



West Virginia

EPI-LOG

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West Virginia helps to evaluate effectiveness of meningitis vaccine

In the United States, *Neisseria meningitidis* is the leading cause of bacterial meningitis in children. Each year, an estimated 1,400-2,800 cases of meningococcal disease occur in the United States (0.5–1.1 cases per 100,000 populations). Although the disease is relatively rare, approximately 10-14% of cases die from the disease. Eleven to nineteen percent of cases who survive develop sequelae such as neurological disability, limb loss, or hearing loss.

The rate of meningococcal disease is high among infants, adolescents and young adults; persons aged 11-19 years have higher rates compared with the general population (CDC, unpublished data, 2004).

There are at least 13 serogroups isolated in the U. S.; serogroups B, C and Y are the major causes of meningococcal disease, each being responsible for roughly one third of cases. Serogroup W-135 accounts for 2-3% of cases, and serogroup A disease is rarely seen in the U.S. Among persons aged 11-18 years, 75% of meningococcal disease cases are caused by serogroups C, Y, or W-135.

(See *Vaccine*, page 6)



Statewide Disease Facts & Comparisons

A quarterly publication of the West Virginia Division of Surveillance and Disease Control

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- Summary of infectious disease outbreaks in West Virginia during 2006

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Joe Manchin III, Governor
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SPECIAL REPORT

Summary of infectious disease outbreaks and clusters for West Virginia in 2006

In West Virginia, outbreaks of infectious diseases are immediately reportable to the local health department and then to the Bureau for Public Health. For a variety of reasons, outbreak recognition and reporting has greatly improved in West Virginia during recent years. **Figure 1** (this page) shows trends in notification of outbreaks in the State of West Virginia since 2000.

Some factors explaining the improvement likely include:

- Additional staffing and training at the state, regional and local levels. This has resulted in improvements in outbreak reporting and investigation. With the additional staffing, the Infectious Disease Epidemiology Program (IDEP) was able to implement improved tracking of infectious disease outbreaks during 2006.

- Improvements in disease management. For example, chickenpox outbreaks can now be managed with post-exposure vaccination, and outbreaks of influenza A and B can be managed with antiviral prophylaxis.

- Improvements in testing for infectious agents. Salmonella isolates can now be linked by molecular methods. The Office of Laboratory Services can now test for norovirus.

- Cyclic increases in incidence of common viral pathogens such as influenza and norovirus. Nationally, changes in circulating strains of norovirus were recognized in 2006-7.

- Improved recognition and reporting of pertussis among adolescents and adults.

Table 1 (page 3) summarizes the numbers and types of outbreaks. A total of 73 outbreaks and clusters were reported in our State during 2006, and are listed in **Table 2** (pages 4-5). Outbreaks of gastroenteritis were the most common type of outbreak, accounting for 36 (49%) of outbreaks. Of these, 13 (36%) were laboratory-confirmed as norovirus and a further 10 (28%) were judged likely to have a viral etiology based on signs, symptoms, and ease of transmission from one person to another. Nursing homes

were the most common setting for outbreaks of gastroenteritis.

Twenty respiratory outbreaks were reported, including 7 (35%) which were laboratory-confirmed as influenza A or B. Schools and nursing homes were the most common settings for outbreaks of influenza.

Ten outbreaks of rash illness were reported; 7 from chickenpox and 2 from hand, foot and mouth disease.

Investigation of outbreaks is important for many reasons. Outbreak investigations are important to control or prevent cases of disease, respond to community or other concerns, identify weaknesses in disease control programs and train

new epidemiologists to do outbreak investigations. In that spirit, the IDEP offers the following lessons learned from 2006 outbreaks:

- Outbreak response. This first category of lessons deals with strengthening our State's outbreak response capacity:

- a. IDEP has developed a toolkit for management of norovirus outbreaks in nursing homes and health care facilities, as these are extremely common types of outbreak.

- b. IDEP will develop a toolkit for management of influenza outbreaks in nursing homes and health care facilities also a common type of outbreak.

- c. IDEP is developing an emergency interview team to facilitate rapid response to large outbreaks.

