

# Florida Morbidity Statistics

2007



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Division of Disease Control  
Bureau of Epidemiology  
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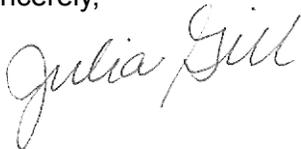
The theme of this year's Florida Morbidity Statistics Report is the development and integration of technology in the Bureau of Epidemiology. The systems that are discussed in the introductory section support disease control efforts by allowing quick access to data and data analysis tools. These efforts would not be possible without collaboration with information technology (IT) professionals within the Florida Department of Health as well as IT professionals within external health systems.

Collaboration is one of the reasons that the Bureau of Epidemiology is so proud of this publication which is produced through the combined efforts of many within as well as outside the Florida Department of Health. One of our most important partnerships outside of the Florida Department of Health is with the physicians, nurses, laboratorians, hospital infection control practitioners and other health care professionals that participate in notifiable disease surveillance. Without their participation, our knowledge of infectious disease epidemiology within the state would be much more limited. Additionally, the Bureau of Epidemiology would like to thank the other program areas within the Florida Department of Health that contributed information to this report including the Bureau of Immunization, Bureau of HIV/AIDS, Bureau of Sexually Transmitted Diseases Prevention and Control, Bureau of Tuberculosis Control and Refugee Health, and the Bureau of Environmental Public Health Medicine. Finally, many thanks are extended to the County Health Department staff and other public health professionals that are involved in notifiable disease surveillance, either through disease control activities, case investigations, data collection, or other essential functions. This year we were pleased to have a record number of County Health Department employees submit summaries to be included in Section 4: Summary of Notable Outbreaks and Case Investigations, 2007.

Tracking these diseases is a cooperative effort which requires all areas of public health to interact and work in a collaborative and efficient way. The goal of this effort is to identify cases where public health action can be taken to prevent and control disease. These actions and responses help to achieve the Florida Department of Health mission to promote, protect and improve the health of all people in Florida.

We hope readers will find this document useful when setting priorities and directions for action at the individual and community levels to improve the health of all Floridians.

Sincerely,

A handwritten signature in cursive script that reads "Julia Gill".

Julia Gill, PhD, MPH  
Chief, Bureau of Epidemiology



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## Introduction

### Purpose

The Florida morbidity report is compiled to:

1. summarize annual morbidity from notifiable acute communicable and environmental diseases, and cancer in Florida;
2. describe patterns of disease as an aid in directing future disease prevention and control efforts; and,
3. provide a resource to medical and public health authorities at county, state and national levels.

### Report Format

This report is divided into 7 sections:

Section 1: Summary of Selected Notifiable Diseases and Conditions

Section 2: Selected Notifiable Diseases and Conditions

Section 3: Summary of Foodborne Disease

Section 4: Summary of Notable Outbreaks and Case Investigations

Section 5: Abstracts of Recently Published Papers and Reports

Section 6: Summary of Cancer Data

Section 7: Summary of Revisions to Florida's Notifiable Disease Reporting Statute (Chapter 64D-3 F.A.C.).

### Data Sources

Data presented in this report are based on reportable disease information received by county and state health department staff from physicians, hospitals, and laboratories throughout the state. Data on occurrence of reportable diseases in Florida were obtained through passive and sometimes active surveillance. Reporting suspect and confirmed notifiable diseases or conditions in the State of Florida is mandated under Florida Statute 381.0031, Chapter 64D-3, *Florida Administrative Code (F.A.C.)*. Persons in charge of laboratories, practitioners, hospitals, medical facilities, schools, nursing homes, state institutions, or other locations providing health services are required to report diseases or conditions and the associated laboratory test results listed in the Table of Notifiable Diseases or Conditions, Chapter 64D-3 F.A.C. Reporting test results by a laboratory does not nullify the practitioner's obligation to also report the disease or condition. These data are the basis for providing useful information on reportable diseases and conditions in Florida to health care workers and policymakers, and would not be possible without the cooperation of the extensive network involving both private and public sector participants.

1. Passive surveillance relies on physicians, laboratories, and other health-care providers to report diseases to the Florida Department of Health using a confidential morbidity report form, electronically, by telephone, or by facsimile.
2. Active surveillance entails Florida Department of Health staff regularly contacting hospitals, laboratories and physicians in an effort to identify all cases of a given disease.
3. Increasingly, information about cases of reportable diseases is passed from providers, especially laboratories, to the Florida DOH as electronic records, which occurs automatically.

## Interpreting the Data

This report should be interpreted in light of the following limitations:

### 1. Underreporting

Evaluations of infectious disease reporting systems have, in general, indicated that the completeness of reporting varies by disease: the less common, more severe reportable diseases such as bacterial meningitis, diphtheria, polio, botulism, anthrax, tuberculosis, and congenital syphilis are more completely reported than the more common but (individually) less severe diseases such as hepatitis A or campylobacteriosis. Variation in reported disease incidence at the local level probably reflects to varying degrees both differences in the true incidence of disease and differences in the vigor with which surveillance is performed.

