BODY AND SOUL

HOW FAITH-BASED ORGANIZATIONS PROMOTE WELL-BEING IN UNDERSERVED COMMUNITIES

A NEW APPROACH to public policy education

GAME CHANGERS in national security

Ethics, rules, and the ‘INTERNET OF BODIES’
Rethinking the Opioid Crisis

The economic burden of opioid abuse and overdoses in the U.S. is around $500 billion per year. According to Bradley Stein, director of RAND’s recently established Opioid Policy Tools and Information Center, policymakers working on solutions should view the opioid epidemic as an “ecosystem” and be wary of policies that target only one dimension of the crisis but that can have serious, unintended consequences.

MORE AT www.rand.org/b181012stein

What’s the Fair Price of a Drug?

In this podcast, Ezekiel J. Emanuel, chair of the Department of Medical Ethics and Health Policy at the University of Pennsylvania, delivers RAND’s 2018 Albert P. Williams Lecture on Health Policy, explaining why drug prices are so high and discussing possible policy solutions.

MORE AT www.rand.org/a181017

Palestinian Voting in Jerusalem Municipal Elections

Since 1967, most Palestinian residents of Jerusalem have boycotted elections to avoid legitimating Israeli rule. But recent polls suggest that some might be warming to the idea of voting. A game with Israeli and Palestinian policy experts explored what might transpire should the boycott end.

MORE AT www.rand.org/t/RR2743

Resiliency in Gulf Coast Communities?

STRONG (the Survey of Trauma, Resilience, and Opportunity Among Neighborhoods in the Gulf) is a tool developed by RAND and its partners in the Consortium for Resilient Gulf Communities. The tool assesses the health and well-being of residents in Gulf Coast communities five years after the 2010 Deepwater Horizon oil spill.

MORE AT www.rand.org/t/TL276

Understanding China’s Role in the Production and Supply of Synthetic Opioids


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Keeping the Faith
Researchers and faith leaders are working together to improve lives

Women in Defense
An inaugural forum spotlights RAND researchers on the future of warfare

Infographic
Managing pain with alternative therapies

Leading the Change
Pardee RAND reimagines the future of public policy problem solving

Commentary
Blurring lines with the Internet of Bodies

Giving
Fred Pardee on making a difference

Convening
A tribute to terrorism expert Brian Michael Jenkins

at RANDom
Creating art, one coordinate at a time

Kathryn Derose, a senior policy researcher at RAND and an Episcopal deacon, has partnered with Latino and African-American churches to address health problems in their communities. Her research has demonstrated the power of the pulpit to fight health disparities, counter stigma, and encourage people to live healthier lives.
Gold Medals and Red Alerts

Some of the world’s best athletes will converge on Tokyo in 2020 for the next summer Olympics. The world’s hackers, cyber criminals, and other bad internet actors will be there, too.

The games, like other mega-events, have had to confront a growing cyber threat in recent years, researchers wrote in an assessment of the risks that Tokyo now faces. In 2012, for example, attackers tried—but failed—to knock out power to London’s Olympic Park during the opening ceremony.

The greatest threat now comes from foreign intelligence services that could try to upstage the 2020 summer games or embarrass Tokyo for political gain, the researchers concluded. Hackers backed by the Chinese army, for example, are known to have already infiltrated sensitive Japanese networks.

Olympic planners also need to guard against cyber terrorists, cyber criminals, and “hacktivists” looking for a world stage. Attacks from those groups might be less sophisticated than a sneak attack from a hostile nation, but they could still disrupt the games and cause real damage.

Tokyo seems well aware of the risks. It already has a cybersecurity plan in place for the summer Olympics, and recently opened a new training center for cybersecurity recruits. It conducted a massive cybersecurity drill last year.

It should make a point of holding more of those drills in the coming year, the researchers wrote—and make them as public as possible. That would send an important message to any would-be cyber attackers, they explained: that Tokyo will be ready for them when the games begin.

MORE AT
www.rand.org/t/RR2395

Cognitive Health in Rural and Urban Adults

Rural seniors are more likely to get dementia than their urban counterparts, a recent study found. That could have profound implications as the Baby Boomers reach their golden years.

Researchers looked at nationally representative data from more than 16,000 older Americans who answered survey questions about their health in 2000 and a similar sample in 2010. They found that rates of dementia had declined faster among rural adults in those years, to the point that they were statistically indistinguishable from urban rates—at least at first glance.

More than 16 percent of the rural seniors had some kind of cognitive impairment in 2010, and 5.1 percent had dementia. Among the urban seniors, just under 15 percent had cognitive impairment, and 4.4 percent had dementia.

