TOMORROW DEMANDS TODAY
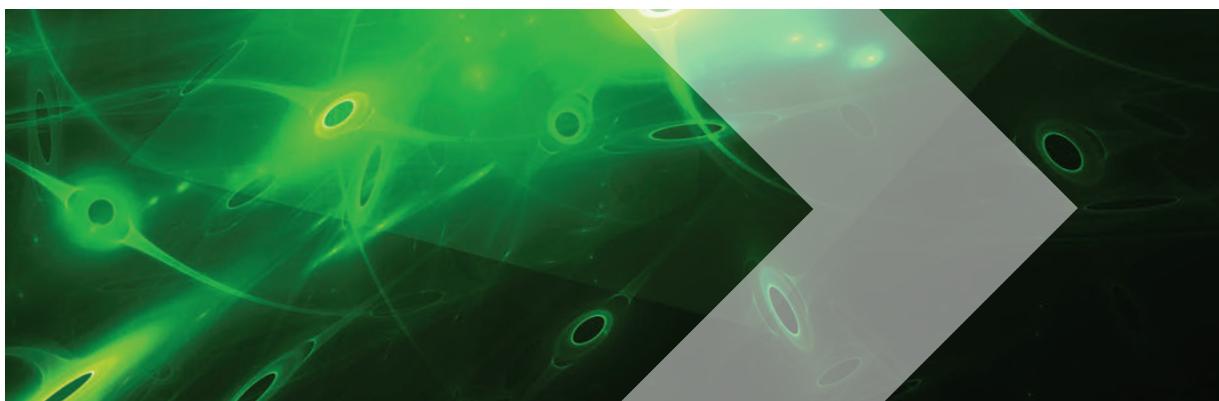
RAND
CORPORATION

THE RAND CORPORATION IS A RESEARCH ORGANIZATION THAT DEVELOPS SOLUTIONS TO PUBLIC POLICY CHALLENGES TO HELP MAKE COMMUNITIES THROUGHOUT THE WORLD SAFER AND MORE SECURE, HEALTHIER AND MORE PROSPEROUS.

TOMORROW
DEMANDS
T→DAY

At the beginning of 2020—before the COVID-19 pandemic changed the lives of people throughout the world, before the killing of George Floyd led to several months of sustained protest and civil unrest throughout the United States and abroad, before an unprecedented and ultimately violent 2020 U.S. presidential election and transition was fully underway—RAND launched its most ambitious fundraising campaign to date.

The turmoil notwithstanding, RAND not only pushed forward; we provided indispensable support to global policymakers on these and numerous other fronts. Moreover, these crises underscore the need for policy solutions in a world riddled with mistrust and an outright assault on truth. Tomorrow Demands Today: The Campaign for RAND is guided by RAND's mission—to help improve policy and decisionmaking through research and analysis—and focused on five priorities.

❱❱ Countering truth decay

"Truth decay" is the term we use to describe the diminishing role of facts and analysis in public life. As a nonpartisan institution that seeks to advance the public good through research and analysis, RAND is the only research institution that has already invested in an initiative to counter this grave, existential threat.

❱❱ Rethinking and retooling institutions

RAND aims to design a revitalized set of institutions to promote security, stability, and prosperity for the decades to come.

❱❱ Strengthening and safeguarding communities

In confronting such problems as social and economic inequity, climate change, and global health, RAND understands the need to solve these problems where people are already experiencing them firsthand—in local communities. By working at the front lines of need, RAND can pilot and refine practical tools and approaches that others can deploy right away.

❱❱ Leading a new era of problem-solving

The Pardee RAND Graduate School is an engine of new ideas and talent, is a vital platform for new tools and strategies, and deeply expands RAND's capacity to bring about positive change.

❱❱ Ensuring agility

Researchers must be prepared to address not only society's most challenging problems but also the emerging problems that arise and need immediate attention. This fifth priority was put to the test starting in March: Millions of dollars that RAND had already raised allowed our researchers to meet the urgent analytic needs of the COVID-19 pandemic rapidly and respond with agility to new research opportunities and evolving research priorities.

This annual report spotlights select research on critical topics we tackled in 2020: detecting online disinformation; deterring cyberattacks; countering violent extremism; strengthening critical health care systems; building back better through strategic and robust postdisaster recovery planning; improving law enforcement strategies for addressing homelessness; promoting civic development among students; and so much more. It also speaks to RAND's collective push for impact, and how philanthropic dollars are helping to make individuals, families, and communities throughout the world safer and more secure, healthier and more prosperous.

As always, we thank the clients, grantmakers, and donors who support our vision, make our work possible, and help us meet tomorrow's demands today.

MICHAEL E. LEITER | CHAIR, RAND BOARD OF TRUSTEES   MICHAEL D. RICH | PRESIDENT AND CHIEF EXECUTIVE OFFICER

CONTENTS

RESEARCH AND ANALYSIS

Each year, clients and grantmakers around the world turn to RAND for empirical, nonpartisan, and objective research and analysis, bringing us their most vexing and complex public policy challenges. RAND researchers pursue innovative solutions across a wide range of policy areas, including

Children, Families, and Communities

Cyber and Data Sciences

Education and Literacy

Energy and Environment

Health, Health Care, and Aging

Homeland Security and Public Safety

Infrastructure and Transportation

International Affairs

Law and Business

National Security and Terrorism

Science and Technology

Workers and the Workplace

On the following pages, we share research highlights from 2020. These projects demonstrate an approach to problem-solving that is founded on rigor and dedicated to advancing the public good.

AN EFFECTIVE APPROACH TO LEARNING FOR CHILDREN AND PARENTS

For nearly 60 years, a learning center in Pasadena, California, has worked to uplift some of the most disadvantaged families in its community, parents and children alike. Its story adds to a growing body of evidence that programs like these can make a real and lasting difference, researchers found.

The Families Forward Learning Center provides free care and education to infants, toddlers, and preschoolers who are mostly living below the poverty line and learning English as a second language. It also provides parenting and English classes to their mothers, among other supports.

The center asked RAND to assess its impact. In interviews, most of the mothers said their English had improved; so had their self-confidence and their ability to advocate for their children in school. Almost all said they were now more involved in their children's education, helping them with homework and reading to them.

The researchers also found that children who went through the program before kindergarten outperformed their peers on standardized tests in the third grade. The differences in their scores were "large and meaningful," the

researchers wrote—enough to make up some of the persistent gap in test scores between white and Latinx students.

It's possible that parents who enrolled in the program would have been more engaged in their children's education anyway. But the findings are in line with other studies that have shown promising results from such two-generation programs. Done well, parents and children both seem to benefit when learning becomes a family affair.

Learn more at www.rand.org/t/RRA358-1

> **In addition to the potential to improve children's learning, we found that mothers benefited from English and parenting lessons, social and emotional supports, and increased engagement in their children's education.**
>
> **JILL S. CANNON**
> senior policy researcher

INTEGRATING CAREGIVERS INTO THE HEALTH CARE TEAM

Tens of millions of Americans rely on family or friends to take care of them, to help them eat or bathe, to make sure they're keeping up with their medicines. Yet health care providers too often overlook those caregivers as the front-line partners they could be.

Fixing that could improve the quality of life of people living with chronic diseases or disabilities, and their caregivers. RAND researchers interviewed health care providers, insurance representatives, and caregiver advocates to find out what it would take to give caregivers a greater voice in patient care.

They found that hospitals and other health providers often fail to identify family caregivers as members of the health care team. Doctors don't always have the time, or the insurance billing coverage, to engage with caregivers. And caregivers can find themselves overwhelmed with information, trying to make sense of what one interviewee described as "health speak."

Health care providers should consider adding a field to patient records to identify any potential caregivers, to make that a standard part of patient intake. They should also invest in support programs for caregivers and expand access to care coordinators. Insurance companies are already moving toward payment models that value quality of care over quantity of procedures. That alone could encourage better integration of caregivers into formal health care teams.

Family caregivers are often better placed than any doctor or nurse to monitor the health needs of a loved one, moment by moment. The analysis, funded by Seniorlink and a gift from a member of the RAND Health Advisory Board, noted that their role will only become more important as the American population ages.

Learn more at www.rand.org/t/RRA105-1

> **Family caregivers too often are treated as secondary members of the care team, with little direct access to formal health care providers. We hope our research helps start a conversation about ways to better integrate them into the health care team.**

ESTHER M. FRIEDMAN
behavioral and social scientist

DIVERTING PEOPLE WITH MENTAL HEALTH NEEDS FROM JAIL

The Los Angeles County jail system doubles as the largest psychiatric hospital in the United States. On any given day, more than a third of the people there are in mental health housing units or taking psychotropic drugs—nearly 5,000 people in all.

Los Angeles, like hundreds of communities nationwide, has pledged to do more to keep people with serious mental illnesses from cycling in and out of jail. As a first step in its "care first, jail last" strategy, the county's Office of Diversion and Reentry asked researchers to determine how many inmates could be diverted into supportive housing or community treatment programs.

Researchers analyzed the criminal and clinical records of hundreds of jail inmates. They ruled out any who were facing serious felony charges or had serious crimes on their records. Then they looked for evidence of serious mental illness: a diagnosis, a prescription for psychotropic medication, or behaviors or symptoms that would point toward mental health problems.

They concluded that at least 61 percent of the people in the jail's mental health population at the time would be appropriate candidates for diversion. Put another way: More than 3,000 people in the jail could be better served elsewhere.

That's an "ideal world" scenario, the researchers noted—one in which the county has the treatment capacity to meet their mental health needs outside of the jail. It doesn't, and so the research findings give county leaders a goalpost as they scale up community treatment programs. Just three courtrooms currently handle hundreds of diversion hearings, for example; the county needs more than that if it wants to divert thousands.

The Los Angeles Board of Supervisors cited the project when it voted to close one of the oldest and most dilapidated jails in the system. The money spent on keeping up the Men's Central Jail, they concluded, would be better spent building up community care options and moving toward that goalpost.

Learn more at www.rand.org/t/RR4328

> **Knowing how many people are appropriate for diversion is a first step toward understanding the types of programs, staff, and funding that would be needed to treat those individuals in the community.**

STEPHANIE BROOKS HOLLIDAY
behavioral scientist

CYBER AND DATA SCIENCES

COMMUNICATIONS IN THE QUANTUM COMPUTING AGE

Future computers may be able to crack the encryption codes that protect private communications on the internet, from personal emails to business transactions. The United States has the time and the technology to meet the threat, RAND researchers found, but it must act now. Some organizations are already incurring risk.

The computers in question are known as quantum computers. To understand what's different about them, imagine that computers today process information in a sequential, black-and-white way. In that analogy, quantum computers can think in black, white, and every shade of gray in between, simultaneously. That will allow them to solve problems in seconds that a conventional computer would need years to work through.

> This is a significant, urgent security issue, and the consequences of failing to act to solve it would be devastating.

MICHAEL J.D. VERMEER
physical scientist

For example: the mathematical key codes that encrypt information on the internet. Experts polled by the researchers thought quantum computers could threaten that encryption by the mid-2030s. That would render existing encryption codes obsolete, making anything encrypted today, from online banking information to national security secrets, retroactively vulnerable in the future.

New, more-secure forms of encryption are under development. The federal government can advance that work by establishing encryption standards and encouraging businesses to adopt them as soon as possible, the researchers wrote.

The government also should raise awareness of the risk. As part of this project, the researchers surveyed hundreds of online consumers. They found low levels of concern for cybersecurity in general, much less possible cyber vulnerabilities in the future.

Congress appears to be taking the threat seriously. Members on both sides of the aisle have called for a comprehensive assessment of the risk from quantum computing, the progress of new encryption methods, and any funding shortfalls that could hinder that work. The need for such an assessment was one of the report's key recommendations.

Learn more at www.rand.org/t/RR3102

USING COMPUTERS TO HELP HOSPITALS LEARN FROM PATIENT COMMENTS

As they work to improve the patient experience, some health care providers have started asking for descriptive reviews of their services using a set of standardized questions. What went well? What do you wish had gone differently? How did you and your provider get along?

The answers can help guide hospitals to better care, from a patient's perspective—if administrators have the time to organize and read them. To help, researchers trained computers to process patient comments and look for actionable information that could guide hospitals to improve.

That can be a deceptively difficult task. There's nothing standard about a written comment; it's a mini-story, told in the patient's own words—what computer programmers call natural language. Extracting meaning from it requires advanced machine-learning algorithms and, typically, high-performance computers.

Instead, the researchers used ordinary laptops to demonstrate what health care providers might achieve without large investments in computing resources. They were able to train the computers to pull out themes that appeared frequently in the comments, such as doctor–patient communication.

The computers struggled with less-common themes, such as negative statements about a doctor's emotional rapport. It's possible that they would perform better with more training data, which would give the computer more exposure to infrequent but important themes like that. Further investments in computational infrastructure—such as cloud computing services or high-performance workstations—might also enable them to use more advanced algorithms.

The computers were not so reliable that they could process patient comments on their own. But the researchers showed that, with sufficiently sophisticated algorithms, they could help health care providers sort and prioritize comments for human review. That could provide a cost-effective way to learn from patient experiences.

The research was conducted as part of the Consumer Assessment of Healthcare Providers and Systems program, a research initiative of the Agency for Healthcare Research and Quality within the U.S. Department of Health and Human Services.

Learn more at www.rand.org/t/RRA628-1

> **The value of patient narratives is matched by the challenge of organizing, analyzing, and generating actionable insights from them. Even with limited training data, RAND's models contained useful insights that could help hospitals better understand, and respond to, patient experiences.**

OSONDE A. OSOBA
senior information scientist
codirector, RAND Center for
Scalable Computing and Analysis

DETECTING MALIGN AND FALSE INFORMATION

Russian internet trolls worked the far-right and -left margins of American politics in the runup to recent elections. Their words, researchers found, gave them away.

The researchers, with RAND and RAND Europe, trained sophisticated computer algorithms to recognize the linguistic tics of known Russian troll accounts. Then they fed nearly 2 million new tweets into the computers. They were able to pick out the trolls, and the online communities they were targeting, nearly 75 percent of the time.

The trolls tried to incite left-wing audiences with "outrage stories" of police brutality or social injustice, and appeals to immediate action with words like "right now" or "this moment." They leaned on liberals' concerns about fascism and racism.

On the right, the trolls pushed a narrative of perceived threats, with references to terrorism or destruction, and warnings about "the way we live." They depicted a United States under attack from outsiders, especially illegal immigrants and Islamic terrorists.

In short, the trolls imitated the most divisive and confrontational elements of the far-left and far-right wings of American politics. RAND's project, sponsored by the UK Ministry of Defence and based on tweets from the 2016 election, shows that it's possible to detect them in real time by using computers to search for word patterns. The researchers plan to use the same methods to hunt for trolls in the online discourse over Brexit.

Their approach could be used in the future to spotlight attempts at misinformation or manipulation as they come across the screen. It also could alert online communities to be careful and move slowly when there are trolls in their midst.

Learn more at www.rand.org/t/RRA519-1

> **Social media is being weaponized throughout the world. Our method can help make that visible to members of targeted publics.**

WILLIAM MARCELLINO
senior behavioral scientist

IMPROVING STUDENTS' MEDIA LITERACY SKILLS

Nearly 90 percent of the secondary school teachers in a RAND survey described the media habits of their students as unhealthy. Almost all said students routinely make false claims in class based on bad information from unreliable sources.

Taken together, those findings suggest schools could do more to prepare their students for the cacophonous media environment we live in. Being able to detect bias and separate fact from fiction are not just important life skills. They're also a necessary response to what RAND has called "truth decay"—the diminishing role of facts and analysis in American public life.

