

Section 10

Travel-Related Illnesses

Background

With the ease of international travel and the large number of tourists that visit Florida each year, there is significant potential for the importation of diseases into the state. Travelers are an epidemiologically important population because of their mobility, their potential for exposure to diseases outside their home state or country, and the possibility that they may carry non-endemic diseases between states or countries. Travelers represent a unique subset of people. Their exposures, behaviors, and disease susceptibility may differ dramatically from those of the local population. Travelers themselves are a heterogeneous group, and different subgroups of travelers may have different risks due to types of activities, behaviors, and other factors.

The risk of travel-related illness varies depending on destination and traveler characteristics. It can be difficult to obtain good travel-related illness data. Many travelers who become infected have returned to their home countries by the time symptoms develop, so they will not be included in the visited country's surveillance data. Similarly, diseases with short incubation periods or brief durations may have resolved by the time a traveler returns home and thus may not be counted in surveillance data of the traveler's country of origin. If the illness is mild, the traveler may never seek health care, or diagnostic tests may not be performed to accurately diagnose the cause. Additionally, travelers often visit multiple locations and it may be difficult to determine the location where the exposure occurred. Travel-specific factors to consider include trip length, destinations, specific travel itineraries, use of preventive measures, and purpose of travel.

The Florida Department of Health collects travel information on people with reportable diseases to determine where their likely exposure occurred. Travel-related data collection is integrated into surveillance activities to identify patterns that will inform targeted prevention measures and estimate the burden of travel-related diseases and conditions. For example, Zika virus emerged as a public health threat in Central and South America and the Caribbean, and 1,122 travel-related Zika virus cases were reported in Florida in 2016. As a result of some of these introductions, ongoing local transmission of Zika virus occurred in four different parts of Miami-Dade County in 2016. Identification of populations that were more likely to both introduce and support increased risk of further transmission of Zika virus was an integral part of surveillance and prevention strategies.

Methods

In Florida, data for over 80 reportable diseases and conditions are entered, managed, and analyzed within the reportable diseases surveillance system, Merlin. Data for HIV, sexually transmitted disease, tuberculosis, cancer, and congenital anomalies are not maintained in Merlin and were not included in this analysis. Exposure information was used to classify all cases in as exposed in Florida, exposed in another U.S. state or territory, or exposed outside the U.S. Confirmed and probable cases of diseases and conditions reported in Merlin from 2007 to 2016 were reviewed and summarized according to their exposure categories and locations where acquired. Specific exposure locations were reviewed for 2016 cases with travel-related illnesses. Chronic hepatitis and hepatitis B in pregnant women were excluded from all analysis, since it is difficult to determine when and where a person was exposed with these chronic diseases. Only cases reported in Florida residents were included, with the exception of Zika virus cases, which included non-Florida residents as well.

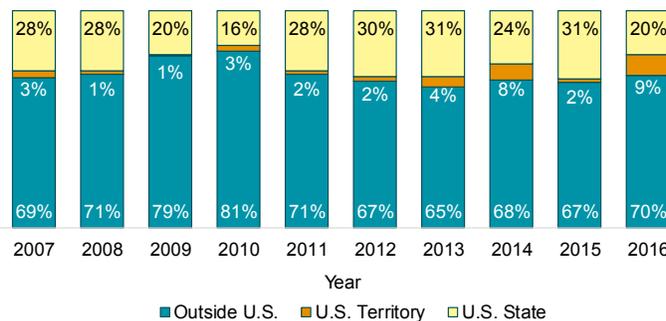
General Trends

The number of reportable diseases captured in Merlin each year increased ~20% from 2007 to 2016 with over 21,000 cases reported in 2016 (excluding chronic hepatitis). Generally, 6-8% of cases each year were associated with travel-related illnesses. Peaks occurred in 2010 and 2016, when 10% and 13% of cases were associated with travel-related illnesses, respectively. In 2016, 2,756 cases associated with travel-related illness were reported. The increase relative to previous years was due to 1,122 travel-related Zika virus cases identified in Florida. Factors contributing to the increase in illnesses acquired outside Florida in 2010 include a large earthquake in Haiti that occurred on January 12, 2010, creating enormous devastation. Florida's proximity to Haiti resulted in more than 22,000 people entering Florida from Haiti as part of federal repatriation and humanitarian parolee efforts. The