### 2. Reliability of Rates

All incidence rates in this report are expressed as the number of reported cases of a disease per 100,000 population unless otherwise specified. Animal rabies is only reported as the number of cases, because no reliable denominators exist for animal populations. Rates for diseases with only a few cases reported per year can be unstable, and should be interpreted with caution. The observation of zero events is especially hazardous. To account for these instabilities, all rates in the report based on fewer than 19 events are considered unreliable. This translates into a relative standard error of the rate of 23% or more, which is the cut-off for rate reliability used by the National Center for Health Statistics.

### 3. Reporting Period

The data in this report are aggregated by the date the case was reported to the Bureau of Epidemiology for each of the years presented, beginning January 1 and ending December 31. Frequency counts included only cases reported during this time. In some cases diseases reported in 2007 may have onset dates in 2006. For some cases, date of onset or diagnosis may be in a different year than date of report.

### 4. Case Definition

Cases are classified as confirmed, probable, or suspected at the local level, using a published set of surveillance case definitions (Surveillance Case Definitions for Select Reportable Diseases in Florida). For cases of selected diseases, these classifications are reviewed at the state level. In this report confirmed and probable cases have been included for all diseases, but no suspected cases have been included.

### 5. Place of Acquisition of Disease or Condition

The distribution of cases among Florida counties was determined by the patient's reported county of residence. Cases were allocated to their county of residence regardless of where they became ill or were hospitalized, diagnosed, or exposed. Cases in people whose official residence was outside the state of Florida, but who became ill or were hospitalized or diagnosed in Florida, were not included. These cases were referred through an interstate reciprocal notification system to the state where the patient resided.

