Annual Report of Communicable Diseases in San Francisco 2016

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Communicable Disease Control & Prevention
San Francisco Department of Public Health

Cora Hoover, MD, MPH
Director, Communicable Disease Control and Prevention
San Francisco Department of Public Health

Tomás J. Aragón, MD, DrPH
Health Officer, City and County of San Francisco
Director, Population Health Division
San Francisco Department of Public Health

Barbara A. Garcia, MPA
Director
San Francisco Department of Public Health

POPULATION HEALTH DIVISION
SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH

This annual report summarizes notifiable disease reports received by the Communicable Disease Control Unit (CDCU) of the San Francisco Department of Public Health (SFDPH) during 2016. In addition, five diseases were selected for demographic profiling on the basis of the annual burden and severity of disease, public health impact, and specific interest to community health programs. Readers can access previous reports at http://www.sfcdcp.org for historical context of disease incidence in San Francisco. Notifiable disease reports managed by other SFDPH sections are not represented here, i.e., tuberculosis, human immunodeficiency virus (HIV), acquired immunodeficiency syndrome (AIDS) and sexually transmitted diseases (STDs) which are managed, respectively, by Tuberculosis Control, HIV Surveillance and STD Prevention and Control Sections.

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San Francisco Department of Public Health at 101 Grove Street (1935)

Methods and Definitions

Data Collection

This report includes confirmed and probable reports of disease among San Francisco residents reported to SFDPH from January 1, 2016 through December 31, 2016*. San Francisco health care providers, laboratories and other mandated reporters are required under Title 17, California Code of Regulations (CCR) (§2500, §2505, §2593, §2641-2643, §2800-2812)[1], to notify the local health authority of the diagnosis, detection or suspicion of certain diseases and conditions. Reports are confidentially received by fax, telephone, postal mail, or secure electronic file transfer. Reports by fax and postal mail are generally submitted using the California Confidential Morbidity Report (CMR) form[2]. Limited case demographic and clinical information is provided on the CMR. Depending on the disease or condition, disease control staff attempt to contact the health care provider, laboratory and/or patient for follow-up and implementation of disease control measures. Clinical and risk factor data are subsequently collected according to departmental and state protocols. Data were managed with locally designed databases.

The chronic hepatitides are managed by the Viral Hepatitis Surveillance Team.

Notifiable diseases managed by other SFDPH sections (HIV Surveillance, Environmental Health, STD Prevention and Control, and Tuberculosis Control) are not presented in this report:

- Acquired Immune Deficiency Syndrome (AIDS)
- Chancroid
- *Chlamydia trachomatis* infections
- Gonococcal Infections
- Hepatitis B, chronic
- Hepatitis C infection, past or present
- Human Immunodeficiency Virus (HIV)
- Lymphogranuloma Venereum (LGV)
- Pelvic Inflammatory Disease (PID)
- Pesticide-related illness or injury
- Syphilis
- Tuberculosis

*Disease incidents of confirmed and probable diseases were included in this report for all diseases, except animal rabies (only confirmed cases were reported), salmonellosis (confirmed, probable, and suspect cases), and shigellosis (confirmed, probable, and suspect cases). The laboratory criteria for case definitions for these suspect cases of disease include detection from a clinical specimen using a non-culture based method. See Notes on Surveillance Data for further discussion of culture-independent diagnostic testing.

Population Under Surveillance

CDCU reports cases of CCR Title 17 reportable diseases among residents living in the City and County of San Francisco. Cases of reportable diseases reported to CDCU occurring in non-residents are considered “out of jurisdiction,” are referred to their respective jurisdictions of residency for follow-up, and are not included in this report.

San Francisco population estimates were obtained from the California Department of Finance (DOF) Demographic Research Unit[3]; DOF estimates are based on the U.S. Census counts. This report uses DOF projections produced in 2014 for the 2016 San Francisco population; the population count is estimated to be 857,104 (Table 5)[3].

Racial and Ethnic Categorization

People were classified as one of the following: American Indian/Alaska Native, Asian/Pacific Islander, African American (Black), Hispanic, or White. A person with Hispanic ethnicity, regardless of race, was classified as Hispanic, while Non-Hispanics were categorized by their race designation. Occasionally, patients were classified as Other race. Because the category Other is not clearly defined and no reliable San Francisco population estimate exists for it, race-specific rates were not calculated for this population group. Only the frequency values for the race Other were included in the incidence tables.

In 2000, the United States Census Bureau began allowing multiple race designations for its decennial population census; therefore, the California DOF population estimates also include an additional race category, Multiple Race. Because CDCU only collects a single race designation, a bridging method established by the California DOF was used to reallocate the population in the Multiple Race category to single race categories[4]. This method provides reproducible denominators for calculating race-stratified incidence rates.

Demographic Data

Depending on the disease, demographic information was usually ascertained through patient interviews, medical chart abstraction or health care provider interviews. Because not all individual cases of disease are investigated by the local health department (e.g., campylobacteriosis), completeness varied by disease.

Age was calculated by subtracting the date of birth from the date of notification to SFDPH, then dividing the difference by 365.25 (the 0.25 accounts for leap years). Numerical values for age were also routinely collected and entered into the database. If either date used in the age formula was missing but a numerical age was recorded, then this age was used in analyses. The frequency of cases with missing or unknown sex or race/ethnicity information is included in the tables.

Notifiable Disease Definitions

The diseases required to be reported to public health and disease definitions can change over time. Changes in disease definitions can impact the numbers of cases of disease reported to the SFDPH.

Please see this report's appendices for a list of notifiable disease definition changes from 2004 to 2016 and definitions for select notifiable diseases. Changes in notifiable disease definitions from 1986 to 2003 are documented in The San Francisco Communicable Disease Report 1986-2003 (May 2005), accessible at: https://www.sfcdcp.org/communicable-disease/publications-data-and-reports/ .

Statistical Calculations

SAS version 9.3 (SAS Institute Inc., Cary, NC) was used to calculate crude incidence rates, age-specific rates, three-year moving averages and confidence intervals. For this report, the crude incidence rate (IR) is defined as the number of new cases of disease per 100,000 residents at risk during a given year. The denominator for all diseases, except infant botulism, congenital rubella, influenza deaths for people aged 0-64 years, and invasive *H. influenzae* is the total San Francisco population. The population at risk for infant botulism and congenital rubella is San Francisco residents less than one year of age. For invasive *H. influenzae,* it is persons less than 5 years of age; and for influenza deaths, it is persons 0-64 years of age.

Age-adjusted rates were not calculated. Rates and proportions were generally rounded to one decimal place.

Formula 1.

$$IR = \left(n \big/ p \right) \times 100{,}000$$

where *n*= Number of Cases and *p*=Population at Risk, and each is identified for a one-year period.

Example: In 2016, there were 154 female cases of campylobacteriosis in San Francisco. The estimated number of female residents in 2016 was 423,191. Accordingly, the incidence among females was:

$$IR_{Campy\,2016_{Females}} = \left(154 \big/ 423{,}191 \right) \times 100{,}000 = 36.4$$

cases per 100,000 population.

Reliability of Rates

With rare diseases or with diseases where the number of cases for a particular population group is very small, a minor change in the number of incident cases can result in a relatively large shift in the corresponding rate. Rates and percentages based on a small number of events may be unreliable and are generally subject to substantial variability over time. Unstable rates should not be statistically compared for differences with the rates for other populations or for San Francisco over time. Rates with a relative standard error (RSE) of 23% or greater were considered unstable and identified by an asterisk in tables of this report[5]. Equivalently, numerators less than 20 result in unreliable rates.

