Our mission is to help improve policy and decisionmaking through research and analysis.
Seventy years ago, Project RAND separated from the Douglas Aircraft Company of Santa Monica, California, and became an independent, nonprofit organization.

Since that time, RAND’s commitment to the public interest has never wavered. RAND’s research pursuits have expanded to include both defense-related topics as well as economic and social challenges—not just in the United States but also across the globe. Today, we have staff from more than 50 countries working in RAND offices in the United States, the United Kingdom, Belgium, and Australia. All share a commitment to RAND’s core values: quality and objectivity.

In addition, the Pardee RAND Graduate School operates the world’s foremost doctoral program in policy analysis. The school attracts top talent from around the world, who in their postgraduate careers are highly sought after by employers in government, academia, research organizations, private industry, and nongovernmental public-service organizations.

The people of RAND are energized by the opportunity to use research and analysis to find solutions to today’s most pressing challenges: how to ensure that every individual and family has an opportunity to reach their full potential; how to ensure that communities promote the well-being of their residents and are resilient in the event and aftermath of crises; and how to ensure that America and its allies are prosperous and secure in an era of growing international dangers.

The need for RAND’s brand of rigorous and objective analysis has never been greater. The last two decades have witnessed the diminishing role of facts and analysis in American public life, a phenomenon we have called “truth decay.” Understanding the drivers and consequences of truth decay and mitigating its most damaging effects are the focus of a new RAND book and a continuing portfolio of projects. RAND was established on the proposition that solving complex policy problems should begin with the facts. That proposition is just as valid today, so we are grateful for the commitment of our clients, grantors, and donors to rigorous and objective analysis and for the trust that they place in RAND.

On this milestone occasion of our 70th anniversary, we thank you for your support and interest in RAND.

Michael D. Rich
President and Chief Executive Officer

Karen Elliott House
Chair, RAND Board of Trustees
A Resource for Decisionmakers

For seven decades, clients and grantors around the world have turned to RAND for empirical, nonpartisan, and objective research and analysis, bringing us their most vexing and complex public policy challenges.

These organizations include cabinet-level agencies, charitable trusts, city governments, and community nonprofits. These decisionmakers include program managers, CEOs, administrators, doctors, thought leaders, and educators. They have different concerns, different priorities, and different constraints.

But these diverse clients have one thing in common: They need analysis that relies on the best data and the strongest methods. And for that, in a landscape full of universities, think tanks, and consulting firms, they turn to RAND and its unique blend of scrupulous nonpartisanship and rigorous, fact-based analysis.

On the following pages, we share highlights from RAND’s client-funded research in 2017. These projects demonstrate an approach to problem-solving that is founded on rigor, stripped of speculation, and dedicated to promoting the public welfare and security.
Reducing Opioid-Related Fatalities

America’s addiction to heroin, fentanyl, and other opioids has helped make drug overdoses a bigger killer than car crashes and gun violence. Researchers identified three measures that could cut the death toll by nearly a third for people with opioid addictions.

The researchers reviewed the medical records of more than 30,000 patients with an opioid-use disorder in the Veterans Affairs health care system. They found that one-year death rates dropped from around 6 percent to 4 percent when the care those patients received followed three key quality measures—potentially saving hundreds of lives.

Those measures included psychosocial treatment, such as individual or group therapy, and regular doctor visits. But it was the third that was the most effective: Making sure recovering addicts had no access to opioids or anti-anxiety benzodiazepines, not even as prescriptions following surgery.

In a separate study, researchers showed that psychotherapy and psychosocial treatments could reduce mortality among people with all substance-abuse disorders, not just opioid addictions.

Even just starting treatment for a substance-abuse disorder was associated with a 14 percent reduction in mortality over 12 months. Those who engaged with treatment and stuck with it had 34 percent lower mortality rates over 12 months.

The National Institute on Drug Abuse sponsored both studies. The Veterans Affairs patients that the researchers analyzed differ in some fundamental ways from patients in private care. More research is needed to test whether the same quality measures work as well in other treatment settings. But the findings could point the way toward better treatment to help combat America’s opioid crisis.

Learn more at www.rand.org/t/EP67359
Cracks in the International Order

The international order that the United States and its allies built from the wreckage of World War II has reached a turning point. To survive, it must change.

The rules and norms of the international order have helped open markets, avert war among great powers, and guide seven decades of international affairs. But researchers looking at an array of indicators, from trade numbers to public opinions, concluded that the order is starting to show cracks.

That was apparent even before populist uprisings in the United States, Britain, and elsewhere challenged some of the very foundations of that order, such as liberal trade and immigration policies.

Developing nations have increasingly viewed the order’s promises of economic prosperity as empty. Major powers like Russia and China have strained against a world order in which the United States writes the rules.

The international order remains stable for now, the researchers concluded in a report for the Office of the Secretary of Defense. But pressure for reform is building. Business as usual is no longer a viable option.

The United States and its allies must accommodate more voices while still upholding international norms. They must continue to promote trade and economic stability while protecting people made vulnerable by globalization.

This is a perilous moment for the international order, the researchers concluded—and no time for the United States to step back. Its alliances, trade agreements, and commitment to international institutions like the United Nations have helped promote world order for 70 years. Its withdrawal now could be the final crack in that system.

Learn more at www.rand.org/t/RR1994

Our analysis strongly supports the sense of an encroaching period of uncertainty and potentially more-dramatic swings in the health of the order—an inflection point in the character of the international order.
Russian Responses to the U.S. and NATO

The United States and NATO have started to move thousands of troops into the Baltic region to deter any possible Russian aggression. That has raised a critical question: How might Russia respond?

The answer could range from quiet acceptance to escalation and open conflict. Given the stakes, researchers built an analytical framework to help decisionmakers think through how Russia might perceive U.S. and NATO actions, and how it is likely to react.

Their framework, produced for the U.S. Air Force in Europe, takes into account Russia’s domestic situation and the broader strategic context, in addition to the specifics of any NATO moves. It draws on current Russian writing about security and defense, as well as historical precedents and assessments of Russian strategic thinking.

The researchers then used that framework to gauge likely Russian responses to NATO’s current plans to strengthen its posture in the Baltics.

They concluded that, despite its rhetoric, Russia is not likely to risk an armed confrontation over what are still relatively limited NATO moves. It appears to see no real strategic value in retaking the Baltic states. But there are domestic factors—a struggling economy, resurgent nationalist groups—that could make its foreign policy less predictable in the future. Further, its elites increasingly view the United States and NATO as long-term threats.

Understanding that context is key as NATO continues to build up its forces in eastern Europe. Recent failures in anticipating Russian moves, such as its 2014 invasion of Crimea, underscore the importance of thinking through how it might respond.

Learn more at www.rand.org/t/RR1879

“Russian reactions to U.S. and NATO posture enhancements could vary considerably, depending on the context in which they take place. Policymakers need to pay careful attention to that, to make sure they maximize the effectiveness of those enhancements while minimizing the risk of unwanted Russian reactions.”

BRYAN FREDERICK
Political Scientist
The U.S. Army faces a formidable rival as it begins to build up its cyber-warfare forces: the civilian job market.

Senior leaders throughout the Department of Defense have worried their cyber warriors will jump to better-paying jobs after years of investment and training. To help the Army understand the likelihood of that happening, researchers analyzed how Army cyber occupations compare with similar jobs in the corporate world, and how the Army might compete more effectively.

Cyber operations specialists must pass some of the toughest entrance requirements in the Army and commit to five years of service after training. But after that, the researchers found, they could compete for civilian jobs as information security analysts. Median earnings: around $82,000 a year.

That perceived opportunity could draw highly trained cyber specialists away from the Army. But without a college degree, former Army cyber specialists would likely make less than a typical information security analyst—roughly what they made in the Army, especially when housing allowances and other benefits are included.

