



Outbreak of *Salmonella* Serogroup B with Multiple Clusters in Miami-Dade County, March of 2003

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Background

An outbreak of *Salmonella* group B infection was identified during surveillance and investigation activities at the Office of Epidemiology and Disease Control (OEDC). Pork sandwiches prepared by one local restaurant, consumed by three separate groups were the suspected vehicles. One group had a party and the other two groups had family reunions. A total of 24 people are suspected to have been ill. Five confirmed cases, three in the party and one in each of the family reunions, were interviewed. Other linked suspected cases had similar symptoms but did not seek medical attention.

Methods

Interviews of cases are conducted routinely using the OEDC Gastroenteric Questionnaire. Patients are asked about exposures to food at parties, home reunions, and other activities. Through these interviews the connection to the restaurant was identified. The suspected cases were interviewed using either the Gastroenteric Questionnaire or the Foodborne Illness Complaint Form.

All *Salmonella* group B from 2/17/03 to 4/18/03 in the Merlin surveillance

system were identified, and were reviewed or reinterviewed to see if they were connected to the outbreak.

The restaurant was inspected by the Department of Business and Professional Regulation (DBPR) with OEDC members present. Site interviews of the restaurant staff and managers were conducted; along with an evaluation of the food preparation procedures.

Employees' stools were tested to determine if they were any *Salmonella* carriers. One suspected case from the party was also tested. Selected food samples were collected at the facility and tested for *Salmonella*.



Salmonella typhimurium, shown here in culture.
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Results

Epidemiology

A total of 24 cases were identified in three clusters (Figure 1). Of them, five were laboratory confirmed *Salmonella* serogroup B cases and 19 were suspected cases.

Of the 24 cases, 14 (57%) were male. The age range was from 2 to 80 years with a mean of 37 years. The onset date of the first cluster of five cases was shortly after the exposure of March 1, 2003. The second cluster had seven cases after the exposure of March 8. The third cluster had a total of twelve cases and was associated with the party on March 15. One case was of unknown onset but experienced symptoms after the exposure at the party.

The symptoms are summarized in Figure 2 and include symptoms consistent with salmonellosis infection. Of the five confirmed cases, three were hospitalized.

In an analysis in the Merlin Surveillance System, 80 cases of *Salmonella* were identified in Miami-Dade from 2/17/03 to 4/18/03. Of them, 43 cases (53.8%) were identified as serogroup B; and Pulsed Field Gel Electrophoresis (PFGE) information was available on 6 of these cases, but only one sample was from this outbreak.

Preparation of the implicated food and facility investigation

The suspected implicated food in this outbreak is sandwiches made of cut pork meat mixed with chopped onions. This is placed in bread and squirted with "mojo" and salt added. The pork meat comes raw and frozen in pork shoulders that are placed in an oven for five hours. There is no thawing done. The meat is then removed from the bone and cut in pieces with a knife-ax over a cutting board. Mixed with the chopped onions and salt. The bread comes in thin, long, frozen loaves and is baked on site in other ovens after a period of growth in humidified holding shelves. The "mojo" is prepared on site from lemon juice, grapefruit juice, salt, onion and garlic powder. This powder is

a mixture of onion, garlic, spices, MSG and salt. This is a commercial product. This mixing is done in the same bottles from the juices that are saved for reuse. The mixture is kept at room temperature in squirt bottles for condimental use in the sandwiches.

No major violations were found in the inspection conducted by the DBPR. Interviews with the staff revealed no ill foodworkers before, during, or after the time of the outbreak.

Laboratory results

One suspected case linked to the outbreak tested negative for *Salmonella* and other pathogens.