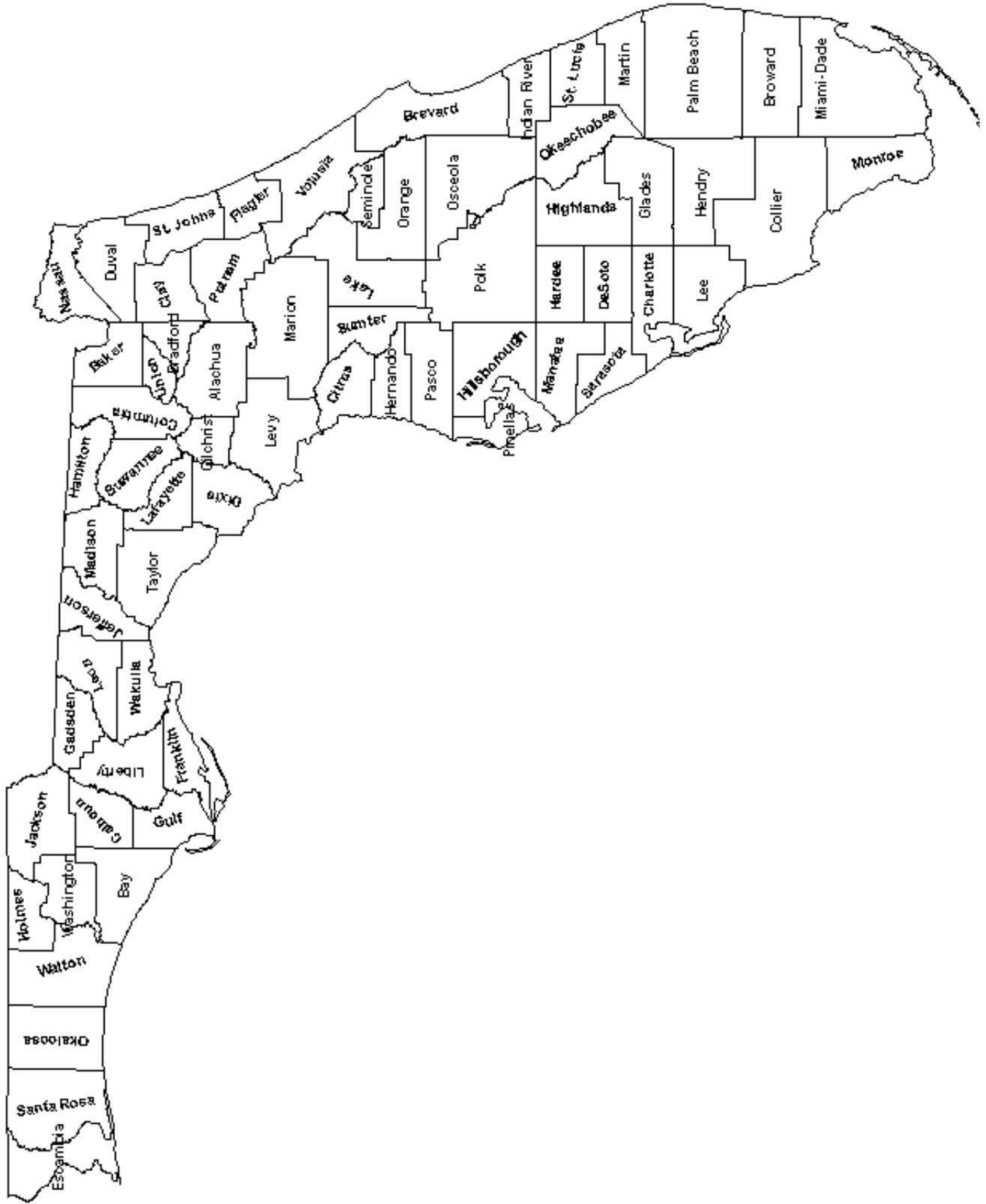
### 6. Population Estimates

All population estimates are from the Community Health Assessment Resource Tool Set (CHARTS). The CHARTS system receives its estimates from the Florida Legislature's Office of Economic and Demographic Research (EDR). Estimates are updated once per year in the CHARTS system. Note that previous editions of this report may show somewhat different populations for a given year than the ones shown here, as these estimates are revised periodically.

7. Incomplete Case Information

Certain analyses may not include all reportable cases of a specific disease due to incomplete case information. For graphs denoting month of onset, it is important to note that only those cases of disease for which an onset date could be determined are included.

# Florida County Boundaries



**Table A. Florida Population by Year and County, 1998-2007. (Source – Florida CHARTS; accessed June 2008)**

County	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
State Total	15,011,697	15,309,968	15,679,606	16,074,896	16,412,296	16,772,201	17,164,199	17,613,368	18,018,497	18,440,700	18,762,014
Alachua	205,414	208,156	213,346	219,239	224,397	229,524	232,110	237,374	241,858	244,648	248,637
Baker	20,801	20,782	21,498	22,388	22,641	23,105	23,472	24,069	23,980	25,216	25,765
Bay	141,889	144,693	147,075	148,692	150,748	152,818	155,414	159,108	162,499	166,160	168,350
Bradford	25,368	25,496	25,767	26,110	26,136	26,649	27,084	27,865	28,195	28,685	29,150
Brevard	454,738	461,493	469,515	478,541	487,131	497,429	510,622	524,046	534,596	545,460	555,003
Broward	1,515,711	1,551,039	1,590,361	1,631,445	1,654,923	1,673,972	1,706,363	1,730,580	1,746,603	1,755,392	1,770,651
Calhoun	12,538	12,611	12,863	13,038	13,101	13,286	13,491	13,636	14,011	14,192	14,550
Charlotte	133,308	135,610	139,032	142,357	145,481	149,486	152,865	158,006	153,788	161,731	165,585
Citrus	111,629	113,914	116,208	118,689	121,078	123,704	126,475	129,822	133,472	137,690	140,938
Clay	128,654	133,044	137,357	141,331	144,161	151,746	157,325	164,868	171,118	178,922	186,248
Collier	217,914	229,929	242,408	254,571	267,632	281,148	295,848	309,369	320,859	327,945	334,631
Columbia	53,088	54,314	55,446	56,683	57,354	58,537	59,218	60,821	61,744	64,052	65,786
Dade	2,152,720	2,179,945	2,219,329	2,262,902	2,292,316	2,320,465	2,354,404	2,388,138	2,432,276	2,442,170	2,469,223
Desoto	29,333	30,389	31,436	32,404	32,741	32,959	33,912	34,220	32,391	33,353	33,896
Dixie	12,946	13,152	13,559	13,883	14,154	14,530	14,768	15,054	15,482	15,715	15,882
Duval	746,515	758,691	767,860	782,691	797,566	813,817	829,937	843,772	865,965	883,875	902,361
Escambia	285,819	288,240	292,937	294,911	297,321	300,421	304,165	308,068	303,240	310,617	312,682
Flagler	42,474	44,897	47,559	50,620	53,881	58,004	62,511	71,004	80,559	90,663	94,889
Franklin	9,626	9,669	9,710	9,871	9,974	10,250	10,530	10,682	10,909	12,082	12,278
Gadsden	44,582	45,011	45,312	45,070	45,419	46,073	46,600	46,965	47,883	48,380	49,235
Gilchrist	12,937	13,554	13,980	14,533	14,759	15,140	15,637	16,016	16,303	16,812	17,226
Glades	9,867	10,090	10,407	10,595	10,624	10,675	10,759	10,763	10,743	10,849	11,120
Gulf	13,201	13,204	13,559	14,785	15,101	15,290	15,691	16,235	16,543	16,565	16,889
Hamilton	12,187	12,472	12,831	13,457	13,792	13,952	14,039	14,346	14,319	14,571	14,751
Hardee	25,601	26,215	26,543	26,952	27,021	27,474	27,434	27,898	27,277	27,240	27,622
Hendry	33,687	34,533	35,608	36,300	36,256	36,174	36,739	37,800	38,610	38,870	39,879
Hernando	123,377	126,176	128,733	131,298	133,497	137,613	141,574	146,118	152,049	158,441	163,401
Highlands	82,484	84,012	85,892	87,676	88,373	89,343	90,770	92,456	93,807	97,336	99,165
Hillsborough	934,544	950,947	978,079	1,005,808	1,034,164	1,062,140	1,085,318	1,114,774	1,137,583	1,171,585	1,197,176
Holmes	17,934	18,011	18,371	18,620	18,713	18,746	18,983	19,027	19,189	19,525	19,476
Indian River	105,148	107,231	110,142	113,755	116,291	118,884	121,887	127,831	130,849	136,546	140,675
Jackson	45,244	45,734	46,050	46,998	47,534	47,963	49,218	48,891	49,883	50,286	50,627

