

tients, and because clinically significant consequences will not become evident for many years.

Overall, we must conclude that with a few exceptions — such as mammography — most radiologic imaging tests offer net negative results. There is little high-level evidence of benefit, whereas cumulative radiation exposure can produce real harm, even if it may not be possible to trace adverse outcomes to individual patients who have been exposed. If we approached this component of medical practice with the humility of Nachmanides, we would have to wonder not only why so much imaging is being carried out but also why its use is increasing so rapidly (see graph).

Because the use of ionizing radiation carries “an element of danger in every . . . procedure,” we need to adopt a new paradigm for our approach to imaging. Instead of investing so many resources in performing so many procedures, we should take a step back and design and execute desperately needed large-scale, randomized trials to figure out which procedures yield net benefits. This approach would require leadership and courage on the part of our profession, our opinion leaders, and the research enterprise, but were we to insist that all, or

nearly all, procedures be studied in well-designed trials, we could answer many critical clinical questions within a short time. Because we will continue to be uncertain of the magnitude of harm, an accurate understanding of the magnitude of benefit is a moral imperative.

To adopt this paradigm, we will have to take two critical steps. First, we must approach imaging with the same humility with which others in our profession approached experimental methods for treating acute coronary syndromes and other conditions that today have a strong evidence base. We have come a long way since the time when the primary management of acute myocardial infarction was prophylactic lidocaine. Many of the interventions that we now consider standard do come with their own elements of danger, but we can feel comfortable recommending them because a large body of data from well-powered randomized trials has clearly shown a net benefit.

Second, we must assume a “public health” mind-set when considering our roles with regard to medical imaging. We have to think and talk explicitly about the elements of danger in exposing our patients to radiation. This

means taking a careful history to determine the cumulative dose of radiation a patient has already received and providing proper, personalized information to each patient about the risk of iatrogenic cancer. If we began a national conversation about the dangers of ionizing radiation, it might cause enough discomfort to stimulate demand for the high-quality evidence our patients deserve.

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H1N1 Influenza, Public Health Preparedness, and Health Care Reform

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In December 2009, the Department of Health and Human Services will present to Congress its first-ever national health se-

curity strategy, outlining high-priority activities and areas of investment for strengthening the capability of the United States to

prepare for, respond to, and recover from large-scale public health emergencies. Fortunately, the strategy is being developed

in parallel with a national debate over health care reform, since national health security will not be achievable without key elements of reform. These elements include an effective focus on prevention and wellness, universal access to needed care, widespread deployment of health information technology, changes in the organization of and payment for care, and research on comparative effectiveness.

A hazard equation that informs many approaches to preparedness makes it clear that risk can be reduced by mitigating vulnerabilities and hazards and increasing resilience.¹ People who are vulnerable because they are poor or have underlying health conditions suffer disproportionately in nearly all emergencies.¹ The people hit hardest by Hurricane Katrina, for instance, were those with the highest burden of chronic disease, many of whom could not be evacuated because they had physical disabilities or required ongoing care.² Responders were caught off guard by the extent of the population's needs. Although many lessons from Hurricane Ike in 2008, a high prevalence of obesity among Ike's victims strained the systems responsible for evacuation and provision of shelter. As a result, some relief organizations now require morbidly obese people to be served in special-needs shelters, a requirement that puts a strain on those resources as well. But if the investments in prevention and wellness that are envisioned in a reformed health care system — including payment for preventive care, aggressive secondary prevention,

and population-level interventions to prevent chronic disease and its complications — achieve their aims, they will increase the population's resilience by reducing key vulnerabilities, including those associated with obesity, chronic diseases, and illnesses that are preventable with vaccines.

Early detection of a new infectious disease — and potentially the survival of those who are infected — requires that sick people have access to the health care system and receive early treatment. Delays in seeking care can lead to delays in the recognition and control of an epidemic and in the treatment of patients. Indeed, experts have hypothesized that one reason the mortality associated with the current epidemic of swine-origin influenza A (H1N1) virus (S-OIV) was so high in Mexico is that many people delayed seeking care, in part because of its cost.³ In the United States, lack of health insurance is a key reason for delays in seeking care; health care reform that results in universal coverage would facilitate earlier detection of new diseases, enable disease-control efforts to be instituted, and alleviate the population's vulnerability that is attributable to delayed care.