Formula 2.

$$RSE = \left(SE_{rate} \big/ r \right) \times 100 = \left(\frac{r \big/ \sqrt{n}}{r} \right) \times 100 = \left(\sqrt{1 \big/ n} \right) \times 100$$

where *r* = Rate and SE_{rate} = Standard Error of a Rate and *n* = Number of Cases

Example: In 2016, there were 454 cases of campylobacteriosis cases reported in San Francisco and three cases of acute typhoid fever. Accordingly, the relative standard errors for campylobacteriosis and acute typhoid fever are:

$$RSE_{Campy\,2016} = \left(\sqrt{1 \big/ 454} \right) \times 100 = 4.7\ \%$$

The rate derived from the frequency of campylobacteriosis is considered stable (RSE < 23%).

$$RSE_{TyphoidFever\,2016} = \left(\sqrt{1 \big/ 3} \right) \times 100 = 57.7\%$$

The rate derived from the frequency of acute typhoid fever is not stable and is considered unreliable (RSE > 23%).

Exact Confidence Intervals

95% Exact Confidence Intervals (95% CI) for incidence rates were approximated from the gamma distribution, using the GAMINV function in SAS to calculate the Poisson confidence limits [6]. Confidence limits were rounded to one decimal place.

The confidence interval provides a useful means for evaluating the precision of a rate calculation. A rate estimate with a wide confidence interval is less precise than a rate with a narrow confidence interval. Using 2016 giardiasis cases as an example, consider the difference between incidence among residents 1 to 4 years of age (rate=11.6, 95% CI=3.2-29.7) and those aged 35-44 years (rate=29.0, 95% CI=21.0-38.9). The range of possible values among the older age group is less than the range for children 1-4 years of age. The rate among residents 35-44 years is therefore considered more precise. Rates with very large confidence intervals should be interpreted cautiously. In this report, confidence intervals are not displayed for individual cell counts with zero cases.

Aggregate Rates: Three-year moving averages

As stated above, with rare diseases or where the number of cases for a particular population group is very small, a minor change in the number of incident cases can result in a relatively large shift in the rate. One approach to minimizing the effect of large rate shifts and allowing detection of overall trends involves the calculation of moving averages. This approach can be used to compare across populations or to compare across time when the two time periods do not overlap. Calculating three-year moving averages involves summing the numerator and denominator over a three year period and dividing by three.

Rules for Data Suppression

If the number of cases for a given time period is small and enough demographic information is given, it may be possible to identify an individual case-patient from tabulated data. Therefore, the total annual incidence was required to be at least 19 cases for information about age, sex, and race/ethnicity data to be included. Of those diseases with an annual incidence of 19 or more cases, five diseases were selected for age, sex, and race/ethnicity stratification for this report. These diseases were selected due to their public health importance and/or volume of reports.

Data Limitations

The surveillance data was reported by laboratorians, clinicians and other mandated reporters to the local health authority in compliance with public health laws[1]. Reports may be incomplete and/or important demographic, clinical or risk information may not be available upon active follow-up. Because not all cases of disease were detected by the health care system and not all detected cases were reported to the public health department, the information presented in this report may underestimate the true incidence of disease.

Note to Users of this Report

Occasionally, users of this report would like to see incidence rates for specific population parameters (e.g., rate of salmonellosis in children <5 years of age in 2016). Simple calculations can be accomplished by inserting the desired incidence data provided in the tables of this report and the San Francisco population estimates from TABLE 5 into *Formula 1* above. When such calculations are used for grants or technical papers, the citation of this report must explicitly indicate that SFDPH did not perform the calculation.

Example: A grant writer wishes to know the rate of salmonellosis in San Francisco residents younger than 5 years of age in 2016. From TABLE 2, it is known that 7 cases were <1 year of age and 21 cases were 1-4 years of age. Similarly, the number of San Francisco residents in 2016 can be found in TABLE 5:

	Female	*Male*
<1 yr	4,465	4,647
1-4 yrs	16,912	17,560

Thus, the total number of cases <5 years of age = $(7 + 21) = 28$ and

the total population <5 years of age = $(4{,}465 + 16{,}912 + 4{,}647 + 17{,}560) = 43{,}584$.

Therefore, the rate of salmonellosis is

$$= \left({}^{28}\!\!\diagup\!\!_{43{,}584} \right) \times 100{,}000 = 64.2$$

cases per 100,000 population.

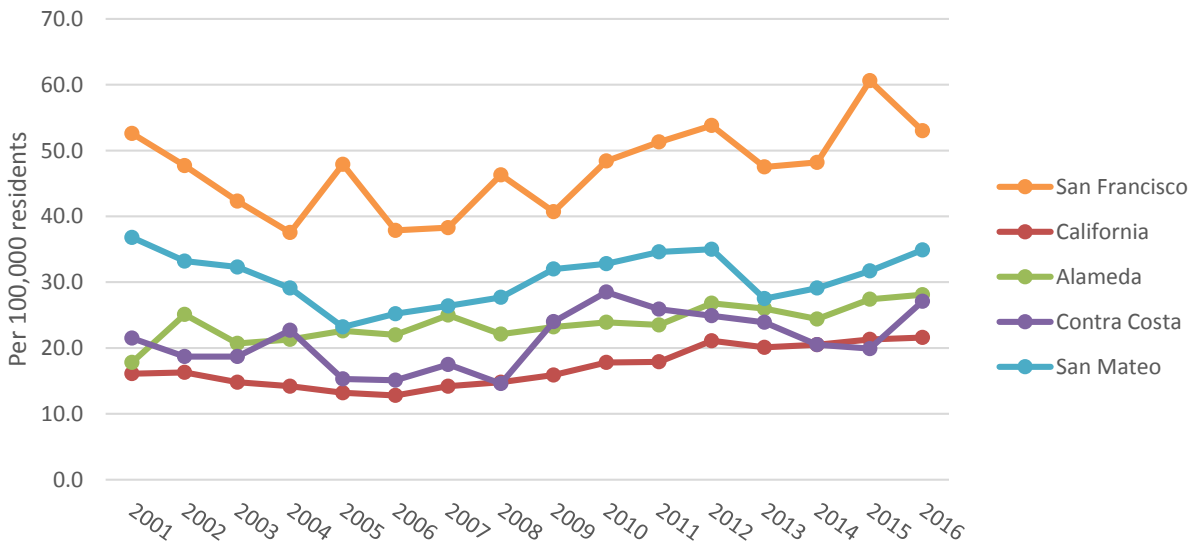
Notes on 2016 Surveillance Data

The following notes are intended to aid in the interpretation of reported cases of selected diseases.

CAMPYLOBACTERIOSIS

Campylobacter infections remained the most frequently reported enteric disease in San Francisco (n=454, rate=53.0 per 100,000 population, 95% CI: 48.2-58.1), which was lower (though not significantly) than in 2015 (n=514, rate=60.6 per 100,000 residents, 95% CI: 55.4-66.0). Historically, rates of campylobacteriosis declined from 1990 (n=782, rate=108.1 per 100,000 residents, 95% CI: 100.7-116.0) until 2004 (n=297, rate=37.5 per 100,000 residents, 95% CI: 33.4-42.1). Since 2004, rates have been increasing, with some year to year fluctuations. Rates of campylobacteriosis in San Francisco are higher than in other Bay Area counties for all available years of data (see Figure 1).

Figure 1. Annual incidence of campylobacteriosis for San Francisco (compared to Alameda County, Contra Costa County, San Mateo County and California*), 2001-2016



*Rates for California, Alameda County, Contra Costa County, and San Mateo County from California Department of Public Health Report, *Yearly Summary Reports of Selected General Communicable Diseases in California*[7,8].

