are helpful. For example, the website DiabetesMine curates video patient reviews that explain how a particular app works and whether the patient or caregiver finds it useful (http://bit.ly/1EtLCCR).

“It’s a great resource that is being missed because it is not coming from the medical establishment,” Lee said. “Patients are the best at finding tools that help them manage their chronic disease.”

Even if a physician and patient find a useful app, it isn’t necessarily clear how the app will work in the context of clinical care.

“The challenge is integrating [mobile apps] into the medical delivery system,” said Lee. She explained that sharing app data via email may not be secure or compliant with patient privacy regulations, or apps may present data in formats that are difficult to upload into widely used medical electronic records.

It has taken years and multiple iterations for Clough and her colleagues to develop systems that allow the practices using the WellDoc Diabetes Manager app to easily integrate it into their prescribing and clinical care workflows, Clough said.

She acknowledged, however, that this is a challenge many tech-driven health solutions haven’t figured out how to solve for their own apps.

While apps are not a panacea for all patients or providers, they may help better engage some patients. Data collected by the BlueStar app during the regional rollout have shown that adults in the 60- to 69-year-old age group, who often struggle with adherence and diabetes complications, are among the WellDoc BlueStar app’s most prolific users.

“They are killing it,” she said, referring to their successful use of the app.

The JAMA Forum
Reforming the World Health Organization After Ebola

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In September 2014, at the height of the West Africa Ebola epidemic, Margaret Chan, MD, DSc, director-general of the World Health Organization (WHO), downplayed the agency’s role in taking a lead in fighting the outbreak in an interview with the New York Times (http://nyti.ms/1ArLPqE). WHO “is a technical agency,” Chan said, adding that it is governments that “have the first priority to take care of their people.” In January 2015, the Chan again deflected responsibility, saying she was following protocol, leaving it to the WHO’s Regional Office for Africa (AFRO) to respond (http://nyti.ms/1ArxfO8). Yet, Guinea, Liberia, and Sierra Leone—among the world’s poorest countries—could not have contained the outbreak on their own.

In January, the WHO Executive Board proposed major reforms, which the World Health Assembly will consider in May (http://bit.ly/17Z0Vig). The outcome of the reform movement could affect the WHO’s status and credibility for a generation. Here are 5 reforms I propose needed to uphold the WHO’s constitutional mandate (http://bit.ly/1BuNfTc) as “the directing and coordinating authority on international health work.”

1. Ensure sustainable funding

To achieve sustainable funding, the World Health Assembly should double the WHO’s overall budget, with mandatory dues from member states comprising at least 50% of the budget within 5 years. Of the agency’s $3.98 billion 2014-2015 budget, only $0.93 billion came from mandatory (assessed) dues; 77% came from voluntary donations, much from rich donors such as the Bill & Melinda Gates Foundation and the United States (http://bit.ly/1vztgRO). Voluntary contributions are earmarked for the donor’s preferred projects, denying the WHO the ability to set its own agenda. Voluntary funds, moreover, are badly misaligned with the global burden of disease. Donors, for example, virtually ignore noncommunicable diseases, injuries, and mental illness.

It wasn’t always this way: 48.8% of the WHO’s 1998-1999 budget was from discretionary sources, growing to nearly 80% today. This 80/20 split undermines the agency’s effectiveness and flexibility to meet changing health threats. Voluntary funding has transformed the WHO into a donor-driven organization.

2. Reform the WHO’s regional structure by empowering WHO’s director-general to appoint regional directors

WHO regional offices are uniquely independent within the United Nations system, and have authority over regional and country personnel (http://bit.ly/1ZIBlum). Ministers of health of a region elect the WHO regional directors, whose allegiances are to the region rather than to WHO headquarters. Each region has its own budget, with most funding coming from the WHO’s central budget—depleting the agency’s financial capacities. During Ebola, Director-General Chan and AFRO fought over control, perhaps hindering the international assistance.