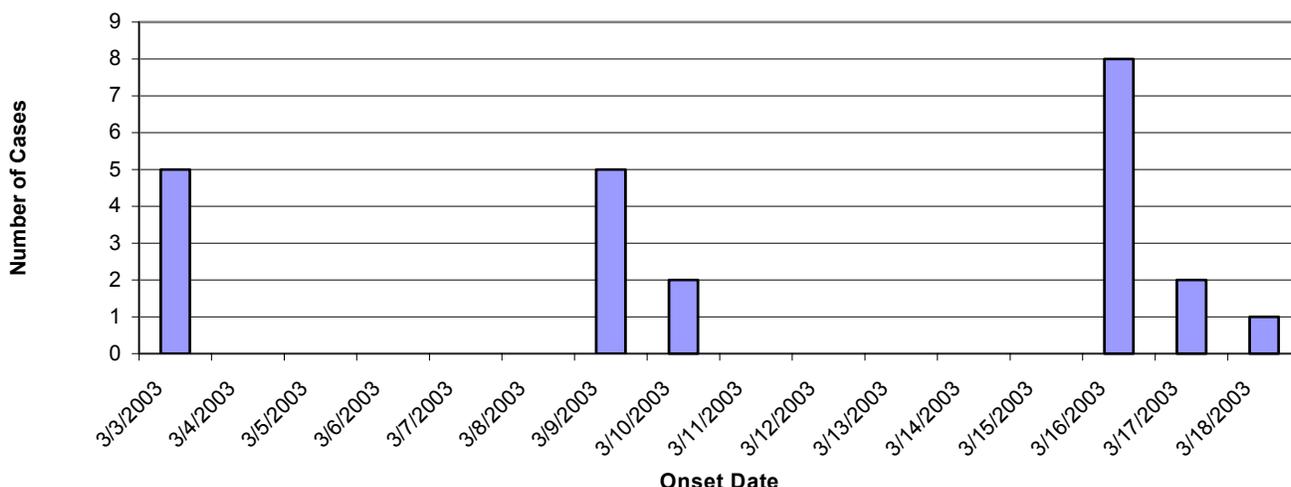
The "mojo" additive to the pork sandwiches tested at the Miami Branch Laboratory, was negative for *Salmonella* but positive for 4 foodborne pathogenic *Bacillus* species (*cereus*, *pumilus*, *subtilis* and *licheniformis*). Table 1 shows a new sample retest of the "mojo" and selected ingredients used at the facility.

Table 1. Test Results of Food Samples.

Food Sample	Organisms Isolated
Chopped fresh onions	<i>B. licheniformis</i> , <i>Enterobacter cloacae</i>
Hot sauce (commercial)	<i>B. licheniformis</i> , <i>B. circulans</i>
Grapefruit juice (commercial)	NO GROWTH
Lemon juice (commercial)	<i>B. circulans</i>
Powdered garlic (commercial)	<i>B. licheniformis</i> <i>sphaericus</i> and <i>megaterum</i>
Complete powdered seasoning (commercial)	<i>B. licheniformis</i> , <i>stearothermophilus</i> and <i>amyloliquefaciens</i>
"Mojo" prepared in-house	<i>B. licheniformis</i> and <i>brevis</i>



Figure 1. Reported Suspected and Confirmed Cases by Onset Date (n=23)



The stool test results on all the foodworkers were negative for Salmonella.

