Travel and Border Health Measures to Prevent the International Spread of Ebola

Nicole J. Cohen, MD[1]
Clive M. Brown, MBBS[1]
Francisco Alvarado-Ramy, MD[1]
Heather Bair-Brake, DVM[1]
Gabrielle A. Benenson, MPH[1]
Tai-Ho Chen, MD[1]
Andrew J. Demma, MS[1]
N. Kelly Holton[1]
Katrin S. Kohl, MD[1]
Amanda W. Lee, MPH[1]
David McAdam, MA[1]
Nicki Pesik, MD[1]
Shahrokh Roohi, MPH[1]
C. Lee Smith, MA(SS)[1]
Stephen H. Waterman, MD[1]
Martin S. Cetron, MD[1]

[1]*Division of Global Migration and Quarantine, National Center for Emerging and Zoonotic Infectious Diseases, CDC*

Corresponding author: Nicole J. Cohen, Division of Global Migration and Quarantine, National Center for Emerging and Zoonotic Infectious Diseases, CDC. Telephone: 404-498-0743; E-mail: NCohen@cdc.gov.

Summary

During the 2014–2016 Ebola virus disease (Ebola) epidemic in West Africa, CDC implemented travel and border health measures to prevent international spread of the disease, educate and protect travelers and communities, and minimize disruption of international travel and trade. CDC staff provided in-country technical assistance for exit screening in countries in West Africa with Ebola outbreaks, implemented an enhanced entry risk assessment and management program for travelers at U.S. ports of entry, and disseminated information and guidance for specific groups of travelers and relevant organizations. New and existing partnerships were crucial to the success of this response, including partnerships with international organizations, such as the World Health Organization, the International Organization for Migration, and nongovernment organizations, as well as domestic partnerships with the U.S. Department of Homeland Security and state and local health departments. Although difficult to assess, travel and border health measures might have helped control the epidemic's spread in West Africa by deterring or preventing travel by symptomatic or exposed persons and by educating travelers about protecting themselves. Enhanced entry risk assessment at U.S. airports facilitated management of travelers after arrival, including the recommended active monitoring. These measures also reassured airlines, shipping companies, port partners, and travelers that travel was safe and might have helped maintain continued flow of passenger traffic and resources needed for the response to the affected region. Travel and border health measures implemented in the countries with Ebola outbreaks laid the foundation for future reconstruction efforts related to borders and travel, including development of regional surveillance systems, cross-border coordination, and implementation of core capacities at designated official points of entry in accordance with the International Health Regulations (2005). New mechanisms developed during this response to target risk assessment and management of travelers arriving in the United States may enhance future public health responses.

The activities summarized in this report would not have been possible without collaboration with many U.S. and international partners (http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/partners.html).

Background

Before the 2014–2016 Ebola virus disease (Ebola) epidemic in West Africa, reports of Ebola virus exportation to other countries were rare, a fact partially attributed to the remote, rural locations of previous outbreaks of Ebola. When Ebola spread in 2014 to the capital cities of Guinea, Liberia, and Sierra Leone, where infected persons and their contacts had greater access to international airports, concerns arose about the potential for further international spread. These concerns were heightened in July 2014, after a Liberian-American businessman with symptomatic Ebola traveled from Monrovia, Liberia, via Togo to Lagos, Nigeria. This event triggered an outbreak in Nigeria that spread to a second city by air travel, infected 20 persons (confirmed and probable cases), resulted in the deaths of eight persons, and exposed almost 900 persons (*1*).

On August 8, 2014, an emergency committee convened by the Director-General of the World Health Organization (WHO) under the International Health Regulations (2005) declared the Ebola epidemic in West Africa a Public Health Emergency of International Concern (*2*). Among the recommendations of the emergency committee were that countries with Ebola transmission should conduct exit screening at international airports, seaports, and major land crossings and that other countries should not generally ban travel or trade.