County	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Jefferson	13,063	13,237	13,307	12,874	13,107	13,329	13,618	14,110	14,265	14,390	14,528
Lafayette	6,649	6,653	6,703	7,061	7,076	7,245	7,394	7,559	8,064	8,092	8,242
Lake	190,097	196,543	204,152	212,823	222,988	233,622	242,919	254,246	265,716	279,583	288,807
Lee	405,640	417,030	430,644	444,151	459,278	481,014	499,387	526,157	555,874	594,219	621,401
Leon	227,612	232,476	236,658	240,631	245,070	249,744	256,921	265,258	272,749	272,573	273,460
Levy	31,713	32,845	33,759	34,626	35,325	36,197	36,856	37,691	38,136	39,277	40,223
Liberty	6,806	6,772	6,967	7,045	7,145	7,165	7,248	7,372	7,623	7,784	7,791
Madison	18,182	18,370	18,596	18,775	18,878	18,974	19,183	19,564	19,738	19,846	19,988
Manatee	246,838	252,397	259,039	265,701	272,342	279,366	288,888	297,037	306,557	309,952	317,646
Marion	238,739	244,918	253,235	260,407	265,629	273,602	284,232	295,550	307,646	317,755	326,958
Martin	119,230	122,482	124,952	127,430	129,415	132,009	135,280	138,329	141,871	142,859	144,340
Monroe	79,850	79,738	79,875	79,721	80,850	81,030	80,473	81,336	82,628	80,055	79,203
Nassau	52,308	53,727	56,022	58,037	59,452	61,643	63,523	65,478	66,019	68,662	69,904
Okaloosa	161,597	164,531	167,880	171,264	174,228	178,036	182,020	186,744	189,766	193,668	197,536
Okeechobee	34,562	34,932	35,452	35,998	36,211	36,715	37,377	38,153	37,752	38,821	39,137
Orange	816,075	835,119	864,197	906,000	936,749	962,531	989,962	1,021,215	1,050,939	1,087,172	1,112,158
Osceola	148,603	154,021	166,024	174,107	182,202	197,901	213,723	228,755	237,659	259,521	268,595
Palm Beach	1,051,581	1,077,422	1,107,053	1,137,532	1,160,977	1,190,653	1,218,508	1,249,598	1,272,335	1,290,600	1,299,341
Pasco	322,705	329,192	337,348	346,882	354,196	364,900	378,085	392,507	410,758	427,594	436,787
Pinellas	901,901	909,434	917,331	923,308	930,602	935,274	941,435	944,966	948,925	947,122	945,437
Polk	455,930	464,207	475,268	487,183	498,011	504,381	514,247	531,472	545,064	570,067	584,133
Putnam	69,091	69,527	70,029	70,532	70,929	71,481	72,114	73,435	73,897	74,549	74,914
Saint Johns	109,055	113,097	118,249	124,613	129,880	135,467	141,216	151,114	159,168	167,553	175,384
Saint Lucie	181,316	185,250	189,330	194,062	199,390	205,396	213,614	228,480	243,061	263,319	274,213
Santa Rosa	106,800	111,025	115,333	118,605	122,252	125,947	129,842	134,761	137,245	142,004	142,456
Sarasota	309,333	314,418	319,980	328,135	335,428	341,784	350,664	360,214	370,123	381,828	389,285
Seminole	340,527	347,636	357,714	368,231	380,763	389,549	396,934	405,565	413,937	422,288	427,131
Sumter	44,533	47,684	50,539	54,203	58,083	61,979	63,522	67,221	75,660	84,687	90,750
Suwannee	32,591	33,423	34,226	35,091	35,744	35,815	37,479	37,863	38,319	39,008	39,780
Taylor	18,887	19,102	19,264	19,297	19,594	19,878	20,794	20,977	21,395	21,696	22,616
Union	12,716	13,071	13,335	13,473	13,660	13,786	13,793	14,752	15,135	15,160	15,816
Volusia	420,574	427,865	436,218	445,676	453,840	462,377	473,185	486,874	497,224	505,317	509,464
Wakulla	19,417	20,787	21,917	23,150	23,936	24,340	25,141	25,692	27,193	28,727	29,548
Walton	35,830	37,275	39,387	40,990	43,270	46,052	47,472	51,167	54,218	56,199	57,418
Washington	20,068	20,508	20,850	21,069	21,516	21,702	21,987	22,534	23,255	23,179	23,877

