infections Program contributes to research that shows that select Connecticut counties have the highest hospitalization rate for coronavirus among jurisdictions in 14 states reviewed.



APRIL 2020



APRIL 19, 2020

Albert Ko is tapped by Connecticut Gov. Ned Lamont to co-chair the eight-member Reopen Connecticut Advisory Group.

Student Leslie Asanga founds Pills2Me, an online platform that allows older adults, people with compromised immune systems and others to order medications at home and have them delivered by a volunteer at no charge the same day.

## LATE APRIL 2020

### APRIL 24, 2020

A preprint study led by YSPH finds that saliva samples are preferable to the widely used deep nasal swabs as an indicator for COVID-19 infection.

Trace Kershaw and REIDS scholars publish research on conducting community-based research during COVID-19 in *AIDS and Behavior*.

YSPH alumna Uzma Alam and colleagues release one of the first modeling studies forecasting COVID-19 infection and mortality rates across Africa.

## MAY 5, 2020

Shelley Geballe leads a webinar for nearly 100 community-based organizations on the CARES Act and other federal legislation related to COVID-19.

## MAY 4, 2020

At the request of the Connecticut Department of Public Health, student volunteers and faculty from YSPH and YIGH support COVID-19 surveillance in more than 215 long-term care facilities across the state to accurately assess the pandemic's impact on the elderly.

## MAY 7, 2020

Rafael Pérez-Escamilla serves as adviser to World Health Organization (Geneva headquarters) on breastfeeding recommendations in the context of COVID-19.

### MAY 12, 2020

Preprint paper by YSPH scientists and others finds the initial evidence for SARS-CoV-2 infection in placenta in a case of fetal loss. The paper is later published in the *Journal of Clinical Investigation*.

## 2020 APRIL

### APRIL 27, 2020

The Washington Post and the Yale School of Public Health announce a partnership, the COVID Counting Consortium (3C), to research and report on the impact of the pandemic.



## MAY

### MAY 1, 2020

Xi Chen helps lead more than 70 public health scholars to urge leaders in the United States and China to coordinate their responses to the pandemic.

YSPH's Humanities, Arts and Public Health Practice Initiative at Yale (HAPPY) launches the Pandemic Archive, a public collection of writing, artwork, music and videos documenting life during COVID-19.

### EARLY MAY 2020

More than 50 YSPH and Yale faculty members sign a letter to Lamont urging the governor to de-populate the state's prisons to combat the spread of COVID-19 and protect the state's most vulnerable populations from the pandemic. Gregg Gonsalves helps organize.

## THE LANCET Planetary Health

### MID-MAY 2020

A study led by Kai Chen and published in *The Lancet Planetary Health* finds that China's ban on traffic in wake of pandemic sharply reduced the country's often severe air pollution.

## MID-MAY 2020

Trained students from YSPH help the Connecticut Department of Public Health monitor conditions in state nursing homes by regularly calling care facilities to remind them to report COVID-19 illnesses and to ask if they need help.

The coronavirus pandemic's life-altering effects are likely to result in lasting physical and mental health consequences for many people, particularly those in vulnerable populations, a study by Sarah Lowe and colleagues in the *Proceedings of the National Academy of Sciences* finds.

## MID-MAY 2020

Tassos Kyriakides serves on the Canadian Institutes of Health Research's committee to evaluate COVID-19 proposals.



## MAY 18, 2020

Virtual commencement held for graduating YSPH students. Alumna Elizabeth Bradley, president of Vassar College, delivers keynote address.



## LATE MAY 2020

A report written by Forrest W. Crawford and colleagues warns that if people resume normal activities and contacts too quickly there will be a "sharp resurgence" in hospitalizations and deaths over the ensuing months.

## MAY 26, 2020

Jason L. Schwartz begins advising the U.S. House of Representatives Committee on Oversight and Reform in its investigation of federal government activities related to the development of COVID-19 vaccines.

## MAY 2020

### MAY 20, 2020

Connecticut declares phase 1 reopening and that the Reopen Connecticut Advisory Group with Albert Ko and others has completed its tenure.

### MAY 25, 2020

George Floyd, a 46-year-old Black man, is killed by police in Minneapolis. His death touches off national protests and calls for reform.



### MAY 27, 2020

Heping Zhang and colleagues publish a preprint article examining the characteristics of confirmed cases and deaths of COVID-19 in all affected counties of the United States.



## MAY 31, 2020

Dean Sten H. Vermund and others send message to YSPH community decrying the death of George Floyd and urging that more be done to end the public health threats of racism, discrimination and police brutality.

## JUNE 8, 2020

YSPH organizes a panel of senior Yale faculty (Albert Ko, Saad Omer, Sunil Parikh, Marie-Louise Landry and Robert Hecht) to consult with the Myanmar Ministry of Health on COVID-19 prevention and reopening.

## JUNE 2020

YSPH launches series of short essays by faculty, alumni and students responding to the death of George Floyd and urging that more be done to address systemic racism in the United States.

## JUNE 15-16, 2020

Sarah Lowe participates in webinars on the potential short- and long-term mental health impacts of COVID-19 with the King Faisal Specialist Hospital and Research Center in Saudi Arabia and the American Psychopathological Association.

## JULY 2020

Study by A. David Paltiel finds that screening is needed every two or three days to safely reopen college campuses.

## 2020 MAY

### JUNE 1, 2020

Howard Forman, in an interview with *Yahoo Finance*, says the COVID-19 pandemic is exposing the massive health care inequalities that exist in the United States.

### JUNE-JULY 2020

Danya Keene and colleagues at the Yale School of Medicine conduct interviews with 48 health care workers across Connecticut to examine experiences of caring for COVID-19 patients.

## JUNE

### JUNE 22, 2020



### JUNE THROUGH SUMMER 2020

Krystal Pollitt, Marie Brault, Sten Vermund and doctoral students Dan Li and Elizabeth Lin begin visiting independent and public schools across Connecticut to provide recommendations on their reopening plans. Their advice for schools is published as a book chapter and summarized on the YSPH website.

### JUNE 23, 2020

Members of the YSPH community participate in a virtual town hall to discuss ways the school can better address diversity, inclusion and social justice in the aftermath of George Floyd's death.

JULY 3, 2020

Rafael Pérez-Escamilla gives a presentation via Zoom on “COVID-19 and Breast-feeding: World Health Organization Recommendations to the Office of the Vice President of Guatemala and Pan American Health Organization.”



JULY 16, 2020

Rafael Pérez-Escamilla participates in a webinar on COVID-19 and food insecurity with the National Institute of Public Health of Mexico.

JULY

2020

JULY 1, 2020

Yale President Peter Salovey announces plans to reopen a portion of the campus in the fall, while much of undergraduate instruction will take place remotely.

Research published in *JAMA Network* by Daniel Weinberger and others examines the national death toll from COVID-19 and indicates that official tallies likely undercount deaths related to the virus.

EARLY JULY 2020

Study by Alison Galvani and colleagues in *Proceedings of the National Academy of Sciences* finds that asymptomatic people may be responsible for more than half of new COVID-19 cases.

To learn more about YSPH's work in the ensuing months, visit its website at [publichealth.yale.edu](http://publichealth.yale.edu)



Assistant Professor Gregg Gonsalves is a guest on “The Rachel Maddow Show” on MSNBC.

Dean Sten H. Vermund with Mika Brzezinski on MSNBC’s “Morning Joe.”

Professor Albert Ko discusses the growing pandemic on CNN.

Experts from Yale and New Haven discuss the latest COVID-19 developments in a virtual town hall.



## PROTESTING AMID A PANDEMIC

BY GREGG GONSALVES

# 13 ESSAYS ON THE PUBLIC HEALTH CRISES WE FACE. YSPH FACULTY, ALUMNI, AND STUDENTS RESPOND.

**P**ublic health is a diverse discipline. Here at the Yale School of Public Health, researchers are working on every aspect of the field, from conducting basic laboratory science to evaluating the implications of social and economic policies on health outcomes. Meanwhile, as protests have broken out across the country in the wake of the death of George Floyd at the hands of police in Minneapolis, many people have joined the marches, which have become a larger movement against racism and white supremacy in American life.

Some public health practitioners may see the protests simply through the lens of the ongoing COVID-19 pandemic as a source of disease transmission; others see the protests as central to public health as police brutality and the health disparities among African Americans in the United States result in tens of thousands of excess deaths per year. Perhaps the truth is somewhere in the middle. The protests around the country will likely lead to new COVID-19 infections, but the rationale for the marches is pro-public health and many in the crowds are making real efforts to protect themselves and those around them.

As a faculty member in the Department of the Epidemiology of Microbial Diseases, I almost instinctively collapse public health into a story about pathogens and their hosts. But we've known for a very long time that what we now call the social determinants of health are powerful forces that can determine health risks and outcomes. As early as the 17th century, demographer John Graunt suggested that overpopulation and squalid conditions accounted for Londoners' poor health and frequent bouts with plague and other infectious diseases. "London, the Metropolis of England, is perhaps a Head too big for the Body, and possibly too strong," Graunt wrote. As scientists, we also sometimes forget the role of social mobilization in the birth of our own discipline. The American Public Health Association was born in 1872 out of "sanitary crusades" and their revival-style conventions to improve living conditions and keep people safe from epidemics.



In public health, we talk often about competing risks, where someone is exposed to more than one mutually exclusive hazard, the prospect of death from different causes. COVID-19 is a recent pandemic ravaging communities of color, but the virus of racism in America has been with us since 1619 and its health effects are enormous. We don't get to choose the time in history in which we live, and today we face multiple, overlapping public health crises. Should we tell the protesters to go home, that the risks of COVID-19

**“COVID-19 IS A RECENT PANDEMIC RAVAGING COMMUNITIES OF COLOR, BUT THE VIRUS OF RACISM IN AMERICA HAS BEEN WITH US SINCE 1619 AND ITS HEALTH EFFECTS ARE ENORMOUS.”**

~Gregg Gonsalves

are too great? That would probably work as well as just asking nicely for the cessation of police brutality or for our president to stop provoking violence and racial discord.

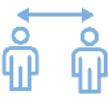
We have competing risks, competing challenges, competing responsibilities. We have to try to minimize the harms across the board for communities of color in the United States. That means working hard to battle COVID-19, but it also means realizing that the protests, which are already achieving some success in getting police departments and municipalities to consider or establish new restrictions on use of force, may be an important public health intervention in and of themselves. We cannot stop the protests, and I've made the case that the benefits associated with them could reshape the lives of communities for the better here in New Haven and around the country. As public health experts, we can "meet communities where they are at," and if they are protesting, help them protest safer, by wearing masks and eye protection, keeping to a small group of friends rather than mingling in the crowd,

bringing hand sanitizer with them, washing their hands or even showering when they get home, seeking testing for COVID-19 and self-isolating if they can.

This is not March or April, we're not in the same kind of lockdown and even with a resurgence of virus across the country, it's unlikely we're going to persuade anyone to resume the strictest of social distancing we saw back then. States have reopened, and closing them down again would be difficult if not impossible to do. This isn't because the protests gave the wrong signal to Americans that the all-clear had sounded, as some have suggested. It's because the president will, as he did in March, April and May, keep banging the drum to keep everything open regardless of what public health experts think.

Whether it's protesting, taking a trip to Las Vegas, sending your kids back to school, all of this is now going to be done in the context of harm reduction. We can't eliminate the risks facing us, but we can blunt the force of what we now can expect to greet us in the months, and perhaps years, ahead.

*Gregg Gonsalves, Ph.D. '17, is an assistant professor at the Yale School of Public Health and co-director of the Global Health Justice Partnership.*



# VACCINE QUEST

BY JASON SCHWARTZ AND SAAD OMER

The rapid development of vaccines against SARS-CoV-2, the virus that causes COVID-19, is essential to the success of any long-term strategy to control the ongoing pandemic. Since early 2020, an unprecedented effort has been underway to dramatically accelerate the vaccine research and development process that typically requires many years, at times even decades, and for which success is never assured. Dozens of research teams around the world, supported by billions of dollars from various governments, pharmaceutical companies and philanthropic foundations, have been rapidly studying various approaches to COVID-19 vaccines. Many of these vaccines are now being tested in increasingly large numbers of human volunteers, generating the evidence for their safety and effectiveness and for potential approval by the U.S. Food and Drug Administration and its international counterparts.

**“ENSURING THAT RESIDENTS IN LOW-INCOME COUNTRIES ARE NOT LEFT OUT WILL BE A PARTICULAR CONCERN, AND BOTH A GLOBAL HEALTH AND ETHICAL IMPERATIVE, AS COVID-19 VACCINATION EFFORTS ARE PLANNED AND LAUNCHED.”**

*~Jason Schwartz and Saad Omer*

Although there are no guarantees in vaccine research and development—a fact demonstrated by over three decades of work on an as-yet-unsuccessful vaccine against HIV—the prospects for vaccines against COVID-19 are encouraging. The large number of different vaccine strategies being pursued, the magnitude of the financial investment in research and development, and the characteristics of the

SARS-CoV-2 virus all give reasons for cautious optimism that the challenges associated with vaccine development will be overcome and in relatively short order.

However, not all vaccines are created equal, and few vaccines are 100% effective. It is possible that the first COVID-19 vaccines to be introduced will be approved on an emergency basis and may provide only partial protection for an indeterminate length of time. Of course, even a moderately effective vaccine would be an extremely valuable tool in COVID-19 response efforts and an important supplement to the suite of public health efforts and emerging therapies able to mitigate the pandemic’s impact.

Approval of the first vaccine will mark the start of a new chapter in the global campaign against COVID-19. But realizing the potential of that vaccine and those that follow will require overcoming a different set of challenges related to rapid, large-scale manufacturing, financing and implementation of a coordinated and equitable global vaccination program. Those challenges are every bit as complex as the ongoing scientific work associated with research and development, and they will require similar levels of coordination and commitment from governments, the private sector, and the public health and global health communities in the months and years ahead.

Ensuring that residents in low-income countries are not left out will be a particular concern, and both a global health and ethical imperative, as COVID-19 vaccination efforts are planned and launched. In other words, the end of the vaccine development race will be just the beginning.

*Jason L. Schwartz, Ph.D., is an assistant professor at the Yale School of Public Health and Saad B. Omer, Ph.D., M.P.H., is the Susan Dwight Bliss Professor of Epidemiology and director of the Yale Institute for Global Health.*



# INEQUITIES EXPOSED BY COVID-19

BY PATRICIA NEZ HENDERSON AND EMMA RUTAN

**W**hile several U.S. states are reopening, Indigenous communities are entering lockdown and facing the highest rates of coronavirus infection in the country. As of June 28, Navajo Nation reported 7,469 cases of COVID-19 — higher than the infection rate of New York.

Around the same time, the White Mountain Apache Tribe surpassed Navajo Nation's infection rate. It is not a coincidence that the COVID-19 pandemic is hitting Indigenous communities the hardest. Although COVID-19 is a novel coronavirus, the effects of infectious disease outbreaks and inadequate health care responses are nothing new to Indigenous populations.

Inequities in COVID-19 infection rates can be traced back to the Indian Removal Act of 1830, the largely unacknowledged health crisis that followed, and the empty promises to tribes made by the U.S. government. Indigenous communities have long been ignored, underserved, and plagued by insufficient access to water, healthy food, and medical care. These structural, place-based deficits — created and perpetuated by the U.S. government — are associated with higher rates of chronic disease and COVID-19 infection. The backdrop of the coronavirus outbreak on Indigenous lands is largely contemporary colonial, subsequent place-based inequities, and the related historical trauma that has ensued.

Historical trauma is “cumulative trauma” that “exacerbates the current social pathology of trauma” among Indigenous populations, putting them at higher risk of infection and illness as past traumatic experiences go unresolved. Developed by Maria Yellow Horse Brave Heart, the concept of historical trauma was established to illuminate the relationship between colonialism and poor health among Indigenous communities. The effects of colonialism have yet to be federally addressed and continue to do harm. This has led to compounded trauma and higher risk of future unresolved trauma, such as an entire family contracting COVID-19.

Historical trauma is unrecognized not only federally but often by Indigenous people themselves. Because historical trauma is a shared experience among Indigenous communities, it has become normalized. Many Indigenous communities are hesitant to acknowledge historical and present trauma as they do not want Indigeneity to be pathologized only for the U.S. government to prescribe temporary solutions devoid of cultural sensitivity or understanding.

Lack of federal acknowledgment and accountability is the backbone of historical trauma and subsequent trauma borne out of the COVID-19 pandemic. To begin to address the disproportionate toll COVID-19 is having on Indigenous communities, public health practitioners must understand historical trauma, present trauma from COVID-19, and the necessity of engaging local clinics and healers. These stakeholders understand historical trauma, having lived it. Interventions for Indigenous communities need to be culturally sensitive and trauma informed, lest they continue to be bandages on bullet wounds.

This health crisis is rooted in unresolved grief and unheard voices. To address current and future disease outbreaks in Indigenous communities, intervention efforts must acknowledge trauma and collaborate with Indigenous spiritual leaders, elected leaders, elders and youth. Only then can the racial disparity associated with COVID-19 among Indigenous communities begin to be reduced.

Inadequate, uninformed care for Indigenous populations is a form of modern genocide, a continuation of historical trauma. COVID-19 is only the most recent barometer of this historical issue.

*Patricia Nez Henderson, M.P.H. '94, M.D. '00, a citizen of the Navajo Nation, is vice president of the Black Hills Center for American Indian Health in Rapid City, South Dakota.*

*Emma Rutan is a rising senior studying psychology at Yale College and health policy at the Yale School of Public Health. She interned at the Black Hills Center for American Indian Health this summer.*



# WHEN CORONAVIRUS BECAME PERSONAL

BY MARNEY WHITE

In spring 2020, I taught the undergraduate course “Introduction to Epidemiology and Public Health.” In trying to “make epidemiology real,” I aim to include topics that resonate with students on a personal level. What I did not expect was that teaching epidemiology during COVID-19 would become incredibly personal for me.

In December 2019 I was given a diagnosis of a severe autoimmune disease that requires chemotherapy treatment. After receiving this news, I cycled through disbelief, fear, grief. In an effort to feel control over the situation, I read every bit of research on the disease and treatment outcomes. And then I imagined worst-case scenarios: What if I can’t tolerate the meds? What if I’m too sick to work? What if I am the 1 in 6 who dies from this disease?

Classes began as usual in January. When I introduced COVID-19 as a topic in class, I did not anticipate that it would become the primary issue of the semester and indeed our lives. In the first in-class case study, students accessed the World Health Organization’s situation reports to compare COVID-19 to the 2000 SARS outbreak. It was clear that we were talking about very different viruses, but it was not until I drew the respective epidemic curves that I realized where we could be headed. Still, somehow, I remained in denial that the virus would make it to the U.S.

In February, my treatments began. I was able to tolerate the meds and felt relief knowing that with this treatment, my prognosis is excellent. I was able to refocus on work. I sent my students the *JAMA* article reporting the first known asymptomatic carrier of the novel coronavirus and wondered why this news was not widespread: Why is the media reporting that COVID-19 is no worse than the flu? Why are they saying that only the elderly and immunocompromised are at risk?

By that time, I was charting the WHO situation reports and checking the Centers for Disease Control and Prevention’s website for travel warnings. My family had a trip planned for spring break, and I wondered if we should

cancel. Since I had just undergone chemo, I was maximally immunocompromised, making me one of the vulnerable few that some people seemed willing to sacrifice.