During a large-scale health emergency, emergency care must be available to seriously ill or injured patients. Without substantial changes in policies and procedures, overcrowded emergency departments and inefficient hospitals will struggle to handle a surge of patients who are acutely ill, as well as those who are worried but only mildly ill. The emergency departments in New York City experienced overcrowding in

the spring of 2009 because of H1N1 influenza. Yet studies repeatedly suggest that one half to two thirds of emergency department visits are potentially avoidable if there is timely access to high-quality primary care.⁴ In some cities, the lack of communication between emergency transportation systems and hospitals means that patients are taken to emergency departments that are too busy or too poorly equipped to care for them. Implementing the recommendations of the Institute of Medicine for revamping the emergency medical services system as part of health care reform will be critical to alleviating overcrowding in emergency departments, improving turnover time, and enhancing the capacity of emergency departments to handle a surge of acutely ill or injured patients.

Investments in interoperable health information technology (HIT) form one of the cornerstones of health care reform. After Hurricane Katrina, the lack of access to medical records was a major impediment to caring for most displaced, chronically ill persons; the records of those who received care through the Department of Veterans Affairs, however, were accessible anywhere in the country. Portable, interoperable HIT will be essential for efficiently and safely caring for displaced populations during a health emergency.

With appropriate planning and standards, HIT can also play a key role in detecting and monitoring disease outbreaks. Routine, automated reporting of diagnoses to health departments by primary care practices, emergency depart-

ments, and laboratories can provide early evidence of an impending epidemic. Such monitoring has proved useful in determining whether a report of a single case might be accompanied by spikes in the use of health care services, signaling that many people are ill. Such a system was used recently by the New York City health department and others to determine whether large numbers of people were ill when a cluster of cases of H1N1 influenza was identified in a school and to monitor the epidemic.

A key challenge facing public health officials who are planning responses to a potentially more severe H1N1 influenza epidemic this fall is finding a way to quickly link information regarding who is vaccinated to information about the subsequent use of health care services by these people. Such linking will be essential for detecting and interpreting reports of adverse events after vaccination and determining the effectiveness of vaccines in preventing illness. Whereas some countries with universal health care systems can readily gather and use such information, the fact that not all Americans are accounted for in our system and the lack of HIT make it impossible to do so in most of the United States.

In the event of a large-scale health emergency such as an influenza pandemic, the health care system will experience unprecedented demand. Although much care can be provided outside hospital settings, intensive-

care resources will be in particularly short supply. Determining how to retain — and pay for — the capacity to “surge” in such an event is a critical aspect of health preparedness; it is particularly challenging, however, because one way to achieve the cost-containment goal of health care reform is to shift care from expensive inpatient settings to less expensive outpatient settings. New approaches, including self-triage guidelines, remote monitoring devices, and telemedicine, support such shifts in the delivery of care. Research suggests that building excess emergency-department and inpatient capacity as a sort of insurance policy may not be a sound approach and will only increase health care expenditures: if capacity is there, it will be used for other, nonemergency care. Unfortunately, we have not yet found the right payment policies to ensure that hospitals will be able to defer elective procedures and discharge patients who are less severely ill in order to make space for those who are more acutely ill.

Currently, we are far from allocating our resources with maximum efficiency, even in the absence of a large-scale emergency. For example, real-time electronic reporting of available bed capacity is not widespread, despite several years of investment in hospital preparedness. Hospitals still have patients who might be better served with a less intensive level of care, remote monitoring and telehealth technologies are not yet widely deployed, and our

surveillance systems are lacking in timeliness and coverage.

Finally, the scientific basis for the real-world application of preparedness measures is underdeveloped. For example, are some modes of public communication in a health emergency or some social-distancing strategies to prevent the spread of disease better than others? Comparative-effectiveness research, a cornerstone of the Obama administration’s approach to health care reform, will be essential for gathering evidence to support particular preparedness measures and for ensuring the creation of a maximally efficient system.

In summary, a U.S. health security strategy will need to build on, and take full advantage of, core components of a reformed health care system. With the right approach, reform could facilitate vast improvements in our ability to respond to and recover from large-scale health emergencies.

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