number of reportable disease and condition cases identified in people with exposures in Haiti more than doubled from the previous year (114 cases identified in 2009, 253 cases in 2010, 111 cases in 2011). Another contributing factor was a change in the giardiasis case definition in 2010, which allowed for asymptomatic infections to be counted as confirmed cases. Asymptomatic infections are commonly identified as part of refugee health screening. In 2011, the case definition reverted back to requiring symptoms to meet the surveillance case definition. As a result, there was a large spike in giardiasis cases reported in 2010 relative to other years.

Over the past 10 years, 71% of cases with travel-related illnesses were exposed outside the U.S., though this varies annually from a low of 65% in 2007 to a high of 81% in 2010 (Figure 1). Generally, 1-2% of cases with travel-related illnesses were exposed in U.S. territories each year. The number and percentage of cases exposed in U.S. territories increased in 2013, 2014, and 2016 due to widespread transmission in Puerto Rico of dengue fever, chikungunya fever, and Zika fever, respectively.

Figure 1: Percent of Travel-Related Illnesses by Exposure Location Category, Florida, 2007-2016



Note that 19 cases were excluded from Figure 1 because they fell into more than one exposure category (e.g., exposure may have occurred in another U.S. territory or outside the U.S.)

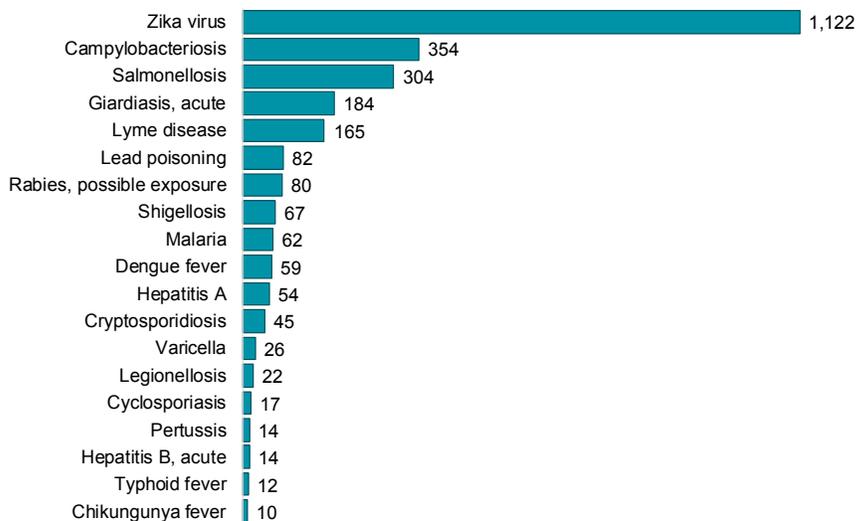
Summary of 2016 Data

Nineteen diseases accounted for 98% of the 2,756 cases with travel-related illnesses reported in 2016 (Figure 2). There were <10 cases with travel-related illnesses reported for each of 22 diseases which were excluded in the subsequent summaries here based on the low number of cases that were travel-associated.

Areas of endemicity contribute to travel-related infection patterns and vary by disease; some diseases are endemic in other parts of the U.S., and others are more commonly seen in other U.S. territories or countries.

However, travel-related infection patterns can also reflect travel patterns among people. Illnesses acquired in other southern U.S. states are likely to be identified in Florida residents due to proximity and frequency of travel. Florida has a large Hispanic population, and travel between Florida and Central and South America, Mexico, and the Caribbean is very common. The large numbers of travelers to and from these areas contribute to the number of cases associated with travel-related illnesses reported in Florida.