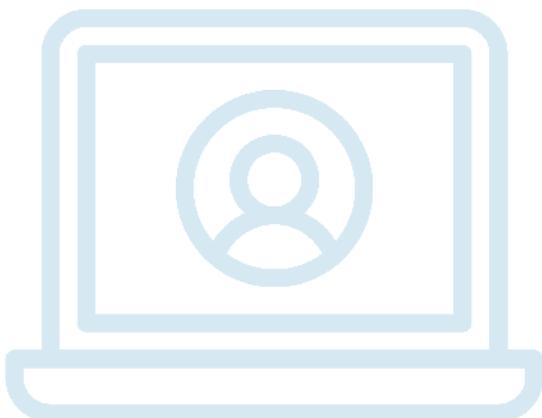
There was no CDC guidance at that time. But I drew from my vantage point as a public health professor and made swift decisions. We canceled our trip, pulled our son from school, and imposed family-level isolation. I obtained permission to teach remotely for the remainder of the semester. While I felt guilty for shortchanging my students, I could not risk exposure through in-person teaching. Ultimately, all of Yale shifted to remote instruction, but I had to make that call early. So far, I have avoided exposure.

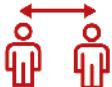
Now my mind is racing through hypotheticals: If I had not been teaching epidemiology, would I have followed the emerging pandemic so closely? Would I have read the WHO situation reports and scoured the research literature? Would I have been so vigilant?

Unlikely.

What I know for certain is that my being in public health was critical in informing my own health decisions. While I have long valued empathy training for public health professionals, in 2020 I became one of the vulnerable people that we in public health work so hard to protect. On a personal level, I am so grateful to our field. From a professional perspective, I am proud to be a part of it.

*Marney White, Ph.D., is an associate professor at the Yale School of Public Health.*





# SOCIALLY DISTANCED, BUT FULLY ENGAGED

BY SAMANTHA STONE

**R**egardless of our backgrounds, public health students have one thing in common: We want to save the world. Whether our drive is to amplify the voices of marginalized populations, increase access to care or track the spread of disease, we are all working toward a utopian health care system. As an incoming second-year health care policy student during the COVID-19 epidemic, I have never felt such a dichotomy between what I want to do for myself and my fellow Americans, and what I should do. I am your typical Yale student who sees a problem and is itching to mobilize. However, right now the best thing I can do is my part to prevent the spread of disease. That means physical inaction, but not social silence.

Satisfying my summer work requirement to graduate seems like the least of my problems as the world around me succumbs to an unseen enemy. While vulnerable populations are the most susceptible to COVID-19, the news keeps changing and it seems like anyone, everyone is vulnerable

However, as public health students, we have a duty to raise awareness in our ever-changing environment. As our population and our government push toward COVID-19 innovation, we have a responsibility to help our society filter through the noise and hear the true scientific advancements. This is how we keep each other safe. Health care students have a unique opportunity to take what we learned in theory in the classroom and use it in real time in our surroundings.

I am proud to be a part of such a socially conscious and engaged community that takes an active role in flattening the COVID-19 curve, whether it is through participating in contact tracing initiatives, shopping for at-risk populations, handing out masks or simply posting on social media about how to be safe. Being a YSPH student during what seems like an epidemic of biblical proportions reminds me why I entered this field. Yale has enabled me and my fellow students to help make a change and make the world a healthier place. Yale has taught us to think critically and actively and has given us the tools to rise to the challenge. We are public health.

*Samantha Stone is an M.P.H. candidate at the Yale School of Public Health.*

**“SATISFYING MY SUMMER WORK REQUIREMENT TO GRADUATE SEEMS LIKE THE LEAST OF MY PROBLEMS AS THE WORLD AROUND ME SUCCUMBS TO AN UNSEEN ENEMY.”**

*~Samantha Stone*

to the disease. This summer, I was one of the lucky ones who held on to my summer internship program, and I am working for a large medical device company. As I log on to my many Zoom calls every day, participants go through the pleasantries of asking how we all are doing and wishing each other, and our loved ones, well. This, along with the social separation, can make me feel helpless during this strange time.



# THE TIP OF THE ZOONOTIC ICEBERG

BY CHANEY KALINICH

The origins of SARS-CoV-2 go back decades before the cluster of cases of a mysterious pneumonia showed up in late 2019.

The virus, like many emergent diseases, spread from a nonhuman species to humans.

Zoonotic diseases, as these are called, were also responsible for other recent pandemics, including the related coronaviruses, SARS-CoV and MERS-CoV. The origins of this latest pandemic and others lie in the interconnected ecology of viruses and hosts and may provide important insight on the best way to mitigate the risk of a future pandemic.

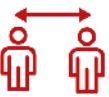
The genome of SARS-CoV-2 provides some of the most important clues about how it emerged. Coronaviruses infect most mammals and often adapt to a host species. The most closely related coronavirus to SARS-CoV-2 is RaTG13, which was identified in 2013 as being from bats. Based on phylogenetics, SARS-CoV-2 and RaTG13 shared an ancestor sometime in the 1990s. The 20- to 30-year gap in the virus's evolutionary history since then raises questions that evolutionary biologists have speculated on extensively. One of the two genome regions with major differences between RaTG13 and SARS-CoV-2 – a change in a binding protein allowing more efficient binding to ACE2 receptors – has been of particular interest. This change found in SARS-CoV-2 also appears in a pangolin coronavirus, indicating potential recombination in a pangolin with simultaneous infection with both the bat and pangolin virus.

It is also possible that the increased efficiency evolved independently of the pangolin virus and that bats (or some other species) are the most proximate host species. While there may have been earlier short-lived, undetected chains of transmission that selected for human adaptations, it is clear that the latest pandemic is the result of a single introduction of SARS-CoV-2 into humans in late 2019. All cases sequenced so far (58,000 as of early July) share a common ancestor in late 2019, indicating that the initial cluster and subsequent cases resulted from a single spillover.

Researchers may never know for certain whether SARS-CoV-2 passed through an animal on its evolutionary journey from bats to humans, or what that animal was. The intermediate virus may no longer exist, and if it does, finding it would be like the proverbial search for a needle in a haystack. It is important to consider the broader reasons for its emergence when seeking ways to prevent similar events. The importance of zoonotic transmission in emerging pathogens with pandemic potential cannot be overstated. The 2002–2004 SARS-CoV pandemic was similarly traced to a bat coronavirus that likely passed through palm civets or raccoon dogs. MERS-CoV, another coronavirus, jumped from bats to dromedary camel populations, where it circulates and causes human outbreaks. Zika, Ebola, H1N1 (2009) and HIV/AIDS could not be more different with regard to transmission and replication, but all caused pandemics and have zoonotic origins.

Zoonotic spillover is inevitable, but pandemics can be prevented. It is possible to reduce the frequency and pandemic risk from zoonotic emergence by taking steps such as conducting disease surveillance in animals, monitoring and limiting wildlife trade, and focusing disease surveillance programs on regions with high potential for zoonosis due to ecological or behavioral factors. Zoonotic disease emergence has occurred with increasing frequency over the past century as humans encroach into wild areas, so habitat conservation and sustainable resource extraction must be the cornerstone of any pandemic prevention effort. By looking at the origins of SARS-CoV-2, we can better prepare for, if not prevent, the next pandemic.

*Chaney Kalinich, M.P.H. '20, is a postgrad working in the lab of Nathan Grubaugh.*



# SLOWING THE SPREAD OF A VIRUS: PHONE CALLS, EMPATHY, CONTACT TRACING

BY MADELINE BENDER

**W**hen I signed up to take a course last January titled “Investigations of Disease Outbreaks,” I had no idea that by the end of the course, I’d be part of an actual outbreak investigation.

Early on in the semester, an epidemiologist from the Connecticut Department of Public Health walked us through a tuberculosis outbreak she had investigated. Fewer than a dozen people were ultimately diagnosed with the disease, but her team identified and interviewed hundreds of individuals who might have come into contact with the patients and been exposed to TB.

This process, known as contact tracing, is key to any outbreak investigation. The COVID-19 pandemic has tested the ability of public health officials to contact trace at an unprecedented scale. With the tuberculosis case study in the back of my mind, I knew that the other student volunteers and I had our work cut out for us when we signed up to be part of YSPH’s contact tracing efforts after COVID-19 came to Connecticut in March.

I served as a contact notifier before most states organized their own teams of contact tracers, but even as we ventured

people I called early on were unaware of these guidelines, which were created to slow the spread of coronavirus.

Contact tracing isn’t as easy as following a script, though. Listening and empathizing and other soft skills can be decisive factors in gaining people’s trust so that they follow public health recommendations. People weren’t always thrilled to receive a call from me: Sometimes they’d been contacted by other public health workers, while other times no one had contacted them for weeks and they felt overlooked. A script can’t prepare you for the moment a woman tells you that she was exposed to coronavirus by her husband, who died of complications from the disease.

These examples underscore the need for emotionally intelligent contact tracing, but they also highlight the toll that contact tracing can take on the volunteers and workers who do it. National contact tracing efforts will have to take into account the well-being of people on both sides of the phone call.

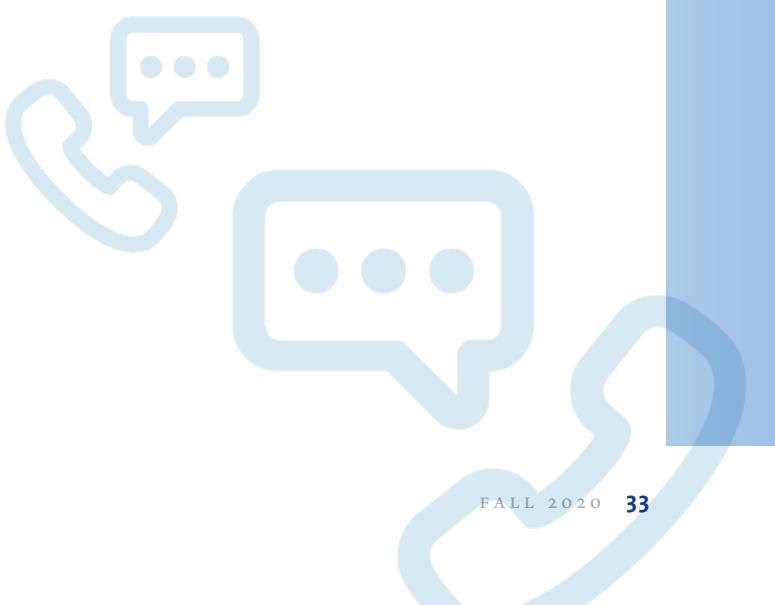
I am grateful to the several instructors of the course for equipping me with knowledge I put to use to do my part in fighting this pandemic. My time as a contact notifier showed me the scope of the challenge ahead, but it also gave me hope that we can slow the spread of COVID-19 through this effective public health tool.

*Madeline Bender is a second-year M.P.H. student at the Yale School of Public Health.*

**“NATIONAL CONTACT TRACING EFFORTS  
WILL HAVE TO TAKE INTO ACCOUNT THE  
WELL-BEING OF PEOPLE ON BOTH SIDES  
OF THE PHONE CALL.”**

*~Madeline Bender*

into uncharted territory, protocols were in place based on years of public health knowledge. I worked off a script to notify people that they’d been exposed to someone who tested positive for COVID-19 and to assess their symptoms. Based on their response, the script provided recommendations for self-isolation and symptom monitoring. Many





# WORKING WITH PARTNERS IN AFRICA TO SLOW A NEW PANDEMIC

BY LUKE DAVIS

In February and March 2020, the first COVID-19 patients began appearing at airport screening points across Africa. At the time, the global spread of SARS-CoV-2 was not yet a foregone conclusion, and this introduction of the virus on the continent was chilling news for the many Yale faculty working with colleagues in East, West and Southern Africa. As an epidemiologist and pulmonary physician with long-standing collaborations in Africa, I often think about the challenges of finding, treating and preventing respiratory tract infections such as tuberculosis and pandemic influenza in this context. It seemed inevitable that the novel coronavirus would exploit Africa's many vulnerabilities – crowding, poor ventilation, limited access to clean water and high rates of HIV/AIDS – to such infections. In addition, considering the capacity in parts of Africa to provide oxygen, advanced nursing care and mechanical ventilation for treatment of severe respiratory illness, the outlook looked particularly grim.

Yale colleagues immediately spoke out to draw attention to these needs and threats. In a March 30 Viewpoint in *The Journal of Clinical Investigation*, Professor Elijah Paintsil, MB.ChB., likened the COVID-19 pandemic's arrival on the continent to the eyes of a crocodile visible just above the water's surface – menacing enough alone, yet obscuring a much larger threat to Africa's fragile health systems below. Professors David Vlahov, Ph.D., R.N., and Albert Ko, M.D., writing in the *Journal of Urban Health*, suggested specific actions to limit the impact of SARS-CoV-2 on the huge populations residing in urban slums in Africa and other parts of the global south. In the journal *Clinical Infectious Diseases*, Professor Gerald Friedland, M.D., wrote of the need to prevent "COVID-19 collateral damage" to three decades of progress on tuberculosis, HIV/AIDS and polio. Together, these commentaries spoke with one voice: Africa must prepare immediately or risk devastation.

In many ways, the situation evoked the early days of the HIV/AIDS pandemic in Africa. With few diagnostics, treatments or prevention strategies accessible at the time, many countries simply denied HIV/AIDS was a problem. A notable exception was Uganda, which became among the first countries in the region to adopt a public health approach to the disease. Counselors were trained and widely deployed. Research programs were initiated. Groundbreaking studies on preventing opportunistic infections and maternal-to-child transmission soon followed. High HIV-burden countries around the globe took note and followed Uganda's example. Today, sub-Saharan African countries lead the world in population-based care for HIV/AIDS.

**"AS SUB-SAHARAN AFRICA NOW CAUTIOUSLY REOPENS, YALE FACULTY ARE RESTARTING THEIR RESEARCH AND TRAINING PROGRAMS, WITH SPECIAL ATTENTION TO THE DIRECT AND INDIRECT EFFECTS OF COVID-19 ON PUBLIC HEALTH."**

~Luke Davis

These countries have realized many other benefits from these investments in health systems, including the rapid and effective containment of at least 10 outbreaks of Ebola and other viral hemorrhagic fevers in Uganda over the past two decades. Could the same public health approach yield similar results for the COVID-19 response?

Most African leaders seemed to need no convincing. By early April, many had imposed strict restrictions on public gatherings, mandated universal face covering, and expanded



surveillance and contact tracing. Africa's scientific leaders gathered the latest information from outside the continent. On March 27, the Yale Institute for Global Health organized a call with the Africa Centers for Disease Control and Prevention to discuss local needs for the pandemic response. Professors Sunil Parikh, M.D., M.P.H., and Saad Omer, Ph.D., M.P.H., moderated a series of conversations between Yale faculty and frontline clinical and public health practitioners in Cameroon, Ghana and Sudan. As of July 2020, the situation in Africa remained tenuous, but in stark contrast to the case surges on other continents, COVID-19's impact on Africa had been comparatively mild. While much remains unknown about the epidemiology of COVID-19, Africa's experience so far provides a fascinating case study on the benefits of early, aggressive, scientifically informed public health policies.

As sub-Saharan Africa now cautiously reopens, Yale faculty are restarting their research and training programs, with special attention to the direct and indirect effects of COVID-19 on public health. There are many new and important questions: Can a primarily public health response continue to suppress COVID-19 in Africa? What will the long-term effects of the pandemic be on other communicable disease programs, including those focused on TB, HIV/AIDS, malaria, diarrheal diseases and neglected tropical diseases? What can we learn from Africa's response to inform our actions in the U.S.? Although travels to visit African colleagues will be restricted for the foreseeable future, Yale collaborations with local partners will continue to drive progress on the pandemic.

*Luke Davis, M.D., is an associate professor at the Yale School of Public Health and does much of his research in Africa.*





# INFORMING POLICY WITH MATHEMATICAL MODELS

BY TED COHEN

The global spread of SARS-CoV-2 has elevated public awareness of the role of transmission dynamic models of infectious diseases for informing public health practice. These models help infectious disease epidemiologists translate information about the biology of pathogens and the clinical course of infection (for example: How long do individuals remain infectious? Are individuals infectious before they develop symptoms? To what degree does previous infection confer immunity?) into knowledge about the transmission patterns of pathogens in communities.

Many transmission dynamic models are encoded as a series of equations describing how individuals transition between health and disease states over time, and as a function of the current status of any epidemic. The explanatory and predictive value of these models has been demonstrated in many contexts. For example, relatively simple mathematical models of infectious diseases have been used to estimate the necessary threshold of immunization to eliminate transmission of important diseases of childhood, to explain the complex and time-varying patterns of infectious diseases that tend to oscillate in populations, and to predict perverse consequences of poorly implemented public health interventions.

So, what have mathematical models told us so far about the COVID-19 pandemic? Models provided early estimates of the transmissibility of SARS-CoV-2 that were subsequently used to sound early warnings about the high likelihood of international spread. Models also suggested that, once established, unmitigated epidemics would infect the majority of the population before incidence would begin to decline. Models have shown that the benefits of early efforts to suppress transmission would be erased by subsequent disease resurgence if interventions could not be sustained until the spread was well controlled. Models have demonstrated the importance of reducing the number and frequency of contacts and the key role of face masks to limit transmission, especially until an effective vaccine is available.

Models, coupled with painstaking shoe leather epidemiology aided by modern methods to sequence the genomes of the virus and novel digital technologies to track mobility, have allowed researchers to track the global spread of the virus; revealed the importance of transmission from individuals who do not report any symptoms; and shown associations between reductions in population movements and subsequent reductions in COVID-19 case notification rates and deaths.

But model-based insights have not been uniformly accurate, and understanding the sources of error is important. First, mathematical models of COVID-19, at best, provide a scaffolding on which to attach the rapidly expanding knowledge of the biology of SARS-CoV-2 and the natural history of COVID-19 infection. In cases where this knowledge is absent, or inaccurate, models will be wrong. For example, the substantial role that asymptomatic individuals play in transmission was not well appreciated early enough, and this likely resulted in overly optimistic estimates of the impact of isolating individuals with symptomatic disease. Second, models have suffered from incomplete, inaccurate and inconsistent reporting of surveillance data. Addressing these gaps in completeness and quality of data will be important for improving model-based insights.

I anticipate that COVID-19 transmission dynamic models will have an increasingly important role in helping policymakers weigh the health benefits against the economic and social costs of physical distancing policies. Moving forward, it is my hope that such models can be used to not only improve the effectiveness and efficiency of existing and future interventions, but also to ensure that the health benefits of such policies are distributed equitably.

*Ted Cohen, DPH, M.D., M.P.H., is a professor at the Yale School of Public Health and a member of its Public Health Modeling Unit.*



# THE ECONOMIC FALLOUT

BY XI CHEN

**A**s the COVID-19 pandemic has plunged the United States and the rest of the world into the worst recession since World War II, contractions in economic activity are occurring at unprecedented speed and scale. The pandemic disrupts both the supply and demand sides of the economy. On the supply side, reduced manufacturing investment and output, collapsed global supply chains and lost productivity due to worker morbidity and mortality have all had a crushing impact on the economy. On the demand side, the dramatic rise in unemployment and shrinkage in family income and wealth have devastated consumer purchasing power. Imposed travel restrictions have hurt the service sectors.

In the U.S., loose monetary policy and fiscal policy are helping to shore up the economy. Since March 2020, the Federal Reserve has cut interest rates to the lowest level. The Coronavirus Aid, Relief and Economic Security Act and the Paycheck Protection Program are providing some relief. Will a V-shape recovery be achievable, or will the recovery wind up being W-shaped or even L-shaped with large permanent economic loss? The answer depends critically on how long the pandemic lasts and how good the coordination is at all levels.

Importantly, this pandemic has stricken the economy well beyond its influences on supply and demand. In a time of historical uncertainty, low confidence may lead firms to cut back on investment and consumers to hold back on spending. How to best integrate economic policy with adequate health measures to reduce uncertainty is the key to cushion the pandemic's consequences and better prepare the economy for resurgence.