**Table B. Florida Population  
by Age Group, 2007**

<b>Age Group in Years</b>	<b>Population</b>
< 1	222,955
1-4	891,819
5-9	1,146,029
10-14	1,179,377
15-19	1,214,911
20-24	1,206,669
25-34	2,275,868
35-44	2,548,694
45-54	2,651,032
55-64	2,193,057
65-74	1,582,395
75-84	1,184,051
85+	465,157
<b>Total</b>	<b>18,762,014</b>

**Table C. Florida Population  
by Gender, 2007**

<b>Gender</b>	<b>Population</b>
Male	9,184,752
Female	9,577,262
<b>Total</b>	<b>18,762,014</b>

**Table D. Florida Population by Race,  
Aggregated to White and Non-White,  
2007**

<b>Race</b>	<b>Population</b>
White	15,139,870
Non-White	3,622,144
<b>Total</b>	<b>18,762,014</b>

## List of Reportable Diseases/Conditions in Florida, 2007

Section 381.0031 (1,2), Florida Statutes, provides that “Any practitioner, licensed in Florida to practice medicine, osteopathic medicine, chiropractic, naturopathy, or veterinary medicine, who diagnoses or suspects the existence of a disease of public health significance shall immediately report the fact to the Department of Health.” County health departments serve as the Department’s representative in this reporting requirement. Furthermore, this Section provides that “Periodically the Department shall issue a list of diseases determined by it to be of public health significance...and shall furnish a copy of said list to the practitioners...”. This list reflects updates made in November, 2006.

Acquired Immune Deficiency Syndrome (AIDS)	Malaria
Anthrax	Measles (Rubeola)
Botulism	Melioidosis
Brucellosis	Meningitis (bacterial, cryptococcal, mycotic)
California Serogroup Virus (neuroinvasive and non-neuroinvasive)	Meningococcal Disease (includes meningitis and meningococemia)
Campylobacteriosis	Mercury Poisoning
Cancer (except non melanoma skin cancer, and including benign and borderline intracranial and CNS tumors)	Mumps
Chancroid	Neurotoxic Shellfish Poisoning
Chlamydia	Pertussis
Cholera	Pesticide-Related Illness and Injury
Ciguatera Fish Poisoning (Ciguatera)	Plague
<i>Clostridium perfringens</i> , epsilon toxin (disease due to)	Poliomyelitis
Congenital Anomalies	Psittacosis (Ornithosis)
Conjunctivitis (in neonates $\leq$ 14 days old)	Q Fever
Creutzfeldt-Jakob Disease (CJD)	Rabies (human, animal)
Cryptosporidiosis	Rabies (possible exposure)
Cyclosporiasis	Ricin toxicity
Dengue	Rocky Mountain Spotted Fever
Diphtheria	Rubella (including congenital)
Eastern Equine Encephalitis Virus Disease (neuroinvasive and non-neuroinvasive)	St. Louis Encephalitis (SLE) Virus Disease (neuroinvasive and non-neuroinvasive)
Ehrlichiosis [human granulocytic (HGE), human monocytic (HME), human other or unspecified agent]	Salmonellosis
Encephalitis, Other (non-arboviral)	Saxitoxin Poisoning (including paralytic shellfish poisoning)
Enteric diseases due to:	Severe Acute Respiratory Syndrome-associated <i>Coronavirus</i> (SARS-CoV) Disease
<i>Escherichia coli</i> , O157:H7	Shigellosis
<i>Escherichia coli</i> , Other (known serotypes)	Smallpox
Giardiasis (acute)	<i>Staphylococcus aureus</i> (with intermediate or full resistance to vancomycin, VISA, VRSA)
Glanders	<i>Staphylococcus</i> Enterotoxin B
Gonorrhea	Streptococcal Disease (invasive, Group A)
Granuloma inguinale	<i>Streptococcus pneumoniae</i> (invasive disease)
<i>Haemophilus influenzae</i> (meningitis and invasive disease)	Syphilis
Hansen’s Disease (Leprosy)	Tetanus
Hantavirus Infection	Toxoplasmosis (acute)
Hemolytic Uremic Syndrome	Trichinosis
Hepatitis A	Tuberculosis
Hepatitis B, C, D, E, and G	Tularemia
Hepatitis B Surface Antigen (HBsAg) Positive in a Pregnant Woman or a Child $\leq$ 24 Months of Age	Typhoid Fever
Herpes Simplex Virus (HSV) [in Infants to 6 months of age; anogenital in children $\leq$ 12 yrs]	Typhus Fever (epidemic and endemic)
Human Immunodeficiency Virus (HIV)	Vaccinia Disease
Human Papillomavirus (HPV) [in children $\leq$ 6 years; anogenital in children $\leq$ 12 yrs, cancer associated strains]	Varicella
Influenza Due to Novel or Pandemic Strains	Varicella Mortality
Influenza-associated Pediatric Mortality (in persons aged < 18 yrs)	Venezuelan Equine Encephalitis Virus Disease (neuroinvasive and non-neuroinvasive)
Lead Poisoning	Vibriosis ( <i>Vibrio</i> infections)
Legionellosis	Viral Hemorrhagic Fevers (Ebola, Marburg, Lassa, Machupo)
Leptospirosis	West Nile Virus Disease (neuroinvasive and non-neuroinvasive)
Listeriosis	Western Equine Encephalitis Virus Disease (neuroinvasive and non-neuroinvasive)
Lyme Disease	Yellow Fever
Lymphogranuloma venereum (LGV)	Any disease outbreak
	Any grouping or clustering