CULTURE-INDEPENDENT DIAGNOSTIC TESTS AND SURVEILLANCE CASE DEFINITIONS

Culture-independent diagnostic tests (CIDTs) are diagnostic laboratory tests that do not require the culture or isolation of a microorganism to detect or characterize a pathogen. Examples of CIDTs include polymerase chain reaction (PCR) testing, enzyme immunoassay (EIA) testing, nucleic acid amplification testing (NAAT), etc. Laboratories are rapidly adopting use of CIDTs because they are faster and more automated than traditional culture-based testing methods, multiple pathogens can be identified with

one test, syndromic diseases (e.g., respiratory or enteric) can be assessed by multiplex molecular panels, less technical training to perform tests is required, and costs are potentially lower. Unfortunately, without a culture or isolate, subtyping and genotyping (PFGE, MLVA, WGS) cannot be performed, antimicrobial resistance cannot be determined, and detecting and monitoring trends, clusters and outbreaks is more difficult. As of 2015, according to Title 17, 2505, if a laboratory test result indicates infection with *Listeria monocytogenes*, *Neisseria meningitidis* from sterile sites, *Salmonella*, *Shigella*, Shiga toxin-producing *Escherichia coli* (STEC), including O157 and non-O157 strains, or identification of Shiga toxin in a clinical specimen, then the laboratory must attempt to obtain a bacterial culture isolate for submission to a public health laboratory.

It's unclear how the use of CIDTs has affected healthcare provider or laboratory testing practices and thus surveillance data and their interpretation[9]. Possible effects may include the following:

1. Less expensive, faster testing in a more clinically relevant timeframe may lead to an increase in tests ordered by healthcare providers, meaning more disease is detected.
2. Multiple pathogens tested with one test may mean more co-infections are detected.
3. CIDT syndromic panels may include pathogens not normally found in routine culture procedures.
4. Without an isolate or culture, reflex testing, subtyping, genotyping and antimicrobial testing cannot be performed, which makes detecting and monitoring trends more difficult.

A case definition is a set of uniform criteria used to define a disease for public health surveillance. Before 2012, the national surveillance disease case definitions for campylobacteriosis, salmonellosis, and shigellosis did not include criteria for CIDTs. In 2012, the laboratory criteria for the surveillance case definitions for campylobacteriosis, salmonellosis, and shigellosis were updated to include cases diagnosed by CIDT without culture confirmation as suspect cases. In 2015, only the case definition for campylobacteriosis was further updated to categorize cases diagnosed by CIDT without culture confirmation as probable. In 2016, salmonellosis and shigellosis cases diagnosed by CIDT alone continued to be classified as suspect. Suspect cases of salmonellosis and shigellosis are included in this report.

MUMPS

In San Francisco, from 2001 to 2015, the annual number of mumps cases has been less than three; however, nine cases were reported in 2016. Seven of the nine cases reported domestic or foreign travel during the exposure period. No mumps outbreaks were reported in San Francisco in 2016.

Since the introduction of the two-dose measles, mumps, rubella (MMR) vaccination program in 1989, the annual number of mumps cases reported nationally ranges from several hundred to several thousand. In 2016, 6,366 mumps cases were reported; the increase was driven by several large outbreaks associated with university campuses and a large outbreak spanning 2016-2017 in a close-knit community in northwest Arkansas. These outbreaks are likely associated with a combination of factors, including vaccine effectiveness, waning immunity following vaccination, outbreak setting factors, and behavior among cases that increases the risk of transmission[10].

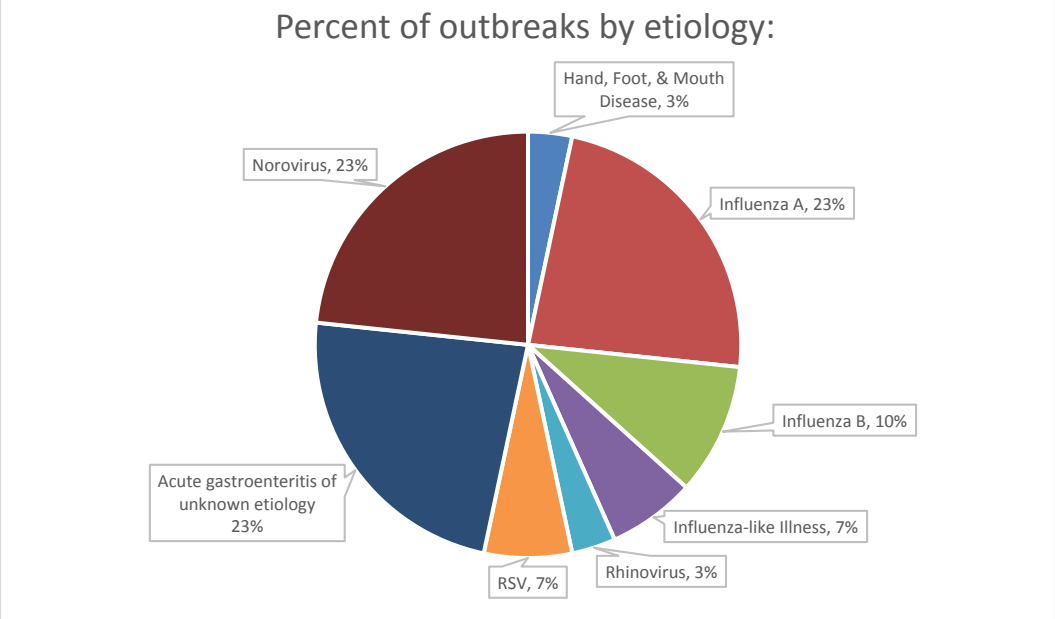
OUTBREAKS

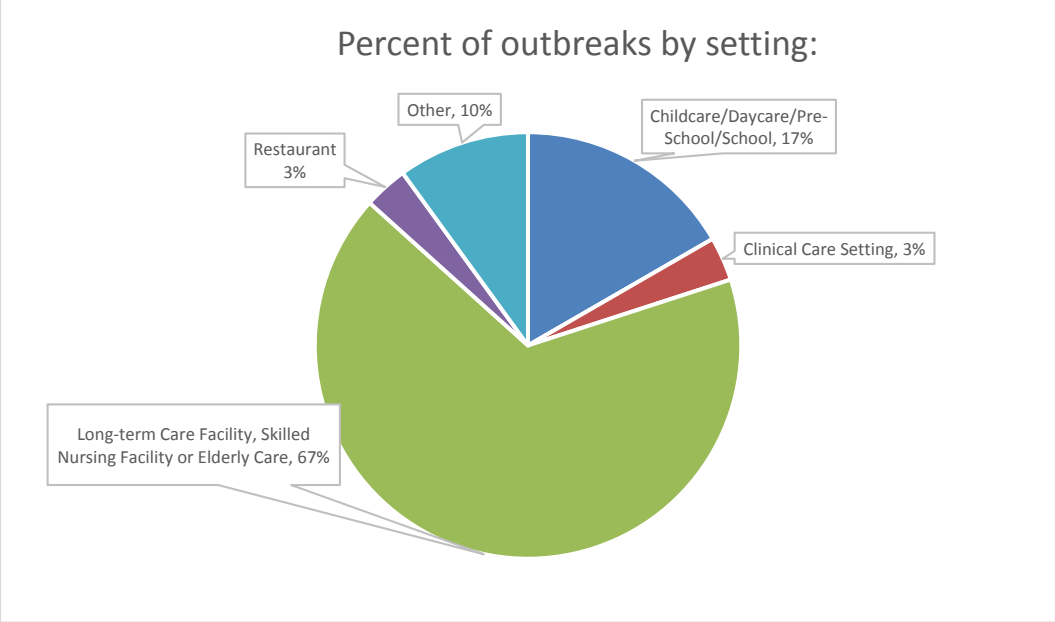
In 2016, CDCU identified and investigated a total of 30 communicable disease outbreaks.

