# WORKING THE (HEALTH) SYSTEM

A standard medical test that could have been done for a tenth of the cost. A doctor's momentary lapse in attention that led to grievous injury—or even death. An upside-down health care bureaucracy that makes poor patients pay the most for treatment.

The "medical-industrial complex" that brought miracle cures to the 20th century has also raised profound questions about value and values. Harvard School of Public Health researchers—operating at the intersection of medicine, economics, social science, law, and ethics—have been world leaders in decision-making science and in assessing the impact of increasingly complex delivery systems on population health and well-being. Our faculty has transformed national health systems around the globe. And our alumni have set an enlightened public health agenda, serving in the most prestigious leadership positions in the field and in governments worldwide.

# THE DOLLARS AND SENSE OF HEALTH CARE

First it was headaches, then crippling fatigue so bad he could barely get out of bed. Finally, on Christmas morning 1961, John Myers awoke to a terrifying sensation—an uncontrollable cough, grotesquely swollen face, bloody nose, and racing heart. Myers had entered the final stages of kidney failure.

At the time, his condition normally meant certain death. But Myers, profiled in a 1962 *Life* magazine article, would live on for years thanks to an experimental new treatment: long-term, out-of-hospital dialysis.

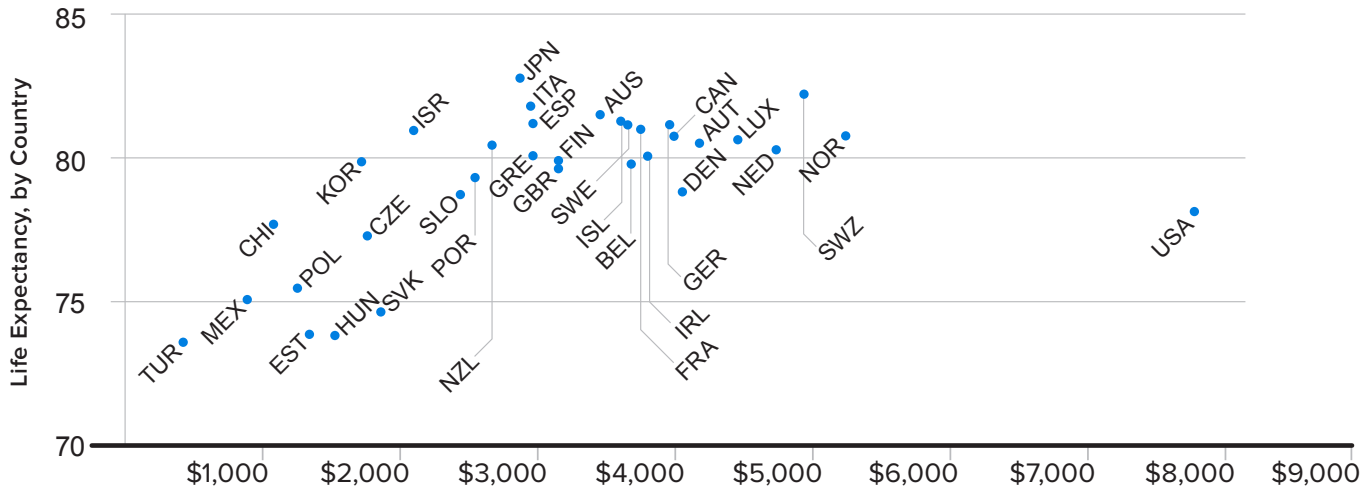
Throughout the late 1960s and '70s, U.S. Medicare and Medicaid programs expanded access to cutting-edge medical procedures like home dialysis. While these new technologies saved thousands of lives, they also created a paradox: The treatments weren't cheap, and by 1973, their widespread use sent medical costs soaring to 11.3 percent of the federal budget—almost three times more than in the previous decade. (Today, the figure is 21 percent.)

These spiraling costs posed difficult problems. How could the nation rein in expenses while ensuring quality treatment? Since the early 1970s, Harvard School of Public Health faculty have addressed questions like these through rigorous research into the scientific, political, legal, economic, and emotional issues that surround medical care. In the process, the School has helped shape today's major debates around health policy, both in the U.S. and abroad.