But those numbers come with some important fine print. Urban and rural areas have different demographics and education rates, both of which have been shown to affect dementia rates. When the researchers factored in those differences, to make it a more apples-to-apples comparison, they found that rural seniors had around 80 percent greater odds of getting dementia than similar urban seniors.

On one hand, overall rates of rural dementia and cognitive impairment did improve—and improved faster in rural areas than in urban ones. The study was able to link that to much higher high school graduation rates among the rural seniors who filled out their surveys in 2010, the result of a major push to expand rural education more than 60 years ago.

On the other hand, rural adults still had persistently higher rates of cognitive impairment and dementia than demographically similar urban adults. That suggests some other factors, such as differences in access to and quality of health care, continue to put an extra burden on rural areas. As the leading edge of Baby Boomers reach their 70s, and peak risk for dementia, that’s a potential health care crisis in the making.

MORE AT
www.rand.org/t/EP67436
Marketers Blowing Smoke?

Teenagers who use e-cigarettes are more likely to escalate their habit with regular cigarettes, according to a new study that underscores the risks of a high school trend better known as vaping.

Recent surveys suggest that more than 20 percent of all high school students used an e-cigarette in the past month. So did around 5 percent of all middle school students. The numbers have shot up in recent years, even as teenage cigarette use continues to decline.

E-cigarettes often look more like pens than traditional cigarettes. They use a battery-powered heater to vaporize liquid nicotine and flavored juices. They have been marketed, with little proof, as a way to help adult smokers kick their cigarette habits.

The new study joins a growing body of evidence that e-cigarettes have the opposite effect among teenagers.

Researchers surveyed more than 2,000 young people when they were between 16 and 18 years old, then followed them for two years. Those who reported using e-cigarettes more frequently in the first wave of surveys were more likely to have progressed to smoking cigarettes two years later. They also were more likely to increase their use of both regular and e-cigarettes over time.

Other risk factors, like alcohol or marijuana use, did not affect that progression within individuals. That suggests it was the e-cigarette use that led to more cigarette use as people got older.

There is a silver lining here. The findings suggest that steering teenagers away from their vape pens—through advertising warnings or sales restrictions, for example—could also help reduce their use of cigarettes and other tobacco products.

MORE AT
www.rand.org/t/EP67710
Which developments in technology, information, and doctrine are likely to change the nature of 21st-century warfare, and which “game changers” and “disruptive technologies” will turn out to be hype?

In October 2018, more than 100 national security experts, flag officers, and decisionmakers joined RAND experts in Washington, D.C., to probe three cutting-edge topics: fighting a disinformation war, technology on the battlefield, and the uncertain nature of warfare.

The forum was named in honor of a pioneering RAND researcher, the late Roberta Wohlstetter, best known for her groundbreaking study of why the United States failed to anticipate the 1941 attack on Pearl Harbor. Wohlstetter, dubbed the “first lady of intelligence,” was hired in 1948, two months after RAND was founded, and would remain an employee or consultant at RAND for the next 54 years.

Organized by Melissa Rowe, vice president for Global Research Talent; Caroline Baxter and Elizabeth Bodine-Baron, codirectors of the D.C. chapter of the RAND Women in Defense Network; and media relations analyst Khorshied Samad, the event aimed to honor Roberta Wohlstetter by providing a forum for vigorous discussion of national security game changers. Each panel showcased a multidisciplinary group of experts from RAND, the Defense Department, and sister organizations.

In addition to being experts in their field, the featured speakers, moderators, and organizers were also all women. “We didn’t hide their names or the fact that they were all women. We just didn’t highlight it in the invitation—because this wasn’t a ‘women’s conference,’” said Baxter. And indeed, some of the participants never noticed. While in Wohlstetter’s day, few women were represented at think tanks, 44 percent of RAND’s current research staff are women. The half-day forum was made possible through the generosity of a female donor who wanted to promote the work of female policy researchers at RAND.

**Fighting a disinformation war**

The U.S. military has maintained a high level of public trust at a time when the credibility of other American institutions, particularly government and media, is in steep decline, said Jennifer Kavanagh, senior political scientist and coauthor of *Truth Decay: An Initial Exploration of the Diminishing Role of Facts and Analysis in American Public Life.* “But the military will need to think carefully about how to maintain that trust in the current era of ‘truth decay,’ which can be characterized by, among other things, a blurring of the line between opinion and fact, a proliferation of opinion in the media, and by mis- and disinformation by both domestic and foreign actors,” Kavanagh said. “Truth decay makes it extremely difficult to communicate national security messages in a coherent way and the fractured and tribalized environment makes disinformation more dangerous.”
The U.S. Department of Defense defines "disinformation" (false information intentionally designed to deceive) as "operationally motivated," said Bodine-Baron, an information scientist at RAND who has studied Russian information operations and propaganda. Purveyors of false information include Russian state agencies and their proxies, but also U.S. citizens, including media figures, some of whom appear on Russian media outlets such as RT. The disinformation chain extends to people who do not work for Moscow but who spread messages that align with Russian state views because they happen to agree with them.