Figure 2: Number of Travel-Related Illnesses by Disease for Diseases With ≥10 Travel-Related Cases (N=2,693), Florida, 2016

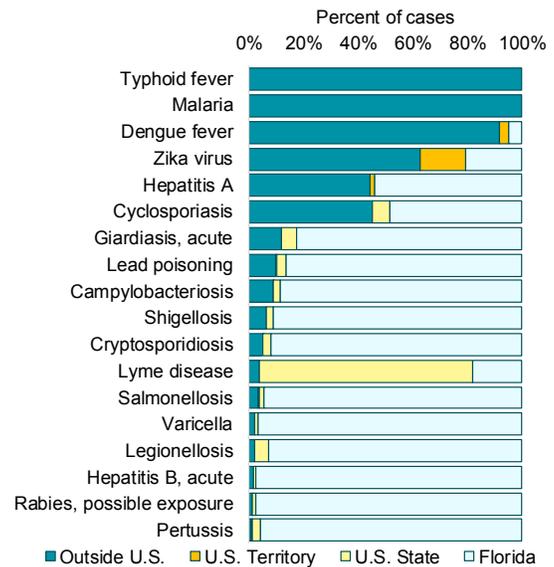


Travel-Related Illnesses

Disease cases reported in Florida in 2016 that were primarily acquired outside the U.S. included typhoid fever (100%), malaria (100%), chikungunya fever (100%), dengue fever (92%), and Zika virus (60%) (Figure 3). For many diseases and conditions of frequent occurrence, the majority of the cases are acquired in Florida. Due to the high volume of these diseases, the number of cases that were exposed outside Florida, while only a small percentage of total cases reported, contributes substantially to the volume of cases with travel-related illnesses. These diseases tend to be common in other parts of the U.S. and the world, so the distribution of exposure locations for some of these diseases is less likely to represent patterns of disease endemicity and more likely to reflect travel patterns among people. Examples of these diseases and conditions include acute hepatitis B, campylobacteriosis, cryptosporidiosis, salmonellosis, shigellosis, pertussis, varicella, legionellosis, and possible exposure to rabies. Zika virus transmission was widespread in Puerto Rico in 2016, with over 34,000 symptomatic cases reported to the Centers for Disease Control and Prevention. Travelers exposed in Puerto Rico accounted for 20% of the 1,122 travel-related Zika disease and infection cases identified in Florida in 2016 and 91% of all cases with travel-related illnesses exposed in a U.S. territory in 2016. Lyme disease is the most common tick-borne disease in the U.S. and is highly endemic in states in the northeast and upper midwestern U.S. In 2016, 73% of Lyme disease cases were exposed in U.S. states.

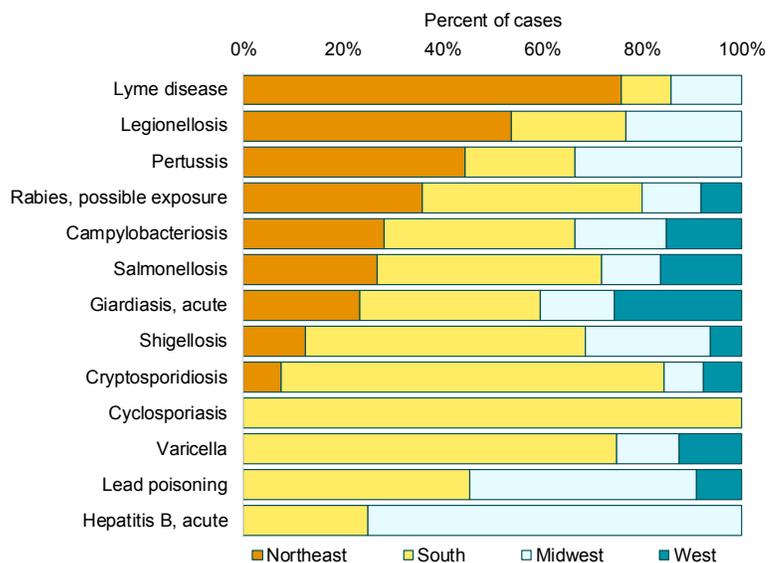
More than 40% of cases with travel-related illnesses exposed in known U.S. states outside of Florida were exposed in the northeast, though this percentage varies dramatically by disease (Figure 4). The percent of cases exposed in the northeast is over 40% for Lyme disease (76%), legionellosis (54%), and pertussis (44%). Other diseases and conditions have more cases exposed in the south, including cyclosporiasis (100%), cryptosporidiosis (77%), varicella (75%), shigellosis (56%), lead poisoning (45%), salmonellosis (45%), and possible exposure to rabies (44%).