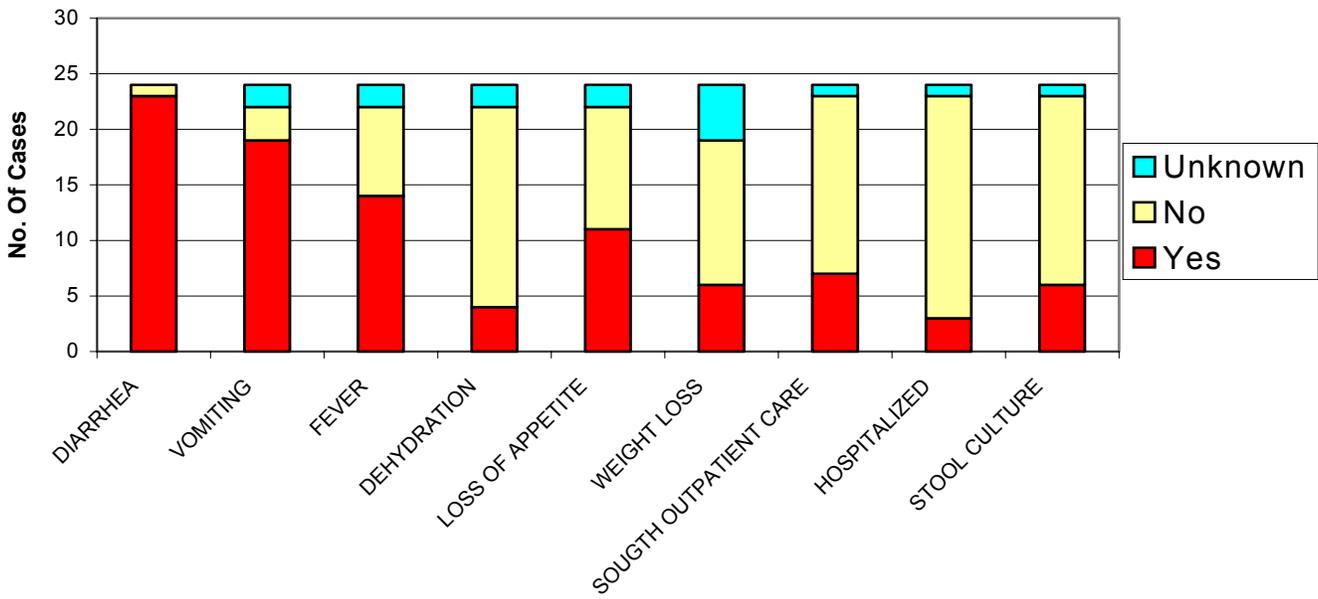
Conclusions

- ◆ The outbreak was discovered by regular surveillance and investigation of Salmonella cases.
- ◆ The reported exposures were on three consecutive Saturdays in March (1,8,15). The facility experiences the highest rate of sales on Saturdays. The outbreak had time (three weeks), place (same facility), vehicle (pork sandwiches), and same pathogen of the same serogroup (*Salmonella* B).
- ◆ The restaurant was visited by DBPR and an inspection done with OEDC members present. No major violations were found. Observation of the preparation of the suspected implicated pork sandwiches did not show any critical points of temperature or cross contamination abuse. All employees cooperated in providing stools.
- ◆ We are not sure if the contamination of the “mojo” product with *Bacillus* spp. is from the preparation or from the ingredients. The product ingredients are not labeled as irradiated, so it may well be contaminated. *Salmonella* was not found in the product but it may not survive long in the very low acidic pH of the final preparation. The original food samples were not available for

- ◆ testing. Possible modes of transmission may include asymptomatic carriers at the time of the outbreak or the organism present in one of the sandwiches’ ingredients.
- ◆ Several barriers to the investigation were found. One was that 19 patients did not seek medical care so no confirmation of linked suspected cases was possible. Another problem was that only one sample from the outbreak positive for *Salmonella* was sent to the Jacksonville Laboratory for PFGE analysis. Therefore, only serotyping could be used to link the cases and clusters.
- ◆ All our enteric illness investigators were alerted to ask about group B isolated food exposures and determined whether they were related to this facility. We continue to monitor new reported cases for exposure to this restaurant. Restaurant staff was reminded of hand-washing and critical points of food preparation and handling. Patients and contacts were educated on salmonellosis disease prevention.



Figure 2. Distribution of Symptoms and Medical Care Use Among All Cases (n=24)

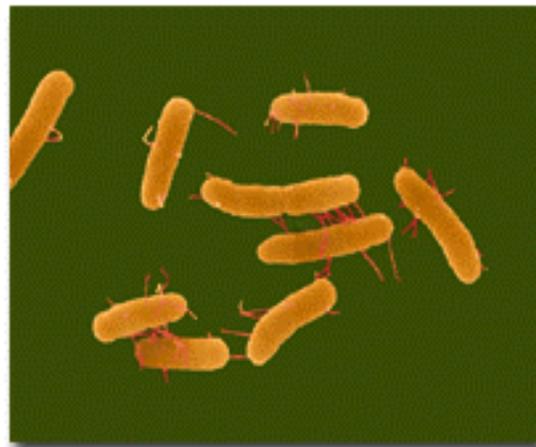


Salmonellosis Infections

Salmonellosis is a reportable infectious disease caused by *Salmonella*. In humans, *Salmonella* are responsible for a variety of clinical syndromes including asymptomatic carriage, self-limited gastroenteritis, bacteremia, enteric fever and metastatic focal infections.