For most, a combination of specialty pay and retention bonuses could tip the balance in favor of staying in the Army. The researchers also recommended keeping the five-year initial obligation for cyber specialists, to ensure the Army benefits from the extensive training it provides.

Cyber is a new field for the Army; its first class of specialists completed training in 2017. It will be important to follow civilian employment trends going forward, especially if the private sector begins to show less preference for college degrees. Keeping such in-demand specialists in the Army will require knowing what opportunities they perceive outside of it.

Learn more at www.rand.org/t/RR1978

These soldiers require extensive training, and Army leadership was concerned that they will be lured away by lucrative jobs in the civilian labor market.
American workers face high rates of physical strain, hazardous conditions, and abuse on the job, according to one of the most in-depth surveys of the American workplace ever done.

More than 3,000 people answered questions about their jobs and workplaces for RAND’s American Working Conditions Survey. The results help fill a gap in our knowledge about the daily realities of American workers, and could guide public policies or workplace initiatives to improve working conditions. Future reports will compare the American workplace with those in Europe and other parts of the world.

Nearly three-quarters of all workers reported intense or repetitive physical exertion at least some of the time, from moving heavy objects to sitting for long stretches. More than a third said they encounter potentially hazardous or unpleasant conditions at their workplace.

More than one in ten workers said they experienced on-the-job bullying or harassment in the past year. Nearly 5 percent of women reported unwanted sexual attention just in the preceding month. Men reported higher rates of verbal abuse.

The median pay for full-time working men in the survey: $54,000. For women: $44,000.

The results were not all negative. More than half of workers said they have a supportive boss, and more than three-quarters said they like and respect their colleagues. Most said they have the freedom to apply their own ideas at their jobs. And two-thirds thought they were doing useful work.

Older people who had retired or were no longer in the workforce pointed to those positive factors—more than even the paycheck—as a reason they would consider clocking back in.

Support for the project was provided by the Alfred P. Sloan Foundation and the Social Security Administration through the Michigan Retirement Research Center.

Learn more at www.rand.org/t/RR2014

One thing employers can do is push back against the perception that there is a business case for pushing employees to their limits. They should instead require that managers protect their employees from abusive coworkers, clients, and customers.
American teachers strongly support state standards in math and language arts. But that support drops when it comes to statewide tests to assess their students’ mastery of those subjects.

Standardized tests and instruction have become a political flash point. To help inform the debate, researchers surveyed more than 1,300 public school teachers for on-the-ground insight into what works, and what doesn’t.

The RAND American Teacher Panel survey, with funding from the Bill & Melinda Gates Foundation, found that nearly 90 percent of math and language arts teachers supported the use of statewide standards in classroom instruction. That support was especially high among teachers in low-income schools and those with higher numbers of English learners. It was a few percentage points lower in states where teachers reported using a set of academic standards known as Common Core.

The numbers flipped when the questions turned to standardized tests. Only about 30 percent of those same teachers supported their state’s tests. Opposition was stronger among teachers with high numbers of special-needs students and those in Common Core states.

Teachers cited two major concerns with state tests: that they were too difficult for their students, and that they did not accurately assess students with special learning needs. Many also said preparing students for the tests took time away from classroom work.

The survey results could help policymakers assess and improve classroom instruction and standardized tests. In particular, states and school districts should strive to align their state tests with state standards, and to communicate how they fit together to the teachers making the lessons. They should also identify instructional materials that more closely align with those same tests and standards.

“Our survey findings suggest that states and districts have much more work to do to improve the implementation of state tests to measure students’ mastery of standards.”

JULIA H. KAUFMAN
Policy Researcher

Learn more at www.rand.org/t/RR2136
Early Childhood Investments

Programs that help children develop and learn in their first few years can have a lasting impact on their lives. Researchers at RAND were among the first to demonstrate the enormous potential future savings from early childhood education, home visiting, and other early childhood programs. Their latest study, building on research they began in the 1990s, analyzed 115 programs, all of which had undergone rigorous evaluations. It found 102 made a clear and positive difference in young lives. Those evaluations often measured many different child outcomes, from test scores to behavior to health. When the researchers looked at every outcome in every study of the 115 programs—more than 3,000 measured outcomes in all—they found 29 percent showed improvement. That was a winning percentage given the sheer range of outcomes measured, about six times higher than would be expected from random chance alone.

Few of the evaluations had tried to measure costs versus benefits. In those that did, though, the researchers found returns of $2 to $4 were typical for every dollar invested. Policymakers have ample evidence now that early childhood programs work and are worth the investment, the researchers concluded in their report for the Robert Wood Johnson Foundation. That’s especially important for children of social or economic disadvantage, they noted. Done well, early childhood programs can give them a better shot at success before they even reach grade school.

Learn more at www.rand.org/t/RR1993
## Clients and Grantors

### U.S. Government
- Administrative Office of the United States Courts
- Consumer Financial Protection Bureau
- Department of Commerce
  - National Oceanic and Atmospheric Administration
- Department of Defense
  - Defense Centers of Excellence
  - Defense Contract Management Agency
  - Defense Security Cooperation Agency
- Department of the Air Force
- Department of the Army
  - Medical Research Acquisition Activity
- Department of the Navy
  - Marine Corps
  - Naval Postgraduate School
- Joint Special Operations Command
- Joint Staff
- Office of the Secretary of Defense
  - Office of the Director, Cost Assessment and Program Evaluation
- Under Secretary of Defense for Acquisition, Technology, and Logistics
  - Defense Advanced Research Projects Agency
  - Under Secretary of Defense for Personnel and Readiness
  - Under Secretary of Defense for Policy
- Special Operations Joint Task Force–Afghanistan
- Unified Combatant Commands
- Department of Education
  - Institute of Education Sciences
- Department of Energy
  - National Renewable Energy 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 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
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    - National Institute of Mental Health
    - National Institute on Minority Health and Health Disparities
    - National Institute of Nursing Research
- Department of Homeland Security
  - U.S. Coast Guard
- Department of Justice
  - National Institute of Justice
  - Office of Justice Programs
- Department of Labor
- Department of State
- Department of Veterans Affairs
- Federal Communications Commission
- National Aeronautics and Space Administration
- National Science Foundation
- Office of the Director of National Intelligence
- Intelligence Community

### U.S. State and Local Governments
- Commonwealth of Massachusetts
- Department of Public Health
- Commonwealth of Pennsylvania
  - County of Allegheny
  - Pittsburgh Public Schools
- Commonwealth of Virginia
  - Office of the Attorney General
- State of California
  - City of Santa Monica
  - Department of Industrial Relations
  - Department of Social Services
- Los Angeles County
  - First 5 LA
  - Metropolitan Transportation Authority
  - Probation Department
- State of Delaware
- State of Illinois
  - City of Chicago
- State of Louisiana
  - City of New Orleans
- State of Michigan
  - Michigan Indigent Defense Commission
- State of New York
  - NYC Opportunity
  - Office of Indigent Legal Services
- State of Ohio
  - Cincinnati Public Schools
  - State of Oregon
  - Multnomah County Health Department
  - Oregon Health Authority
- State of Vermont
  - Agency of Administration

### Non-U.S. Governments, Agencies, and Ministries
- Canada
  - Department of National Defence
- Commonwealth of Australia
  - European Union
  - European Commission
  - Directorate-General for Health and Food Safety
  - Directorate-General for Migration and Home Affairs
  - Directorate-General for Research and Innovation
  - Research Executive Agency
  - European Defence Agency
  - European Parliament
  - Government of Japan
  - Iraq
    - Kurdistan Regional Government
  - People’s Republic of China
    - Jinan Water Resources Bureau
  - Republic of Korea
    - Korea Institute for Health and Social Affairs
  - United Arab Emirates
    - Embassy of the United Arab Emirates
  - United Kingdom
    - Defence Science and Technology Laboratory
    - Department of Health
    - Department for Transport
    - Foreign & Commonwealth Office
    - Ministry of Defence
    - National Institute for Health Research
    - Public Health England
    - Transport for London