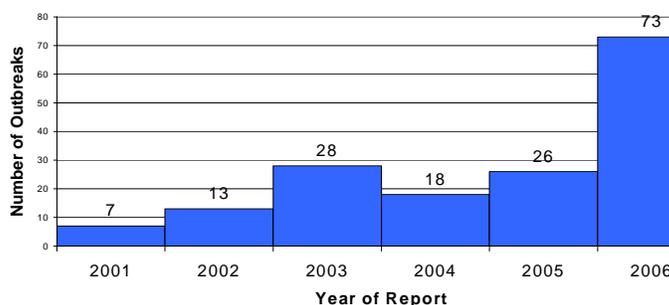
- d. IDEP is facilitating development of a foodborne outbreak response manual to improve epidemiological, environmental and laboratory investigation of outbreaks.

- Foodborne outbreak prevention:

- a. Foodhandlers should NOT work while symptomatic with diarrhea.

- b. Foodhandlers should wash hands appropriately and all persons should wash before eating.

Figure 1
Outbreaks Reported and Investigated in West Virginia, 2001 - 2006



(See **Outbreaks**, page 3)

(*Outbreaks, continued from page 3*)

c. Avoiding temperature abuse of foods, basically keeping hot foods hot and cold foods cold is important to prevent outbreaks of disease.

- Chickenpox outbreak prevention and response:

a. Two doses of chickenpox vaccine are recommended for prevention of breakthrough disease:

i. For persons aged less than 13 years, two doses of vaccine are recommended at least 3 months apart and on or after the first birthday.

ii. For persons aged 13 and older, two doses of vaccine are recommended at least 28 days apart.

- Pertussis outbreak prevention and response:

a. Acellular pertussis vaccine is newly licensed for adolescents and adults, and should be given according to new recommendations:

i. Adolescents aged 11-18 years should receive one booster dose of Tdap.

ii. Adults aged 19 to 64 should receive one booster with Tdap instead of Td.

iii. Physicians should use appropriate diagnostic testing for suspect pertussis cases; isolation of *Bordetella pertussis* from clinical specimens, or positive polymerase chain reaction (PCR) assay for *B. pertussis*. Serological testing for pertussis is neither diagnostic nor recommended.

- *Clostridium difficile* prevention and control:

a. Children with diarrhea, especially with *Clostridium difficile* in the stool, should be restricted from school until symptoms resolve.

b. *Clostridium difficile* should be considered in the differential of community-acquired diarrhea in persons recently treated with antibiotics.

- Influenza-like illness prevention and response:

a. Culture confirmation of respiratory outbreaks is useful for surveillance as well as outbreak management. The sentinel providers can be very helpful in obtaining laboratory specimens during outbreaks.

b. For influenza outbreaks in nursing homes, initiate antiviral prophylaxis promptly according to current recommendations.

- Mumps outbreak prevention:

a. Health care workers, students and school staff should assure they are immune to mumps according to current recommendations:

i. Two doses of MMR vaccine, one month apart, on or after the first birthday;

ii. Birth before 1957;

iii. History of physician-diagnosed mumps; OR

iv. A positive IgG for mumps.

- Methicillin resistant *Staphylococcus aureus* outbreak prevention:

a. Teachers, coaches and trainers should familiarize themselves with MRSA prevention and control recommendations: don't share towels, clothing and other personal items; cover wounds, cuts and scrapes; get prompt medical attention for infected skin lesions; practice good personal hygiene. ☒

Table I Summary of Outbreaks and Clusters Reported in 2006; West Virginia; N=73

TYPE OF OUTBREAK	NUMBER REPORTED
Total Gastroenteritis outbreaks	36
> confirmed norovirus(13 total)	
> foodborne (3 total)	
> <i>Clostridium difficile</i> (2 total)	
> Salmonellosis (2 total)	
Total rash illness outbreaks	10
> Chickenpox outbreaks(7 total)	
> Hand, foot and mouth disease outbreaks (2 total)	
Total outbreaks of respiratory illness	20
> Confirmed influenza A (3 total)	
> Confirmed influenza B (4 total)	
> Pertussis outbreaks (5 total)	
Mumps	3
Methicillin resistant <i>Staphylococcus aureus</i>	4
Total outbreaks /clusters reported	73