- Etiology: Fourteen (47%) outbreaks involved gastrointestinal illness, 15 (50%) involved respiratory illness, and one (3%) involved a rash illness.
    - Gastrointestinal outbreaks: Seven of the 14 gastrointestinal outbreaks (23% of total outbreaks reported) were caused by norovirus (one confirmed, six suspected); seven (23%) were of unknown etiology.
    - Respiratory outbreaks: Seven of the 15 respiratory outbreaks (23% of total outbreaks reported) were caused by influenza A (all confirmed), three (10%) were caused by influenza B (all confirmed), two (7%) were caused by respiratory syncytial virus (both confirmed), one (3%) was caused by rhinovirus (confirmed), and two influenza-like illness outbreaks (7%) were of unknown etiology.
    - Rash illness: One (3%) of the 30 outbreaks was a Hand, Foot, and Mouth Disease outbreak caused by enterovirus (suspected).

- Setting: Twenty (67%) of the 30 outbreaks were associated with a long-term care facility, a skilled nursing facility, or elderly care; five (17%) were associated with childcare, daycare, preschool or school settings; one (3%) was associated with a restaurant; one (3%) was associated with a clinical care setting, and three (10%) were associated with other settings.

Figure 2. Percent of reported outbreaks by etiology and setting, 2016, San Francisco

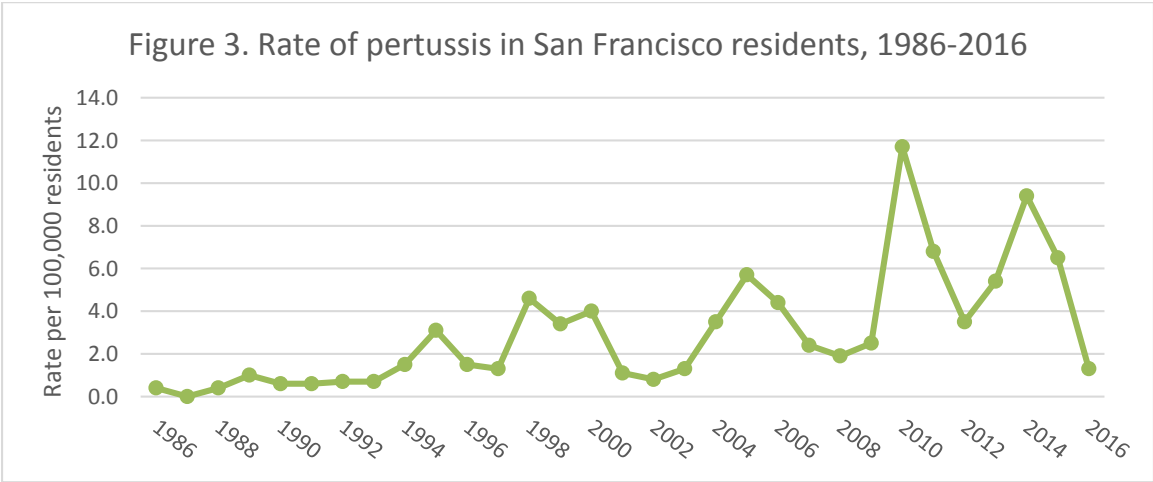




PERTUSSIS

Pertussis is endemic in the U.S. with epidemic cycles every three to five years. In 2010 and 2014, there were cyclic increases in cases in California. San Francisco followed the same pattern of cyclic increases as California (Figure 3). In 2016, only 11 cases were reported among San Francisco residents; no deaths occurred.

People of all ages can get pertussis, though death and serious complications are most likely in young infants. In October 2012, the Advisory Committee on Immunization Practices (ACIP) recommended maternal pertussis immunization during every pregnancy to help prevent morbidity and mortality in infants through passive immunity[11]. In 2014, the surveillance case definition for pertussis was changed to better capture the burden of disease in infants who do not meet the traditional clinical criteria for pertussis.



RABIES

Two rabid bats were detected in San Francisco in 2016. Bats present a risk of rabies exposure to humans and pets, especially when they are handled or enter people's homes [12]. Rabies was not detected in any animals aside from bats in 2016. No cases of rabies have been reported in terrestrial animals (e.g. dogs, cats, skunks, raccoons, foxes, coyotes) in San Francisco for over 70 years[12]. The last human rabies case in San Francisco occurred in 1987, and the presumed source was a dog bite that occurred while the patient was in the Philippines.

SALMONELLOSIS

In 2016, 153 non-typhoidal salmonellosis cases in San Francisco residents were reported (17.9 cases per 100,000 residents, 95% CI: 15.1-20.9), which is not significantly different from the rate in 2015 (21.6 cases per 100,000 residents, 95% CI: 18.6-24.9). In 2016, 20 of the 153 cases (13%) were classified as suspect cases [in 2015, 26 of the 183 cases (14%) and in 2014, 7 of the 180 cases (3.9%) were classified as suspect cases]; all 20 suspect salmonella cases were diagnosed by CIDT alone. Only confirmed and probable cases were included in reports prior to 2014.

Rates of salmonellosis in 2016 were highest among those under the age of one (N=7, 76.8 per 100,000 residents, 95% CI: 30.9-158.3) and among 1-4 year olds (N=21, 60.9 per 100,000 residents, 95% CI: 37.7-93.1), which is consistent with data from previous years.

The most frequently reported *Salmonella* serotypes in 2016, which together accounted for 64% of the 133 cases with serotype information (20 cases had no serotype information) were as follows:

- *S.* Enteriditis (N=20, 15%)
- *S.* Newport (N=12, 9%)
- *S.* Infantis (N=11, 8%)
- *S.* I 4,5,12:i:- (N=10, 8%)
- *S.* Typhimurium (N=10, 8%)
- *S.* Muenchen (N=8, 6%)
- *S.* Adelaide (N=5, 4%)
- *S.* Berta (N=5, 4%)
- *S.* Weltevreden (N=4, 3%)

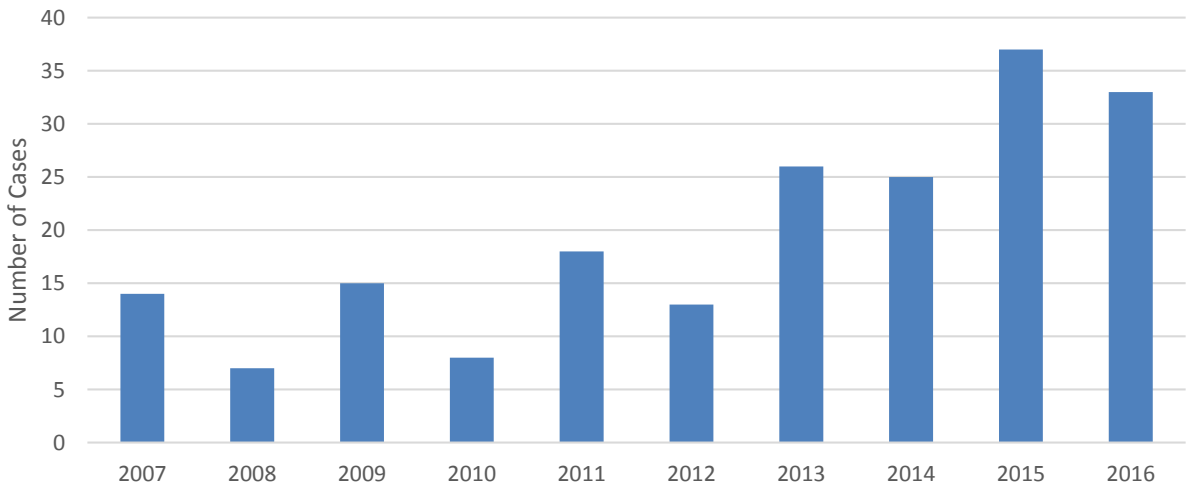
SHIGA TOXIN-PRODUCING *ESCHERICHIA COLI* and HEMOLYTIC UREMIC SYNDROME

Public health surveillance and reporting requirements for *Escherichia coli* have changed over time as laboratory testing methods and understanding of pathogenesis have evolved. *E. coli* O157:H7 is one of many Shiga toxin-producing *E. coli* serotypes that cause clinically and epidemiologically significant disease, including Hemolytic Uremic Syndrome (HUS). Until 2006, only *E. coli* O157:H7 and/or HUS were reportable. Since October 2006, Shiga toxin-producing *E. coli* (STEC), which encompasses *E. coli* O157:H7 and other serotypes, and Shiga toxin in feces have been reportable.