Researchers asked hundreds of social studies teachers for their front-line observations of how students use media and how schools can help them become better media consumers. More than 80 percent of the middle and high school teachers said they emphasize media literacy skills in their teaching. So did more than 60 percent of the elementary school teachers, who typically teach across all subjects.

Most of the teachers said learning to critically evaluate information for credibility and bias is a crucial citizenship skill. But it's one that students struggle with, especially when that information is online. Around three-quarters of the secondary school teachers, and about a third of the elementary school teachers, said students' limited ability to evaluate online information was a moderate or major problem in their classrooms.

Other surveys have found that as many as half of American adults struggled to discern what was real from what was rumor during the pandemic. Against that backdrop, the survey results point to an opportunity for schools to better prepare today's students to become the informed electorate of tomorrow. They should provide clear guidance about the importance of media literacy, and the expectation that students will graduate knowing not to accept every purported "fact" as truth.

Learn more at www.rand.org/t/RRA112-2

> **We're entering this pivotal moment where heightened use of media is happening at the same time there's growing distrust of government and other institutions. So there's a growing need for schools to focus on media literacy and civic development.**
>
> **JULIA H. KAUFMAN**
> senior policy researcher
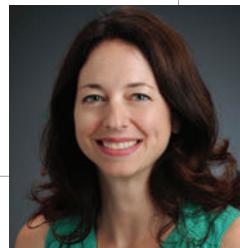
LESSONS FROM PROGRAMS IMPLEMENTING SOCIAL AND EMOTIONAL LEARNING

Between the reading, writing, and arithmetic, schools have started making a point of teaching students to understand and manage their emotions, to pursue positive goals, to play well with others. It's called social and emotional learning, and RAND researchers are studying what happens when communities make it a priority inside and outside of school.

Their research is part of a six-year project funded by The Wallace Foundation. Its purpose is to link schools with after-school activities, so they can work together to improve students' social and emotional development. Researchers interviewed hundreds of school and program leaders and instructors, and surveyed thousands more, to see how such a coordinated approach can work.

They found that the six communities funded by the foundation jumped into the project with ambitious plans for new activities and new partnerships. But they often ran into time constraints and confusion over program goals. Only one of the communities fully accomplished all that it wanted to in the first year.

With feedback from the researchers, they adjusted in subsequent years in ways that could smooth the path for other communities. They defined what "social and emotional learning" would mean for them, how they would incorporate it into school and out-of-school activities, and what success would look like. They hired managers to oversee the program, provided better training for teachers, and did more to communicate expectations and provide guidance.

The project provides the most comprehensive look to date at how communities can make social and emotional learning a part of the school day and beyond. Researchers are continuing to follow the six communities to see whether, and how, students benefit.

Learn more at www.rand.org/t/RRA379-1

> **Social and emotional learning has become ubiquitous in schools and out-of-school time programs across the United States in recent years. Our report provides some much-needed details and lessons about what it takes to implement it effectively.**

HEATHER L. SCHWARTZ
senior policy researcher
director, Pre-K to 12
Educational Systems Program

A POSTDISASTER RECOVERY PLAN FOR PUERTO RICO

Puerto Rico's water sector was already underfunded and overburdened when back-to-back hurricanes, Irma and Maria, hit the island in 2017. Millions of residents lost drinking water; sewage treatment plants were forced offline; and a major dam threatened to give out.

The Federal Emergency Management Agency (FEMA), a component of the U.S. Department of Homeland Security, asked researchers to assess the damage and recommend a path toward recovery. Working with local and federal officials, they identified nearly $34 billion in projects to repair—and reshape—Puerto Rico's water sector.

Those include an overhaul of the pipes and plants that deliver the island's drinking water; improvements to its wastewater treatment plants; and urgent repairs to its dams and levees. The slate of projects would address Puerto Rico's immediate needs but also make its water sector safer, more reliable, and more resilient for the long term. Researchers described it as transformational.

The government of Puerto Rico agreed, and adopted the full project list as its plan for the recovery. To cover the costs, researchers identified potential funding sources for each of the 30 projects and courses of action on the list. Most would come from FEMA or other federal agencies, hazard-mitigation grants, and insurance payments for hurricane damage.

The water report was one of more than a dozen that researchers with the Homeland Security Operational Analysis Center prepared to guide the recovery. Taken together, the reports provide a road map to rebuild, and reimagine, the island's housing stock, labor market, schools, roads, and health care system, among other sectors. They formed the basis for a congressionally mandated vision of what Puerto Rico's post-hurricane future should look like.

Learn more at www.rand.org/t/RR2608

> **The 2017 hurricanes revealed critical vulnerabilities in Puerto Rico's water sector. But they also highlighted opportunities to improve water systems and enhance their resilience to future natural disasters.**

BENJAMIN LEE PRESTON
senior policy researcher
director, RAND Community
Health and Environmental
Policy Program

POWER PLANTS IN THE AGE OF CLIMATE CHANGE

American power plants need to prepare for the extreme conditions they will encounter with a changing climate. Otherwise, researchers found, they could struggle to maintain production by mid-century.

The researchers modeled thousands of future climate scenarios to see how power plants would perform under different conditions. Their project, a collaborative effort with researchers at three universities and RAND, was funded by the National Science Foundation and the National Oceanic and Atmospheric Administration in the United States.

Power plants use coal or natural gas to heat water into steam, which then pushes the turbines that generate electricity. Some plants only use the water once. Others cool the water down to reuse it, often by circulating it through open air cooling towers; or, less often, by running it under huge fans.

Climate change could slow that process by raising the air temperature and humidity, researchers found. That would reduce how much energy a plant can generate, likely on the same hot days when demand would be high. Plants that use cooling towers will be especially vulnerable east of the Rocky Mountains, where humidity will be highest. Plants that use cooling fans will struggle more in parts of the dry-heat Southwest, where temperatures will be higher.

But the researchers found that well-designed plants with effective cooling systems should be able to weather shifts in climate, at least for the next few decades. Their findings underscore the critical importance of considering climate change as older plants reach the ends of their useful lives and need to be replaced. Engineers need to allow for a much wider range of operating conditions, and a new definition of what peak temperatures could mean.

Learn more at www.rand.org/t/EP68308

> **Climate change is unlikely to threaten the generating capacity or efficiency of power plants in most locations, so long as their cooling systems are designed adequately. That really is going to drive the degree of climate change impact that we see in the power supply.**
>
> **KELLY KLIMA**
> engineer
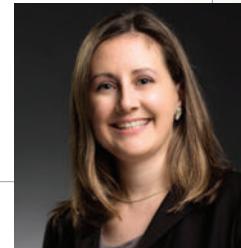
HELP FOR HOSPITAL AND CRITICAL CARE SYSTEMS DURING THE PANDEMIC

As COVID-19 exploded into a global pandemic, RAND researchers raced to develop a tool to help hospitals prepare for the worst, and to stretch their space, staff, and supplies when it came. They gave themselves 21 days to get it done.

Working with the American College of Emergency Physicians, the researchers surveyed hundreds of front-line clinicians about the challenges they were facing: shortages of testing kits, protective masks, isolation rooms. Then the researchers convened two conference-call roundtables with emergency doctors and preparedness experts to strategize how to create more critical care capacity in the nation's hospitals.

The tool they created looks like a spreadsheet. Hospitals, health systems, and even entire regions can input their own numbers—beds, doctors, ventilators, nurses—to see how many patients they can treat. From there, they can model increasingly drastic changes they could make to accommodate more patients if they get hit with a surge.

They could, for example, convert operating rooms to intensive-care suites, or call in anesthesiologists to help with critical care. As the assumptions change, the tool identifies any bottlenecks that form downstream. If they bring in more doctors and nurses, for example, but don't have enough ventilators, then that becomes the limiting factor that determines how many patients they can accept.

The tool went live on the 21st day. It was the first piece of research RAND published in response to the pandemic; it came out in early April 2020, before some states had even issued stay-at-home orders. The tool, with an accompanying report, was downloaded from RAND's website thousands of times in the first few weeks. The American Hospital Association recommended it as a resource for its members as COVID case counts soared.

📑 Learn more at www.rand.org/t/RRA164-1

> You need three things to predict a hospital's critical care capacity: space, staff, and stuff. It's not enough to have just one or two; you need all three for every patient you're going to take care of. I knew from my own experience that, at the epicenter of a surge, that would be one of the biggest challenges, and one area where we could help.

MAHSHID ABIR
senior physician policy researcher

MAINTAINING CLINICAL PROFICIENCY OF ARMY MEDICAL PERSONNEL DURING PEACETIME

U.S. Army doctors and nurses serve two distinct missions. At home, they provide day-to-day medical care for soldiers, their families, and retirees. In theater, they might race to save lives from combat injuries more grievous than anything they would see at a domestic trauma center, let alone at the hospital or clinic at their home base.

The Army asked RAND Arroyo Center to examine how it can better maintain the combat readiness of its medical personnel, especially as the United States draws down its forces in Iraq and Afghanistan. Researchers interviewed dozens of Army doctors, surgeons, physician assistants, and nurse practitioners, many of whom reported gaps in their readiness.

Few Army doctors get the practice and experience they need to keep up their trauma skills, with only one Army hospital in the United States designated as a Level I trauma center. Many practice specialty care in garrison, and are not accustomed to providing the general sick-call care they would need to provide to soldiers in the field.

The Army provides training sessions for medical providers who are about to deploy, but RAND found that most surgeons and other physicians deploy without taking them. Because deployments can happen with little notice, the Army should consider expanding that training and making it routine, not just something doctors do right before they deploy.

It also should increase ways to get its providers more hands-on experience at domestic trauma centers, such as through training partnerships. The researchers also recommended that the Army build a system to better track the training and experience of its medical providers, a step toward readiness that the Army has since taken.

Learn more at www.rand.org/t/RR2543

> **As operating tempo decreases and time goes on, experienced providers will leave the service and be replaced with newer providers without wartime experience. The Army needs to ensure they are ready to care for the most critically injured trauma patients on day one of their deployments.**
>
> **EDWARD W. CHAN**
> senior operations researcher

ADAPTING TO LIFE-LIMITING ILLNESS

As they near the end of life, people with terminal illnesses must navigate the loss of their physical health and ability, but also the loss of who they were and the roles they played when they were healthy.

Their loved ones also have to absorb those losses, but existing clinical models have not looked deeply at how those relationships evolve and endure. That's an important gap to fill, because clinicians might be missing opportunities to help patients and their loved ones face those progressive losses together.

Researchers from RAND and several medical schools started looking at how end-of-life patients and their spouses, caregivers, or other life partners adapt to loss as a team. They had already developed a model to help individual patients move through stages of adjustment; now they expanded its focus from "I" to "we."

Their new model starts with comprehension, a shared understanding of what is to come, how it will impact each person differently, and how it will redefine the relationship. Next comes creative adaptation, as roles change and both members of the relationship learn to live with the new realities. Finally, reintegration, as they incorporate those changes into their daily lives and reimagine what the relationship can be in the time they have left.

The steps are well marked, so clinicians can identify where each person is on the journey. That also gives them entry points to intervene. They can help one or both move toward acceptance of end-of-life losses, both physical and emotional, and a healthy adjustment to what is still possible. They can, in the end, help both members of the team find new meaning in their closest relationship.

Learn more at www.rand.org/t/EP68209

> **Each person adjusts to end-of-life losses both individually and in context of his or her closest relationships. Our model shows how people can adjust and move forward by incorporating such losses into their newly adapted relationships.**
>
> **SANGEETA C. AHLUWALIA**
> senior policy researcher

THE CYBER THREAT FROM DRONES

Drones are fast becoming a critical cybersecurity risk—as potential targets of attack, or potential tools. RAND researchers studying the threat for the U.S. Department of Homeland Security (DHS) warned that cyber defenses are not ready for hacker drones.

In one experiment, for example, scientists flew a drone close enough to the smart light bulbs in an Israeli office building to tap into their network. The drone was able to take control and make the lights blink SOS in Morse code.

A more powerful drone could fly over a city block, scan it for vulnerable Wi-Fi networks, and use them to launch an untraceable cyberattack across many systems and networks. As drones become cheaper, more available, and more autonomous, an attack like that would be hard to detect, much less deflect.

That's one side of the threat. The other is drone as target. Security consultants have shown that they can take remote control of even professional-grade drones, such as those used by law enforcement. And DHS has limited options for stopping a rogue drone. American law treats drones as equivalent to manned aircraft in some cases, so they cannot always be intercepted or overridden.

The dual nature of the drone risk has not gotten enough attention, the researchers concluded. DHS should establish security standards and engage with drone manufacturers to make sure they are mitigating any vulnerabilities in their systems. At the same time, it should ensure its own networks are secure enough to fend off any drone-initiated cyberattack.

It should also consider putting its own drones into the air around sensitive locations, the researchers wrote. Those "guard dog" drones could chase away drones acting under malicious control—or drones attempting to assert malicious control themselves.

Learn more at www.rand.org/t/RR2972

> **Cyberattacks on drones could undermine critical law enforcement or data collection missions. But, in the hands of adversaries, drones themselves could serve as cyber weapons to deliver malicious content or even physical attacks.**

KATHARINA LEY BEST
operations researcher

IMPROVING LAW ENFORCEMENT STRATEGIES FOR ADDRESSING HOMELESSNESS

American police need better policies and partnerships to address a problem that has become theirs by default: homelessness. Many departments don't even have a working definition of what homelessness means, much less data on what works to get people off the streets.

Researchers from RAND and the Police Executive Research Forum convened a workshop to explore how police could better protect and serve people experiencing homelessness. Their work was part of a multiyear collaboration sponsored by the National Institute of Justice (NIJ)—the research, development, and evaluation agency of the U.S. Department of Justice—to identify technical and policy options to improve criminal justice.

The officers and experts at the workshop noted that police have become first-call responders to the nation's homeless problem. Yet they are not well-equipped to address the underlying needs of people experiencing homelessness, beyond giving them a ride to a clinic or to jail.

Workshop participants identified 40 strategies that would make the police response more effective. Among the top-ranked ideas: Develop best practices for clearing encampments; explore ways to fund social-service partnerships; and identify any gaps in the local behavioral health system. Police also need a consistent definition of homelessness as a first step toward gathering better data and staying ahead of any trends.

The NIJ, acting on those findings, plans to fund a two-year, $1.5 million assessment of existing law enforcement and community programs to respond to homelessness.

Police can't do it alone. They need to collaborate with other government agencies, social service providers, and community leaders to keep people experiencing homelessness from cycling in and out of the criminal justice system. To be effective, they also need to work more closely with advocates and people who know what homelessness is from their own lived experience.

Learn more at www.rand.org/t/RRA108-6

> **Many communities have over-relied on police as a response to complaints about homeless impacts on sidewalks, streets, and neighborhoods. We're starting to see a shift away from traditional police approaches and an increased emphasis on homeless services that are more tailored to the needs of homeless individuals.**

DULANI WOODS
quantitative analyst

A NEW TOOL TO ANALYZE AIR TRAVEL INVOLVING PASSENGERS INFECTED WITH COVID-19

As the coronavirus began its worldwide sprint to pandemic status, the numbers coming out of China seemed manageably low. On a single day in mid-January 2020, for example, the Chinese government reported a total caseload of just over 500 infections.

Air travel data and some basic arithmetic suggest it was off by around 3,700 percent.

RAND researchers paired coronavirus case numbers with detailed travel information to track the spread of coronavirus infections around the world. Their model uses the rate of confirmed infections in a country to estimate how many international travelers from that country may have carried the coronavirus with them. The project was sponsored by the Office of the Secretary of Defense and the U.S. Air Force.

In the early days of the pandemic, for example, China's official numbers suggested a daily average of around one active case for every 8.2 million residents. Far fewer than 8.2 million Chinese people flew to Japan, Thailand, South Korea, the United States, and Taiwan during that time period, so the number of cases exported from China should have been less than one. Yet every one of those countries traced new infections to Chinese travelers.