“It’s a thorny legal issue if you have an American citizen pushing Russian propaganda—especially if it’s based on false information,” Bodine-Baron said.

Susan Hennessey, who specializes in national security governance at the Brookings Institution, agreed that U.S. law, because of free speech protections, does not offer easy remedies to disinformation. “Technology has allowed people to warp the marketplace of ideas and we are not able to respond,” she said. Hennessey suggested that FARA—the Foreign Agents Registration Act—can be used to combat certain kinds of foreign interference but U.S. restrictions on foreigners’ operations have resulted in reciprocal crackdowns abroad. Hennessey suggested one step to consider is to reinstate the 1949 Fairness Doctrine in broadcasts, which was repealed in 1987.

The panel’s moderator, Elise Labott of CNN, noted that the problem extends beyond the media, citing Chinese funding of U.S. think tanks, Confucius institutes, and U.S. college campus organizations. “That’s skirting the line between misinformation, disinformation, propaganda, and truth decay,” she said.

Technology as a battlefield game changer
Technologies to watch include hypersonic missiles, as well as traditional intercontinental ballistic missiles in the hands of nations like North Korea; lasers and direct energy; chemical, biological, and radiological weapons; and nuclear weapons, said management scientist Cortney Weinbaum. “What matters most is who controls them, whether they are used by a rational actor, or whether they are put to innovative uses that can require major adjustments in strategy and can cost billions to counter,” she said, noting that 20 years ago, no one would have named improvised explosive devices as a “disruptive technology.” “Unlike in the past, when defense ministry contracting drove technological development, the private sector now drives innovation, creating new vulnerabilities,” said Weinbaum, and Stacie Pettyjohn, codirector of the RAND Center for Gaming, agreed. Moreover, artificial intelligence (AI) can enable qualitative increases in military capability that are difficult to quantify, said Elsa Kania of the Center for a New American Security. The Chinese government is attempting to improve its talent base, hire better AI experts, and derive advantage from its widespread access to U.S. data, Kania said.

Given the new emphasis on multidomain operations and information technologies, moderator Sylvie Lanteaume of Agence France-Presse asked Pettyjohn, “How is the human brain able to absorb all this information that is going to be coming to the fighter?”

“I’m not sure,” Pettyjohn replied, drawing laughter from the audience. “We don’t know how much information people can process at any one time, and the turn to artificial intelligence and machine-learning to assist in decisionmaking raises ethical questions,” she said. Pettyjohn and Kania agreed that the United States needs to study how to gain asymmetrical advantage over potential adversaries.

The uncertain future of warfare
Wargaming is undergoing a resurgence as a way of wresting with an uncertain future, agreed panelists Yuna Wong, a policy researcher at RAND, and Cherie Emerson of the Army’s Strategic Analysis Division. “As human as it is to want to know what is going to happen in the future, no tool, let alone wargaming, can show you,” Wong noted. “But it can identify your weaknesses.”

Wong quoted the late Thomas Schelling—Nobel Prize–winning economist and longtime RAND consultant: “One thing a person cannot do, no matter how rigorous his analysis or heroic his imagination, is to draw up a list of things that would never occur to him.” Emerson noted that wargames are providing strategic insights, informing investment decisions, and helping identify “the hiccups that could arise.” She advocates more wargaming for cybersecurity and space scenarios.

Lara Schmidt, director of the Strategy, Policy, and Operations Program within the Homeland Security Operational Analysis Center at RAND, has fielded wargames on cyberthreats. According to Schmidt, these have revealed unanticipated problems and could be used to improve cyber preparedness, which is lagging. Moderator Nadia Bilbassy, Washington bureau chief of Al Arabiya, asked about the disadvantages of wargaming. Panelists said these can include insufficient resources for game adjudication and failure to understand that adversaries are constantly learning and adapting to one’s strategy, not “stuck on stupid.”

The vital role of research
The event closed with a free-ranging conversation between Christine Wormuth, director of the International Security and Defense Policy Center at RAND, and Kimberly Kagan, founder of the Institute for the Study of War. Kagan noted that humans have repeatedly predicted that a technological change will provide a decisive advantage that would end warfare for all time—and repeatedly been wrong. “We have to remain learning and adaptive, peacetime and wartime.”