In 2016, 33 STEC cases (3.9 cases per 100,000 residents), three Shiga toxin in feces cases and one case of HUS were reported. The overall increase in STEC cases since 2013 is consistent with statewide trends[8]. The increase is hypothesized to be due to increased detection of non-O157 Shiga toxin-producing *E. coli*, increased use of Shiga toxin testing by clinical laboratories, and an increased number of specimens

forwarded to a public health laboratory for culture and identification[13]. Beginning in 2014, clinical laboratories were required to submit Shiga toxin-positive fecal broths, and Shiga toxin-producing *Escherichia coli* (STEC) O157 and non-O157 isolates, to the local public health laboratory or the State Public Health Laboratory.

Figure 4. Number of Shiga toxin producing *Escherichia coli* (STEC) cases among San Francisco residents, by year of report, 2007-2016

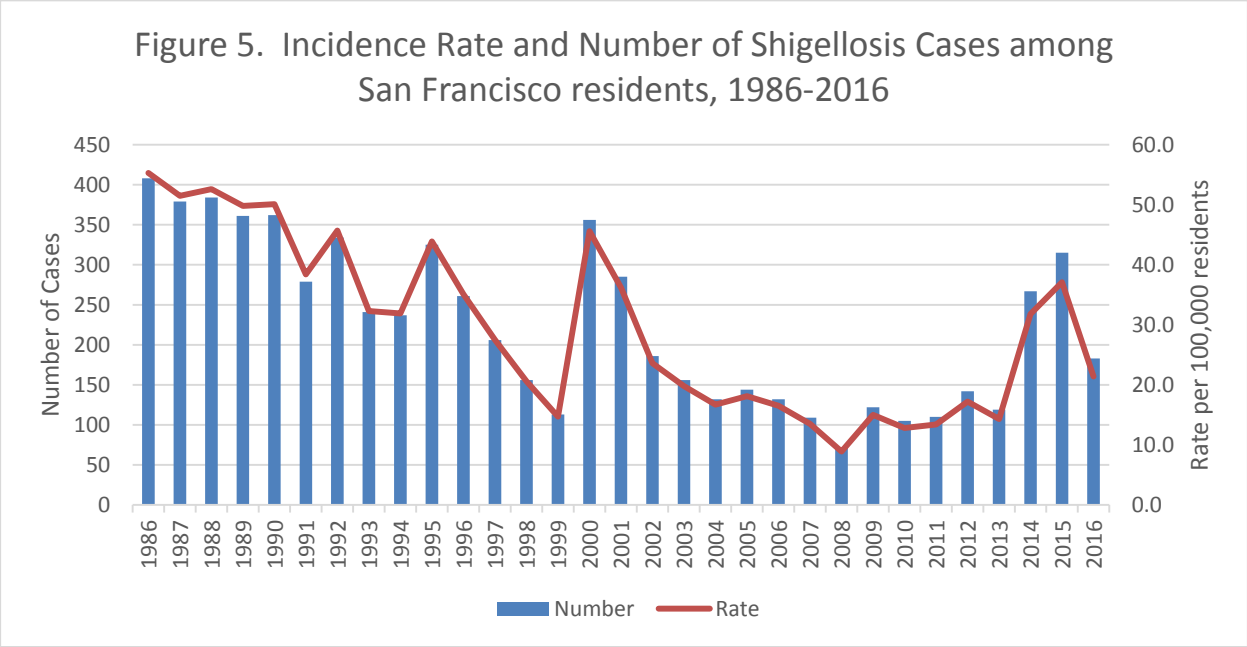


SHIGELLOSIS

Of the 183 shigellosis cases reported in 2016, 83 were classified as suspect; all 83 suspect cases were diagnosed by CIDT alone. Prior to 2014, only confirmed and probable cases were included.

The rate of shigellosis in 2016 (n=183, rate=21.4 cases per 100,000 residents, 95% CI: 18.4-24.7) is significantly lower than in 2015 (n=315, rate=37.1 cases per 100,000 residents, 95% CI: 33.1-41.5) and 2014 (n=267, rate=31.8 cases per 100,000 residents, 95% CI: 28.1-35.8). The higher rates of shigellosis in 2014 and 2015 as compared to 2016 are attributable to several local outbreaks, including a citywide outbreak of ciprofloxacin-resistant shigellosis that disproportionately affected homeless and marginally housed individuals in San Francisco.

Generally, the rates of shigellosis in San Francisco are higher compared to other California jurisdictions[7, 8] and have been increasing since 2008, with a significant increase from 2013 (n=119, rate=14.3 cases per 100,000 residents, 95% CI: 11.8-17.1) to 2016 (n=183, rate=21.4 cases per 100,000 residents, 95% CI: 18.4-24.7). The high incidence of shigellosis in San Francisco is partly attributable to sexual transmission among men who have sex with men (MSM)[14].



ZIKA

Zika is a mosquito-borne flavivirus that is transmitted by the bite of the *Aedes* mosquito. Zika was first identified in Africa during the 1940s; the virus has spread rapidly throughout Latin America since early 2015, and active transmission is now occurring in more than 60 countries and U.S. territories worldwide. Intrauterine transmission and sexual transmission are significant factors in the current epidemic[15].

Many of those infected with Zika virus are asymptomatic or only have mild symptoms such as fever, rash, conjunctivitis, and/or joint pain. The complications of Zika virus infection include Guillain-Barré syndrome and birth defects resulting from maternal infection during pregnancy. Zika infection during pregnancy can cause fetal microcephaly, ocular malformations, intracranial calcifications, congenital contractures, spontaneous abortion, and stillbirth.

In 2015, Zika was not a nationally notifiable disease in the United States, though some cases were reported to the CDC in 2015. Zika became a nationally notifiable disease in the US in 2016 and a reportable disease in California in June 2016. Most cases reported in the United States were among travelers returning from affected areas. In 2016, 29 cases of Zika were reported to the San Francisco Department of Public Health – all among travelers returning from affected areas. No locally acquired mosquito-borne cases of Zika have been reported in San Francisco or in California; however, the *Aedes aeqypti* and the *Aedes albopictus* mosquitoes that transmit the virus have been detected in some California locations outside of San Francisco.

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TABLE 1: FREQUENCY OF REPORTABLE DISEASES IN SAN FRANCISCO, 2016

Disease	N	Rate
Amebiasis	50	5.8
Anaplasmosis/Ehrlichiosis	1	0.1 *
Anthrax	0	0.0
Babesiosis	1	0.1 *
Botulism, Foodborne	0	0.0
Botulism, Infant (1)	0	0.0
Botulism, Unspecified	0	0.0
Botulism, Wound	0	0.0
Brucellosis	0	0.0
Campylobacteriosis	454	53.0
Chickenpox, Severe (Death or Hosp)	0	0.0
Chikungunya	6	0.7 *
Cholera	0	0.0
Ciguatera Fish Poisoning	0	0.0
Coccidioidomycosis	9	1.1 *
Creutzfeldt-Jakob Dis. or Other TSE (2)	1	0.1 *
Cryptosporidiosis	23	2.7
Cysticercosis or Taeniasis	1	0.1 *
Dengue	6	0.7 *
Diphtheria	0	0.0
Domoic Acid Poisoning	0	0.0
Encephalitis, Arboviral	0	0.0
Encephalitis, Bacterial	0	0.0
Encephalitis, Fungal	0	0.0
Encephalitis, Other Viral	1	0.1 *
Encephalitis, Parasitic	0	0.0
Encephalitis, Unspecified	0	0.0
Encephalitis, Total	1	0.1 *
Flavivirus, unspecified	0	0.0
Giardiasis	215	25.1
Haemophilus influenzae, Invasive (3)	1	2.3 *
Hantavirus Infection	0	0.0
Hemolytic Uremic Syndrome (4)	1	0.1 *
Hepatitis A	3	0.4 *
Hepatitis B, Acute (5)	2	0.2 *
Hepatitis C, Acute	7	0.8 *
Hepatitis Delta	1	0.1 *
Hepatitis E	2	0.2 *
Influenza, Deaths, 0-64 years of age	0	0.0
Legionellosis	1	0.1 *
Leprosy	0	0.0
Leptospirosis	1	0.1 *
Listeriosis	4	0.5 *
Lyme Disease	2	0.2 *
Malaria	7	0.8 *
Measles	0	0.0