As a nephrologist, Howard Frazier saw firsthand how dialysis gave new life to patients with late-stage renal failure. He was troubled, however, by what he saw as a lopsided approach in the use of these treatments. As Frazier, then professor in the Department of Health Policy and Management, recalled in a 1997 interview, the nation was channeling thousands of dollars each year to treat sick patients in the early 1970s, but relatively little money to care that would have kept them healthy in the first place.

"It was just a wasteful way of deploying very limited resources," he said. "You can't even afford three bucks to provide immunization for the kids across Huntington Avenue … and yet you could afford $35,000 to $40,000 a year to maintain someone symptomatically uremic but not dead."

## How Much Health Do We Get for Our Money?




Total health expenditures per capita spending in U.S. dollars and purchasing power parity (PPP) adjusted (2010)

*Infographic: Column Five*

Howard Hiatt, then HSPH dean, shared Frazier's frustration. In an effort to fight the growing inequity in American medicine, Hiatt teamed with Frazier in 1972 to form the Center for the Evaluation of Clinical Procedures (CECLIP), later renamed the Center for the Analysis of Health Practices. From its dusty basement office at 55 Shattuck Street, the group became a sort of internal think tank, recruiting faculty from many different disciplines to examine medical policy through the lenses of economics, statistics, management, biology, law, even engineering.

By 1977, a University-wide seminar organized by Dean Hiatt produced a landmark book, *The Costs, Risks, and Benefits of Surgery*—a volume that laid the groundwork for evidence-based medicine, using as examples a wide range of surgical interventions, from gallbladder removal to hysterectomy. CECLIP also applied the concept of "cost effectiveness" research—a type of analysis that can help determine which programs have the biggest health bang for every buck spent on care. Research of this sort might,

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# Shining a Light on Medical Errors

Lucian Leape has made a career out of other people's mistakes. Over the past three decades, his research has focused largely on strategies for reducing those all-too-common errors that kill tens of thousands of patients every year.

Leape, adjunct professor in the Department of Health Policy and Management, began looking into medical errors as part of the Harvard Medical Practice Study, which examined the rates and root causes of malpractice in more than 50 New York hospitals during the 1980s. After analyzing nearly 30,000 patient records, the researchers found that roughly 4 in every 100 patients were injured as a result of their hospital stay, and two-thirds of those injuries happened because of a preventable error.

Lucian Leape

Leape and his colleagues also discovered that the malpractice system meant to address these problems was badly out of sync. On the one hand, there was a large number of "false positives"—malpractice claims against innocent doctors. On the other, there was an even bigger problem with "false negatives"—patients harmed by negligent care who had never filed any malpractice claim.

The study led Leape to uncover the human factors engineering literature on preventing errors through improved designs of work systems. He recommended this approach for health care in "Error in Medicine," his seminal 1994 paper in the *Journal of the American Medical Association*. His policy prescription: Change some of medicine's unexamined standard operating procedures—adopt checklists instead of individual memorization, for example, or reduce sleep deprivation. "Errors must be accepted as evidence of system flaws, not character flaws. Until and unless that happens, it is unlikely that any substantial progress will be made in reducing medical errors."

for example, weigh the costs and health benefits of coronary bypass surgery against a drug regimen that lowers patients' overall cholesterol level in an attempt to identify the more effective treatment.

The cost-effectiveness model, however, has seldom guided choices in medical practice in the U.S.—in part, many experts say, because it is difficult to change doctors' "defensive medicine" practices and patients' high expectations for treatment. Cost-effectiveness analysis also stops short of pinpointing factors that drive up expenses. Figuring out the comparative efforts and skills required to deliver a range of medical services, procedure by procedure, proved to be a nearly impossible task—until William Hsiao, the K.T. Li Professor of Economics at HSPH, took on the challenge in a groundbreaking and controversial study in 1986.

## PAYING UP: DOCTORS' COMPENSATION

In the mid-1980s, services and procedures could be paid at widely varying rates under Medicare and Medicaid. A doctor who spent an hour making a lifesaving diagnosis might be paid $40, yet that same doctor could earn more than $600 an hour removing polyps during a colonoscopy. So how could hospitals begin to determine the "real" value of each procedure?