## **Selected Florida Department of Health Contacts**

### **Division of Disease Control**

Bureau of Epidemiology	(850) 245-4401 (accessible 24/7)
Bureau of Immunization	(850) 245-4342
Bureau of HIV/AIDS	(850) 245-4334
Bureau of Sexually Transmitted Diseases Control and Prevention	(850) 245-4303
Bureau of Tuberculosis and Refugee Health	(850) 245-4350

### **Division of Environmental Health**

Bureau of Environmental Public Health Medicine	(850) 245-4277
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## Public Health Disease Surveillance Developments in the Bureau of Epidemiology

Public health surveillance is defined as “the ongoing systematic collection, analysis, interpretation, and dissemination of data regarding health-related events for use in public health action to reduce morbidity and mortality and to improve health”(1). Public health surveillance systems provide the fundamental data and tools that the epidemiologist uses as the scientific basis for making informed decisions. The purpose of this summary is to briefly describe recent public health surveillance system developments in the Bureau of Epidemiology.

Florida Statute 381.0031 gives the Department of Health the responsibility to control communicable diseases and conditions which may significantly affect public health. One way this goal is achieved is by monitoring those diseases and conditions that have been identified as having a significant impact on the health of the State, through a high incidence or severe disease outcomes. Four key items are assessed when determining if a disease or condition is of public health significance and needs to be placed on the list of notifiable diseases for public health surveillance: 1) there will be an urgent public health response to every individual case; 2) there will be an urgent public health response to clusters or outbreaks of the disease; 3) there is information that needs to be collected about occurrence and exposures to design prevention programs; 4) or there is information that needs to be collected to assess effectiveness of control programs. Careful evaluation is important as making a disease or condition notifiable is not the only manner in which to conduct surveillance.

If a disease or condition is deemed appropriate to be placed under public health surveillance as a reportable disease, it is included in the *Diseases or Conditions to Be Reported* section of *Florida Administrative Code (F.A.C.)* Chapter, 64D-3.029. Health care professionals who operate within the State of Florida, and certain licensed health care facilities like hospitals and laboratories, are responsible for complying with the Rule and must report cases, or suspected cases, of those diseases under public health surveillance to the Florida Department of Health (FDOH).

The majority of notifiable disease reports come from hospital infection control practitioners and clinical laboratories. The methods of reporting and reporting time frames are slightly different for practitioners and laboratories; also, there is a slight variation in the diseases or conditions that are reportable for each group (a complete explanation of the reporting requirements can be viewed in the *F.A.C.* 64D-3.028, through 64D-3.033).

In addition to the two main sources, notifiable disease case reports are also received from many other sources including physicians, blood banks, school nurses, hospices, assisted living facilities, nursing homes, charitable groups, daycare center operators, cruise operators, and private citizens, etc. These groups also partner with the FDOH to conduct other important public health surveillance activities for non-notifiable disease surveillance such as the Florida Sentinel Physician Influenza Surveillance Network. This program plays a vital role in monitoring influenza surveillance activity each season and is designed to detect the start, peak, and wane of the influenza season. (For more information about influenza surveillance please visit [http://www.doh.state.fl.us/disease\\_ctrl/epi/htopics/flu/index.htm](http://www.doh.state.fl.us/disease_ctrl/epi/htopics/flu/index.htm))

## **Integration of Technology for Notifiable Disease Surveillance**

Prior to January, 2001 paper copies of morbidity reports were received by the Bureau of Epidemiology from each of the County Health Department (CHD) offices on a weekly basis. Staff at the Bureau of Epidemiology then entered the case data as well as any laboratory testing information into an electronic database that was managed using EpiInfo software. The paper-based notifiable surveillance system was inadequate for meeting the needs of modern surveillance activities particularly in a state with over 18 million residents. The process was slow, time consuming, and error prone. It led to errors with data entry and required state staff to contact the CHD office with questions about their submissions. Eliminating duplicate reporting of cases was difficult.