Salmonella are motile, nonencapsulated, gram-negative, facultative anaerobic bacilli of the Enterobacteriaceae family. It has three antigens, somatic antigen (O), flagellar antigen (H), and Vi antigen (*S. Typhi*). The principal reservoirs for non-typhoidal *Salmonella* organisms include poultry, swine, cattle, rodents, iguanas, turtles, terrapins, dogs, and cats. Most people infected with *Salmonella* develop diarrhea, fever and abdominal cramps 12 to 72 hours after infection. The illness usually lasts 4 to 7 days, and most people recover without treatment. However, in some people, the diarrhea is so severe that the patient needs to be hospitalized. The mode of transmission for non-typhoidal *Salmonella* is contaminated food, water, or contact with people or animals with the disease. Miami-Dade County Health Department's Office of Epidemiology and Disease Control received 401 of reported confirmed cases during 2002. In the United States there are an estimated 1.4 million cases annually

and 30,000 of these cases are culture confirmed cases reported to the Centers for Disease Control and Prevention. Every year there are more than 500 fatal cases, and 2 % of these cases are complicated by chronic arthritis.

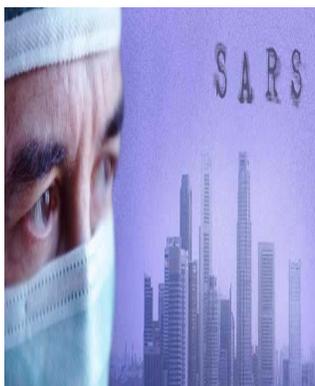


Salmonella Bacterium



Update: Severe Acute Respiratory Syndrome — United States, 2003

[The following article was published on *MMWR*, a weekly publication by CDC (April 25, 2003 /vol. 52 / No. 16). The full article can be downloaded from <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5216a1.htm>]



CDC continues to work with the World Health Organization (WHO) and other partners to investigate cases of severe acute respiratory syndrome (SARS). This report updates information on reported SARS cases worldwide and among

U.S. residents and summarizes information on one additional case with laboratory evidence of infection with the SARS-associated coronavirus (SARS-CoV).

During November 1, 2002 - April 23, 2003, a total of 4,288 SARS cases were reported to WHO from 25 countries, including the United States; 251 deaths (case-fatality proportion: 5.8%) have been reported (1). In the United States as of April 23, a total of 245 SARS cases were reported to CDC from 37 states (Figure). Of these, 39 (16%) had illnesses characterized by the presence of pneumonia or acute respiratory distress syndrome consistent with the interim U.S. surveillance case definition for probable SARS (2). The remaining 206 (84%) had fever and respiratory symptoms (Table). Of the 39 probable SARS patients, 37 (94%) had traveled to mainland China, Hong Kong, Singapore, Hanoi, or Toronto; one (3%) was a health-care worker (HCW) who provided care to a SARS patient, and one (3%) was a household contact of a SARS patient. Twenty-seven (69%) of the probable SARS patients were hospitalized, and one (3%) required mechanical ventilation.

As of April 23, of the 245 reported SARS cases, 45 (18%) have diagnostic SARS-CoV laboratory

findings (i.e., positive findings based on detection of antibody to SARS-CoV in serum or evidence of virus in respiratory specimens by reverse transcriptase polymerase chain reaction analysis, or negative findings based on absence of antibody to SARS-CoV in convalescent serum obtained >21 days after symptom onset). Thirty-nine reported cases (32 suspect and seven probable based on SARS case definition) tested negative for SARS-CoV; six have been identified with laboratory-confirmed SARS-CoV infection, all of which were classified as probable cases. Five of these six patients were described previously (3). Clinical information for the one additional patient and the related public health investigation and actions are summarized below.

