From the Editor-in-Chief

Koplik's Spots: The Harbinger of a Measles Epidemic

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WHEN REVIEWING THE RECENT (AND ENTIRELY preventable) epidemic of measles that began in, of all places, Disneyland, we were reminded of many things. The first is that of all the victories we have achieved in public health over the past century or more, the development of effective immunizations against a battery of infectious scourges surely ranks among the highest.

So successful have the mass immunizations of children across the nation been that few American pediatricians practicing today have ever even seen a case of measles. Yet as the physicians who treat measles in the poorer nations of the world and, now, in California and elsewhere know all too well, this disease is no weakling in the pantheon of infection. Measles, one of the most contagious viral diseases known, makes its sufferers terribly ill with high fevers, intolerance to light, aching muscles, cold-like symptoms, and peeling skin.

We were also reminded that measles patients who experience only those symptoms are the lucky ones. In the years before antibiotics, a significant percentage of afflicted children went on to develop bacterial pneumonia, and many of them died because of that complication. Even today, 1 out of every 10,000 cases of measles results in an inflammation of the brain called *subacute sclerosing panencephalitis*, which often leads to serious brain damage or death. Overall, the risk of death from measles is about 0.2%, but in impoverished areas where malnutrition is common, that rate can soar to 10%. The majority of these deaths occur in children under the age of 5.

The 2015 measles crisis should also remind us that before measles immunization became widely available in the United States, there were between 3 million and 4 million cases a year. Thanks to measles vaccinations, the World Health Organization estimates that 15.9 million deaths were prevented, making the measles vaccine one of “the best buys in public health today.” That said, measles continues to stalk the planet

with a vengeance; in 2013, there were 145,700 deaths globally (down from 544,200 deaths in 2000) or about 400 deaths every day or 16 deaths every hour.

The fact that any child living in the 21st century becomes ill with measles is especially astounding when we consider that measles has been completely preventable with an inexpensive, safe, and effective vaccine that has been available for more than 50 years. The only catch is that you have to be inoculated with the vaccine, typically as an infant and then again, as a child, with a booster shot. Sadly, this seems to be an activity that appears to be less and less popular among a large number of parents who fear vaccinating their children based largely on erroneous information, unrealistic views of what constitutes a health threat, and mythical claims of the measles immunization's putative danger. And this state of affairs does not begin to account for the health risks incurred for millions of immune-compromised patients, such as those being treated for cancer, HIV/AIDS, transplanted organs, etc., who cannot be immunized with live-attenuated vaccines for risk of developing vaccine-related illnesses.

The 2015 measles epidemic in the United States is a direct function of the public health risks posed by antivaccinationists, the loss of herd immunity, and the myriad problems that arise when vaccinations become politicized in the form of state-mandated, and rather loose, exemption laws.¹ With respect to the latter, several state legislatures—including California—are re-evaluating their vaccine exemption laws and, as we go to press, there are several bills in the pipeline to revoke these decidedly unhealthy policies. Predictably, anti-vaccination activists are fighting against such efforts.

All these realizations have unfortunately turned our thoughts not forward but backward in time to the work of a brilliant pediatrician named Henry E. Koplik (1859-1927). Dr. Koplik, it may be recalled, was the man who first described the pathognomonic sign of measles called "Koplik's spots." (Pathognomonic is merely a medical means of describing a sign or symptom that is specifically characteristic or indicative of a particular disease or condition.) Dr. Koplik managed this feat in 1896.

Henry Koplik was educated at the City College of New York and the College of Physicians and Surgeons of Columbia University. After an internship at the Bellevue Hospital, Koplik spent 18 months in Berlin, Prague, and Vienna, and it was there that he decided to dedicate his medical career to the relatively new specialty of pediatrics. He began his

practice in 1887 at the Good Samaritan Dispensary on New York City's Lower East Side. There he worked among some of the city's poorest residents and their children, largely East European Jewish immigrants who lived cheek by jowl in overcrowded tenements lining crowded streets with quaint names like Orchard, Delancey, and Hester.²

Diagnosing extremely contagious and deadly diseases such as measles in the late 19th and early 20th centuries, without the aid of modern diagnostic tests, was no simple matter. Yet it was precisely these difficult determinations that comprised the bulk of Koplik's practice as well as those of the other doctors who worked alongside him.

Measles is one of the most contagious viruses known, and to make matters worse, a child with an incipient case of measles is most contagious in the days before the classic red, blotchy, or maculo-papular rash erupts all over his or her skin. Consequently, doctors of Koplik's era were always a step or two behind the march of a measles outbreak.

For many years, the studious and enterprising Henry Koplik searched for a diagnostic sign or clue that might lead to an early diagnosis of measles. In order to do this, he charted his measles patients' every symptom and complaint, exhaustively reviewed their histories and physical examinations, and devoured the medical literature on the illness until he finally found the answer in 1896.

IN THE CHILDREN'S CORNER. THE DOCTOR LOOK-
ING FOR VACCINATION SCARS.