Table 2 Line Listing of 2006 Outbreaks, West Virginia; N = 73

Final No	Date reported	County	Persons affected*	Etiologic agent	Setting	Mode(s) of Transmission / Source(s)
1	1/23/2006	Taylor	8 of 448 students	Chickenpox	Elementary School	Person-to-person
2	2/28/2006	Jefferson	55 of 420 students **	Probable Group A Streptococcus pharyngitis	Elementary School	Person-to-person
3	2/28/2006	Cabell	14 students	Chickenpox	Two Elementary Schools	Person-to-person
4	3/2/2006	Berkeley	5-6 residents	Influenza-like illness 2	Nursing Home	Person-to-person
5	2/16/2006	Pendleton	5 of 91 residents	Culture-confirmed influenza A/H3	Nursing Home	Person-to-person
6	3/8/2006	Morgan	Students (Absentee rate 11-16%)	Culture-confirmed influenza A	4 schools	Person-to-person
7	3/10/2006	Putnam	18 / 110 residents	Culture-confirmed influenza A	Nursing Home	Person-to-person
8	3/20/2006	Webster	Students (Absentee rate 20%)	Culture-confirmed influenza B	Elementary School	Person-to-person
9	3/20/2006	Grant	115 of 600 students absent	Culture-confirmed influenza B	Elementary School	Person-to-person
10	3/20/2006	Cabell	3 residents	Influenza-like illness	Nursing Home	Person-to-person
11	3/3/2006	Ohio, Harrison and Fayette	3 persons	Salmonella branderup	Community	Unknown; PFGE-linked to Oregon outbreak versus local reptile exposure
12	3/21/2006	Ohio	100 of 333 children absent	Culture-confirmed influenza B	Elementary School	Person-to-person
13	3/22/2006	Marion	Students (15% absenteeism)	Influenza-like illness	County Schools	Person-to-person
14	3/30/2006	Ohio	80 of 220 students absent	Influenza-like illness	Middle School	Person-to-person
15	3/30/2006	Grant	56 of 296 students absent	Culture-confirmed influenza B	Elementary School	Person-to-person
16	4/4/2006	Cabell	12 of 30 persons	Gastroenteritis	Country Club	unknown
17	4/7/2006	Wayne	19 of 75 patients	Gastroenteritis, likely viral 1	Health care facility	Person-to-person
18	5/3/2006	Greenbrier	6 children	Rotavirus diarrhea	Daycare Center	Person-to-person
19	5/3/2006	Putnam	2	Mumps	Community	Person-to-person
20	5/26/2006	Fayette	40 of 120 residents; 13 of 140 employees	Norovirus, genotype II	Nursing Home	Person-to-person
21	6/6/2006	Greenbrier	2/60 residents; 9/74 staff	Gastroenteritis, likely viral 3	Nursing home	Person-to-person
22	6/7/2006	Monroe	38/60 residents; 20/80 staff	Laboratory confirmed norovirus, genotype II	Nursing Home	Person-to-person
23	6/7/2006	Monongalia	48/108 residents; 29/102 staff	Norovirus, genotype II	Nursing Home	Person-to-person
24	6/12/2006	Mercer	14 persons	Influenza-like illness 3	Community	unknown
25	6/14/2006	Monongalia	57 of 98 residents	Norovirus, genotype II	Nursing Home	Person-to-person
26	4/12/2006	Upshur	82 students	Chickenpox	4 Schools	Person-to-person
27	6/16/2006	Jefferson	20 of 24 persons at a Family dinner; unknown number of persons at a wedding; 7 other persons **	Gastroenteritis, likely viral 1	Restaurant	Foodborne; vehicle could not be determined
28	6/19/2006	Kanawha	4 of 21 residents	Respiratory illness, uncharacterized	Nursing Home Unit	unknown
29	7/12/2006	Jefferson	5 persons	Pertussis	Home	Person-to-person
30	7/18/2006	Wetzel	5 persons	Pertussis	Home	Person-to-person
31	7/27/2006	Kanawha	5 of 6 household members	Campylobacter	Home	Unknown
32	7/29/2006	Greenbrier	6 children **	Pertussis	Community	Person-to-person
33	8/10/2006	Hampshire	26 of 28 counselors; 1 of 250 campers; 1 of 30 other staff	Gastroenteritis, likely viral 3	Camp	Person-to-person
34	8/10/2006	Mercer	17 of 26 residents; 8 of unknown staff	Norovirus, confirmed by PCR	Nursing Home	Person-to-person
35	8/17/2006	Marion	2 persons	Mumps	Home	Person-to-person
36	8/30/2006	Marion	3 persons	Salmonella typhimurium	Community	Unknown
37	8/31/2006	Marshall	55 of 125 residents and 21 of 150 staff	Gastroenteritis, probably viral 3	Nursing Home	Person-to-person
38	9/6/2006	Cabell	25 of 108 players **	Methicillin-resistant <i>Staphylococcus aureus</i>	Football team	Person-to-person and fomites
39	9/13/2006	Hancock	1 child	Methicillin-resistant <i>Staphylococcus aureus</i>	Football team	Likely person-to-person
40	9/14/2006	Monroe	25 of 600 children	chickenpox	Elementary School	Person-to-person