Wormuth, former under secretary of defense for policy in the U.S. Department of Defense from 2014 to 2016, noted the vital role that research institutions play in supporting the national security bureaucracy, “by helping it work through problems it will never be able to solve alone.”
Friendly Friendship Baptist Church shares a busy block of South Los Angeles with a liquor store and a McDonald’s. So when parishioners decided to plant some fruit trees there, they meant it as a statement. They were taking back their health.

They hosted exercise classes and cooking workshops. They swapped out the pastries in the fellowship hall for fruit cups. The senior pastor gave up his daily soda habit and lost seven pounds. “It was just a total, all-in effort,” parishioner Linda Hopkins said. “We moved the needle.”
Kathryn Derose, a senior researcher at RAND and an ordained Episcopal deacon, works with churches in mostly underserved communities to fight health disparities and encourage healthy living. Her research has shown that the church can be a powerful and effective force against such health problems as HIV and obesity.
“It’s really about social justice. That’s what propelled me into research addressing health disparities, and into a religious service founded on justice. That’s where they overlap.”

KATHRYN DEROSE

Dignity for all

In low-income African-American and Latino neighborhoods like South Los Angeles, long shadowed by poor health and chronic disease, the church is one institution that can move the needle. In recent years, dozens of churches like Friendly Friendship have partnered with RAND to confront two of the biggest killers in their communities: HIV and obesity. Their work has provided a model for how health departments, researchers, and faith leaders can work together for the good of the community.

The partnerships are led by Kathryn Derose, a senior researcher at RAND and a specialist in how social ills like poverty and prejudice can poison the physical health of whole communities. She has spent her career working to improve living conditions, and through them health, in places as varied as the indigenous villages of Ecuador and the HIV clinics of the Dominican Republic.

She has one other important qualification for her work with the churches. She’s an ordained Episcopal deacon who has ministered to the sick and injured in one of the busiest trauma centers of Los Angeles. She takes her inspiration from the words of the church’s baptismal covenant: Will you strive for justice and peace among all people, and respect the dignity of every human being?

“It’s really about social justice,” she says. “That’s what propelled me into research addressing health disparities, and into a religious service founded on justice. That’s where they overlap.

“It’s about creating the conditions in which people can live healthy lives. It takes a village, and sometimes more, to build and advocate for those conditions.”

Interventions that work

There were, at last count, around 300,000 religious congregations in the United States. That’s more than twice the number of cities, school districts, law-enforcement agencies, post offices, and Starbucks locations, combined. They are the meeting places and public squares of their communities, with a legacy of organizing and leading social change. As faith leaders like to say, they have a captive audience for an hour or two every week.

Most already provide some kind of health programming—a blood drive here, a health fair there, maybe a special ministry for drug users or homeless people. But their efforts have too often been piecemeal, treating the symptoms but not the causes, without enough sustained support from public-health agencies. The research base that could help make those interventions more effective is surprisingly thin.

As a deacon, Derose had seen the power of the church to help those in need; that’s the job description for a deacon. But she had also seen the challenges that many churches face: limited resources, over-full calendars, pastors working two jobs to make ends meet. That’s where she thought her research experience could help.

She knew she couldn’t just knock on church doors and deliver a health program. Instead, she brought together a small group of faith leaders from mostly African-American and Latino churches to help develop health interventions that would work in their communities. Their first target: HIV.

It was not what Rev. Dr. Clyde Oden, a leader among the African-American churches, would call an easy layup. The stigma around HIV was so high, especially in the more conservative churches, that people were afraid to even get tested. “It was like we were walking on glass through prejudice, through fear,” Oden said.
Derose and the faith leaders developed a sample sermon that asked people to imagine meeting someone with HIV, and reminded them of the Biblical command to love their neighbors. They trained peer leaders, and showed a short video of a man struggling beneath the plus sign of a positive HIV test as if it were a cross, as people shut their doors to him. When the health department brought mobile testing vans to the churches, the pastors were the first in line.

Testing rates were more than five times higher in the Latino churches, and nearly three times higher in the African-American churches, than in similar churches that did not implement the program. Surveys also found a marked decline in stigma around HIV in the Latino churches especially.

“Nobody wants to be unhealthy,” said Rev. Michael Mata, one of the Latino faith leaders involved in the study. “We have a moral responsibility toward the well-being of the community. But a lot of times, churches don’t have the resources or the background to do it alone.”

When Derose received a federal grant to extend her work a short time later, she went back to the community and asked parishioners, clergy, and public health leaders: What health problem should the church tackle next? The answer she heard, again and again, was obesity.