The odds of that happening if the infection rate in China were really so low is around one in 1.3 million. To even those odds, researchers calculated that China must have had around 18,700 infected people by January 22, some of them still flying. The total number it reported that day: 503.

RAND's COVID-19 Air Traffic Visualization tool also showed that outbreaks in the Persian Gulf likely started with travelers from outside of the region—

not with Iran, as had been thought. Separately, it showed that countries with low infection numbers, such as South Korea, could still pose a significant risk if they had high numbers of international travelers.

As the United States and the world manage their reopenings, insights like that can help policymakers weigh the risks—and take steps to prevent another surge of infections from taking flight.

Learn more at www.rand.org/t/RRA248-1

> Given air travel data and reported infection rates, our tool can be used to estimate future patterns of COVID-19 transmission. Policymakers, analysts, and others can estimate the impact of travel-related policy interventions, such as restricting air travel from various countries.

RUSSELL HANSON
research software engineer
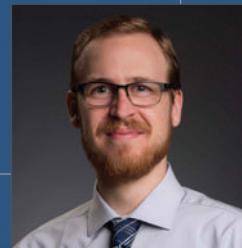
DETERRING PHYSICAL AND CYBERATTACKS AGAINST THE U.S. POWER GRID

As it becomes more automated and complex, the U.S. power grid also becomes more vulnerable to cyberattack. That presents a significant risk to one of its major customers, the U.S. military.

Most of the electricity used on domestic bases comes from the same commercial supply that powers everyone else. RAND developed a framework to help the military consider ways to deter an attack, even though it neither owns nor operates the power system it relies on.

The military's first option is to strengthen the grid against a potential attack. That could mean investing in backup generators or pushing for tougher regulations—anything that reduces the odds that an attack will succeed. Those investments would also improve the grid's reliability in the face of such non-cyber threats as climate change and aging infrastructure.

Its second option is to make clear that any attack on the grid will not go unpunished. International law and existing cyber norms are not clear on how a nation can retaliate for a cyberattack. Clearing up that uncertainty and establishing clear guidance on when and how the United States would respond to an attack on the grid would provide stronger deterrence. But the ability to identify where an attack came from, and who is responsible, remains a key challenge that the military needs to invest in solving.

The two approaches are not an either/or decision. The military should pursue a mix of both to protect one of its most important outside-the-fence resources. As it becomes more automated and complex itself, ensuring ready access to electric power will only become more critical to its mission.

Learn more at www.rand.org/t/RR3187

> **One key problem here is attribution. It can be hard to pinpoint the bad actor in a cyberattack. But that really determines what levers you can pull under international law.**

ANU NARAYANAN
senior engineer

VACCINE NATIONALISM

The world economy will continue to lose billions of dollars every month until the lowest-income countries are able to vaccinate their people against COVID-19. By some estimates, that might not be until well into 2022.

Researchers developed an economic model of world trade to explore the potential costs of "vaccine nationalism." That's when wealthy nations like the United States or United Kingdom corner the market on vaccines, striking deals directly with vaccine makers, hoarding supplies, and leaving poorer countries out.

But the world economy is so hyperconnected that it will not fully recover until every country is able to bring the virus under control. The researchers looked at what a "my nation first" approach would mean to five sectors that have been hit especially hard by COVID-19 precautions: hospitality, recreation, retail and wholesale, transportation, and health.

The global loss to those sectors alone could exceed $150 billion a year until vaccines reach the world's poorest countries. Wealthy countries would take a direct economic hit from the continued slowdown in economic demand and from supply-chain disruptions. The United States, for example, would lose between $6 billion and $30 billion a year. The United Kingdom would lose as much as $10 billion a year, and the European Union would lose up to $78 billion.

That makes a strong business case for wealthier nations to help expand the reach of the vaccines. By one estimate, it would cost around $25 billion to procure and deliver vaccines to the poorest countries. At that rate, every dollar invested in the effort would save between $1.90 and $12.60 for the world economy.

Learn more at www.rand.org/t/RRA769-1

> **Timing is an important factor here. As long as poorer countries do not have access to the vaccines, the potential economic costs to the world economy—and to wealthier countries individually—will continue to rise.**

MARCO HAFNER
senior economist
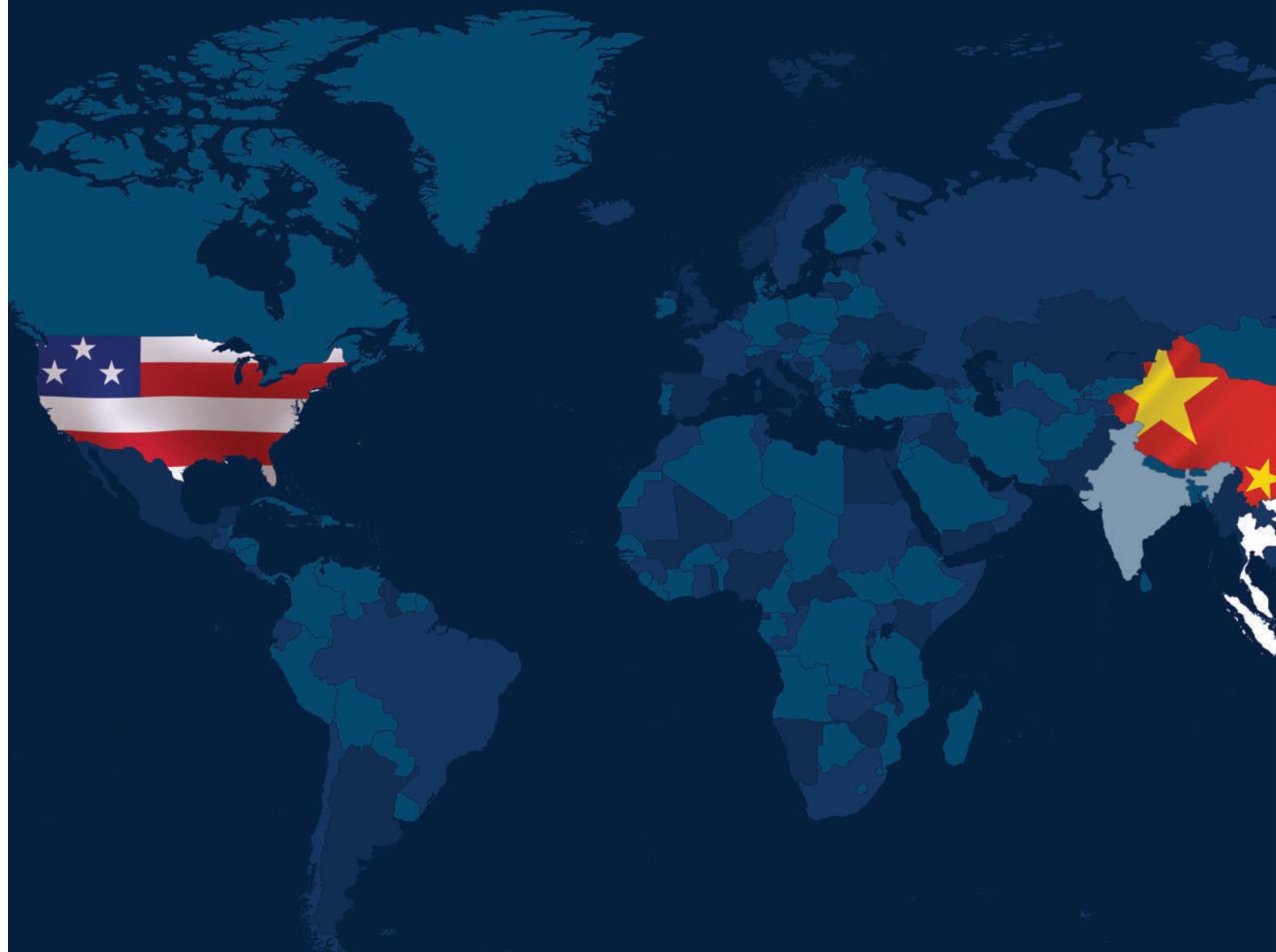
U.S.–CHINA COMPETITION FOR INFLUENCE IN THE INDO-PACIFIC

Six countries in southeast Asia could help tilt the balance of power between the United States and China. RAND researchers developed a framework for the U.S. Air Force to better assess how those countries view the United States, China, and the competition between them.

Its key measure is influence—diplomatic, military, and economic. The researchers interviewed scores of government officials and experts to see which side is winning the struggle for hearts and minds in each of the six countries: Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam.

They found that those countries generally consider the United States to be the dominant military power in the region, and most prefer its vision of a free and open Indo-Pacific. All but Thailand view China as a military threat—but all of them also see more economic opportunity from China. And China, for one, believes economic influence is the "center of gravity" in its competition with the United States.

The framework shows that the United States has more overall influence than China in Singapore and the Philippines. It has less in Malaysia and Vietnam. It has more to gain in Indonesia, and more to lose in Thailand.

The Air Force should consider increasing its engagement and security cooperation with countries in the region, especially those leaning toward China. It also should work more closely with Japan, Australia, and India, three regional powers that the study found all align strongly with the United States. But it also should avoid any actions that could be seen as forcing the six countries into its corner. Caught in the middle of a great-power competition, none of them is eager to pick sides.

Learn more at www.rand.org/t/RR4412

> **The United States has more shared interests with countries in the region, but China has more capability and willingness to incentivize or punish countries to align with its interests.**

BONNY LIN
political scientist

A NEW APPROACH TO DIPLOMATIC RELATIONS WITH NORTH KOREA

Twenty years of failed diplomacy have left North Korea with a nuclear arsenal and the missiles to deliver it to the United States. Researchers analyzed what went wrong in previous rounds of negotiations, and then developed a way forward that would avoid those old mistakes. The project was funded by the Korea Foundation.

The result is a new approach to North Korea that brings in more voices, sets clearer expectations, and might be enough to finally break the impasse. The researchers described it as the Portfolio Method.

It starts with both sides agreeing on the goals they want to accomplish before they even sit down at the negotiating table. It focuses on hard commitments, with action plans and time lines—the partial dismantling of the Yongbyon nuclear facility, for example, rather than a vague promise to "denuclearize." Then it groups those commitments into portfolios, so that every concession can be offset by benefits.

A possible portfolio could balance the dismantling of Yongbyon with an agreement from the United States and South Korea to scale back military exercises. It could also include some infrastructure aid and sanctions relief as further inducements to North Korea, as well as the opening of informal communications channels and cultural exchanges. The format, trading specific action for specific action, with verification at every step, would help build trust along the way.

The process would involve other countries from the start, especially China and South Korea, to build up the international support that previous efforts have lacked. It also would involve internal stakeholders who could make or break any deal, such as U.S. congressional leaders or North Korean elites.

There are few, if any, win–win solutions in international diplomacy. But it should be possible to craft win–win portfolios, even between the United States and North Korea. After 20 years of stalemate, that might be enough to get negotiations moving again.

Learn more at www.rand.org/t/RRA432-1

> **This approach explicitly addresses the reasons for past failures; reflects stakeholder goals and priorities; and covers the diplomatic, economic, and security domains. It offers a promising way forward in negotiations with North Korea.**

RAFIQ DOSSANI
senior economist
director, RAND Center for
Asia Pacific Policy
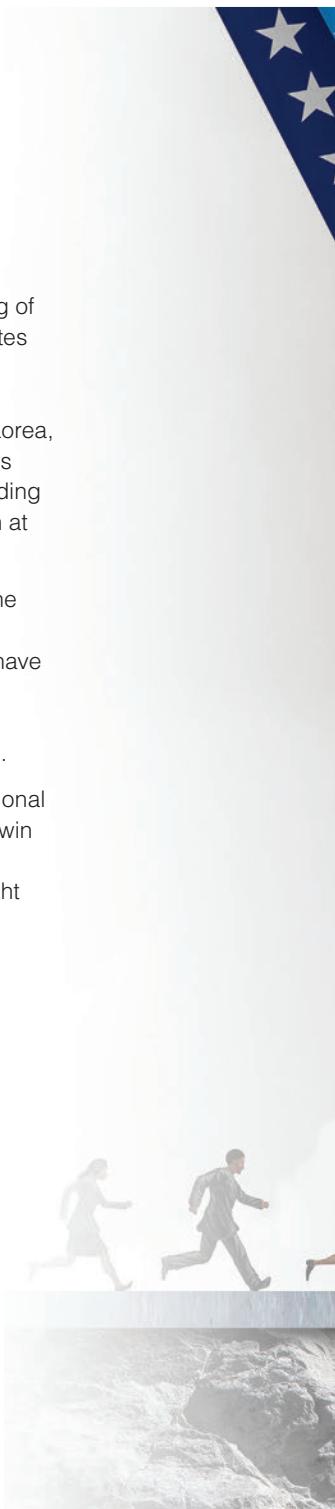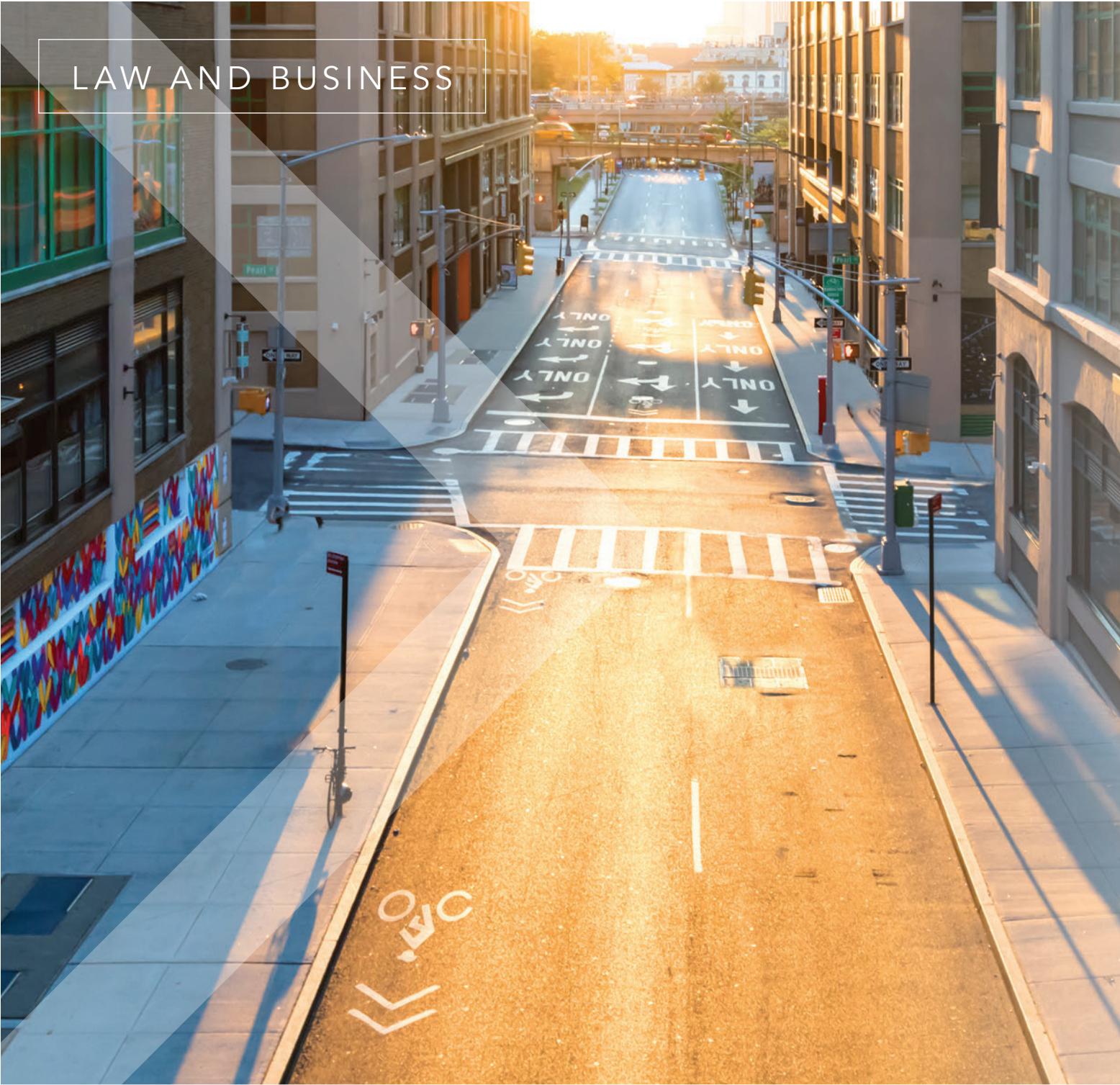
SHOCKS IN THE U.S. ECONOMY

The world financial crisis of 2008 provided a multitrillion-dollar lesson in what happens when banks that are too big to fail, fail. Few policymakers stopped to ask whether companies in other sectors might pose the same kind of systemic risk to the economy.

