

INVASIVE BACTERIAL DISEASE SURVEILLANCE REPORT, 2013

Emerging Infections Program

Active Bacterial Core Surveillance (ABCs)

Minnesota Department of Health

Diseases Included

- Group A Streptococcus page 5
- Group B Streptococcus page 12
- *Haemophilus influenzae* page 21
- *Neisseria meningitidis* page 28
- *Streptococcus pneumoniae* page 34
- Methicillin-resistant *Staphylococcus aureus* (MRSA) page 42
- Legionellosis page 49

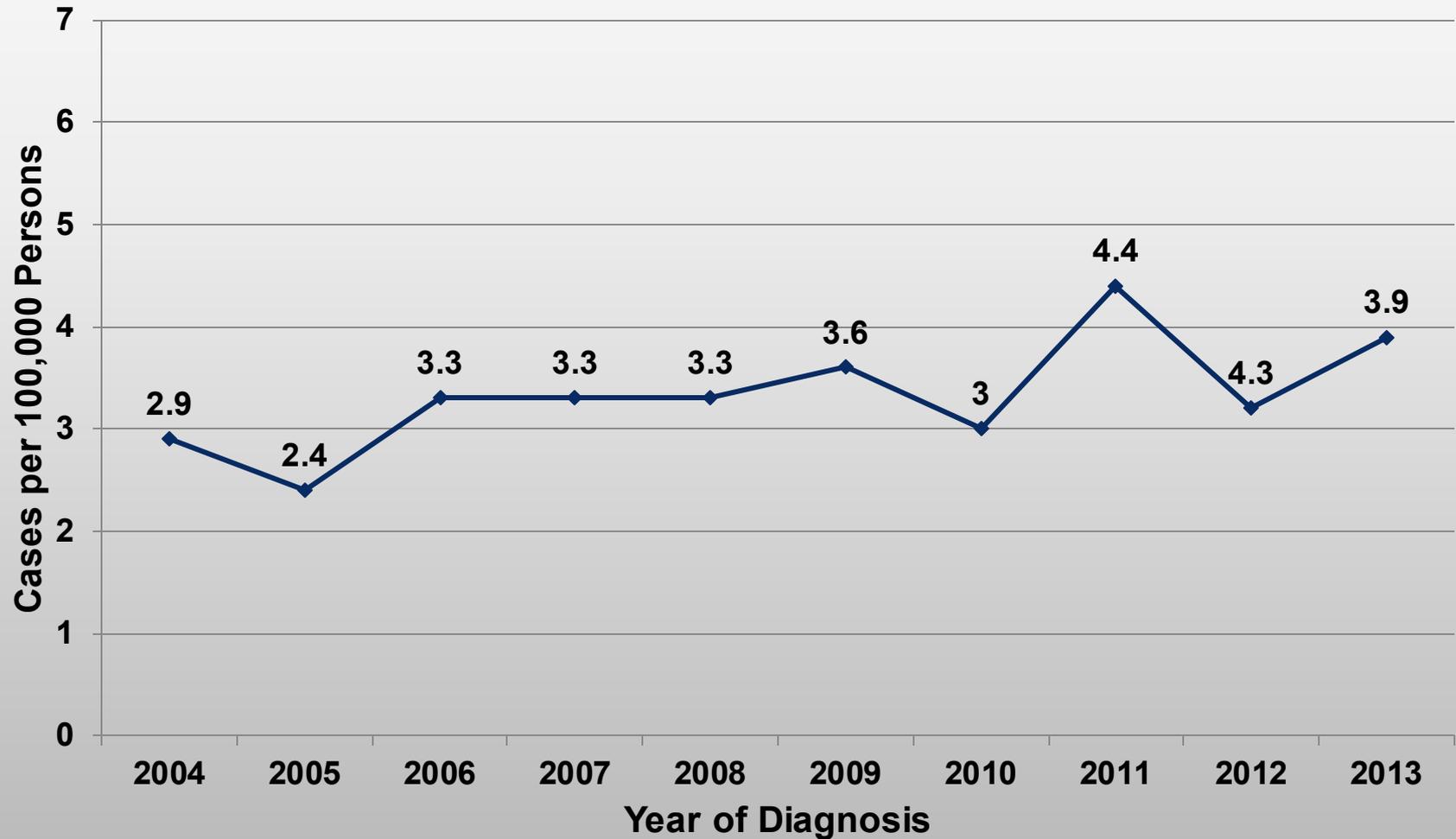
Surveillance Methods

- Cases include Minnesota residents with invasive infections due to Group A Streptococcus, Group B Streptococcus, *Haemophilus influenzae*, *Neisseria meningitidis*, *Streptococcus pneumoniae*, and methicillin-resistant *Staphylococcus aureus* (MRSA).
- Invasive infections are from normally sterile body sites such as blood, cerebrospinal fluid and others. These usually cause serious illnesses (disease).
- Legionellosis is also included in this report and has separate confirmatory testing criteria including urine antigen, culture, paired serology, and PCR or DFA combined with culture or urine antigen.