In 1985, HSPH's Hsiao set out to answer that question. The key to measuring value, he reasoned with economic theory, lay in finding the average amount of work a physician had to do to perform a procedure. The more time, skill, knowledge, and effort it took, the more the physician should be compensated.

Figuring out the exact amount of "work" a doctor performed was no simple task, so Hsiao cast his net widely. For months, he and a large team of researchers developed methods, conducted interviews, and surveys with thousands of doctors from dozens of specialties, painstakingly ranking each task.

From this data, Hsiao's team assigned each procedure a score called a "relative value unit," or RVU. Installing a coronary artery stent would score 24 units; reading an EKG printout, a mere 0.5 units, and so on. Within three years, Hsiao and his colleagues had developed these scores into a system he called the "resource-based relative value scale" (RBRVS), a comprehensive list of RVUs for all the tasks covered under Medicare. Equipped with this scale, hospitals could tally up a total score per patient, multiply it by a set dollar rate (about $40 per RVU in 2009), and pay the resulting amount to a doctor—meaning Hsiao's team had, for the first time, effectively standardized the cost of medical procedures.

But the RBRVS—which Hsiao had conceived as a rational means of allocating medical dollars—took a paradoxical turn. Today, the system is blamed for the very problem it tried to halt: rising health care costs. In its

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## POLLING PROWESS

For nearly 30 years, Robert Blendon, senior associate dean for policy translation and leadership development, has been polling Americans about their views of public health, health care, and other related hot-button issues. "We're living in a world where people believe in smaller government and lower taxes," he said in 2012. "So you have to convince people that there are interventions that can actually save their lives."

# FIRST IN LINE FOR AFFORDABLE CARE

For 15 years, Madelyn Rhenisch struggled with an illness that drained her of all physical and mental vitality, destroyed the successful career she had worked hard to build, and left her with no savings.

All because she couldn't afford health insurance.

Then her luck changed. Now a 63-year-old resident of Boston, Rhenisch was the first person to enroll in the Massachusetts Commonwealth Care program, part of the pioneering 2006 health care reform, passed with bipartisan support, which provides subsidized coverage to lower-income residents who are uninsured. The program—dubbed "Romneycare," after then-governor Mitt Romney—helped inspire the national 2010 Patient Protection and Affordable Care Act, known as Obamacare.

Ironically, Rhenisch had worked her entire life as an activist on behalf of farmworkers and lower-income people. "I came of age in the '60s and wanted to change the world for the better. I never imagined I would be in a position where I myself would be desperately in need of support and advocacy." She was pursuing a doctorate and MBA simultaneously and was juggling several human resource positions when she became sick.

The illness came on suddenly, in the winter of 1996. "It had snowed, so I shoveled a path to my car. When I came in, I was drenched with sweat and exhausted. I couldn't get up for the rest of the day," Rhenisch recalled. The overwhelming fatigue persisted, and new symptoms cropped up: severe muscle and joint pain, and a pervasive "brain fog."

By 1998, she was forced to quit school, leave her jobs, deplete her retirement savings, and ultimately go into debt. Having lost school- and employer-based health insurance, she often had to choose between medicine and food.

In 2006, Health Care for All (HCFA)—Massachusetts' leading consumer health advocacy organization—asked Rhenisch to become the debut enrollee in the state's new health insurance program. There she met John McDonough—now director of the HSPH Center for Public Health Leadership—who at the time served as executive director of HCFA, where he played a key role in designing, passing, and implementing the state's health- reform law. "He was so passionate about the issue," said Rhenisch. "And he made me feel like a worthy person who had something important to contribute."

*Madelyn Rhenisch*

In 2008, after a series of medical tests that she could finally afford, Rhenisch got a diagnosis: untreated Lyme disease. Three years of combination antibiotic treatment have made her nearly whole again.

But the memory of 15 years of physical and mental agony hasn't faded. "Americans believe in bootstrapping your way to opportunity—that if you work hard and be good, everything will be fine," Rhenish reflected. "But sometimes things happen, through no fault of your own. In a flash, you can slide over that line. As I learned firsthand, there's a set of attitudes and judgments and hoops and rules and justifications that dehumanize people."