CDC's initial response to the Ebola epidemic in West Africa included communication to travelers (e.g., travel notices on CDC's website, messaging displayed in airports) and enhancement of existing mechanisms to detect sick travelers entering the United States. Recognizing the importance of preventing further isolation of, and economic impact to, the countries with Ebola outbreaks and maintaining the essential flow of humanitarian aid workers and supplies, CDC sent teams to these countries in August 2014 to provide technical assistance with border health measures. The teams initially focused on training and capacity building to rapidly implement effective exit screening (i.e., screening of departing travelers for acute illness or possible exposures) at international airports (*3*). Although not routinely recommended, exit screening might be considered an important mechanism of source containment during an infectious disease outbreak to prevent international spread. Because the primary benefit of exit screening is protection of the international community, assisting in its effective implementation is a shared international responsibility.

In late 2014, two imported cases of Ebola were identified in the United States, one of which resulted in two domestic cases and extensive contact investigations in the community and for travelers on two domestic flights (*4–7*). Demands increased from some political leaders and members of the public to strengthen the domestic response, including banning air travel between the United States and the three countries with widespread transmission (*8*). Many public health professionals cautioned that such a ban would cause greater harm than good to the public health response by hampering travel of responders and delivery of supplies into the region and paradoxically could increase the risk for spread via covert and circuitous travel routes (*9*,*10*). To build on the exit screening already in place, CDC collaborated with the U.S. Department of Homeland Security (DHS) to initiate an enhanced entry risk assessment and management program for travelers from countries with Ebola outbreaks. This unprecedented operation required coordination across multiple U.S. government agencies, as well as with airport authorities and health departments in all U.S. states and territories (*3*).

CDC's travel and border health–related response to the Ebola epidemic comprised three goals: 1) prevent international spread of disease, 2) educate and protect travelers and communities, and 3) minimize disruption of international travel and trade. This report discusses specific measures, considerations for their implementation, and their potential use in response to future outbreaks of international public health concern (Table).

CDC's Role: Working with Partners

International Response

Airports

In August 2014, after Ebola spread from Liberia to Nigeria by air travel, concerned airlines canceled flights to Guinea, Liberia, and Sierra Leone, and multiple countries closed their borders to travelers from these countries (*11*); the shortage of commercial flights caused delays to the provision of humanitarian aid, resulting in shortages of medical supplies, personal protective equipment, and food (*12*). The few airlines that continued to fly to the countries with Ebola outbreaks insisted that departing travelers be screened before boarding (*11*). CDC Border Health teams in Guinea, Liberia, Nigeria, and Sierra Leone, and later Mali and Senegal, helped airport and health authorities implement airport exit screening measures that included administering an exposure-and-symptom questionnaire and at least one temperature check with a handheld noncontact thermometer to all departing passengers. Health screeners were trained to conduct secondary assessments of travelers who reported possible exposures or who had symptoms compatible with Ebola. Symptomatic or exposed travelers were denied boarding and referred for further medical and public health assessment. As national databases of known contacts became more robust, they were matched against passenger manifests for departing flights. These measures helped countries with Ebola outbreaks meet WHO recommendations and ensured that some commercial air carriers continued to fly to these countries, serving as vital conduits for supplies and response personnel.

During August 2014–January 2016, approximately 300,000 travelers were screened in Guinea, Liberia, and Sierra Leone. Only four cases of Ebola were exported through air travel to other countries (United States [two cases], United Kingdom [one case], Italy [one case]) after exit screening was implemented; none of the infected travelers were overtly symptomatic at the time of travel (*4*,*7*,*13*,*14*). No Ebola cases were reported to have been detected during exit screening.

To support the international response, CDC developed Ebola communications tools, job aids for airline and airport staff, and messages specific to different organizations and populations. Information also was provided through webcasts and trainings, and some materials were made available on the CDC website as templates to assist other countries in developing their own communications resources.