She brought together health officials, community nonprofits, and more than 60 Latino and African-American churches to make a stand for better health. The plan they developed went first to a small test group of churches. They planted gardens, hosted garden-based cooking classes, and sent out daily texts reminding people to make healthy choices. They brought in mobile clinics to test for diabetes and high blood pressure. They walked their neighborhoods to map the physical barriers to good health—the over-abundance of fast food, the absence of any grocery stores, and where a few fruit trees could make a big difference.

Derose and colleagues called the project “Eat, Pray, Move.”

Community impact

The churches that participated saw average diets improve and body-mass indexes fall. Their congregants lost an average of just under one pound, which might not seem like much—except that the intervention ran over the Thanksgiving, Christmas, and New Year’s holidays. The people in a control group of churches that did not implement the program gained an average of 1.8 pounds over the same time period.

Derose is now working on a project to encourage greater park use by churches in neighborhoods with few other exercise options—and, where needed, to advocate for park improvements to better meet their needs.

“Churches are really key anchors in underserved communities,” Derose said. “They excel at responding to critical needs, and they know those needs in their communities very intimately. When you start to combine efforts with churches, you can really have an important impact on the community as a whole.”

“It’s not always easy,” she added. “Those donuts at coffee hour are kind of a sacred thing. And there are much broader forces working against health in so many communities.”

Senior Pastor LaMonte King has seen the impact at Friendly Friendship Baptist Church—and not just from the pounds he lost from kicking his soda habit. A few church elders learned they had diabetes or high blood pressure through Eat, Pray, Move, he says, and have changed their lifestyles to address it. Church youth now sell fruit smoothies for their fundraisers, not cookies and candy.

And every now and then, he’ll see someone stop on the sidewalk outside, between the liquor store and the McDonald’s, and snap off an orange from one of the church fruit trees.

Eat, Pray, Move benefited from strong partnerships with Los Angeles Metropolitan Churches (LAM) and Seeds of Hope of the Episcopal Diocese of Los Angeles. The Long Beach Health Department was a key partner in the HIV intervention.
Leading the Change

A new direction for the Pardee RAND Graduate School

By Susan L. Marquis
The problems we face today have become so complex, so interconnected, and so shifting that we need new ways of thinking to solve them. One place to start is at the nation’s elite public-policy graduate schools.

Over the next few years, the Pardee RAND Graduate School intends to lead that change. We’re not just bringing in new courses, but new ways of practicing policy analysis. We’re shifting the focus from coming up with solutions to actually implementing them.

This change is imperative. As a catch-all term, “public policy” stands for every major issue facing the nation and the world, from international terrorism to income inequality to underperforming schools. How we train the next generation of policy experts will help determine how effective we are in addressing those issues.
A new approach

Pardee RAND was one of eight schools that established the nation’s first graduate-level programs in public policy in the early 1970s. They were traditional academic programs, grounded in economic theory, with a focus on working through the federal government to solve problems. For the most part, they still are.

But the world doesn’t work that way anymore. Private companies like Facebook and Apple are often two steps ahead of the federal government on policy issues like privacy. Advanced technologies like artificial intelligence and machine learning are creating solutions, as well as problems, that no one has ever thought of before. Decisions made on one side of the globe can ripple across the other.

We need a new approach to public policy. We need to recognize, and take on, ever-changing complex and wicked policy problems. We need new tools, new perspectives, a new understanding of what it really takes to effect change. Pardee RAND is a small school, built on the strong foundation of RAND but not bound by the constraints of a big university. It has the freedom and flexibility to go first.

We’re creating three new streams of study and action that better align with the policy needs of now. All of them will have a new focus on ethics, communication, and bringing new perspectives into public policy.

RESEARCH AND ANALYSIS

The first stream draws on the school’s longtime strength and analytic foundation. We call it “Research and Analysis,” and it will continue to emphasize rigorous and sophisticated policy analysis. But it will also redefine the field to include more complex social and systemic problems, with a focus on designing policies, mechanisms, and actions for potential solutions.

The other two streams will be unlike anything we’ve tried before.

TECHNOLOGIST

One of them, the “Technologist” stream, will bring in computer scientists, software engineers, and other tech professionals to work at the intersection of technology and policy. Its centerpiece will be a physical lab to push the limits of technology, from machine learning to virtual reality to digital gaming.

We want to develop new applications, new tools, that can help solve problems. We want to capture some of the energy and innovation of Silicon Valley, and apply it to making better policy for the 21st century.

POLICY IN ACTION

The other new stream, “Policy in Action,” will focus on what it really takes to make change at street level. We plan to establish long-term relationships—ten years or more—with a handful of communities that don’t often get policy support to effect real and sustainable change. Then students, faculty, and RAND researchers will embed in those communities for months or even years, working with local leaders, local institutions, to solve local problems.