With the new law in place, others may not have to endure the bureaucratic neglect that brought Rhenisch so much distress. "If I had had adequate health care to pursue a diagnosis, I am sure the infection would have been found much sooner," she said. "I wouldn't have lost the prime earning and living years of my life."

## QUESTIONING OUR ENCHANTMENT WITH HIGH TECHNOLOGY

After spending more than 25 years as a doctor—eventually becoming physician-in-chief at Boston's Beth Israel Hospital—Howard Hiatt knew firsthand the limitations of U.S. health care: a penchant for expensive, high-tech treatments, lack of rigorous evaluation of new clinical procedures, growing numbers of patients excluded from the system, and a failure to emphasize prevention.

When Hiatt became dean of Harvard School of Public Health in 1972, he saw an opportunity to address those shortcomings. Transforming the School's Departments of Biostatistics and of Health Policy and Management, he made public health the conscience of medicine. Immediately after his appointment, Hiatt founded the Faculty Seminar in Health and Medicine, a biweekly group of more than 100 researchers who looked at public health through an interdisciplinary lens. And through a series of faculty appointments, he imported powerful new research tools and methodologies of molecular biology and the quantitative social sciences into the School's traditionally strong research on tropical diseases, cancer, toxicology, and environmental disease.

"Many [health care] problems had not only biological and clinical basis, but political and economic ... and historic underpinnings," Hiatt told the *Harvard Public Health Review* in 1997.

Hiatt's efforts to broaden the School's research portfolio—to include assessment of medical procedures, clinical trials of treatment drugs, and analysis of the economics of health care systems in the U.S. and abroad—are now seen as visionary. But some faculty members at the time resisted what they viewed as an unwelcome departure from the School's historic trajectory. Among other issues, they didn't think public health should be the "watchdog" of medicine. In 1978, they called for Hiatt's resignation, in a letter to Harvard's then-president Derek Bok.

But Bok strongly supported Hiatt, who continued to reshape the School's focus until stepping down in 1984. Hiatt currently serves as associate chief of Brigham and Women's Hospital's Division of Global Health Equity.

original form, RBRVS would have led to a drop in specialists' incomes and a rise in the incomes of primary care physicians. But according to Hsiao, powerful specialty groups altered the original values to create a flood of well-paid specialists and a drought of low-paid primary care physicians.

## THE CHECKLIST APPROACH

While some HSPH efforts to reduce health care costs have yet to be widely adopted, others have caught on almost instantly. One is the drive to minimize surgical mistakes and the long-term medical expenses they generate. Each year around the world, well over 200 million major surgical procedures take place—sometimes at the patient's peril. In industrial nations, 3–16 percent of inpatient surgeries result in major medical complications. In developing countries, 5–10 percent of surgical patients die. And around the world, infections and other postoperative problems pose serious health threats.

About half of these complications may be preventable, through an astonishingly simple approach: safety checklists for medical practitioners. Beginning in 2007, under the leadership of Atul Gawande, professor in the Department of Health Policy and Management, HSPH and the World Health Organization (WHO) developed a 19-item surgical checklist. Before anesthesia, for example, the checklist requires confirmation that the patient has a safe airway and proper intravenous lines for resuscitation. Before making a skin incision, the surgery team must check off that it has verbally confirmed the patient's name and the site of the procedure.

In a 2009 paper in the *New England Journal of Medicine*, Gawande and his colleagues found that surgeons using checklists missed minor steps in only 6 percent of surgeries, as opposed to 23 percent without checklists, leading to a dramatic difference in outcome. The WHO Surgical Safety Checklist has since been introduced in more than 4,000 hospitals worldwide.

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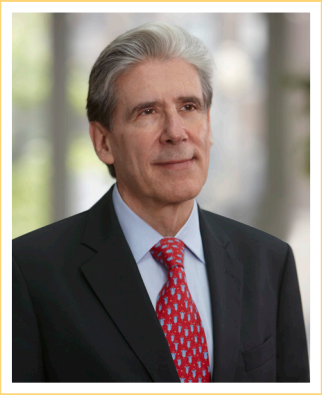
# What's So Hard about Health Care Reform?

Change is usually slow. It moves in fits and starts and veers left and right. That's how behavioral systems move. It's true in every facet of our government: economic policy, foreign policy, transportation policy, education policy.

