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Disease Surveillance Among Newly Arriving Refugees and Immigrants — Electronic Disease Notification System, United States, 2009

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Disease Surveillance Among Newly Arriving Refugees and Immigrants — Electronic Disease Notification System, United States, 2009

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Abstract

Problem/Condition: Approximately 450,000 legal permanent immigrants and 75,000 refugees enter the United States annually after receiving required medical examinations by overseas panel physicians (physicians who follow the CDC medical screening guidelines provided to the U.S. Department of State). CDC has the regulatory responsibility for preventing the introduction, transmission, and spread of communicable diseases into the United States as well as for developing the guidelines, known as technical instructions, for the overseas medical examinations. Other conditions that are not infectious might preclude an immigrant or refugee from entering the United States and also are reported as part of the medical examination. After arrival in the United States, all refugees are recommended to obtain a medical assessment by a health-care provider or a health department within 30 days. In addition, immigrants with certain medical conditions such as noninfectious tuberculosis at the time of the original medical examination are recommended to be evaluated after arrival to ensure that appropriate prevention or treatment measures are instituted. Health departments need timely and accurate notifications of newly arriving immigrants, refugees, and persons with other visa types to facilitate these evaluations. Notifications for all newly arriving refugees (with or without medical conditions) and immigrants with medical conditions are provided by CDC's Electronic Disease Notification (EDN) system. This is the first report describing EDN.

Reporting Period: This report summarizes notifications by the EDN system during January–December 2009.

Description of System: The EDN system is a centralized electronic reporting system that collects health information on newly arriving refugees and immigrants with Class A and Class B medical conditions. Class A conditions render applicants inadmissible and require a waiver for entry; Class B conditions are admissible but might require treatment or follow-up. Information in the EDN system is used to notify state health departments in all 50 states and the District of Columbia about the arrival of these persons in the United States.

Results: In 2009, the EDN system notified U.S. state and local health departments of 104,954 newly arriving refugees and immigrants, of whom 78,899 (75.2%) were refugees (with or without medical conditions), 19,358 (18.4%) were immigrants with medical conditions, and 6,697 (6.4%) were persons with other visa types. Of the 78,899 refugees, 21,319 (27%) had a medical condition. The majority (93.4%) of immigrants with medical conditions had tuberculosis classifications (i.e., either had evidence of latent tuberculosis infection or chest radiograph findings interpreted by the overseas panel physician as consistent with tuberculosis). Of the 41,415 refugees and immigrants with Class A or Class B medical conditions, 405 (1%) had Class A conditions, and 40,994 (99%) had Class B conditions. The majority of refugees and immigrants with suspected Class B tuberculosis were born in the Philippines (41.3%), Mexico (12.1%), Burma (8.7%), Vietnam (7.8%), and the Dominican Republic (5.8%). The majority of refugee notifications were for persons born in Iraq (23.9%), Burma (18.9%), and Bhutan (15.1%). Approximately one third of the tuberculosis notifications were sent to health departments in California (20.5%), Texas (9.8%), and New York (6.3%), and the national reporting rate for tuberculosis follow-up was 75.4% within 30 days of arrival.

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Interpretation: The findings in this report suggest that 1) overseas medical screening results in a low frequency (0.4%) of inadmissible medical conditions in the United States, 2) the EDN system provides more direct notifications to health departments than the previous paper-based system about newly arriving immigrants and refugees who need medical follow-up, and 3) approximately 75% of follow-up occurs among persons with suspected tuberculosis who are reported to EDN by states receiving newly arriving refugees and immigrants.

Public Health Actions: The data in this report can be used to help state and local health departments provide prompt and effective follow-up, evaluation, and treatment to newly arriving immigrants and refugees. Timely follow-up might prevent additional spread of tuberculosis or other communicable diseases of public health significance into their communities. In addition, information from the EDN system allows health departments to use their resources as effectively as possible by providing clinical information that identifies the refugees and immigrants who should be prioritized for evaluation and treatment.

Background

Approximately 75,000 refugees and 450,000 legal permanent immigrants enter the United States annually (*1*). Immigrants and refugees coming to the United States are required to have a medical examination by the U.S. Department of State (DOS) and the U.S. Department of Homeland Security (DHS) to identify applicants with health conditions that render them inadmissible. The Secretary of the U.S. Department of Health and Human Services (HHS) has the statutory responsibility for preventing the introduction, transmission, and spread of communicable diseases into the United States (42 U.S. Code 264). Under the authority of the Immigration and Nationality Act (8 U.S. Code 1182 and 1222) and the Public Health Service Act (U.S. Code 252), CDC outlines the requirements for the overseas medical examination of immigrants and refugees seeking admission into the United States. CDC provides DOS and DHS with the medical screening guidelines used by approximately 700 overseas examining physicians (*2*), who are referred to as panel physicians (42 CFR Part 34). The medical examination determines whether the applicant has a Class A condition (inadmissible condition) or Class B condition (admissible condition). Class A conditions include 1) a communicable disease of public health significance, 2) lack of documentation for certain vaccinations, 3) a physical or mental disorder with associated harmful behavior, or 4) drug abuse or addiction. Class B conditions are health-related conditions that are admissible but that might require extensive medical treatment or follow-up. Applicants with a Class A condition can enter the United States only if they are granted a waiver. The guidelines that outline the overseas screening requirements for these communicable diseases are provided by CDC in documents called technical instructions (*3,4*). (Information on medical examination requirements for various types of immigrant visas is available at http://travel.state.gov/visa/immigrants/immigrants_1340.html.)

Under the authority of the Immigration and Nationality Act (8 U.S. Code 1522), CDC has the regulatory responsibility to ensure that state or local health officials at the U.S. resettlement destination of each refugee are notified promptly of the refugee arrivals and provided all applicable medical records. After entry into the United States, all refugees are recommended to undergo a medical assessment by a U.S. health department or a health-care provider within 30 days of arrival (Immigration and Nationality Act, Sect. 412, or Refugee Act of 1980, 8 U.S. Code 1522[b]). Immigrants with medical conditions that require follow-up, such as noninfectious tuberculosis and other conditions specified by the panel physician, are recommended to be evaluated after arrival to ensure appropriate follow-up and prevention measures.

In the United States, the incidence of tuberculosis is 12 times greater among foreign-born persons than among U.S.-born persons (*5*). Tuberculosis is challenging to diagnose, treat, and control; the medical screening for tuberculosis among immigrants and refugees who apply for entry to the United States is an essential component of the overseas medical evaluation. The identification of and follow-up for immigrants and refugees with noninfectious tuberculosis is an important public health control measure to prevent the spread of tuberculosis in the United States.

CDC sends notifications to state and local public health authorities when all refugees and immigrants with conditions of public health significance enter the United States and arrive in their jurisdiction. In March 2006, CDC established the Electronic Disease Notification (EDN) system to facilitate these notifications, which are used to identify new arrivals who require follow-up. This is the first report describing the EDN system, including its methods and results during January–December 2009, the first year with enough data to conduct a meaningful analysis. The findings in this report are intended to provide guidance for the medical examination of immigrants and refugees, create evidence-based recommendations that can protect the health of newly arriving immigrants and refugees, and prevent the spread of disease in U.S. communities.

Methods

Definitions of Immigrants, Refugees, and Persons with Other Visa Types

- **Immigrants.** Immigrants, also described as legal permanent immigrants or lawful permanent residents, are persons who are not citizens of the United States but who live in the United States under a legally recognized and lawfully recorded permanent residence as an immigrant.
- **Refugees**. Refugees are persons who are unable or unwilling to return to their country of nationality because of persecution or a well-founded fear of persecution due to race, religion, nationality, membership in a particular social group, or political opinion (Immigration and Nationality Act, Sect. 101[a][42]). Each fiscal year, the U.S. government sets an overall refugee admissions limit based on regional allocations. The limit for refugee admissions in 2009 was 80,000 (*1*). In 2009, Iraqis and Afghans with special immigrant visas who were eligible for refugee benefits (*6*,*7*) were classified under the refugee visa type in the EDN system. During that year, 78,899 persons were admitted as refugees, primarily from Iraq (18,838), Burma (18,202), and Bhutan (13,452) (*1*).
- **Asylees**. Asylees are foreign persons who are unable or unwilling to return to their country of nationality or who seek protection in the United States because of persecution or a well-founded fear of persecution. Available asylee records were classified as other visa types. In addition, asylees are already in the United States or are seeking admission at a port of entry. (Additional informatation available at http://www.uscis.gov.)
- **Parolees.** Parolees are foreign persons allowed into the United States for urgent humanitarian reasons or when that person's entry is determined to be for significant public benefit. Available parole records were classified as other visa types.

Overseas Medical Examination

Each refugee or immigrant who enters the United States must undergo a medical examination in their country of origin. These legally required medical examinations identify persons with inadmissible conditions of public health significance before they enter the United States. The examinations are conducted by panel physicians, who are medically trained, licensed, and experienced physicians practicing overseas who are appointed by the local U.S. embassy or consulate and who follow the CDC medical screening guidelines provided to DOS and HHS. Certain panel physicians who examine U.S.-bound refugees work within the International Organization for Migration (IOM), which assists with refugee-related responsibilities such as migration management and movement (*8*). The panel physicians record the results of the medical examination on DOS forms that document the health information obtained during the medical examination of immigrants and refugees bound for the United States. The forms include the following:

- Medical Examination of Immigrant or Refugee Applicant (DS-2053 or DS-2054),
- Chest X-Ray Classification Worksheet (DS-3024 or DS-3030),
- Vaccination Documentation Worksheet (DS-3025), and
- Medical History and Physical Examination Worksheet (DS-3026).

(Information about obtaining these forms is available from DOS at http://www.travel.state.gov/visa/visa_1750.html.) Data from the Vaccination Documentation (DS-3025) and Medical Health and Physical Examination Worksheet (DS-3026) are not included in this report because they were incomplete in 2009.

Class A and Class B Conditions

The medical examination determines whether the applicant has an inadmissible condition of public health significance (a Class A condition) or has a health-related condition that is admissible but that might require extensive medical treatment or follow-up (a Class B condition) (Box). Applicants with Class A (inadmissible) conditions can only enter the United States if they are granted a waiver. Applicants who have Class A conditions include those who 1) have a communicable disease of public health significance, 2) do not have documentation of having received vaccinations against vaccine-preventable diseases, 3) have a physical or mental disorder with associated harmful behavior, or 4) abuse or are addicted to drugs. (42 USC 252, 8 USC 1182, and 8 USC 1222 provide for the physical and mental examination of applicants in accordance with regulations prescribed by the HHS Secretary.) The communicable diseases of public health significance include tuberculosis, syphilis, chancroid, gonorrhea, granuloma inguinale, lymphogranuloma venereum, Hansen disease (leprosy), and the following two disease categories: 1) quarantinable diseases designated by a presidential executive order (as provided under Sect. 361[b] of the Public Service Health Act), which include cholera, diphtheria, infectious tuberculosis, plague, smallpox, yellow fever, viral hemorrhagic fevers, severe acute respiratory syndrome (SARS), and influenza caused by novel or reemergent influenza viruses, and 2) events or conditions that are reportable as a public health emergency of international concern to the World Health

BOX. Classification of health-related conditions on the Medical Examination of Immigrant and Refugee Applicant form (DS-2053 and DS-2054) required for immigrant to enter the United States

Class A Conditions

Class A conditions are health-related conditions of public health significance that prohibit persons from entering the United States. In certain instances, persons may obtain a waiver for entrance.