RAND researchers thought they might. They developed a computer program to search hundreds of thousands of corporate filings and map the connections between firms in a way no one ever had. When they were finished, they had a model of the economy that looked like a cloud of interconnected dots on a page, with a very dense center.

Most of the companies had only a handful of critical connections. But those at the center of the cloud had hundreds. A shock to one of those companies would ripple outward to its customers and suppliers, and then to their customers and suppliers, spreading through the economy like a contagion.

To test that, the researchers simulated a 1-percent shock to each of the top 1,000 companies by revenue, roughly equivalent to the disruption a major storm might cause. They found that a 1-percent hit to Amazon would cost the U.S. economy $77 billion as it spread. A similar disruption at Comcast would cause $65 billion in total losses. If anything, those companies have only grown larger and more central to the economy during the pandemic.

Banks and other financial institutions did appear at the center of the dot cloud. But so did tech and telecommunication companies, retailers,

and insurance carriers. A shock to internet service providers would have an especially disproportionate impact as major companies lost their websites.

The results suggest the old definition of what counts as too big to fail isn't broad enough anymore. Economists and policymakers need to start looking at companies that are not just too big, but too connected.

Learn more at www.rand.org/t/RR4185

> **When we started looking at the network data, it was obvious that there are other firms, outside of finance, that are quite central to the economy. That's a different narrative than what we've been hearing for more than a decade, and it's something that really deserves policy attention.**

JONATHAN WILLIAM WELBURN
operations researcher

OPIOID LITIGATION AND PUBLIC HEALTH

Opioid suppliers, like tobacco companies and the makers of lead paint before them, face a courtroom reckoning for the devastating consequences of the products they sold. Their liability could run into the tens of billions of dollars.

The courts are often considered an imperfect last resort when policy and regulation have failed. Opioid litigation shows the courts can help achieve three important objectives for public health, even before the gavel falls: compensation, deterrence, and accountability.

Thousands of local, state, and tribal governments have filed suit, seeking at least some restitution for the damage opioids did to their communities. Their lawsuits have brought to light evidence of corporate malfeasance and a massive failure of regulation. The litigation has influenced several companies to shift from mass marketing opioids to developing new products that cannot be abused so easily.

Most of the companies have not admitted responsibility for the opioid crisis. But the courtroom headlines alone have helped hold them accountable in public opinion. The litigation also has prompted increased government scrutiny and regulation, which can deter harmful company practices going forward.

A global settlement of the opioid lawsuits should build on the lessons learned in courtroom battles over tobacco, lead paint, and asbestos. It could require companies to invest in developing new, less-addictive therapies, and to earmark money for addiction treatment and overdose-reversing drugs. It also should require a clear admission of fault from the opioid companies if they broke the law, and transparent reporting of court records and settlement terms.

No settlement or judgment can address the full scope of loss caused by the opioid epidemic. But, if wielded effectively, the litigation can supply the funds and corporate reforms needed to help abate it.

This analysis was supported by the National Center for Advancing Translational Sciences of the National Institutes of Health and the Centers for Disease Control and Prevention, both part of the U.S. Public Health Service.

Learn more at www.rand.org/t/EP68232

> **Prominent litigation campaigns related to tobacco use, food consumption, lead paint and asbestos exposure, and firearms have met with mixed success. Opioid litigation represents the latest surge in public health litigation. It does hold the potential to help ameliorate some, though certainly not all, opioid-related harms.**
>
> **REBECCA LEE HAFFAJEE**
> policy researcher
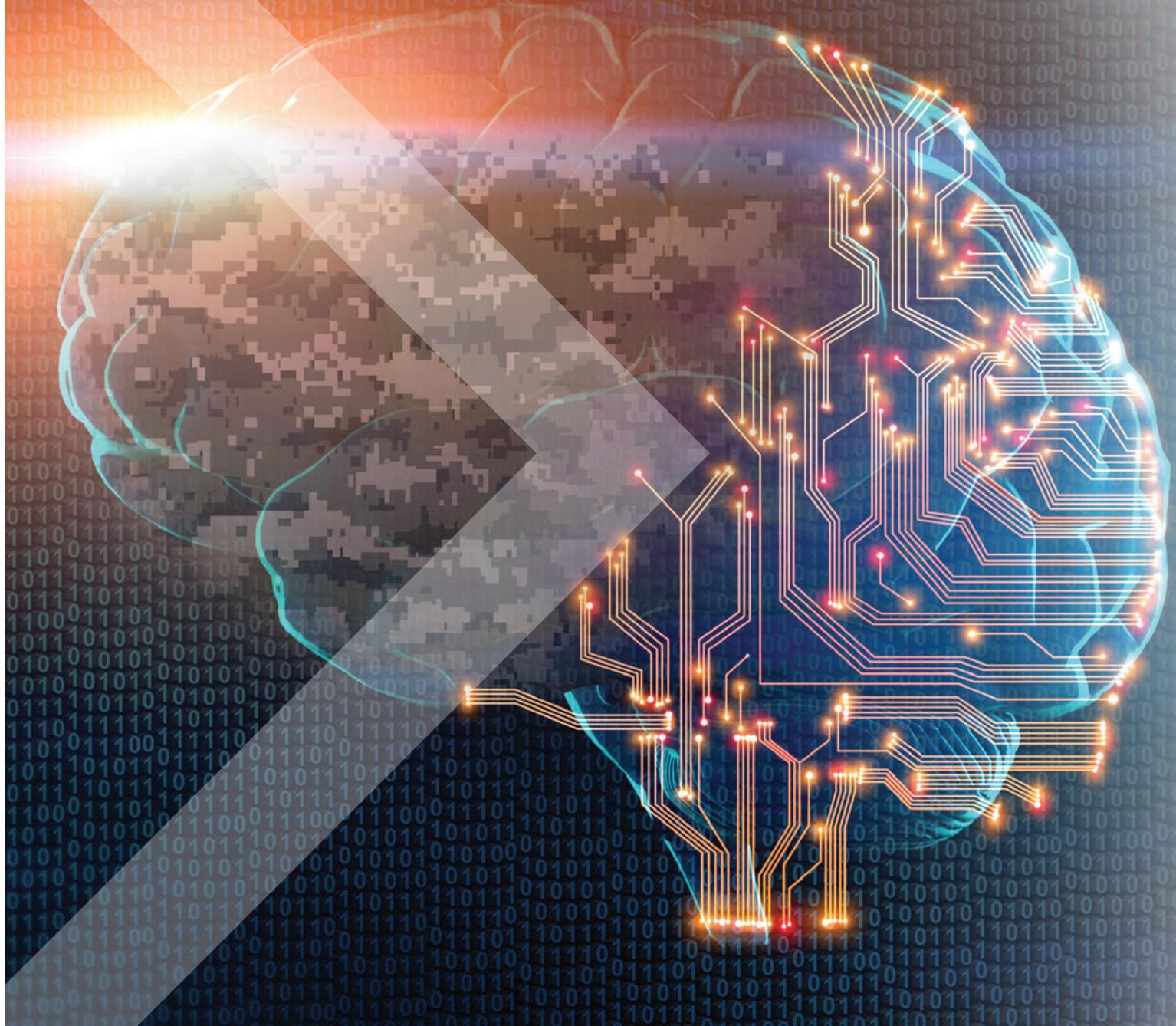
MILITARY APPLICATIONS AND IMPLICATIONS OF BRAIN–COMPUTER INTERFACES

The U.S. military has started to put real research funding into the idea that future fighters may be able to engage machines with their minds. It may sound less like science than fiction, but researchers found the technological challenges might not be the biggest obstacles to making it happen.

Scientists have already developed electrodes that can read brain signals and translate them into commands for a drone in flight. Amputees have used brain–computer interfaces to control a mouse point with their minds.

In the future, that kind of technology could enable soldiers to communicate directly with surveillance drones or to control battlefield robots without using their hands. Computer implants could allow them to take in more information than their five senses provide, or to communicate with their team members without saying a word.

To test what that might look like, RAND researchers invited experts—including neuroscientists and combat veterans—to play a tabletop wargame. The players were given a scenario—clearing a building, surviving an ambush—and asked to think through what human–computer capabilities they would want on the ground.

Their technological wish lists included computer-enhanced information processing, improved physical performance, and direct mind control of drones and other machines. But all of those came with some big asterisks.

Players questioned whether brain signals could be jammed or intercepted in the blur of war. They worried that decisions made at computer speed could outrun moral and ethical considerations. And they doubted that future enlistees would consent to link their brains to computers unless the technology had been tried, tested, and adopted in the civilian world first.

Those concerns should guide the development of brain–computer technologies going forward. The risks are significant, but they have not received enough attention. The military and other funders should make sure the need is driving the demand for such technology, and not the other way around.

Learn more at www.rand.org/t/RR2996

> **Neurotechnologies could profoundly alter the human experience, in the military as well as civilian realms. Our analytical platform provided original insights into this emerging area, and has generated interest from domestic and international stakeholders.**
>
> **ANIKA BINNENDIJK**
> political scientist
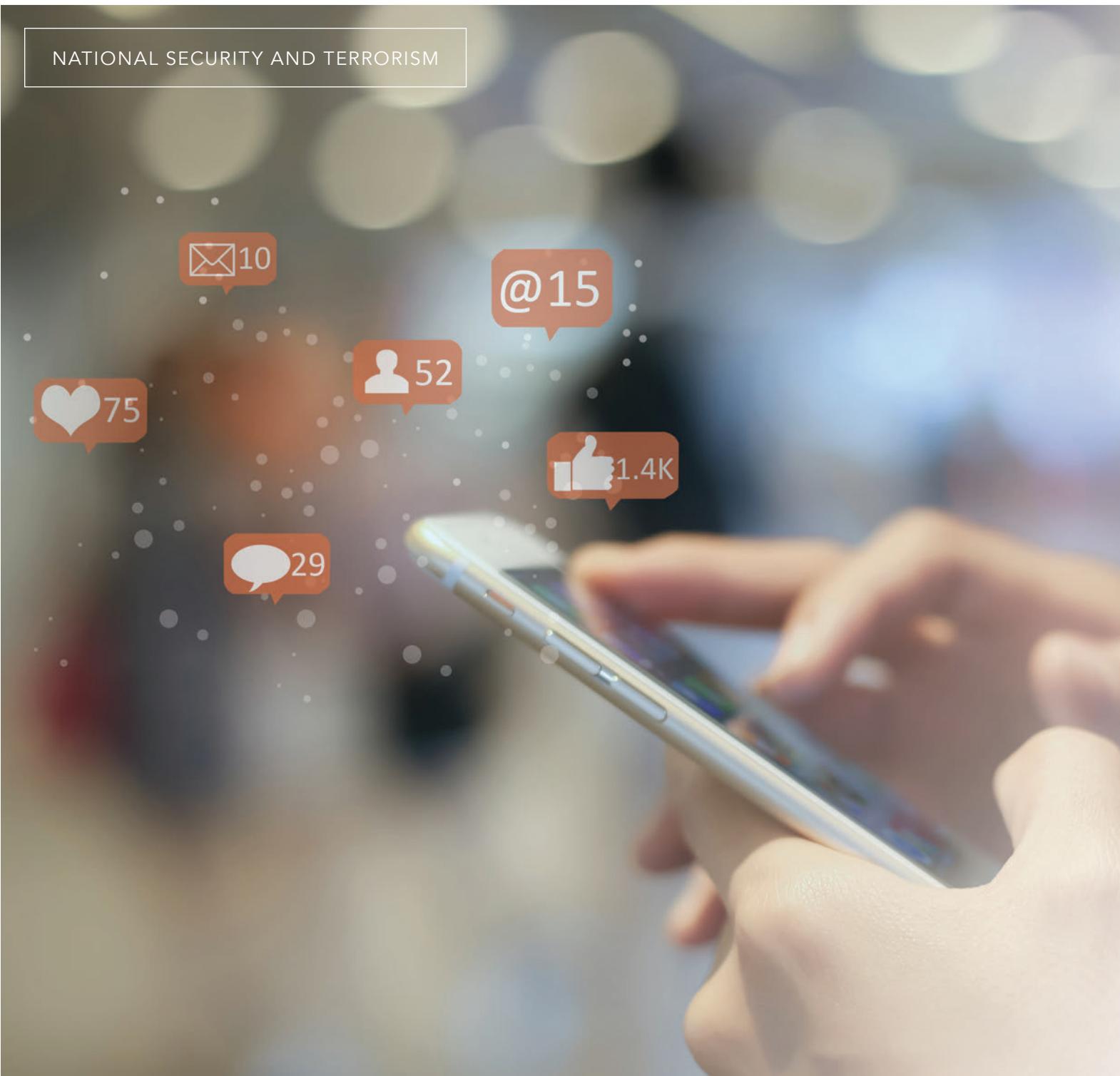
A SOCIAL MEDIA CAMPAIGN TO COUNTER VIOLENT EXTREMISM

Extremist groups have become expert at using social media to spread their messages of hate and violence. RAND researchers tracked hundreds of young Facebook users in Indonesia to better understand how anti-extremism campaigns are fighting back online.

Similar campaigns on the radio in Africa have succeeded in turning people away from violent extremism. But no major studies had rigorously tested whether online messages could have the same impact on attitudes and behaviors.

The Global Engagement Center at the U.S. Department of State asked researchers to assess an online campaign it was funding in Indonesia. The campaign's purpose was to appeal to the silent majority of young Indonesians who oppose intolerance and bigotry. It sought to amplify their voices with two hashtags: #AkuTamanmu ("I am your friend") and #CapekLakSih ("Aren't you tired" of online hate and division).

Researchers recruited more than 1,500 young people on Facebook to participate. They assigned half to view campaign images and videos in an online survey. The other half, the control group, saw ordinary retail or entertainment ads and public-service announcements.

Those who saw the hashtag posts were able to identify the intended messages of diversity and peace. They also rated the content highly. But the researchers found no clear changes in their attitudes, except for a troubling shift in favor of segregated communities. They did find a small but significant improvement in attitudes against violence among more rural users, those outside Java.

It's possible the online messages put people on the defensive by raising uncomfortable issues and forcing them to question their beliefs. It will be important to guard against that "boomerang effect," the researchers wrote, as groups take the fight against violent extremism online.

Learn more at www.rand.org/t/RRA233-1

> It is critical to develop strategies and efforts to reduce the lure of extremism, in Indonesia and elsewhere. Among other threats, there are concerns that the Islamic State will seek to increase operations in Southeast Asia to compensate for its losses in the Middle East.