And proposals for policy reform are almost always heavily altered by lawmakers, because we live in an extraordinarily large society—300 million people, who don't always agree on the proper role of government or on the tradeoffs implicit in various policies. I know of no instance when a policy reform idea went soup to nuts without modification.

—ARNOLD EPSTEIN, Chair, Department of Health Policy and Management



The prospect of changing the health care system generates resistance because there are huge economic interests vested in the current structure: pharmaceutical, construction, equipment, information technology. It is the largest sector of the U.S. economy and 10 percent of the global economy. And health care is a major political issue.

Health systems also deal with the most vulnerable aspects of human existence: birth, death, suffering, uncertainty in the face of disease. They are our most sensitive point of contact with science and with formal institutions.

—JULIO FRENK, Dean, Harvard School of Public Health

In the era of the iPhone, Facebook, and Twitter, we've become enamored of ideas that spread as effortlessly as ether. We want frictionless, "turnkey" solutions to the major difficulties of the world—hunger, disease, poverty. We prefer instructional videos to teachers, drones to troops, incentives to institutions. People and institutions can feel messy and anachronistic. They introduce, as the engineers put it, uncontrolled variability.

But technology and incentive programs are not enough …. Every change requires effort, and the decision to make that effort is a social process. …

[H]uman interaction is the key force in overcoming resistance and speeding change.

*(Excerpt from "Slow Ideas," in* The New Yorker, *July 29, 2013)*

—ATUL GAWANDE, Professor, Department of Health Policy and Management

# HPV Screening

## *Saving Lives in Resource-Poor Nations*

*Sue J. Goldie, Roger Irving Lee Professor of Public Health*

Each year, approximately half a million women develop cervical cancer, a malignancy linked to high-risk strains of the sexually transmitted human papillomavirus (HPV). In wealthy nations, cervical cancer deaths have plummeted over the six decades that the Pap smear has been used for routine screening. But in countries lacking the resources to support organized screening, the cancer kills nearly 200,000 women each year.

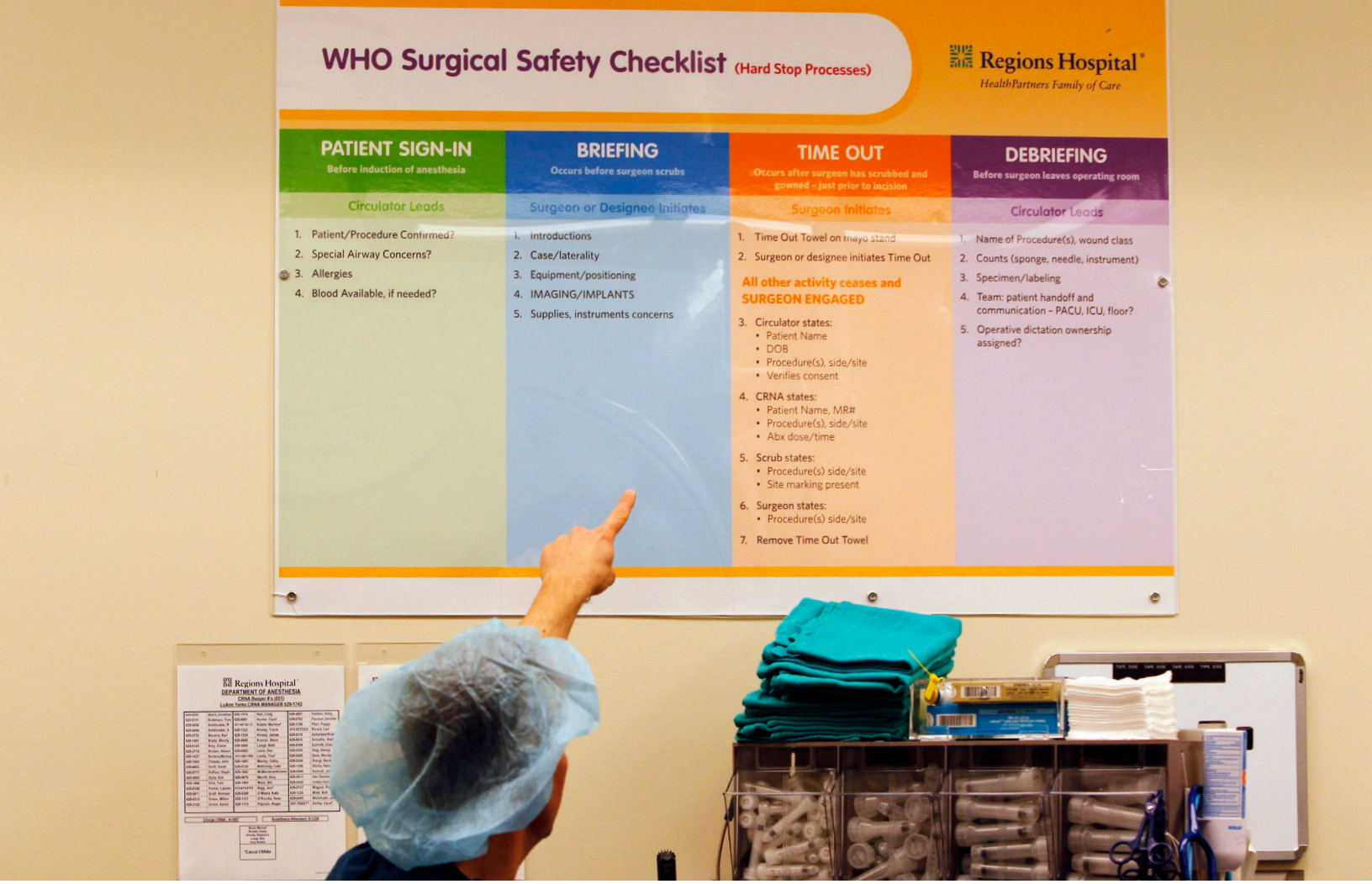
Pioneering work over the past 10 years by Sue J. Goldie, Roger Irving Lee Professor of Public Health and director of the School's Center for Health Decision Science (CHDS), predicted that two promising interventions—a rapid DNA test for cancer-causing types of HPV or visual inspection after applying acetic acid to the cervix, followed by same-day treatment—could cut cancer risk by a third. Empirical data from India confirmed a 31 percent reduction in cervical cancer deaths in 150,000 women with visual screening.