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**RAND provides research services, systematic analysis, and innovative thinking to a global clientele.**
**International Organizations**

Basic Needs
NATO
Organisation for Economic Co-operation and Development (OECD)
World Bank
World Health Organization

**Colleges and Universities**

Boston University
Columbia University
Columbia University Medical Center
The Evergreen State College
Florida International University
The George Washington University
Harvard University
Brigham and Women’s Hospital
Indiana University
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Pennsylvania State University
Research Foundation of the City University of New York
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University of Michigan
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The University of North Carolina at Chapel Hill
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**Foundations**

Aetna Foundation
Baton Rouge Area Foundation
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The Commonwealth Fund
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Unita Chapman-Cox Foundation
DICK’S Sporting Goods Foundation
The Eliza Dole Foundation
Education Endowment Foundation
Bill & Melinda Gates Foundation
The Health Foundation
Health Strategies of New Hampshire, Inc.
The Helmsley Charitable Trust
The William and Flora Hewlett Foundation
The Robert Wood Johnson Foundation
The Klarman Family Foundation
Laughing Gull Foundation
Henry Luce Foundation
MacArthur Foundation
Neillie Mae Education Foundation
McCormick Tribune Foundation
Richard King Mellon Foundation
New York State Health Foundation
The Pew Charitable Trusts
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Raikes Foundation
The Rockefeller Foundation
Royal Society
Alfred P. Sloan Foundation
The Stanton Foundation
The Wallace Foundation
Walton Family Foundation

**Other Nonprofit Organizations**

American Institutes for Research
Baycrest
Brilliant Corners
California Mental Health Services Authority
California Travel and Tourism Commission
Cedars-Sinai Medical Center
Center for Court Innovation
Children’s Hospital Boston
Collaborative Spine Research Foundation
College for All Texans Foundation
Corporation for Supportive Housing
Criterion Education, LLC
ExpandED Schools
Great Lakes Higher Education Corporation and Affiliates
Gulf of Mexico Alliance
Harlem Children’s Zone
Hepatitis Foundation International
International Initiative for Impact Evaluation (3ie)
JIR PFS (“Just-in-Reach” Pay for Success)
Kaiser Foundation Research Institute
Kentucky Valley Educational Cooperative
Korea Institute for Defense Analyses
Leading Educators
Mayor’s Fund to Advance New York City
Memorial Sloan Kettering Cancer Center
The MITRE Corporation
The Monterey Metropolitan Water Fund (Fondo de Agua Metropolitano de Monterey)
National Academy of Sciences
National Committee for Quality Assurance
National Education Association
National Safety Council
Network for Teaching Entrepreneurship
New Leaders for New Schools
New York City Economic Development Corporation
NYC Leadership Academy
Patient-Centered Outcomes Research Institute
The Research Foundation for the State University of New York
The Scripps Research Institute
Silicon Valley Community Foundation
Single Stop USA
TNTP
United Way of Greater Cincinnati
Vera Institute of Justice
The Water Institute of the Gulf

**Industry**

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Canvas Medical
CarePoint Health
Chevron Corporation
Ethicon Endo-Surgery, Inc.
Health Services Advisory Group
ICF International, Inc.
JIA (Institute for the Study of Labor)
Janssen Scientific Affairs
KH Consulting Group
Kidney Disease Program of Glendale
Mathematica Policy Research
Microsoft
New York City Economic Development Corporation
Pillar Systems Corporation
Policy Studies Associates, Inc.
Renova Therapeutics
Resolution Economics
Schell Games
Symantec
Truven Health Analytics
United Healthcare Services, Inc.
Vitality Health
Westat

*These clients and grantors commissioned one or more projects that were active in 2017 and that totaled at least $100,000. For revenue by client sector, see p. 49.*
RAND Ventures

Fueled by philanthropic gifts and RAND’s income from operations, RAND Ventures is an important way to pursue visionary ideas; address critical problems that are under-researched; shape emerging policy debates; and devise innovative approaches for solving acute, complex, or provocative policy challenges.

In short, RAND Ventures helps us think big.

RAND Ventures is like a research and development lab—essential to our ability to gaze over the horizon, beyond the constraints of many of today’s decisionmakers, to imagine, prepare for, and enable what’s next.

On the following pages, we share highlights from RAND Ventures in 2017. These projects introduced innovations by using existing methods in new contexts, generated important and timely insights, or spotlighted novel ways to frame some of the biggest challenges of our time.
We have to be careful and not give people a false hope that they can just watch for warning signs to prevent suicide. It’s really way more complicated than that.

Understanding Suicide

The public-service message has been clear: To prevent suicide, watch for warning signs. But according to RAND research, it’s much more complicated than that.

Around 120 people die by suicide on an average day in America, making it one of the leading causes of death. RAND research has helped suicide hotlines better respond to callers in crisis, and helped military leaders better address suicide risks in the ranks.

But to understand suicide up close, a small team of researchers embedded themselves with the coroner’s office in New Orleans. They conducted “psychological autopsies” of 17 people who died by suicide, interviewing family and friends about their loved one’s daily routines, relationships, health and financial problems, and other factors.

One clear pattern emerged: In almost none of the cases did the usual warning signs—withdrawal, acting anxious or aimless, voicing suicidal thoughts—provide a reliable red flag.

More than two-thirds of the people in the study had a diagnosed mental illness; more than half were using illegal drugs. For their friends and families, the warning signs were a part of daily life, not a new behavior that could have signaled a growing risk of suicide.

The findings could reorient suicide-prevention efforts toward high-quality programs for people with mental illness, and support services for families struggling with depression and other types of mental illness. The time to intervene, the researchers concluded, is not just in the hours or days before a suicide attempt, but in the months and even years leading up to it.

Learn more at www.rand.org/t/EP67027
The United Kingdom will almost certainly take an economic hit when it makes its Brexit from the European Union in 2019.

Researchers modeled the most plausible scenarios and concluded that almost all leave the UK in worse economic shape than if it had stayed. That’s true even if it succeeds in negotiating a free-trade agreement with the EU to take effect after its membership ends.

If it fails even that—the “no-deal scenario”—then it stands to lose $140 billion after ten years, resulting in an economy nearly 5 percent smaller than it would have been. A free-trade deal with Europe would help, but only so much. The British economy would still lose $55 billion after ten years.

In fact, the analysis found only one scenario in which post-Brexit Britain comes out ahead: if it can negotiate a three-way trade deal with the EU and the United States. But negotiations on such a deal have been on hold since the beginning of the Trump administration.

Drawing on RAND’s long experience with game theory, the researchers also showed that the EU has the upper hand in its negotiations with Britain. That’s in part due to the high stakes for the British economy, but also because of the tight deadline for negotiating any exit deal. And the EU’s main objective is to ensure the British are worse off when they leave, to discourage other states from following.

RAND posted an online Brexit calculator with the study. It allows users to change assumptions and create new scenarios to explore the economic consequences of Brexit as negotiations proceed.

Learn more at www.rand.org/t/RR2200

“Nothing like Brexit has occurred in the last century. Advocates expect it will mean renewed sovereignty over economic and social policy. But the United Kingdom is learning that leaving the European Union is likely to also have real costs.”

MARCO HAFNER
Research Leader
A Plan for U.S. Infrastructure

America’s roads, bridges, mass transit, and water works have a reputation for disrepair. But when researchers took a closer look at that infrastructure, they found that not everything is broken—except our approach to maintaining and investing in it.

There’s no question that U.S. transportation and water infrastructure is showing signs of age. More than 60 percent of the interstate highway system, for example, was built before 1970. But annual spending increases of 2.8 percent above inflation could largely eliminate backlogs for highway and bridge repairs by 2032.

That would represent billions of dollars in new spending across all levels of government. But there are ways to pay for it.