- Tuberculosis (active, infectious)
- Syphilis, untreated
- Chancroid, untreated
- Gonorrhea, untreated
- Granuloma inguinale, untreated
- Lymphogranuloma venereum, untreated
- Human immunodeficiency virus (HIV)*
- Hansen's disease (leprosy), untreated multibacillary
- Addiction to or abuse of specific substances (amphetamines, cannabis, cocaine, hallucinogens, inhalants, opioids, phencylidines, sedative-hypnotics, and anxiolytics)
- Physical or mental disorders with harmful behavior or history of harmful behavior that is likely to recur
- Substance abuse
- Quarantinable diseases
  - Cholera
  - Diphtheria
  - Infectious tuberculosis
  - Plague
  - Smallpox
  - Yellow fever
  - Viral hemorrhagic fever
  - Severe acute respiratory syndrome
  - Influenza caused by novel or reemergent influenza (pandemic influenza)
- Events or conditions that are reportable as a public health emergency of international concern to the World Health Organization under the International Health Regulations (2005)
  - Poliomyelitis caused by wild-type poliovirus
  - Smallpox
  - Severe acute respiratory syndrome
  - Human influenza caused by a new subtype
  - Other public health emergencies of international concern

Class B Conditions

Class B conditions do not preclude a person from entering the United States. These conditions do not constitute grounds for medical inadmissibility and are defined as physical or mental abnormalities, diseases, or disabilities serious in degree or permanent in nature amounting to a substantial departure from normal well-being.

- Syphilis
- Other sexually transmitted infections treated within the past year
- Current pregnancy
- Any physical or mental disorder without history of harmful behavior or with a history of harmful behavior that is unlikely to recur
- Hansen disease, paucibacillary or treated multibacillary
- Sustained, full remission of addiction or abuse of specific substances (amphetamines, cannabis, cocaine, hallucinogens, inhalants, opioids, phencylidines, sedative-hypnotics, and anxiolytics)
- **Class B tuberculosis**
  - Class B1 tuberculosis, pulmonary
  - Class B1 tuberculosis, extrapulmonary
  - Class B2 tuberculosis, latent tuberculosis infection evaluation

* On January 4, 2010, HIV infection was removed from the list of inadmissible conditions for immigration purposes, and HIV testing is no longer required as part of the immigrant medical examination.

Organization under the International Health Regulations of 2005 (polio, smallpox, SARS, influenza, and other public health emergencies of international concern) (*9*).

A Class B condition (Box) is a physical or mental disorder that, although not precluding persons from entering the United States, represents a departure from normal health or well-being that is significant enough to possibly interfere with the ability to care for oneself or to attend school or work or that might require extensive medical treatment or institutionalization in the future. These significant health problems must be brought to the attention of U.S. consular officials in the country where the applicant resides; persons with a Class B condition are recommended for medical follow-up when they arrive in the United States.

Screening for Tuberculosis

According to an agreement with the consular section of the embassy or consulate in the originating country, panel physicians conduct the medical examination for immigrants and refugees bound for the United States using specific criteria outlined by CDC in technical instructions. Two versions of the tuberculosis technical instructions are in use. Immigrants and refugees bound for the United States are examined in accordance with either the 1991 technical instructions (*10*) or the culture and directly observed therapy (CDOT) version of the tuberculosis technical instructions (which were released in 2007 and are being implemented in a phased approach) (*11*).

The tuberculosis technical instructions are designed to detect and treat tuberculosis disease among applicants to reduce the risk for spread of tuberculosis among the U.S. population after immigration. Studies found that the 1991 tuberculosis screening requirements lacked the sensitivity to detect persons with tuberculosis who had negative acid-fast bacillus sputum smear results but sputum culture results that were positive for *Mycobacteria tuberculosis*. In addition, the 1991 tuberculosis technical instructions did not prevent importation of multidrug-resistant tuberculosis into the United States (*12*,*13*). In 2007, the tuberculosis technical instructions were updated to require sputum cultures and drug-susceptibility testing for persons with suspected tuberculosis based on WHO data for immigration patterns and countries with a high prevalence of tuberculosis (*11*) and also to require directly observed therapy for persons found to be infected. As of July 2013, CDOT had been implemented in 117 countries (*11*). Implementation was prioritized based on the country's number of U.S. immigrants, the number of refugees resettling to the United States, tuberculosis rates, and tuberculosis rates in immigrant groups in the United States (*4*). By October 1, 2013, all U.S. panel physicians will be required to screen according to the CDOT tuberculosis technical instructions (http://www.cdc.gov/panelphysicians/index.html).

1991 Tuberculosis Technical Instructions for Tuberculosis Screening and Treatment

The 1991 technical instructions (*10*) require applicants aged ≥15 years to have chest radiography and to provide three sputum smears for acid-fast bacillus microscopy if the chest radiograph findings suggest active tuberculosis. Before traveling to the United States, applicants who have positive sputum smear results must undergo treatment until their sputum smear results are negative or they are granted a Class A waiver; the therapy they should receive is not specified (Table 1).

CDOT Technical Instructions for Tuberculosis Screening and Treatment

In the CDOT tuberculosis technical instructions, which were released in 2007, CDC updated the panel physician screening algorithms to increase sensitivity for active tuberculosis and prevent importation of multidrug-resistant tuberculosis (*3*). Applicants with chest radiograph findings that are suggestive of tuberculosis are required to submit three sputum specimens to undergo microscopy for acid-fast bacilli and culture for mycobacteria; drug-susceptibility testing is required on positive cultures. Persons with a positive culture or positive smear must complete treatment according to American Thoracic Society/CDC/Infectious Diseases Society of America guidelines, with medications delivered as directly observed therapy (*11*), before immigrating to the United States.

Medical Waivers

A provision of the Immigration and Nationality Act allows eligible applicants with a Class A (i.e., inadmissible) condition to apply for a waiver. Without this waiver, persons with Class A conditions cannot enter the United States. During 2009, waivers were available for Class A applicants with HIV infection, active pulmonary or laryngeal tuberculosis undergoing treatment, or a physical or mental disorder with associated harmful behavior. According to CDOT technical instructions, all applicants with pulmonary or laryngeal tuberculosis disease who need treatment overseas must complete directly observed therapy (DOT) by a trained health-care worker before immigration to the United States. Health-related waiver applications are submitted by individual applicants to the U.S. Citizenship and Immigration Services (USCIS), a DHS agency. Before USCIS grants a waiver, CDC reviews the health-related waiver applications and supporting medical documentation to ensure

TABLE 1. Comparison of procedures for tuberculosis diagnosis and treatment and for tuberculosis classifications in the 1991 tuberculosis technical instructions and the culture and directly observed therapy tuberculosis technical instructions

Procedures and classifications	1991 tuberculosis technical instructions	Culture and directly observed therapy tuberculosis technical instructions
Procedure		
Tuberculin skin test or IGRA	Not required	Children aged 2–14 years if their country tuberculosis rate is ≥20 per 100,000 population
Chest radiography	All persons aged ≥15 years	All persons aged ≥15 years Children aged 2–14 years with tuberculin skin test induration of ≥10 mm or positive IGRA results
Laboratory testing	Sputum smear microscopy for acid-fast bacilli	Sputum smear microscopy for acid-fast bacilli Culture for *Mycobacterium tuberculosis* and drug susceptibility testing
Tuberculosis treatment	No directly observed therapy	Directly observed therapy using U.S. guidelines until therapy is complete
Validity period of tuberculosis part of examination	6 months if Class A or Class B tuberculosis	3 months if Class A or Class B1 tuberculosis, otherwise 6 months
Classification		
No classification	Normal evaluation	Normal evaluation
Class A	Tuberculosis disease	Tuberculosis disease
Class B1		
Pulmonary	Abnormal chest radiograph findings, negative sputum smears	Abnormal chest radiograph findings, negative sputum smears and cultures
Extrapulmonary	Extrapulmonary tuberculosis	Extrapulmonary tuberculosis
Class B2	Chest radiograph findings consistent with inactive tuberculosis	Latent tuberculosis infection evaluation
Class B3	Old or healed tuberculosis	Contact evaluation

Abbreviation: IGRA = interferon-gamma release assay.

that the applicant has been classified properly and that an appropriate U.S. health-care provider has been identified who agrees to evaluate the applicant within 30 days of arrival in the United States. DHS and USCIS make the final approval or denial of the waiver request (*14*).

The EDN System

The EDN system is a centralized electronic reporting system that collects health information on all newly arriving refugees and newly arriving immigrants with Class A or B medical conditions. Information in the EDN system is used to notify state health departments in all 50 states and the District of Columbia (DC) about these arrivals. The objectives of EDN are to 1) provide timely and accurate medical notifications to U.S. health departments of all newly arriving refugees and immigrants with health conditions that might require follow-up; 2) monitor diseases of public health significance, such as tuberculosis; and 3) provide data for evidence-based recommendations to the U.S. and international public health communities, as well as to federal partners.

Before 2008, using the existing paper-based notification system to conduct surveillance for Class A or Class B conditions adequately was challenging. Notifications of immigrants with medical conditions and all refugee arrivals (regardless of medical status) were sent by CDC through the U.S. Postal Service to state and local health departments. Some notifications were lost, others were not received, and documentation of the overseas medical examinations was not consistently available, leading to the additional expenses of repeated chest radiography and vaccinations. To address these issues, in March 2006, the EDN system pilot programs were implemented at three of the 20 CDC quarantine stations (*15*) (Atlanta, Miami, and New York City), covering ports of entry in 12 destination states. Documents were entered electronically into the EDN system for some of the arrivals coming through these quarantine stations. Following the successful pilot, EDN became fully functional and completely replaced the paper-based notification system, allowing electronic notification by e-mail of arrivals at all 20 quarantine stations by October 2008. On October 1, 2008, the EDN system was designated as the primary method to notify health officials of all newly arriving refugees and immigrants with Class A and Class B medical conditions or with HIV infection. These notifications were sent through EDN to tuberculosis and refugee health coordinators in U.S. state and local health departments in all 50 states and DC.

To collect the data for EDN, CDC collaborates closely with federal and international partners to compile accurate medical examination data. Medical documents for all refugees and immigrants entering the United States are collected by U.S. Customs and Border Protection (CBP) at U.S. ports of entry. CBP sends the documents to the quarantine station in charge of that port of entry into the United States (information available at http://www.cdc.gov/quarantine/QuarantineStations.html). Each quarantine station obtains the information for all refugees

and immigrants with Class A and B medical conditions. Information collected by the CDC quarantine station staff includes health indicators that are derived from DOS medical examination forms. These include Class A and B conditions; current general physical examination; vaccination history; chest radiography results; and past medical history related to cardiology, pulmonology, neurology, psychiatry, endocrinology, and sexually transmitted diseases.

Flow of Information

After the panel physician in the originating country conducts the medical screening examination, all refugees and immigrants with medical conditions are given a copy of the completed medical examination form (Figure 1). Officials from CBP collect these completed forms at the ports of entry and provide a copy to the officials at the CDC quarantine station that has jurisdiction over the port of entry (*15*). Within 24–48 hours, the officials at the quarantine station send the forms via courier to the CDC EDN data entry center in Atlanta, Georgia (rather than to multiple health departments), where the forms are scanned and entered manually into the EDN system. Once the records are in the EDN system, an electronic notification is sent via e-mail. Health departments can access the scanned forms for clinical use or download electronic data sets for analysis (Figure 1).