Disease	N	Rate
Meningitis, Bacterial	8	0.9 *
Meningitis, Fungal	7	0.8 *
Meningitis, Parasitic	0	0.0
Meningitis, Unspecified	0	0.0
Meningitis, Viral	8	0.9 *
Meningitis, Total	23	2.7
Meningococcal Infection	2	0.2 *
Mumps	9	1.1 *
Outbreaks, Foodborne	3	N/A
Outbreaks, Non-Foodborne	27	N/A
Paralytic Shellfish Poisoning	0	0.0
Pertussis	11	1.3 *
Plague	0	0.0
Poliovirus Infection	0	0.0
Psittacosis	0	0.0
Q Fever	0	0.0
Rabies, Animal	2	N/A
Rabies, Human	0	0.0
Relapsing Fever	0	0.0
Rickettsial Diseases (not RMSF or Typhus)	0	0.0
Rocky Mountain Spotted Fever	0	0.0
Rubella	0	0.0
Rubella, Congenital (1)	0	0.0
STEC including E. coli O157	33	3.9
Salmonellosis (6)	153	17.9
Scombroid Fish Poisoning	0	0.0
Shiga toxin in feces	3	0.4 *
Shigellosis, Group B: *S. flexneri*	61	7.1
Shigellosis, Group D: S. *sonnei*	39	4.6
Shigellosis, Other Group (6)	83	9.7
Shigellosis, Total (6)	183	21.4
Smallpox	0	0.0
Streptococcal Infection	0	0.0
Tetanus	0	0.0
Trichinosis	0	0.0
Tularemia	0	0.0
Typhoid Carrier	0	0.0
Typhoid Fever, Acute	3	0.4 *
Typhus Fever	0	0.0
Vibriosis, Non-Cholera	4	0.5 *
Viral Hemorrhagic Fever	0	0.0
West Nile Asymptomatic blood donor	1	0.1 *
West Nile Disease	0	0.0
West Nile Infections, Total (7)	1	0.1 *
Yellow Fever	0	0.0
Yersiniosis	4	0.5 *
Zika	29	3.4

(1) Rate among residents age <1 yr. (2) TSE = transmissible spongiform encephalopathies (e.g., vCJD, kuru). (3) Reportable in <5 yrs; rate for residents aged <5 yrs. (4) Includes HUS only and E. coli STEC cases with HUS (5) Includes perinatal cases (6) Includes suspect cases (7) Includes both West Nile Disease & asymptomatic infections

****=Unstable Rates (where n<20) should not be compared statistically. See report appendix for disease reporting changes and selected disease definitions.***

Source: SFDPH Communicable Disease Control Unit. Data shown by year cases were reported to SFDPH. Rates are cases per 100,000 population. Population estimates from the California Department of Finance.

TABLE 2: FREQUENCY AND UNADJUSTED RATES FOR FIVE SELECTED DISEASES BY AGE, SAN FRANCISCO, 2016

Amebiasis						Campylobacteriosis				
Year	Age	N	Rate	95% CI		Age	N	Rate	95% CI	
2016	0-14 yrs	0	0.0 *			<1 yr	2	21.9 *	2.7	79.3
	15-24 yrs	3	4.3 *	0.9	12.5	1-4 yrs	21	60.9	37.7	93.1
	25-34 yrs	15	9.0 *	5.0	14.8	5-14 yrs	27	41.6	27.4	60.5
	35-44 yrs	14	9.2 *	5.0	15.5	15-24 yrs	29	41.2	27.6	59.2
	45-54 yrs	13	10.8 *	5.8	18.5	25-34 yrs	125	75.0	62.4	89.3
	55-64 yrs	4	3.8 *	1.0	9.8	35-44 yrs	71	46.7	36.5	58.9
	65+ yrs	1	0.7 *	0.0	4.1	45-54 yrs	70	58.4	45.5	73.8
	Total	50	5.8	4.3	7.7	55-64 yrs	55	52.7	39.7	68.6
						65+ yrs	53	39.1	29.3	51.2
						Total	454	53.0	48.2	58.1

Giardiasis						Salmonellosis				
Year	Age	N	Rate	95% CI		Age	N	Rate	95% CI	
2016	<1 yr	0	0.0 *			<1 yr	7	76.8 *	30.9	158.3
	1-4 yrs	4	11.6 *	3.2	29.7	1-4 yrs	21	60.9	37.7	93.1
	5-14 yrs	10	15.4 *	7.4	28.3	5-14 yrs	12	18.5 *	9.6	32.3
	15-24 yrs	11	15.6 *	7.8	28.0	15-24 yrs	10	14.2 *	6.8	26.1
	25-34 yrs	64	38.4	29.6	49.0	25-34 yrs	30	18.0	12.1	25.7
	35-44 yrs	44	29.0	21.0	38.9	35-44 yrs	13	8.6 *	4.6	14.6
	45-54 yrs	48	40.0	29.5	53.1	45-54 yrs	5	4.2 *	1.4	9.7
	55-64 yrs	23	22.0	14.0	33.1	55-64 yrs	20	19.2	11.7	29.6
	65+ yrs	11	8.1 *	4.1	14.5	65+ yrs	35	25.9	18.0	36.0
	Total	215	25.1	21.8	28.7	Total	153	17.9	15.1	20.9

Shigellosis (Total)						Shigellosis (flexneri)					Shigellosis (sonnei)				
Year	Age	N	Rate	95% CI		Age	N	Rate	95% CI		Age	N	Rate	95% CI	
2016	<1 yr	2	21.9 *	2.7	79.3	<1 yr	0	0.0 *			<1 yr	0	0.0 *		
	1-4 yrs	3	8.7 *	1.8	25.4	1-4 yrs	0	0.0 *			1-4 yrs	0	0.0 *		
	5-14 yrs	4	6.2 *	1.7	15.8	5-14 yrs	1	1.5 *	0.0	8.6	5-14 yrs	1	1.5 *	0.0	8.6
	15-24 yrs	10	14.2 *	6.8	26.1	15-24 yrs	2	2.8 *	0.3	10.3	15-24 yrs	5	7.1 *	2.3	16.6
	25-34 yrs	52	31.2	23.3	40.9	25-34 yrs	15	9.0 *	5.0	14.8	25-34 yrs	11	6.6 *	3.3	11.8
	35-44 yrs	36	23.7	16.6	32.8	35-44 yrs	11	7.2 *	3.6	13.0	35-44 yrs	12	7.9 *	4.1	13.8
	45-54 yrs	48	40.0	29.5	53.1	45-54 yrs	24	20.0	12.8	29.8	45-54 yrs	5	4.2 *	1.4	9.7
	55-64 yrs	20	19.2	11.7	29.6	55-64 yrs	7	6.7 *	2.7	13.8	55-64 yrs	3	2.9 *	0.6	8.4
	65+ yrs	8	5.9 *	2.6	11.6	65+ yrs	1	0.7 *	0.0	4.1	65+ yrs	2	1.5 *	0.2	5.3
	Total	183	21.4	18.4	24.7	Total	61	7.1	5.4	9.1	Total	39	4.6	3.2	6.2

**=Unstable Rate (n<20). Unstable rates should not be compared statistically. 95% CI=Confidence Intervals; 95% Exact Confidence Intervals not displayed for counts of zero.*
Cases with missing age are represented in total column counts only. Thus, the sum of individual age groups for these diseases may not match the total column count shown.