Depiction of Henry Koplik at the Great Eastern Free Dispensary circa 1898 from Darkness and Daylight: Lights and Shades of New York Life by Helen Campbell. (Hartford, Connecticut: The Hartford Publishing Co., 1898)

Specifically, Dr. Koplik noted that a full 2-3 days before the presence of the distinctive rash of measles, there appeared “minute, bluish white specks” on the “buccal mucous membrane on the inside of the cheeks and on that of the lips.” This was no mere footnote to clinical pediatrics. By identifying these contagious children a full 2-3 days before they erupted in rash, the infected children would be isolated from others, both those in their family and at school, so doctors and public health officials could try to stem the tide of an incipient epidemic.³⁻⁵

Koplik’s discovery brought him international fame. An oft-told anecdote gives a sense of his esteemed reputation. Around the turn of the last century, Dr. Koplik’s wife took her daughter and 2 sons to Europe for a summer holiday. While on the ocean voyage, one of the boys developed the classic fever, cough, and runny nose that precede the rash of measles. The ship’s physician, a newly minted medical doctor from one of Germany’s finest medical schools, was called to the Kopliks’ stateroom to examine the child. A few moments after looking into the boy’s mouth, the physician informed Mrs. Koplik that her son had measles. The young doctor could not help but add that he, and he alone, could make such a diagnosis because he detected bluish white spots on the inside of the boy’s cheek—a newly described sign called *Kopliksche Flecken*, which he had just read about in a medical journal. Mrs. Koplik thanked the young physician, but not before informing him that the boy’s father was the man who had identified the spots. The doctor turned almost as red as the little boy stricken with measles.

Anecdotes aside, the current situation is no laughing matter. How terribly tragic it is that this now forgotten clinical sign may need to be retaught to medical students for the early diagnosis of a disease that by all rights should be eradicated from the face of the earth. Such a quandary is one more reminder that science alone does not always guide the public’s health or the health policies developed to protect it. People, politics, and vested interests, some noble, some ill informed, and many more in between these two ends of the spectrum often enter the equation at the peril of our collective well-being. How to right the ship of public health on such stormy waters while respecting the needs and beliefs of those we do not always agree with is one of the greatest challenges we face today.

In this issue of *The Milbank Quarterly*, we begin with a superb slate of Op-Ed essays from our contributing columnists, covering topics such as the politics of ending the lifelong gay blood donor ban, health reform

in a hostile political environment, the future of health care co-ops, why healthy behavior is so hard to achieve and maintain, peer review and the public's health, confusion over the US Food and Drug Administration's role in regulating e-cigarettes, the importance of investing in children's health, and the dogmatization of Bradford Hill's population health criteria.

Our lead original contribution is an article on pursuing the Triple Aim of health care, by John Whittington and his colleagues at the Institute for Healthcare Improvement, which coined the concept in 2008. The Triple Aim has since become an important part of the Affordable Care Act of 2010. In their evaluation, after 7 years of implementation and work with health care systems, hospitals, insurance companies, and other stakeholders, Whittington and his colleagues found 3 principles essential for an organization to successfully pursue the Triple Aim: (1) creating the right foundation for population management; (2) managing services at an appropriate scale for the population; and (3) establishing a learning system to drive and sustain the work over time. Such findings are especially important because the Triple Aim concept has been adopted as part of the US national health care strategy and is now widely used by many organizations around the world.

Our second original contribution is Jennifer Pomeranz's study of participatory workplace wellness programs with respect to rewards, penalties, and regulatory conflicts. As more and more of these wellness programs are developed, a trend toward providing incentives for participating workers to complete a health risk assessment has appeared. Yet as Pomeranz demonstrates, legal and ethical concerns arise when employers assess penalties for not completing a health risk assessment, raising questions about the voluntary nature of such programs. Most troubling, as we work to develop new wellness policies, Pomeranz argues, the 2013 regulations for participatory programs and employers' current practices employed by the US Departments of Treasury, Labor, and Health and Human Services conflict with the Equal Employment Opportunity Commission's prevailing interpretation of the Americans with Disabilities Act of 1990.

Amanda Fallin and Stanton Glantz present a fascinating account of tobacco-control policies in the tobacco-growing states (Kentucky, North Carolina, South Carolina, Tennessee, and Virginia). Their findings include evidence that the tobacco companies prioritized blocking such health policies in tobacco-growing states and joined with

tobacco farmers in opposing them. Fallin and Glantz also found that while the 1998 Master Settlement Agreement settled state litigation against the cigarettes companies, the 2004 tobacco-quota buyout and the companies' increasing use of foreign tobacco led to a rift between the companies and the American tobacco farmers. Interestingly, they report, in 2003, the first comprehensive smoke-free law passed in a major tobacco-growing state, and since then, there has been steady progress in the region. Fallin and Glantz conclude that health advocates should educate the public and policymakers on the changing reality in these states, notably the major reduction in the volume of tobacco produced.

Pamela Doty, Pamela Nadash, and Nathalie Racco reflect upon the lessons of long-term care financing in France. They describe how France's model of third-party coverage for long-term services and supports (LTSS) combines a steeply income-adjusted universal public program for people over 60 years of age with voluntary supplemental private insurance. They contrast the French system with US policies: France's system pays cash, its premiums are lower, and its take-up rates are higher—in part because employer sponsorship, with and without subsidization, is more common. But, they argue, this situation also exists because the coverage in France targets higher levels of need and pays a smaller proportion of costs. Doty and her colleagues maintain that such inexpensive, bare-bones private coverage, especially if marketed as a supplement to a limited public benefit, would be more affordable to Americans currently most at risk of “spending down” to Medicaid.

Finally, a systematic review by Linden Farrer, Claudia Marinetti, Yoline Kuipers Cavaco, and Caroline Costongs examines the issue of advocacy for health equity. These scholars found a variety of barriers that hamper advocacy for health equity, including the contemporary economic zeitgeist, biomedical health perspectives, and difficulties co-operating across policy sectors on the issue of equity. Furthermore, effective advocacy must include persistent efforts to raise awareness and understanding of the social determinants of health. Education on the social determinants as part of medical training should be encouraged, including professional training in disadvantaged communities. Farrer and colleagues conclude that advocacy organizations have a central role in advocating for health equity, given the challenges bridging the worlds of civil society, research, and policy.

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