Since then, the HSPH team has shown, based on analyses in 25 developing countries, that the most promising approach consists of screening women three times per lifetime, between the ages of 30 and 45. This work has led to a paradigm shift—from developing new technologies to forging new strategies for delivery.

More than 50 studies by Goldie and colleagues have contributed to position statements on this issue by the World Health Organization, influenced investment choices by foundations and public-private alliances, and framed government policies.

Most recently, Goldie and colleagues assessed the impact, affordability, and cost effectiveness of preadolescent HPV vaccination, showing that a decade's delay in access would mean the loss of more than a million lives. They argued that if the vaccine's price were lowered, HPV vaccination would be as cost effective as childhood immunization, one of our greatest public health buys. This catalyzed the decision of the Global Alliance for Vaccines and Immunization to prioritize HPV vaccination and influenced industry to drastically lower prices—from $100 per dose to as low as $4.50. A related program in middle- and high-income countries is being led by CHDS' Jane Kim, associate professor in the Department of Health Policy and Management.

"Doing nothing is a choice," said Goldie, who also serves as director of the University-wide Harvard Global Health Institute. "And that choice has tragic consequences: for individuals, for families, and for society."




The World Health Organization's Surgical Safety Checklist can help avert mistakes in the operating room.

Gawande and his team have more recently applied this commonsensical approach to childbirth. Of the 130 million births globally each year, nearly 350,000 result in the mother's death and 3.1 million in infant death during the neonatal period. "At times, the problem is inadequate resources," said Gawande in 2011, "but often the issue is a lack of hand washing or screening for use of available antibiotics." In southern India, the checklist-based childbirth safety program—dubbed the BetterBirth clinical trial—has reduced deaths and improved outcomes of both mothers and infants. In the fall of 2012, Gawande and his team launched a new center—Ariadne Labs, a collaboration between HSPH and Brigham and Women's Hospital—to house the checklist program.