Source: SFDPH Communicable Disease Control Unit. Data shown by year cases reported to SFDPH. Rates are cases per 100,000 population. Population estimates obtained from the California Department of Finance. This report uses 2014 estimates.

TABLE 3: FREQUENCY AND UNADJUSTED RATES FOR FIVE SELECTED DISEASES BY SEX, SAN FRANCISCO, 2016

		Amebiasis				Campylobacteriosis				
Year	Sex	N	Rate	95% CI		Sex	N	Rate	95% CI	
2016	Male	44	10.1	7.4	13.6	Male	300	69.1	61.5	77.4
	Female	6	1.4*	0.5	3.1	Female	154	36.4	30.9	42.6
	Unk	0				Unk	0			
	Total	50	5.8	4.3	7.7	Total	454	53.0	48.2	58.1

		Giardiasis				Salmonellosis				
Year	Sex	N	Rate	95% CI		Sex	N	Rate	95% CI	
2016	Male	164	37.8	32.2	44.0	Male	73	16.8	13.2	21.2
	Female	50	11.8	8.8	15.6	Female	80	18.9	15.0	23.5
	Unk	1				Unk	0			
	Total	215	25.1	21.8	28.7	Total	153	17.9	15.1	20.9

		Shigellosis (Total)				Shigellosis (flexneri)				Shigellosis (sonnei)				
Year	Sex	N	Rate	95% CI		Sex	N	Rate	95% CI		Sex	N	Rate	95% CI	
2016	Male	154	35.5	30.1	41.6	Male	58	13.4	10.1	17.3	Male	32	7.4	5.0	10.4
	Female	29	6.9	4.6	9.8	Female	3	0.7*	0.1	2.1	Female	7	1.7*	0.7	3.4
	Unk	0				Unk	0				Unk	0			
	Total	183	21.4	18.4	24.7	Total	61	7.1	5.4	9.1	Total	39	4.6	3.2	6.2

Rates are cases per 100,000 population; Rates not calculated for the sex category Unknown; *=Unstable Rate (n<20); Unstable rates should not be compared statistically.
95% CI=Confidence Intervals; 95% Exact Confidence Intervals not displayed for counts of zero.

Source: SFDPH Communicable Disease Control Unit. Data shown by year cases reported to SFDPH. Population estimates obtained from the California Department of Finance. This report uses 2014 estimates.

TABLE 4: FREQUENCY AND UNADJUSTED RATES FOR THREE SELECTED DISEASES BY RACE/ETHNICITY, SAN FRANCISCO, 2016

Year	Race/ Ethnicity	Amebiasis N	Amebiasis Rate	Amebiasis 95% CI		Salmonellosis N	Salmonellosis Rate	Salmonellosis 95% CI	
2016	White	25	7.1	4.6	10.4	44	12.5	9.0	16.7
	Black	2	3.8*	0.5	13.8	2	3.8*	0.5	13.8
	Asian/PI	3	1.0*	0.2	2.9	48	15.7	11.6	20.8
	Hispanic	9	6.5*	3.0	12.4	28	20.4	13.5	29.4
	Other/Unk	11				31			
	Total	50	5.8	4.3	7.7	153	17.9	15.1	20.9

Year	Race/ Ethnicity	Shigellosis (Total) N	Shigellosis (Total) Rate	Shigellosis (Total) 95% CI		Shigellosis (flexneri) N	Shigellosis (flexneri) Rate	Shigellosis (flexneri) 95% CI		Shigellosis (sonnei) N	Shigellosis (sonnei) Rate	Shigellosis (sonnei) 95% CI	
2016	White	86	24.3	19.5	30.1	29	8.2	5.5	11.8	19	5.4*	3.2	8.4
	Black	14	26.8*	14.6	44.9	11	21.0*	10.5	37.6	1	1.9*	0.0	10.6
	Asian/PI	8	2.6*	1.1	5.2	1	0.3*	0.0	1.8	1	0.3*	0.0	1.8
	Hispanic	31	22.6	15.3	32.0	14	10.2*	5.6	17.1	7	5.1*	2.0	10.5
	Other/Unk	44				6				11			
	Total	183	21.4	18.4	24.7	61	7.1	5.4	9.1	39	4.6	3.2	6.2

Asian/PI = Asian or Pacific Islander; there were no cases of these select diseases among people identified as American Indian/Alaskan Native.

*Rates are cases per 100,000 population; Rates not calculated for the race/ethnicity categories Other & Unknown. *=Unstable Rate (n<20). Unstable rates should not be compared statistically.*

95% CI=Confidence Intervals; 95% Exact Confidence Intervals not displayed for counts of zero.

Source: SFDPH Communicable Disease Control Unit. Data shown by year cases reported to SFDPH. Population estimates obtained from the California Department of Finance. This report uses 2014 estimates.

TABLE 5: SAN FRANCISCO POPULATION ESTIMATES BY SEX, AGE AND RACE/ETHNICITY, 2016

Year	Sex	Age	White	Hispanic	Black	Asian/PI	Am Indian	Total
2016	FEMALE	<1 yr	1,755	853	278	1,483	96	4,465
		1-4 yrs	6,515	3,377	1,104	5,545	371	16,912
		5-14 yrs	9,752	8,063	2,641	10,831	682	31,969
		15-24 yrs	9,141	7,396	3,072	14,588	389	34,586
		25-34 yrs	39,507	12,182	3,869	27,967	807	84,332
		35-44 yrs	34,304	11,460	3,273	23,548	601	73,186
		45-54 yrs	20,585	7,847	3,237	22,043	422	54,134
		55-64 yrs	16,680	6,100	3,521	23,266	295	49,862
		65+ yrs	26,673	7,645	4,704	34,403	320	73,745
			164,912	***64,923***	***25,699***	***163,674***	***3,983***	***423,191***
	MALE	<1 yr	1,827	887	289	1,543	101	4,647
		1-4 yrs	6,757	3,502	1,154	5,753	394	17,560
		5-14 yrs	9,788	8,434	2,700	11,274	733	32,929
		15-24 yrs	8,044	7,836	3,127	16,331	408	35,746
		25-34 yrs	39,638	14,696	3,338	24,020	697	82,389
		35-44 yrs	40,846	14,153	3,320	19,792	623	78,734
		45-54 yrs	31,890	10,699	4,077	18,509	561	65,736
		55-64 yrs	23,200	6,776	4,510	19,673	379	54,538
		65+ yrs	26,414	5,536	4,108	25,272	304	61,634
			188,404	***72,519***	***26,623***	***142,167***	***4,200***	***433,913***
2016			***353,316***	***137,442***	***52,322***	***305,841***	***8,183***	***857,104***

Source: California Department of Finance, Demographic Research Unit. This report uses 2014 estimates.
Note: Am Indian=American Indian/Alaska Native; Asian/PI=Asian/Pacific Islander.

Appendix: Notifiable Disease - Historical Changes (2004 - 2016)

The diseases required to be reported to public health and disease definitions can change over time. Changes in disease definitions can impact the numbers of cases of disease reported to the SFDPH. Documentation of changes in definitions from 2004 – 2016 are outlined below.