Federal policymakers could expand existing credit programs and broaden the pool of investors willing to help state and local governments finance needed improvements.

They could ramp up experiments to replace the existing gas tax with a fee based on miles traveled to fund transportation projects. They should make vital federal assets such as military bases, national parks, dams, and levees a high priority for maintenance funding. And they should require greater resilience to natural disasters and climate change as a condition of public funding, to lower federal recovery costs in the future.

Above all, the federal government needs a plan. It should work with state and local governments to prioritize investments that benefit the nation as a whole, address regional needs, or exceed the capacity of individual states. Its focus should be on maintaining and modernizing vital infrastructure to meet the needs of the 21st century.

"Spreading federal dollars around to fund short-term, 'shovel-ready' projects without a sense of national purpose or priority will not get the United States where it needs to be.

Learn more at www.rand.org/t/RR1739
Movie recommendations, credit scores, and even home loans and job offers might all come down to the cryptic judgment of computer algorithms. And that should make everyone a little nervous.

Bias, inequality, and outright racism are often hardwired into the algorithms and data that machines are using to make increasingly important decisions, researchers found. Criminal courts, for example, have been using a risk-assessment algorithm in sentencing hearings that too often penalizes people of color.

Feeding even the best algorithms a diet of historically biased data only teaches them to imitate those same biases. That has real consequences when those algorithms are helping to decide who can get a home loan or where police should focus their patrols.

Part of the answer lies with the algorithms themselves, the researchers concluded. Decision-making machines should have an audit function that allows human operators to track back the reasoning behind a given answer, to ensure transparency and fairness.

But the researchers also called for “algorithmic literacy” in society at large—a healthy skepticism that the algorithms of everyday life don’t always make the best decisions. Organizations using algorithms should disclose when a given decision was computer mediated; and the people affected by that decision should know enough to question—and, if needed, challenge—the outcome.

Learn more at www.rand.org/t/RR1744

“Researchers in artificial intelligence and algorithms dismissed [questions of bias] because they were not ‘engineering concerns.’ That was OK for commercial toys, but the moment the switch was made to applying algorithms to public policy systems, the issue of bias no longer became a triviality.

OSONDE A. OSOBA
Engineer
Iraq and Syria from Space

The Islamic State struggled to govern the cities it conquered, or even to keep the lights on, researchers found, based on observations from hundreds of miles overhead.

Satellite data provided an unprecedented look at how cities and local economies changed when ISIS took control. The data allowed researchers to follow agricultural production, pinpoint working factories, even estimate the number of commercial trucks on the road.

Researchers collected data on more than 150 cities in Iraq and Syria, month by month. They estimated that as much as a third of the population had fled areas under ISIS control. Factories closed; fields withered. In Syria, more than 60 percent of the urban lights went dark in ISIS-controlled territory as the group struggled to restore electricity or fuel generators. In Iraq, it was more like 80 percent.

The researchers found only occasional signs of effective governance, mostly in major cities like Mosul or Raqqa—in the core of the caliphate, away from heavy fighting. ISIS invested in a central marketplace in Mosul, for example, that was soon crowded with shoppers and truck traffic, all of which it could tax.

The group has since lost much of the territory it once ruled. That has given RAND’s analysis new importance as a window into the economic damage left behind, and what it will take to rebuild. Researchers have been working with U.S. government agencies to prioritize work in Syria to help stabilize cities captured from ISIS—restoring the electric grid, for example, or building up local markets.

Learn more at www.rand.org/t/RR1970

“Without the military campaign to retake this territory, the Islamic State could have tried to replicate some of the modest success it experienced in Mosul and Raqqa. We would be facing a much different enemy.”

ERIC ROBINSON
Research Programmer and Analyst
Community Citizen Science

In 2015, a worried mother in Flint, Mich., began sending samples of her tap water to a Virginia Tech lab to be tested for lead. The results helped expose a public-health crisis that may have poisoned 100,000 people. They also demonstrated the power of citizen science. Growing numbers of concerned citizens are using scientific tools, such as data collection or environmental monitoring, often to improve their own communities. Researchers surveying the field concluded those citizen scientists could transform both science and public policy, but major barriers remain.

Concerns about the quality of citizen-generated data have held back its potential, the researchers found. Many citizen-science projects, driven by community concerns, also walk a fine line between research and advocacy. What is needed, the researchers concluded, is for citizens, scientists, and decisionmakers at all levels to work together to enhance and encourage citizen science. The scientific community, for example, could partner with and guide citizens as on-the-ground data collectors.

With the rise of citizen science, we hope that scientific debate can now motivate an educated and observant public to help renew the scientific enterprise for the production of greater knowledge.

“...”

RAMYA CHARI
Policy Researcher

Some states have already turned to citizen scientists to help with environmental monitoring. Federal law encourages science agencies to use crowdsourcing and citizen science to advance their missions. RAND has collaborated on citizen-science projects in New York and Louisiana. The citizen-science movement is, in some ways, a return to scientific tradition, the researchers wrote. The theory of evolution and the field of genetics, for example, both owe their origins to amateur, citizen scientists.

Learn more at www.rand.org/t/PE256
Gifts—Making a Difference

The RAND Ventures program combines philanthropic gifts from individuals, foundations, and private-sector firms with earnings from RAND’s endowment and operations to help RAND support vital research pursuits and outreach activities that would otherwise go unfunded. Our donors share RAND’s commitment to quality, objectivity, and independence; entrust us with protecting these values in our work; and help RAND have an impact across the national and global policy landscape.

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The Pardee RAND Advantage

Founded in 1970 as one of eight graduate programs created to train future leaders in public policy, the Pardee RAND Graduate School is the largest public policy Ph.D. program in the United States. It also has the distinction of being the only policy school based at a public policy research institute.

At Pardee RAND, elite students from around the world learn the importance of methodological and analytic innovation, engage in a curriculum renowned for rigor and breadth, and are taught by faculty who are also RAND researchers. They conduct policy research with RAND mentors in on-the-job training, developing skills and sophistication that can’t be conveyed in a classroom.

But it isn’t just students who benefit from this collaboration with RAND. Students infuse RAND’s environment with important new ideas and perspectives, generating new ways of looking at difficult problems, new methods and approaches for dissecting and rebuilding systems and processes, and new ways of outlining options and solutions.

On the following pages, we share highlights from RAND research and analysis that benefited from the fresh perspectives, engagement, and sense of intellectual innovation of students in the Pardee RAND Graduate School.

To learn more about the Pardee RAND Graduate School, visit www.prgs.edu
People living in the north-central plains of India—an area known as the heat belt—face a potentially lethal threat in the temperature extremes of a changing planet.

Researchers mapped heat-wave vulnerability across India’s 640 districts. Their purpose wasn’t to show where the heat is most extreme, but where demographics and living conditions make extreme heat especially dangerous.

Their data included the percentage of people who are elderly, working, poor, or live in a good house. They looked at socioeconomic caste and tribe, a substitute for race in the Indian context. They used satellite data to measure vegetation, and census data to determine the percentage of houses in each district with indoor drinking water (it ranged from 2.4 percent to 93.8 percent).

Their map, the first of its kind for India, identified ten districts that are especially vulnerable to heat waves. Those districts—rural, poor, and socially disadvantaged—all lie within the sweltering central heat belt. By comparison, the map showed 20 districts with very low vulnerability, almost all of them on the better-developed southwest coast.

Heat waves have caused massive numbers of deaths in the recent past, in India and elsewhere. In response, cities and countries around the world have adopted heat-wave preparedness plans—but very few districts in India have.

RAND’s map and vulnerability index can help policymakers and disaster planners better target climate-adaptation efforts. The need is urgent, the researchers wrote: Climate change models project coming increases in the frequency, intensity, and duration of heat waves.

“Heat is increasingly being recognized as a public health problem, especially given several recent deadly heat waves in India. Our heat vulnerability index is a useful first step in protecting the public from the health burden of heat.”