Beginning in February 2000, the Bureau of Epidemiology worked with an outside contractor to design and develop an electronic system for managing the surveillance and reporting process of notifiable disease reports. This system was called Merlin, and after a brief pilot period, was available for use by all the 67 counties in January, 2001. Merlin is a person-centric surveillance system, making it is easy to see if there are multiple disease occurrences for one individual over time. Merlin allows for the electronic entry of patient information, case information, laboratory data, interview questions, and other pertinent data. Once data is entered into the system the data associated with a case are immediately available to all staff with access to the Merlin system including those at the State Health Office. This system allows for more timely reporting from the CHD to the Bureau of Epidemiology, and subsequently, data transmission from the Bureau of Epidemiology to the Centers for Disease Control and Prevention. Each CHD has electronic access to all of their cases including those previously reported. This allows for easy case updating when new information is obtained. Merlin also has built in analysis and visualization functions that help to summarize and display notifiable disease data on a zip code, county, and state level as well as by time. Merlin continues to evolve as new features and functionality are added and the process flow is improved.

Major modules developed since Merlin's initial implementation handle data related to lead poisoning, perinatal hepatitis B, rabies, electronic laboratory reporting and disease outbreaks. Merlin interfaces with the Food- Water- and Vectorborne Surveillance System (FWVSS) operated by the Division of Environmental Health by providing a daily data feed.

The Merlin Outbreak Module (MOM) is a tool for documenting and analyzing outbreaks and unusual disease occurrences investigated by county health department epidemiology programs and the State Health Office. The MOM is highly integrated with the surveillance module so there is a ready exchange of records from surveillance application to outbreak module. The MOM facilitates more complete outbreak reporting, provides a tool to CHDs to guide and train staff in outbreak investigation and epidemiology, provides a drop-in surveillance tool using the statewide central database and provides a simple way for state staff to assist counties to manage outbreaks. The MOM has been evaluated against Public Health Information Network (PHIN) early event detection standards and additional enhancements are planned for release in fall 2008.

EpiCom (described below) serves as an information-sharing and alert network for epidemiologists and their partners, accessible to users outside the DOH firewall. Following PHIN guidance, Merlin and EpiCom systems now function with a seamless user interface. Integration of Merlin and EpiCom has de-segregated the data collection and data dissemination through the creation of a single portal to report diseases and receive information. System enhancements include a seamless user interface for Merlin and EpiCom, single sign-on feature, email alerting features to notify state surveillance staff of case investigations of all associated case activities and rapid paperless case reporting from users beyond the DOH firewall.

A major addition to the FDOH surveillance systems, including Merlin, is electronic laboratory reporting (ELR). ELR is part of a national initiative that allows public and private clinical labs, including those serving multiple states, to report laboratory results indicative of cases of notifiable diseases to their respective State Health Departments in a standardized electronic format. This eliminates the need for laboratories to fax or mail paper copies of lab results to public health agencies, and the need for most manual data entry. Paper laboratory reports have several disadvantages: they are slow to arrive at the appropriate office, and time consuming to process and route appropriately. Duplicates may be sent because the laboratory reports to the State Office as well as the County Office, and they require manual data entry by health department staff into the electronic system which is time consuming and another opportunity for data entry errors. ELR mitigates many of these problems and in particular increases the timeliness of reporting by the laboratories to the CHDs. Any delay in reporting leads to increases in the time to implement disease control measures leading to greater opportunity for additional infections to occur.

In a recent evaluation of reporting timeliness conducted by the Bureau of Epidemiology, it was observed that the implementation of ELR will shorten the interval between the time laboratory results are completed and when they are reported to the CHD from five days to one for salmonellosis, from four days to one for shigellosis, and from three days to one for hepatitis A. The evaluation indicated there will be no change in reporting timeliness for meningococcal disease reporting. This is largely due to the fact that meningococcal disease is required to be reported by telephone upon first suspicion (prior to confirmatory diagnosis), and is already reported very quickly.

Another recent addition to Merlin is the use of Electronic Case Reporting (ECR). This module provides Infection Control Practitioners (ICP) at participating hospitals around Florida the ability to report cases of notifiable diseases electronically as opposed to calling their local CHD or faxing in a form. This reduces duplicate data entry and facilitates for more complete reporting by the ICPs because they are able to upload documents such as laboratory results and history and physicals. This system began its pilot period in 2007.

## **Integration of Technology for Other Disease Surveillance Activities**

The Bureau of Epidemiology (BOE) conducts other surveillance activities in addition to notifiable disease surveillance. The BOE supports a robust respiratory disease surveillance program. This includes surveillance for influenza and respiratory syncytial virus (RSV). The Pneumonia and Influenza Mortality Surveillance System became operational in January 2007. Twenty-three of Florida's 67 most populous counties participate in this system, representing approximately 85% of Florida's population and deaths. This surveillance system is a partnership between the Office of Vital Statistics and the Bureau of Epidemiology. Each week, a user from each of the participating vital statistics offices logs into EpiGateway (described below) and enters data related to the number of deaths due to pneumonia and/or influenza that occurred in that county for the past week, total and by age group. This data is then used to model the expected number of deaths and the actual number of deaths. The system is used for monitoring the time, magnitude, and duration of seasonal epidemics and will be used to monitor the magnitude of mortality during a pandemic. Data analysis displays are available through the same interface used for data entry.