Immigrants and other visa groups, such as asylees and parolees, might arrive in any of the approximately 300 official points of entry (*16*). In contrast, refugees enter the United States through one of five points of entry: 1) John F. Kennedy International Airport (New York City, New York), 2) Newark Liberty International Airport (Newark, New Jersey), 3) Chicago O'Hare International Airport (Chicago, Illinois), 4) Miami International Airport (Miami, Florida), and 5) Los Angeles International Airport (Los Angeles, California). Refugee arrivals are managed by the DOS Bureau of Population and Refugee Migration through the International Organization for Migration (IOM). Within 24 hours of arrival, approximately 65% of all refugee medical records are transmitted to EDN from IOM's Migrant Management and Operational Systems Application (MiMOSA) (*17*) database using the Public Health Information Network Messaging System (*18*) interface. Before these electronic refugee records are made available on the EDN system, staff members at the data entry center compare them with the corresponding scanned document for any discrepancies, such as incorrect classifications or incomplete records. All other records are entered manually from the copies received from quarantine stations.

EDN System Data Analysis

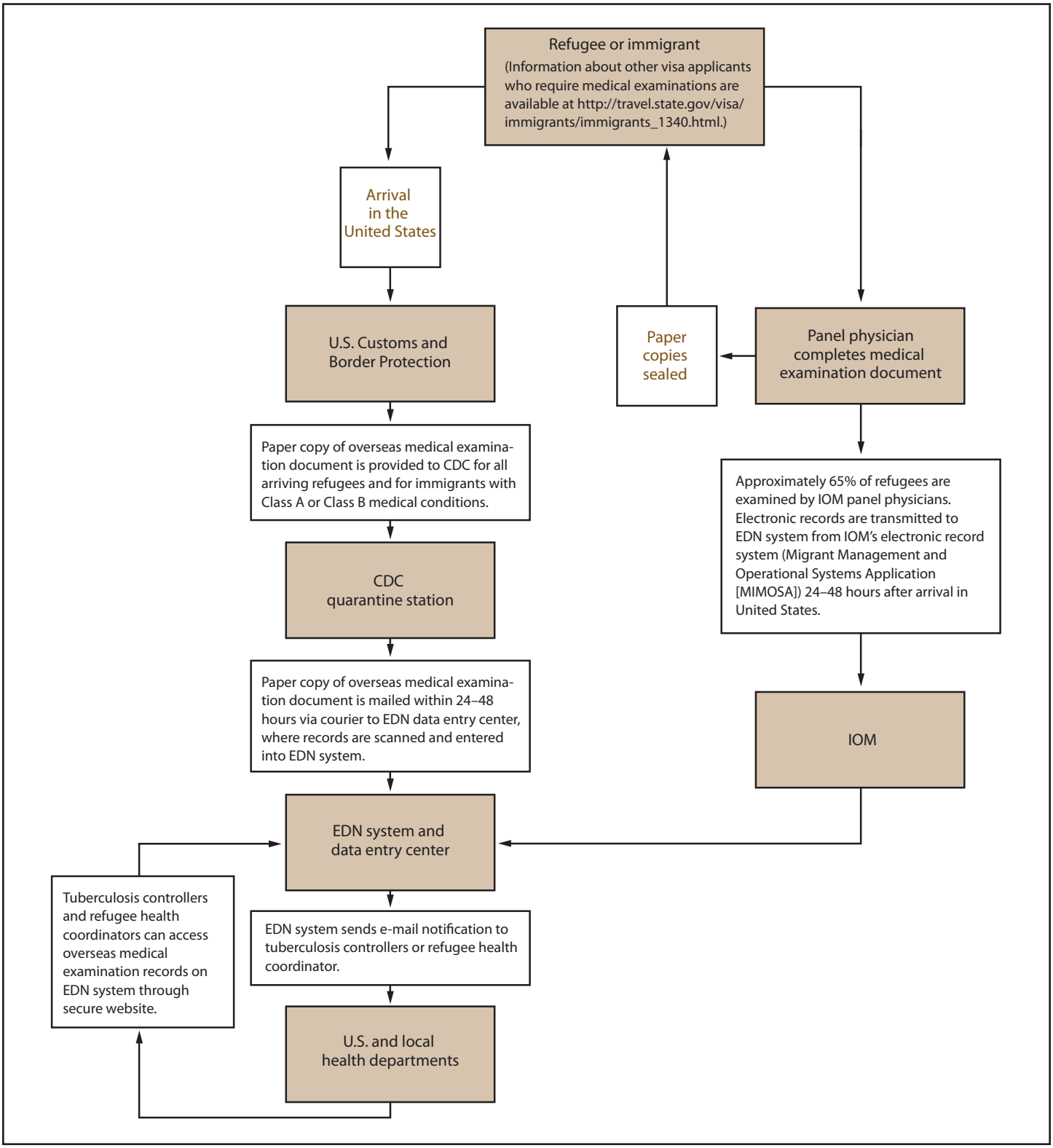
To describe the number and type of Class A or B conditions among all newly arriving refugees (with or without Class A or B conditions) and among newly arriving immigrants (with Class A or B conditions), CDC analyzed EDN data for 2009 (the first year with adequate and complete data to allow for meaningful analysis). The analysis was stratified by type of visa (refugees, immigrants with medical conditions, and other, which included asylees, parolees, and unknown). Because overseas medical records for immigrants without Class A or B medical conditions are not collected in the EDN system, analysis of the total population of immigrant arrivals (i.e., approximately 400,000 immigrant records) is not possible. In contrast, the EDN system collects overseas medical records for refugees both with and without Class A or B medical conditions. Variables analyzed included birth country, sex, age group, number of arrivals or medical records received by quarantine stations, destination state or area, number of days until health departments were notified of arrivals, and tuberculosis classification.

Notifying Health Departments of Arriving Immigrants with Class A and B Medical Conditions and of All Refugees

Within approximately 2 weeks of arrival, all state health departments and CDC are notified about all refugee arrivals and of immigrants with Class A or B conditions (primarily tuberculosis and HIV) by an e-mail from EDN indicating that new or changed information is available. Notification of arrivals with tuberculosis classifications to U.S. territories such as Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific Islands is coordinated by CDC quarantine stations and local health departments. EDN, which is accessed through a secure website, allows permitted users to see a list of specific new arrivals, including those who have been classified with suspected tuberculosis and recommended follow-up. Before January 2010, refugees and immigrants with HIV infection were classified as having a Class A condition; medical information for refugees and immigrants with Class A HIV and the required waiver were mailed via courier to the listed primary health-care provider. Class A HIV notifications are included in this report. On January 4, 2010, HIV infection was removed from the list of inadmissible conditions for immigration purposes, and HIV testing is no longer required as part of the immigrant medical examination (*19*).

Contact information for refugees who might have been exposed (during the incubation period) to a communicable disease such as measles or varicella is compiled from the EDN

FIGURE 1. CDC Electronic Disease Notification system flow chart



Abbreviation: EDN = Electronic Disease Notification; IOM = International Organization for Migration.

system and provided to state and local health departments via Epi-X, a CDC-managed secure communication system for public health professionals (*20*).

Tuberculosis Follow-Up Reporting by States

State and local health departments are asked to complete tuberculosis follow-up evaluations of persons with tuberculosis classification in the EDN system. The tuberculosis follow-up evaluation form was expanded from the CDC form 75.17 (*2*) to include additional testing conducted during the U.S. medical evaluation, such as a skin test, radiology, microscopy, and bacteriology, as well as treatment.

State health departments can access the health information from overseas medical examinations in an electronic analyzable format and as a scanned copy of the paperwork for all refugee arrivals and immigrants with tuberculosis through the secure EDN website. When an immigrant or refugee moves to another state, records are reassigned to the new state, and a notification is sent to the state tuberculosis coordinator so that follow-up activities can be completed.

Analysis

This report includes a summary of the first report from the EDN system, including the number of newly arriving refugees, immigrants with medical conditions, and persons of other visa types whose information was collected at CDC quarantine stations, and the number of notifications by birth country, U.S. local health departments by birth country, (Class A or B medical condition), and suspected tuberculosis classification. Also provided is the number of persons who received follow-up because of a suspected tuberculosis classification that was reported into the EDN system by U.S. health departments. Other notifications of communicable diseases that occurred in 2009 are summarized. This report does not include overseas vaccination and medical history information because this information was incomplete for 2009.

Results

EDN System Data

EDN provided access to overseas medical examinations that were reported to CDC quarantine stations (Table 2). During 2009, the CDC EDN system notified 438 tuberculosis controllers and refugee health coordinators in 223 U.S. state and local health

TABLE 2. Number and percentage of immigrants with medical conditions, refugees, and persons with other visa types arriving in the United States, by visa type and location of quarantine station — Electronic Disease Notification system, United States, 2009

	Visa type							
	Immigrant with medical condition		Refugee*		Other†		Total	
Quarantine station	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Anchorage, Alaska	144	(0.7)	NA	NA	NA	NA	**144**	**(0.1)**
Atlanta, Georgia	319	(1.6)	NA	NA	164	(2.4)	**483**	**(0.5)**
Boston, Massachusetts	109	(0.6)	1§	(0)	4	(0.1)	**114**	**(0.1)**
Chicago, Illinois	1,087	(5.6)	13,827	(17.5)	583	(8.7)	**15,497**	**(14.8)**
Dallas, Texas	279	(1.4)	NA	NA	1	(0)	**280**	**(0.3)**
Detroit, Michigan	1,117	(5.8)	NA	NA	44	(0.7)	**1,161**	**(1.1)**
District of Columbia	430	(2.2)	NA	NA	708	(10.6)	**1,138**	**(1.1)**
El Paso, Texas	2,870	(14.8)	NA	NA	NA	NA	**2,870**	**(2.7)**
Honolulu, Hawaii	1,660	(8.6)	NA	NA	68	(1.0)	**1,728**	**(1.6)**
Houston, Texas	168	(0.9)	NA	NA	17	(0.3)	**185**	**(0.2)**
Los Angeles, California	4,182	(21.6)	13,438	(17.0)	2,601	(38.8)	**20,221**	**(19.3)**
Miami, Florida	415	(2.1)	7,666	(9.7)	1,218	(18.2)	**9,299**	**(8.9)**
Minneapolis, Minnesota	225	(1.2)	NA	NA	20	(0.3)	**245**	**(0.2)**
New York City, New York	1,937	(10.0)	30,898	(39.2)	12	(0.2)	**32,847**	**(31.3)**
Newark, New Jersey	518	(2.7)	13,061	(16.6)	21	(0.3)	**13,600**	**(13.0)**
Philadelphia, Pennsylvania	64	(0.3)	NA	NA	2	(0)	**66**	**(0.1)**
San Diego, California	15	(0.1)	NA	NA	12	(0.2)	**27**	**(0)**
San Francisco, California	2,891	(14.9)	8§	(0)	1,063	(15.9)	**3,962**	**(3.8)**
San Juan, Puerto Rico	167	(0.9)	NA	NA	NA	NA	**167**	**(0.2)**
Seattle, Washington	761	(3.9)	NA	NA	159	(2.4)	**920**	**(0.9)**
Total	**19,358**	**(100.0)**	**78,899**	**(100.0)**	**6,697**	**(100.0)**	**104,954**	**(100.0)**

Abbreviation: NA = not applicable.
* Refugee arrivals include Iraqis and Afghans with special immigrant visas.
† Asylees, parolees, and unknown.
§ Persons who were classified as refugees at point of entry.