GULREZ SHAH AZHAR
Doctoral Candidate, Pardee RAND
Azhar was the lead author on this report.
Veterans Health Care

As Congress wrestled with the future of the Affordable Care Act (ACA), researchers estimated what repeal of the health care law would mean for military veterans and the U.S. Department of Veterans Affairs.

Nearly one in ten veterans under age 65 lacked any health insurance in 2013, just before the ACA’s major insurance coverage provisions took effect. The act helped cut the number of uninsured veterans by more than a third between 2013 and 2015 by creating health insurance marketplaces and expanding Medicaid eligibility.

Repealing the ACA would reverse those coverage gains. The replacement American Health Care Act, which passed the House in May 2017 but failed to pass the Senate, would have removed more non-elderly veterans from insurance rolls than had gained coverage after the ACA took effect.

Coverage losses following ACA repeal would lead older, sicker, and lower-income veterans especially to cut back on health care from non-VA sources. They would try to offset those reductions by seeking more care from the VA health care system.

RAND estimated that demand for VA care among non-elderly veterans would increase by 1 to 1.4 percent nationwide. The increase would be largest in Medicaid expansion states with younger and lower-income veteran populations, most notably Arkansas, Louisiana, and Kentucky.

The study was sponsored by the Robert Wood Johnson Foundation and the New York State Health Foundation.

Congress did not have the votes to pass a repeal-and-replace bill in 2017, but the debate about the future of the ACA is far from over. As the debate continues, RAND’s study provides a starting point for understanding how veterans would fare, and what it would mean for the VA.

A better understanding of the ways in which health insurance and health policy changes can affect veterans is essential to set health policy in a way that avoids creating unintended consequences for veterans or the VA.

MIMI SHEN
Doctoral Candidate, Pardee RAND
Shen provided statistical analysis support for this research, which was led by an economist and a senior policy researcher.
More than one in five women in the veterans health care system experienced sexual trauma while in the military. Almost as many report recent incidents of interpersonal violence.

The numbers underscore the urgent and growing need for primary care providers to screen their female patients for such traumas. Researchers surveyed nearly 100 care providers in the Veterans Health Administration to identify factors that could help more women get the screenings they need.

About two-thirds of the providers said they had screened a patient for military sexual trauma in the past year. About 60 percent said they had screened for interpersonal violence. Those numbers were much higher than typically found in civilian care settings.

Yet they still left room for improvement, especially with women now the fastest-growing demographic in the veterans health care system.

The researchers found that care providers were more likely to ask about sexual trauma or interpersonal violence when they had more experience with women veterans. Those who felt more confident in their care of women were also more likely to broach those topics. Most of the providers in the survey were women themselves, and many expressed some discomfort with addressing mental health problems. But those factors did not seem to affect screening rates.

The Veterans Administration, which funded the study, has launched initiatives to improve comprehensive care for women veterans. The survey findings suggest additional training for doctors and other primary care providers could raise screening rates by improving their comfort with and confidence in addressing military sexual trauma and interpersonal violence.

Learn more at www.rand.org/t/EP67297
Recruiting Women in the Military

The U.S. military has a historic opportunity to bring more women into the ranks, but researchers found it still has some obstacles to clear first.

The opening of ground-combat units to women could usher in a “new era of equality,” the researchers wrote. Women make up around 17 percent of the armed forces, and each of the service branches has made raising that number a goal.

The researchers convened a series of focus groups with new recruits—male and female, officer and enlisted—to better understand what that might take. Their research was sponsored by the Office of the Undersecretary of Defense for Personnel and Readiness. They found overwhelming support for women in combat positions, as long as they met the same standards as men. At least one or two women in almost every group volunteered that they wanted to go into a combat job.

But one other theme emerged in most of the women’s focus groups: the need for more women recruiters, and for recruitment strategies better tailored to both genders. The military still has a male-centric image, some noted, and female role models—in advertisements and in recruitment booths—could counter that.

Some women also raised concerns about sexual harassment and assault in the military. Many said it wasn’t a factor in their decision to join, but it was something their families or friends worried about.

Male and female recruits and recruiters uniformly expressed dismay at the amount of paperwork, processing, and waiting that occurs during the recruiting process. Recruiters pointed out that women leave at a higher rate than men during that process. They speculated that shortening and streamlining the process could reduce losses in both genders, but could especially help to retain female recruits.

Our research suggests that small modifications in recruiting practices could increase the number of women who decide to join.

Learn more at www.rand.org/t/RR1538
Israel’s War in Gaza

The Israeli military fought three major conflicts against Hamas in the Gaza Strip between 2009 and 2014. Its experience in the crowded streets of Gaza can teach the United States military some important lessons about urban warfare in the 21st century.

Researchers interviewed Israel Defense Forces officers who participated in the Gaza operations, as well as dozens of experts, journalists, and government officials in Israel. Their account of the three conflicts (starting with Operation Cast Lead in 2009 but focused more on Operation Pillar of Defense in 2012 and Operation Protective Edge in 2014) shows the challenges Israel faced against a determined, adaptive, hybrid adversary.

The Israeli experience demonstrated the limits of air strikes and precision firepower in dense urban terrain. Hamas fighters were able to use a network of tunnels to maneuver and evade Israeli strikes. Despite its technological superiority, the Israeli Air Force struggled to detect and destroy these networks from the air, forcing Israeli forces to conduct a ground operation. The U.S. military may face similar challenges in its future urban conflicts.

Other technologies proved more successful in Gaza. Active protection systems on vehicles protected Israeli forces from Hamas’s rocket-propelled grenades, while the Iron Dome missile defense system shielded the Israeli civilian population from Hamas’s missile attacks and gave Israeli policymakers the political space to conduct a more limited operation. The U.S. military should consider investing in both technologies.

The Gaza operations unfolded under the glare of international scrutiny. Both sides made such effective use of social media that Pillar of Defense has been called the first Twitter war. As the Israeli experience shows, modern militaries must also be prepared for “lawfare”—that battle for public opinion and legal legitimacy—when combating irregular forces.

Learn more at www.rand.org/t/RR1888

“Through firsthand accounts of the wars in Gaza, we were able to provide important insights into the challenges of urban warfare and identify lessons for the U.S. Army.”

ELIZABETH M. BARTELS
Doctoral Candidate, Pardee RAND
Bartels researched Israel’s Iron Dome missile-defense system for this project, which was led by a political scientist.
Cannabis prices in Washington State fell sharply, and the market shifted toward higher-potency products, after voters there legalized recreational use in 2012, researchers found. The state created a “seed to sale” system that tracked information about every cannabis product sold in the state. With support from the National Institute on Drug Abuse, researchers analyzed every legal cannabis sale in the system—more than 36 million in all. RAND researchers had predicted in 2010 that cannabis legalization would lead to a large price decline. The sales data showed they were right: The average price per gram of dried cannabis dropped by more than 30 percent from May 2015 to May 2017, from about $11.50 to $7.50.

At the same time, the labeled potency of the products—measured by levels of the active compound THC—increased. Sales of cannabis extracts for inhalation, such as vape pens and waxes, more than doubled; by 2016, they accounted for more than a fifth of all sales. Even the dried marijuana in the market got stronger. More than 90 percent had reported THC levels greater than 15 percent by 2016, well above national averages.

Washington has largely allowed the market to shape the price and potency of legal cannabis, the researchers noted. Other states could consider potency-based taxes or THC limits to manage high-potency products until their health consequences are better understood.

Learn more at www.rand.org/t/EP67304

“Legalization advocates have long argued that prohibition drives up potency, and that legal markets would naturally deliver less-potent products. We found the opposite happened in Washington, and that raises important questions about the public-health consequences.”

STEVEN DAVENPORT
Doctoral Candidate, Pardee RAND
Davenport provided data analysis and management services for this research, which was led by an economist.