The delayed timing of social distancing and stay-at-home orders has caused a large number of preventable infections and deaths. Compared with other nations, parts of the United States have resembled a giant garden party, and nonessential visits to parks and outdoor spaces in hot spot regions have risen rapidly. Meanwhile, social distancing

and stay-at-home measures have disproportionately affected vulnerable populations, such as older adults and people in lower paid or less flexible jobs. As I write this in midyear, the United States still lacks nationwide policies to support people while practicing social distancing and staying home, including expanding and improving unemployment insurance benefits, paid sick leave and access to a social safety net.

Mask wearing in public alone is known to slow down the spread of the virus and is estimated to save thousands of lives and affect a significant portion of GDP. However, only a third of states have mandated wearing masks, while many states politicize the practice.

The stakes of ramping up testing and contact tracing are high, as each day of economic shutdown in the United States translates to an estimated \$19 billion in losses. However, almost all of the \$2 trillion stimulus has been allocated to affected people and firms; little has gone toward public health measures. This distribution is treating the symptoms, not the cause. To try to match the speed and scale of the crisis, considerably more must be spent on public health efforts to support safe reopening. Public health measures aren't the enemy of the economy, but the pandemic is.

History often repeats itself. The not-so-distant history offers us wisdom. In 1918, the world was faced with essentially the same choices between the short-term economy and public health. While the pandemic substantially decreased manufacturing employment and output, cities that intervened earlier and more aggressively ended up with both lower mortality and faster economic recovery. Areas more inflicted, in contrast, remained more depressed through 1923.

*Xi Chen, Ph.D., is an associate professor at the Yale School of Public Health.*



# VIRAL ENEMY BETTER UNDERSTOOD WITH GENOMICS

BY MARY PETRONE

The COVID-19 pandemic has elevated the role of virus genomics in public health research. Fourteen days after a pneumonia-like illness was reported in Wuhan, China, genomic data identified SARS-CoV-2 as the cause.

Although the media has stoked fears that this virus could mutate to become more dangerous, epidemiologists embrace genetic change. Experts in genomic epidemiology leveraged mutations to map the global spread of SARS-CoV-2 and uncover the zoonotic source from which the virus likely emerged. These discoveries were made at an unprecedented speed, but the virus proved faster, infecting millions. Nonetheless, genomic insights should not be relegated to the annals of academia. By late June, we were entering a new phase of the pandemic, armed with the advantage of hindsight, in which the power of genomics lies in our ability to translate this newfound understanding of virus evolution into effective public health practice.

One impediment to achieving this goal is the temporal disconnect between genomic epidemiology and public policy. Genomic analyses, which reconstruct a pathogen's evolutionary history, are inherently retrospective, thereby exposing the impact of policy decisions through an historical lens. For example, genomic data revealed that domestic transmission drove Connecticut's COVID-19 outbreak before international travel restrictions were enforced in the U.S. While these findings are important because they allow us to judge the performance of elected officials, they were borne out of the fact that SARS-CoV-2 had already arrived in the state. Policymakers are called to act before such events transpire.

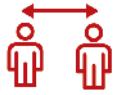
Fortunately, this impasse dissipates with the passage of time. As the volume of genomic data increases, so does the value of retrospection. A virus's genome must accumulate mutations to be informative. This is especially true for SARS-CoV-2, which mutates relatively slowly for an RNA virus. Patterns of mutations can illuminate when and how viruses spread, by capturing epidemiological aspects that elude traditional surveillance systems. During the West

Africa Ebola epidemic, these patterns were used to identify traditional funereal practices as a primary source of virus transmission. Shortly thereafter, officials devised guidelines for performing burials safely. As in this case, when genomic data is well supported, it can inform effective disease control policies.

Successfully bridging this translational gap for COVID-19 will require interdisciplinary coordination. Unlike other epidemiological disciplines, which study patterns of disease in human populations, genomic epidemiology examines the relationship between abstracted virus populations, represented by the genome. This is a problem for conceptualizing and interpreting genomic data in the context of public health. Scientists can use genomic relationships to infer the epidemiological dynamics of a virus, but the methods involved require special training well outside the purview of the average politician. At the same time, the uncertainty that is inherent to these statistical methods may be mistaken by the public for incompetence or duplicity. Therefore, strong political leadership is needed to communicate epidemiological findings to constituents and promote community cooperation.

Epidemics are both crises and learning opportunities from which both researchers and the public emerge better prepared to fight future public health threats. Over 55,000 SARS-CoV-2 genomes were sequenced by the middle of this year. The open sharing of laboratory protocols and data has enabled scientists to study outbreaks globally. We have established a new baseline. During this next phase of the pandemic, we must go further and translate our knowledge into action.

*Mary Petrone is a Ph.D. candidate at the Yale School of Public Health.*



# THE TOLL ON THE ELDERLY

BY SUNIL PARIKH AND LINDA NICCOLAI

**A**s of July 9, approximately six months after the first case of COVID-19 was documented in the U.S., the dramatic toll of the virus on the elderly was staggering. An astounding 44% of overall deaths and 12% of overall cases were in long-term care facilities, where just 0.4% of the U.S. population resides. The situation locally was even more dire. Within just two months of reporting the first case in a Connecticut nursing home, over 80% of Connecticut nursing homes had experienced at least one case, accounting for 60% of the state's COVID-19-related mortality.

Connecticut's Department of Public Health recognized the unprecedented pace and breadth of the outbreak, reaching out to YSPH in late March for additional capacity to track and control multicenter outbreaks. In an example of a successful applied public health-academic partnership, within weeks of the call, the agency set up a nursing home web-based surveillance portal with YSPH assistance to track and analyze trends, weeks before national recommendations to the same effect were adopted. Once the portal was in place, analytics demonstrated the necessity for more aggressive measures, and again, weeks before national recommendations, Connecticut embarked on statewide point prevalence surveys of all nursing home residents to inform infection prevention measures. YSPH devised a list of priority facilities to roll out testing. The result: Of the residents tested in the initial 33 facilities, about 28% of residents were found to be SARS-CoV-2 positive, 90% of whom were asymptomatic. Moreover, in some facilities, COVID-19 had spread through over 90% of all facility residents in just a matter of weeks.

What are the lessons here? From a public health standpoint, our experience demonstrates the synergy that can be achieved through applied and academic public health partnerships. The magnitude of the COVID-19 pandemic required on-the-ground experience coupled with state-of-the-art analytics and knowledge transfer to stem

the outbreak. From a more granular standpoint, the data generated from this partnership illuminated how rapidly SARS-CoV-2 can spread in congregate settings, and, most important, the failure of policy aimed at testing only those residents who were symptomatic. The power of this partnership was evidenced by the fact that many of the steps taken by the state Department of Public Health and YSPH in long-term care facilities became national policy after they were initiated in Connecticut and other states.

COVID-19 has laid bare the consequences of many failures in our society, and among the most striking is the lack of adequate care for society's vulnerable elders. While the factors contributing to the devastation in nursing homes are numerous, perhaps one positive step in the right direction is the forging of public-academic partnerships aimed at responding to and preparing our nation's long-term care facilities so that such a toll does not occur again.

*Sunil Parikh, M.D., M.P.H., is an associate professor, and Linda Niccolai, Ph.D., is a professor at the Yale School of Public Health.*





# HERD IMMUNITY MISUNDERSTOOD

BY EDWARD KAPLAN

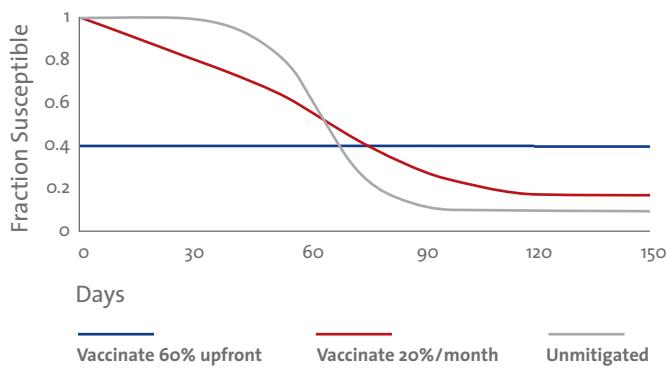
**T**hroughout the months of the COVID-19 pandemic, “herd immunity” has frequently surfaced in popular reporting. The precise meaning of the phrase is not well understood, however, and references to the concept have sometimes contributed more confusion than clarity. It is easy to see why many people are excited about herd immunity talk for, on reflection, those listening will recall that they *heard* “immunity,” and what could be better than immunity in the middle of an infectious disease outbreak?

The basic herd immunity idea sounds simple enough: The larger the number of immune individuals in a population, the more difficult it is for an infection to spread. Herd immunity pushes beyond this basic idea to a more technical definition: Herd immunity is reached when the average number of new infections transmitted by a newly infected person equals 1, implying that the number of infected people in the population stops increasing (since for the number of infected people to increase, each infected person would have to infect more than one other).

A simple model will fix this idea. At the beginning of an infectious outbreak, the average number of new infections an infected person will transmit to others is referred to as the *reproductive number*, denoted by  $R_0$ . For the number of infections to grow,  $R_0$  must be  $> 1$  as stated above. At the very beginning of an outbreak, essentially everyone is susceptible to this new infection. If we let  $S$  be the fraction of the population that is susceptible, at the start of an epidemic,  $S$  is approximately equal to 1. As the infection begins to spread, however, the number of susceptible people will deplete in accord with the increase in infections. This is bad for the population, but it also makes transmitting infections more difficult for a newly infected person, who instead of managing to infect  $R_0$  people on average is now able to infect only  $R_0 S < R_0$  (since the fraction of the population that is susceptible,  $S$ , is now itself less than 1). Recalling

that herd immunity is reached when the average number of new infections transmitted by a newly infected person equals 1, we see that herd immunity is reached when  $R_0 S = 1$ , or equivalently when the fraction of the population that remains susceptible to infection equals  $1/R_0$ .

## THREE APPROACHES TO HERD IMMUNITY



Herd immunity can thus be understood as a statement about susceptibility in a population. As long as the fraction susceptible to infection remains above the threshold  $1/R_0$ , infections will continue growing, absent other interventions. The reproductive number  $R_0$  for SARS-CoV-2 has been about 2.5 in many studies, which suggests that the fraction of the population that is susceptible must fall below 40% for herd immunity to be reached.

As is often stated, where one ends up in life is less meaningful than the journey taken to get there. So it is with herd immunity: How population susceptibility falls from 100% to 40% matters a great deal more than simply reaching the 40% target. The reason, obviously, is that there are different ways a person can lose susceptibility. Consider the following three scenarios:



1. 60% of the population is vaccinated prior to the importation of an infection from elsewhere.
2. Susceptible people are vaccinated at a rate of 20% per person per month over four months.
3. No susceptible people are vaccinated, leading to an unmitigated outbreak.

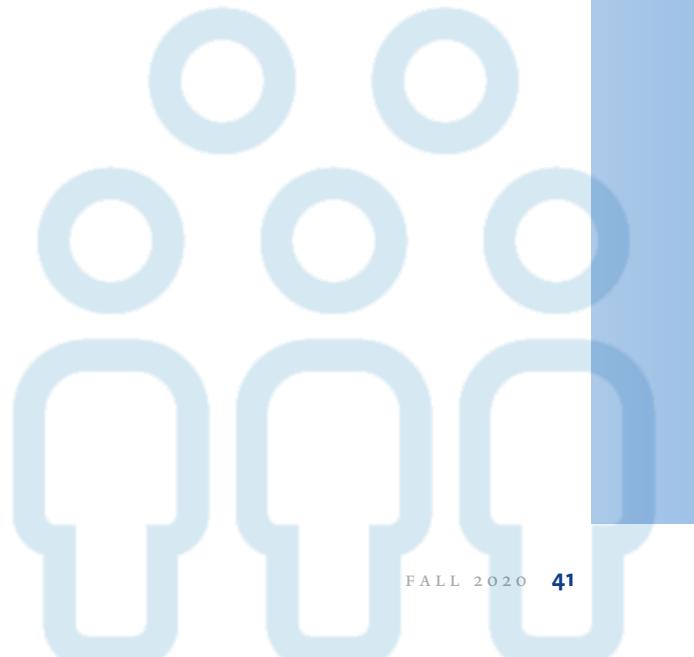
The accompanying figure plots the fraction of the population that remains susceptible over time. In the first case (blue line), herd immunity is reached before any infections have been transmitted, which makes the number of infected people decline rapidly from those few imported cases at the start of the epidemic. In the second case (orange curve), some people are getting infected while others are getting vaccinated. When the herd immunity threshold is reached after 75 days, the susceptible population continues to decline until eventually 45% will have been vaccinated and 38% infected, and 17% will remain susceptible. In the third case (gray curve) of an unmitigated outbreak, herd immunity is reached sooner at 70 days, but at a terrible cost: Fully 90% of the population is infected while 10% remains susceptible. This last example shows that contrary to popular misunderstanding, infections do not simply stop once herd immunity is reached in natural outbreaks; only the rate of new infections slows.

The COVID-19 pandemic is more complex than the simple model illustrated on the preceding page. For one thing, there is no vaccine yet. For another, a suite of interventions including social distancing and restrictions on large gatherings, mask wearing and lockdown-like stay-at-home orders have been implemented with varying degrees of success. Unlike a true immunizing vaccine, these interventions serve to preserve susceptibility only until they are lifted, at which point there is a remixing of susceptible and infectious individuals that allows outbreaks to reignite as has been observed in many locations.

There are those who have argued for a managed approach to herd immunity, expressing a willingness to infect a very large fraction of the population while trying to protect the elderly or other vulnerable members of the population with underlying health conditions. This approach has also failed, for it has proven nearly impossible to implement the sought-after protections given the contagiousness and asymptomatic transmission of coronavirus on the one hand and the largely irreducible connections among members of the population on the other.

One tool that is understood but underutilized is aggressive testing of the population for asymptomatic infection with concomitant isolation of those found infected. This singular intervention could meaningfully reduce  $R_0$  by removing infectious individuals from circulation, effectively denying them the opportunities to infect others unknowingly while infectious and asymptomatic. Applied on a large scale, such an intervention could succeed where misguided dreams of herd immunity have failed.

*Edward Kaplan, Ph.D., is the William N. and Marie A. Beach Professor of Management Sciences at the Yale School of Management, professor of public health and professor of engineering in the Yale School of Engineering and Applied Sciences.*





# COVID-19'S TERRIBLE ARITHMETIC

YSPH researchers find that the pandemic's death toll is much higher than originally believed.

How many people in the United States have perished as a result of the COVID-19 pandemic?

The answer is not as clear as it may seem. A Yale School of Public Health team has used a time-tested approach to demonstrate a significant undercount in the national burden of death related to the COVID-19 pandemic.

The statistical model, developed by a team led by Associate Professor Daniel Weinberger, Ph.D., shows that the number of deaths from COVID-19 could be as much as 30 percent higher than official figures have indicated.

Weinberger arrived at his findings by looking at excess deaths, a tally of all deaths that exceed the number expected in any given year. The excess death count has been used routinely for some time in the United States to track the severity of disease outbreaks such as yearly influenza.

Subtracting the number of COVID-19 cases confirmed by government-collected death certificate data from the number of expected deaths paints a truer picture of the breadth of the pandemic than official figures, Weinberger said.

"We went into this with an expectation that the recorded number of deaths would be an undercount," he said, looking at previous pandemics, such as H1N1 in 2009, in which deaths were found to be undercounted. "So, we started looking at the broader categories – deaths due to pneumonia, or to any cause, seeing how those two categories increase compared to what you would typically see at this time of year, and comparing that with the confirmed numbers of COVID deaths."

As a result, Weinberger found that early in the pandemic, many deaths related to COVID-19 were missed by official tallies. Many people died at home and were never officially

**"WE WENT INTO THIS WITH AN EXPECTATION THAT THE RECORDED NUMBER OF DEATHS WOULD BE AN UNDERCOUNT."**

*~Daniel Weinberger*

diagnosed. Many deaths that might have been caused by COVID-19 may have been entered onto death certificates as pneumonia or other respiratory causes. Heart attacks may have been triggered by the disease. There could also have been increases in deaths related to pandemic response measures but not directly caused by the virus, such as people avoiding emergency care for heart attacks or strokes, as well as increases in suicides and drug overdoses.

"When we started following this back in March, there was a very wide gap between the number of reported COVID deaths and the number of excess deaths that we were estimating. In some places it was even a couple of times higher early on," Weinberger said. Yet as time goes on, the gap is decreasing. "Over time, there is greater recognition of what a COVID death looks like, and also the capacity for viral testing has increased," he said. Areas with higher rates of testing have shown a narrower gap between reported deaths and excess deaths.

Weinberger has shared his findings with the White House, members of Congress and the World Health Organization. "Citizens have expressed concerns about the accuracy of reported death tolls to members of Congress,"

**“OUR WORK IS REALLY ABOUT DOING  
THE BEST JOB WE CAN TO DEAL WITH  
ALL THE PROBLEMS WITH THE DATA TO  
UNDERSTAND THE TRUE MAGNITUDE AND  
TRAJECTORY OF THIS EPIDEMIC.”**

*~ Ted Cohen*

he said. “I’ve been able to discuss with the politicians some of the complexities of the reported death statistics and have used our analyses to highlight areas where the official numbers might be more or less reliable.”

However telling the analysis of excess death has been and will continue to be, it alone cannot provide a full picture of COVID-19’s impact. “In many places we will never get to capturing 100 percent of deaths captured in death certificates, and we would never expect to,” Weinberger said. “Deaths are a lagging indicator. You see them increasing several weeks after you see cases increase. It’s not the best sentinel.”

Weinberger’s colleague, Professor Ted Cohen, D.P.H., M.D., M.P.H., is working with a team at YSPH (including Weinberger, Associate Professor Virginia Pitzer, Sc.D., Joshua Warren, Ph.D., doctoral student Melanie Chitwood and research associate Marcus Russi) to build a mechanistic model that incorporates information on delays between infection, symptom onset, diagnosis and outcome (including the possibility of death) to create better estimates of the current state of the pandemic. As the model produces estimates of the real-time number of infections, the group’s hope is that this can be a tool to better assess the effects of interventions such as social distancing. Weinberger’s estimates of excess deaths provide a check on these estimates of incident infections and serve as an important point of model validation.



**AIM FOR NEW INFECTIOUS CASES CAUSED BY A  
SINGLE INFECTIOUS PERSON. SOME STATES HAVE  
SEEN REPRODUCTION RATES RISE TO 3.5.**

One use of this model is to produce daily state- and county-level estimates of the COVID-19 reproduction number. The reproduction number, a key quantity in epidemiological surveillance, represents the average number of new infectious cases caused by a single infectious person. The reproduction number decreased in most locations since the beginning of the pandemic, when it ranged from 2.0 to more than 3.5 in some states, but it has recently risen in much of the country as physical distancing has relaxed, Cohen said. “Our goal should be to reduce and sustain the reproduction number below 1 such that incidence will continue to decline.”

Cohen is working with case notification and mortality data gathered by federal, state and local governments, but lags in reporting and incompleteness in data collection are a challenge. One factor behind the lack of accurate data is that not everyone infected with SARS-CoV-2 becomes symptomatic, but asymptomatic individuals nonetheless can cause new infections. Testing intensity and access to diagnosis and care are also important because not every symptomatic person has access to a viral test. “The nature of the work we are doing arises out of problems with the underlying data,” Cohen said.

There is also great variation in the way data are reported from state to state, and from county to county. “Even when states are reporting the same metrics, things that share a name are often different,” he said. “There is a real need to improve consistency or reporting systems between states.”