ELIZABETH BODINE-BARON
senior information scientist
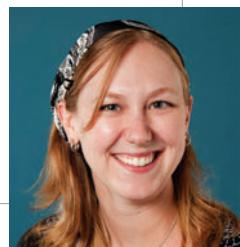
OUR BODIES, OUR CYBERSELVES

A new generation of personal technology is increasingly connecting human health—and even, in some cases, human bodies—to the internet. There are dangers here, of course, as RAND researchers found when they explored the emerging "Internet of Bodies." But they also highlighted the life-changing, life-saving potential of devices that know us inside and out.

Their project included any devices that collect health or biometric information or alter human function in some way. To make the list, a device also needed to transmit information over the internet, on its own or through another device like a cell phone.

That definition encompasses fitness trackers, electronic hospital records, even some employee badges—but also brain implants, artificial pancreases, and smart stents that can monitor themselves for blood clots.

All of those devices tracking our health and behavior will provide a treasure trove of new data about what keeps people healthy and what makes them sick. That will advance our understanding of long-term population health and point the way toward more-effective public health interventions.

But realizing those benefits will require managing the clear risks that such technology presents. Any device can be hacked, for example; and devices that live with us could create new threats to privacy and security. Yet the researchers found only a patchwork of regulations and consumer protections that might govern the Internet of Bodies and avert its potential harms.

Congress should consider establishing some national ground rules for data transparency and privacy, the researchers concluded. Consumers need to be more aware that their devices might be collecting and transmitting personal information. And manufacturers need to build in security from the very start—and figure out how to patch vulnerabilities in a device that might already be in someone's body.

Learn more at www.rand.org/t/RR3226

> **These technologies are just going to keep growing in popularity. We need to get ahead of the policy issues and make sure we get the balance between potential risks and benefits right.**

MARY LEE
mathematician
RAND Center
for Global Risk and
Security Fellow

IMPROVING AUTOMATED TARGET RECOGNITION SYSTEMS

Lightning-fast computers have the potential to search hours of surveillance video to help the military locate and identify a target. But finding enough images, from enough different perspectives, to train a computer to recognize even a single object has emerged as a major barrier.

RAND researchers used a rented Humvee, a drone, and a commercial video game to see if they could find a workaround.

The game is called Arma 3. It's a first-person shooter game that allows users to introduce real-world objects into its virtual world. The researchers added a Humvee, and then captured hundreds of images of it from different angles, in different environments, and under different lighting conditions.

Then they rented a real Humvee, drove it to the Mojave Desert, and had a drone operator reproduce the game images.

They found that a computer trained on the real images could identify a Humvee with precision of close to 80 percent. One trained on the game images couldn't identify a real Humvee at all. But a computer trained on both performed the best, with small but statistically meaningful improvements over the real images alone.

The results suggest that artificial images could help improve the performance of target recognition computers, especially in situations where real images are limited. Existing systems need tens of thousands of images to learn to recognize a single object, each of them labeled by hand. And that kind of data just isn't available for many military targets.

The computers in the experiment were still not reliable enough to be used in a real-world setting. But they could provide a virtual second set of eyes, to help human analysts find targets as fleeting as a Humvee in the desert.

Learn more at www.rand.org/t/RRA683-1

> We set out to demonstrate that an automated target recognition system could be built using nothing more than off-the-shelf algorithms and artificial images. We didn't succeed, but our results did suggest a technique to improve the training of models when existing data are scarce.

GAVIN S. HARTNETT
information scientist

HUMVEE FOUND

BARRIERS TO EMPLOYMENT FOR EGYPTIAN WOMEN

Egypt has an opportunity to expand and modernize its economy—not with trade deals or new industries, but with better working conditions for its women.

Only around 20 percent of working-age women in Egypt participate in the labor force, researchers found. Those who do face high unemployment rates, harassment, and weak enforcement of labor laws meant to ensure they get fair pay and treatment. As a result, the most populous country in the Arab world is leaving behind a significant part of its potential workforce.

That's despite growing numbers of Egyptian women with college degrees. They tend to study education, health, and public administration, preparing for government jobs where they can expect more protections and better working conditions. But those jobs have become much harder to find, and the private sector has not made up the difference.

Women also are expected to handle child care and most household chores, a "second shift" that adds up to an average of 31 hours of extra work a week. Married women face restrictions on obtaining a passport or traveling outside of the home.

Those limits on women in the workforce are likely to seriously impede Egypt's progress, the researchers concluded. The country needs to better enforce labor laws, crack down on workplace harassment, and address a persistent wage gap. It should also look for ways to improve its overall business environment, to create more opportunities in the private sector.

The researchers also recommended a series of public service announcements to promote equal opportunity and advocate for women in the workplace. It's not women who need to hear those messages; it's the men with whom they'd be working.

> **Egypt has invested in expanding access to education; yet Egyptian society is not fully reaping the rewards of those investments. That's because Egypt has not provided the major beneficiaries of that expanded access the opportunity to fully contribute to the country's growth and development.**
>
> **LOUAY CONSTANT**
> senior policy researcher

Learn more at www.rand.org/t/RR2868

9 TO 5, AND NIGHTS AND WEEKENDS

Millions of American workers need more than one job to pay the rent and keep the lights on. Yet existing labor statistics provide an incomplete picture of who they are, what they do, and how they get by.

Researchers used an expanded definition of multiple-job workers to take a closer look. They included regular wage earners, but also people who own a side business, take a temporary contract job, moonlight, or work an occasional gig. To focus on the most vulnerable households, they narrowed their scope to working adults without a college degree.

They found that nearly 4 percent of those adults consistently work a second job, and around 14 percent occasionally do. That's much higher than existing census estimates, which put the total number at around 5 percent.

Those who consistently worked a second job tended to be older, white, more educated, and better able to pay their bills. Those who strung together occasional side jobs were more likely to say they struggle to afford their rent and utility bills. Around 20 percent said they had been unable to cover their monthly expenses.

The researchers estimated that the poverty rate was 10.4 percent for all households, but 8.6 percent for those with a multiple-job worker. When they excluded those secondary earnings from income totals, they found that many of the multiple-job workers slid below the poverty line.

The results suggest that working a side job is an effective strategy for low-income workers and their families to stay out of poverty. But the analysis did not look at the costs of working more than one job, such as stress, absence from children, and relationship strains. Policymakers should consider child care subsidies, overtime and minimum wage requirements, and unemployment insurance to help those workers on and off the job.

Learn more at www.rand.org/t/EP68282

> **Understanding who these households are and whether these strategies serve to lift them out of poverty is key to improving practice and policy for economically vulnerable families.**

KATHRYN A. EDWARDS
economist

PARDEE RAND GRADUATE SCHOOL

THE 2020 COHORT

With 33 members, the 2020 cohort is the largest class of new students in the school's history, the first to be admitted to the school's three new academic streams and enter the fully redesigned program. The new streams are Research, Analysis, and Design; Community-Partnered Policy and Action; and Technology Applications and Implications.
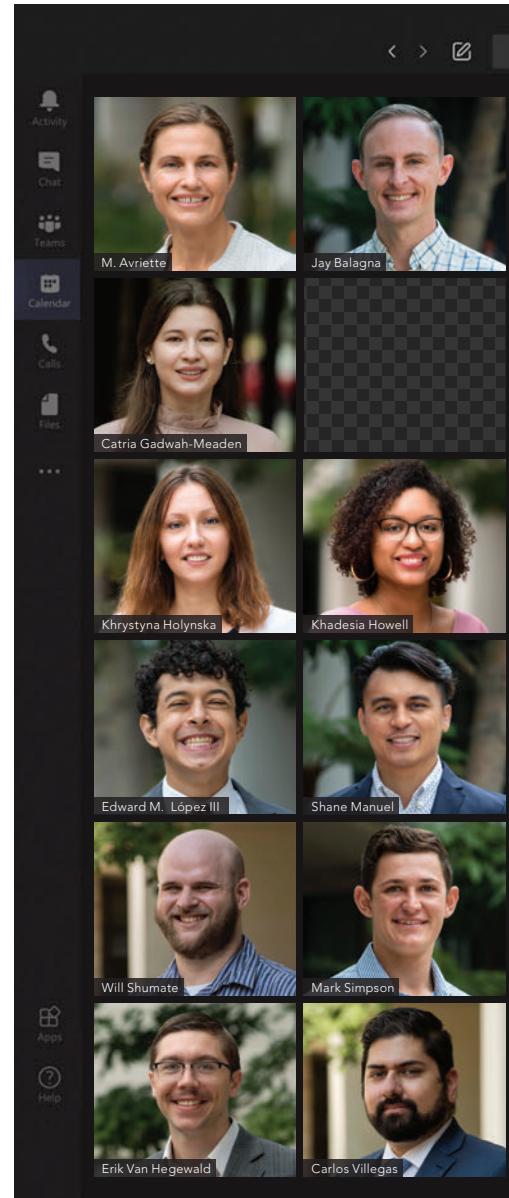
Although they arrived in September, they connected earlier through online discussions of the Dean's Summer Reading List and joined in virtual town halls. The result was an incoming cohort that had more interaction prior to arriving than any prior cohort. In a message to the school, Dean Susan Marquis said of the new cohort, "They applied and were admitted at the very start of 2020, and since then have been together through the onset of the COVID-19 pandemic, nationwide protests calling for social justice and racial equity, record-setting hurricanes and fires, and one of the most contentious presidential elections in U.S. history. The 2020 cohort is one for the ages."

The school worked with RAND leadership to develop safety protocols for in-person classes and support its operations during the pandemic.

> **We are fortunate that the home to our program is in RAND's headquarters building, which in addition to being beautiful has a significant amount of outdoor space with very few people on-site because of the pandemic. And we've been able to draw on the scientific expertise within RAND to ensure safe practices in compliance with guidance and directives from local and state governments.**
>
> **SUSAN MARQUIS**
> Frank and Marcia Carlucci Dean, Pardee RAND Graduate School
> Vice President, Innovation, RAND Corporation

TOMORROW DEMANDS TODAY

Search or type a command

Lisa Berdie • Elliott Brennan • Nihar Chhatiawala • Swaptik Chowdhury
Priya Gandhi • Ishita Ghai • Lucas Greer • Marissa Herron
Swad Komanduri • Jonah Kushner • Ignacio Lara • Justin M. Lee
Jim Mignano • Brian Mills • Zhan Okuda-Lim
Danielle Sobol • Cory Stern • Nathan Thompson • Jeannette Tsuei
Rebecca Wolfe • Alex Wong • Brian Wong

BY THE NUMBERS

17 admitted to Research, Analysis, and Design

7 admitted to Community-Partnered Policy and Action

9 admitted to Technology Applications and Implications

22 men

11 women

6 active-duty military, including four from the U.S. Air Force Academy

3 international students, from India and Ukraine

6 additional international students admitted (but deferred until Fall 2021 because of COVID-related travel restrictions)

28 median age

They previously worked with, among others, the Florida Department of Health, NASA, the U.S. Army Veterinary Corps, the Robert Wood Johnson Foundation, and the United Nations Development Programme. Their colleges and universities include Brown University, Caltech, Emory University, Florida A&M University, Macalester College, the University of Houston, and Vellore Institute of Technology.

THE THREE NEW POLICY ENGAGEMENT STREAMS

Pardee RAND began recruiting in 2019 for its three policy engagement streams and updated program requirements for Cohort '20, to include community-partnered externships, Tech and Narrative Lab residencies, and new courses to meet these requirements. Applicants now need to select which of the three streams they wish to pursue: Research, Analysis, and Design; Community-Partnered Policy and Action; or Technology Applications and Implications.

Research, Analysis, and Design

For 50 years, the Pardee RAND Ph.D. has emphasized rigorous and sophisticated policy analysis. With the Research, Analysis, and Design stream, our goal is to enable students to understand complex social problems both conceptually and empirically. As they explore Pardee RAND's cross-cutting themes of ethics, communication, and social justice and racial equity, they also work side by side with researchers on a range of ongoing RAND projects. With these experiences and on-the-job training (OJT), students gain a solid understanding of what it takes to accomplish real and sustainable change. They will then harness this understanding to design policies, mechanisms, and actions for potential solutions.

The Research, Analysis, and Design stream is for students who are curious about why policies succeed and fail, and they constantly look for new ways to understand the world around them. They are driven to improve policy design through systematic evaluations of policy instruments and carefully designed experiments, and they want to become sophisticated users and developers of analytic tools.

The courses and activities in this stream teach students a diverse set of modeling and analytic methods, as well as best practices in policy analysis and design. Students will acquire a better understanding of the systemic and dynamic nature of complex policy challenges while conducting cutting-edge research and data analysis.

Community-Partnered Policy and Action

What does it take to make real and sustainable change in local communities? That is the focus of the new Community-Partnered Policy and Action stream, which prepares students to work on policy problems in diverse community settings and with a variety of stakeholders.

Students entering this stream look to turn policymaking on its head by emphasizing community-generated and community-prioritized policies and actions that address local issues of greatest importance to the community. They build on Pardee RAND's strong foundation in policy analysis, ethics, communication, and social justice and racial equity, developing strong qualitative and quantitative skills. Students then combine these rigorous research methods and their understanding of localized contexts as they partner with communities to design, implement, and evaluate policies. These partnerships arise through work on RAND research projects, but also through newly developed community externships. The extensive field experience they receive enables them to further refine the skills they developed in classrooms.

Technology Applications and Implications

Although technological advancements continue to increase in size, scope, and impact on society, many policy processes and analytic approaches remain rooted in 20th-century models and capabilities.

The Technology Applications and Implications stream redefines next-generation policy analysis and action. It is designed to enable and empower policy students to engage in technology explorations, experimentation, and development applied to public policy problems and solutions.

The Tech stream complements and interacts with the other streams in a variety of ways, such as workshops, residencies, hackathons, research projects, courses, and OJT. It also embraces the cross-cutting themes of ethics, communication, social justice, and racial equity; experimentation in the stream to directly address or include aspects of one or more themes is strongly encouraged.

LEADERSHIP GIFTS

Two multimillion-dollar gifts were made in 2020 as part of RAND's Tomorrow Demands Today fundraising campaign, a critical priority of which is to catalyze a new era of problem solving through the Pardee RAND Graduate School.

Pardee Commons Housing Community

Thanks to the generosity of Frederick S. Pardee, the school is establishing a new student housing community. Pardee, a former RAND researcher and longtime supporter of the school who currently serves as a member of the Pardee RAND Board of Governors, has gifted two apartment buildings valued at $10 million.

The buildings, which will be called Pardee Commons, are located in the Brentwood neighborhood of Los Angeles, approximately three miles from the graduate school.

"We know that learning does not stop when students leave the classroom. A dedicated shared space to foster connections and provide mutual support, and a safe and supportive environment for students and their families will enable our students to enjoy each other and thrive in our program," said Dean Marquis.

With this new gift, Pardee has contributed nearly $27 million to the Pardee RAND Graduate School and $5 million to RAND. His long history of support includes a $5 million donation to RAND in 2001 to create the RAND Frederick S. Pardee Center for Longer Range Global Policy and the Future Human Condition. In 2003, he made a $10 million contribution to the graduate school's endowment, and the school was renamed in his honor. In 2012, he donated $3.6 million to support the school's endowment and establish the Pardee Initiative

for Global Human Progress. In 2018, he built on his earlier gift and pledged $3 million to continue to support the Global Human Progress initiative and the globalization of the redesigned Pardee RAND.

> **Students who join the Pardee RAND Graduate School community are passionate about confronting the world's largest and most urgent challenges. My hope is that a student housing option will help relieve the burden of finding and affording housing in Los Angeles so that students and their families can focus on building relationships with each other and making the world a better place.**
>
> **FREDERICK S. PARDEE**

A Family Legacy

The campaign also received a $10 million gift from the family of former Secretary of Defense Frank C. Carlucci—a combination of current and planned giving—that will endow scholarships, support the dean's priorities, and provide a title to the role of Pardee RAND dean. Frank Carlucci, who passed away in 2018, served on the RAND Board of Trustees for nearly 25 years.