Surveillance Methods (cont.)

- All hospitals and reference laboratories serving Minnesotans are contacted routinely to identify cases.
- Species confirmation, antibiotic resistance and other testing is performed by the MDH Public Health Laboratory.
- Disease rates are based on Census data.
- The Centers for Disease Control and Prevention (CDC) includes these results from Minnesota and other states and regions in a network called Active Bacterial Core Surveillance (ABCs) which covers a population base of 42 million.

Incidence of Invasive Group A Streptococcal Disease, Minnesota, 2004-2013



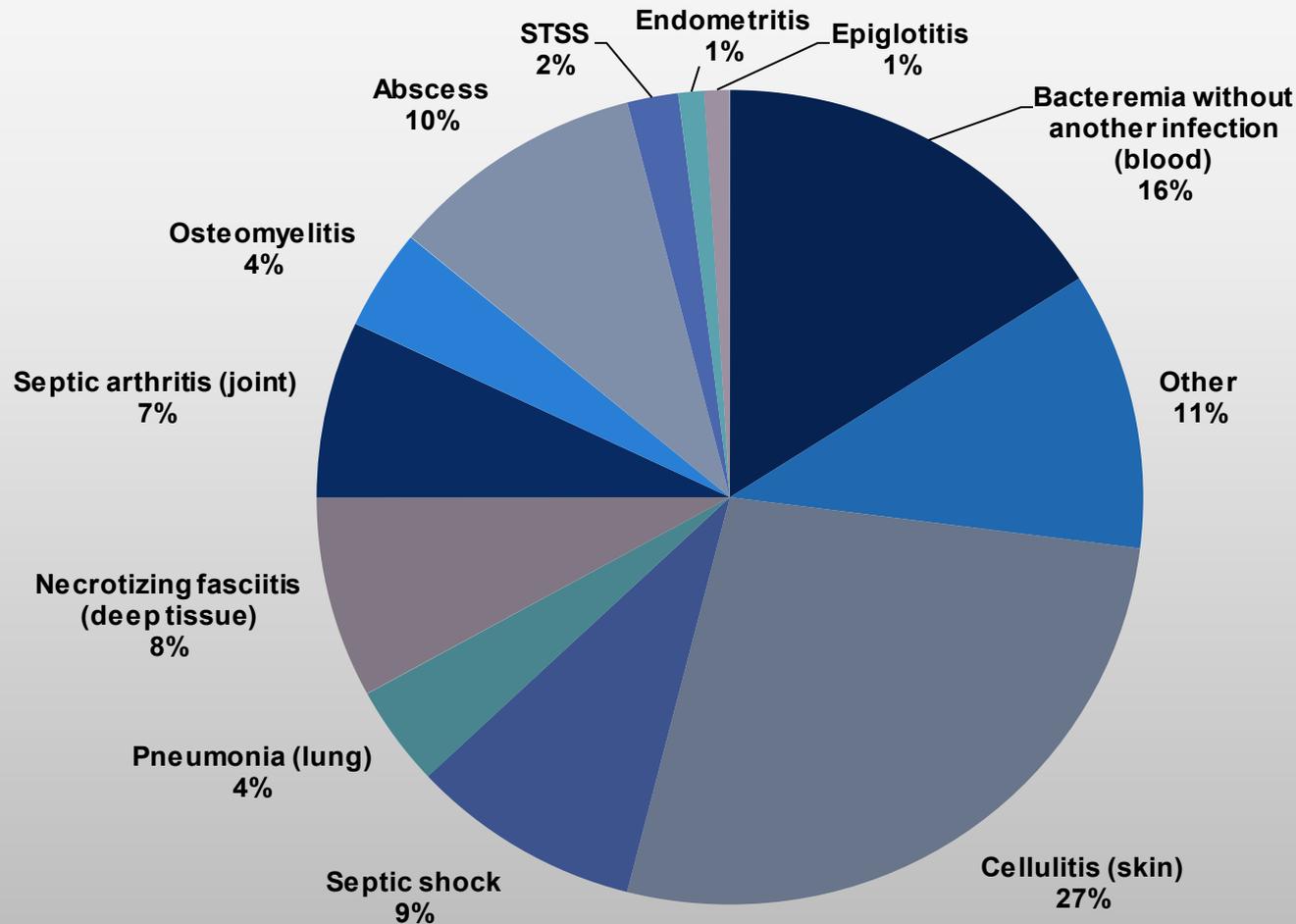
Incidence of Invasive Group A Streptococcal Disease by Gender and Age Group, Minnesota, 2013