The WHO must speak and act coherently, which requires the director-general to have control over the agency’s worldwide resources, workforce, norm development, and deployment in a global health emergency. Better
alignment is consistent with the constitutional design, with regions envisaged as an integral part of the WHO.

3. Improve WHO governance by empowering stakeholders to harness the creativity of civil society

Civil society organizations (CSOs) lamented that they have little-heard voices, with the WHO failing to include them in governance. Many CSOs have become disillusioned with WHO. Leadership means harnessing the resources and energy of key stakeholders. The distrustful relationship between WHO and nonstate actors could be changed to enlist stakeholders in a strategic alliance.

Nonstate actors play no formal role in WHO governing structures. This contrasts with Joint United Nations Programme on HIV/AIDS (known as UNAIDS) and the Global Fund to fight AIDS, tuberculosis, and malaria, which include CSOs on their governing boards. The WHO makes it difficult for nongovernmental organizations to gain “official relations” status, which is a prerequisite for nonvoting participation.

The WHO should harness the creativity of CSOs. AIDS changed the world with civil society leading the fight for resources and political attention. That could happen with WHO as well, but it would take major reforms.

4. Exert WHO’s constitutional authority by setting an ambitious agenda of health treaties and voluntary codes

The WHO was created as a normative agency (that is, an agency that works to establish global standards for health and safety) with incomparable powers to adopt health treaties. Yet, in more than 65 years it has adopted only 2 major health agreements, the International Health Regulations (IHR) and the Framework Convention on Tobacco Control (FCTC). The justification for standard setting, or norm creation, is not simply that it is constitutionally mandated, but also that it will drive change far better than technical support. Creating international standards can set the global health agenda, guide priorities, harmonize activities, and influence key state and nonstate actors.

Just as tobacco and health security issues transcend borders, justifying the FCTC and IHR, so too do major health hazards, such as noncommunicable diseases, mental illness, and injuries. By pressing standard setting, the WHO could influence multiple stakeholders, much in the way the World Trade Organization has done.

5. Build health system capacities to help prevent the next global health emergency

What Ebola taught us is that preventable health hazards in states with fragile health systems can easily escalate with hypercrowded cities, intense human and animal interchanges, and rapid air travel. The IHR requires WHO member states to develop their health systems and asks richer countries to contribute toward that goal, but this legal mandate has never been enforced. The following building blocks would help prevent the next epidemic:

- **An emergency fund.** The WHO should establish a Contingency Fund deployable after a declaration of a global health emergency. A 2011 review of the influenza A(H1N1) pandemic found (http://bit.ly/1DUvxxHK), “The world is ill-prepared to respond to a … global, sustained and threat-en ing public-health emergency,” with the health capacities “not now on a path to timely implementation worldwide.” The review committee that wrote the review proposed a $100 million contingency fund for public health emergencies, but the WHO failed to respond. Furthermore, the Ebola epidemic in West Africa showed that the fund would have to be several times greater.

A global health reserve workforce. The WHO should maintain a reserve health workforce of highly trained professionals experienced in lower-income settings for deployment in a global health emergency (http://lat.ms/1759U7). Among the main drivers of the Ebola epidemic was the absence of trained health workers to diagnose, treat, and isolate infected patients.

- **An international health systems fund.** A longer-term dedicated health system fund would build national capacities not only to rapidly respond to emergencies, but also to enable lower-income countries to deliver comprehensive health services (http://bit.ly/1vzuSY). Robust health systems would improve health security and also shore up capacity to meet everyday needs. A sustainable health system fund, however, would require a multibillion dollar investment.

The Ebola epidemic should spark a badly needed global course correction favoring strong health infrastructure. It is in all nations’ interests to contain health hazards that may travel to their shores. But beyond self-interest are the imperatives of global health with justice (http://bit.ly/1fQ7kX2).

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**Published online:** February 25, 2015, at http://newsatjama.jama.com/category/the-jama-forum/.

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