Pennsylvania

On April 3, a man aged 52 years had onset of symptoms including fatigue, myalgia, headache, chills, and diaphoresis (sweating). The patient had diarrhea on April 5 and sought care at the emergency department (ED) of hospital A on April 6. A temperature of 100.7° F (38.2° C) was recorded, but diagnostic testing was not performed and he was discharged with a diagnosis of acute viral syndrome. By April 10, despite initiation of oral amoxicillin, his symptoms progressed to include a dry cough, prompting him to visit his primary-care provider. He had no fever or abnormal findings on physical examination. The patient had a chest radiograph at hospital B and phlebotomy at an outpatient laboratory. The chest radiograph was normal. On April 14, the patient went to the ED of hospital B with dehydration, cough, and severe shortness of breath. Bilateral interstitial infiltrates were present on chest radiograph. In the ED, he was identified as a suspect SARS patient approximately 2.5 hours after arrival. He was subsequently admitted to the hospital with a diagnosis of atypical pneumonia and possible SARS, and was placed in an isolation room with negative pressure. Serum samples collected on April 15 (day 12 of illness) demonstrated SARS-CoV antibodies. The patient received supportive care and antibiotic treatment (e.g., levofloxacin for pneumonia and metroni-



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dazole for diarrhea associated with laboratory-confirmed *Clostridium difficile*). By April 17, the patient's shortness of breath improved considerably, and he was discharged on April 21.

The patient had traveled to Toronto, Canada, for a religious retreat during March 29--30; the event has been linked to subsequent SARS cases among the attendees (4). On April 17, a CDC team traveled to Pennsylvania to assist the Pennsylvania Department of Health in its investigation of this patient and his contacts. Twenty-three HCWs (from hospitals A and B, the physician's office, and the outpatient laboratory) who had contact with the patient before his placement in an isolation room in the hospital were evaluated for their types and durations of contact with the patient, their use of personal protective equipment, and their subsequent health status. Six HCWs with unprotected, close contact were furloughed for 10 days after exposure and advised to monitor their temperatures twice daily and to report fever and respiratory symptoms to the hospital's occupational health clinic. The six furloughed HCWs included three persons from hospital B exposed on April 10 and three persons from hospital B exposed on April 14. While furloughed, two HCWs had mild symptoms (sore throat, rhinorrhea, mild cough, or headache), which resolved without treatment. Two additional HCWs (one each from hospital B and the outpatient laboratory) who had mild respiratory symptoms subsequently were furloughed from work, although neither had fever $>100.4^{\circ}\text{F}$ ($>38.0^{\circ}\text{C}$) or evidence of SARS on clinical evaluation. After the man was identified as a potential SARS patient, HCWs in hospital B used fit-tested N95 respirators and wore gowns and gloves but did not wear eye protection.

The patient had close contact with four family members before SARS was diagnosed. Beginning April 9, the patient and his family members reported intermittently wearing surgical masks during close contact. One family member reported illness consistent with the case definition for suspect SARS; however, symptom onset occurred before contact with the index patient; this family member's illness has resolved and persons who had contact with this family member are being monitored. Among six additional nonfamily contacts, one reported new respiratory symptoms since exposure,

but continues to be without fever or other symptoms of SARS. The investigation is ongoing and SARS-CoV testing of specimens from all contacts is under way.

TABLE. Number* and percentage of reported severe acute respiratory syndrome (SARS) cases, by selected characteristics — United States, 2003