Figure 3: Percent of Travel-Related Illnesses by Exposure Location Category for Diseases With ≥10 Travel-Related Cases (N=2,693), Florida, 2016



Note that the exposure category was known for 2,677 cases of travel-related illnesses in 2016. In addition to these cases, an additional 16 cases were known to be exposed outside of Florida, but the location was unknown (i.e., another U.S. state, U.S. territory, or outside the U.S.). An additional 772 cases of these diseases did not have any exposure information. These cases are excluded from this figure.

Figure 4: Percent of Cases Exposed in U.S. States Outside Florida for Diseases With ≥10 Travel-Related Cases (N=526) by Region, Florida, 2016

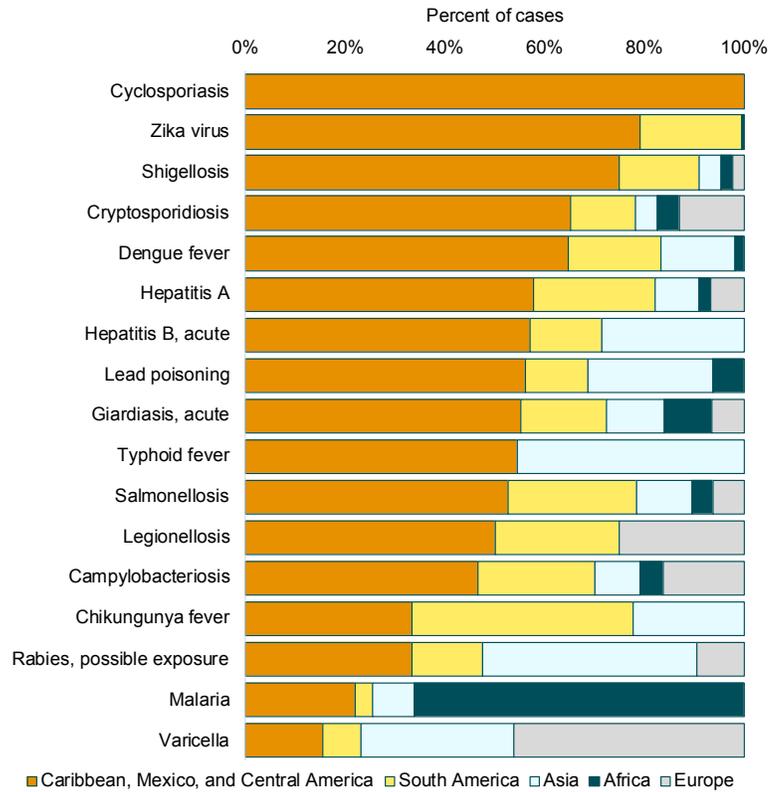


Note that 526 travel-related cases were exposed in U.S. states outside Florida. This includes 64 cases where the exact state was unknown and 11 cases with exposures in multiple regions. These 75 cases are excluded from this figure.

U.S. Census Bureau regions were used for this figure (map available at www.census.gov/geo/reference/webatlas/regions.html).

Over 60% of cases with travel-related illnesses exposed in known countries outside the U.S. were exposed in the Caribbean, Mexico, and Central America (Figure 5). Exposures in Asia were common for typhoid fever (45%), possible exposure to rabies (43%), varicella (31%), acute hepatitis B (29%), and lead poisoning (25%). Exposures in Africa were common for malaria (66%).

Figure 5: Percent of Cases Exposed Outside the U.S. for Diseases With ≥10 Travel-Related Cases (N=1,894) by Region, Florida, 2016



Note that 1,894 travel-related cases were exposed outside the U.S. This includes 144 cases where the exact country was unknown, 223 cases with exposures in multiple regions, and 35 cases exposed in other regions not captured in this figure. These 402 cases are excluded from this figure.