Characteristic	Cases (n=209)	Incidence per 100,000 persons
Gender		
Male	124	4.6
Female	85	3.1
Age Group		
Under 1 yr.	1	1.5
1-4 yrs.	9	3.2
5-9 yrs.	0	0
10-19 yrs.	7	1.0
20-29 yrs.	16	2.2
30-39 yrs.	20	2.9
40-49 yrs.	33	4.6
50-59 yrs.	29	3.7
60-69 yrs.	34	6.4
70+ yrs.	52	10.3

Invasive Group A Streptococcal Disease Cases and Deaths by Age Group, Minnesota, 2013

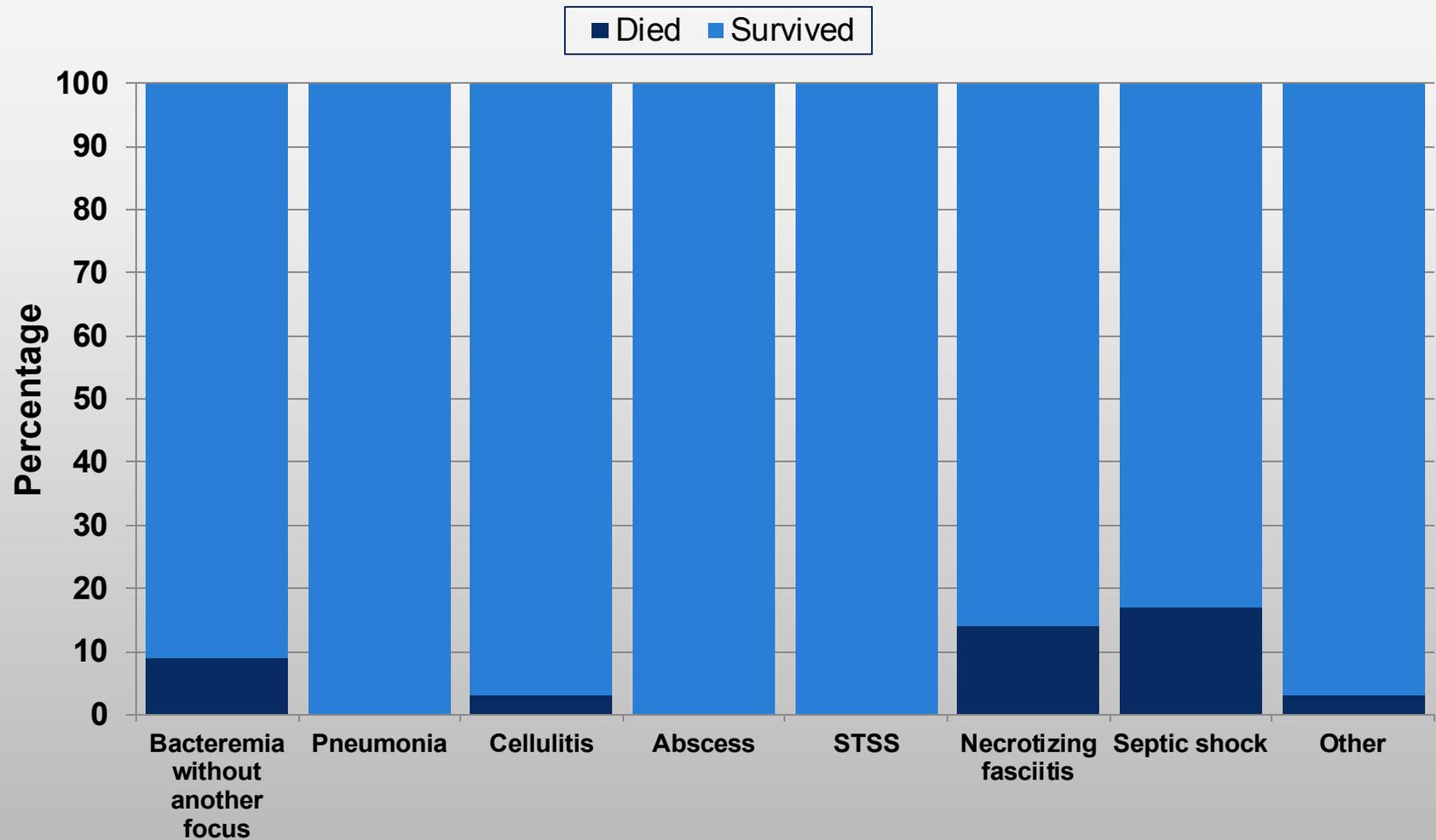
Age Group	Cases	Deaths	% Died
Under 1 yr.	1	0	0%
1-4 yrs.	9	0	0%
5-9 yrs.	0	0	0%
10-19 yrs.	7	0	0%
20-29 yrs.	16	0	0%
30-39 yrs.	20	1	5%
40-49 yrs.	33	0	0%
50-59 yrs.	29	2	7%
60-69 yrs.	34	1	3%
70+ yrs.	52	10	19%
Total	209	14	7%