The Potency of Legal Marijuana
23 entering students

39 percent of the new cohort hails from outside the United States

9 countries of origin: China, Ethiopia, India, Israel, Mexico, Pakistan, Poland, South Korea, and the United States

82 percent hold advanced degrees, including the MA, MS, MPA, MPH, and MPP

1 former foreign service special agent

1 Peace Corps volunteer (Guyana)

1 former game designer

1 research scientist for oncology drug discovery

1 volunteer of the year recipient, San Diego County Library

2 NCAA athletes (baseball and diving)

1 yoga instructor (also founder of a yoga studio in Rwanda)

1 Middle Eastern dancer (also a ballroom dancer)

1 accordion player

6 former or current U.S. military, including two special operations forces

Proficiencies in 14 non-English languages: Amharic, Cantonese, French, German, Gujarati, Hebrew, Japanese, Korean, Mandarin, Polish, Portuguese, Russian, Spanish, Ukrainian

Support for Incoming Cohorts

Full-Tuition Scholarships and Mentoring

For the fifth consecutive year, all eligible incoming students received full-tuition scholarships in year one and partial tuition scholarships in year two. Scholarships help students incur less debt as they move through their Ph.D. studies, and meet requirements quicker and graduate sooner.
A Curriculum Focused on Public Policy Analysis

The Pardee RAND Graduate School aspires to be the world’s leading Ph.D. program in policy analysis. Our goals are:

- to produce Ph.D. graduates whose dissertations make important intellectual contributions to practical issues and whose careers distinguish them as powerful intellectual influences on public life;
- in conjunction with RAND, to develop new lines of teaching and research on some of the world’s most difficult challenges in security, poverty, health, and development;
- for the profession as a whole, to rethink what public policy means in a time when we no longer automatically turn to government to solve all problems but increasingly rely on partnerships between government, business, and civil society.

The curriculum serves these goals, with a particular vision. Pardee RAND should be a place where some of the world’s most able graduate students come to work on some of the world’s hardest problems, with the rigor, interdisciplinarity, and flair that characterize RAND. And so the Pardee RAND curriculum tries to provide:

- (a) the best analytical tools from many disciplines;
- (b) practice in applying such tools to real problems; and
- (c) a creative, sometimes experimental approach that encourages new ways of thinking and doing.

The Ph.D. program consists of five elements:

- **Interdisciplinary Core Curriculum.** In the first year, students complete a rigorous core curriculum, covering mathematics, statistics, economics, operations research, political science, and other social sciences.

- **Analytic Concentration (optional).** In the second and third years, students may elect to focus their studies in one of three analytic concentrations: economics, quantitative methods, or social and behavioral sciences.

- **Policy Specialization.** Students also specialize in at least one policy area, such as national security, health, education, energy and environment, labor and population, economic development, or civil justice and regulation.

- **Project-Based Research.** Outside the classroom, students acquire practical experience as paid members of RAND research teams, which we call OJT (on-the-job training).

- **Policy-Relevant Dissertation.** Students write a doctoral dissertation that combines analytic rigor and practical utility under the guidance of a committee of RAND faculty and researchers.
New Courses

In 2017, the school added the following new courses. They contribute to a curriculum that conveys essential research methods and perspectives and teaches students how to assess and improve systems rather than simply alleviate symptoms.

**Causal Inference for Policy Researchers Under Potential Outcomes: The Use of Propensity Score Methods.** This course examines the methods for estimating and identifying causal effects using the potential outcomes framework. The class focuses on observational studies—particularly those related to the method of propensity scores in the potential outcomes framework. Participants debate theoretical and practical issues arising in causal inference as well as applications in public policy studies where these or other methods have been employed.

**Serious Gaming.** This three-part course introduces students to gaming and game design. The first part introduces students to the use and history of serious games in policy analysis and compares gaming with other analytic techniques. The second explores gaming as a methodology for specific policy challenges, with sessions organized by policy problem and different gaming approaches to each. In the third part, students develop their own games to explore a policy question of their choice.

**Drugs and Policy.** This two-week summer course offers students a foundation for understanding contemporary issues about substance use and drug policy. Topics covered include the rise in opioid overdoses, cannabis legalization, reducing substance use in community supervision settings, measuring the costs and benefits of drug consumption, and international drug control conventions.

**Making Policy on Contested Ground: Navigating the Changing Relationship Between States and the Federal Government.** Ongoing debates over voting rights, health care, immigration, abortion, and education underscore important shifts in the formal division of power between the states and the federal government. This course examines how judges and lawmakers are redefining federal and state roles. This dynamic federalism constrains some policy choices as it facilitates others, and understanding these changes is critical to defining effective policy recommendations.

**Public Economics and Finance.** This course explores empirical evidence on the role of government intervention in the economy, focusing on tax and social program policies.

**Quantitative Methods with Applications in Technology Policy.** This course covers quantitative methods for assessing the performance of sensor, communication, and computing system technologies, with an emphasis on applications to intelligence, surveillance, and reconnaissance capabilities of drones used to fight terrorism. The methods also apply to the evaluation of similar technologies used elsewhere in the defense and commercial sectors.

**Multi-Objective Optimization: Practical Use and Policy Applications.** Policy development and analysis often boil down to decisionmaking, and most decisions involve multiple objectives or goals, with various constraints. In fact, many decisions can be posed as multi-objective optimization (MOO) problems. This five-week course focuses on concepts and methods for MOO, using real-world policy applications ranging from human performance to national strategy.

**Survey Design.** In this course, students learn how to design, implement, and analyze an internet-based survey—building their capacities in sampling; instrument design and testing; scale development; and survey management, budgeting, and contracting.
Highlights from Capitol Hill

Congressional Testimony

RAND experts are frequently invited to testify before Congress. Testimonies are available at www.rand.org/testimony. Highlights from 2017 include the following:

- **Restoring the Power Projection Capabilities of the U.S. Armed Forces** | David Ochmanek | presented before the Senate Armed Services Committee | February 16, 2017

- **Deterring Russian Aggression in the Baltic States: What It Takes to Win** | David A. Shlapak | presented before the House Armed Services Committee, Subcommittee on Tactical Air and Land Forces | March 1, 2017

- **Understanding Russian “Hybrid Warfare” and What Can Be Done About It** | Christopher S. Chivvis | presented before the House Armed Services Committee | March 22, 2017

- **Funding Considerations in the Fight Against the Opioid Epidemic: What the Science Tells Us** | Rosalie Liccardo Pacula | presented before the House Appropriations Committee, Subcommittee on Labor, Health and Human Services, Education, and Related Agencies | April 5, 2017

- **The Weaponization of Information: The Need for Cognitive Security** | Rand Waltzman | presented before the Senate Armed Services Committee, Subcommittee on Cybersecurity | April 27, 2017

- **Challenges and Approaches to Realizing Autonomous Vehicle Safety and Mobility Benefits** | Nidhi Kalra | presented before the House Appropriations Committee, Subcommittee on Transportation, Housing and Urban Development, and Related Agencies | May 18, 2017

- **Creating Better Support for Our Nation’s Hidden Heroes: A Research Blueprint for Military and Veteran Caregivers** | Terri Tanielian | presented before the Senate Special Committee on Aging | June 14, 2017

- **Jihadist Violence in the Caucasus: Russia Between Counterterrorism and Counterinsurgency** | Colin P. Clarke | presented before House Foreign Affairs Joint Subcommittees (Subcommittee on Terrorism, Nonproliferation, and Trade; Subcommittee on Europe, Eurasia, and Emerging Threats) | November 7, 2017

Congressional Briefings

RAND experts visit Capitol Hill to inform policymakers about research and analysis that is relevant to current legislative debates. Video and audio recordings of Hill briefings on topics ranging from Baltic security to health care for veterans are available at www.rand.org/congress

Event Highlights

RAND's Role in Fighting Antimicrobial Resistance

Senior vice president Andrew Hoehn and policy analyst Jirka Taylor addressed the need for a holistic approach to antimicrobial resistance.