TABLE. Timeline of key travel-related events and CDC border health measures during the 2014–2016 Ebola epidemic in West Africa

Date	Event/CDC action or recommendation
2014	
March 23	WHO announces Ebola outbreak in Guinea.
March 26	CDC posts Level 2 travel notice* for Guinea.
March 30	First cases of Ebola confirmed in Liberia.
April 10	CDC posts Level 2 travel notice for Liberia.
May 27	First cases of Ebola confirmed in Sierra Leone.
June 4	CDC posts Level 2 travel notice for Sierra Leone.
July 9	CDC EOC is activated to support Ebola response.
July 20	Symptomatic infected traveler flies from Liberia to Nigeria, triggers outbreak in Nigeria.
July 31	CDC elevates travel notices for Guinea, Liberia, and Sierra Leone to Level 3, recommending against nonessential travel to these countries.
August 4–11	CDC deploys border health teams to Guinea (August 4), Liberia (August 4), Sierra Leone (August 9), and Nigeria (August 11); CDC posts Level 2 travel notice for Nigeria (August 5).
August 7	First publication of CDC's Interim U.S. Guidance for Monitoring and Movement of Persons with Potential Ebola Virus Exposure with recommendations for self-monitoring.
August 8	WHO declares Ebola in West Africa a Public Health Emergency of International Concern.
September 25	CDC downgrades Nigeria travel notice to Level 1.
September 30	First imported U.S. case identified in Texas.
October 6	Transmission of Ebola to a HCW reported in Spain.
October 11–16	Two domestic cases of Ebola diagnosed in Dallas, Texas, HCWs; one infected HCW travels domestically by commercial airline (October 10 and 13).
October 11–16	CDC and CBP begin enhanced entry risk assessment and management for travelers from Guinea, Liberia, and Sierra Leone: October 11 at JFK and October 16 at four other airports (EWR, IAD, ORD, and ATL).
October 20	CDC removes travel notice for Nigeria.
October 21	CBP announces that travelers from Guinea, Liberia, and Sierra Leone will be redirected to the five airports participating in enhanced entry risk assessment.
October 23	Second imported U.S. case identified in New York.
October 27	CDC updates Interim U.S. Guidance for Monitoring and Movement of Persons with Potential Ebola Virus Exposure with recommendations for active and direct active monitoring.
October 27	Traveler from Guinea dies of Ebola in Mali, triggers outbreak in Mali.
November 13	CDC posts Level 2 travel notice for Mali.
November 17	Enhanced entry risk assessment and management begins for travelers from Mali.
December 29	Imported case of Ebola identified in the United Kingdom.
2015	
January 6	Enhanced entry risk assessment and management discontinued for travelers from Mali.
January 7	CDC removes travel notice for Mali.
May 4	CDC downgrades Liberia travel notice to Level 2.
May 9	Liberia first declared free of Ebola transmission by WHO.
May 11	Imported case of Ebola identified in Italy.
June 17	Recommendation for monitoring changed to self-observation for travelers from Liberia.
September 3	CDC downgrades Liberia travel notice to Level 1.
September 21	Enhanced entry risk assessment and management discontinued for travelers from Liberia.
November 2	CDC downgrades Sierra Leone travel notice to Level 2.
November 7	Sierra Leone declared free of Ebola transmission by WHO.
November 10	Recommendation for monitoring changed to self-observation for travelers from Sierra Leone.
November 25	CDC downgrades Sierra Leone travel notice to Level 1 and Guinea travel notice to Level 2.
December 22	Enhanced entry risk assessment and management discontinued for travelers from Sierra Leone.
December 29	Guinea declared free of Ebola transmission by WHO; recommendation for monitoring changed to self-observation for travelers from Guinea; CDC downgrades Guinea travel notice to Level 1.
2016	
February 19	Enhanced entry risk assessment and management discontinued for travelers from Guinea; CDC removes all Ebola travel notices.
March 29	WHO declares end of the Public Health Emergency of International Concern.