It’s policymaking up close, not just conducting a study or even a series of studies, but working with these communities to turn our recommendations into action. We’ll be helping these communities—but also gaining new insights into the implementation side of policy.

Public policy for the future

One other big change is worth noting, and it’s an idea we borrowed from architecture schools. All of our students, from the computer scientists to the community workers, will par-
participate in policy-and-action design studios. They’ll work in small teams, in parallel, to tackle a major policy issue—homelessness, for example. Then they’ll present their results, critique each other, go back and refine their ideas, and present again. The idea is to dig deeper and deeper into a complex problem, working toward insights and solutions that are not just novel, but viable.

With these structural changes to what we teach and how we teach it, we intend to make Pardee RAND the model for a new generation of public policy in America. We’re committed to sharing what we learn with other policy schools, to work with them to change the very definition of public policy. It’s a field that has existed, more or less unchanged, for half a century, and it’s time for it to take that next step.

The world we live in is rapidly changing, and the problems we face are deeply interconnected, often unknowable, and highly adaptive in the face of attempted solutions. We need to look at new approaches. We need to engage in the social systems that are the context for these problems, and to draw upon new disciplines and new tools. That is the change we are leading.

We began this project nearly five years ago, with a question: If we could build a public-policy school from the ground up, to open in 2030, what would it look like? Our answer will welcome its first full class of new students next year.

Susan L. Marquis is dean of the Pardee RAND Graduate School and vice president of Innovation at RAND.
Managing Pain with Alternative Therapies

About 126 million adults report having pain in the past three months. Annually, nearly 62 million Americans fill at least one prescription for opioids, and approximately 12 million individuals misuse prescription pain relievers. Alternative and integrative therapies, such as acupuncture, mindfulness (meditation), and tai chi, may help some individuals manage pain.

Understanding the effectiveness of these therapies can be a challenge. RAND researchers studied hundreds of reviews of the evidence on the effect of these three therapies on different types of pain.

The chart on page 15 compiles information from these studies on the effectiveness of acupuncture, mindfulness, and tai chi for the types of pain listed. Each symbol represents both the likelihood of being effective (for example, color-filled circles represent therapies likely to have a positive effect) and the number of studies on the effect of a particular therapy. Areas of the chart without circles indicate insufficient evaluation of certain combinations of pain type and therapy.

Individuals can use this chart to understand which therapies may be promising to help manage their pain. This chart is not meant to provide medical advice; patients should consult their health care providers before pursuing therapeutic treatment.

RAND researchers studied hundreds of reviews of the evidence on the effect of three alternative and integrative therapies—acupuncture, mindfulness (meditation), and tai chi—on different types of pain.

BY THE NUMBERS

IT IS ESTIMATED THAT

126.1 million adults reported having pain in the past three months

61.8 million Americans fill at least one prescription for opioids annually

12.4 million individuals misuse prescription pain relievers annually
About the Research

This graphic is based on evidence maps for mindfulness (July 2017), tai chi (February 2014, updated March 2018), and acupuncture (March 2013, updated March 2018). The evidence maps represent an overview of the evidence found in systematic reviews that identify, extract, synthesize, and appraise information from published research. The methodology is described in detail in the published reports cited below.


To view this infographic online, visit www.rand.org/t/IG142.
As smart devices in health care evolve, the line between human and machine is blurring—and creating new concerns about consumer safety and privacy rights. Smart contact lenses are being developed to monitor glucose levels and could eliminate the daily blood sugar pinprick for people with diabetes. You could even have an artificial lens implanted in your eye to correct your vision, but such lenses could also one day record everything you see. Bluetooth-equipped electronic pills are being developed to monitor the inner workings of your body, but they could eventually broadcast what you’ve eaten or whether you’ve taken drugs. And while you can restore hearing with a cochlear implant, be aware that it could log data on the audio environment surrounding you.

These high-tech health care solutions are part of an emerging sector of medical technologies that monitor personal health data by essentially connecting your body to the internet. These devices are members of the “Internet of Bodies,” a nod to the Internet of Things—a term coined in 1999 to describe the thriving network of everyday smart gadgets, appliances, and cars that are connected through the Web. If retroactive privacy laws for the internet have taught us anything, we should consider establishing rules to govern the legal, privacy, and ethical issues that are already arising from smart medical and biometric devices.

The Internet of Bodies is problematic by design, since connected devices are implanted, ingested, or otherwise affixed to the human body, which raises serious concerns regarding cybersecurity, privacy, and sensitive data protection. Having a device directly attached to the body heightens the potential havoc that hacking or intentional malfunction could wreak. Former U.S. vice president Dick Cheney so feared being assassinated by electronic shock to his implanted heart defibrillator, he had a new device without Wi-Fi capability installed.