FIGURE 2. CDC U.S. quarantine stations and Electronic Disease Notification system jurisdictions in 2009*

* Quarantine stations are indicated by dots; Electronic Disease Notification jurisdictions (N = 223) are indicated by borders. Jurisdictions include individual states, counties, and cities. Notifications of arrivals in Puerto Rico are coordinated by the quarantine station and local health department.

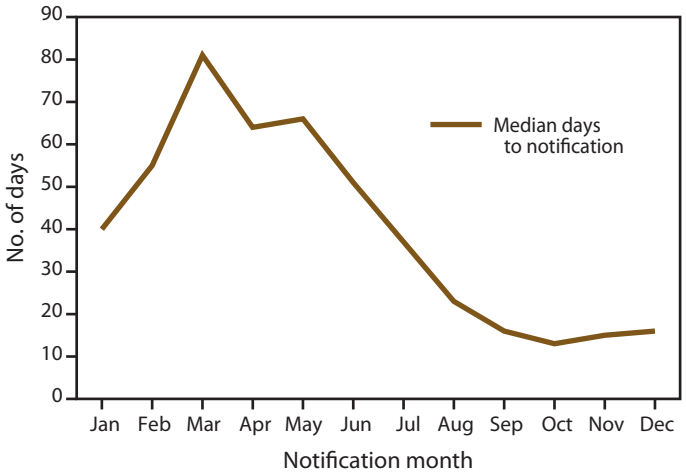
departments (Figure 2) in all 50 states and DC of 104,954 arrivals, including 19,358 (18.4%) immigrants with medical conditions of public health significance, 78,899 refugees with or without medical conditions (75.2%), and 6,697 (6.4%) applicants with other visa types (with or without medical conditions). Of the 78,899 total refugees arrivals, 21,319 (27%) had a medical condition. The New York John F. Kennedy International Airport was the entry point for the largest proportion (39%) of refugees. Medical examinations of immigrants with medical conditions were collected at all 20 quarantine stations, of which Los Angeles, California, collected the most (21.6%).

At the start of January 2009, the median number of days from arrival to notification was 39 days, with a high of 81 days in March 2009 (Figure 3). During October–December 2009, after full EDN implementation, the median number of days from arrival to notification decreased to 14 days.

Notifications by Birth Country

In 2009, the EDN system generated notifications for arrivals from 174 birth countries (Table 3). The three most common countries of birth for refugees were Iraq (18,897 [23.9%]), Burma (14,951 [18.9%]), and Bhutan (11,898 [15.1%]). The majority of refugees and immigrants with suspected Class B tuberculosis were born in the Philippines (9,642 [41.3%]), Mexico (2,828 [12.1%]), Burma (2,033) [8.7%]), Vietnam (1,830 [7.8%]), and the Dominican Republic (1,352 [5.8%]) (Table 4). The proportion of female arrivals overall was 49.5% and was not significantly different within age groups (<15 years, 49.2%; 15–44 years, 48.3%; and ≥45 years, 52.3%). Overall, the percentage of notifications received was highest among persons aged 15–44 years.

FIGURE 3. Number of days from arrival until notification of immigrants, refugees,* and persons with other visa types† — Electronic Disease Notification system, United States, 2009



* Refugee arrivals include Iraqis and Afghans with special immigrant visas.
† Asylees, parolees, and unknown.

Notifications to U.S. Health Departments

California's 58 county health departments received notifications for 36.1% of all immigrants with medical conditions of public health significance and 14.3% of all refugees, for a total of approximately 20% of EDN notifications during 2009 (Table 5). Texas and New York received the second- and third-highest proportion of notifications both for immigrants with medical conditions (6.7% and 7.8%, respectively) and all refugee arrivals (11.1% and 6.2%, respectively). Montana and Wyoming received no notifications of refugee arrivals.

Notifications of Class A and B Medical Conditions

Of 41,415 notifications of Class A and B medical conditions, 405 (1%) were for Class A and 40,994 (99%) were for Class B medical conditions (Table 6). Of the 405 Class A medical conditions, approximately 90% were for arrivals with waivers who tested positive for HIV infection during the medical examination; the U.S. health-care provider who agreed to care for the HIV-positive person was notified by mail. Of the 40,994 Class B medical conditions, 56.8% were from persons classified with noninfectious tuberculosis. Other than tuberculosis, the two most frequently identified Class B medical conditions were any physical or mental disorder (unlikely to recur) (1.9%) and pregnancy (1.8%).

Notifications of Immigrants and Refugees with Tuberculosis Classifications

All 50 states and DC received notifications of arrivals with tuberculosis classifications (Figure 4). California (7,006 [30%]), New York (1,885 [8.1%]), and Texas (1,872 [8%]) received the most tuberculosis notifications (Table 7). Most (84%) of these notifications were for persons born in the 28 countries that had implemented the CDOT tuberculosis technical instructions by the end of 2009 (*21*). Of these 28 countries, 13 (46.4%) had implemented the CDOT tuberculosis technical instructions for all applicants bound for the United States, and four (14.3%) had implemented them for refugees before 2009. Overall, a median of 75.4% of persons received follow-up for suspected tuberculosis classifications that were reported into the EDN system by the U.S. health departments. Thirty-three states reported following up with 65%–100% of arrivals with a suspected tuberculosis classification. Among the notifications for tuberculosis, only 10 (0.02%) were for persons with Class A tuberculosis who received waivers; these notifications were sent to seven states (Table 6), and all were among immigrants. Among persons classified as having Class B tuberculosis, 6,257 (26.8%) were classified by using 1991 tuberculosis technical instructions, and 16,828 (72.0%) by the 2007 CDOT tuberculosis technical instructions (Table 8).

Notifications of Disease Outbreaks

EDN can provide data rapidly that can be used to locate refugees who might have been exposed to a disease outbreak overseas before their arrival at their U.S. destinations. During 2009, state and local health departments were notified of four outbreaks of suspected varicella among refugee children. Before their departure for the United States, some of these children might have been exposed to varicella in transit centers overseas (transit center 1, January 30, 2009; transit center 2, February 2, 2009; transit center 3, March 23, 2009; transit center 4, May 4, 2009), The U.S. contact information of each refugee who might have been exposed during the outbreak was compiled immediately by CDC from the EDN system and provided to state and local health departments for follow-up via Epi-X, a CDC-managed secure communication system for public health professionals (*20*).

TABLE 3. Percentage of immigrants with medical conditions, refugees, and persons with other visa types arriving in the United States, by birth country, visa type, sex, and age group — Electronic Disease Notification System, United States, 2009

	Total		Visa type			Sex		Age group (yrs)[§]		
Birth country (N = 179)	No.	(%)	Immigrant with medical condition (%)	Refugee* (%)	Other[†] (%)	Male (%)	Female (%)	<15 (%)	15–44 (%)	≥45 (%)
Iraq	**19,021**	**(18.1)**	(0.4)	(99.3)	(0.3)	(52.3)	(47.7)	(26.0)	(56.1)	(17.9)
Burma	**15,108**	**(14.4)**	(0.4)	(99.0)	(0.6)	(54.8)	(45.2)	(21.1)	(68.1)	(10.8)
Bhutan	**11,898**	**(11.3)**	(0)	(100.0)	(0)	(51.4)	(48.6)	(11.2)	(67.3)	(21.5)
Philippines	**9,924**	**(9.5)**	(99.6)	(0)	(0.4)	(44.0)	(56.0)	(39.3)	(14.9)	(45.8)
Iran	**5,326**	**(5.1)**	(1.1)	(98.0)	(1.0)	(49.4)	(50.6)	(11.6)	(53.8)	(34.6)
Cuba	**4,590**	**(4.4)**	(0.2)	(98.9)	(0.9)	(50.0)	(50.0)	(21.1)	(52.5)	(26.4)
Thailand	**3,957**	**(3.8)**	(1.2)	(98.7)[¶]	(0.1)	(50.4)	(49.6)	(78.4)	(20.4)	(1.2)
China	**3,632**	**(3.5)**	(24.0)	(2.0)	(74.0)	(45.0)	(55.0)	(23.1)	(48.9)	(28.0)
Vietnam	**3,334**	**(3.2)**	(47.9)	(51.4)	(0.7)	(52.0)	(48.0)	(15.9)	(35.0)	(49.1)
Nepal	**3,219**	**(3.1)**	(0.5)	(89.1)	(10.4)	(49.0)	(51.0)	(66.9)	(30.1)	(3.0)
Somalia	**3,135**	**(3.0)**	(0.6)	(98.6)	(0.8)	(49.8)	(50.2)	(19.3)	(67.5)	(13.2)
Mexico	**2,863**	**(2.7)**	(99.9)	(0)	(0.1)	(49.4)	(50.6)	(58.2)	(14.2)	(27.7)
Ethiopia	**2,360**	**(2.2)**	(7.7)	(76.4)[¶]	(15.9)	(52.3)	(47.7)	(36.0)	(57.6)	(6.4)
Dominican Republic	**1,467**	**(1.4)**	(99.3)	(0.5)	(0.2)	(48.9)	(51.1)	(67.6)	(11.0)	(21.5)
Kenya	**1,368**	**(1.3)**	(4.1)	(87.6)[¶]	(8.3)	(50.4)	(49.6)	(78.7)	(20.2)	(1.2)
Haiti	**1,199**	**(1.1)**	(14.1)	(0)	(85.9)	(46.5)	(53.5)	(45.9)	(42.6)	(11.5)
Democratic Republic of Congo	**1,015**	**(1.0)**	(1.4)	(94.7)	(3.9)	(50.0)	(50.0)	(34.0)	(57.6)	(8.4)
India	**837**	**(0.8)**	(50.7)	(12.5)	(36.8)	(47.1)	(52.9)	(16.5)	(39.2)	(44.3)
Ukraine	**760**	**(0.7)**	(22.2)	(72.2)	(5.5)	(47.2)	(52.8)	(23.3)	(41.1)	(35.7)
Sudan	**625**	**(0.6)**	(1.0)	(96.6)	(2.4)	(67.4)	(32.6)	(23.0)	(60.2)	(16.8)
Afghanistan	**620**	**(0.6)**	(4.0)	(95.3)	(0.6)	(57.3)	(42.7)	(31.0)	(62.1)	(6.9)
Malaysia	**606**	**(0.6)**	(0.7)	(99.3)[¶]	(0)	(49.2)	(50.8)	(88.1)	(11.7)	(0.2)
Russia	**569**	**(0.5)**	(20.9)	(73.8)	(5.3)	(43.9)	(56.1)	(32.7)	(32.2)	(35.1)
Eritrea	**512**	**(0.5)**	(2.7)	(88.5)	(8.8)	(59.2)	(40.8)	(42.0)	(53.3)	(4.7)
Moldova	**509**	**(0.5)**	(2.0)	(91.9)	(6.1)	(52.3)	(47.7)	(24.6)	(47.2)	(28.3)
Liberia	**416**	**(0.4)**	(1.2)	(94.5)	(4.3)	(46.4)	(53.6)	(25.2)	(54.3)	(20.4)
Jordan	**383**	**(0.4)**	(3.1)	(94.0)	(2.9)	(47.0)	(53.0)	(83.3)	(13.8)	(2.9)
Burundi	**335**	**(0.3)**	(0.6)	(94.3)	(5.1)	(49.6)	(50.4)	(24.5)	(53.1)	(22.4)
United Republic of Tanzania	**316**	**(0.3)**	(0.9)	(96.8)[¶]	(2.2)	(46.5)	(53.5)	(84.5)	(13.6)	(1.9)
Congo	**286**	**(0.3)**	(2.1)	(94.4)	(3.5)	(44.4)	(55.6)	(24.8)	(66.1)	(9.1)
Syria	**236**	**(0.2)**	(2.1)	(96.6)[¶]	(1.3)	(42.8)	(57.2)	(74.2)	(18.2)	(7.6)
Armenia	**236**	**(0.2)**	(5.1)	(9.7)	(85.2)	(48.7)	(51.3)	(19.9)	(61.0)	(19.1)
Pakistan	**224**	**(0.2)**	(55.8)	(36.6)	(7.6)	(48.2)	(51.8)	(20.1)	(37.5)	(42.4)
Cameroon	**222**	**(0.2)**	(5.4)	(6.3)	(88.3)	(46.4)	(53.6)	(35.6)	(59.0)	(5.4)
Uzbekistan	**205**	**(0.2)**	(8.8)	(81.0)	(10.2)	(49.3)	(50.7)	(33.7)	(50.2)	(16.1)
Colombia	**196**	**(0.2)**	(20.4)	(39.3)	(40.3)	(46.4)	(53.6)	(26.0)	(54.1)	(19.9)
Lebanon	**189**	**(0.2)**	(5.8)	(93.1)[¶]	(1.1)	(36.5)	(63.5)	(65.6)	(24.9)	(9.5)
Rwanda	**153**	**(0.1)**	(2.0)	(83.7)	(14.4)	(48.4)	(51.6)	(32.7)	(58.8)	(8.5)
Yemen	**152**	**(0.1)**	(3.9)	(78.9)	(17.1)	(43.4)	(56.6)	(61.8)	(31.6)	(6.6)
Belarus	**139**	**(0.1)**	(8.6)	(82.0)	(9.4)	(47.5)	(52.5)	(30.2)	(41.7)	(28.1)
Republic of Korea	**129**	**(0.1)**	(97.7)	(0)	(2.3)	(54.3)	(45.7)	(0.8)	(22.5)	(76.7)
Kuwait	**124**	**(0.1)**	(4.8)	(95.2)[¶]	(0)	(53.2)	(46.8)	(8.9)	(84.7)	(6.5)
Egypt	**118**	**(0.1)**	(31.4)	(53.4)	(15.3)	(52.5)	(47.5)	(37.3)	(36.4)	(26.3)
Bangladesh	**111**	**(0.1)**	(87.4	(9.9)[¶]	(2.7)	(67.6)	(32.4)	(9.9)	(18.0)	(72.1)
Cambodia	**102**	**(0.1)**	(70.6)	(20.6)	(8.8)	(46.1)	(53.9)	(4.9)	(35.3)	(59.8)
Other**	**2,228**	**(2.1)**	(27.5)	(44.8)	(27.7)	(47.7)	(52.3)	(37)	(43.9)	(19.6)
Total	**104,954**	**(100.0)**	**(18.4)**	**(75.2)**	**(6.4)**	**(50.5)**	**(49.5)**	**(30.4)**	**(48.4)**	**(21.2)**