Invasive Group A Streptococcal Disease by Type of Infection/Syndrome, Minnesota, 2013

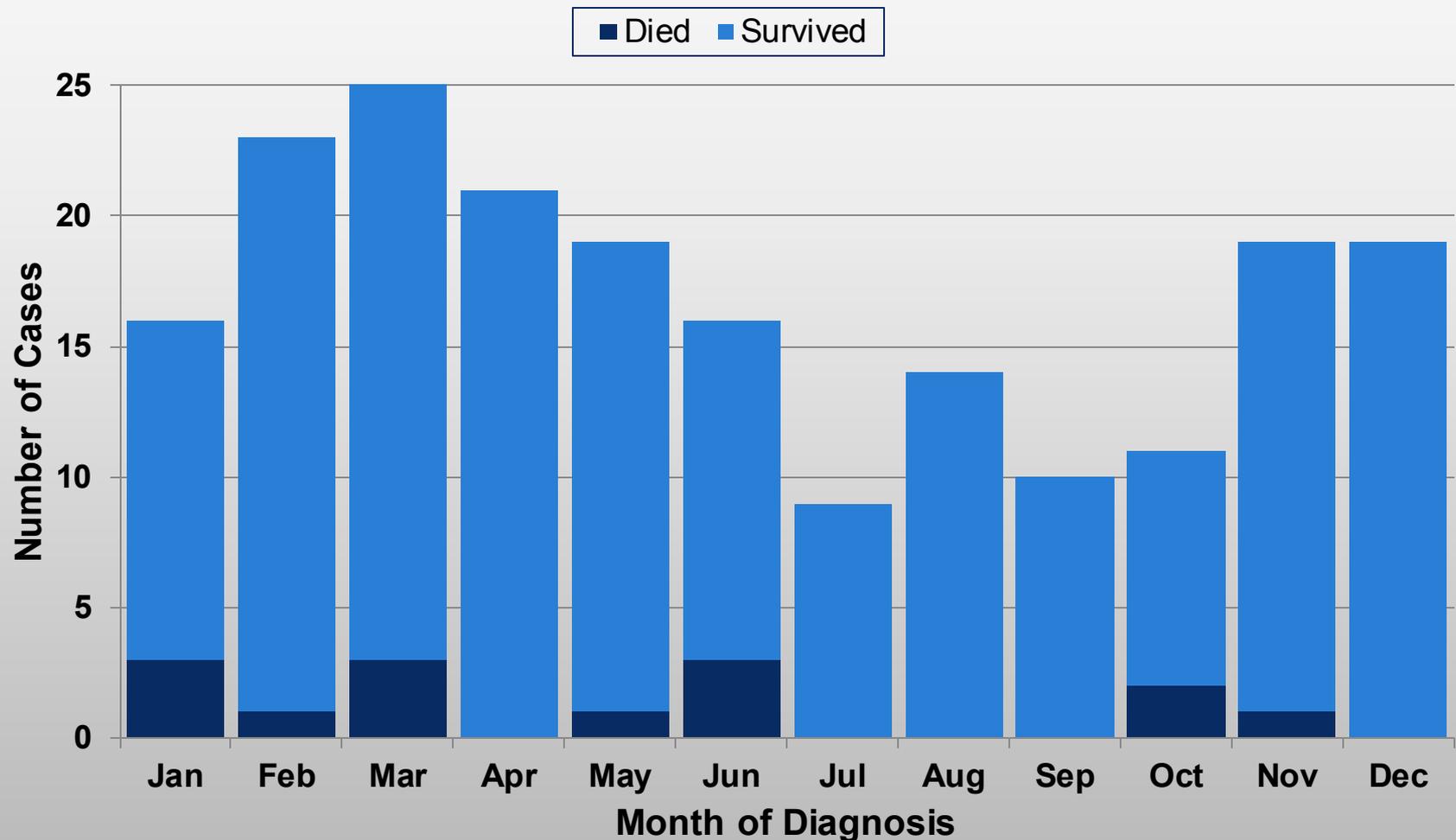


This chart represents 268 infections among 209 