For documentation of changes from 1986 to 2003, please refer to The San Francisco Communicable Disease Report 1986-2003 (May 2005), accessible at: https://www.sfcdcp.org/communicable-disease/publications-data-and-reports/

Date of change	Disease	Description
2005	**Acute hepatitis B**	Includes perinatal cases starting in 2005.
June 2005	**Lyme disease**	Clinician reportable since 1989, and also became laboratory-reportable in June 2005.
June 2005	**Severe Acute Respiratory Syndrome (SARS)**	Became reportable in June 2005.
June 2005	**West Nile Disease**	Includes West Nile Fever, West Nile Meningitis, & West Nile Encephalitis, and became reportable in June 2005.
October 2006	**Non-O157:H7 Shiga toxin producing *Escherichia coli* (STEC) infections**	Non-O157:H7 STEC infections became notifiable in California in October 2006.
June 2007	**Anisakiasis**	Removed from the list of notifiable diseases in California in June 2007.
June 2007	**Avian Influenza (H5N1)**	Human infection with the influenza A H5N1 virus was added to the list of notifiable diseases in California in June 2007.
June 2007	**Chickenpox**	Previously all varicella hospitalizations and deaths (including shingles) were reportable, but as of June 2007, only chickenpox hospitalizations and deaths are reportable.
June 2007	**Creutzfeldt-Jakob. Disease (CJD) and other Transmissible Spongiform Encephalopathies**	Added to the list of notifiable diseases in California in June 2007.
June 2007	**Echinococcosis**	Removed from the list of notifiable diseases in California in June 2007.
June 2007	**Influenza Deaths, Pediatric**	Deaths associated with infection with an influenza virus are reportable in patients <18 years of age and were added to the list of notifiable diseases in California in June 2007.
June 2007	**Invasive *Haemophilus influenzae* Disease**	Reportable only in patients <15 years of age as of June 2007. Prior to June 2007, it was reportable in patients <30 years of age.
June 2007	**Lymphocytic Choriomeningitis**	Removed from the list of notifiable diseases in California in June 2007.
June 2007	**Reye Syndrome**	Removed from the list of notifiable diseases in California in June 2007.
June 2007	**Shiga toxin producing *Escherichia coli* (STEC) infections**	All *E. coli* O157 STEC (regardless of presence of H7 antigen) became notifiable in California in June 2007. Case counts and rates for STEC, *E. coli* O157:H7 and *E. coli* O157 non-H7 infections are presented together.
June 2007	**Taeniasis**	Added to the list of notifiable diseases in California in June 2007.

February 2008	**Severe *Staphylococcus aureus* infection**	Severe *Staphylococcus aureus* infection in a "previously healthy person" has been a reportable condition in California since February 13, 2008. For the purposes of surveillance, a severe infection is defined as one resulting in death or admission to an intensive care unit, and a previously healthy person is defined as one who has not been hospitalized or had surgery, dialysis, or residency in a long-term care facility in the past year and did not have an indwelling catheter or percutaneous medical device at the onset of illness. A *S. aureus* infection in a person without these healthcare-associated risk factors would be considered community-associated.
February 2008	**Smallpox**	Eradicated in 1979; reportable again since 2001 for bioterror surveillance.
2009	**Anaplasmosis/Ehrlichiosis**	Added Anaplasmosis to Ehrlichiosis
2009	**Poliovirus infection**	Changed poliomyelitis to poliovirus infection.
July 2011	**Anthrax, animal**	Added to the list of notifiable diseases in California in July 2011.
July 2011	**Brucellosis, animal**	Added to the list of notifiable diseases in California in July 2011. Excludes infections due to *Brucella canis*
July 2011	**Hepatitis D**	Added to the list of notifiable diseases in California in July 2011.
July 2011	**Hepatitis E**	Added to the list of notifiable diseases in California in July 2011.
July 2011	**Influenza, deaths**	Added to the list of notifiable diseases in California in July 2011. Only deaths of laboratory-confirmed cases of patients ages 0-64 years.
July 2011	**Influenza, novel strains**	Added to the list of notifiable diseases in California in July 2011.
July 2011	**Rickettsial Diseases**	Added to the list of notifiable diseases in California in July 2011. Does not include Rocky Mountain Spotted Fever or Typhus.
July 2011	**Tularemia, animal**	Added to the list of notifiable diseases in California in July 2011.
July 2011	**Viral Hemorrhagic Fevers, animal**	Added to the list of notifiable diseases in California in July 2011.
July 2011	**Avian influenza (human)**	Removed from the list of notifiable diseases in California in July 2011.
July 2011	**Colorado Tick Fever**	Removed from the list of notifiable diseases in California in July 2011.
July 2011	**Hepatitis, Viral**	Removed from the list of notifiable diseases in California in July 2011.
July 2011	**Hepatitis, other, acute**	Removed from the list of notifiable diseases in California in July 2011.
July 2011	**Influenza (report in a person less than 18 years of age)**	Removed from the list of notifiable diseases in California in July 2011.
July 2011	**Kawasaki Syndrome**	Removed from the list of notifiable diseases in California in July 2011.
July 2011	**Rheumatic Fever, acute**	Removed from the list of notifiable diseases in California in July 2011.
July 2011	**Water-associated disease**	Removed from the list of notifiable diseases in California in July 2011. Includes Swimmer's Itch and Hot Tub Rash.
Jan 2014	**Pertussis**	Includes revision to clinical signs and symptoms for infants
June 2016	**Severe Acute Respiratory Syndrome (SARS)**	Removed from the list of notifiable diseases in California in June 2016
June 2016	**Severe *Staphylococcus aureus* infection**	Removed from the list of notifiable diseases in California in June 2016
June 2016	**Toxic Shock Syndrome (TSS)**	Removed from the list of notifiable diseases in California in June 2016
June 2016	**Chikungunya infection**	Added to the list of notifiable diseases in California in June 2016; reportable beginning in 2015 under Unusual Disease Occurrence

June 2016	**Flavivirus infection of undetermined species**	Added to the list of notifiable diseases in California in June 2016
June 2016	**Novel virus infection with pandemic potential**	Added to the list of notifiable diseases in California in June 2016
June 2016	**Respiratory Syncytial Virus, death, under 5 years of age**	Added to the list of notifiable diseases in California in June 2016
June 2016	**Zika Virus infection**	Added to the list of notifiable diseases in California in June 2016; prior to June 2016, Zika was reportable as an Unusual Disease Occurrence.
June 2016	**Anaplasmosis/Ehrlichiosis**	Conditions separated in June 2016.

Appendix: Definitions for Select Notifiable Diseases

Bacterial Meningitis	Excludes meningitis caused by *Neisseria meningitidis*, which is listed separately as Meningococcal Infections.
Cholera	Is caused by *Vibrio cholerae* serogroup O1 or O139.
Meningococcal Infection	Are *N. meningitidis* infections that result in meningitis, meningococcemia or other infections.
Outbreaks	Foodborne outbreaks are defined by 4 or more illnesses with a common food exposure. Other outbreaks of any disease, including those not reportable per CCR Title 17, are defined by an increase in cases above the expected number for a given time period. Additionally, cases may be subjectively classified as an outbreak based on common exposures or other epidemiologic information. In 2011, CDCU changed the way outbreak information was stored and processed; therefore, outbreak data from years before 2011 may not be comparable.
Salmonellosis	Includes the more than 2,500 recognized serotypes of *Salmonella* spp., excluding *S.* Typhi, which causes typhoid fever.
Streptococcal Infection	Individual cases of streptococcal infection are reportable only if diagnosed in foodhandlers or dairy workers.
Typhoid Fever	Is caused by infection with *S.* Typhi.
Vibriosis	Is caused by other *Vibrio cholerae* serogroups (non-O1, non-O139) and other *Vibrio* spp., including *V. parahaemolyticus* and *V. vulnificus*.
Viral Hemorrhagic Fever	Includes hemorrhagic fevers caused by filoviruses (e.g., Ebola, Marburg), arenaviruses (e.g., Lassa fever, Machupo), bunyaviruses (e.g., Crimean-Congo), and flaviviruses (e.g., Omsk). Yellow fever and dengue are listed separately and not included in this category.