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Ebola: Mobility data

UNDERSTANDING HUMAN movement and mobility is important for characterizing, forecasting, and controlling the spatial and temporal spread of infectious diseases. Unfortunately, the current West African Ebola outbreak is taking place in a region where mobility has changed considerably in recent years. Efforts must be made to better understand these mobility patterns. For example, mobile phone call records provide insight into how people move within countries, particularly if they move from hotspots of disease. Analyses of Orange Telecom data have produced initial maps of movement in Senegal and Ivory Coast (*1*, *2*), and endeavors are under way to obtain similar data for Sierra Leone, Guinea, and Liberia.

Additional sources are needed to gain a more complete picture of mobility and infer patterns of disease spread. For example, information on land border crossings would elucidate regional movement. Genomic surveillance data can genetically link cases across time and space ("Genomic surveillance elucidates Ebola virus origin and transmission during the 2014 outbreak," S. K. Gire *et al.*, Reports, 12 September, p. 1369; published online 28 August). More complete data are needed on the routes taken by trucks and buses, which have been implicated in disease spread. Quantifying recurrent seasonal migration in response to climate, harvest cycles, or cultural events is important for anticipating fluctuations in transmission rates (*3*).

All these types of data can be used in dynamic transmission models to provide case projections, help focus resources and interventions, and assess the success of interventions. However, modeling efforts are limited in the absence of good mobility data. Existing data sources for West Africa include air transportation data, which have been used to model the local, regional, and global spread of Ebola (*4*) and newly updated world population data sets (*5*). However, newer census data are vital to underpin the mobility data. Keeping this information up to date while developing more comprehensive mobility data sets will greatly benefit intervention planning and resource allocation.

Such data should not necessarily lead to travel restrictions, such as flight route cancellations and border closures, which hamper relief efforts. Rather, the information should be used to create more valid models of transmission, which can then be used to plan and evaluate potential interventions. Better quantification of the impact of potential interventions will be critical in the coming weeks as the outbreak continues to grow.

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Liberian health care workers collect the body of an Ebola victim.

PHOTO: EPA/AHMED JALLANZO

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Ebola: Public-private partnerships

ACCORDING TO THE World Health Organization, the current Ebola epidemic is unlikely to be controlled in the coming months (*1*). With the exception of the compassionate use of unregistered compounds (*2*), no specific medical interventions, including the use of antiviral drugs, antibodies, or vaccines, are available. Some candidate compounds and vaccines have entered into limited clinical trials for safety and immunogenicity in healthy individuals. Most of these trials have been carried out by governmental organizations, such as the National Institute of Allergy and Infectious Diseases (NIAID), or by small or medium-size biotechnology companies with public funding. Private-sector investment has been very limited because past filovirus outbreaks were largely self-limiting and therefore believed to provide insufficient financial return on investment. We argue that this is a misconception of the very nature of emerging viruses.

Effective medical intervention strategies against the Ebola and other emerging viruses should address the following needs: local or regional antiviral treatment or vaccination of a limited number of individuals, including health care workers, while prepandemic conditions continue to be observed; stockpiling of antiviral treatments or vaccines to address the potential threat of a large-scale epidemic or pandemic; and antiviral treatments or vaccines for travelers and humanitarian volunteers. These needs can be addressed