Weinberger and Cohen have been sharing their analysis on COVID-19 through a partnership with *The Washington Post*, a collaboration with the news organization’s statisticians and journalists to present a measured picture of COVID-19’s impact.

“The collaboration has shown us that we need to do an even better job communicating than we already have,” Cohen said. “Our work is really about doing the best job we can to deal with all the problems with the data to understand the true magnitude and trajectory of this epidemic.” **YPH**

*Jeanna Lucci Canapari*



# GAME CHANGER

COURTESY OF THE NATIONAL BASKETBALL ASSOCIATION



**“ THIS IS A HUGE STEP FORWARD TO MAKE TESTING MORE ACCESSIBLE.”**

~Chantal Vogels

## Accurate and inexpensive, saliva-based COVID-19 test developed by YSPH receives FDA emergency use authorization.

BY MICHAEL GREENWOOD

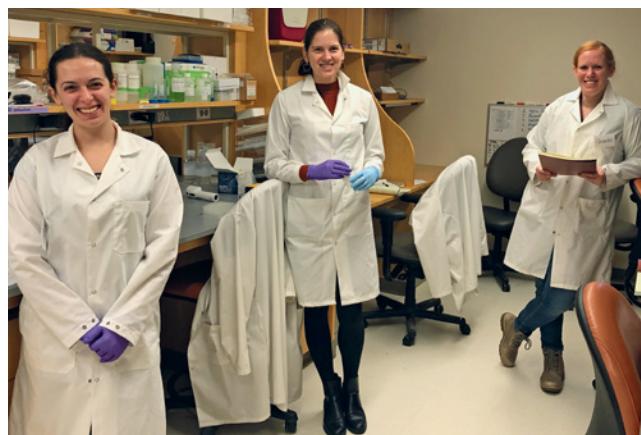
A saliva-based laboratory diagnostic test developed by researchers at the Yale School of Public Health to determine whether someone is infected with the novel coronavirus received emergency use authorization in mid-August by the U.S. Food and Drug Administration, paving the way for its widespread use in the fight against the pandemic.

Known as SalivaDirect™, the testing method underwent further validation with asymptomatic individuals through a partnership between YSPH and the National Basketball Association (NBA) that tests players and staff.

The method requires only a small amount of saliva that is collected by spitting into a cup. The test itself is less expensive and far less invasive than the traditional method for such testing, known as nasopharyngeal (NP) swabbing. Results from the NBA partnership and elsewhere show that SalivaDirect™ is highly sensitive and yields similar outcomes as swab-based approaches.

With the FDA's emergency use authorization, the Yale School of Public Health is now able to designate labs around the country to use SalivaDirect™ under their authorization, several of which were announced in late September. A key component of the method, the researchers note, is that it has been validated with reagents and instruments from multiple vendors—and they will continue to expand this list. This flexibility enables continued testing if some vendors encounter supply chain issues, as experienced early in the pandemic. In addition, this allows testing to be quickly scaled up across the nation and, perhaps beyond, the researchers said.

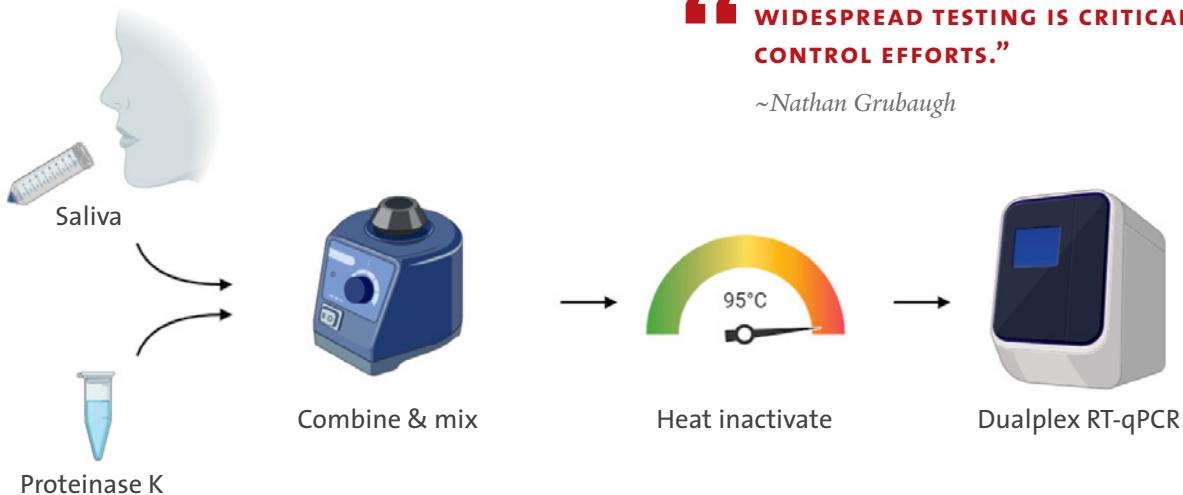
“This is a huge step forward to make testing more accessible,” said Chantal Vogels, Ph.D., a Yale School of Public



Members of Nathan Grubaugh's lab who have helped develop the SalivaDirect™ testing method are, from left, Mary Petrone, Anne Wyllie and Chantal Vogels.

Health postdoctoral fellow, who led the laboratory development and validation along with Doug Brackney, Ph.D., an adjunct assistant clinical professor. “This started off as an idea in our lab soon after we found saliva to be a promising sample type of the detection of SARS-CoV-2, and now it has the potential to be used on a large scale to help protect public health. We are delighted to make this contribution to the fight against coronavirus.”

Development of SalivaDirect™ as a means of rapidly expanding SARS-CoV-2 testing was spearheaded in the spring by Nathan Grubaugh, Ph.D., and Anne Wyllie, Ph.D., assistant professor and associate research scientist, respectively, at the Yale School of Public Health. After finding



saliva to be a promising sample type for SARS-CoV-2 detection, they wanted to improve the method further.

"With saliva being quick and easy to collect, we realized it could be a game changer in COVID-19 diagnostics," said Wyllie. With testing urgently needed, the Yale team was determined to decrease both time and cost, and to make it widely accessible.

"Widespread testing is critical for our control efforts," Grubaugh said. "We simplified the test so that it only costs a couple of dollars for reagents, helping to make large-scale testing more affordable. If less expensive alternatives like SalivaDirect™ can be implemented across the country, we may finally get a handle on this pandemic, even before a vaccine."

One of the team's goals was to eliminate the expensive saliva collection tubes that other companies use to preserve the virus for detection. In a separate study led by Wyllie, the team found that SARS-CoV-2 is stable in saliva for prolonged periods at warm temperatures, and that preservatives or specialized tubes are not necessary for collection of saliva.

Grubaugh and Wyllie said that they are not seeking to commercialize the method. Rather, they want the simplified testing method to help those most in need. Testing for SARS-CoV-2 has been a major stumbling block in the fight against the pandemic, with long delays and shortages of testing. Some experts have said that up to 4 million tests are needed per day; the saliva test provides one pathway toward that goal, the researchers said.

"Using SalivaDirect™, our lab can double our testing capacity," said Professor Chen Liu, M.D., Ph.D., chair of the

**"WIDESPREAD TESTING IS CRITICAL FOR OUR CONTROL EFFORTS."**

~Nathan Grubaugh

CREATED WITH BIORENDER.COM



## SALIVADIRECT™

The SalivaDirect™ workflow includes collecting a saliva sample, mixing it with an enzyme (proteinase K) to break down the saliva and release SARS-CoV-2 RNA, heat inactivation of the enzyme and virus, and finally dualplex RT-qPCR testing to determine whether the virus is present.

Department of Pathology at the Yale School of Medicine, who assisted with the clinical validation of the method.

SalivaDirect™ is a protocol, or process, that requires a certified laboratory and trained technicians to conduct the testing. It is not a kit, point-of-care or at-home rapid test and is not available commercially for purchase. The Yale School of Public Health researchers are already looking into this however, with the hope that someday such kits may be available. However, commercial availability is months away at the earliest, the researchers said.

Funding for the research came from the National Basketball Association, National Basketball Players Association, a Fast Grant from the Emergent Ventures at the Mercatus Center at George Mason University and the Rapid Response Fund at YSPH. **YPH**

# YSPH'S KO KEY IN CT'S RECOVERY

**Professor serves on committee to reopen the state after near total shutdown.**

To Connecticut Gov. Ned Lamont, Yale School of Public Health Professor Albert Ko is “our Dr. Fauci.”

Much like the actual Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases and a familiar national presence throughout the pandemic, Ko takes the ongoing fight against COVID-19 extremely seriously. Although Connecticut cases are in decline since rates of disease peaked in late April and hospitalizations and deaths are decreasing, to Ko, the fight has just begun.

“There is a lot of hard work yet to be done,” said Ko, M.D., chair of the Department of Epidemiology of Microbial Diseases at YSPH. “We have not dealt with something like this in modern times. The science is catching up, and the road ahead is not perfectly clear.”

Ko was at the center of the effort to navigate and protect Connecticut’s citizens and economy against the effects of the pandemic. Along with former PepsiCo CEO Indra Nooyi, SOM ’80, Ko was tapped by the governor in mid-April to lead the Reopen Connecticut Advisory Group. After several weeks of nearly constant effort, that group was formally disbanded May 20 as the state began its next phase of reopening following the “Stay Safe, Stay Home” restrictions in place since March to halt the spread of COVID-19.

Ko worked hand in hand with Nooyi and others on a series of recommendations to the state to address the myriad issues surrounding public health and the state’s economy.

“That requires a careful calibration of both strong public health interventions and mitigating the harmful impact this shutdown has had for the state,” Ko said. The Reopen Connecticut Advisory Group’s committees, focusing on health, the economic and business sector, education, and the community, met regularly to provide input to the governor, culminating in the release of a report to the public May 26 that outlined a road map to reopening the state in the weeks and months ahead. Ko and Nooyi were also regular participants in the governor’s daily briefings on COVID-19 with Connecticut media.

Ko’s public health recommendations concerned primarily increased testing, the initiation of contact tracing, and the support of people through isolation, particularly vulnerable citizens. “The next several months are going to be critical to getting those programs up so we can keep our populations safe as we reopen and also to prevent or mitigate the risk of a resurgence,” he said.

Some public health priorities going forward, according to the report, are conducting large-scale testing, particularly in cities; continuing the practice of social distancing and the wearing of face masks in public; testing that targets asymptomatic populations; establishing capacity for contact tracing; and enhancing protection of populations most likely to be seriously or fatally ill with COVID-19.

While many residents and business owners are anxious to restart the state economy without further delay, Ko and the advisory group recommended against speed in reopening, to best avoid a resurgence of COVID-19. This was grounded in analysis provided to the group by YSPH Associate Professor Forrest W. Crawford, Ph.D., who utilized state data to create projections for the trajectory of the virus. He created scenarios for fast and slow reopenings. The consequences of a fast reopening, in terms of additional infections and deaths, were ominous.

“His models and projections were an important step that was taken in terms of guiding how a quick reopening would have potential deleterious effects, and that is why we were promoting this slow, phased opening,” Ko said.

The governor agreed with the advisory group on such a cautious, evidence-based strategy. “Even before the advisory group was convened, many of the governor’s policies have been data-driven and based on strong scientific and public health evidence,” Ko said.

Still, reopening in the economy is “truly important,” he said. “We are concerned about the unemployment, particularly about the impact this is having on our underserved communities that have been hit hardest by the direct effects of the COVID response.”



“

**THE SCIENCE IS CATCHING UP, AND THE ROAD AHEAD IS NOT PERFECTLY CLEAR.”**

~Albert Ko

Ko said that the group's work was challenging, particularly when it came to recommending policies and decisions as the state moved forward into the uncharted territory created by the pandemic, and balancing the risk of COVID-19 resurgence with unemployment and the deleterious effects of keeping schools and business closed.

But Ko said he found it rewarding to work with Nooyi and other highly dedicated colleagues on the advisory group, as well as with state officials and the governor, on a common, united goal of protecting Connecticut's communities during this health emergency.

Although the advisory group has officially disbanded, going forward, Ko and Nooyi will continue to advise the governor and represent Connecticut in a seven-state coalition to coordinate a broader regional strategy for reopening the economy.

Dean Sten H. Vermund, M.D., Ph.D., applauded Ko's work with the state, and all of the volunteer work that the school has done to promote better health outcomes during the pandemic.

“The Yale School of Public Health sought every opportunity to help our colleagues and constituents in the university, city, state, and our partners in Africa, Asia and South America,” Vermund said. “Dr. Ko's extraordinary work is a particularly fine example of the ethos of service that we practice and that we strive to teach to our students.”

In addition to Ko and Nooyi, other Yale members of the advisory group were Harlan Krumholz, M.D., S.M., Harold H. Hines, Jr. Professor of Medicine and professor in the Institute for Social and Policy Studies, of Investigative Medicine and of Public Health; Marcella Nunez-Smith, M.D., M.H.S., associate professor of medicine and of epidemiology; and Carrie A. Redlich, M.D., M.P.H., professor of medicine.

With foresight worthy of his federal counterpart, Ko looked ahead to other concerns that would affect the state heading into the summer and fall. Keeping other widespread seasonal illnesses at bay, he said, is necessary to avoid overwhelming the state's health system in the event of a resurgence of COVID-19.

“Each year, our health system goes into surge crisis because of seasonal influenza,” Ko said. “Universal [influenza] immunization is going to be another key step as we go into the fall.”

A similar contribution to the state was the May 2020 interdisciplinary advisory report, *An Adaptive Risk-Based Strategy for Connecticut's Ongoing COVID-19 Response*, from a committee of the Connecticut Academy of Science and Engineering on which Professor Harvey Risch, M.D., Ph.D., and Vermund served. **YPH**

*Jeanna Lucci Canapari*

# PUBLIC HEALTH DISPATCHES 2020

The incoming class of Yale School of Public Health students is diverse, large and already accomplished in many respects. And while the students come from all over the United States and many countries beyond, all of them have experienced the COVID-19 pandemic and, more recently, the upheaval surrounding racial injustice in the United States. These seismic and simultaneous events are shaping their perceptions of public health and, in many cases, their thinking about their future career paths.

FUEL TO MY FIRE  
ACTIVIST PUBLIC HEALTH  
TRUE LEADERSHIP COLLECTIVE FURY  
ADDRESSING SYSTEMIC RACISM  
ALIGNED WITH THE FUTURE RACISM'S NEWEST MANIFESTATION



**CRYSTAL HARRELL**

## FUEL TO MY FIRE

When I began health disparities research three years ago, I was shocked by the poor health outcomes in the Black community. I lost my father to leukemia when I was 11, and since then I have dedicated my education to combating health inequities in low-income communities similar to the one where I grew up in Alabama. The dual scourges of COVID-19 and structural racism have only added fuel to my fire. As an African American female, I find it difficult to witness the state of the world and not feel burdened by it. I am excited to begin my journey at Yale as a first-generation college student because I know that my education here will be not just for me, but also for the progress of my community, for which I am a devoted advocate.

*Crystal Harrell is a Ph.D. candidate.*



**ELAINE M. LOUDEN**

## ACTIVIST PUBLIC HEALTH

I am still processing the many thoughts and feelings that stem from my frequent attendance at protests of police brutality in Columbus, Ohio; however, one of my conclusions is that we desperately need a new, radical public health. Radical public health seeks to prevent disease, but more importantly, it takes on the systemic social factors that cause and exacerbate disease in marginalized communities. To solve underlying causal factors of disease, radical public health considers novel solutions that address inequities in society, including such issues as police abolition, universal health care and mass incarceration. As a health policy scholar, I realize that the health of the public is inherently tied to equity and justice and will advocate for that in my career.

*Elaine M. Louden is an M.P.H. candidate.*

FUEL  
ACTIVIST  
TRUE LEADER  
ADDRESS RACISM  
ALIGNED WITH

# FURY LEADERSHIP STEMIC FUTURE 'S NEWEST IFESTATION



**SREEJA KONDETI**  
**COLLECTIVE FURY**

The COVID-19 crisis has taught me the power of collective fury. Two months into this pandemic, I found myself volunteering alongside enraged activists and health care workers that I met over the Internet (sorry, Mom!) to form Right to Health Action. This grassroots organization is fighting to repeal and replace dangerous health care policies that effectively sentence people to death by virtue of their demographics. With a background primarily in software engineering and aloofness, working to mobilize thousands of angry people across the nation to take action was brand-new territory for me. Suddenly, I was squeezing in calls with congressional staffers and helping draft a Pandemic Prevention Plan between code review sessions and stakeholder demos. And that's when I realized that I wanted to spend my life doing macro-level social work and changed my M.P.H. concentration from biostatistics to health policy.

*Sreeja Kondeti is an M.P.H. candidate.*



**ANASTASIA  
EBERHARDT**

## TRUE LEADERSHIP

My biggest takeaway from the COVID-19 pandemic has been to revise my view of leadership. Through the wide range of examples of leaders – from those tasked with keeping hospitals running to those burdened with safeguarding entire countries – I am better able to articulate the leader I hope to be. Great leaders accept responsibility for those they were meant to keep safe, show integrity through transparency, express vulnerability and are accountable to their word. As an intensive care unit nurse, I have witnessed how the pandemic has really challenged top-down leadership, and it has been many of my frontline colleagues who have exhibited these exemplary qualities.

*Anastasia Eberhardt is an M.P.H. candidate.*



## RAHMA AHMED ADDRESSING SYSTEMIC RACISM

With the recent COVID-19 pandemic, I have become especially aware of the many disparities in our health care system that disproportionately hurt people of color. In order to truly live the values of service and relief that are focal to public health, I am realizing that we desperately need to address the underlying systemic racism that has allowed dangerous racial bias to go unchecked among health care providers. I hope to use my degree to help create a future where people around the world, regardless of race or social status, have access to equitable health care. In order to fulfill this goal, I'm adding a global health concentration to my M.P.H. so I can help build a stronger network of charity clinics in the United States as well as in developing countries.

*Rahma Ahmed is an M.P.H. candidate.*



## GEORGIANA ESTEVES ALIGNED WITH THE FUTURE

The COVID-19 pandemic has confronted us with social discrepancies among communities. It has affected Black, Latino and poor people differently due to characteristics related to access to health, information, employment and housing. These structural aspects of inequality are linked to the vulnerability of those who are treated as outliers of society. While working as a nutritionist in Brazil, I came across the social impact on the health of defenseless populations, which opened my eyes and inspired me to pursue an M.P.H. As the economy becomes increasingly global, it is necessary to mitigate discrimination and social injustice to improve public health. As my career goal is to promote basic access to health and prevent diseases, addressing the population in need, I feel completely aligned with the post-pandemic future of public health.

*Georgiana Esteves is an M.P.H. candidate.*



## MARIE-FATIMA HYACINTHE

## RACISM'S NEWEST MANIFESTATION

I do not think of COVID-19 and structural racism as “dual pandemics”; rather, the disproportionate damage COVID-19 has on Black, Indigenous and Latinx communities is the newest manifestation of structural racism. As public health practitioners, we should recognize this pattern. I have seen it in my HIV advocacy and in the protests of police brutality – both movements attempting to tackle epidemics fueled by systemic racism. As I begin my Ph.D., the rallying cries of the protests serve as a mandate: Public health scholarship must reckon with structural oppression, and it must facilitate the creation of new, just systems.

*Marie-Fatima Hyacinthe is a Ph.D. candidate.*

# ON THE FRONTLINES OF A PANDEMIC

---

BY COLIN POITRAS

## THE PANDEMIC EXPERT REBECCA KATZ

As director of Georgetown University's Center for Global Health Science and Security, Professor Rebecca Katz, helps decision-makers worldwide prepare for public health emergencies like COVID-19.