Abbreviations: ATL = Hartsfield–Jackson Atlanta International Airport; CBP = Customs and Border Protection, U.S. Department of Homeland Security; Ebola = Ebola virus disease; EOC = Emergency Operations Center; EWR = Newark Liberty International Airport; HCW = health care worker; IAD = Washington Dulles International Airport; JFK = John F. Kennedy International Airport (New York City); ORD = Chicago O'Hare International Airport; WHO = World Health Organization.

* CDC travel notice definitions are available at http://wwwnc.cdc.gov/travel/yellowbook/2016/introduction/planning-for-healthy-travel-cdc-travelers-health-website-and-mobile-applications.

Seaports

Countries in West Africa, including Guinea, Liberia, and Sierra Leone, rely heavily on commercial maritime transport to deliver food and other critical commodities and to export supplies that sustain national economies (*15*). Keeping these supplies moving was critical to avoiding further strain on the countries' already fragile systems. CDC assisted national seaport and maritime authorities by evaluating health security measures at major seaports and training staff how to recognize and respond to Ebola. Port authorities established temperature

checkpoints for port access; reviewed and practiced emergency medical response procedures; established onsite isolation facilities; implemented personal protective equipment requirements for staff required to board vessels; and restricted access to vessels in port and disembarkation of seafarers, including cancellation of shore passes and crew transfers.

Land Borders

Ebola initially spread at the land borders of Guinea, Liberia, and Sierra Leone, and frontiers between these countries and their neighbors posed the most difficulties for the border health component of the response. Movement across land borders also resulted in the introduction of Ebola into neighboring Senegal and Mali causing an outbreak in Mali that resulted in eight cases and six deaths; international sharing of information about contacts led to interventions that prevented transmission and contributed to successful containment in Senegal without further spread (*16*).

The origin of the epidemic highlighted weaknesses in routine and cross-border disease surveillance. In the border regions of West Africa, tribal and ethnic kinship affiliations rather than geopolitical boundaries define village communities. Official border points of entry (those where travelers are inspected by border officials) are sparse, understaffed, and underresourced; dozens of informal border crossings exist for every official point of entry; and travel volumes are high. For all of these reasons, land borders are porous and applying screening procedures at official land border crossings similar to those used at airports is impractical and probably ineffective. CDC, together with ministries of health, WHO, the International Organization for Migration, nongovernment organizations, and other international partners, strengthened disease surveillance in border communities and sharing of information across borders; implemented simple, sustainable measures (e.g., visual screening for illness at designated official border crossings); and developed clearly articulated plans for isolation, communication, assessment, referral, and transportation on the basis of existing and nearby resources. These organizations also coordinated improved mapping of geopositional landmarks, including official and informal border crossings, villages, and markets and other areas of congregation, as well as mapping of population movement patterns. This approach aimed to improve cross-border operations and situational awareness and engage community members in the public health response.

Domestic Response

Travel and border health measures within the United States evolved over time in response to changing needs, newly identified risks, and public concern. At the start of the epidemic, CDC strengthened coordination with U.S. port-of-entry and community partners to identify and assess risks for symptomatic or potentially exposed travelers. Communications materials supported a strategy that relied on educating travelers to self-monitor and seek health care if they developed symptoms.

In August 2014, CDC issued interim guidance that provided a standard for public health measures in the United States on the basis of clinical criteria and exposure risk (*17*). Measures ranged from monitoring (primarily self-monitoring) to controlled movement (e.g., preclusion from long-distance travel on commercial conveyances such as aircraft, ships, buses, or trains) and aimed to apply the least restrictive measures necessary to protect communities and travelers.