* Refugee arrivals include Iraqis and Afghans with special immigrant visas.
† Asylees, parolees, and unknown.
§ Age at time of arrival.
¶ All or most of these refugees are of another nationality: >99% of refugees born in Thailand, Malaysia, and Bangladesh are Burmese; 70% of refugees born in Ethiopia are Eritrean; 94% of refugees born in Kenya are Somali; 75% of refugees born in Tanzania are Burundian; and approximately 75% of refugees born in Syria, Lebanon, and Kuwait are Iraqi.
** Other birth countries with <100 notifications (N = 129) include Albania, Algeria, Angola, Antarctica, Argentina, Australia, Austria, Azerbaijan, Bahamas, Barbados, Belgium, Benin, Bermuda, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Cape Verde, Central African Republic, Chad, Chile, Cocos (Keeling) Islands, Costa Rica, Cote d'Ivöire, Croatia, Cyprus, Czech Republic, former Czechoslovakia, Denmark, Djibouti, Dominica, Ecuador, El Salvador, Equatorial Guinea, Estonia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Gaza Strip, Georgia, Germany, Ghana, Greece, Guam, Guatemala, Guinea, Guyana, Heard Island and McDonald Islands, Honduras, Hong Kong, Hungary, Iceland, Indonesia, Ireland, Israel, Italy, Jamaica, Japan, Johnston Atoll, Kazakhstan, Kiribati, Democratic People's Republic of Korea, Kyrgyzstan, Laos, Latvia, Lesotho, Libya, Liechtenstein, Lithuania, Macau, Macedonia, Madagascar, Mali, Malta, Martinique, Mauritania, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Netherlands, New Zealand, Nicaragua, Nigeria, Oman, Panama, Peru, Pitcairn Islands, Poland, Portugal, Qatar, Reunion, Romania, South Georgia and the South Sandwich Islands, Saudi Arabia, Senegal, Serbia, Sierra Leone, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tajikistan, Togo, Trinidad and Tobago, Trust Territory of the Pacific Islands, Tunisia, Turkey, Turkmenistan, U.S. Minor Outlying Islands, Uganda, United Arab Emirates, United Kingdom, Uruguay, Vanuatu, Venezuela, West Bank, former Yugoslavia, Zambia, and Zimbabwe.

TABLE 4. Number and percentage of immigrants, refugees,* and persons with other visa types† with tuberculosis classifications arriving in the United States, by birth country and by Class B classification — Electronic Disease Notification system, United States, 2009

			Classification used to assign Class B condition for tuberculosis				
	Total tuberculosis classification notifications		1991 tuberculosis technical instructions§		2007 CDOT tuberculosis technical instructions§		
			B1	B2	B1	B2	B3
Birth country	No.	(%)	(%)	(%)	(%)	(%)	(%)
Philippines	**9,642**	**(41.3)**	(9.7)	(3.7)	(48.1)	(37.4)	(1.1)
Mexico	**2,828**	**(12.1)**	(6.1)	(8.4)	(26.8)	(58.7)	
Burma	**2,033**	**(8.7)**	(11.0)	(2.7)	(64.4)	(19.6)	(2.2)
Vietnam	**1,830**	**(7.8)**	(43.4)	(4.7)	(39.7)	(11.4)	(0.8)
Dominican Republic	**1,352**	**(5.8)**	(16.4)	(8.0)	(12.2)	(63.4)	
Bhutan	**1,254**	**(5.4)**	(8.7)	(2.1)	(74.2)	(12.2)	(2.8)
China	**893**	**(3.8)**	(19.4)	(51.1)	(10.0)	(19.3)	(0.3)
India	**400**	**(1.7)**	(13.0)	(83.8)	(3.0)	(0.3)	
Thailand	**322**	**(1.4)**	(6.8)	(17.4)	(18.6)	(52.5)	(4.7)
Nepal	**311**	**(1.3)**	(1.9)	(7.7)	(12.5)	(74.6)	(3.2)
Somalia	**267**	**(1.1)**	(22.1)	(6.7)	(61.8)	(8.6)	(0.7)
Ukraine	**225**	**(1.0)**	(24.0)	(72.0)	(4.0)		
Ethiopia	**219**	**(0.9)**	(15.1)	(23.7)	(37.0)	(22.8)	(1.4)
Russian Federation	**170**	**(0.7)**	(8.8)	(90.0)	(1.2)		
Iraq	**163**	**(0.7)**	(49.1)	(31.9)	(14.1)	(3.1)	(1.8)
Haiti	**139**	**(0.6)**	(20.1)	(59.7)	(3.6)	(13.7)	(2.9)
Republic of Korea	**127**	**(0.5)**	(9.4)	(53.5)	(36.2)	(0.8)	
Kenya	**126**	**(0.5)**	(20.6)	(15.1)	(15.9)	(47.6)	(0.8)
Pakistan	**118**	**(0.5)**	(54.2)	(31.4)	(8.5)	(5.9)	
Other¶	**922**	**(4.0)**	(19.5)	(58.6)	(9.7)	(11.3)	(0.9)
Total	**23,341**	**(100.0)**	**(14.0)**	**(13.0)**	**(39.0)**	**(32.9)**	**(1.1)**

Abbreviation: CDOT = culture and directly observed therapy.

* Refugee arrivals include Iraqis and Afghans with special immigrant visas.

† Asylees, parolees, and unknown.

§ Class B tuberculosis was defined as chest radiograph findings that are consistent with tuberculosis infection without positive sputum smear or culture results for tuberculosis (B1), or latent tuberculosis infection (B2), or contact with a person with a case of tuberculosis. Class B1, 1991: chest radiograph findings consistent with active tuberculosis without a positive sputum smear; 2007, chest radiograph findings consistent with tuberculosis without a positive sputum smear or culture. Class B2, 1991: chest radiograph findings consistent with inactive tuberculosis without a positive sputum smear; CDOT: latent tuberculosis infection.

¶ Other birth countries with <100 tuberculosis notifications (N = 108) include Afghanistan, Albania, Angola, Antarctica, Argentina, Armenia, Azerbaijan, Bahamas, Bangladesh, Barbados, Belarus, Bolivia, Bosnia and Herzegovina, Brazil, Bulgaria, Burundi, Cambodia, Cameroon, Central African Rep., Chile, Colombia, Congo, Democratic Republic of Congo, Cote D'Ivoire, Croatia, Cuba, Czech Republic, Djibouti, Dominica, Ecuador, Egypt, El Salvador, Eritrea, Estonia, Fiji, Georgia, Germany, Ghana, Greece, Guam, Guatemala, Guyana, Honduras, Hong Kong, Iceland, Indonesia, Iran, Israel, Italy, Jamaica, Japan, Johnston Atoll, Jordan, Kazakhstan, Democratic People's Republic of Korea, Kuwait, Kyrgyzstan, Laos, Lebanon, Liberia, Lithuania, Macau, Macedonia, Malaysia, Malta, Moldova, Mongolia, Montenegro, Morocco, Namibia, Netherlands, Nicaragua, Nigeria, Oman, Peru, Pitcairn Islands, Poland, Portugal, Romania, Rwanda, South Georgia and the South Sandwich Islands, Saudi Arabia, Senegal, Serbia, Sierra Leone, South Africa, Spain, Sri Lanka, Sudan, Syria, Taiwan, Tajikistan, United Republic of Tanzania, Togo, Trust Territory of the Pacific Islands, Tunisia, Turkey, Turkmenistan, Uganda, United Arab Emirates, United Kingdom, Uzbekistan, Vanuatu, Venezuela, Yemen, former Yugoslavia, Zambia, and Zimbabwe.

Discussion

The U.S. Public Health Service has provided the guidance for the medical examination of immigrants and refugees since the late 1800s (*22*), and CDC has maintained a database of selected examinations abroad and domestically since 1996. Before full implementation of EDN in 2009, the notifications provided to state and local health departments of immigrant and refugee arrivals was incomplete or delayed, which did not allow for robust data analysis. The current system, EDN, has multiple functions. First, as a disease notification system, EDN provides systematic collection and electronic transmission of information on communicable diseases of public health significance for newly arriving immigrants with medical conditions and all refugees, facilitating prompt medical care after arrival when needed. Second, EDN can be used as a registry of all refugee arrivals to find specific refugees after disease outbreaks are identified and follow-up investigation is required. Finally, the medical screening data provided by EDN is analyzed and used to develop or enhance evidence-based medical guidance for specific refugee populations (*21*).