A statewide respiratory syncytial virus (RSV) surveillance system was implemented in Florida in 1999 to support clinical decision-making for RSV prophylaxis of premature infants. RSV infections usually occur during the late fall, winter, or early spring months. Data collected by the Florida RSV surveillance system from 1999 to the present time provides the ability to identify geographical regions where high infection rates also occur during the summer months. Data are collected weekly by the BOE from sentinel hospitals throughout Florida. Each site reports the total number of RSV tests performed and

the total number positive via email or fax. Regional and statewide data are made available to public health professionals, health care providers and the public via a website [http://www.doh.state.fl.us/disease\\_ctrl/epi/RSV/rsv.htm](http://www.doh.state.fl.us/disease_ctrl/epi/RSV/rsv.htm). The current process is labor intensive as it requires manual data entry and analysis by the BOE staff. A module has been developed that allows the reporting and analysis of RSV test data via the EpiGateway system. Facilities participating in this system will immediately be able to access data summaries for their facility as well as regional and state-level data displays. This sub-component of the EpiGateway application is expected to be available for use by participants from around the state in the fall of 2008.

In October of 2007, the Bureau of Epidemiology implemented a standard statewide syndromic surveillance system called the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE). This system was originally designed by the Walter Reed Army Institute of Research for use in a military context. System development and distribution is currently managed by the Johns Hopkins University Applied Physics Laboratory. ESSENCE uses automated processes to collect the earliest available pre-diagnostic clinical data (a patient's chief complaint) from hospital emergency rooms across the state, and automatically categorizes chief complaint text into clinical syndromes. Various analyses are then performed on the syndrome categories that are designed to determine whether the current number of observations are more than expected based on a historical baseline. The underlying goals of this surveillance are to improve the timeliness of disease outbreak detection, to help characterize health problems in natural disaster settings, to assist with influenza-like illness surveillance, and to provide general situational awareness. Data from the notifiable disease surveillance system, Merlin, will be integrated into the ESSENCE system. This module will enable analysis and visualization of notifiable disease data via ESSENCE and will include mapping functionality utilizing GIS.

The National Retail Data Monitor (NRDM), another form of syndromic surveillance, has been utilized in Florida since 2003. This system was designed by the University of Pittsburgh's Real-Time Outbreak and Disease Surveillance (RODS) Laboratory. The NRDM is a surveillance tool that collects and analyzes daily over-the-counter (OTC) medication sales from >2,000 retail stores across Florida in an effort to rapidly detect disease outbreaks.

## **Additional Surveillance Applications and Software**

Beyond Merlin, other applications are used within the Florida Department of Health to monitor disease outbreaks, emerging trends, and health issues that need immediate attention. EpiCom provides a secure, threaded, moderated information exchange for reporting and tracking threats and outbreaks and to alert public health officials to such events. Users are able to log on to the system and post information related to outbreaks, potential outbreaks, unusual cases, or other health issues that might be relevant to other users. Content experts, referred to as moderators, review the submissions or "posts" prior to approving them in order to ensure the content is appropriate, no confidentiality rules have been breached, and the post is accurate and timely. EpiCom is a sub application of the Florida Department of Health Emergency Notification System (FDENS) which can contact all or selected users by e-mail, phone, pager, or fax, depending on the urgency of the message. Health care practitioners may request accounts so they can post and read health notifications posted on EpiCom. However, the most frequent users are CHD and State level public health staff.

Another BOE application is EpiGateway. EpiGateway is housed outside of the Department of Health firewall. EpiGateway serves as the single portal for accessing surveillance programs. Programs or systems accessible via EpiGateway include ESSNECE, the Pneumonia and Influenza Mortality Surveillance System, County Influenza Activity Code Reporting System and Electronic Case Reporting. Additionally, a module that will allow for the entry of respiratory disease laboratory surveillance data is being developed and is scheduled to be operational in the fall of 2008.

## Future Areas for Development

On the national level, there is great activity in the creation of electronic medical records. Electronic medical records give each patient complete access to all of their health related data through a secure internet-based portal. Electronic medical records provide patients the ability to consolidate their medical information from various physicians, pharmacies, outpatient clinics, rehabilitation centers, etc. into one location. This would also allow patients to see their test results or physician notes as soon as they are entered into the system. Such systems assure that all of a patient's clinical information is available to any of their treating providers. The evolution of these electronic records can support more rapid complete reporting of confirmed or probable cases of reportable diseases to public health officials. The integration of technology would allow for automatic reporting or automatic triggers and reminders for reporting, as well as provision of decision support content for providers.

The integration of current technology into the field of public health has significantly improved the quality of data available to epidemiologists as well as the timeliness of that data. However, the complete reporting of all notifiable diseases that occur in Florida is not assured and the continued development and implementation of technology will help achieve surveillance goals. The intersection of "traditional public health surveillance" methods with new technological capabilities provides the opportunity to focus more clearly on the end user of the systems, data output, and not the flow of how data is captured. System integration enables the best features of each system to be effectively utilized in order to improve public health surveillance and information exchange.