ANNEX 3G. The Role of Surveillance in Achieving UHC

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Routine, reliable, low-cost, long-term surveillance of various types is vital to maintaining public health and providing effective medical care. Health surveillance systems are key to policy development, tracking trends in health status of the population, detecting new epidemics and outbreaks (such as Ebola and Zika), evaluating the success of health policies and programs, and improving accountability for health expenditures (1).

The health status of populations in high-income countries was transformed when vital statistics on age, sex, and socioeconomic distribution of births and deaths became available in the late nineteenth century and early twentieth century (2). Vital statistics have been central to documenting the large declines in tuberculosis and under-five mortality during the twentieth century. They have also sounded alarms of changing patterns and new threats, such the HIV/AIDS epidemic, which was signaled by an increase in unusual cancers among young men in San Francisco in the early 1980s, and the lung cancer epidemic among men beginning around World War II, which led to recognition of tobacco as a risk factor for many diseases. Additionally, active surveillance of smallpox and polio has been central to eradication efforts (2).

As illustrated in Figure 3G.1, surveillance supports four major health objectives:

1. **Monitoring health status** (including premature mortality (3)) to guide policy choices;
2. **Assessing health system performance** and ensuring the efficient use of resources;
3. **Conducting disease surveillance** to aid control programs and to identify new health risks and determinants; and
4. **Epidemic alert** to enable rapid response and containment

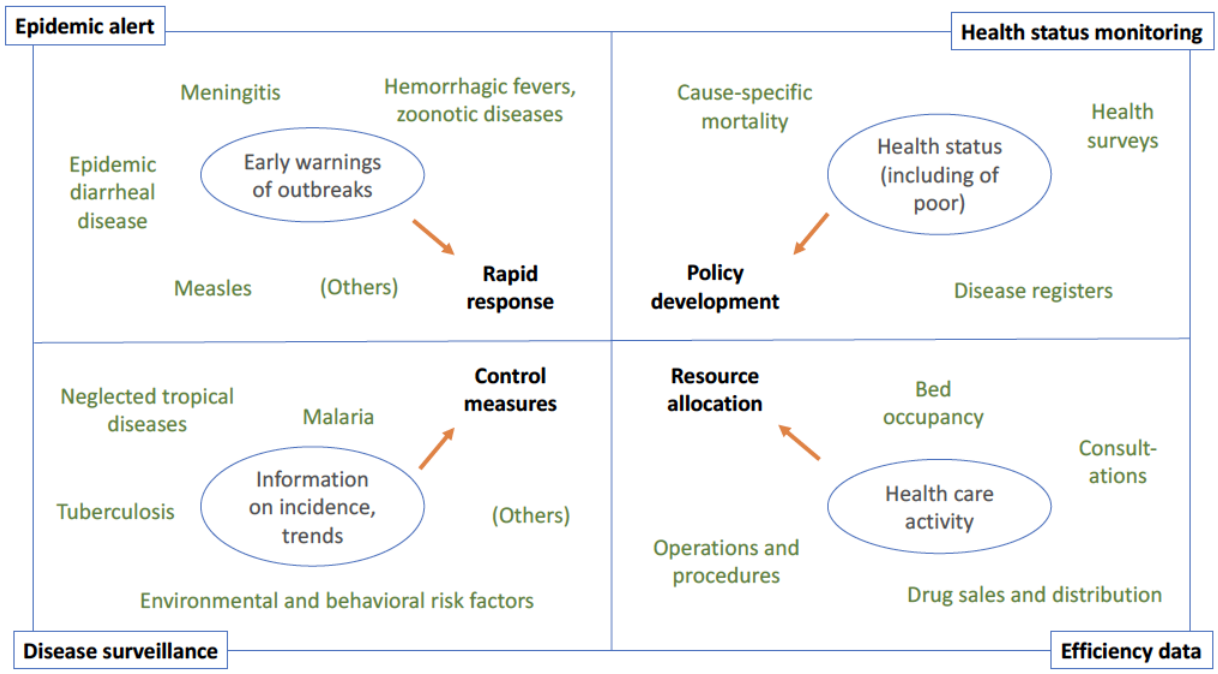

Figure 3G.1. Components of a well-functioning surveillance system.
Adapted from (1)