Her knowledge, experience and leadership are always in high demand. During the COVID-19 pandemic, she has given numerous national and international media interviews to help explain the public health threat posed by the highly contagious disease. She also is a member of Georgetown's COVID-19 emergency response team, helping guide the university's response to and management of the coronavirus.

Katz spends a good portion of her days advising a slew of public officials and private organizations — mayors, governors, international organizations, sports organizations, private industry, critical infrastructure systems and clinicians — about best practices in dealing with COVID-19.

She is also a member of presidential nominee Joe Biden's public health advisory committee for COVID-19 response, providing science-based, expert advice to minimize health risks for Biden, his staff and supporters. Others on the committee include former Food and Drug Administration Commissioner David A. Kessler, former Homeland Security Adviser Lisa Monaco and former U.S. Surgeon General Vivek Murthy.

Katz and her team at Georgetown are creating a suite of tools to help key decision-makers improve their pandemic preparedness. Those resources include a rapid assessment tool to assist urban areas in strengthening their public health resilience and security. For local municipalities, the Center for Global Health Science and Security, under the direction of Katz, is developing a frontline guide to help officials manage the COVID-19 outbreak based on guidance from experienced public health professionals.



Katz also serves as an epidemiological adviser for Covid Act Now, a multidisciplinary team of technologists, public health experts, epidemiologists and policy leaders working to provide disease intelligence and data analysis related to the pandemic. The team's analytical model has been used by over 10 million people in the United States, including officials in the U.S. military and the White House, to assist with response planning.

"Whether we're conducting original research related to COVID-19 or advising policymakers on best science-based practices, our center is providing support where it is needed during the current pandemic," Katz said. "It is our hope that the global health awareness, infrastructure and preparedness that we are building with our partners now will be sustained in anticipation of other emerging health threats."

*Rebecca Katz, Ph.D., M.P.H. '98, is a professor and director of the Center for Global Health Science and Security at Georgetown University.*

# THE INTERNATIONAL INTELLIGENCE OFFICER

## ERI TOGAMI

As a student at the Yale School of Public Health, Eri Togami worked closely with acclaimed researcher Albert Ko, investigating leptospirosis and other zoonotic diseases.

But the challenges she faced conducting field research with Ko were nothing compared with the pressures of her current job as a member of the World Health Organization's COVID-19 incident management support team in Geneva.

In this role, Togami, a public health practitioner and veterinarian by training, develops and publishes daily official emergency health information notices, such as COVID-19 situation reports.

The constant need to provide accurate, timely and verified information to governments, companies and citizens around the world during the pandemic can be daunting, Togami said.

"This is the first time in my career where I've worked under immense scrutiny and pressure, not only from my academic and public health peers, but also from the general public, governments, and the media," she said. "We are constantly asking ourselves, 'Are we capturing relevant information? How do we present data in a way that is actionable for countries?'"

Togami is part of a team of multidisciplinary and multi-national experts in data management, disease surveillance, partner organization and epidemiology. Together they work to disseminate reliable, actionable information quickly to those who need it when problems arise.

*Eri Togami, D.V.M., M.P.H. '17, works in health emergencies information management and risk assessment for the World Health Organization.*

**“WE ARE CONSTANTLY ASKING OURSELVES,  
‘ARE WE CAPTURING RELEVANT  
INFORMATION.’”**

~Eri Togami



## THE MIDWIFE PROTECTOR VIVIAN LOPEZ

The COVID-19 pandemic has taken a particularly frightening toll on one segment of the global health care workforce: midwives.

According to Vivian M. Lopez, executive coordinator of the United Nations' Every Woman Every Child initiative, midwives working on the frontlines of the pandemic are experiencing an increase in gender discrimination, domestic violence and human rights abuses that have instilled fear and distress and affected their ability to do their jobs.

To bring attention to the plight of midwives during this global health crisis, Lopez posted a global call for action from the International Confederation of Midwives on her organization's website, *everywomaneverychild.org*. The document urges governments, nongovernmental organizations and health institutions to protect midwives by making sure they have access to personal protective equipment, adequate hand-washing and sanitization resources, and other support as needed.

"Midwives are vital to protecting the health and well-being of women and newborns during pregnancy, childbirth and in the critical early days once a baby is born," Lopez said. "We must do all we can to protect midwives, women and children from being exposed to potential harm through the transmission of COVID-19."

Launched in 2010 by Ban Ki-moon, the U.N. secretary-general at the time, Every Woman Every Child is part of a global movement to mobilize and intensify international action to address major health challenges facing women, children and adolescents around the world.

Through the *everywomaneverychild.org* portal, Lopez is working to advocate for and communicate the specific needs of women, children and adolescents during the COVID-19 pandemic. The website serves as a central repository for important information about the virus including

**"MIDWIVES ARE VITAL TO PROTECTING THE HEALTH AND WELL-BEING OF WOMEN AND NEWBORNS DURING PREGNANCY, CHILDBIRTH AND IN THE CRITICAL EARLY DAYS ONCE A BABY IS BORN."**

~Vivian Lopez



the latest international infection reports, public health messages, mental health supports and humanitarian aid. Every Woman Every Child is also hosting video discussions with experts in various fields who share their insights relative to COVID-19 and its impact on the health of women, children and adolescents.

Providing ongoing information and support is key during this crisis, Lopez said.

"We are working closely with our key partners, namely the WHO, UNICEF and the World Bank—as well as other U.N. agencies and financing institutions—to support countries in their respective responses to this international health crisis," she said.

*Vivian M. Lopez, M.P.H. '98, is executive coordinator for Every Woman Every Child at the United Nations.*

**“ THIS IS HEALTH CARE INNOVATION  
AND IMPLEMENTATION AT ITS FINEST,  
AND FOR THIS, I AM PROUD OF OUR  
INTERNAL TALENT AND INSPIRED TO DO  
MORE.”**

~Tasmeen Shiny Weerakoon

## THE MULTITASKER TASMEEN SHINY WEERAKOON

Before the COVID-19 pandemic hit Connecticut, Tasmeen Shiny Weerakoon was helping manage outpatient clinical operations at the Yale School of Medicine.

But that all changed in March when waves of COVID-19 patients began flooding into emergency departments throughout the Yale New Haven System. Weerakoon was quickly reassigned to assist with the local pandemic response, a process she found both exhilarating and a little overwhelming.

“I’m collaborating with people in the health care system I never collaborated with before,” Weerakoon said in an interview last spring. “This is health care innovation and implementation at its finest, and for this, I am proud of our internal talent and inspired to do more.”

As part of her new assignment, Weerakoon worked to convert nearly 1,000 daily outpatient visits to video interactions through the health system’s COVID-19 telehealth initiative. She also collaborated with the Yale Child Study Center in planning childcare arrangements to support essential health care workers. In addition to all of that, she managed rapidly evolving supply chain requests at each Yale Medicine outpatient site.

“We are all adopting multiple roles and responsibilities as needed in these uncertain times,” said Weerakoon, who credited her education at YSPH and the Yale School of Management with helping prepare her for the challenges presented by COVID-19.

*Tasmeen Shiny Weerakoon, M.Sc., M.P.H. ’19, is a project specialist, Yale Medicine Administration, Yale School of Medicine.*



# YSPH ALUMNI GROUPS HONORED FOR ADVANCING DIVERSITY

Two groups of Yale School of Public Health alumni were recognized this past year for the work they have done to improve diversity, equity and inclusion at the school.

BY COLIN POITRAS

Members of the Emerging Majority Affairs Committee, or EMAC, and the Association of Yale Alumni in Public Health (AYAPH) received an excellence award from the Yale Alumni Association Board of Governors during the Alumni Association's 2019 Assembly and Alumni Fund Convocation.

The award recognized the YSPH alumni board and EMAC for sponsoring a daylong retreat in February 2019 that brought together more than 35 alumni, administrators and students from YSPH and across Yale to discuss ongoing diversity, equity and inclusion efforts.

The retreat was a first-of-its-kind event for the Yale School of Public Health and was considered a model for other Yale schools.

Working collaboratively with AYAPH and EMAC, the Yale School of Public Health has integrated health equity, social justice, respectful discourse and community empowerment into its mission statement. In July 2019, Associate Professor Mayur Desai, M.P.H. '94, Ph.D. '97, was appointed as the school's inaugural associate dean for diversity, equity and inclusion. In June 2020, more than 120 students, faculty, staff and representatives of AYAPH participated in a virtual town hall to discuss these values.

Kevin Nelson, M.P.H. '92, a former president of AYAPH and former chair of EMAC, said the award acknowledges "an incredible group" of YSPH alumni who have persisted in their quest to improve student diversity and the recruit-

**"CONTINUING TO DEVELOP AND SUPPORT A DIVERSE AND INCLUSIVE YSPH COMMUNITY IS CENTRAL TO OUR EFFORTS TO STRENGTHEN THE PUBLIC HEALTH WORKFORCE AND ADDRESS THE PUBLIC HEALTH CHALLENGES."**

*~Mayur Desai*

ment, retention and promotion of faculty from underrepresented groups. He also praised the support provided by former Dean Paul D. Cleary and current Dean Sten H. Vermund.

"This excellence award is wonderful and well-deserved," Vermund said in an email to AYAPH board members after the Alumni Association convocation. "I look forward to building upon our successes. But in the meantime, know that we are grateful to you for your partnership, vision, and dedication to YSPH."

Current AYAPH President Tassos Kyriakides, Ph.D. '99, echoed those sentiments.

"This award showcases that in true partnership with past Dean Cleary and present Dean Vermund, Professor Trace Kershaw [former chair of the YSPH Committee on

Diversity, Equity and Inclusion], and so many others, the AYAPH board is leading efforts to not only raise awareness but also proactively ensure that the concepts of diversity, equity and inclusion are respected and implemented both at YSPH and the Yale campus at large,” said Kyriakides, an associate research scientist at the school.

### A major step forward

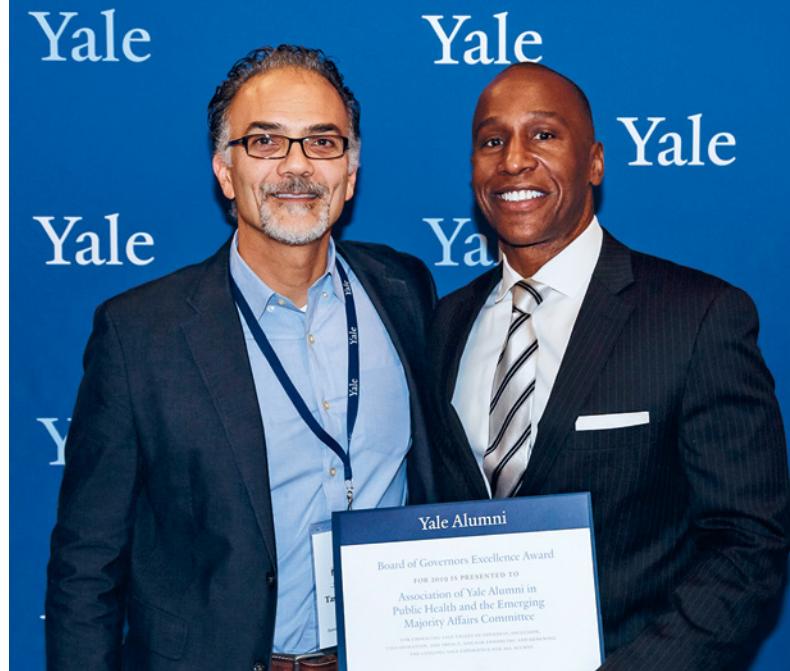
AYAPH and EMAC have been leaders in promoting greater diversity, equity and inclusion at YSPH. In 2001, when YSPH alumnus Robert Steele, M.P.H. ’71, Ph.D. ’75, started a scholarship to help recruit and support outstanding students from underrepresented groups, the two organizations helped raise \$100,000 to support the initiative. The Creed/Patton/Steele Scholarship – named for Courtlandt Van Rensselaer Creed, the first African American graduate of the Yale School of Medicine; YSPH Professor Emeritus Curtis Patton, who devoted much of his career to advancing diversity, equity and inclusion initiatives; and Steele – continues to be awarded each year to an outstanding minority student in public health.

EMAC pivoted to a new mission in 2006 when it secured a \$30,000 grant from the Connecticut Health Foundation to study diversity, equity and inclusion at YSPH. The school chipped in to help offset the study’s cost.

Led by alumna Linda Marc, M.P.H. ’92, Sc.D., the study explored how existing practices and policies could be improved to enhance the recruitment, retention and promotion of underrepresented faculty and students. The study led to an initial report in 2009 and a follow-up report in 2018.

EMAC and AYAPH organized the 2019 retreat to discuss strategies for implementing the 2018 report’s recommendations, such as hiring a chief diversity officer with a dedicated budget and staff and generating regular progress reports on diversity, equity and inclusion. Vermund announced at the retreat that the school had revised its mission statement to clearly state that health equity, social justice, respectful discourse and community empowerment are priorities. He also announced plans to add an associate dean for diversity, equity and inclusion.

Darryl Crompton, J.D., M.P.H. ’76, a Yale Alumni Association and AYAPH board member, cited the retreat in nominating EMAC-AYAPH for the excellence award. Crompton said the retreat was a major step forward in terms of bringing alumni, students, faculty and administrators together to speak openly about diversity, equity and inclusion and to set goals.



Tassos Kyriakides, left, and Kevin Nelson with Yale Alumni Association Board of Governors’ Excellence Award.

“A similar process could serve as a best practices example that could benefit Yale and other universities and colleges who often struggle to address diversity, equity, and inclusion in an effort to develop strategies and reach outcomes that will make an impact,” Crompton wrote in his nomination.

As the new associate dean for diversity, equity and inclusion, Desai said he is looking forward to working with AYAPH, EMAC and other alumni, faculty and students to address and expand diversity and inclusion at YSPH.

“Continuing to develop and support a diverse and inclusive YSPH community is central to our efforts to strengthen the public health workforce and address the public health challenges of today and tomorrow,” he said.

Having a more diverse, equitable and inclusive faculty and student body enhances learning, professional development and research, Nelson said. And greater awareness and understanding of people from all races, genders and ethnicities, Desai added, make for better public health professionals.

“We appreciate the recognition granted to us through the excellence award,” Nelson said. “The Yale School of Public Health has done a lot of work in this area. But this issue is so profound and so pervasive, and I’m not just talking about YSPH or Yale, that more still needs to be done and should be done sooner rather than later.” **YPH**

# STAY CONNECTED

The Yale School of Public Health offers numerous services and ways to stay involved and informed to more than 6,500 alumni.



## ALUMNI SERVICES

**Lifelong email:** *YaleMail* is a service for alumni on the G Suite for Education platform, offering free, fully functional, Yale-branded Gmail accounts.

**YSPH career services:** The YSPH Office of Career Management is committed to providing continued assistance to alumni of YSPH—for free! This includes CareerBoard, a web-based tool that allows alumni to view an array of public health job postings.

**Yale Alumni Association:** Avail yourself of myriad alumni benefits and services, including:

- ▶ *Yale Career Network*—a database of all Yale alumni who are interested in networking with fellow alumni and current students. This network will allow you to search for and connect with fellow alumni to discuss career-based topics.

- ▶ *Yale Online Alumni Directory*—a searchable database of Yale alumni across the globe who have registered to be connected.
- ▶ *Access to JSTOR*—a digital archive with more than 1,000 academic journals, alumni rates for Payne Whitney Gym and borrowing privileges from Yale libraries. You can also access a list of Yale clubs.

**Distance learning:** Yale provides free online courses through Open Yale Courses, the university's free online education initiative. Over half a million visitors from 187 countries have immersed themselves in this extraordinary experience.

**Podcasts by Yale:** Yale's podcast collection has grown to over 2,500 podcasts and over 1,000 high-quality videos. All content is available free through the iTunes U platform.



## SOCIALIZE, SERVE & SUPPORT

Alumni are welcomed and encouraged to become an active part of the YSPH community. Below are some of the ways you can get started:

**Become a mentor:** The YSPH Mentor Program is a great way to give back by contributing to the professional development of the next generation of health care leaders. Recruitment for mentors happens by email each summer.

**Attend events and reunions:** The alumni office coordinates a series of activities and receptions for alumni including:

- ▶ American Council of Healthcare Executives reception (Chicago)
- ▶ Alumni Day (New Haven)
- ▶ Alumni Speaker Series (New Haven)
- ▶ American Public Health Association Reception and Annual Meeting
- ▶ New student welcome reception during orientation week (New Haven)
- ▶ Pop-up events—coming to a city near you

**Post a job or internship online:** Our students and your fellow alumni would make great colleagues! Contact the Office of Career Management for more information.

**Join the board:** The Association of Yale Alumni in Public Health (AYAPH) is governed by a board of directors. Graduates of the M.P.H., M.S. and doctoral programs are eligible to represent the social and professional interests of the alumni. With 30 members and 11 committees, the AYAPH board serves in an advisory capacity to the dean.

**Pay it forward and make a gift:** Give current and future students the help they need to become public health leaders of tomorrow. Support for scholarships is a concrete way to further the school's mission and to ensure that the best and brightest are able to attend Yale. To make a gift online, visit: [www.yale.edu/givesph](http://www.yale.edu/givesph).



## STAY INFORMED & CONNECTED

**Update your contact information:** The single most important thing you can do to remain involved and connected is to ensure that we have your most current contact information. You can update your information at any time on our website, [publichealth.yale.edu/alumni](http://publichealth.yale.edu/alumni).

**Join the YSPH alumni LinkedIn group:** The YSPH LinkedIn group is over 1,200 members strong and is open to all alumni and current students of YSPH. Reap the professional rewards of your YSPH degree and grow your Yale network!

**Connect with the Yale School of Public Health:** Social media (Facebook, Twitter, Instagram and YouTube) is where you'll find current YSPH news, lectures, tweets and alumni news.

**Read the digital edition of *Yale Public Health* magazine:**

Missed an edition? Prefer to read online? You can find all of our previous *Yale Public Health* editions on the school website for easy access email items for *Yale Public Health* magazine promotions, awards, marriages and new additions—we love to brag about our alumni. We feature alumni in every issue of *Yale Public Health*. Send items and ideas to [ysph.alumni@yale.edu](mailto:ysph.alumni@yale.edu).

**Check out the @YSPH alumni e-newsletter:** Published three times a year, the e-newsletter keeps you up to date on your alumni association and provides news and information of interest.

---

If you have questions on how to access any of these services, contact [ysph.alumni@yale.edu](mailto:ysph.alumni@yale.edu)

## Yale SCHOOL OF PUBLIC HEALTH



## ANNUAL GIVING

### Daily Impact

When you make an annual gift to the Yale School of Public Health, it goes to work immediately providing essential support for financial aid.

You are also helping to build Yale's future when you help us educate the next generation of leaders in public health. As the school expands its class size to meet public health demands, the need for financial aid has never been greater.

Your generosity makes a difference today and for many years to come.

**[yale.edu/giveSPH](http://yale.edu/giveSPH)**

BROOKE SEVERE, M.P.H. '19

Tower Health named **VIKRAM ACHARYA**, M.B.A., M.P.H. '04, interim CEO for Brandywine Hospital in Coatesville, Pennsylvania. Acharya joined Tower Health last year as chief operating officer for Brandywine Hospital. At Brandywine, he has overseen all aspects of hospital operations and has been instrumental in driving quality initiatives.

**MARI ARMSTRONG-HOUGH**, Ph.D., M.P.H. '16, published *Biomedicalization and the Practice of Culture: Globalization and Type 2 Diabetes*. The book examines the rise in and response to the disease in the United States and Japan.