## EXPANDING HEALTH CARE IN THE U.S. AND BEYOND

Although keeping expenses under control will be essential for the sustainability of the U.S. Medicare program and more recent health care reforms, policies that focus only on lowering spending without accounting for the effects on health benefits and value may be counterproductive. Expanding access to efficient care is a far more important factor, says Katherine Baicker, professor of health economics.

In a 2008 study in Oregon—a study already considered a classic in the field of health economics—Baicker and colleagues gathered data on low-income adults who were on a waiting list to be selected by lottery for Medicaid coverage. They wanted to gauge the effect of insurance coverage on health care use, physical and mental health,

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and financial stability. Baicker and her colleagues found that those gaining Medicaid coverage used more care—from doctors to prescriptions to hospitalizations—than did the uninsured. With that coverage came substantial reductions in financial strain and improvements in mental health and self-reported physical health, though no detectable improvements in several chronic physical health conditions.

Ashish Jha, professor of health policy and management, has used innovative metrics to improve health care—examining the effects of health care reform efforts on quality and costs of care and identifying interventions that reduce inequities in care. According to Jha, "An ounce of data is worth a thousand pounds of opinion."

HSPH faculty have also been heavily involved in the United States' latest experiment in national health care. John McDonough, professor of the practice of public health and director of the School's Center for Public Health Leadership, advised U.S. lawmakers on health reform. In 2014, President Barack Obama's Affordable Care Act will go into effect, giving U.S. citizens new access to health insurance.

Although the expansion of government-subsidized health care remains contentious in the U.S., dozens of other nations have adopted the concept with great success. Over the last 20 years, HSPH researchers have examined those national health systems extensively, from decades-old universal health programs in Canada, Australia, and Europe to the younger universal system of Taiwan—a health care finance model designed by William Hsiao, the School's professor of health economics, and now seen as one of the most effective examples of national single-payer health care. Hsiao also designed a plan—the New Rural Cooperative Medical System—that covers most of the hundreds of millions of previously uninsured individuals in rural mainland China.

"Many members of our faculty are physicians, who have a nuanced understanding of the clinic. Others have been pioneers in statistics, epidemiology, economics, law, and sociology," said Arnold Epstein, chair of the Department of Health Policy and Management. "In combining those two sets of expertise, we've come up with important new ideas for reforming health systems here and abroad." ❖

**A Rwandan mother and her child at a malnutrition clinic in northern Rwanda. While universal health care is contentious in the U.S., Rwanda has had such a system since 2008.**