Mortality surveillance deserves particular mention. Accurate information on the fact and cause of death is currently very limited in many low- and middle-income countries (LMICs). The latest World Health Statistics noted positive trends over the past decade, though major areas of concern remain (4). In 2015, around half of all deaths worldwide were registered in a national death registration system with information on cause of death. However, only 28 percent or so of all global deaths are reported to the WHO by ICD code (regardless of ICD revision), and even then, a significant share is assigned "garbage codes;" in all, only 23% of deaths are reported with precise and meaningful information on their cause.

The very fact of death is frequently not recorded in many poor countries, including many sub-Saharan African countries. Only three percent of the world's children who died in 2010 had a proper medical certificate of death (5). WHO's assessment of the quality of death registration data reported by Member States indicates that for 2005–2015, only 25 percent of countries are considered to have high quality data, 20 percent medium quality, and 55 percent low quality or no data, including most LMICs. No country in the Eastern Mediterranean region (a region covering at least six high-income countries) or South East Asia region was included in the high quality group, and only one country from Africa was included.

In the Sustainable Development Goals (SDG) era, strengthening health information systems will need to be a top priority action for LMICs. Currently very few of the 42 health-related SDG indicators, including mortality indicators, are adequately measured in most countries. Strengthening mortality statistics – by building comprehensive vital registration systems in the intermediate- and long-term and by implementing verbal autopsy in the shorter term – is a key component of health system strengthening.

In addition, there are three specific surveillance activities that are noteworthy:

- **Sentinel surveillance** monitors in-depth outcomes in selected areas over time. The WHO Global Influenza Surveillance and Response System was established in 1952 and now covers about 150 national laboratories to collect samples that form worldwide flu vaccines for the following year, saving millions of lives since their introduction.
- **Integrated surveillance** combines disease detection systems using a single infrastructure to gather information on several intervention programs at several levels of care (population, clinic, hospital, and laboratory). The Philippine National Epidemic Surveillance System for example detected about 80 outbreaks including typhoid and cholera and monitored HIV behavioral risks (6).
- Finally, **antimicrobial resistance (AMR) surveillance** has emerged as an indispensable component of the response to a rising tide of antimicrobial resistance worldwide. WHO recommends surveillance as part of every AMR national action plan and has developed a global initiative to collect a standard set of AMR data from each country. AMR surveillance is the second consumer of antimicrobial susceptibility testing results, which also aids the treating clinician. The added value of surveillance is not free, but comes at a relatively low cost, though it requires well-functioning laboratories that produce reliable results. Additional costs are largely for information technology, data analysis capacity, personnel time and training, and software, and for the costs of policy changes based on surveillance results. A number of LMICs are beginning surveillance networks with their central laboratories and a small number of satellite (e.g., district) laboratories (7).

Currently, no low-income country has adequate coverage of the key, often quite different, surveillance functions shown in Figure 3G.1. However, effective models have been implemented successfully in some countries, often at low cost. In India, the Registrar General has created the Million Death Study in which a verbal autopsy instrument is added to its Sample Registration System to obtain cause-of-death data by age, from about 1.4 million nationally representative homes from every state. The overall system costs less than US$ 1 per person annually and has transformed disease control in India (8). In South Sudan, an Early Warning and Response System (EWARS) system used a simple radio network to link field staff at over 100 reporting sites, covering eight syndromes. Prior to EWARN, an outbreak of relapsing fever in 1998–1999 killed over 2600 people. It took six months for the disease to come to the attention of authorities and a further three months to establish a diagnosis. After EWARS, when relapsing fever hit again, a local lab identified the disease within three days. The outbreak was held to 142 cases, and only 11 people died (1).

Three key principles apply to the development of robust surveillance systems.