CDC issued revised interim guidance in October 2014 (*17*) after the first imported case of Ebola in the United States was identified (and initially diagnosed as presumed sinusitis) in Dallas, Texas (*4*); an infected U.S. health care worker (HCW) flew on two domestic commercial flights, causing panic among U.S. travelers and disrupting the travel industry (*6*,*18*,*19*); and an infected humanitarian aid worker was reported to have been in public areas, including the New York City subway, during the early stages of his illness (*7*,*20*). CDC's guidance was revised in response to assertions that self-monitoring was insufficient; growing concerns about infected HCWs in Spain, the United States, and the West African countries with Ebola outbreaks (*4*,*7*,*21*,*22*); and renewed calls for travel bans (*8*). Demands to restrict movement of HCWs caring for patients with Ebola were countered by predictions that stringent restrictions would discourage HCWs from supporting the response in West Africa or taking care of patients with Ebola at designated facilities in the United States (*23*,*24*). The revised guidance recommended that state or local public health authorities assume responsibility for monitoring all potentially exposed persons for the duration of the 21-day incubation period (active monitoring); established a higher standard of monitoring (direct active monitoring that included daily direct observation by public health officials) for persons with greater potential risk for exposure, including HCWs; and provided guidance for possible application of movement restrictions within communities. Although CDC's guidance represented a minimum standard, states could, and in many cases did, apply more restrictive measures (e.g., temporarily quarantining HCWs returning from West Africa) (*25*). Many of these measures were enacted before CDC issued the updated guidance.

To facilitate postarrival management of travelers, in October 2014, CDC and DHS's Customs and Border Protection (CBP) began an enhanced entry risk assessment and management program for travelers arriving in the United States from

countries with Ebola outbreaks (*3*). To implement this program with maximum efficiency and minimal disruption to travel, CBP limited entry of air travelers from Guinea, Liberia, and Sierra Leone (and for several weeks from Mali, during the outbreak in that country) to five airports: Hartsfield–Jackson Atlanta International Airport, Newark Liberty International Airport, Washington Dulles International Airport, John F. Kennedy International Airport (New York City), and Chicago O'Hare International Airport.

Enhanced entry risk assessment at U.S. airports included processes to identify travelers from countries with Ebola outbreaks, either through scheduled flight itineraries or during customs and immigration inspections. CBP officers and other U.S. Department of Homeland Security staff collected contact and locating information, administered an exposure-and-symptom questionnaire, checked travelers' temperatures with noncontact thermometers, and observed travelers for signs of illness. Data were entered electronically through an online interface and transmitted securely to CDC's database and then to states. Travelers who were symptomatic or who reported possible exposures were referred to CDC for an in-depth public health risk assessment. Symptomatic travelers who met predefined criteria were referred for medical evaluation to designated assessment hospitals, in consultation with the health department with jurisdiction for the airport.

The enhanced entry risk assessment and management program enabled CDC to educate travelers individually about Ebola and the postarrival monitoring process. Screened travelers received a CDC CARE (Check and Report Ebola) kit containing information and tools (including a thermometer and prepaid cell phone) to facilitate monitoring and reporting to health departments (Figure 1).

Enhanced entry risk assessment was discontinued for travelers from Liberia on September 21, 2015; for travelers from Sierra Leone on December 22, 2015; and for travelers from Guinea on February 19, 2016. Of the approximately 38,000 travelers assessed at U.S. ports of entry during October 11, 2014–February 18, 2016, only one was subsequently determined to have Ebola. The infected humanitarian aid worker arrived during the brief period between initiation of enhanced entry risk assessment and implementation of postarrival monitoring. He was asymptomatic upon arrival, and his illness was detected through self-monitoring and reporting to the local health department as recommended at the time (*7*).

To help enforce recommendations that travelers with certain exposures to Ebola should not travel on commercial conveyances and to further reduce the risk for Ebola spread through air travel, in March 2015 CDC revised criteria for use of federal travel restrictions to prevent travel by persons possibly exposed to Ebola or other communicable diseases but not yet considered contagious (*26*). The updated criteria gave CDC greater flexibility to control the movement of persons who might pose a public health threat during travel and to apply federal travel restrictions in support of outbreak control.

Communication

Throughout the response, CDC disseminated messages to inbound and outbound travelers through the CDC website, traditional and social media, partner outreach, and printed materials. Messages displayed in U.S. airports and in airports in countries with Ebola outbreaks reminded travelers to avoid travel while symptomatic, monitor themselves for illness, and seek health care should symptoms develop (Figure 2) (Figure 3) (Figure 4).