Provision of timely notification to U.S. health departments of refugee and immigrant arrivals is essential for medical and public health follow-up. The HHS Office of Refugee Resettlement, which provides oversight for refugee medical assistance, initial refugee medical screening, and technical assistance and consultation for physical and mental health concerns of refugees, recommends that all refugees undergo medical screening (*23*) based on CDC domestic screening guidelines (*21*) when they arrive in the United States. The

TABLE 5. Number and percentage of immigrants, refugees, and persons with other visa types arriving in the United States, by destination state/area ranked by total number of notifications and visa type — Electronic Disease Notification system, United States, 2009

Destination state/area	Ranking, by total no. of notifications	Total notifications		Visa type							
				Immigrant with medical condition		Refugee*				Other†	
						Total		With medical condition			
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Alabama	40	**281**	**(0.3)**	44	(0.2)	226	(0.3)	60	(0.3)	11	(0.2)
Alaska	43	**235**	**(0.2)**	141	(0.7)	94	(0.1)	30	(0.1)	0	(0)
Arizona	5	**4,860**	**(4.6)**	297	(1.5)	4,501	(5.7)	1,246	(5.8)	62	(0.9)
Arkansas	46	**101**	**(0.1)**	57	(0.3)	39	(0)	10	(0)	5	(0.1)
California	1	**21,484**	**(20.5)**	6,985	(36.1)	11,299	(14.3)	2,744	(12.9)	3,200	(47.8)
Colorado	14	**2,147**	**(2.0)**	145	(0.7)	1,934	(2.5)	621	(2.9)	68	(1.0)
Connecticut	32	**543**	**(0.5)**	116	(0.6)	419	(0.5)	96	(0.5)	8	(0.1)
Delaware	49	**26**	**(0)**	17	(0.1)	6	(0)	2	(0)	3	(0)
District of Columbia	44	**184**	**(0.2)**	31	(0.2)	61	(0.1)	16	(0.1)	92	(1.4)
Florida	4	**5,879**	**(5.6)**	803	(4.1)	4,054	(5.1)	834	(3.9)	1,022	(15.3)
Georgia	8	**3,624**	**(3.5)**	234	(1.2)	3,302	(4.2)	963	(4.5)	88	(1.3)
Hawaii	26	**1,086**	**(1.0)**	1,011	(5.2)	5	(0)	3	(0)	70	(1.0)
Idaho	24	**1,279**	**(1.2)**	55	(0.3)	1,212	(1.5)	364	(1.7)	12	(0.2)
Illinois	7	**3,760**	**(3.6)**	774	(4.0)	2,799	(3.5)	725	(3.4)	187	(2.8)
Indiana	23	**1,341**	**(1.3)**	98	(0.5)	1,208	(1.5)	290	(1.4)	35	(0.5)
Iowa	27	**1,000**	**(1.0)**	55	(0.3)	934	(1.2)	271	(1.3)	11	(0.2)
Kansas	34	**512**	**(0.5)**	101	(0.5)	385	(0.5)	117	(0.5)	26	(0.4)
Kentucky	17	**1,908**	**(1.8)**	60	(0.3)	1,834	(2.3)	510	(2.4)	14	(0.2)
Louisiana	36	**439**	**(0.4)**	65	(0.3)	361	(0.5)	82	(0.4)	13	(0.2)
Maine	37	**350**	**(0.3)**	15	(0.1)	303	(0.4)	101	(0.5)	32	(0.5)
Maryland	20	**1,546**	**(1.5)**	290	(1.5)	953	(1.2)	285	(1.3)	303	(4.5)
Massachusetts	13	**2,290**	**(2.2)**	353	(1.8)	1,872	(2.4)	536	(2.5)	65	(1.0)
Michigan	9	**3,601**	**(3.4)**	199	(1.0)	3,338	(4.2)	874	(4.1)	64	(1.0)
Minnesota	22	**1,372**	**(1.3)**	191	(1.0)	1,105	(1.4)	288	(1.4)	76	(1.1)
Mississippi	47	**56**	**(0.1)**	26	(0.1)	30	(0)	6	(0)	0	(0)
Missouri	19	**1,647**	**(1.6)**	91	(0.5)	1,537	(1.9)	404	(1.9)	19	(0.3)
Montana	50	**20**	**(0)**	12	(0.1)	0	(0)	0	(0)	8	(0.1)
Nebraska	28	**996**	**(0.9)**	74	(0.4)	915	(1.2)	277	(1.3)	7	(0.1)
Nevada	25	**1,185**	**(1.1)**	471	(2.4)	626	(0.8)	132	(0.6)	88	(1.3)
New Hampshire	31	**724**	**(0.7)**	37	(0.2)	683	(0.9)	223	(1.0)	4	(0.1)
New Jersey	16	**1,926**	**(1.8)**	723	(3.7)	1,170	(1.5)	325	(1.5)	33	(0.5)
New Mexico	42	**238**	**(0.2)**	56	(0.3)	170	(0.2)	42	(0.2)	12	(0.2)
New York	3	**6,586**	**(6.3)**	1,517	(7.8)	4,928	(6.2)	1,515	(7.1)	141	(2.1)
North Carolina	11	**2,793**	**(2.7)**	189	(1.0)	2,590	(3.3)	673	(3.2)	14	(0.2)
North Dakota	35	**507**	**(0.5)**	7	(0)	494	(0.6)	130	(0.6)	6	(0.1)
Ohio	15	**2,006**	**(1.9)**	176	(0.9)	1,765	(2.2)	518	(2.4)	65	(1.0)
Oklahoma	39	**288**	**(0.3)**	83	(0.4)	176	(0.2)	31	(0.1)	29	(0.4)
Oregon	29	**845**	**(0.8)**	168	(0.9)	661	(0.8)	217	(1.0)	16	(0.2)
Pennsylvania	10	**2,821**	**(2.7)**	293	(1.5)	2,494	(3.2)	744	(3.5)	34	(0.5)
Rhode Island	41	**252**	**(0.2)**	42	(0.2)	210	(0.3)	71	(0.3)	0	(0)
South Carolina	45	**174**	**(0.2)**	42	(0.2)	128	(0.2)	28	(0.1)	4	(0.1)
South Dakota	33	**534**	**(0.5)**	14	(0.1)	514	(0.7)	163	(0.8)	6	(0.1)
Tennessee	18	**1,720**	**(1.6)**	115	(0.6)	1,568	(2.0)	378	(1.8)	37	(0.6)
Texas	2	**10,289**	**(9.8)**	1,304	(6.7)	8,790	(11.1)	2,398	(11.2)	195	(2.9)
Utah	21	**1,500**	**(1.4)**	80	(0.4)	1,382	(1.8)	338	(1.6)	38	(0.6)
Vermont	38	**337**	**(0.3)**	4	(0)	333	(0.4)	86	(0.4)	0	(0)
Virginia	12	**2,505**	**(2.4)**	423	(2.2)	1,929	(2.4)	544	(2.6)	153	(2.3)
Washington	6	**3,814**	**(3.6)**	708	(3.7)	2,915	(3.7)	816	(3.8)	191	(2.9)
West Virginia	48	**44**	**(0)**	14	(0.1)	30	(0)	4	(0)	0	(0)
Wisconsin	30	**757**	**(0.7)**	105	(0.5)	612	(0.8)	187	(0.9)	40	(0.6)
Wyoming	51	**12**	**(0)**	10	(0.1)	0	(0)	0	(0)	2	(0)
Other§	—	**530**	**(0.5)**	437	(2.3)	5	(0)	1	(0)	88	(1.3)
Total	—	**104,954**	**(100.0)**	**19,358**	**(100.0)**	**78,899**	**(100.0)**	**21,319**	**(100.0)**	**6,697**	**(100.0)**

* Refugee arrivals include Iraqis and Afghans with special immigrant visas.
† Asylees, parolees, and unknown.
§ Includes Guam, Puerto Rico, U.S. Marshall Islands, and U.S. Virgin Islands.

TABLE 6. Number and percentage immigrants, refugees, and persons with other visa types with Class A and Class B medical conditions arriving in the United States, by medical condition and visa type — Electronic Disease Notification system, United States, 2009

Medical condition	Immigrant (N = 19,358)		Refugee* (N = 21,193)		Other† (N = 864)		Total (N = 41,415)	
	No.§	(%)	No.§	(%)	No.§	(%)	No.§	(%)
Class A¶,§								
Total	**184**	**(1.0)**	**206**	**(1.0)**	**15**	**(1.7)**	**405**	**(1.0)**
Tuberculosis: active	14	(0.1)	5	(0)	1	(0)	**20**	**(0)**
Syphilis	4	(0)	0	(0)	0	(0)	**4**	**(0)**
Chancroid	0	(0)	1	(0)	0	(0)	**1**	**(0)**
Gonorrhea	0	(0)	0	(0)	0	(0)	**0**	**(0)**
Granuloma	0	(0)	0	(0)	0	(0)	**0**	**(0)**
Lymphogranuloma	0	(0)	1	(0)	0	(0)	**1**	**(0)**
HIV	166	(0.9)	186	(0.9)	14	(1.6)	**366**	**(0.9)**
Hansen's disease	0	(0)	1	(0)	0	(0)	**1**	**(0)**
Addiction or abuse of specific substance without harmful behavior**	2	(0)	10	(0)	0	(0)	**12**	**(0)**
Any physical or mental disorder (likely to recur)††	2	(0)	7	(0)	1	(0.1)	**10**	**(0)**
Class B¶,§								
Total	**19,025**	**(98.3)**	**21,119**	**(99.7)**	**850**	**(98.4)**	**40,994**	**(99.0)**
Tuberculosis: active, noninfectious and inactive§§	18,112	(93.6)	5,041	(23.8)	168	(19.4)	**23,321**	**(56.3)**
Syphilis	108	(0.6)	131	(0.6)	9	(1.0)	**248**	**(0.6)**
Other sexually transmitted infections	8	(0)	5	(0)	0	(0)	**13**	**(0)**
Pregnancy	198	(1.0)	528	(2.5)	22	(2.5)	**748**	**(1.8)**
Hansen's disease, previous treatment	2	(0)	4	(0)	0	(0)	**6**	**(0)**
Hansen's disease, paucibacillary	0	(0)	0	(0)	0	(0)	**0**	**(0)**
Remission of addiction¶¶	7	(0)	23	(0.1)	0	(0)	**30**	**(0.1)**
Any physical or mental disorder (unlikely to recur)***	71	(0.4)	689	(3.3)	10	(1.2)	**770**	**(1.9)**
Other Class B†††	12,263	(63.3)	19,587	(92.4)	739	(85.5)	**32,589**	**(78.7)**