**JUSTIN L. BERK**, '10, MBA, M.D., M.P.H. '11, assistant professor in the Division of Internal Medicine and Pediatrics at the Warren Alpert Medical School of Brown University, is the recipient of the 2020–22 Jeremiah A. Barondess Fellowship in the Clinical Transaction from the New York Academy of Medicine and the Accreditation Council for Graduate Medical Education. During the fellowship, he plans to develop and test podcasting as an innovative medium to teach medical students and residents.



**LESTER BORNSTEIN**, M.P.H. '55, was honored this past Flag Day with the Legion of Honor, France's highest decoration, for fighting in the Battle of the Bulge

and in the Normandy invasion. In the years following the war and after he served in Korea, Bornstein was known for his decades of service to the Jewish community, including in his role as director of Newark Beth Israel Medical Center.

**GILI HRUSA CASTILLO**, M.Sc., M.P.H. '16, recently started a new job as data manager at the Population Based HIV Impact Assessment Project at Columbia University. She is responsible for data cleaning, management, monitoring and dissemination aspects of six nationally representative population-based surveys in sub-Saharan Africa and Haiti designed to assess the impact of PEPFAR-supported HIV prevention, care and treatment programs.



**CHANDA CHACÓN**, M.P.H. '02, is the new president and CEO of Children's Hospital & Medical Center in Omaha, Nebraska. She comes to the hospital from Arkansas

Children's Hospital in Little Rock, where she was executive vice president and system chief operating officer since 2016.

**CASSIE CHAMBERS ARMSTRONG**, '10, M.P.H. '11, won a seat on Louisville's Metro Council, the city's legislative body, in June. She works with low-income women in Kentucky and is the vice chair of the state's Democratic Party.

**LINDA DEGUTIS**, M.S.N. '82, DrPH '94, received the Robert Wood Johnson Health Policy Fellows Program's 2019 Lifetime Achievement Award.



**ZAI DIVECHA**, '10, M.P.H. '11, a San Francisco-based artist who creates intricate patterns of light and shadow by folding, pleating or rolling sheets of white paper,

created a four-part series to show how HIV/AIDS diagnoses in San Francisco have changed over the decades. Her work has been featured on Twitter and Square.

**BRITTON A. GIBSON**, M.D., M.P.H. '12, graduated this spring from the Frank H. Netter, M.D., School of Medicine at Quinnipiac University. She is an OB/GYN resident at the University of Connecticut Health Center.

**RAJESH GUPTA**, M.D., M.P.H. '00, led the clinical development, approval and market access strategy for one of the first two approved drugs in 40 years for multidrug-resistant tuberculosis. He leads the global health portfolio at Vir Biotechnology in San Francisco.



**JAMES HAMBLIN**, M.D., M.P.H. '18, and **SARAH YAGER**, '11, were married on July 6, 2019, outside of Pryor, Montana. Hamblin also recently published a book, *Clean: The New Science of Skin*, which explores the effects of hygiene practices.

**MAHMUD IQBAL**, M.P.H. '17, started a new job at Children's Hospital of Philadelphia as a senior analyst in design evaluation methodology and metrics for Healthier Together, a program aimed at improving social determinants of health in at-risk areas of West Philadelphia.

**DAVID L. KATZ**, M.D., M.P.H. '93, stepped down as director of Yale-Griffin Prevention Research Center in 2019 after 21 years at the helm to focus full time on Diet ID, of which he is the founder and CEO. Diet ID is a digital toolkit that reinvents dietary assessment and management with an innovative, clinically tested visual approach to optimizing health.

**AARON S. LUKSE**, M.P.H. '11 and **MELISSA IVINS-LUKSE**, '11, announce the birth of their daughter, Zoe Susanna Lukse.

**KATRINA MCCLURE**, M.P.H. '11, has joined the Dr. Terry Sinclair Health Clinic in Winchester, Virginia, as executive director.

**MIRIAM MILLER**, M.P.H. '19, legislative liaison and health policy associate in the Connecticut Office of the State Comptroller, collaborated on a statewide pandemic testing strategy with the governor's office, the National Guard and state Department of Public Health.

**YEELI MUI**, Ph.D., M.P.H. '10, was appointed in October 2019 as a Bloomberg assistant professor of American health in obesity and the food system in the Johns Hopkins Bloomberg School of Public Health's Department of International Health. Her research, teaching and practice focus on advancing health equity through the planning for food systems and community development. As part of a multicountry project in the Global South, Mui leads an interdisciplinary research team examining how small-scale farmers' adaptations—in the face of urbanization, globalization of food and climate change—affect farmer food security and health in Kerala, India.

**JEWEL MULLEN**, '77, M.P.H. '96, M.P.A., M.D., was appointed director of health equity at Ascension Seton Medical Center and associate dean for health equity at the Dell Medical School at the University of Texas at Austin.

# ALUMNI NEWS

# DUAL PANDEMICS

**WAN NURUL**

**NASZEERAH**, M.P.H. '15, was selected as one of the Association of Southeast Asian Nations (ASEAN) Youth Fellows for 2019.

The St. Peter (Minnesota) Regional Treatment Center recently honored **WILLIAM PEDERSEN**, M.P.H. '70, by renaming its administration building for him. Pedersen was CEO of the treatment center, the largest public treatment facility in the state dealing with forensic, mentally ill and developmentally disabled patients, for 14 years.

New York City Mayor Bill de Blasio appointed **RAUL PEREA-HENZE**, M.D., M.P.H. '87, as deputy mayor of health and social services overseeing the departments of health and mental hygiene, social and homeless services, children, aging and the public hospital system as well as mayoral offices on domestic violence, LGBTQ, data informatics and food policy. Perea-Henze previously was assistant secretary for policy and planning at the U.S. Department of Veterans Affairs for three years during the Obama administration.

**EDWARD M. RAFALSKI**, M.P.H. '90, was a contributor and co-editor of *Healthcare Analytics: Foundations and Frontier*, a comprehensive guide that looks at the advantages and limitations of data analysis techniques being introduced across public health and administration services.



**RYAN SAADI**, M.D., M.P.H. '95, was named one of the top 100 inspiring leaders in the life science industry by *PharmaVOICE* magazine. He is global vice president for

evidence, market access and strategic pricing at CSL Behring.

**VICTORIA SHIRRIFF**, M.P.H. '19, began a new position in October 2019 as a public health adviser for the Centers for Disease Control and Prevention in its Center for State, Tribal, Local, and Territorial Support in the Northern Mariana Islands.

After completing his Winston Health Policy Fellowship in the Office of the Speaker of the United States House of Representatives, **ALEXANDER URRY**, M.P.H. '19, joined the office as a full-time policy adviser covering health, unemployment insurance, Social Security and child welfare issues. Urry has worked on four COVID-19 response packages, totaling almost \$3 trillion in federal aid.

**LEON VINCI**, D.H.A., M.P.H. '77, founder and CEO of Health Promotion Consultants, was selected as a climate ambassador by the National Environmental Health Association. He also was recognized by ecoAmerica as a climate and health leader.

**TIFFANI WILLIAMS**, J.D., M.P.H. '01, of Baker Donelson and the Daschle Group, was named by Lawyers of Color to its Top Lobbyists & Influencers list for 2019.

**TIARA C. WILLIE**, Ph.D. '18, M.A., has been appointed Bloomberg assistant professor of American health in the Department of Mental Health at the Johns Hopkins Bloomberg School of Public Health. Willie is a social epidemiologist examining the etiology and health consequences of gender-based violence among populations experiencing or at risk of experiencing violence. Her research investigates different levels of determinants of victimization and perpetration to develop primary interventions. She aims to better understand mechanisms linking victimization and poor mental, sexual and reproductive health to develop effective, evidence-based secondary and tertiary interventions.

**SARA SHAMOS YELPAALA**, M.P.H. '07, has been named chief experience officer of access.mobile International, a company that delivers personalized mobile health messages to drive clinical outcomes and organizational performance. She started at the company in 2015 as global operations and special projects manager.

**HAVE AN UPDATE?** Your classmates want to hear about you! Send your news (and photos) to [ysph.alumni@yale.edu](mailto:ysph.alumni@yale.edu)

(continued from p. 2)

In Connecticut alone, over 50,000 people have been diagnosed with COVID-19 and over 4,500 have died from the disease (as of August 2020). Residents of nursing homes and assisted living facilities have paid a particularly high price. Education has been interrupted on all levels, and the economic disruption likely will be felt for years to come. Leadership at the national level has been inconsistent, ineptly bypassing public health counsel in favor of wishful thinking. Recognition of the racial disparities in COVID-19 death rates was underscored by brutal and public murders by racists and police officers that touched off mass protests demanding the end of the systemic racism that affects all aspects of our nation.

YSPH launched our U.S. Health and Justice Concentration this fall. Planning had been in the works for nearly two years based on faculty insights that socioeconomic disadvantage is the principal antecedent cause of poor health, marginal housing, food insecurity, and poor educational and job opportunities. This program will prepare students to become tomorrow's crusaders in addressing the root causes of the health disparities that are so pronounced in communities of color.

During the traumatic days of 2020, YSPH faculty, staff, students and alumni have shone in their commitments to make a difference. Whether delivering breakthrough research, caring for others in our communities, informing local and national policy-makers, or protesting for social justice, our community continues to be a formidable force, committed to making our world a better and healthier place.

*Sten H. Vermund, M.D., Ph.D.  
Dean, Yale School of Public Health  
Twitter: @SVermund*

# A DECADE OF ANALYSIS

Yale Center for Analytical Sciences opened 10 years ago; amid COVID-19, researchers working there stepped back to evaluate the center's accomplishments.

BY KEN BYRON

Yale Center for Analytical Sciences (YCAS) observed its 10th anniversary this past summer. Instead of celebrating, however, its staff worked harder than ever on a crisis where their skills and experience were desperately needed. "Routine" activities were augmented by efforts to help stem the COVID-19 pandemic that had taken more than 1 million lives worldwide by late September.

"We have been going non-stop since the start of the pandemic," said Yanhong Deng, M.P.H. '10, senior biostatistician and co-director of analytics for the center, which is part of the Department of Biostatistics at the Yale School of Public Health.

Since March, the bulk of the center's work has been assisting on studies of therapies that could help combat the COVID-19 pandemic. The epidemic was not on the horizon when the center opened in 2010. But Deputy Director James Dziura, M.P.H. '98, Ph.D. '01, professor of emergency medicine and of biostatistics and of medicine (endocrinology), said it is ideally suited for this kind of public health emergency.

"We were prepared to deal with this. We have the resources to help design and conduct rigorous evaluations of research questions that relate to COVID-19," Dziura said. YCAS has helped with 10 COVID-19-related therapeutic studies so far and is deeply involved with five of them.

A study that recently started will assess the effectiveness of an antiviral drug called camostat in treating COVID-19, which is already used to treat pancreatitis. Participants

in the study have COVID-19 but are not so sick that they need inpatient care at a hospital. The study illustrates the challenges of running clinical investigations in the middle of a pandemic. Patients require frequent in-person visits to assess viral load while quarantined, and there's a need to mitigate the risk of spread to other people, including the investigators themselves, Dziura said.

Then there is the challenge of finding participants. Investigators can choose a city where there are many COVID-19 cases for the study. But by the time they organize logistics, coordinate equipment and personnel, and are ready to start work, that location may no longer be a hot spot for the virus.

"It's a fluid situation that makes conducting these studies a challenge," Dziura said.

YCAS is also helping researchers find out if a new drug called sobetirome can protect the lung tissue of patients suffering from COVID-19. Naftali Kaminski, M.D., Boehringer-Ingelheim Endowed Professor of Internal Medicine and chief of Pulmonary, Critical Care and Sleep Medicine at the Yale School of Medicine, developed sobetirome several years ago to treat lung fibrosis. But after seeing that it might help with COVID-19 this spring, he and other investigators began preparing for the new study.

The COVID-19 pandemic is a time when the center can put the strengths of its staff to the best possible use. It is also an opportunity for them to learn. Dziura said he and other leaders at YCAS wanted to expand into



Members of the Yale Center for Analytical Sciences convene a Zoom meeting during the COVID-19 pandemic.

investigations of new drugs and become experienced working on studies conducted under the oversight of the Food and Drug Administration and other regulatory agencies. With governments and researchers scrambling to find effective treatments for COVID-19, the center now has a chance to do that, he said.

YCAS was established in 2010 to meet a growing need for statistical collaboration in clinical investigations fueled by the explosive growth in computer technology. Just five people worked there at the beginning: Director Peter Peduzzi, Ph.D. '76, Dziura, Deng, Fangyong Li, M.P.H. '10, M.S., and Veronika Shabanova, Ph.D. '17, M.P.H. '99. Deng and Li had just graduated from the School of Public Health, and they are now co-directors of analytics for the center. Shabanova went on to obtain her Ph.D. at Yale.

"We had a pretty small shop when we started, but we saw a need to expand," said Dziura, an epidemiologist. And expand they did. The center now has 40 people on its staff. More than half are biostatisticians like Deng and Li.

In the beginning, the center mainly helped investigators at the Yale School of Medicine with data analysis. The center is now a leader in the field, and its reach goes beyond Yale. Peduzzi said the center collaborates with other institutions in multisite clinical investigations.

The center recently worked with researchers from 10 health care systems across the country on a six-year effort to find ways of preventing falls in the elderly population. Peduzzi said falling is particularly hazardous for older

people and of the 25% nationwide who fall, 20% to 30% have such serious injuries as fractures. The National Institutes of Health and the Patient-Centered Outcomes Research Institute funded the investigation, which had 5,451 participants and cost nearly \$35 million. Other large, multisite investigations involving YCAS include testing strategies for caring for people with dementia and testing nonpharmacological approaches for pain management in the U.S. Department of Veterans Affairs and Department of Defense health care systems.

"You need infrastructure to participate in these trials. Ten years ago, Yale did not have that," Peduzzi said.

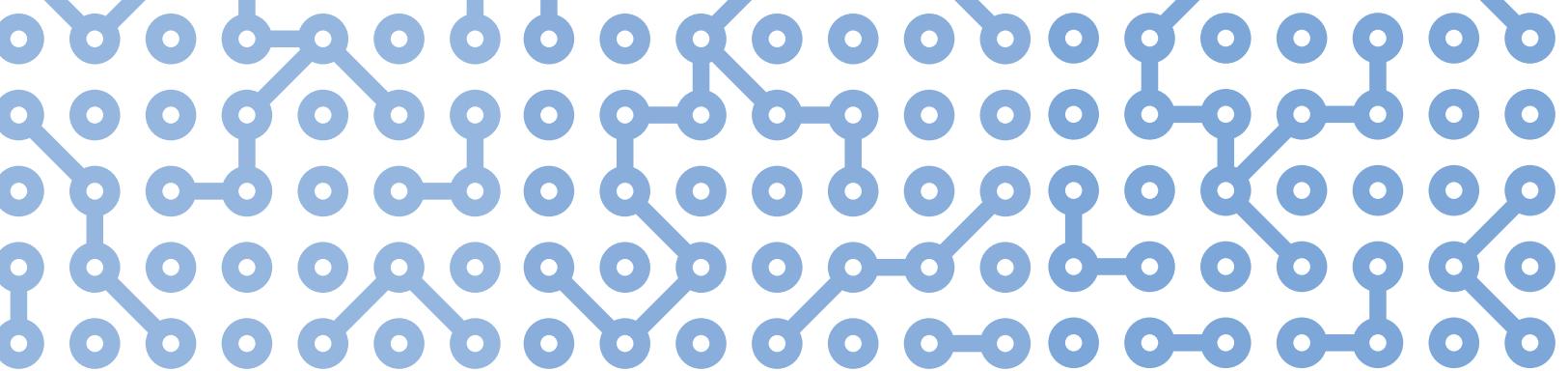
"Biostatistics is an old field that keeps getting new," Deng said. "And it's growing fast because of advances in computer science."

Gone are the days of putting your study results in an Excel spreadsheet. Now, ever more powerful computer programs collect and analyze vast amounts of data generated by clinical investigations.

"It used to be that you would have to wait for weeks to get results. Now we can deal with millions of pieces of data in seconds," Deng said.

In the past year, YCAS staff consulted on 854 unique projects with 457 Yale Center for Clinical Investigation investigators from 65 Yale departments and centers yielding 102 grant submissions and 162 publications.

Another component of the YCAS work is helping investigators at the medical school comply with the



**“WE WERE PREPARED TO DEAL WITH THIS. WE HAVE THE RESOURCES TO HELP DESIGN AND CONDUCT RIGOROUS EVALUATIONS OF RESEARCH QUESTIONS THAT RELATE TO COVID-19.”**

~James Dziura

federal government's changing requirements for registering studies.

In the past several years, the center has begun overseeing Yale's compliance with mandatory federal clinical trial registration and results reporting on *ClinicalTrials.gov*. That website is maintained by the National Library of Medicine at the National Institutes of Health, and the volume of studies that must be reported is increasing.

Jesse Reynolds, M.S., a biostatistician, heads a team at the center that decides which studies at the medical school must register on *ClinicalTrials.gov*. He said that 1,100 of them are on the site so far.

The *ClinicalTrials.gov* website has existed since 2000. It is open to the public so researchers, as well as patients and their families, can use it. Lisa Calvocoressi, Ph.D. '03, an epidemiologist with YCAS, said the website makes clinical investigations more transparent and effective.

“Trial registration and results reporting on *ClinicalTrials.gov* is one of the best things to happen to clinical research,” Calvocoressi said.

“In the past, people found out about new developments through articles published in journals,” she said. “But editors decide what does and does not appear in a journal, and studies with positive findings are what tend to be published. But what about studies that do not have positive findings? Without those, you get a skewed view of how effective a drug may be. With access to *ClinicalTrials.gov*, where all applicable trials are registered before they begin, we have a much more complete understanding and better transparency than we did previously.”

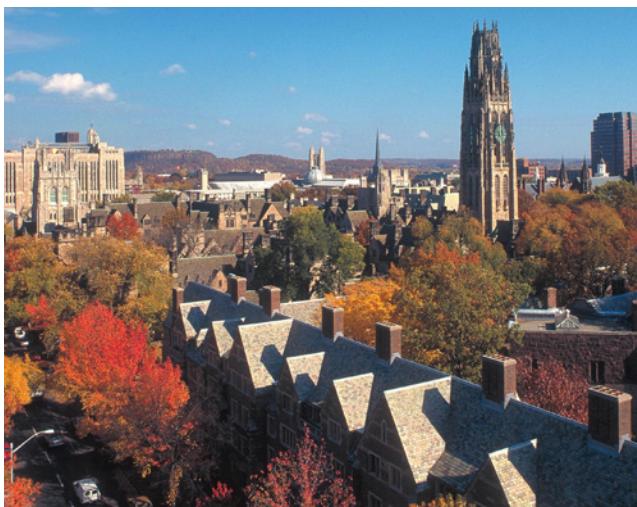
And there are the center's many educational offerings for audiences ranging from professionals to high school students.

The center's offerings include statistics courses for professionals and graduate students, mentorship of post-doctoral fellows, internships for graduate students and an intensive two-week program for high school students – the Young Scholars Program in Biostatistics and Medical Research. Previous sessions of the Young Scholars program were on campus and most students were from the New Haven area. But the center held it online this summer because of COVID-19, with participants from as far away as India. The program will augment its standard curriculum in biostatistics, computer programming languages and research methods with guest speakers who are involved in ongoing COVID-19 research at Yale.

Even without the COVID-19 pandemic, Peduzzi said he sees plenty of need for the center and what it does.

“We are still building and growing,” he said. YPH

*This story originally appeared in Yale Medicine Magazine.*



## AN ONLINE M.P.H.

**YSPH launches program aimed at working health professionals.**

The Yale School of Public Health is offering an online executive master's degree in public health (M.P.H.) for professionals interested in acquiring a strong public health education and hands-on leadership and management training. The program is part time and will take two years to complete.