Frank Carlucci had a long career as a senior-level government official, serving under Presidents Nixon, Ford, Carter, and Reagan. He joined RAND's Board of Trustees in 1983, stepping down in 1986 after Reagan appointed him national security advisor and, in 1987, secretary of defense. He rejoined the board in 1989 and served almost without break until 2007, when he became trustee emeritus. Carlucci was a founding member of the advisory board of the RAND Center for Middle East Public Policy, which he cochaired with Zbigniew Brzezinski, President Carter's national security advisor.

This gift will also provide financial aid for students and create an endowed fellowship that will offer dissertation support to students.

In addition to Frank's longtime service as a RAND trustee, his daughter, Kristin, served as a researcher at RAND and RAND Europe and her husband, Joshua, is a Pardee RAND graduate.

Prior to this gift, Marcia and Frank Carlucci contributed more than $2 million in scholarship support to the school.

> **RAND has greatly benefited from Frank Carlucci's vast experience and from the incredible generosity he and his wife, Marcia, have shown our organization over the years as advisors and philanthropists. We are deeply honored that the Carlucci name will be linked to the Pardee RAND deanship and extremely thankful for Marcia's commitment to support our graduate school and its students for years to come.**
>
> **MICHAEL D. RICH**
> President and Chief Executive Officer, RAND Corporation

PHILANTHROPY IN ACTION

CAMPAIGN NEWS

Communities and societies worldwide are facing a new set of complex problems—and they are facing them on multiple fronts. With funding from donors and grantmakers, RAND continued to study truth decay—a RAND initiative to restore the role of facts and analysis in public life; responded with agility and determination to help mitigate the COVID-19 crisis; and launched six philanthropically supported research centers and institutes to help solve both new and enduring challenges. By applying objective research and analysis in novel and far-reaching ways, we aim to help individuals, families, and communities throughout the world be safer and more secure, healthier and more prosperous.

Advancing Racial Equity Policy

Against the backdrop of a pandemic that was already inflicting disproportionate physical and economic pain on communities of color, and an overdue reckoning with America's long history of systemic inequity and structural racism,

RAND launched the RAND Center to Advance Racial Equity Policy. With funding from philanthropic contributions, the center will support a growing portfolio of innovative, high-impact racial equity research and analysis at RAND.

"We must examine where inequities intersect across systems and groups, represent voices that are too often left out of leadership on these topics, and integrate the structural contexts in which policies have been developed and applied sometimes with unintended consequences," said Anita Chandra, vice president and director of RAND Social and Economic Well-Being.

The center will usher in a new phase of research and action that goes deeper into the policies that underlie systemic racism and what it will take to build future systems and policies that advance racial equity. The center's blueprint was developed with the input of RAND staff, and the center is part of a larger commitment to advance diversity, equity, and inclusion in the organization's operations and external engagement.

The COVID-19 Pandemic

Philanthropic support gave RAND the agility to support effective policy amid the whirlwind of change and challenges that was the year 2020. It funded the creation of a tool to help hospitals brace for a surge of COVID patients and explored the changing nature of telecommuting.

It also allowed researchers to pair health and economic data to help states weigh the trade-offs of different physical-distancing restrictions. The tool they built showed what would happen to coronavirus caseloads and to economic indicators as states tightened or loosened their restrictions.

A series of surveys funded with donor support showed the pandemic's unequal impact on American families. By May 2020, the surveys showed, nearly a third of all households were having trouble paying their bills. The number was closer to 40 percent for Black households, and 50 percent for Hispanic households.

More than two-thirds of teachers in high-poverty schools said at least some of their students were having trouble getting online for class. And in schools with widespread access problems like that, only 6 percent of teachers said all or nearly all of their students were finishing their assignments.

With intensive-care wards filling with patients, researchers developed a checklist to guide hospitals if they had to allocate scarce but life-saving

resources, like ventilators. To avoid decisions like that, researchers also proposed creating a centralized pool of supplies as an emergency backstop. Hospitals in "cool spots" could send their supplies to hospitals in "hot spots," knowing they could draw from the centralized stockpile if they got hit by an unexpected surge of patients themselves.

Donor support also allowed researchers to investigate the needs of small business owners and the needs of parents. It allowed researchers to create a privacy scorecard to help consumers weigh the pros and cons of COVID-related mobile apps. And, as the 2020 election approached, it allowed them to look at how each state planned to ensure a safe and fair vote.

The work continues. Among the legacies of 2020 at RAND was the creation of a donor-funded Rapid Research Response Fund. It will continue to support quick-turn research at RAND and the Pardee RAND Graduate School—through the recovery, into the next normal, and during future times of great uncertainty, when the need for fact-based analysis is now.

Truth Decay

In a year in which Americans continued to disagree about basic facts and to express deep distrust in civil institutions, researchers advanced their examination and search for solutions to counter what RAND has described as "truth decay"— the diminishing role of facts and analysis in American public life. Countering truth decay is one of the top priorities of the Tomorrow Demands Today fundraising campaign. And in 2020, with unrestricted donor support, RAND explored topics such as fighting disinformation online, civic development in the era of truth decay, and drivers of institutional trust and distrust. RAND also conducted a deep dive into the November elections—exploring voter expectations about election integrity and election safety during a pandemic.

In a suite of studies focused on civic education, researchers collected and analyzed the first nationally representative data on how public schools promote the civic development of their students. Researchers found that most social studies teachers in American public schools do not feel well prepared to support the civic development of their students. Many cited pressure to cover other subjects, like reading or math, as an obstacle. Most described civic development as important, but fewer said it was an "absolutely essential priority." More than 10 percent of the teachers said the materials they get from their districts are factually inaccurate or culturally inappropriate. And most of the teachers—and especially teachers of color and those in schools with high levels of poverty—said they need more support and better materials.
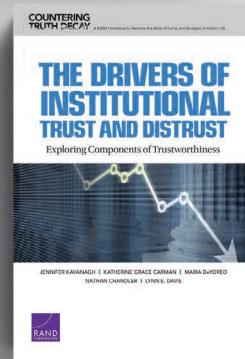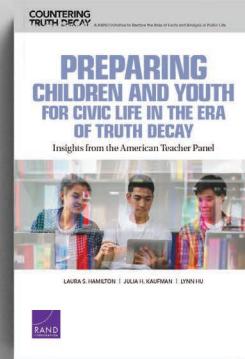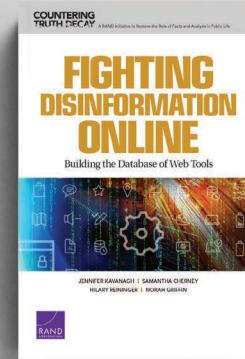
In an election year like 2020, that was an especially important finding. A growing body of research has linked civics education with real-world civic outcomes, like voting. The election laid bare the consequences of declining trust in American institutions like Congress and the media. Researchers have been tracking that decline in trust to understand its implications for truth decay. An initial project, from before the 2020 campaigns got underway, showed not just a lack of trust in American institutions, but active distrust.

The researchers identified five key drivers of trust in institutions: competence, integrity, performance, accuracy, and informational relevance. The results provided new evidence for how institutions lose the trust of the people they serve—and how they can earn it back as a step toward fighting truth decay.
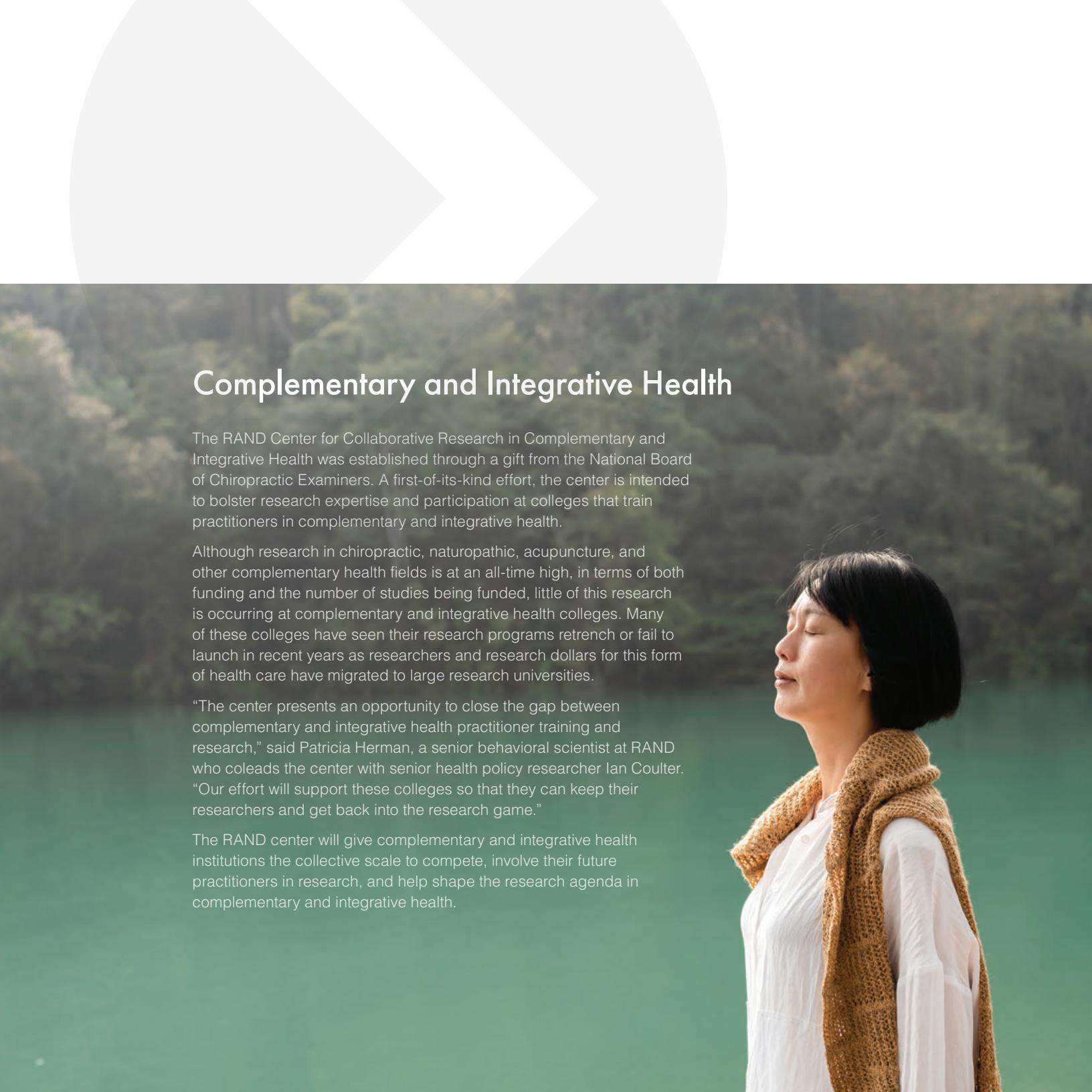
Complementary and Integrative Health

The RAND Center for Collaborative Research in Complementary and Integrative Health was established through a gift from the National Board of Chiropractic Examiners. A first-of-its-kind effort, the center is intended to bolster research expertise and participation at colleges that train practitioners in complementary and integrative health.

Although research in chiropractic, naturopathic, acupuncture, and other complementary health fields is at an all-time high, in terms of both funding and the number of studies being funded, little of this research is occurring at complementary and integrative health colleges. Many of these colleges have seen their research programs retrench or fail to launch in recent years as researchers and research dollars for this form of health care have migrated to large research universities.

"The center presents an opportunity to close the gap between complementary and integrative health practitioner training and research," said Patricia Herman, a senior behavioral scientist at RAND who coleads the center with senior health policy researcher Ian Coulter. "Our effort will support these colleges so that they can keep their researchers and get back into the research game."

The RAND center will give complementary and integrative health institutions the collective scale to compete, involve their future practitioners in research, and help shape the research agenda in complementary and integrative health.

Supporting Veterans and Military Families

A gift from the Epstein Family Foundation is launching the RAND Epstein Family Veterans Policy Research Institute. The institute will be dedicated to generating creative strategies and interventions to address issues facing veterans and military families, including housing, health, and mental health care needs.

The new institute will help build on RAND's history of research on veterans' issues. RAND research has helped bring posttraumatic stress disorder and other "invisible wounds of war" out of the shadows. It has helped get military caregivers the support they need. And it has shown how the American health care system too often fails veterans, especially those in suicidal distress.

The institute's core research agenda will include analysis to better understand how military service and post-service experiences affect the needs of veterans in the short and long term. Researchers, led by senior policy researcher Carrie Farmer and senior behavioral scientist Rajeev Ramchand, will evaluate interventions and policy changes that can minimize adverse outcomes, support those at risk, and increase access to high-quality services. The institute will prioritize conducting research that recognizes the diversity of the veteran population and that leads to equitable and inclusive solutions for improving outcomes for veterans and their families.

Analysis of U.S. Grand Strategy

The RAND Center for Analysis of U.S. Grand Strategy draws on research and expertise from across RAND to advance the debate on American foreign policy.

"The United States is in the midst of a debate about its future grand strategy," said K. Jack Riley, vice president and director of the RAND National Security Research Division. "But a number of analytical gaps make it difficult for the country to fully engage with the choices it faces and the relative merits of various options."

Led by senior political scientist Miranda Priebe and initially funded by a grant from the Charles Koch Institute, the center is designed to address these gaps so that policymakers may consider fully developed options for future U.S. grand strategy—the country's road map for how it uses all instruments of national power to achieve security and promote its vital interests.

America's current grand strategy—referred to by different groups as liberal internationalism, liberal hegemony, or primacy—is relatively well understood. Yet its central assumptions have not been fully articulated or tested. The center will test the assumptions and arguments of current and proposed grand strategies and consider how they might cope with technological change, shifts in the balance of power, and other global trends.

Housing, Homelessness, and Sustaining a Middle Class

As communities throughout the country grappled with the effects of a global pandemic and economic downturn, a gift from the Lowy family enabled RAND to launch two new research centers: one aimed at tackling housing and homelessness in Los Angeles and the other focused on building new pathways to revive and sustain an American middle class.

The core research agenda of the RAND Center on Housing and Homelessness in Los Angeles will include analysis to better understand the needs of people experiencing homelessness in Los Angeles and the challenges of addressing affordable housing solutions in one of the most expensive housing markets in the nation. Led by RAND researchers Sarah Hunter and Jason Ward, RAND will work to align incentives among stakeholders, including people experiencing homelessness, community members, service providers, housing developers, and policymakers. Researchers will explore broad questions concerning the supply and demand for housing and services, including examining the disproportionate impacts on communities of color and the varied needs of subpopulations such as veterans, as well as zoning and regulation reform options that can speed up housing development.

Researchers will also investigate ways to address the effects of COVID-19 on the housing and homelessness landscape.

The RAND Lowy Family Middle-Class Pathways Center will focus on ways to create and support middle-class employment in the face of rapidly changing labor market conditions. Led by RAND researchers Jeffrey Wenger and Melanie Zaber, RAND experts will examine the forces of technology and automation, outsourcing and trade, and COVID-19's effects on the middle-class workforce. Researchers will explore impediments to starting and growing a business and will work on removing barriers that limit business success. Researchers will also reimagine and rework current education and skill development systems, with the goals of advancing equity and preparing workers for career pathways that offer more Americans resilience and upward mobility. Through pilot tests, and in collaboration with educators, businesses, and support organizations, RAND will identify what works, and for whom, to create an integrated system of supports that can help workers reach and maintain in the middle class.