Characteristic	Probable cases* (n = 39)		Suspect cases* (n = 206)	
	No.	(%)	No.	(%)
Age (yrs)				
0-4	2	(5)	30	(15)
5-9	0	(0)	11	(5)
10-17	1	(3)	1	(0)
18-64	28	(72)	137	(67)
≥ 65	7	(18)	22	(11)
Unknown	1	(3)	5	(2)
Sex				
Female	19	(49)	100	(49)
Male	19	(49)	105	(51)
Unknown	1	(3)	1	(0)
Race				
White	19	(49)	112	(54)
Black	0	(0)	5	(2)
Asian	17	(44)	74	(36)
Other	0	(0)	1	(0)
Unknown	3	(8)	14	(7)
Exposure				
Travel [§]	37	(95)	187	(91)
Close contact	1	(3)	15	(7)
Health-care worker	1	(3)	4	(2)
Hospitalized >24 hrs[¶]				
Yes	27	(69)	47	(23)
No	11	(28)	156	(76)
Unknown	1	(3)	3	(1)
Required mechanical ventilation				
Yes	1	(3)	1	(0)
No	37	(94)	201	(98)
Unknown	1	(3)	4	(2)
SARS-associated novel coronavirus laboratory findings				
Positive	6	(15)	0	(0)
Negative	7	(18)	32	(15)
Pending**	26	(67)	174	(85)

* N = 245.

† Reference 2.

§ To mainland China, Hong Kong, Hanoi, Singapore, or Toronto.

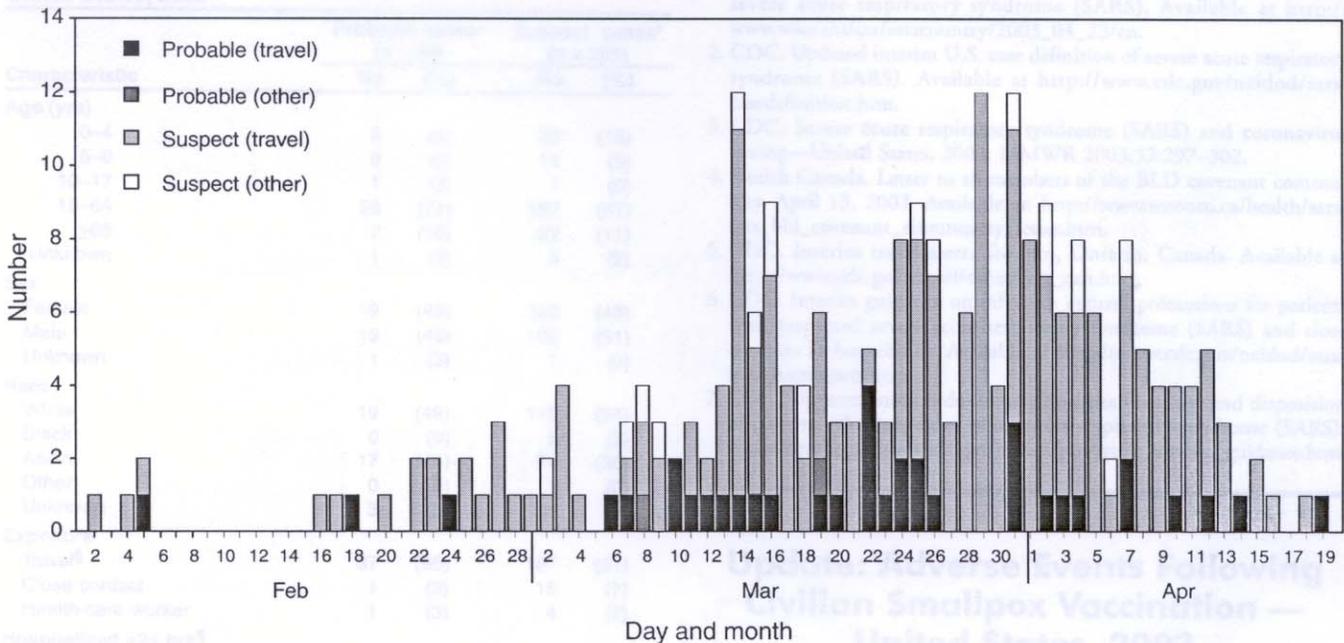
¶ As of April 23, no deaths of SARS patients have been reported in the United States.

** Collection and/or laboratory testing of specimens in progress.

Reported by: State and local health departments. SARS Investigative Team; A Peck, MD, C Newbern, PhD, EIS officers, CDC.



FIGURE. Number of reported cases* of severe acute respiratory syndrome, by classification, exposure category,† and date of illness onset — United States, 2002



*N = 245.