Most of the coursework is remote, with three five-day in-person intensive sessions on the Yale campus over two years. Applications are now being accepted, and classes will get underway in summer 2021.

The new Executive M.P.H. encompasses all of the strengths that define the Yale School of Public Health academic experience: faculty excellence, individualized attention, curricular innovation and interdisciplinary approaches to public health challenges.

**“WE DEVELOPED THIS PROGRAM WITH A FOCUS ON THE KNOWLEDGE AND SKILLS WORKING HEALTH PROFESSIONALS NEED TO ADVANCE IN THEIR CHOSEN CAREERS.”**

~Martin Klein

“We developed this program with a focus on the knowledge and skills working health professionals need to improve their skills and to advance in their chosen careers,” said Martin Klein, M.P.H. '86, Ph.D., director of the Executive M.P.H. program. “As someone who obtained a graduate degree while working full time, I know how challenging it can be. We created a simple and direct value proposition: Dedicate some of your valuable time to this program and we will ensure that you get an education that befits the excellence and quality that is a Yale degree.”



The program offers the following four tracks:

- Health Informatics.
- Environmental Health Sciences.
- Applied Analytical Methods and Epidemiology.
- Essential Public Health Skills.

Every student in the Executive M.P.H. program will receive a \$10,000 scholarship to help offset costs.

The school joins most of its peers in now offering an online M.P.H. The new program provides an opportunity for faculty to enhance their online teaching skills, and its innovative design and structure highlight the educational qualities that define the school.

Designed for working health professionals, the Executive M.P.H. provides a broad foundation in public health, specialized instruction in areas critical to health promotion and disease prevention, and a yearlong integrative capstone experience that enables students to apply what they have learned to a real-world public health problem.

More than 20 top faculty within the Yale School of Public Health and Yale School of Medicine and from outside Yale were hand-picked to serve as instructors for the program.

“For over a hundred years, our graduates have gone out to change the world,” said YSPH Dean Sten H. Vermund, M.D., Ph.D., who will teach one of the program’s foundational courses. “This program is designed to bring into our community of learners working professionals who could

not leave career and family to come to New Haven for full-time study. This program fills that need, designed to help practicing professionals enhance their abilities to lead.”

Each one-credit course is 13 weeks long, with each week’s session consisting of roughly a one-hour pre-recorded lecture and one hour of real-time class discussion in the evening. The curriculum is 16 credits and is built around four themes: management and leadership, core public health knowledge, specialization and integration.

Within these themes, students can learn such essential skills as:

- Evidence-based decision-making.
- Applying and interpreting biostatistics.
- Fundamentals of behavior theory.
- Public health ethics.
- Health informatics.
- Toxicology.
- Public health modeling.
- Leading transformational change.

To learn more about the program, visit its website at [publichealth.yale.edu/education/degrees/executive/](http://publichealth.yale.edu/education/degrees/executive/)



Elizabeth Bradley

## A VIRTUAL GRADUATION

Yale School of Public Health's Class of 2020, facing the daunting prospect of starting careers in the midst of a global pandemic, were reminded that theirs is a noble mission and that the time has come to transform their newfound knowledge into action.

"COVID-19 is the defining public health crisis of our era, and you have studied to do the work most needed now to help the world heal, learn and move forward," Dean Sten H. Vermund, M.D., Ph.D., told the graduates during a commencement address May 18, which, like almost all other graduations this year, was delivered virtually to students around the world.

Vermund said the 207 M.P.H. recipients are "uniquely equipped" to enter the public health workforce, which today offers "countless opportunities for you to alter the future for the better."

In her keynote address, Vassar College President Elizabeth Bradley urged graduates to not just engage but to lead in their chosen public health interests of epidemiology, chronic disease, public health policy and environmental health.

"You may not fashion yourself to be a leader but you have leadership in you because, like my colleagues around the world, with this public health degree you have taken a step to say there is unnecessary suffering and disease and I will do something about it," Bradley said.

A 1996 Yale School of Public Health graduate (Ph.D., health policy and health economics), Bradley was an administrator at Massachusetts General Hospital before returning to lead the YSPH Health Management Program. During her long tenure at the university, she directed the Brady-Johnson Program in Grand Strategy at Yale, an interdisciplinary universitywide initiative providing leadership training for undergraduates. She also served as head of Branford College.

Known for her international work strengthening health systems in China, Egypt, Ethiopia, Liberia, South Africa

**"PUBLIC HEALTH IS INHERENTLY SOCIAL JUSTICE."**

~Helen Moore

and the United Kingdom, Bradley founded the Yale Global Health Leadership Institute. She became the 11th president of Vassar in 2017.

Effective leadership was a cornerstone of Bradley's commencement address. With ongoing concerns about climate change, future pandemics and human encroachment on natural habitats, Bradley said the need for strong, impactful public health leadership continues to be great.

"Given our shared field of leadership and public health, no matter what your role is in it, you are called to lead," Bradley said. "You have chosen to pursue one of the most important fields of our time."

Recognizing 2019 as the 50th anniversary of the matriculation of women in Yale College and the 150th anniversary of the first female students at the university, Bradley recounted how women around the world have demonstrated outstanding leadership in public health.

"Many women have seen suffering and disease in their communities and have concluded they could no longer accept things as they were," she said.

Helen Moore, an M.P.H. recipient, helped set the tone of the day by praising her fellow graduates for consistently advocating for marginalized communities and pushing for change even in the face of opposition.

During her time at Yale, Moore worked on state legislative efforts to expand health services for undocumented children. As a Yale President's Public Service Fellow, she volunteered with neighborhood housing services, where she advocated for nondiscriminatory zoning policies.

"I chose to get my M.P.H. in health policy because I want to improve the lives of others," she said. "Public health is inherently social justice. My classmates have demonstrated this time and time again advocating for a core curriculum that incorporates these values throughout."

At the start of the virtual ceremony, Huaqi Li, M.P.H. in chronic disease epidemiology, was honored as student marshal, and Josemari Feliciano, M.P.H. in biostatistics, was honored as banner bearer.

Colin Poitras



## 2020 FACULTY HONORS

and staff

### DISTINGUISHED TEACHING AWARD

Marney White

### DISTINGUISHED STUDENT MENTOR

Nathan Grubaugh

### TEAM RESEARCH AWARD

Albert Ko and colleagues

### INVESTIGATOR RESEARCH AWARD

Hongyu Zhao and Zack Cooper

### EARLY CAREER INVESTIGATOR AWARD

Nathan Grubaugh

## 2020 STUDENT HONORS

### STUDENT AWARD FOR OUTSTANDING CONTRIBUTIONS IN DIVERSITY, EQUITY AND INCLUSION

Helen Moore and Bethlehem Teshome

### DEAN'S PRIZE FOR OUTSTANDING M.P.H. THESIS

Ryan Sutherland

### WILBUR G. DOWNS, M.D., M.P.H., OUTSTANDING THESIS PRIZE IN INTERNATIONAL HEALTH

Shannon Han

### HENRY J. (SAM) CHAUNCEY JR. INSPIRATION AWARD

Tal Gurevich

### LOWELL LEVIN AWARD FOR EXCELLENCE IN GLOBAL HEALTH

Shadrack Frimpong

### TEACHING FELLOW AWARD

Alexandra Edmundson



**“IT IS MY CONVICTION THAT ONE  
CANNOT FULLY UNDERSTAND THE  
NATURE OF AMERICAN ART UNLESS ONE  
UNDERSTANDS THE CONTRIBUTION OF  
AFRICAN AMERICAN ARTISTS.”**

*~Robert Steele*

## YSPH ALUM GIFTS YALE— WITH ART

Robert E. Steele has shared his 50-plus-year devotion to African American art with Yale — 100 times over.

Since 2004, Steele and his wife, Jean, have given the Yale University Art Gallery 100 works from their collection of African American art. The four most recent gifts — a lithograph by Romare Bearden, a mixed-media piece by Sam Gilliam and screen prints by Jacob Lawrence and Gwendolyn Knight Lawrence — arrived at the museum’s Department of Prints, Drawings and Photographs in 2019, augmenting one of Yale’s richest resources for the study of African American art and culture.

“It is my conviction that one cannot fully understand the nature of American art unless one understands the contribution of African American artists,” said Steele, M.P.H. ’71, M.S. ’74, Ph.D. ’75, a retired professor of clinical psychology now living in Hawaii and a member of the art gallery’s governing board since 2004. “Given that the art gallery has its roots in those 100 pieces of [John] Trumbull’s Revolutionary [War] art, we thought we’d give 100 pieces to lay the foundation for a greater presence of African American art on campus.”

*Michael Cummings*

Above: Robert Steele

## VACCINE EXPERT TESTIFIES IN FAVOR OF REFORM

Professor Linda Niccolai, Ph.D., took her vaccine expertise to Hartford in February and testified before the state House's Public Health Committee on a vaccination bill that would overturn religious exemptions and mandate that all children receive certain vaccinations before being allowed to enroll in any public or private school unless they have a medical exemption.

She said HB 5044 is an evidence-based public health measure that would protect the health and safety of children and adults alike. Niccolai submitted written testimony in support of the bill and also testified in person before the committee during a daylong and sometimes raucous public hearing at the state Capitol.

"Now is the time to enact [this vaccination bill] with confidence that it will save lives and protect the public health," Niccolai said. "It is now the responsibility of our elected officials, with the support of their constituents, to do what they have been elected to do, and that is to protect the public's health with evidence-based and constitutionally sound policies."

Professor Saad B. Omer, Ph.D., M.P.H., director of the Yale Institute for Global Health, also testified at the hearing. The bill has been tabled since the outbreak of the COVID-19 pandemic.

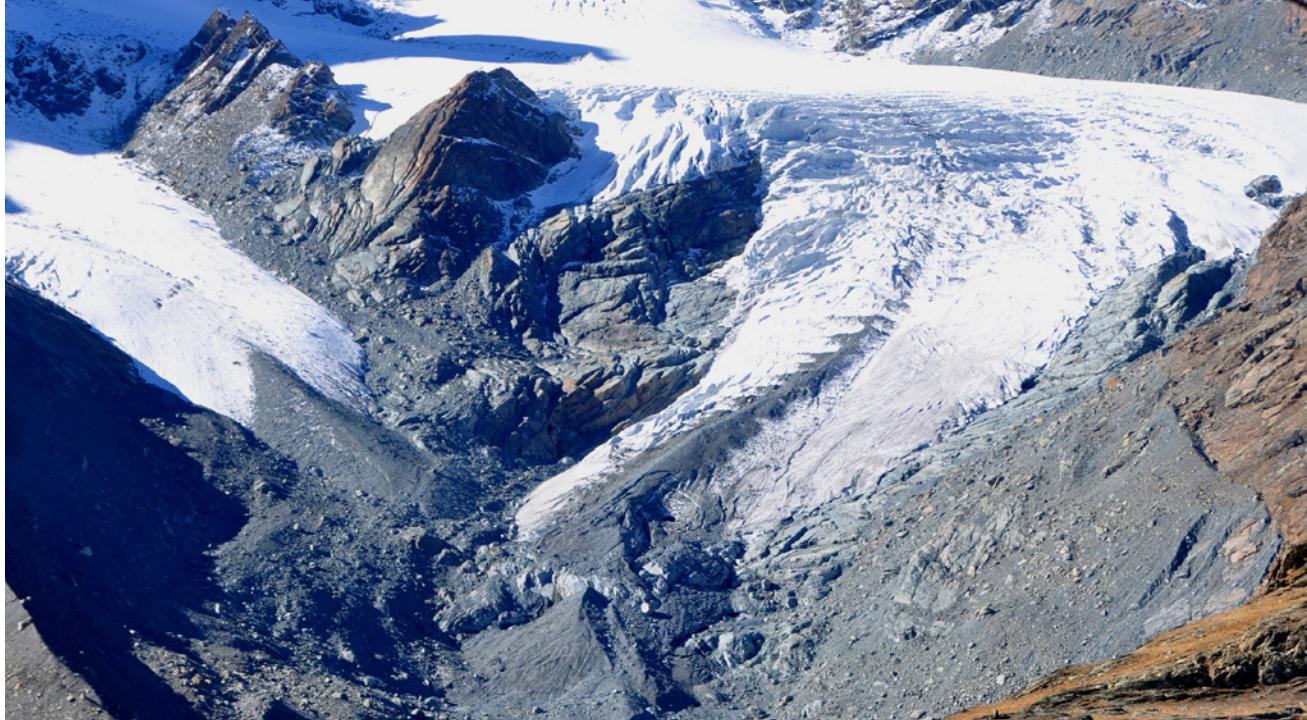
*Michael Greenwood*



Linda Niccolai

**“NOW IS THE TIME TO ENACT [THIS VACCINATION BILL] WITH CONFIDENCE THAT IT WILL SAVE LIVES AND PROTECT THE PUBLIC HEALTH.”**

*~Linda Niccolai*



## CLIMATE CHANGE CENTER ESTABLISHED

The recently formed Yale Center on Climate Change and Health (YCCCH) will use research, education, public health practice and service to help achieve a stable and safer climate in which public health and diverse ecosystems thrive.

The Yale School of Public Health is among a handful of public health schools in the world to have a center dedicated solely to climate change and health.

“The world needs to urgently reduce greenhouse gas emissions, the root cause of climate change, while at the same time protecting the public from climate change’s adverse health impacts. The Yale School of Public Health – in close partnership with many experts from across the university and beyond – is uniquely situated to contribute to these efforts,” said Professor Robert Dubrow, M.D., Ph.D., the center’s inaugural director.

YCCCH evolved from the Yale Climate Change and Health Initiative, which was created at the Yale School of Public Health in 2015 in response to growing concerns about how climate change was affecting the health of populations in both developed and developing countries around the world. Martin Klein, M.P.H. ’86, Ph.D., who helped establish the initiative, served as its executive director and now holds the same position for YCCCH.

**“THE YALE SCHOOL OF PUBLIC HEALTH — IN CLOSE PARTNERSHIP WITH MANY EXPERTS FROM ACROSS THE UNIVERSITY AND BEYOND — IS UNIQUELY SITUATED TO CONTRIBUTE TO THESE EFFORTS.”**

*~Robert Dubrow*

As a full center, YCCCH’s priorities will include:

- Establishing a world-class interdisciplinary research program.
- Expanding its public health practice program.
- Increasing educational opportunities.

The center was approved by the provost as an official Yale center in December 2019. Its main funder is the High Tide Foundation.

Dean Sten H. Vermund, M.D., Ph.D., said YCCCH will fundamentally reshape the way climate change is addressed by the Yale School of Public Health and the university.

“This is a significant step forward for the Yale School of Public Health,” Vermund said. “I am excited to see what important contributions our new research center will make to our understanding of climate change and how we might mitigate human suffering caused by weather.”

The school also recently created the Climate Change and Health Concentration, which seeks to educate the next generation of professionals to address climate change as a public health issue.

*Michael Greenwood*



A scene from the winning student video, “The 4 R’s of Suicide Prevention.”

## STUDENTS’ HEALTH-THEMED VIDEOS EARN CASH PRIZES

Yale School of Public Health students addressed a range of important public health issues, from suicide to gun violence, while showcasing their creativity in the school’s second Roger Barnett Public Health Video Challenge, known as the Winnies.

Six videos were considered in this year’s contest and winners were selected by a panel of seven judges.

This year’s top prize of \$2,500 went to a team composed of Conlin Bass, Geena Chiumento and Eduardo Encina, for their 90-second video, “The 4 R’s of Suicide Prevention.”

Filmed in New Haven, the video highlights ways people can help individuals struggling with mental health issues. It notes that depression affects nearly 18 million adults in the United States and is a primary reason someone dies of suicide every 12 minutes.

“I have found that the biggest source of support during challenging times stems from friends and loved ones recognizing signs that someone is not doing well and taking the time to check in,” said Encina, who helped shoot and edit the video. “I believe that being there for others, whether in person or through a phone call or text, are all small actions that can have a substantial impact.”

The video tells the story of a young woman named Geena (Chiumento), who is experiencing depression after learning of a tragic event involving a friend. A friend, Ed (Encina), checks on her and expresses condolences. He gets concerned when she responds, “Thanks. That means a lot. But it’ll all be over soon and then you won’t have to worry about me anymore.”

Ed tells Geena he and others are worried about her and are there for her if she needs support. He gives her a hug before leaving. This behavior exemplifies the video’s first R of suicide prevention: recognizing signs of guilt, sadness and pessimism.

Ed then shares their interaction with Conlin (Bass), who sends Geena a text expressing his concerns for her well-being. This is the second R: respond. Conlin’s text includes several hotline numbers for individuals in crisis, which is the third R: refer to resources.

The clip ends with Ed and Conlin paying Geena a visit at her apartment, checking on her and sitting with her for a while, which is the fourth R: reengage.

“I always thought that the 4 R’s were an easily digestible, memorable and meaningful way to talk openly and honestly about suicide, hopefully giving people the tools to be able to reach out when they otherwise wouldn’t feel comfortable,” Bass said.

Two videos tied for second place, with three student producers splitting \$2,000 in prize money three ways. Isabella Berglund-Brown’s video, “Young Lives Are on the Line,” focused on gun violence as a public health crisis. A video produced by Ryan Sutherland and Anna Jennings, “Foot Health Is Public Health,” highlighted the importance of foot health as a public health concern, especially among homeless people.

Two videos earned honorable mention awards of \$250 each: a suicide prevention video produced by Kevin Zheng, Leonardo Lizbinski and Coco Ma, and a video produced by Mukesh Adhikari titled “Important, but Often Overlooked, Determinants of Public Health Challenges.”

“It is inspiring and a sheer delight to see our students showcasing their diverse talents by merging public health and the arts,” said Dean Sten H. Vermund, M.D., M.P.H.

Vermund acknowledged Roger Barnett, chairman and CEO of Shaklee Corp. and an alumnus of Yale College and the Yale Law School, for donating funds to make the video challenge possible. The Winnie awards are lightheartedly named for Yale School of Public Health founder C.-E.A. Winslow.

*Colin Poitras*

View the 2020 videos at:  
[publichealth.yale.edu/news-article/23931/](http://publichealth.yale.edu/news-article/23931/)



Rafael Pérez-Escamilla

**“ BEING ELECTED TO THE NATIONAL ACADEMY OF MEDICINE IS A TRULY HUMBLING HONOR.”**

*~Rafael Pérez-Escamilla*

## PROFESSOR ELECTED TO TOP SCIENTIFIC ACADEMY

Yale School of Public Health Professor Rafael Pérez-Escamilla, a researcher with wide-ranging expertise in maternal-child nutrition, food security, diabetes and global health, has been elected to the National Academy of Medicine.

NAM seeks to improve health by advancing science, striving for health equity, and providing independent and authoritative advice in the fields of medicine and public health nationally and globally.

“Being elected to the National Academy of Medicine is a truly humbling honor as it represents the recognition of highly respected peers of the scientific and policy value of my lifetime contributions to advancing the field of public health nutrition globally,” said Pérez-Escamilla, who is also director of the Office of Public Health Practice and director of the Global Health Concentration at the school. He joined YSPH in 2009.

NAM focuses on critical health issues that need to have evidence-based principles applied to inform policymakers and to inspire investments to solve major medical and public health problems with community engagement. It also seeks to develop the next generation of scientists and policy innovators. At any given time, many NAM members are involved in studies commissioned by committees for high-priority challenges in domestic and foreign health.

Founded in 1970, NAM today has more than 2,200 members. It elects no more than 75 new members each year based on professional achievement and volunteer service. Pérez-Escamilla, Ph.D., joins two other Yale School of Public Health scientists who are NAM members, Dean Sten H. Vermund, M.D., Ph.D., and former Dean Paul D. Cleary, Ph.D.