The centers will work to outline effective solutions for developing a resilient and upwardly mobile American workforce and combating homelessness in communities throughout the country.

PROFILES IN GIVING

The individuals and organizations that have made RAND a philanthropic priority share our commitment to quality and objectivity. Our supporters have partnered with RAND to help us pursue visionary ideas, develop evidence-based solutions to acute policy challenges, and create positive change throughout the world.

Countering Truth Decay

Joel Mogy has seen "truth decay"—the diminishing role of facts and analysis in public life—spreading through the financial world. An investment counselor and the founder of Joel R. Mogy Investment Counsel, Inc., he sees it as an existential threat to the United States, metastasizing in financial scandals and lurking at the root of geopolitical crises. But it was a challenge from his rabbi, Sharon Brous, that convinced him to take action. Don't sleep through life and then wake up one day and ask yourself what the heck just happened, she told him. Get out there and do something.

Mogy, a RAND supporter for more than 20 years, established the Joel and Joanne Mogy Truth Decay Fellowship to support research on truth decay, civics, and democracy. "This was a way I could act on my value system," Mogy said. "I'm making an investment to ensure we fix what we have."

He selected RAND, he said, because of its independence, integrity, and commitment to this issue. He hopes the fellowship allows a researcher to not just focus on the causes and consequences of truth decay, but to work across fields to identify potential solutions.

> **"This was a way I could act on my value system ... I'm making an investment to ensure we fix what we have.**
>
> JOEL MOGY

Investing in Education to Change Lives

"I can't overstate just how important it is to have people around you who believe in you and value you and push you to do things and cheer you on," said award-winning journalist Soledad O'Brien, a longtime supporter and member of the RAND Board of Trustees and the Pardee RAND Graduate School Board of Governors. "I gave this gift to support young people who want to come to RAND and make a difference."

Her gift established the Edward and Estela O'Brien Inclusion, Diversity, and Equity Award. Named after her late parents who inspired her, the gift provides full-tuition scholarships annually to entering Pardee RAND graduate students. The scholarship is intended first and foremost for students who are underrepresented in the student body population,

have overcome such obstacles as socioeconomic or educational disadvantage, or are the first generation in their family to attend college or pursue an advanced degree.

"When you invest in education, you change people's lives," O'Brien said. "You change their lives, certainly, but you also have the opportunity to change lives in every community that they touch." You can, she said, start to build a pipeline—to bring people from diverse backgrounds into positions where they can apply their life experiences to some of the toughest issues we face. Getting more voices into the conversation starts with education, she said.

A Legacy of Advancing Health Care Research

It was the impression made by a colleague that inspired longtime RAND supporter John J. Rydzewski to make an estate gift that will benefit students at the Pardee RAND Graduate School. The colleague—a highly analytical, insightful, and socially committed individual—happens to be a Pardee RAND graduate.

"RAND's objective health policy research and analysis has the power to be transformative," said Rydzewski, a health care executive and chair of the RAND Health Advisory Board. "Observing firsthand the impactful career of a Pardee RAND graduate brought the recognition that I had a unique opportunity: I could use my giving to improve health and quality of life—issues I'm dedicated to advancing—while also supporting a new generation of health policy experts."

Rydzewski's gift will provide funding for student dissertations on health-related topics, helping to catalyze policy research on some of the most challenging issues. His gift also makes him a member of the RAND Legacy Society, which recognizes those who have made a planned gift to benefit RAND or Pardee RAND. "I'm honored that my RAND legacy will now include supporting Pardee RAND students and helping them use their graduate education to further innovative heath policy research and enhance people's lives."

A Commitment to Social and Economic Justice

Before committing to a cause or an organization, Frank Clark asks himself one question: Will it have an impact that outlasts me? He serves as chair of both the RAND Social and Economic Policy Advisory Board and the National Collaborative on Gun Violence Research because he believes that RAND research can make a difference. "This is a place where you think, You're getting something done," he said.

Clark, a guiding force in the leadership circles of Chicago, got his start in the mailroom of the local electric company, Commonwealth Edison. Over the next 40 years, he worked his way up the ranks while also attending night school to earn his college and law degrees. By the time he became the company's first Black president in 2001, ComEd was one of the largest utilities in the country. He retired in 2012 as the chairman and CEO and has built a second career out of giving back.

His most recent pledge will support RAND Social and Economic Well-Being. "It boils down to trying to make a difference in life and leaving this world a better place than you found it when you entered it," he said. "The research I see at RAND will not just benefit Chicago, or Illinois, but people throughout the United States and, I think, throughout the world."

Improving the Lives of Veterans

Daniel J. Epstein has made a career out of thinking big. An engineer by training and a solver of problems, he's partnered with RAND to advance solutions to the challenges facing veterans and military families. A recent gift through the Epstein Family Foundation will launch a new RAND institute dedicated to research on issues concerning veterans, including housing, health and mental health care, employment, and education.

"Over the years, I think there's been a failure to recognize and appreciate the sacrifices veterans have made for the country," Epstein said. "When I considered providing support, I identified veterans and their needs and decided to try to be helpful in that regard."

Epstein, who served in the Army after high school, has made previous contributions to support initiatives for veterans. At RAND, he provided funding for a research effort with the University of Southern California to understand what life is really like for veterans experiencing homelessness, and what could help get them into permanent housing. He also helped fund "Veterans in America," a podcast series about RAND research on veterans' issues. "RAND has an expertise that a lot of other institutions don't have. When there are challenges that need studying and need thoughtful solutions, RAND's capabilities are really unequaled," he said.

Promoting International Understanding

Ann Kerr-Adams has dedicated her career to fostering collaboration among people of different nations—starting with students. As the longtime coordinator of the Visiting Fulbright Scholar Enrichment Program at UCLA, and facilitator of the class "Perceptions of the United States Abroad," she works to promote international understanding through education. A California native who has studied, lived, and worked in the Middle East, she also models these principles through her philanthropy.

Kerr-Adams, a member of the RAND Center for Middle East Public Policy Advisory Board and a dedicated supporter, made a gift to establish the Kerr Family Scholarship at the Pardee RAND Graduate School. The scholarship, which provides students with full-tuition support for the first year of study, is intended to help Pardee RAND recruit students from the greater Middle East and North Africa region.

"The experiences I've had, and relationships I've maintained with friends and colleagues throughout the world, have no doubt shaped who I am," Kerr-Adams said. "It's an honor to help create opportunities for students to learn from each other; share their perspectives; and use their research, education, and knowledge to catalyze positive change and global goodwill."

> It's an honor to help create opportunities for students to learn from each other; share their perspectives; and use their research, education, and knowledge to catalyze positive change and global goodwill.
>
> ANN KERR-ADAMS

Grantmakers

RAND thanks the foundations and other grantmaking organizations who supported RAND research and analysis in 2020.

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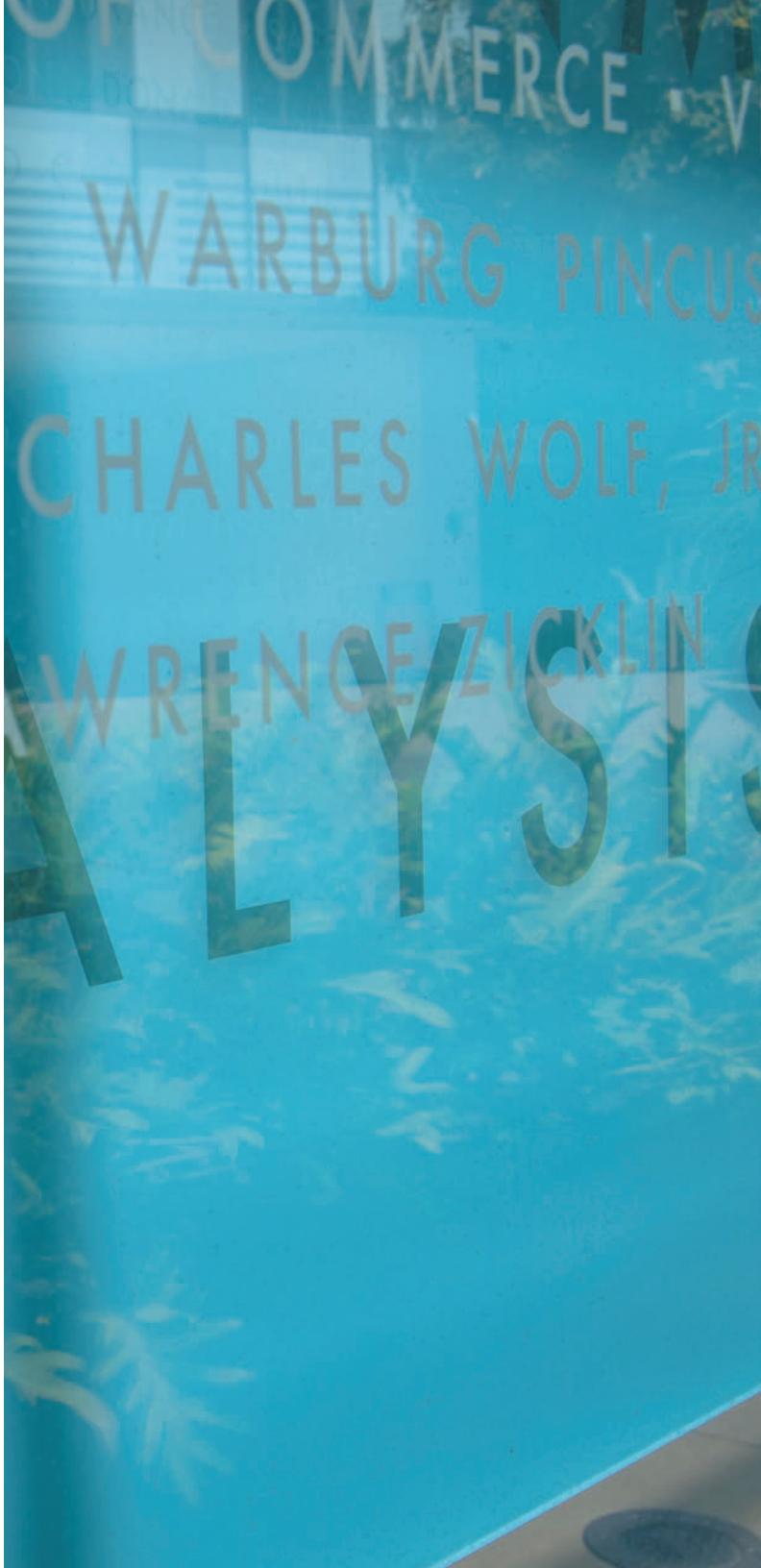
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CONGRESSIONAL OUTREACH

HIGHLIGHTS FROM 2020

COVID-19 brought swift changes to how and where RAND engaged with Congress—transforming overnight an environment fundamentally built on relationships forged through in-person visits and hallway encounters. Despite the challenges of shifting to an all-virtual environment, RAND continued to engage extensively with policymakers on both sides of the aisle via online platforms in nearly 240 meetings and 16 expert testimonies to help inform legislation addressing the United States' greatest challenges.

Much of this work centered on helping policymakers understand and address the COVID-19 pandemic. RAND experts testified about how to improve the Strategic National Stockpile, provided an assessment of federal preparedness during the early stages of the pandemic, and shared insights about how to support small- and medium-sized businesses. RAND experts also shared growing knowledge about the utilization of telehealth during the pandemic, helped legislators understand the potential need for enhanced state and local funding, discussed conducting safe and secure elections, explained trade-offs of vaccine supply and distribution approaches, and illustrated options for designing a pandemic risk insurance program.

Beyond the pandemic, our experts supported the work of the Future of Defense Task Force—a bipartisan task force charged with creating a road map for the national security community for the next 30 to 50 years; testified on the importance of allies and partners; and informed provisions in the National Defense Authorization Act on space launch vehicles, artificial intelligence, and diversity and equity in the military. We continued to help inform responses to the opioid crisis, the high cost of health care, climate resilience, and the need for better-integrated workforce development and employment systems.

In addition, 2020 brought an exciting opportunity for a RAND researcher to directly shape new evidence-based legislation aimed at stemming the tide of veteran suicide. With generous philanthropic support, the Congressional Fellowship Program—a first of its kind for RAND—enabled a senior researcher to work alongside U.S. congressional committee staff to help improve understanding between policy research and policymaking in real time. The RAND fellow drew on a portfolio of prior RAND analysis to inform the Veterans Comprehensive Prevention, Access to Care, and Treatment (COMPACT) Act of 2020, which became law in December.

Michael D. Rich, RAND's president and CEO, in an online meeting with Rep. Adam Smith, chair of the House Armed Services Committee
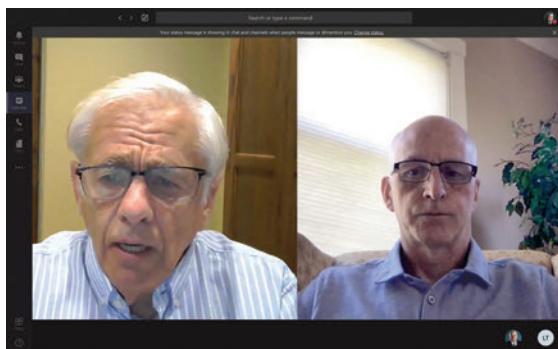
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U.S. Government

Administrative Office of the United States Courts

Consumer Financial Protection Bureau

Consumer Product Safety Commission

Department of Commerce

    National Institute of Standards and Technology

    National Oceanic and Atmospheric Administration

Department of Defense

    Defense Centers of Excellence

    Defense Health Agency

    Defense Security Cooperation Agency

    Defense Threat Reduction Agency

    Department of the Air Force

    Department of the Army

        Medical Research Acquisition Activity

    Department of the Navy

        Marine Corps

    Joint Staff

    Missile Defense Agency

    Office of the Secretary of Defense

        Office of the Director, Cost Assessment and Program Evaluation

        Office of Net Assessment

        Under Secretary of Defense for Acquisition and Sustainment

        Under Secretary of Defense for Personnel and Readiness

        Under Secretary of Defense for Policy

        Under Secretary of Defense for Research and Engineering

            Defense Advanced Research Projects Agency

    Unified Combatant Commands

Department of Education

    Institute of Education Sciences

Department of Energy

    Lawrence Livermore National Laboratory

Department of Health and Human Services

    Administration for Children and Families

    Agency for Healthcare Research and Quality

    Centers for Disease Control and Prevention

    Centers for Medicare and Medicaid Services

    Health Resources and Services Administration

    National Institutes of Health

        Eunice Kennedy Shriver National Institute of Child Health and Human Development

        National Cancer Institute

        National Center for Advancing Translational Sciences

        National Center for Complementary and Integrative Health

        National Heart, Lung, and Blood Institute

        National Institute on Aging

        National Institute on Alcohol Abuse and Alcoholism

        National Institute of Allergy and Infectious Diseases

        National Institute of Dental and Craniofacial Research

        National Institute of Diabetes and Digestive and Kidney Diseases

        National Institute on Drug Abuse

        National Institute of Environmental Health Sciences

        National Institute of Mental Health

        National Institute on Minority Health and Health Disparities

        National Institute of Nursing Research

Department of Homeland Security

    Countering Weapons of Mass Destruction Office

    Cybersecurity and Infrastructure Security Agency

    DHS Headquarters

    Federal Emergency Management Agency

    Management Directorate

    Office for Civil Rights and Civil Liberties

    Science and Technology Directorate

    U.S. Coast Guard

    U.S. Customs and Border Protection

    U.S. Immigration and Customs Enforcement

    U.S. Secret Service

Department of the Interior

    Bureau of Reclamation

Department of Justice

    COPS Office (Office of Community Oriented Policing Services)