cases (some cases had >1 infection).

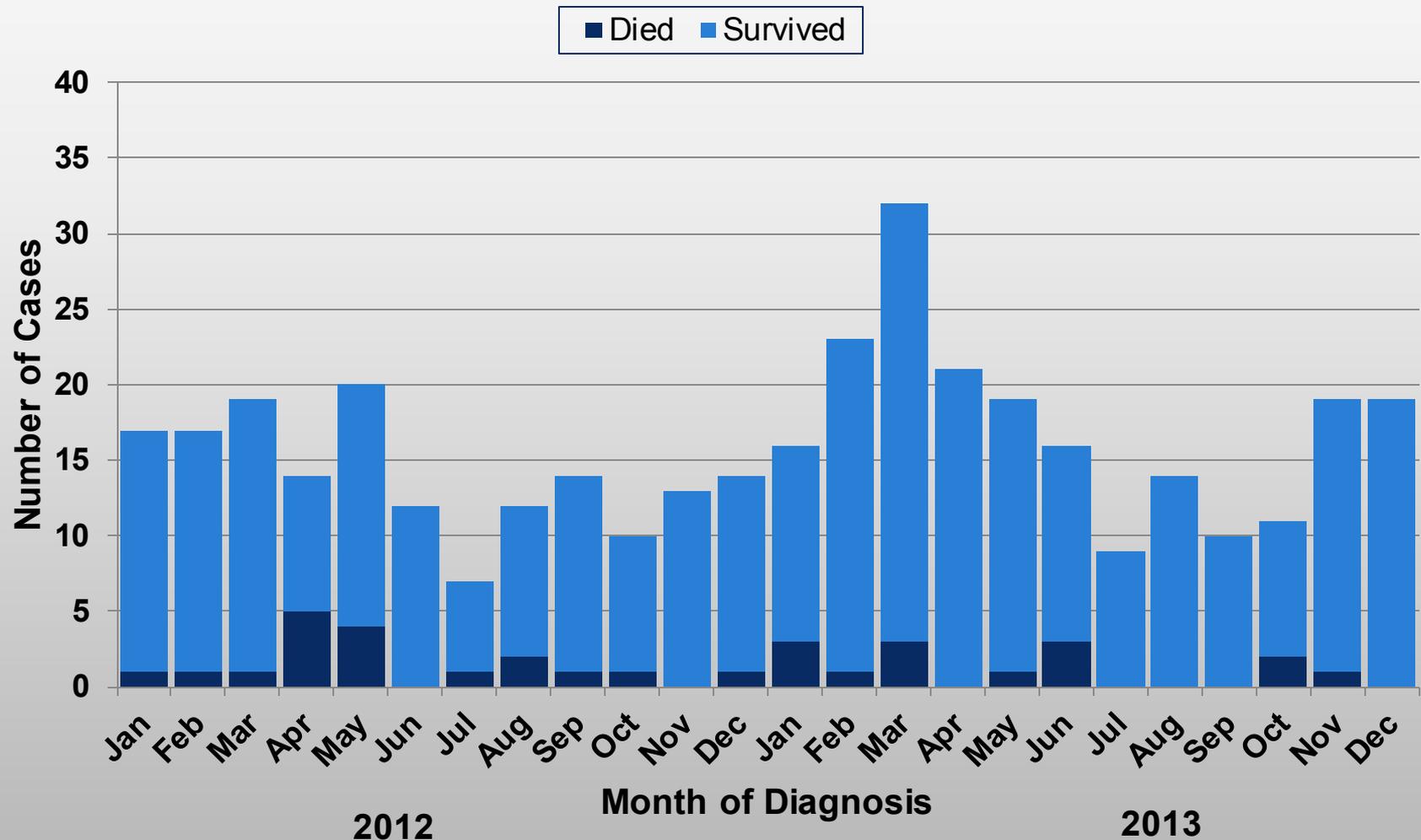
Outcome of Invasive Group A Streptococcal Disease by Type of Infection/Syndrome, Minnesota, 2013