“Dr. Pérez-Escamilla is a superb teacher, mentor and pioneer in global public health. His research contributions have made a fundamental difference in child health both in Connecticut and around the world,” Vermund said. “We are incredibly fortunate to have Rafael as a community and global health leader at the Yale School of Public Health.”

Over the past three decades, Pérez-Escamilla has developed, led and implemented pioneering programs in public health nutrition. His multidisciplinary research focuses on the effective translation of evidence generated on a small scale to the design of policies and programs across the life course at the national and global level.

Pérez-Escamilla’s work is people-centric and based on complex adaptive systems and life course equity frameworks informed by primary research in over 15 countries. Its wide-ranging impact has included improvements in policies, programs and outcomes in breastfeeding promotion and support; maternal, infant and young child feeding; iron deficiency among infants; early childhood development; household food security; and Type 2 diabetes self-management.

As a result of this global impact, Pérez-Escamilla has been a scientific expert adviser to the World Health Organization; UNICEF; the Food and Agriculture Organization of the United Nations; Robert Wood Johnson Foundation; National Academies of Sciences, Engineering and Medicine; U.S. Departments of Agriculture and Health and Human Services; and the Bill & Melinda Gates Foundation, among others.

“These newly elected members represent the most exceptional scholars and leaders whose remarkable work has advanced science, medicine and health in the U.S. and around the globe,” said National Academy of Medicine President Victor J. Dzau. The new members were announced during NAM’s 2019 annual meeting.

*Michael Greenwood*



# THE OLIVE AND ITS OIL CELEBRATED IN ANCIENT DELPHI

Taking a cue from the ancient Greeks and their deep respect for the olive tree and the oil produced from its fruit, researchers led by the Yale School of Public Health hosted a symposium in the legendary city of Delphi to explore the many human and planetary health benefits associated with the olive tree and its products.

The second Yale International Symposium on Olive Oil and Health brought together a host of international speakers with diverse areas of expertise for four days to explore the current state and future directions of the olive tree and its products.

“This is the much anticipated next step after the success of the first symposium in New Haven in late 2018; and what better place for the world of olive oil to meet other than what the ancient world considered as the center of the universe,” said Professor Vasilis Vasilou, Ph.D., and Tassos Kyriakides, Ph.D. ’99, associate research scientist, said in a statement. They organized the event along with colleagues from Spain, Italy, Greece, Brazil, Japan, Tunisia, Cyprus and the United States.

The Yale School of Public Health is seeking to launch a Yale Initiative for Olive Sciences and Health, which would be devoted to the scientific exploration of the olive tree, its products and their derivatives and ways to further integrate the fruit and its products into people’s nutrition. The institute would also focus on planetary health issues, including sustainability, circular economies and climate change.

In keeping with the overarching motif of health, the 2019 symposium’s first session was devoted to nutrition. It looked at olive-based nutrition through the lens of the clinician, the farmer and the chef. Participants also sampled olive oils.

The symposium’s interest in health went beyond human health and extended to planetary health. Another session explored sustainability and ways that the multi-billion-dollar olive oil industry can reduce waste and carbon emissions. Economic and social sustainability were



**“THROUGHOUT HISTORY, THE OLIVE TREE HAS BEEN NOURISHING AND CONNECTING PEOPLES AND CULTURES.”**

~Vasilis Vasilou

also part of the discussion with presentations of olive oil brands and their business strategies.

Three other sessions addressed broad themes relevant to the future of the olive:

- Diversity in farm environments, cultivars and production methods.
- Product styles and producers.
- Consumers and current trends in olive oil usage.

“Throughout history, the olive tree has been nourishing and connecting peoples and cultures,” Vasilou said.

Vasilou also organized and hosted a daylong symposium in November 2019 on mass spectrometry that drew experts from industry and academia to YSPH to compare how they are using imaging technology to pry ever deeper into the mysteries of biology, and a separate daylong symposium on chemicals known as per- and polyfluoroalkyl substances, or PFAS, in December 2019. The event, at YSPH, drew a range of experts from Yale and beyond to discuss the latest research on PFAS and possible health implications associated with the man-made compounds.

Michael Greenwood

Above: Tassos Kyriakides, left, and Vasilis Vasilou from the Yale School of Public Health helped organize the second Yale International Symposium on Olive Oil and Health held in Delphi, Greece.



## AWARDS & HONORS FALL 2020

**LESLIE ASANGA**, M.P.H. '20, **LEONARDO LIZBINSKI**, M.P.H. '20, and **ROGER SOUKE** won the Thorne Prize for Social Innovation in Health or Education for their novel platform ePharmHub.

**HALBERT BAI**, M.P.H. candidate in the Department of Chronic Disease Epidemiology, received the Integrative, Complementary, and Traditional Health Practices Student Presentation Award at the American Public Health Association conference for 2019 for his systematic review of auricular acupuncture therapy for weight management.

Six Yale School of Public Health faculty have been elected to the Connecticut Academy of Science and Engineering: **ELIZABETH CLAUS**, Ph.D. '88, M.D. '94, professor of biostatistics; **ALBERT KO**, M.D., professor and chair of the Department of Epidemiology of Microbial Diseases; **PETER N. PEDUZZI**, Ph.D. '76, professor of biostatistics; **RAFAEL PÉREZ-ESCAMILLA**, Ph.D., professor of epidemiology; **MEGAN V. SMITH**, DrPH, M.P.H. '00, associate professor in the Department of Psychiatry; and **CHRISTIAN TSCHUDI**, Ph.D., the John Rodman Paul Professor of Epidemiology.

**NICOLE DEZIEL**, Ph.D., M.H.S., associate professor in the Department of Environmental Health Sciences, has been named to the National Academies of Sciences Standing Committee on Use of Emerging Science for Environmental Health Decisions.

**ALEXANDRA EDMUNDSON**, M.P.H. '20, received the Teaching Fellow Award from the Yale School of Public Health.

**SHADRACK FRIMPONG**, M.P.H. '20, received the Afro-American Cultural Center's Arthur L. Pulley and Bernice Cosey Pulley Research Award for the Advancement of Peace and Justice in the Americas and Africa. He also earned a prestigious Gates Cambridge Scholarship.

**JEANNIA FU**, a Ph.D. student in the Department of Epidemiology of Microbial Diseases, received the Gruber Global Justice and Women's Rights Fellowship.

**GREGG GONSALVES**, Ph.D. '17, assistant professor in the Department of Epidemiology of Microbial Diseases, received a \$1.5 million Avenir Award from the National Institute on Drug Abuse.

**NATHAN GRUBAUGH**, Ph.D., assistant professor in the Department of Epidemiology of Microbial Diseases, received the Distinguished Student Mentoring Award from the Yale School of Public Health.

**CAROLINE JOHNSON**, Ph.D., assistant professor in the Department of Environmental Health Sciences, received a Rudolph J. Anderson Endowed Postdoctoral Fellowship and the Metabolomics Association of North America's Young Investigator Award.

**HARLAN KRUMHOLZ**, M.D., S.M., professor in the Department of Health

Policy and Management, received the American Heart Association's 2019 Clinical Research Prize.

**DUANE MADZIVA**, M.P.H. '19, won the Afro-American Cultural Center's Award for Outstanding Research in Science, Technology, Engineering and Math.

**JOAN MONIN**, Ph.D., associate professor in the Department of Social and Behavioral Sciences, received the 2020 Florence L. Denmark Award from the Society for the Psychology of Women, Division 35 of the American Psychological Association, for her accomplishments in the field of women and aging.

**LINDA NICCOLAI**, Ph.D., professor in the Department of Epidemiology of Microbial Diseases, won the Yale Cancer Center's Population Science Research Prize for her work studying HPV vaccination rates and efficacy.

**RAFAEL PÉREZ-ESCAMILLA**, Ph.D., professor in the Department of Social and Behavioral Sciences, has been awarded the Kellogg Prize for Lifetime Achievements in International Nutrition from the American Society for Nutrition.

**MARGARET PICHARDO**, M.P.H., a Ph.D. candidate in the Department of Chronic Disease Epidemiology, received a 2019 Dean's Emerging Scholars Research Award from the Office of the Provost and the Graduate School of Arts and Sciences to support her research.

# AWARDS & HONORS (CONT'D)

**BRIAN THOMPSON**, Ph.D., candidate in the Department of Environmental Health Sciences, has been selected for the Association for Research in Vision and Ophthalmology's 2020 Science Communication Training Fellowship.

**ADAM VIERA**, Ph.D. candidate in the Department of Social and Behavioral Sciences, has been accepted into the Clinton Global Initiative University community. This honor includes access to a comprehensive Commitment to Action curriculum, high-touch mentorship, funding streams, Clinton Foundation topic experts and attendance at the CGIU annual meeting.

**MARNEY WHITE**, Ph.D., M.S., associate professor in the Department of Social and Behavioral Sciences, received the 2020 Distinguished Teaching Award, the top teaching award given by the Yale School of Public Health.

**SHANNON WHITTAKER**, Ph.D. candidate in the Department of Social and Behavioral Sciences, won the Outstanding Student Poster Award at the Interdisciplinary Association for Population Health Science conference in Seattle.

**HONGYU ZHAO**, Ph.D., chair of the Department of Biostatistics and the Ira V. Hiscock Professor of Biostatistics, received the Pao-Lu Hsu Prize at the 11th International Chinese Statistical Association conference in Hangzhou, China.

**JERRY L. AINSWORTH**, Ph.D., M.P.H. '77, of Shreveport, Louisiana, died Sept. 6, 2019, at the age of 82. He received a doctorate in education from the University of Arkansas. While at Yale he was also a visiting scholar at Yale Law School. He pursued postdoctoral studies at the National Autonomous University of Mexico. During his collegiate years he competed as a gymnast, a trampolinist and a diver. He was an official at the 1972 Olympics in Munich. He developed health programs in Mexico, Guatemala, Belize and Honduras and worked with the Albert Schweitzer Institute to develop health programs among Huichol Indians. He was a professor of health at Southern Connecticut State University, where he developed the International Love and Health Congress. An accomplished pilot, sailor and scuba diver, he used all of these skills in investigating ruins in the jungles, waters and highlands of Guatemala, Belize and Mexico, becoming known in his family as "Indiana Jones." He also wrote two books, *Love and Health* and *The Lives and Travels of Mormon and Moroni*.

**EARL BUCKINGHAM BYRNE**, M.D., M.P.H. '64, died Nov. 15, 2019, at the Glen of Willow Valley Communities, Lancaster, Pennsylvania, at the age of 87. He graduated with a degree in chemical engineering from Princeton University, where he played varsity football, and received his M.D. degree from the Columbia University Vagelos College of Physicians and Surgeons. He was a surgeon and commissioned officer in the United States Public Health Service from

1961 to 1963. He taught at the Yale School of Medical and at Thomas Jefferson University Hospital in Philadelphia prior to joining the staffs of Bryn Mawr and Paoli hospitals and Lankenau Medical Center. He and his wife enjoyed skiing and moved to Colorado in 1994 to pursue new careers.

**CHESTER L. DAVIS II**, Sc.D., M.P.H. '71, died Sept. 19, 2019, at a hospital in Salem, Virginia, at the age of 76. He served in the Peace Corps in Brazil where, in 1967, he met Rebecca Thomas, a fellow Peace Corps volunteer, and they wed in 1968. After their return to the United States, he went on to earn his M.P.H. degree from Yale and a Sc.D. from Johns Hopkins University. He worked with the old Department of Health, Education and Welfare and as an analyst in the National Academy of Sciences.

**JEAN F. HESTON**, M.P.H. '46, of Cheshire, Connecticut, died on November 27, 2019. She was 99. She worked on the Yale faculty as a research associate in the Department of Epidemiology, School of Public Health, until her retirement in 1982. She was a member of Spring Glen UCC in Hamden for over 50 years where she served in a variety of roles. A member of the local Bryn Mawr Alumnae Club, she was long active in its used book sales and book shop. She belonged to the North End Club and the New Haven Garden Club. She and her late husband George worked with great enthusiasm on several Garden Club conservation projects, including Long Wharf nature preserve.

## IN MEMORIAM

**MARGARET L. KARIS**, M.P.H. '78, died April 16, 2020, at Hartford Hospital at the age of 82. She graduated from Fisher Junior College and Deaconess Nursing School. After years of working the night shift as a nurse and raising her family, she earned her undergraduate degree from Southern Connecticut State College and became a psychiatric nurse, eventually starting a private practice. She dove into politics and civil rights, showing the power of action. After years in health care, she trained in financial services and became a stockbroker for A.G. Edwards. She lived her life doing things she loved: traveling, painting, working, worshipping, and spending time with family and friends. She cherished good conversation and fellowship and had the ability to connect with people on a deep level.

**ELIZABETH SCHWARZ LAMB**, M.D. '55, M.P.H. '58, J.D., died of brain cancer Feb. 15, 2020, at the Kensington in Sierra Madre, California, at the age of 90. She received her B.A. from the University of Pennsylvania and M.D. from Yale University in 1955, followed by an internship at Philadelphia General Hospital. She continued her studies and received an M.P.H. from Yale in 1958. With three young children, she then completed her residency as a fellow in rehabilitation at the Stanford Medical Center in Palo Alto, California, from 1961 to 1964. After being certified by the American Board of Physical Medicine and Rehabilitation in physical medicine and rehabilitation in 1973, she practiced as a physiatrist in private

practice and for the Veterans Administration and its successor, the Department of Veterans Affairs. After retiring, she earned her J.D. in 2000.

**ANDREW EDMUND SLABY**, M.D., M.P.H. '73, Ph.D. '77, died May 4, 2020, from complications of COVID-19. He was 78. He was a psychiatrist in private practice in New York and in Summit, New Jersey. He also served as a clinical professor of psychiatry at New York University Grossman School of Medicine and as an adjunct professor in the Department of Psychiatry and Behavioral Sciences at New York Medical College. He was president of the HealthCare Chaplaincy Network, a board member of the Albert Ellis Institute, a member of the National Board of the American Foundation for Suicide Prevention, treasurer of the International Academy of Law and Mental Health, and co-chair of the Decorative Arts Committee of the National Arts Club. He also served in the U.S. Public Health Service, stationed at the National Institute of Mental Health and at the Laboratory of Clinical Psychopharmacology. He wrote a foundational textbook, *Handbook of Psychiatric Emergencies: A Guide for Emergencies in Psychiatry*, and wrote or edited 56 books.

**ELLWYN D. SPIKER**, M.P.H. '59, died March 4, 2020, at Country Meadows of Allentown, Pennsylvania, where he had been residing. He was 96. He served in the Navy's Hospital Corps during World War II. He retired in 1986 as president of the Lehigh Valley Hospital Center, a position he held since 1969, when he came to Allentown to supervise the planning, design and construction of the new hospital. Under his leadership, the hospital became a world-class health care facility, and his special interest in emergency medicine and trauma care helped establish Lehigh Valley as Pennsylvania's first state-designated trauma center. Upon enactment of the Pennsylvania Trauma Systems Foundation Act, he became the first vice president of the foundation, an accrediting body for trauma centers, in 1985, and was instrumental in the development of the state's standards for trauma care.

**Send obituary notices to**  
**[ysph.alumni@yale.edu](mailto:ysph.alumni@yale.edu)**



## ELM CITY HEALTH

# SECURING CRITICAL SUPPLIES FOR GREATER NEW HAVEN COMMUNITY

**Yale community works behind the scenes to acquire nearly 100,000 face masks, other PPE.**

While nations around the world struggled to acquire personal protective equipment (PPE) to fight the COVID-19 pandemic earlier this year, a small group of Yale community volunteers and alumni worked independently behind the scenes to bring the critical supplies to New Haven.

One of those volunteers was recent Yale School of Public Health graduate Tanya Yajnik, SBS '20, who, along with Mavila Marina Miller, Yale College '16, and Ken Lin, an oncology pharmacist at Smilow Cancer Hospital, arranged delivery of nearly 100,000 face masks and 96,000 face shields to Yale New Haven Hospital and the Yale New Haven Health System.

The protective equipment was donated by Frank Ji, YC '09, who purchased thousands of pieces of certified PPE in Shanghai with the intention of donating them to the Yale New Haven Health System. But he needed help getting the supplies to their destination.

The process wasn't easy. The Yale volunteers had to navigate international shipping regulations, trade restrictions and other legal requirements. Complicating matters, Lin was temporarily sidelined when he contracted COVID-19 during the middle of the project.

"On the public health side, it really reinforces the idea that everything is connected to everything," Yajnik said of the experience. "When you're thinking about public health challenges and getting shipments to people in need, you have to think about the policy side and the regulatory side, and you have to communicate with a lot of different people really effectively."

Small details became big problems.

The process started in early spring when Ji, an active member of the Yale undergrad alumni community, reached out to Miller on the popular Chinese social messaging



app WeChat. Ji expressed interest in donating PPE to Yale New Haven Hospital but wasn't sure what supplies were most needed. Miller, also an active member of the Yale undergrad alumni community, works in Shanghai and has a background in international trade and logistics.

About the same time, Yajnik and other members of the Yale Coalition for Health Innovation in Medical Emergencies, or CHIME, were engaging in various projects to help frontline workers in New Haven during the COVID-19 crisis. Miller is a former student of CHIME leader Joseph Zinter, assistant director of the Yale Center for Engineering Innovation and Design, and contacted him about Ji's planned donation.

Zinter shared the news with Yajnik, who contacted Miller on WeChat and together the pair started putting the idea into action. Soon after, Lin, who had been working on his own to arrange PPE donations through New Haven's Asian American and Yale communities, learned of the pending donation through WeChat and offered to help.

With Miller and Ji in Shanghai and Yajnik in her hometown of Dallas due to COVID-19 restrictions at Yale, Lin became a critical connection for coordinating the actual delivery and receiving of the PPE at Yale New Haven Hospital.

"This is really a team effort by people from across the globe," Lin said.

*Colin Poitras*

Above: Ken Lin, left, and his brother Austin Lin oversee a PPE shipment as it arrives at a depot for use by the Yale New Haven Health System.

Inset: Tanya Yajnik, left, and Mavila Marina Miller worked on shipment logistics remotely from Dallas and Shanghai, respectively.

# YSPH INTERVIEWS AROUND THE WORLD

**UNITED STATES** YSPH faculty are regularly quoted in *The Washington Post*, *The New York Times*, CNN, the *New Yorker*, *The Atlantic* and many other outlets to discuss the evolving health crisis.

**RUSSIA** Several faculty grant podcast interviews to *RT* (formerly *Russia Today*) and offer their expertise on the emerging crisis.

**CHINA** Numerous YSPH faculty are quoted in *China Daily*, the *South China Morning Post* and other media outlets throughout the pandemic.

**GHANA, NIGERIA** YSPH experts are quoted in stories about the pandemic.

**SAUDI ARABIA, IRAN** YSPH makes the Middle East press in stories about lockdowns and how to best prepare.

**MALAYSIA** *The Star* runs a story featuring a YSPH researcher on how social media can be used in the fight against the pandemic.

**NEW ZEALAND** New YSPH research on using saliva to test for COVID-19 infection is featured in the *New Zealand Herald*.

To see a fuller listing of YSPH media stories on the COVID-19 pandemic, go to [publichealth.yale.edu/coronavirus/](http://publichealth.yale.edu/coronavirus/)



A close-up photograph of a medical professional's face. The person is wearing a white surgical cap and a blue surgical mask. Their brown eye is visible, looking directly at the camera. The background is a plain, light color.

Yale Public Health  
60 College Street  
P.O. Box 208034  
New Haven, CT 06520-8034

Non-Profit  
U.S. Postage  
**PAID**  
New Haven, CT  
Permit No. 526