While assassination by pacemaker may seem far-fetched, precedents are, however, being set for Internet of Bodies data to be used in criminal investigations. Medical data from a cardiac pacemaker were used to bring arson and insurance fraud charges against a man who allegedly burned down his house in 2016. The man claimed the fire started of its own accord and that he had packed his things, threw them out his bedroom window, and brought them to his car to save himself. But a cardiologist concluded that the pacemaker read...
ings, including heart rate and cardiac rhythms, made the timing of the man’s account unlikely, given his heart condition. Citing violation of his client’s privacy, the man’s lawyer moved for the evidence to be tossed out, but the judge ruled to permit the data to be used at trial.

Consumers can look out for themselves by making sure they know how medical technology companies plan to safeguard their data and privacy. But as such devices become more common, we also need guidelines that protect consumer safety and privacy rights before—instead of in reaction to—the seemingly inevitable data breaches and cyber vulnerabilities that follow.

Legal, policy, and tech experts have started discussing the privacy and ethical implications inherent in advances related to the Internet of Bodies, asking questions such as who should have access to the data, how data can be protected from those who shouldn’t have access, how tech companies can protect clients from malicious hackers who could remotely wreak havoc on someone’s body, and what role, if any, health information privacy rules should play. Questions such as whether insurance companies should be able to deny coverage based on poor health habits revealed through these devices should be asked.

The development and consumer adoption of new technology are outpacing the rate at which policymakers can implement regulations to govern them. In May, the European Union’s General Data Protection Regulation, which provides consumers more transparency over how their personal data are used, became enforceable. More such regulations are needed that would help better protect consumers and safeguard their data. Policymakers could also propose regulations that create marketplace incentives for tech companies to build security into the devices from the get-go.

The legal and privacy issues are as complex and as interconnected as the Internet of Bodies technologies themselves. The Internet of Bodies is certain to change what it means to have autonomy over ourselves and our bodies. So before these devices become ubiquitous, society should consider putting regulations in place, before it’s too late. ☐
Warfare in the future will increasingly be about manipulating perceptions, whether by hostile states or nonstate actors, according to terrorism expert Brian Michael Jenkins. The creation of fear and anxiety by terrorists, and foreign meddling in U.S. politics, are components of contemporary conflict. A major challenge facing the U.S. is how to get better at countering foes while strengthening national institutions, and U.S. democracy depends on it, Jenkins said in November 2018 at RAND’s annual fundraising event in Santa Monica, One Night with RAND. The event brought together leaders in business, government, academia, and philanthropy to pay tribute to Jenkins and mark his 50-year affiliation with RAND and the substantial body of research on terrorism that he has produced.

Jenkins, senior adviser to the president of RAND, is regarded as a leading authority on terrorism and initiated RAND’s research on terrorism in the early 1970s. In addition to Jenkins, several other terrorism researchers spoke at the event about changing tactics and strategies for countering terrorism in the future. They described the evolution of terrorism and its effect on the direction of U.S. national security, specifically since 9/11, when terrorism was framed as an “existential threat.” As a result, terrorism became the country’s highest national security priority and the country fell into a “security trap,” according to Jack Riley, vice president and director of the RAND National Security Research Division. “In our rush to prevent future attacks, we tested the perilous slope upon which our criminal justice and national security systems are perched.”

Jenkins said that terrorism has not turned out to be the existential threat we feared in the shadow of 9/11, but continuing terror still threatens our democracy.
The 9/11 attacks fundamentally altered our perceptions of plausibility—after 9/11, no scenario, no matter how far-fetched, could be ruled out. The threat has transcended what we see happening to instead what we can imagine might happen, Jenkins said.

While a hyperfocus on counterterrorism enveloped much of the national security enterprise after 9/11, “tensions between the U.S. and adversaries such as Russia, China, Iran, and North Korea were also rising,” said Javed Ali, acting associate director of the RAND Cyber and Intelligence Policy Center. A new counterterrorism challenge emerged as well. ISIS, which expanded rapidly, had by 2015 “more people, money, and resources under its control than al-Qa’ida in its heyday,” he said.

ISIS is just one example of the staying power of terrorism, an “intergenerational fight,” said Christine Wormuth, director of the RAND International Security and Defense Policy Center. Elements needed for a sustainable counterterrorism strategy include working with allies and partners to address the root causes that lead people to radicalize and making sure there are no safe havens for terrorists to plot and plan attacks—in the real world and in the virtual world, she said.