(Table 2 continues on page 5)

(Table 2, continued from page 4)

Final No	Date reported	County	Persons affected*	Etiologic agent	Setting	Mode(s) of Transmission / Source(s)
41	9/20/2006	Kanawha	5 of 157 children	Hand, foot and mouth disease	Daycare	Person-to-person
42	9/20/2006	Harrison	Not reported	Non-specific rash illness; etiology undetermined	Community	Not known
43	10/3/2006	Harrison	2 children	<i>Clostridium difficile</i>	School classroom	Person-to-person
44	10/3/2006	Kanawha	8 children	Chickenpox	Elementary School	Person-to-person
45	10/3/2006	Ohio	50 children	Influenza-like illness ²	Community	Unknown
46	10/5/2006	Upshur	9 of 16 residents; 1 employee; 1 volunteer	Gastroenteritis ¹	Nursing home	Person-to-person
47	10/3/2006	Mingo	20 of 240 children	Hand, foot and mouth disease	Two daycares and an elementary school	Person-to-person
48	10/11/2006	Harrison	2 children	Methicillin-resistant <i>Staphylococcus aureus</i>	Football team	Likely person-to-person
49	10/17/2006	Harrison	3 children	Methicillin-resistant <i>Staphylococcus aureus</i>	Football team	Likely person-to-person
50	10/17/2006	Grant, Preston, Tucker, Randolph, and multi-state	28 persons (attack rate = 58%) **	Norovirus, genotype II	Family reunion dinner	Foodborne and person-to-person
51	10/27/2006	Taylor	14 of 37 residents and staff	Gastroenteritis, likely viral ³	Nursing home	Person-to-person
52	11/1/2006	Taylor	2 of 698 children	<i>Clostridium difficile</i>	Elementary School	Likely person-to-person
53	11/15/2006	Ohio	23 of 119 persons responding to a survey; attack rate = 19%	Likely <i>Clostridium perfringens</i> or <i>Bacillus cereus</i> ¹	School dinner	Foodborne - likely turkey
54	11/17/2006	Morgan	11 of 450 children	Chickenpox	Elementary School	Person-to-person
55	11/6/2006	Logan	3 children	Pertussis	Middle school	Person-to-person
56	11/27/2006	Monroe	1 child	Mumps	Elementary School	Person-to-person
57	12/8/2006	Ohio	89 residents and 49 staff **	Laboratory confirmed norovirus type II	Nursing Home	Person-to-person
58	12/4/2006	Braxton	12 of 673 children **	Chickenpox	Elementary School	Person-to-person
59	12/15/2006	Fayette	36 of 50 residents **	Norovirus, PCR confirmed	Nursing Home	Person-to-person
60	12/18/2006	Raleigh	18	Gastroenteritis ³	Nursing Home	Unknown
61	12/18/2006	Marshall	17% absenteeism among children; no staff illness	Gastroenteritis ³	Elementary school	Likely person-to-person
62	12/18/2006	Kanawha	5 persons; denominator unknown	Gastroenteritis ³	University	Unknown
63	12/20/2006	Cabell	21 of 40 residents and 14 staff	Norovirus, PCR confirmed	Nursing home	Unknown
64	12/20/2006	Cabell	10 of 16 co-eaters	Gastroenteritis, likely viral ³	restaurant	Person-to-person or foodborne
65	12/19/2006	Fayette	2 football players	Methicillin resistant <i>Staphylococcus aureus</i>	Football team	Person-to-person
66	12/28/2006	Mingo	25 residents	Gastroenteritis ³	Nursing home	Unknown
67	12/29/2006	Kanawha	3 persons	Pertussis, PCR confirmed	Family	Person-to-person
68	12/12/2006	Ohio	21 residents	Norovirus, Genotype II, PCR confirmed	Nursing Home	Unknown
69	12/29/2006	Kanawha	24 (39%) of 60 residents and 6 of 35 staff	Norovirus, PCR confirmed	Nursing Home	Person-to-person
70	12/29/2006	Berkeley	14** patients (100% attack rate on a unit) and approximately 12 of 15 staff	Norovirus, PCR confirmed	Health care facility	Person-to-person
71	12/29/2006	Kanawha	7 residents	Gastroenteritis ³	Nursing Home	Unknown
72	1/2/2007	Roane	6 of 33 residents	Norovirus, EIA confirmed	Nursing home	Unknown
73	12/28/2006	Kanawha	25 residents 7 staff	Gastroenteritis, likely viral ³	Nursing Home	Person-to-person