1. First, **separate users of data from producers** so that results may be used effectively and without political interference in data collection and reporting.
2. Second, **collect data transparently and make them widely accessible to the public**. In addition to being important for health planners and the politicians responsible for action, these data are important to the community as a whole; i.e., they can form the basis for social auditing of the service(s) being provided, which is a particularly powerful form of feedback. If communities can see improvements and failures, they can call to account

those responsible and use their knowledge to understand and influence the setting of health priorities. This form of accountability can operate at many levels and can be very powerful. For example, the requirement that every maternal death be reported directly to the prime minister helped to reduce maternal mortality in Sri Lanka (1).

3. Third, **hold international organizations and initiatives to the same accountability standards** that apply at the local and regional level. It is particularly important that international efforts be transparent to scrutiny so that their effectiveness can be assessed and the mistakes (which will surely be made) rectified.

Of course, in many LMICs there are important gaps and constraints to developing surveillance systems. Problems include fragmented systems, inadequate coordination among stakeholders, scarcity of financial and human resources, and low capacity to collect, analyze, and use data. For example, LMICs in the Eastern Mediterranean region are not able to report on up to 50 percent of indicators for key health risks and determinants (9). The situation is similar in low-income countries elsewhere. Hence effective and sustained efforts are needed to build and reinforce surveillance capabilities in these settings, though they may require international support.

Donor support for surveillance has been limited in the past but is increasing in part for support for results-based financing (10). Most funding has been directed to health status monitoring, such as the Demographic and Health Surveys (DHS), which are conducted about every two years in about 50 countries, and typically use nationally-representative samples of about 5000 households and cost an average of US$ 20 to 50 per person per round (2). DHS tend to be strong on family planning and child survival but include few useful questions on infectious or noncommunicable diseases or their risk factors.

While continued domestic and international (donor) support of DHS will be important in the SDG era, complementary surveillance tools should also be supported in order to monitor the full range of health-related SDG targets. The authors of this chapter recommend several additional steps for domestic and international stakeholders to support the health-related SDGs, including universal health coverage.

First, **greater global developmental assistance funding could be allocated to establishing and maintaining surveillance systems in LMICs**, particularly low-income countries. An ambitious step would be to form a "Global Health Surveillance Facility" that could establish surveillance systems rapidly and support all surveillance functions in a number of priority geographies. Such a facility would require easily accessible funding, backed with ongoing technical support from universities, schools of public health, and international agencies. It could monitor the performance not just of single countries but also of international donors and organizations such as the WHO, the World Bank, and the Bill and Melinda Gates Foundation. Compliance could be intensively monitored by independent, outside reviews.

Second, **data on noncommunicable diseases and injuries and on key behavioral and environmental risks is particularly lacking and could be a particular focus of expanded surveillance systems**. Specific actions could include expanding cancer registries, improving data and methods for ascertaining causes of death, and conducting surveys of risk factors. An increasing number of countries are implementing standardized noncommunicable disease risk

factor surveys to monitor trends and assess their progress in meeting global commitments on noncommunicable disease prevention and control (11).

Third, **communication and accountability mechanisms could be strengthened**. An ambitious step would be to establish an "International Health Audit Day," perhaps once every other year, on which progress is praised and failures are noted. The need would not be for lengthy reports and analyses but rather for headline figures comparing improvements with previous aspirations, commitments, and actions. Setting a norm for providing simple facts and tracking trends over time could engage senior politicians – and publicly hold them to account – making it easier to sustain commitment.

Finally, progress should not be punished. Currently, countries with good surveillance systems that report outbreaks quickly run the risk of lost tourism or other international actions, as happened in Eastern African countries not affected by the Ebola, or even to Toronto, Canada during the SARS outbreak of 2003. Risks of disclosing outbreaks could be mitigated through the equivalent of insurance pools, perhaps modeled after the Multilateral Investment Guarantee Agency, which provides insurance for investors against political risks. Such actions would probably need to be supported at the international level, particularly for low-income countries.

End Notes:

1. This note draws and updates from the Report of Working Group 5 of the Commission on Macroeconomics and Heath
2. The authors wish to acknowledge the contributions of David Heymann and Hellen Gelband to the content of this annex.

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