RAND and the Michelson 20MM Foundation cohosted “Why Prison Education Matters,” a conversation on the effectiveness of programs like The Last Mile, which prepares inmates for reentry by providing them with marketable skills. KPCC correspondent Frank Stoltze moderated a panel that featured Last Mile founder Kenyatta Leal.

The RAND Center for Asia Pacific Policy hosted “Pivot to Asia?” Political scientist Scott W. Harold (right) is shown with keynote speaker Admiral Sam Locklear, who served as commander of the U.S. Pacific Command from 2012 to 2015.

Broadcast journalist Warren Olney moderated a conversation about policy challenges in the Arctic featuring physical scientist Abbie Tingstad.
One Night with RAND

In November 2017, RAND hosted One Night with RAND, a fundraising event bringing together leaders in business, government, academia, and philanthropy to pay tribute to the seven-decade relationship between RAND and the U.S. Air Force. Held in Santa Monica, California, the event also honored the contributions of three individuals who have supported the Air Force–RAND partnership: Natalie Crawford, vice president and director of RAND Project AIR FORCE (1997–2006); Donald B. Rice, 17th U.S. Secretary of the Air Force and former president and CEO of RAND; and Susan F. Rice, a fundraising consultant who helped establish RAND’s development program.

Lieutenant General John Thompson, commander of the Space and Missile Systems Center, Air Force Space Command, toasts the evening’s honorees.

The event featured a panel discussion with former Air Force Chief of Staff Larry D. Welch, former U.S. Deputy Secretary of Energy Elizabeth Sherwood-Randall, and RAND President and CEO Michael D. Rich, moderated by journalist and RAND trustee Soledad O’Brien. They discussed what it takes to get—and to give—effective and trusted advice for making decisions at the highest levels.

Michael Rich with the evening’s honorees, Susan and Don Rice, and Natalie Crawford. The event marked their contributions both to the nation and to RAND.

The evening’s presenters included Ted Harshberger, vice president and director of RAND Project AIR FORCE, and former Air Force Chief of Staff Ronald Fogleman.
Honoring RAND’s partnership with the U.S. Air Force

The history of RAND and the U.S. Air Force is linked by the foresight of General Henry H. “Hap” Arnold, commander of the U.S. Army Air Forces. He helped establish Project RAND immediately after World War II to connect military planning with research and development decisions.

In 1948, Project RAND became the independent, nonprofit RAND Corporation with RAND’s Air Force work as its nucleus. While RAND has grown from a staff of 200 serving the Air Force to an international research institution, this unique partnership endures.

Don Rice stewarded the RAND–Air Force relationship during his tenure as president of RAND and he later served as Secretary of the Air Force. Through their leadership and philanthropy, Don and Susan Rice have advanced RAND’s mission and they remain active members of the RAND community.

Natalie Crawford, Distinguished Chair in Air and Space Policy, has made significant contributions to national security during her more than 50 years at RAND. She led research in the early 1980s to determine the preferred characteristics of the next-generation tactical fighter. In order to better understand tactical air operations, she has flown missions in approximately 11 different aircraft.
New Trustees

In 2017, the RAND Corporation Board of Trustees elected two new members: Mala Gaonkar and Michael E. Leiter.

Gaonkar is a managing director and co-portfolio manager at Lone Pine Capital, LLC. She is a trustee of the Clinton Health Access Initiative; Ariadne Labs; the Queen Elizabeth Prize for Engineering; and Tate, the institution that operates the United Kingdom’s four Tate art museums. She also is a member of the advisory board of The Economist. In 2015, Gaonkar cofounded the Surgo Foundation, a nonprofit “action tank” focused on the behavioral effects of health and development.

Leiter is a partner in the Washington, D.C., office of the law firm Skadden, Arps, Slate, Meagher & Flom. Previously he served as director of the U.S. National Counterterrorism Center, during the administrations of both Barack Obama and George W. Bush. In the private sector, Leiter formerly served as president of the Defense Group at Leidos, where he led more than 8,000 personnel providing support to the U.S. Department of Defense and allied nations around the world. He previously served as a RAND trustee from 2012 to 2014.

New Tang Chair in China Policy Studies

In 2017, RAND received a $3 million gift from the Cyrus and Michael Tang Foundation to establish the Tang Chair in China Policy Studies at RAND. The chair will support a senior scholar who will undertake research on the critical factors that will influence China’s future, particularly in education and health care.

A previous gift to RAND from the Cyrus Chung Ying Tang Foundation helped to create the Tang Institute for U.S.–China Relations, which supports research on issues such as trade and investment, intellectual property, manufacturing and division of labor, currency, and China’s relations with its neighbors. The Tang Institute, which will house the new chair, is part of the RAND Center for Asia Pacific Policy (CAPP) and has supported the RAND Chinese-language website, the development of new research initiatives, and joint projects with leading research institutions in China.

Cyrus Tang served on the CAPP advisory board from 1999 to 2002, after which time Michael Tang joined the board, on which he remains an active member.
New Director of RAND Australia

Carl Rhodes is the new director of RAND Australia. He succeeds Jennifer D. P. Moroney, who served as RAND Australia’s inaugural director. In his new role, Rhodes plans to grow and expand RAND Australia’s social and economic policy portfolio, while maintaining and strengthening its initial success in the areas of defense and national security.

Rhodes most recently served as director of the Force Modernization and Employment Program within RAND Project AIR FORCE (PAF). A 20-year RAND veteran, he has held a series of management positions at RAND, including associate director of PAF; director of PAF’s Manpower, Personnel, and Training Program; and group manager of the Technology and Applied Sciences department (the predecessor of today’s Engineering and Applied Sciences department). He has also been a prolific researcher, having worked on projects examining interdiction of armored ground forces; long-range strike; military use of commercial space services and assets; Air Force intelligence, surveillance, and reconnaissance capabilities; and the employment and modernization of unmanned aircraft systems.

Notable Books by Distinguished Chairs

From Vietnam in the 1960s to the Afghanistan of this decade, Ambassador James Dobbins has worked to advance U.S. national interests in some of the world’s most difficult and troubled situations. In Foreign Service: Five Decades on the Frontlines of American Diplomacy (Brookings Institution Press), Dobbins takes the reader behind the scenes at the Vietnam peace talks; the darkest days of the Cold War; the reunification of Germany; the collapse of the Soviet Union; and the U.S. military interventions in Afghanistan, Bosnia, Haiti, Kosovo, and Somalia. Presidents Clinton, Bush, and Obama turned repeatedly to Dobbins as a diplomatic troubleshooter with the right instincts and experience to help find creative solutions for seemingly irresolvable problems. Now readers can benefit from his insights, learning that, while specific situations in world affairs are different, the basic principles and techniques for defending U.S. interests on the global stage have a long history and remain valid today.

In her book I Am Not a Tractor! How Florida Farmworkers Took on the Fast Food Giants and Won (Cornell University Press), Susan Marquis takes readers inside the fight to improve working conditions in the Florida tomato fields, once some of the most brutal workplaces in American agriculture. Marquis describes past abuses workers suffered in the fields—toxic pesticide exposure, beatings, sexual assault, rampant wage theft, and even modern-day slavery—and unveils how, even without new legislation, regulation, or government participation, the Coalition of Immokalee Workers wrested better wages and working conditions from major tomato growers and their corporate buyers.

Marquis is dean of the Pardee RAND Graduate School and vice president of innovation at RAND, where she holds the distinguished chair in policy analysis.
In Truth Decay: An Initial Exploration of the Diminishing Role of Facts and Analysis in American Public Life, political scientist Jennifer Kavanagh and RAND’s president and CEO, Michael D. Rich, begin the search for solutions to the collapse of civil discourse in the United States.