* Numbers are confirmed at time of first report, except where indicated

** Total numbers confirmed at the end of the outbreak investigation

*** After investigation, determined not to be an outbreak

¹ Cultures / laboratory tests were submitted but were negative or non-contributory² Rapid test positive, but no culture confirmation³ No cultures / laboratory tests were reported

(Vaccine, continued from page 1)

Figures 1 and 2 (below) show the number of West Virginia cases of invasive meningococcal disease from 1995 to 2005 by year of onset and month of onset, respectively. The incidence is highest among infants at 15.5 per 100,000 population, followed by age group 1-4 years with 3.98 per 100,000 population (Figure 3, page 7). Between 2000 and 2005, 23 of 59 (39%) cases of invasive meningococcal disease had isolates available for serogrouping (Figure 4, page 7). Of the 23 isolates, 39% were serogroup C, 26% were serogroup B, 17 % were serogroup Y, and 8% were serogroup W-135.

The Infectious Disease Epidemiology Program (IDEP) and Office of Laboratory Services (OLS) of West Virginia Department of Health and Human Resources (WVDHHR) are participating in a special study conducted by

the Centers for Disease Control and Prevention (CDC) to evaluate the effectiveness of meningococcal conjugate vaccine (Menactra, MCV4).

In 2005, the Food and Drug Administration (FDA) licensed a new tetravalent (A, C, Y, W-135) meningococcal conjugate vaccine (MCV4) for persons aged 11-55 years. MCV4 was licensed based on safety and immunogenicity data, but not on clinical efficacy. On February 2005, the Advisory Committee on Immunization Practices (ACIP) recommended routine use of MCV4 to the following:

- Young adolescents aged 11-12 years
- Adolescents who have not previously received MCV4 before high school entry
- College freshmen living in dormitories
- Other populations at increased risk, such as military recruits, travelers to areas where meningococcal disease is hyperendemic or epidemic

- Microbiologists routinely exposed to *Neisseria meningitidis*
- Patients with terminal complement deficiency

The objective of the study is to evaluate in adolescents the post-licensure effectiveness of MCV4 against vaccine preventable serogroups (A, C, Y, W-135).

Invasive meningococcal disease is reportable in West Virginia as well as in the United States. The study criteria include West Virginia residents who are aged 11 years or older and born on or after January 1, 1986, plus:

- Those who have meningitis and or meningococemia that may progress rapidly to purpura fulminans, shock, and death
- When *Neisseria meningitidis* (serogroup A, C, Y, or W-135) isolated from a normally sterile site (e.g., blood or cerebrospinal or synovial fluid) or skin scrapings of purpuric lesions; or evidence of *N. meningitidis* serogroup A, C, Y or W-135, DNA using a validated polymerase chain reaction (PCR) obtained from a normally sterile site (e.g., blood or CSF); or, evidence of *N. meningitidis* (serogroups A, C, Y, or W-135) antigen by immunohistochemistry (IHC).

- When the isolate or sample has to be available for serogrouping. Laboratories are required to send the isolates of *N. meningitidis* from normally sterile site to OLS for serogrouping.

Four control subjects will be recruited for every eligible case. The inclusion criteria for controls are a West Virginia resident aged 11

(See Vaccine, page 7)

Figure 1. Cases of Invasive Meningococcal Disease by Year of Onset, 1995-2005, West Virginia (n=132)