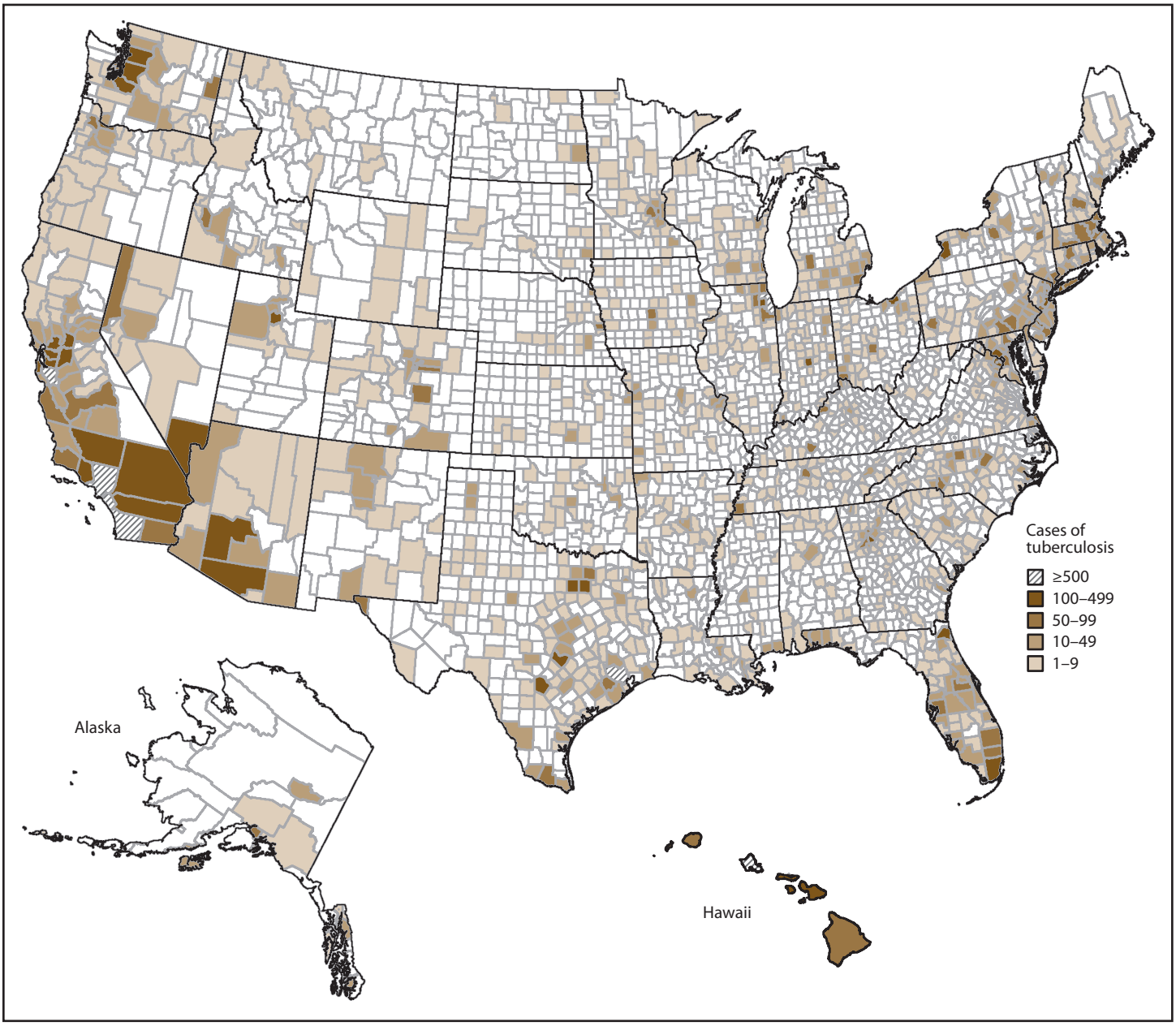
* Refugee arrivals include Iraqis and Afghans with special immigrant visas.
† Asylees, parolees, and unknown.
§ Counts are not mutually exclusive.
¶ Class A and B conditions are not mutually exclusive. A person can be classified as having both Class A and B conditions as well as multiple Class A and B conditions.
** Specific substances include amphetamines, cannabis, cocaine, hallucinogens, inhalants, opioids, phencyclidines, sedative-hypnotics, and anxiolytics.
†† Any physical or mental disorder (including other substance-related disorder) with harmful behavior or history of such behavior that is likely to recur.
§§ Class B tuberculosis was defined as radiographic tuberculosis without a positive sputum smear or culture for tuberculosis (B1), or latent tuberculosis infection (B2), or contact with a person with a case of tuberculosis and includes extrapulmonary classification.
¶¶ Sustained, full remission of addiction or abuse of specific substances.
*** Any physical or mental disorder (excluding addiction of abuse of specific substance but including other substance-related disorder) without harmful behavior or history of such behavior that is unlikely to recur.
††† Conditions that were marked as other Class B and described in the open remarks section of the worksheets. These data are not quantifiable.

domestic medical evaluation offers refugees the continuum of health and well-being required for and supportive of successful resettlement. CDC recommends that all those with tuberculosis classifications be contacted to initiate a medical evaluation within 30 days of arrival and that the evaluation be completed within 90 days (*24*); EDN provides medical and contact information for state and local health officials to facilitate these evaluations.

During 2009, state and local health departments received 104,954 notifications of arrivals of refugees and of immigrants with medical conditions; a low percentage (0.4%) with Class A waivers had inadmissible medical conditions. This information equipped public health officials with timely data to rapidly identify and intervene with persons with active disease, such as HIV infection, and to identify those who needed follow-up to prevent recurrence or development of tuberculosis. During 2009, delays in providing notifications of all newly arriving refugees and immigrants with medical conditions to states occurred, likely because of an unexpected 28% increase in the number of latent tuberculosis infection referrals from the previous year resulting from the implementation of new tuberculosis technical instructions (i.e., CDOT) in originating countries and a 19.4% increase in refugee arrivals (74,062) compared with the previous fiscal year (60,108) (*25*). These increases in classifications and delays warranted improvements such as additional procedures and staff in the EDN data entry center.

EDN also provides surveillance data that can be used to monitor communicable diseases of public health significance among newly arriving immigrants and refugees. During 2009, most (23,363) Class B notifications were for persons with suspected tuberculosis (noninfectious at the time of the overseas medical examination), such as persons with chest radiograph findings consistent with tuberculosis but with negative sputum smears and cultures for acid-fast bacilli or persons who were a

FIGURE 4. Number of notifications for suspected tuberculosis classifications,* by county — Electronic Disease Notification system, United States, 2009



Abbreviation: CDOT = culture and directly observed therapy.

* Class B tuberculosis was defined as chest radiograph findings consistent with tuberculosis without a positive sputum smear or culture (B1), latent tuberculosis infection (B2), or contact with a person with a case of tuberculosis. Class B1, 1991: chest radiograph findings consistent with active tuberculosis without a positive sputum smear; CDOT: chest radiograph findings consistent with tuberculosis without a positive sputum smear or culture. Class B2, 1991: chest radiograph findings consistent with inactive tuberculosis without a positive smear; 2007: latent tuberculosis infection.

contact of a person with tuberculosis disease. Of these, 75% were reported as having initiated a follow-up examination within 30 days after arriving in the United States. This tuberculosis screening that occurs after arrival (*2*) provides EDN with results of the tuberculin skin test, interferon-gamma release assay, a comparison of overseas and domestic chest radiographs, sputum microscopy and bacteriology, and tuberculosis treatment. Linking the results of domestic and overseas tuberculosis examinations permits monitoring and evaluation of the overseas screening program to ensure refugees and immigrants are receiving appropriate evaluations and care.

EDN also attempts to obtain a vaccination history (Vaccination Documentation Worksheet, DS-3025) and medical history (Medical History and Physical Examination,

TABLE 7. Number and percentage of immigrants, refugees,* and persons with other visa types† with tuberculosis classifications arriving in the United States, by percentage of follow-up and by Class B classification — Electronic Disease Notification system, United States, 2009

Destination state/area	Ranking, by total no. tuberculosis classification notifications	Total tuberculosis classification notifications		Classification used to assign a Class B condition for tuberculosis					Reported tuberculosis follow-up (%)¶
				1991 tuberculosis technical instructions§		CDOT§			
				B1	B2	B1	B2	B3	
		No.	(%)	(%)	(%)	(%)	(%)	(%)	
Alabama	41	**50**	**(0.2)**	(2.0)	(24.0)	(48.0)	(26.0)	—	(80.8)
Alaska	29	**144**	**(0.6)**	(4.2)	(3.5)	(41.0)	(51.4)	—	(84.0)
Arizona	9	**589**	**(2.5)**	(3.2)	(2.7)	(60.3)	(31.7)	(1.9)	(95.3)
Arkansas	39	**51**	**(0.2)**	(3.9)	(5.9)	(51.0)	(39.2)	—	(41.2)
California	1	**7,006**	**(30.0)**	(2.4)	(5.3)	(51.0)	(40.8)	(0.6)	(85.8)
Colorado	19	**303**	**(1.3)**	(3.0)	(5.9)	(58.7)	(31.7)	(0.7)	(97.0)
Connecticut	32	**122**	**(0.5)**	(2.5)	(19.7)	(45.9)	(32.0)	—	(4.1)
Delaware	48	**16**	**(0.1)**		(6.3)	(37.5)	(56.3)	—	(100.0)
District Of Columbia	47	**25**	**(0.1)**	(16.0)	(4.0)	(20.0)	(60.0)	—	(0)
Florida	7	**824**	**(3.5)**	(3.5)	(12.4)	(46.7)	(36.2)	(1.1)	(93.3)
Georgia	11	**475**	**(2.0)**	(2.7)	(7.2)	(60.8)	(28.0)	(1.3)	(24.2)
Hawaii	4	**995**	**(4.3)**	(0.3)	(0.7)	(42.1)	(55.8)	(1.1)	(63.3)
Idaho	30	**134**	**(0.6)**	(3.0)	(6.7)	(56.0)	(34.3)	—	(81.5)
Illinois	6	**880**	**(3.8)**	(4.0)	(10.0)	(54.7)	(30.1)	(1.1)	(92.3)
Indiana	21	**234**	**(1.0)**	(0.9)	(4.7)	(62.4)	(30.3)	(1.7)	(68.6)
Iowa	33	**117**	**(0.5)**	(2.6)	(4.3)	(62.4)	(29.9)	—	(76.5)
Kansas	31	**125**	**(0.5)**	(2.4)	(4.0)	(49.6)	(44.0)	—	(73.2)
Kentucky	24	**201**	**(0.9)**	(1.0)	(3.0)	(52.7)	(42.8)	(0.5)	(96.1)
Louisiana	36	**82**	**(0.4)**	(1.2)	(3.7)	(64.6)	(30.5)	—	(1.2)
Maine	43	**37**	**(0.2)**		(2.7)	(73.0)	(24.3)	—	(62.2)
Maryland	16	**352**	**(1.5)**	(4.0)	(12.8)	(51.7)	(30.7)	(0.9)	(95.5)
Massachusetts	14	**435**	**(1.9)**	(5.1)	(14.0)	(40.5)	(38.6)	(1.8)	(75.2)
Michigan	17	**316**	**(1.4)**	(6.6)	(10.8)	(52.5)	(28.5)	(1.3)	(36.5)
Minnesota	20	**270**	**(1.2)**	(5.2)	(15.9)	(45.9)	(31.5)	(1.5)	(99.6)
Mississippi	46	**27**	**(0.1)**	(11.1)	(11.1)	(25.9)	(51.9)	—	(93.1)
Missouri	26	**171**	**(0.7)**	(1.8)	(7.0)	(63.2)	(27.5)	—	(17.4)
Montana	49	**14**	**(0.1)**		(7.1)	(21.4)	(71.4)	—	(0)
Nebraska	25	**174**	**(0.7)**	(4.0)	(5.2)	(56.9)	(31.6)	(2.3)	(36.2)
Nevada	12	**466**	**(2.0)**	(1.5)	(3.4)	(56.0)	(38.4)	(0.6)	(89.4)
New Hampshire	34	**103**	**(0.4)**	(4.9)	(8.7)	(63.1)	(23.3)	—	(38.8)
New Jersey	8	**787**	**(3.4)**	(4.7)	(15.0)	(44.7)	(34.8)	(0.8)	(93.8)
New Mexico	37	**62**	**(0.3)**	(4.8)	(3.2)	(33.9)	(56.5)	—	(53.2)
New York	2	**1,885**	**(8.1)**	(6.6)	(13.5)	(36.5)	(42.2)	(1.3)	(88.4)
North Carolina	15	**355**	**(1.5)**	(3.4)	(5.1)	(54.4)	(34.6)	(2.5)	(78.4)
North Dakota	44	**34**	**(0.1)**	—	(2.9)	(61.8)	(29.4)	(2.9)	(85.7)
Ohio	18	**308**	**(1.3)**	(4.2)	(10.1)	(54.2)	(30.2)	(1.0)	(95.8)
Oklahoma	35	**96**	**(0.4)**	(2.1)	(11.5)	(59.4)	(26.0)	(1.0)	(61.2)
Oregon	22	**219**	**(0.9)**	(4.1)	(8.7)	(45.7)	(40.2)	(1.4)	(95.5)
Pennsylvania	13	**440**	**(1.9)**	(5.7)	(11.6)	(52.3)	(29.8)	(0.5)	(45.7)
Rhode Island	38	**52**	**(0.2)**	(5.8)	(5.8)	(34.6)	(51.9)	(1.9)	(98.1)
South Carolina	39	**51**	**(0.2)**	—	(7.8)	(47.1)	(41.2)	(3.9)	(98.0)
South Dakota	42	**49**	**(0.2)**	(4.1)	(4.1)	(42.9)	(49.0)	—	(98.0)
Tennessee	23	**216**	**(0.9)**	(3.7)	(6.0)	(56.5)	(30.1)	(3.2)	(93.6)
Texas	3	**1,872**	**(8.0)**	(2.0)	(4.8)	(54.1)	(38.0)	(0.9)	(41.4)