## AMONG THE HSPH ALUMNI WHO HAVE HELD LEADERSHIP ROLES AROUND THE WORLD:

**Current Ministers of Health**

*Afghanistan:* Suraya Dalil, MPH ’05

*Thailand:* Pradit Sintavanarong, MPH ’89

*Indonesia:* Nafsiah Mboi, TF ’91

**Past Ministers of Health**

*Papua New Guinea:* Clement Malau, MPH ’95, 2007–2011

*Indonesia:* Endang Sedyaningsih, MPH ’92, SD ’97, 2009–2012

*Taiwan:* Ching-Chuan Yeh, SM ’81, 2008–2009

*Colombia:* Beatriz Londoño Soto, MPH ’90, 2011–2013

*India:* K. Sujatha Rao, TF ’92, 2009–2010

**CDC Directors (Five of the last 10)**

Jeffrey Koplan, MPH ’78, 1998–2002

James O. Mason, MPH ’63, DPH ’67, 1983–1989

William Foege, MPH ’65, 1977–1983

David Sencer, MPH ’58, 1966–1977

James L. Goddard, MPH ’55, 1962–1966

**WHO Directors**

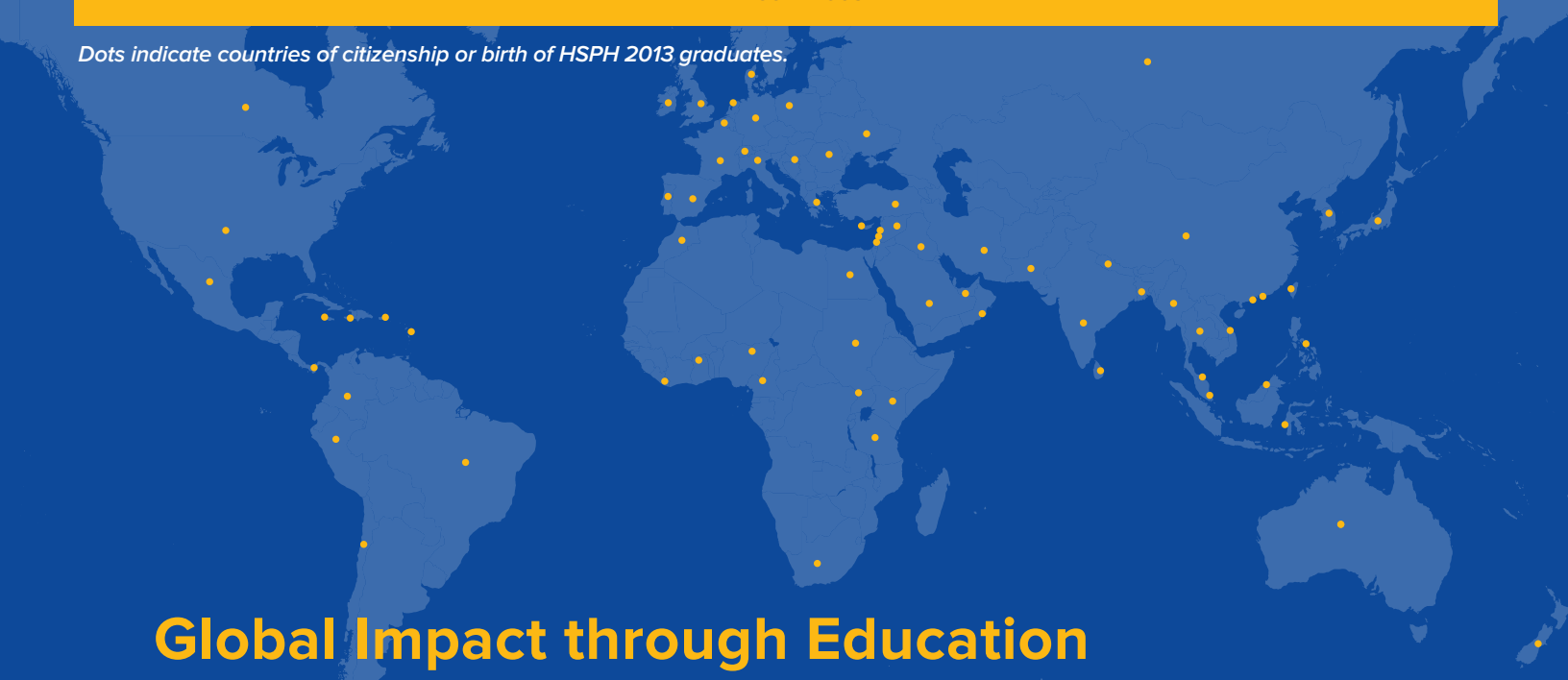
Gro Harlem Brundtland, MPH ’65, 1998–2003

**Heads of State**

*Cook Islands:* Thomas Davis, MPH ’54, Prime Minister, 1978–1983, 1983–1987

*Norway:* Gro Harlem Brundtland, MPH ’65, Prime Minister, 1990–1996

*Uganda:* Speciosa Wandira-Kasibwe, SD ’09, Vice President, 1994–2003



*Dots indicate countries of citizenship or birth of HSPH 2013 graduates.*

# Global Impact through Education

From its earliest days, HSPH has enjoyed a reputation as a global center for public education and research, in part a reflection of the strong support the School received from the Rockefeller Foundation to promote international research and training efforts. Each year, the School graduates candidates from 60-plus countries, with a third coming from outside the U.S. Learning is a lifetime pursuit, and the School has offered numerous opportunities for public health managers and leaders to hone their abilities. For example, the Global Flagship Course on Health Systems Strengthening and Sustainable Financing—a collaboration between HSPH and the World Bank Institute—has enrolled more than 20,000 health care leaders from more than 50 countries since 1997. Since 2005, the HSPH China Initiative has convened hospital and health systems leaders from the U.S. and China for exchanges to improve health in both countries. In the last two years, two new programs aimed at ministers of health and finance, run in conjunction with Harvard’s Kennedy School and the African Bank, have attracted some 40 cabinet-level leaders from Asia, Africa, and Latin America.