    National Institute of Justice

        Office of Justice Programs

Department of State

    Bureau of International Security and Nonproliferation

    Bureau of Political–Military Affairs

    Bureau of Population, Refugees, and Migration

    Global Engagement Center

    Under Secretary for Public Diplomacy and Public Affairs

Department of Transportation

    Federal Aviation Administration

Department of Veterans Affairs

Millennium Challenge Corporation

National Science Foundation

Office of the Director of National Intelligence

    Intelligence Community

Performance Accountability Council

Securities and Exchange Commission

United States Postal Service

Western Hemisphere Drug Policy Commission

U.S. State and Local Governments

Commonwealth of Massachusetts
  Clean Energy Center
  Department of Public Health
Commonwealth of Pennsylvania
  County of Allegheny
  Pittsburgh Public Schools
Commonwealth of Virginia
  Office of the Attorney General
  Virginia Department of Emergency Management
State of Arizona
  Pima County
State of California
  CalPERS
  Covered California
  Department of Health Care Services
  Department of Industrial Relations
  Department of Social Services
  Government Operations Agency
  Governor's Office of Emergency Services
  Los Angeles County
    City of Los Angeles Mayor's Office
    City of Santa Monica
    First 5 LA
    Los Angeles Community College District
    Office of Diversion and Reentry
    Probation Department
  The Metropolitan Water District of Southern California
  San Bernardino Valley Municipal Water District

State of Colorado
  Denver Water
  Department of Human Services
  Department of Natural Resources
    Colorado Water Conservation Board
  Department of Public Safety
    Colorado State Patrol
State of Delaware
State of Illinois
  City of Chicago
State of Louisiana
  City of New Orleans
  Department of Education
State of Maryland
  Prince George's County
State of Michigan
  Michigan Indigent Defense Commission
State of New York
  Department of Health
  District Attorney of New York County
  NYC Opportunity
State of South Carolina
  State Fiscal Accountability Authority, Procurement Services
State of Utah
  Utah Indigent Defense Commission

Non-U.S. Governments, Agencies, and Ministries

Commonwealth of Australia
  Department of Defence
  Department of Finance
  National Health and Medical Research Council
European Union
  European Anti-Fraud Office
  European Border and Coast Guard Agency
  European Centre for Disease Prevention and Control
  European Commission
    Directorate-General for Employment, Social Affairs and Inclusion
    Directorate-General for Health and Food Safety
    Directorate-General for Justice and Consumers
    Directorate-General for Migration and Home Affairs
    Directorate-General for Trade
  European Defence Agency
  European Institute for Gender Equality
  European Parliament
Federal Republic of Germany
  Federal Foreign Office
Government of Canada
  Department of National Defence
  Public Services and Procurement Canada
Government of Japan
Government of Norway
  Ministry of Foreign Affairs
Iraq
  Kurdistan Regional Government

Kingdom of Saudi Arabia
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  Research and Documentation Centre
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  Taipei Economic and Cultural Office
Republic of Korea
  Korea Institute for Health and Social Affairs
  Korean Consulate General in Los Angeles
State of Qatar
  Qatar Fund for Development
United Arab Emirates
  Embassy of the United Arab Emirates
United Kingdom
  Defence Science and Technology Laboratory
  Department for Environment, Food, and Rural Affairs
  Department of Health and Social Care
  Department for Transport
  Development, Concepts, and Doctrine Centre
  Economic and Social Research Council
  Home Office
  Ministry of Defence
  National Institute for Health Research

International Organizations

BasicNeeds

NATO

Organisation for Economic Co-operation and Development (OECD)

Pan American Health Organization

Sasakawa Peace Foundation

United Nations Development Programme

World Bank

Colleges and Universities

Boston University

Bowling Green State University

Brandeis University

Brown University

California State University, Dominguez Hills

Carnegie Mellon University

Columbia University

   Columbia University Medical Center

Florida International University

The George Washington University

Georgetown University

Harvard University

   Brigham and Women's Hospital

   President and Fellows of Harvard College

Indiana University

Iowa State University

Johns Hopkins University

Makerere University School of Public Health

Massachusetts Institute of Technology

Medical University of South Carolina

Monterrey Institute of Technology and Higher Education (Tecnológico de Monterrey)

NC Community Colleges

New York University

Northwestern University

Oregon Health & Science University

Pennsylvania State University

Seattle Colleges

Singapore Management University

SOAS University of London

Tufts University

Tulane University

Universitätsklinikum Ulm

University of Arkansas

University of Botswana

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   University of California, Davis

   University of California, Irvine

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University of Colorado Denver

University of Georgia

University of Gothenburg

University of Iowa

University of Maryland

University of Massachusetts

   UMass Boston

   UMass Lowell

   UMass Medical School

University of Michigan

University of Minnesota

University of Missouri–Kansas City

University of New Hampshire

University of New Mexico

   UNM Health Sciences

The University of Newcastle, Australia

The University of North Carolina at Chapel Hill

The University of North Carolina at Greensboro

The University of Oklahoma

University of Pittsburgh

University of South Carolina

University of Southern California

The University of Texas

   The University of Texas Health Science Center at Houston

   The University of Texas Medical Branch at Galveston

   The University of Texas at Tyler

   UT Southwestern

The University of Utah

University of Virginia

University of Washington

University of Wisconsin System

Utica College

Vanderbilt University

Western Michigan University

Yakima Valley College

Yale University

Zhejiang University

Foundations

AANA Foundation

AARP Foundation

Aetna Foundation

Baton Rouge Area Foundation

Benevolentia Foundation

BHP Foundation

George W. Bush Foundation

Cancer Research UK

Una Chapman Cox Foundation

DICK'S Sporting Goods Foundation

Education Endowment Foundation

Elrha

Thomas B. Fordham Foundation

Greater Rochester Health Foundation

Harmon Family Foundation

The Health Foundation

Health Strategies of New Hampshire

KnowledgeWorks

Laughing Gull Foundation

MacArthur Foundation

PhRMA Foundation

Propel Schools Foundation

Qatar Foundation

The Rippel Foundation

Bernard van Leer Foundation

The Water Research Foundation

Wellcome

Professional Associations

American Academy of Hospice and Palliative Medicine

American Academy of Physician Assistants

American Association of Neuromuscular and Electrodiagnostic Medicine

American Medical Association

American Orthotic and Prosthetic Association

Pennsylvania Association of Nurse Anesthetists

Other Nonprofit Organizations

3 Rivers Wet Weather

AAA

AARP

AcademyHealth

AccessCircles

Advanced Robotics for Manufacturing Institute

Allegheny Health Network

AMBS Research and Education Foundation

American Association for Justice

American Enterprise Institute

American Institutes for Research

Ascendium Education Group

Association of Public Health Laboratories

Baycrest

Bayou Interfaith Shared Community Organizing (BISCO)

BellXcel

Boston Medical Center

Brilliant Corners

George W. Bush Institute

California Hospital Association

California Mental Health Services Authority

Cedars-Sinai

Center for Climate and Energy Solutions

Central Indiana Corporate Partnership

CHDI Foundation

Chesapeake Bay Trust

Corporation for Supportive Housing

Criterion Education, LLC

Dog Tag Inc.

Economic Mobility Corporation

Ednovate

Education Northwest

Equitas Academy

ExpandED Schools

Families Forward Learning Center

Families USA

Give an Hour

Guinn Center

Gulf of Mexico Alliance

Health Care Service Corporation

Health Research & Educational Trust

The Hebrew Home at Riverdale

Inland Empire Health Plan

Inter-American Development Bank

JIR PFS ("Just-in-Reach" Pay for Success)

Kaiser Permanente

Kentucky Valley Educational Cooperative

Leading Educators

Local Initiatives Support Corporation

Magee-Womens Research Institute

Maimonides Medical Center

Massachusetts General Hospital

Mayor's Fund to Advance New York City

Medical Device Innovation Consortium

Memorial Sloan Kettering Cancer Center

The Mind Research Network

The MITRE Corporation

The Monterrey Metropolitan Water Fund (Fondo de Agua Metropolitano de Monterrey)

National Academy of Sciences

National Bureau of Economic Research

National Committee for Quality Assurance

National Education Association

New Leaders for New Schools

New Levant Initiative

NORC at the University of Chicago

NYC Leadership Academy

Oklahoma Partnership for School Readiness

Pan American Development Foundation

Partners in Health

Pathfinder International

Patient-Centered Outcomes Research Institute

PCAOB (Public Company Accounting Oversight Board)

PetSmart Charities

Project HOPE Foundation

Purchaser Business Group on Health

Research Foundation of the City University of New York

Research Foundation of the State University of New York

RTI International

Santa Fe Institute

The Scripps Research Institute

Seattle Children's Research Institute

Single Stop

Sitka Sound Science Center

SRI International

Teach for All

The Tides Center

TNTP

Urban Institute

Vera Institute of Justice

Wandersman Center

WestEd

Wounded Warrior Project

Youth Villages

ZEW–Leibniz Centre for European Economic Research

Industry

Abt Associates

Analytics of Aging, Inc.

ARCADIS

Arthur D. Little Middle East

The Asan Institute for Policy Studies

BiasSync

Biba Ventures Inc.

Biogen

Black & Veatch

BOTEC Analysis

Brown and Caldwell

Centene Corporation

Chevron Corporation

codeSpark

Comcast

CSRA LLC

Marc Cuban

Dakota Consulting Inc.

dfusion

DSG (Development Services Group)

ExactCare

Feelmore Labs

Ford Smart Mobility

Google

Health Services Advisory Group

Hoogalit

Industrial Technology Research Institute

Institute for National Defense and Security Research

JBS International

Kidney Disease Program of Glendale

Mathematica Policy Research

Microsoft Russia LLC

Mitsubishi Research Institute

Mizuho Information & Research Institute

MPG Consulting

Otsuka

Pharmavite

Policy Research Associates

The Policy & Research Group

Policy Studies Associates, Inc.

Rotem Strategy

Schell Games

Search for Common Ground

Seniorlink

TRC

Uber Advanced Technologies Group

USAA

Vertex Evaluation & Research

Wakely

WayBetter

Westat

The Wonderful Company

John Wood Group PLC

These clients commissioned one or more projects that were active in 2020 and that totaled at least $100,000. For revenue by client sector, see page 93.

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The RAND Corporation is a global organization with offices in North America, Europe, and Australia. RAND's U.S. locations include Santa Monica, California, the home of its headquarters campus and the Pardee RAND Graduate School; Arlington, Virginia; Pittsburgh, Pennsylvania; and Boston, Massachusetts. RAND also has U.S.-based researchers living and working in more than 25 states and operates the RAND Gulf States Policy Institute serving the U.S. Gulf States region. RAND Europe has offices in Cambridge, United Kingdom, and Brussels, Belgium; its research staff comprises people from more than 25 countries. RAND Australia has its office in Canberra.

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Our people bring a diverse range of professional, educational, and cultural backgrounds to their project teams.

55% Hold Doctorates

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75 Languages

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RESEARCH TALENT

Doctorates, including MDs and JDs **55%**
38% Master's
7% Bachelor's

Arts and letters **3%**
Social sciences **12%**
Political sciences **7%**
Policy analysis **13%**
Physical sciences **6%**
Mathematics, operations research, statistics **8%**
Life sciences **6%**
7% Behavioral sciences
4% Business and law
6% Computer sciences
11% Economics
8% Engineering
9% International relations
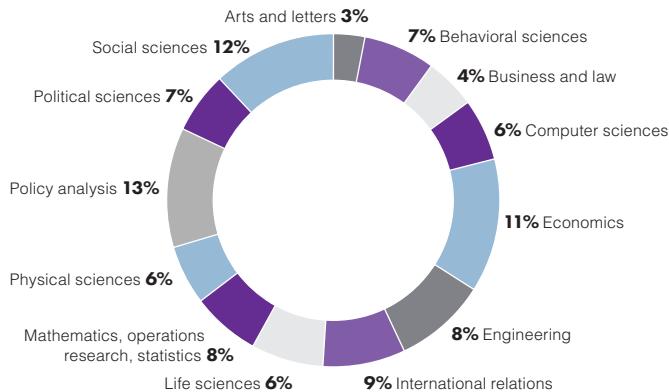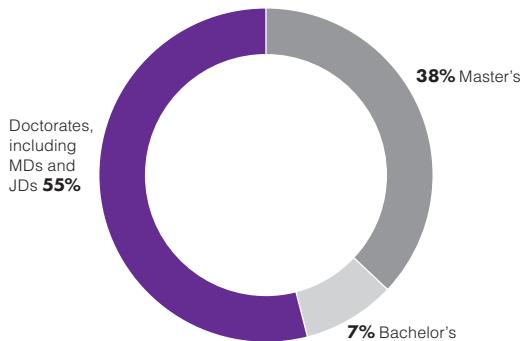
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Last year, we added ~540 RAND publications and ~325 journal articles to our growing digital library—26,000 and counting—of reports, podcasts, videos, and commentary, which can be accessed at www.rand.org.
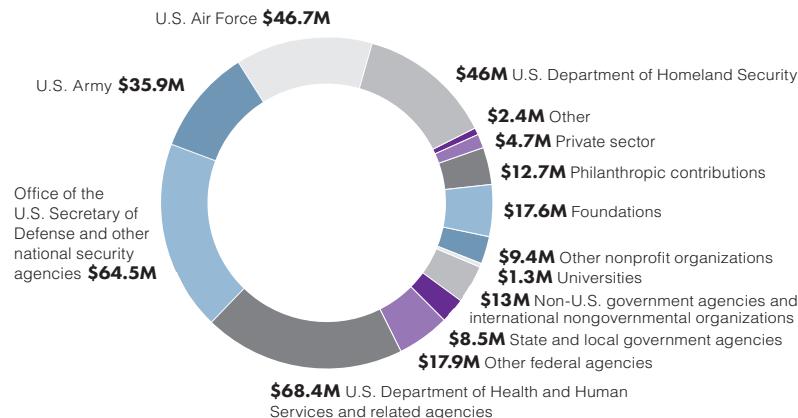
900 New Projects

Through more than 1,740 projects (including ~900 new ones), RAND provides research services, systematic analysis, and innovative thinking to a global clientele.
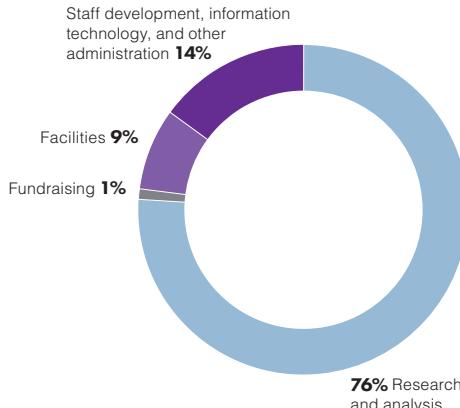
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7.9M Web Downloads

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REVENUE AND EXPENSES

U.S. Air Force **$46.7M**

U.S. Army **$35.9M**

Office of the U.S. Secretary of Defense and other national security agencies **$64.5M**

$46M U.S. Department of Homeland Security

$2.4M Other
$4.7M Private sector

$12.7M Philanthropic contributions

$17.6M Foundations

$9.4M Other nonprofit organizations
$1.3M Universities

$13M Non-U.S. government agencies and international nongovernmental organizations

$8.5M State and local government agencies

$17.9M Other federal agencies

$68.4M U.S. Department of Health and Human Services and related agencies

$349M in revenue
FY2020, net of subcontracts and RAND-initiated research

Staff development, information technology, and other administration **14%**

Facilities **9%**

Fundraising **1%**

76% Research and analysis

A complete copy of RAND's financial statements can be found at www.rand.org/about/financial_statements

Credits

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Vice President, External Affairs

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