Editorial Note:

The majority of suspect and probable cases of SARS in the United States continue to be travel associated, with only limited secondary spread to contacts such as family members and HCWs. Toronto has been added to the list of areas with suspected or documented community transmission of SARS included in the interim U.S. SARS case definition (2).

SARS transmission in Toronto has been limited to a small number of hospitals, households, and specific community settings. In particular, cases of SARS have been documented among some members of a religious community who attended a large gathering in Toronto in late March; some of these persons infected members of their households and other close contacts (4). In response to these reports, CDC recommended that U.S. travelers to Toronto observe precautions to safeguard their health, including avoidance of places in which SARS is most likely to be transmitted (e.g., Toronto health-care facilities) (5). The Pennsylvania resident who attended this religious meeting is the only reported U.S. patient with SARS associated with travel to Toronto.

The availability of diagnostic testing for SARS-CoV is critical to more precisely characterize the epidemiology and clinical spectrum of the SARS epidemic, both worldwide and in the United States.

Many U.S. patients, particularly those with milder clinical illness, have tested negative for SARS-CoV, reflecting the low specificity of the current case definition, which captures persons with respiratory infections caused by other infectious agents, and underscoring the importance of obtaining convalescent serum samples to make a final determination about infection with SARS-CoV. CDC is planning to update its interim surveillance case definition for SARS to include laboratory criteria in addition to the clinical and epidemiologic criteria.



Monthly Report

Selected Reportable Diseases/Conditions in Miami-Dade County, March 2003

Diseases/Conditions	2003 this Month	2003 Year to Date	2002 Year to Date	2001 Year to Date	2000 Year to Date	1999 Year to Date
AIDS ^{Provisional}	113	306	313	368	389	391
Campylobacteriosis	11	28	16	22	7	10
Chancroid	0	0	0	0	0	0
<i>Chlamydia trachomatis</i>	260	783	1107	735	849	1107
Ciguatera Poisoning	0	0	0	0	0	0
Cryptosporidiosis	1	3	1	4	1	0
Cyclosporiasis	0	0	0	0	0	0
Diphtheria	0	0	0	0	0	0
<i>E. coli</i> , O157:H7	0	0	0	0	0	0
<i>E. coli</i> , Other	0	0	0	0	0	0
Encephalitis	0	0	1	0	0	0
Giardiasis, Acute	14	29	32	42	2	4
Gonorrhea	128	390	524	395	621	745
Granuloma Inguinale	0	0	0	0	0	0
<i>Haemophilus influenzae</i> B (invasive)	2	2	0	2	1	0
Hepatitis A	5	7	14	33	15	8
Hepatitis B	3	5	3	7	10	8
HIV ^{Provisional}	155	421	449	323	379	337
Lead Poisoning	23	42	44	46	93	71
Legionnaire's Disease	0	0	0	0	0	0
Leptospirosis	0	0	0	0	0	0
Lyme disease	0	0	0	0	0	0
Lymphogranuloma Venereum	0	0	0	0	0	0
Malaria	2	4	2	8	0	6
Measles	0	0	0	0	0	0
Meningitis (except aseptic)	1	1	2	1	4	1
Meningococcal Disease	0	2	4	4	5	3
Mumps	0	0	0	0	0	1
Pertussis	0	0	0	0	0	2
Polio	0	0	0	0	0	0
Rabies, Animal	0	0	0	0	0	0
Rubella	0	0	0	0	0	0
Salmonellosis	26	62	53	35	24	24
Shigellosis	20	56	32	21	19	25
<i>Streptococcus pneumoniae</i> , Drug Resistant	19	29	25	43	33	6
Syphilis, Infectious	13	45	48	49	40	20
Syphilis, Other	99	275	282	115	224	294
Tetanus	0	0	0	0	0	0
Toxoplasmosis	2	3	3	1	0	0
Tuberculosis ^{Provisional}	27	58	58	39	48	47

* Data on AIDS are provisional at the county level and are subject to edit checks by state and federal agencies.

** Data on tuberculosis are provisional at the county level.