To provide international travelers with information to protect their health and, ultimately, the health of their communities, CDC regularly posts travel notices about disease outbreaks and international events. Notices are assigned a risk level (*27*) on the basis of the situation and available health recommendations and are escalated or deescalated as the analysis of risk to travelers changes (e.g., status of the outbreak or ability to access health care facilities). The highest risk level is Level 3 (i.e., warning), used only for situations in which the risk is so great that CDC recommends against nonessential travel to a destination. When considering issuance of Level 3 travel notices, CDC takes into account the health risk and impact to travelers and the potential for economic harm to the destination country and the travel industry.

During the 2014–2016 Ebola epidemic in West Africa, CDC initially posted Level 2 (i.e., alert) notices, which recommended enhanced precautions for travelers to Guinea (March 2014), Liberia (April 2014), and Sierra Leone (June 2014); later, Level 2 notices were added for Nigeria (August 2014) and Mali (November 2014) when Ebola outbreaks occurred in those countries. The notices for Guinea, Liberia, and Sierra Leone were subsequently elevated to Level 3 in July 2014 to advise U.S. residents to avoid nonessential travel to these countries and enable their governments to respond most effectively to the epidemic by reducing the potential for difficulties posed by nonessential travelers. As the situation improved in Liberia and extensive control measures were put into place, CDC downgraded the notice for this country to Level 2 in May 2015, then to Level 1 (i.e., watch) in September 2015. Similarly, CDC downgraded the notices for Sierra Leone to Level 1 and Guinea to Level 2 in November 2015, and the notice for Guinea was downgraded to Level 1 in December 2015. CDC removed all three notices on February 19, 2016, coinciding with the discontinuation of enhanced entry risk assessment at U.S. ports of entry.

FIGURE 1. CDC CARE kit distributed to travelers to facilitate monitoring and reporting to health departments during the 2014–2016 Ebola epidemic in West Africa

Abbreviations: CARE = Check and Report Ebola; Ebola = Ebola virus disease.

CDC also issued guidance for specific groups of travelers most at risk. Because humanitarian aid was essential to managing the epidemic, CDC posted guidance for aid workers and organizations to help ensure safe travel to and from the region. In contrast, CDC considered education-related travel to be nonessential and advised postponing travel in its guidance for colleges, universities, and students. CDC also published guidance for airlines, cruise ships, and cargo ships to help crew members manage sick travelers onboard when Ebola was suspected.