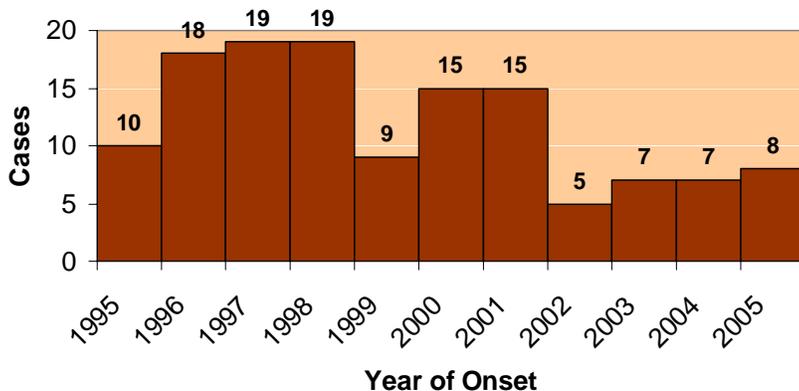
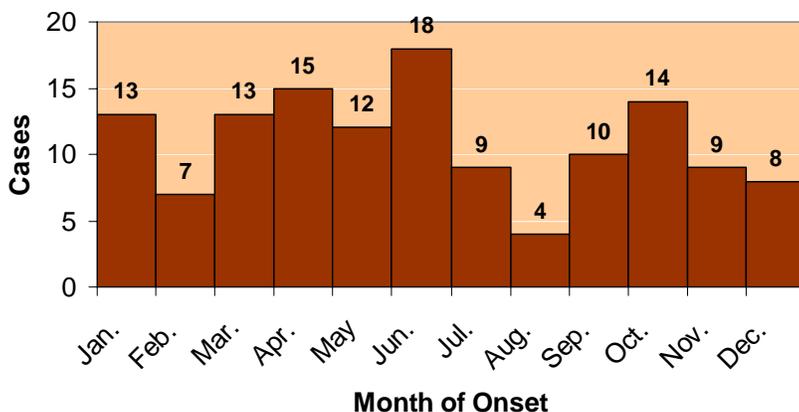


Figure 2. Cases of Invasive Meningococcal Disease by Month of Onset, 1995-2005, West Virginia (n=132)



(Vaccine, continued from page 6)

years and born on or after January 1, 1986 and without meningococcal disease. After enrolling a case or a control who meets the study criteria, informed consent and interview will be conducted. If the subject is less than 18 years old, parent/s or guardian/s will be contacted. Healthcare providers of cases will be contacted to complete the vaccination form.

All health care providers, laboratories and local health departments are encouraged to notify IDEP within 24 hours of diagnosis when a case of invasive meningococcal disease is suspected or diagnosed. *Neisseria meningitidis* isolates from a normally sterilized site should be sent to OLS for serogrouping. For specimen collection and shipment, please contact OLS at 304-558-3530. For more information about detecting and reporting cases of invasive meningococcal disease, please contact IDEP at 304-558-5358.

References:

Procedures Manual - Evaluation of Meningococcal Conjugate Vaccine Effectiveness, March 28, 2006, CDC.

Red Book – 27th edition, 2006 Report of the Committee on Infectious Diseases, American Academy of Pediatrics ☒

Figure 3

Incidence of Invasive Meningococcal Disease By Age Group, 1995-2005, West Virginia

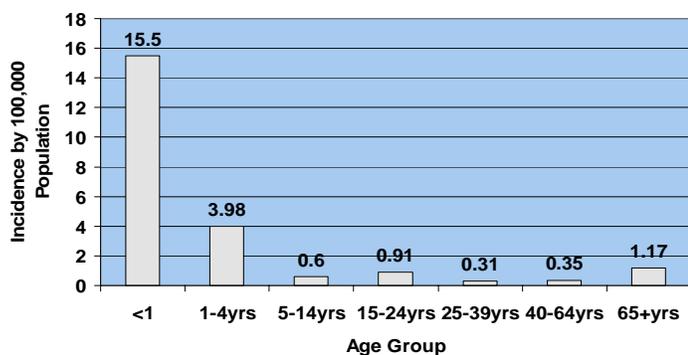
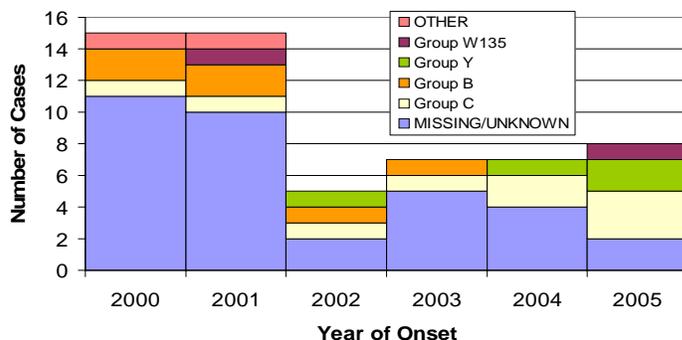


Figure 4. Cases of Invasive *Neisseria meningitidis* by Serogroup and Year of Onset, West Virginia, 2000 - 2005; N=57



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