See footnotes on page 18.

DS-3026). These data are not included in this report because they were incomplete for 2009. Beginning in 2010, data on vaccination and medical history were entered into the EDN system. In addition, vaccination for refugees and therefore the vaccination history (DS-3025) is not always completed.

Communicable diseases are a major cause of morbidity and death among refugee populations (*26*). Before the EDN system was fully functional, contact information for refugees who had recently arrived and potentially been exposed to communicable diseases related to outbreaks in the host country was compiled manually through correspondence with the DOS Bureau of Population and Refugee Migration and IOM. This resulted in less timely notification and the potential for the secondary spread of disease within the United States. During 2004–2007, CDC responded to 19 outbreaks of nine vaccine-preventable diseases such as varicella among refugees bound for

TABLE 7. (*Continued*) Number and percentage of immigrants, refugees,* and persons with other visa types† with tuberculosis classifications arriving in the United States, by percentage of follow-up and by Class B classification — Electronic Disease Notification system, United States, 2009

Destination state/area	Ranking, by total no. tuberculosis classification notifications	Total tuberculosis classification notifications		Classification used to assign a Class B condition for tuberculosis					Reported tuberculosis follow-up (%)¶
				1991 tuberculosis technical instructions§		CDOT§			
				B1	B2	B1	B2	B3	
		No.	(%)	(%)	(%)	(%)	(%)	(%)	
Utah	27	159	(0.7)	(3.1)	(6.9)	(46.5)	(42.1)	(1.3)	(95.6)
Vermont	45	32	(0.1)	—	(3.1)	(68.8)	(25.0)	(3.1)	(93.8)
Virginia	10	485	(2.1)	(3.5)	(9.3)	(51.5)	(33.8)	(1.2)	(25.9)
Washington	5	918	(3.9)	(4.4)	(10.8)	(48.3)	(33.6)	(2.9)	(93.1)
West Virginia	50	12	(0.1)	(8.3)	(8.3)	(33.3)	(50.0)	—	(58.3)
Wisconsin	28	157	(0.7)	(4.5)	(9.6)	(47.1)	(33.8)	(5.1)	(78.5)
Wyoming	51	10	(0)	—	—	(70.0)	(30.0)	—	(100.0)
Other**	—	404	(1.7)	(1.7)	(0.7)	(41.1)	(55.0)	(1.5)	—
Total	**—**	**23,341**	**(100.0)**	**(3.2)**	**(7.5)**	**(49.9)**	**(38.2)**	**(1.1)**	**(75.4)††**

Abbreviation: CDOT = culture and directly observed therapy.

* Refugee arrivals include Iraqis and Afghans with special immigrant visas.

† Asylees, parolees, and unknown.

§ Class B1, 1991: chest radiograph findings consistent with active tuberculosis without a positive sputum smear; CDOT: chest radiograph findings consistent with tuberculosis without a positive sputum smear or culture. Class B2, 1991: chest radiograph findings consistent with inactive tuberculosis without a positive smear; 2007: latent tuberculosis infection. Class B tuberculosis was defined as chest radiograph findings consistent with tuberculosis without a positive sputum smear or culture (B1), latent tuberculosis infection (B2), or contact with a person with a case of tuberculosis (B3).

¶ Indicates that a worksheet was initiated by the health department. Tuberculosis follow-up data from some states might not have been reported in the system.

** Includes Guam, Puerto Rico, U.S. Marshall Islands, U.S. Virgin Islands, and unknown.

†† Median percentage represents instances of tuberculosis follow-up that were reported in the system.

the United States (*27*). Other examples include identification and treatment of intestinal parasites among the Lost Boys of Sudan (*28*), malaria among refugees from East Africa (*29*), and increased lead levels among Burmese refugees (*30*). The EDN system serves as a registry of all refugee arrivals. During 2009, EDN provided public health partners with contact information needed to find and evaluate refugees in the United States who were exposed to three disease outbreaks identified in their country of origin overseas before their departure for the United States.

Findings from domestic screenings have prompted several epidemiologic studies and have enhanced overseas screening recommendations (*31*,*32*). Reports of chronic abdominal pain among 462 Sudanese refugees led to a serologic assessment in 2007 that identified active schistosomiasis infections (44%) and strongyloides infections (46%) in these refugees, despite presumptive treatment (*28*). A study of 39 cases of malaria during May 2007–February 2008 among newly arriving refugees who had received presumptive treatment before leaving their country found that the disease prevalence was significantly higher among those who received sulfadoxine-pyrimethamine than among those who received artemether-lumefantrine (risk ratio: 6.2; 95% confidence interval = 3.1–12.4) (*29*). In 2008, refugee health coordinators in six states reported increased blood lead levels (i.e., >10 μg/dL) among 13% of Burmese refugee children. An additional investigation confirmed this finding, with the highest prevalence among children aged <2 years (14.5%) (*30*). Collaboration by CDC program and subject-matter staff and academic partners on evaluating the findings from these studies has led to improved health-care guidance for refugees bound for the United States, such as presumptive treatment for malaria and parasitic diseases.

Limitations

The findings in this report are subject to at least four limitations. First, the majority of immigrant records (approximately 400,000) are not collected; thus, the health status of most newly arriving immigrants cannot be described completely. Second, certain medical documents of immigrants with medical conditions are not collected or are missing at ports of entry, which might result in lower estimates of medical conditions. Third, the medical history is self-reported; thus, follow-up is necessary to identify and verify chronic health conditions. Finally, missing personal information, such as destination location, poses a challenge to timely notification and follow-up.

Conclusion

Since 2009, the EDN system has strived to improve the timeliness, accuracy, accessibility, and comprehensiveness of its data. In collaboration with the DOS Bureau of Population, Refugees, and Migration, the EDN system began acquiring

TABLE 8. Number and percentage of immigrants, refugees, and persons with other visa types with Class B tuberculosis arriving in the United States, by year of tuberculosis technical instructions, tuberculosis type and treatment, and visa type — Electronic Disease Notification System, United States, 2009

Class B tuberculosis type and treatment and year of tuberculosis technical instructions	Immigrant (N = 18,112)		Refugee* (N = 5,041)		Other† (N = 168)		Total (N = 23,321)	
	No.	(%)§	No.	(%)	No.	(%)	No.	(%)
1991								
Tuberculosis: active, noninfectious (B1)								
Total	2,604	(14.4)	603	(12.0)	29	(17.3)	**3,236**	**(13.9)**
Partial or completed treatment¶	550	(3.0)	118	(2.3)	5	(3.0)	**673**	**(2.9)**
Tuberculosis: inactive, noninfectious (B2)								
Total	2,524	(13.9)	392	(7.8)	86	(51.2)	**3,002**	**(12.9)**
Partial or completed treatment¶	565	(3.1)	22	(0.4)	21	(12.5)	**608**	**(2.6)**
Culture and directly observed therapy								
Class B1 tuberculosis, pulmonary								
Total	6,307	(34.8)	2,828	(56.1)	24	(14.3)	**9,159**	**(39.3)**
Completed treatment**	400	(2.2)	257	(5.1)	1	(0.6)	**658**	**(2.8)**
Class B2 tuberculosis, latent tuberculosis infection evaluation								
Total	6,562	(36.2)	1,084	(21.5)	28	(16.7)	**7,674**	**(32.9)**
Current or completed treatment**	75	(0.4)	0	(0)	0	(0)	**75**	**(0.3)**
Class B3 tuberculosis, contact evaluation								
Total	115	(0.6)	134	(2.7)	1	(0.6)	**250**	**(1.1)**
Current or completed treatment**	0	(0)	7	(0.1)	0	(0)	**7**	**(0.0)**

* Refugee arrivals include Iraqis and Afghans with special immigrant visas.
† Asylees, parolees, and unknown.
§ Percentages might not add to 100% due to rounding.
¶ Partial or completed treatment as reported by applicant.
** Current or completed treatment administered by panel physician.

direct data for every newly arriving refugee and notifying health departments of these arrivals within 5–7 days. Also, U.S. destination information is more accurate than it was previously. The EDN system experienced an increase in the number of users from 438 in 2009 to 719 in 2013, and the number of jurisdictions notified increased from 233 in 2009 to 283 in 2013. The EDN system allows a clinic or health-care provider read-only access to overseas medical records of persons arriving in their local community. To ensure that medical information for refugees is as complete as possible during their U.S. medical examination, the EDN system includes information on any vaccinations and predeparture medical interventions such as presumptive treatment for malaria and intestinal parasites provided by IOM.

Fulfilling CDC's mission to protect the public from emerging and reemerging diseases depends, in part, on data obtained from the overseas medical examinations of all newly arriving refugees and immigrants with medical conditions. Public health officials rely on EDN data to track new arrivals who might have been exposed to a disease such as tuberculosis, which allows for interventions to safeguard the public from imported communicable diseases. The overseas medical evaluation is a critical component in reducing the importation of communicable diseases into the United States. Documentation of findings from the medical examination combined with tuberculosis (and other diseases and conditions) follow-up data after arrival in EDN allows for the evaluation of that data, the identification of disease trends among arriving refugee populations, and the provision of evidence-based recommendations to federal, state, and local public health officials, as well as to the international public health community.

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