Kavanagh and Rich cite the immigration debate as a present-day example of the erosion of civil discourse. Without agreement on a common set of facts about the number of immigrants entering the United States, their economic costs and contributions, and the amount of crime they do or do not commit, it becomes difficult to have important policy debates and come to policy solutions.

In exploring earlier periods in U.S. history, the authors focus on three with similar hallmarks: the 1880s–1890s (rapid industrialization and economic inequality), 1920s–1930s (mistrust of banks and financial institutions), and 1960s–1970s (social upheaval, Vietnam War). They also identify truth decay’s four causes: humans’ natural mental habits; changes in the information ecosystem; competing demands on the educational system that limit its ability to keep up with changes in that information ecosystem; and political, sociodemographic, and economic polarization.

This is but the first of several projects on the subject at RAND. Researchers will continue to analyze related trends in American life, such as the changing mix of opinion and objective reporting in journalism, the decline in public trust in major institutions, and initiatives to improve media literacy in light of “fake news.”

“Truth decay and the polarization that drives it are grave threats to America—to our politics, our values, and ultimately our democracy. It’s rotting away our public discourse, undermining our civic literacy, and we’ve even seen it inspire violence.

MICHAEL D. RICH
President and Chief Executive Officer

Funding for this venture was provided by gifts from RAND supporters and income from operations.

Learn more at www.rand.org/t/RR2314
On the Ground in Puerto Rico

The Homeland Security Operational Analysis Center (HSOAC) is part of an ongoing initiative to help restore essential services to the people of Puerto Rico in the wake of a 2017 hurricane season that devastated the island. HSOAC is a federally funded research and development center operated by RAND under contract to the Department of Homeland Security.

Over a six-month period, RAND researchers will be on the ground in Puerto Rico, providing in-depth analytical support to the Federal Emergency Management Agency (FEMA) as they evaluate housing; economic issues; health and social services; natural and cultural resources; governance and civic institutions; electric power systems and grid restoration; environmental issues; and other infrastructure systems. A congressionally mandated report that describes a long-term economic and disaster recovery plan will inform the government of Puerto Rico, other federal agencies, the private sector, and local organizations in their concerted efforts to stabilize Puerto Rico and enable a resilient recovery.

RAND in the San Francisco Bay Area

In June 2017, Joint Venture Silicon Valley hosted a public lecture by Nidhi Kalra, director of RAND’s San Francisco Bay Area office, called “A Tour of Our Future with Autonomous Vehicles.” Kalra, a senior information scientist, spoke to a capacity crowd about her research and analysis on the policy implications of self-driving cars.

In addition, the San Francisco Bay Area office has hosted meetings with more than 60 thought leaders from the tech, policy, academic, and nongovernmental organization communities. RAND also hosted workshops related to Security 2040, an initiative of RAND Ventures that is considering the effects of political, technological, social, and demographic trends that will shape security challenges in the coming decades.
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ADOBE STOCK
p. 17 (left); p. 18 (top); p. 38 (bottom right); p. 39 (top); p. 41 (bottom); Timeline (teen smoker; NATO; medical records)

AP PHOTO/CARLOS GIUSTI
A girl on the porch of her house, in front of electric cables knocked down by the winds of Hurricane Maria, in Morovis, Puerto Rico.
p. 41 (top)

AP PHOTO/DAVID GOLDMAN
A recovering addict stands outside an old church he is fixing up as a community center in Hoquiam, Wash.
p. 5 (left)

AP PHOTO/PABLO MARTINEZ MONSIVAIS
Carolyn Schapper in her home in Washington, D.C. Schapper was harassed in Iraq by a fellow Army National Guard soldier.
p. 27 (left)

AP PHOTO/JOHN MINCHILLO
A participant writes on a message board adorned with notes for loved ones who took their own lives during an Out of the Darkness Walk event organized by the Cincinnati Chapter of the American Foundation for Suicide Prevention in Sawyer Point park.
p. 15 (left)

AP PHOTO/JIM MONE
Sculpture of a wounded soldier on the grounds of the Minneapolis VA Hospital.
p. 26 (right)

AP PHOTO/MARK MORAN/
THE CITIZENS’ VOICE
Wilkes University environmental scientists and engineers are teaching high school students about being environmental stewards in their communities at a weekend Environmental Science Day Camp at Frances Slocum State Park, the Back Mountain Trail, and Wilkes-Barre River Common.
p. 20 (right)

AP PHOTO/JOSE F. MORENO
A second-grader reads during a literacy class at the John Fenwick Elementary School in Salem, N.J.
p. 10 (right)

AP PHOTO/KAY NIETFELD
Flags at the UN headquarters in February 2016.
p. 6 (right)

AP PHOTO/MATT ROURKE
Iron workers help to build a new Comcast Innovation and Technology Center in 2015, in Philadelphia.
p. 9 (left)

AP PHOTO/IVAN SEKRETAREV
Russian marines march along Red Square during the Victory Day military parade in Moscow, Russia, in 2011.
p. 7 (top)

AP PHOTO/RAJESH KUMAR SINGH
A man in Allahabad, India. The country is launching programs to protect people from extreme heat in two high-risk cities, after a devastating heat wave killed at least 2,500 people in 2015.
p. 25 (right)

AP PHOTO/WIKTOR SZYMANOWICZ
A group of pro-EU supporters gather outside Parliament to protest against Brexit.
p. 16 (left)

AP PHOTO/ELAINE THOMPSON
Children at the Creative Kids Learning Center in Seattle.
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AP PHOTO/TED S. WARREN
The owner of the Cannabis City recreational marijuana store in Seattle stands behind his edibles counter.
p. 30 (left)
army.mil
p. 28 (left)

GWEN BELL/computerhistory.org
Timeline (RAND Tablet)

BILL BENGSTON/army.mil
p. 8 (top)

BROOKINGS INSTITUTION PRESS
p. 39 (bottom left)

CORNELL UNIVERSITY PRESS
p. 39 (bottom right)

COURTESY OF MALA GAONKAR
p. 38 (top left)

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
p. 19 (left)

OFFICE OF THE DIRECTOR OF NATIONAL INTELLIGENCE
p. 38 (top right)

RAND CORPORATION
p. 40; Timeline (Truth Decay)

RAND CORPORATION/RAND ARCHIVE
p. 37 (top left, top right, bottom left); Timeline (JOHNNIAC; Willis Ware)

RAND CORPORATION/DIANE BALDWIN
p. 2; p. 5 (right); p. 7 (bottom); p. 8 (bottom); p. 9 (right); p. 15 (right); p. 17 (right); p. 19 (right); p. 25 (left); p. 26 (left); p. 27 (right); p. 28 (right); p. 29 (right); p. 30 (right); p. 31; p. 32; p. 35 (top right; bottom left; bottom right); p. 36 (left, center right, bottom right); p. 37 (bottom right)

RAND CORPORATION/SARAH FIELDHOUSE
p. 35 (top left)

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RAND EUROPE/MARK ELLIS
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MICHAEL RAY
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REUTERS/AMIR COHEN
p. 29 (left)

KAREN SAYRE
p. 6 (left); p. 20 (left)

COURTESY OF CYRUS TANG
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COURTESY OF MICHAEL TANG
p. 38 (bottom right)

FRED WATKINS
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p. 18 (bottom)
The difference between RAND in 2018 and the organization created in 1948 is substantial and dramatic. We started with one client—the U.S. Air Force—and over the past seven decades have enjoyed productive relationships with thousands of clients. The mix of studies, singular accomplishments, and streams of research and analysis included in this timeline exemplifies the range and originality of RAND research. The selections are by no means the only ways and not necessarily the most important ways that RAND has made a difference. But they reflect the breadth of an ever-diversified organization and reveal a common motif: our ability to have a positive effect on the world by applying rigorous and objective analysis to challenging problems. That aspiration has guided RAND ever since it was established.
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