Recent RAND research has pointed to the rising polarization of national politics and the diminishing role of facts and analysis in American public life, Jenkins said. When combined with an atmosphere of terror, these developments make it harder to defend democracy against the hostile manipulation of our perceptions, he said.

“Neither border walls nor firewalls can protect a divided society that dismisses fact and submits to the tyranny of fear,” Jenkins said. “Our defense must come from all of us—all of us as Americans—not just the Departments of Defense or Homeland Security. A nation united in its commitment to fundamental values—liberty, courage, self-reliance, sense of community, and mutual respect—cannot be sundered, cannot be conquered.”
Fred Pardee grew up in the shadow of World War II and has spent his life supporting the cause of human dignity and development around the world. His most recent gift to the Pardee RAND Graduate School will provide $3 million to expand the school’s global reach.

“I do believe it’s possible to shape the future and improve the lot of the least advantaged with creative thinking by talented people.”

Fred Pardee

The school has carried his name since 2003, when he donated $10 million to support its endowment, the largest individual gift in RAND’s history. In all, he has given more than $22 million over his lifetime to RAND and Pardee RAND to support research on some of the world’s most pressing problems, such as youth unemployment and food insecurity.

“I think about why I’m here,” he once said. “Why did I get placed on planet Earth? I’ve concluded that one is placed here to make a difference, and I want to make a difference by supporting institutions that will shape the future.”

Pardee worked as an economic analyst at RAND from 1957 to 1971; his starting salary was $7,500 a year. He made his fortune later as a real-estate investor and the head of a successful Los Angeles-area apartment management firm.

He often points to his childhood memories of distant war and unrest as the guiding force in his philanthropy. He has funded research centers at Boston University and the University of Denver to study ways to improve lives around the world. “Global human progress is what I’m interested in,” he has said.

His latest gift to Pardee RAND comes as the school is reimagining public policy education to more effectively address the problems of the 21st century. It will help expand the school’s international focus, to include long-term international residencies for students and RAND researchers. It also will support student dissertations, research, and speakers with an international perspective.

Those efforts build on an existing program that Pardee funded at the school, the Pardee Initiative for Global Human Progress. In the past few years alone, it has funded student dissertations and RAND research on improving financial access to health care in sub-Saharan Africa; the cost of sexual violence in conflict areas; and barriers to HIV treatment in developing countries.

The school’s plans also fit with a research focus at RAND on improving the quality and condition of human life, looking especially at the next 35 to 200 years. Such ventures, through the Pardee-funded Center for Longer Range Global Policy and the Future Human Condition, have included a recent examination of decarbonization as one way to address climate change.

His new gift to Pardee RAND is a continuation of those earlier ventures, ensuring that the redesigned school maintains its focus on solving problems worldwide.

“The school is not in the dream business,” Pardee once said. “But I do believe it’s possible to shape the future and improve the lot of the least advantaged with creative thinking by talented people.”

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 underresearched; shape emerging policy debates; and devise innovative approaches for solving acute, complex, or provocative policy challenges. To learn more about RAND Ventures, visit www.rand.org/giving.
The Da Vincis of Data

By Melissa Bauman, Staff Writer

What does physics look like? To former RAND researcher Ivan Finkle, it looks a lot like art.

In 1964, Finkle wanted to experiment with a new piece of equipment that RAND had acquired—a Stromberg-Carlson 4020 plotter printer. He remembered reading about a scientist who decades earlier had used a compound pendulum with a light at the end to trace the pendulum’s motion on photographic paper. Finkle decided he would try to digitally replicate the shape—called a Lissajous figure—with RAND’s new printer.

“If you’re a physicist, the motion of a pendulum is a very fundamental physics problem,” the retired Finkle recently explained, and a Lissajous figure is a useful way to help visualize it. However, Finkle, a computer scientist at RAND from 1957 to 1968, was primarily interested in this new and less labor-intensive way to create a data visualization.

The printer was programmed to draw a straight line between two points on a cathode-ray tube, or CRT display. To replicate the mechanically drawn figure, Finkle fed his equations into the computer (via magnetic tape, since early computers had less storage than your old flip phone!) to give the coordinates of each point. As each line was drawn, the printer photographed the result and compiled the lines. The result was strikingly similar to the original figure. “It demonstrated that our mathematical formula was accurate,” Finkle said.

But Finkle also recognized that data visualizations were aesthetically interesting as well. Soon, scientists and engineers—those with access to sophisticated equipment—were creating computer art just for fun. In a possible nod to this trend, the journal Science used one of Finkle’s Lissajous figures as its cover art in 1965—proving that Science and art really do intersect.

Sources: RAND archives, Science, The Atlantic
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