CDC Contributions and Impact

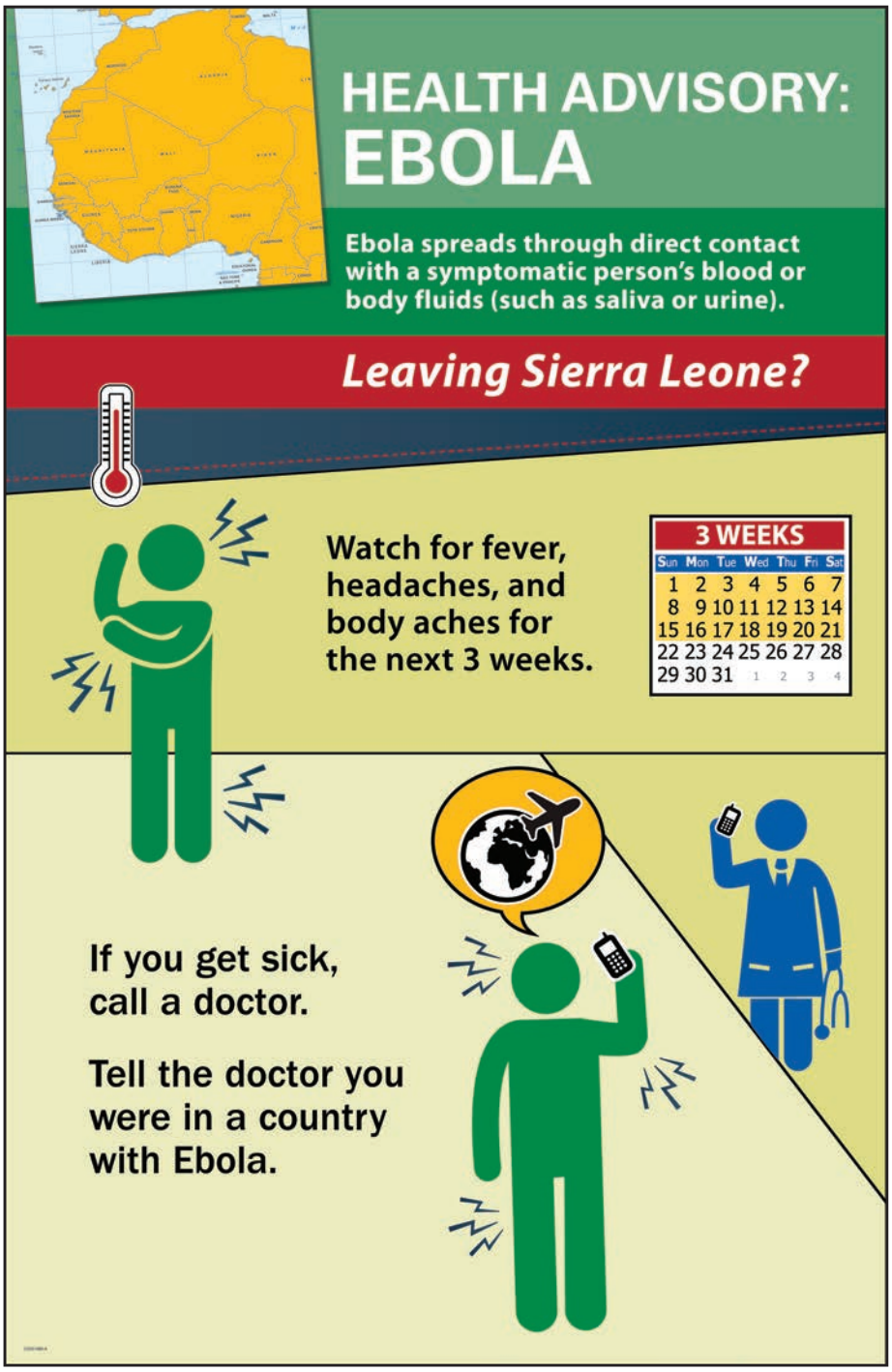
As CDC's response to the Ebola epidemic ends, travel and border health measures can be reviewed to assess whether they met the stated goals: 1) prevent international spread of disease, 2) educate and protect travelers and communities, and 3) minimize disruption of international travel and trade. These measures fall into four broad categories: 1) risk determination and characterization, 2) risk communication, 3) risk assessment of persons, and 4) risk management on the basis of individual assessment. Although spread of Ebola through air travel is an inherently low-probability event, the consequences of such spread would be high, including potential for disruption of travel and trade to a highly vulnerable region. Thus, any consideration of travel and border health measures must balance public health risk against the perception of such risk by travelers, the travel industry, and government decision makers. These measures demand constant assessment and refinement to adjust to changing epidemic characteristics. When recommending and implementing such measures, CDC aims to protect civil liberties through the use of least restrictive means.

Although WHO declared the end of the Public Health Emergency of International Concern and recommended

FIGURE 2. Example of CDC messages displayed on posters at U.S. airports for travelers going to West Africa during the 2014–2016 Ebola epidemic

Abbreviation: Ebola = Ebola virus disease.

FIGURE 3. Example of CDC messages displayed on posters at airports in Sierra Leone* for departing travelers during the 2014–2016 Ebola epidemic in West Africa



Abbreviation: Ebola = Ebola virus disease.
* Similar posters were displayed in airports in Guinea, Liberia, Mali, Nigeria, and Senegal.

FIGURE 4. Example of information displayed on electronic message boards at U.S. airports for travelers arriving from West Africa during the 2014–2016 Ebola epidemic

Abbreviation: Ebola = Ebola virus disease.

discontinuation of exit screening on March 29, 2016 (*28*), exit screening continued in Guinea, Liberia, and Sierra Leone in response to a cluster of cases in Guinea with limited spread to Liberia. As of June 6, 2016, when this report went to press, no new cases had been reported and exit screening was expected to end shortly. Exit screening successfully addressed vulnerabilities that enabled exportation of Ebola to Nigeria by an actively symptomatic traveler, minimizing the number of exported cases and preventing travel by overtly symptomatic persons (*29*). Separating the effectiveness of exit screening at airports from other public health measures (e.g., identifying and managing cases and exposed persons at the community level or educating travelers) or the deterrent effect of the screening process is difficult. However, these collaborations contributed meaningfully to controlling the epidemic. Exit screening was challenging for the affected countries because resources and staffing needs for these activities competed with other priorities. These difficulties most likely were offset by intangible benefits, including reassurance of airlines and travelers of the continued safety of air travel that no doubt contributed to the willingness of some airlines to maintain flight schedules within the region throughout the epidemic (*11*).

Operationally, the U.S. enhanced entry risk assessment and management program succeeded as a mechanism to assess individual risk, educate travelers, and facilitate postarrival management of travelers including active or direct active monitoring by public health authorities. Funneling of travelers from countries with Ebola outbreaks to selected airports rather than diverting airplanes was substantially less disruptive to the travel industry. The ability to track and monitor travelers in any U.S. state or territory, including their movement among states, resulted in rapid identification and evaluation of approximately 1,400 symptomatic travelers, none of whom had Ebola diagnosed. However, the operation was not without costs (e.g., high resource demands), much of which have been borne by the federal government, as well as the subsequent burden to health departments in the United States and inconvenience to airlines and travelers. The opportunity costs of diverted public health resources must also be taken into account.

The more difficult task of preventing, detecting, and responding to the spread of Ebola across highly porous land borders in West Africa resulted in a multisector collaboration, greater awareness of population movement, enhanced procedures and resources to manage sick travelers in remote border locations, and improved binational and multinational communication and cooperation. Border officials and residents of border communities were trained to recognize sick travelers as sentinel events, contributing to more integrated surveillance and response systems that could help prevent unrecognized cross-border spread during future epidemics. However, much work remains to build and maintain these nascent border health systems as part of the broader public health infrastructure.

Travel and border health measures applied in the countries with Ebola outbreaks, domestically in the United States, and through various communications mechanisms might have averted a breakdown of global interconnectedness that would have damaged the Ebola response and severely disrupted international travel and trade to a highly vulnerable region. A new model was developed that replaced single-point screening at borders with a continuum of measures that started with pretravel information for travelers and ended with monitoring through the end of the potential incubation period. These measures provided an alternative to more stringent options (e.g., travel bans or widespread use of quarantine) and calmed the concerns of political leaders and the public. This experience managing a public health threat from a relatively remote area elevated interagency cooperation at the federal, state, local, and international levels and led to development, revision, and validation of new and old tools that were effective and might prove invaluable in the future.

Conclusion

The Ebola epidemic devastated Guinea, Liberia, and Sierra Leone. However, the reconstruction process presents a unique opportunity to build sustainable public health infrastructure by leveraging resources and systems put in place to combat the epidemic, including helping countries comply with core capacities at designated official points of entry in accordance with the International Health Regulations (2005) (*30*) and developing systematic cross-border communication as part of plans to establish a West African surveillance network. Moving forward, the Global Health Security Agenda (*31*) presents an opportunity to reduce the risk for global spread of disease through migration and travel and to meet the crucial need for enhanced border health security in vulnerable regions of the world. In the United States, new mechanisms for targeted risk assessment and management of travelers can improve the efficiency of border health measures aimed at preventing the introduction and spread of high-consequence communicable diseases into the United States and enhance the public health response to future outbreaks involving travelers.

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