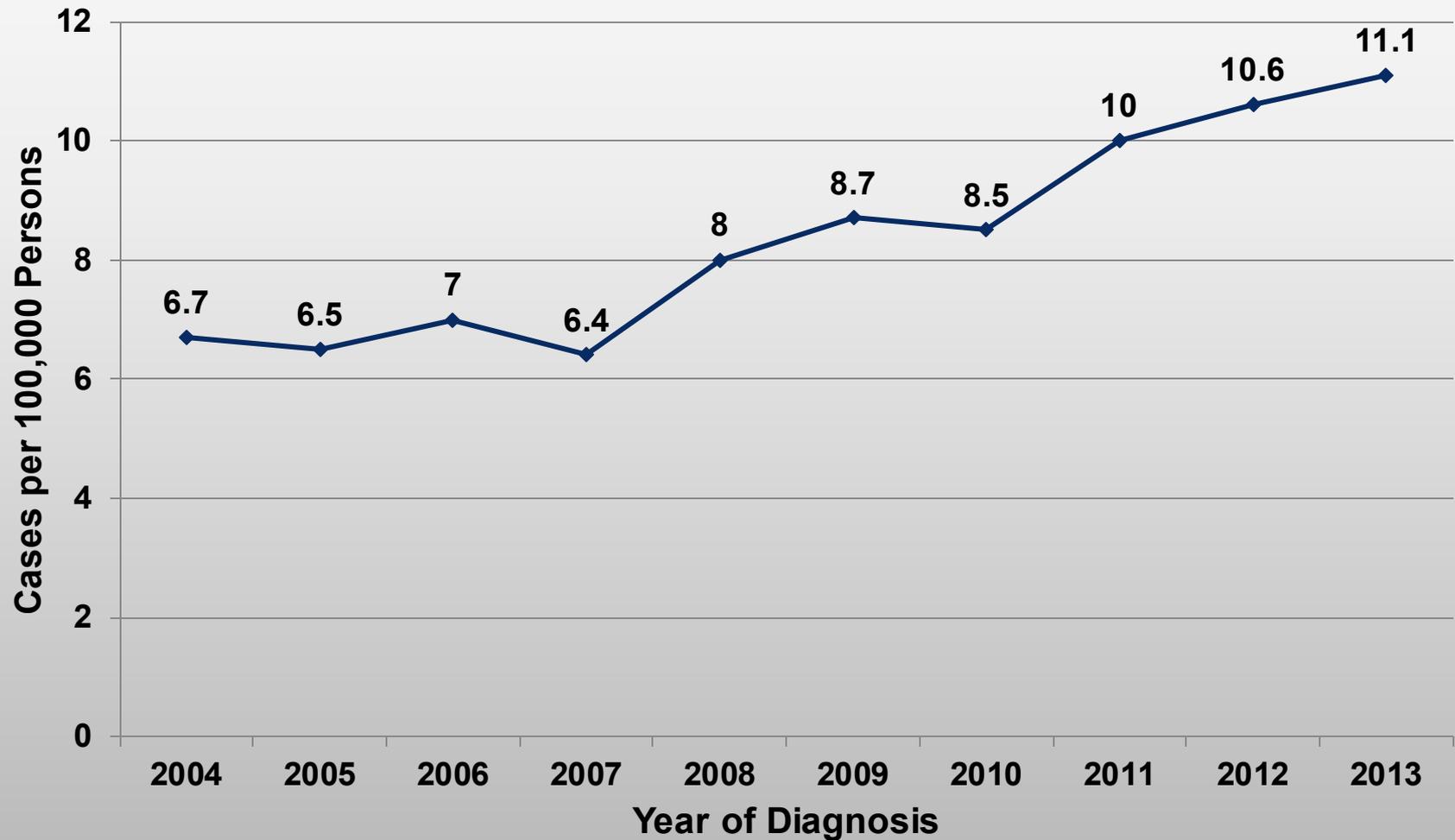
Cases of Invasive Group A Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2013



Cases of Invasive Group A Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2012-2013



Incidence of Invasive Group B Streptococcal Disease, Minnesota, 2004-2013



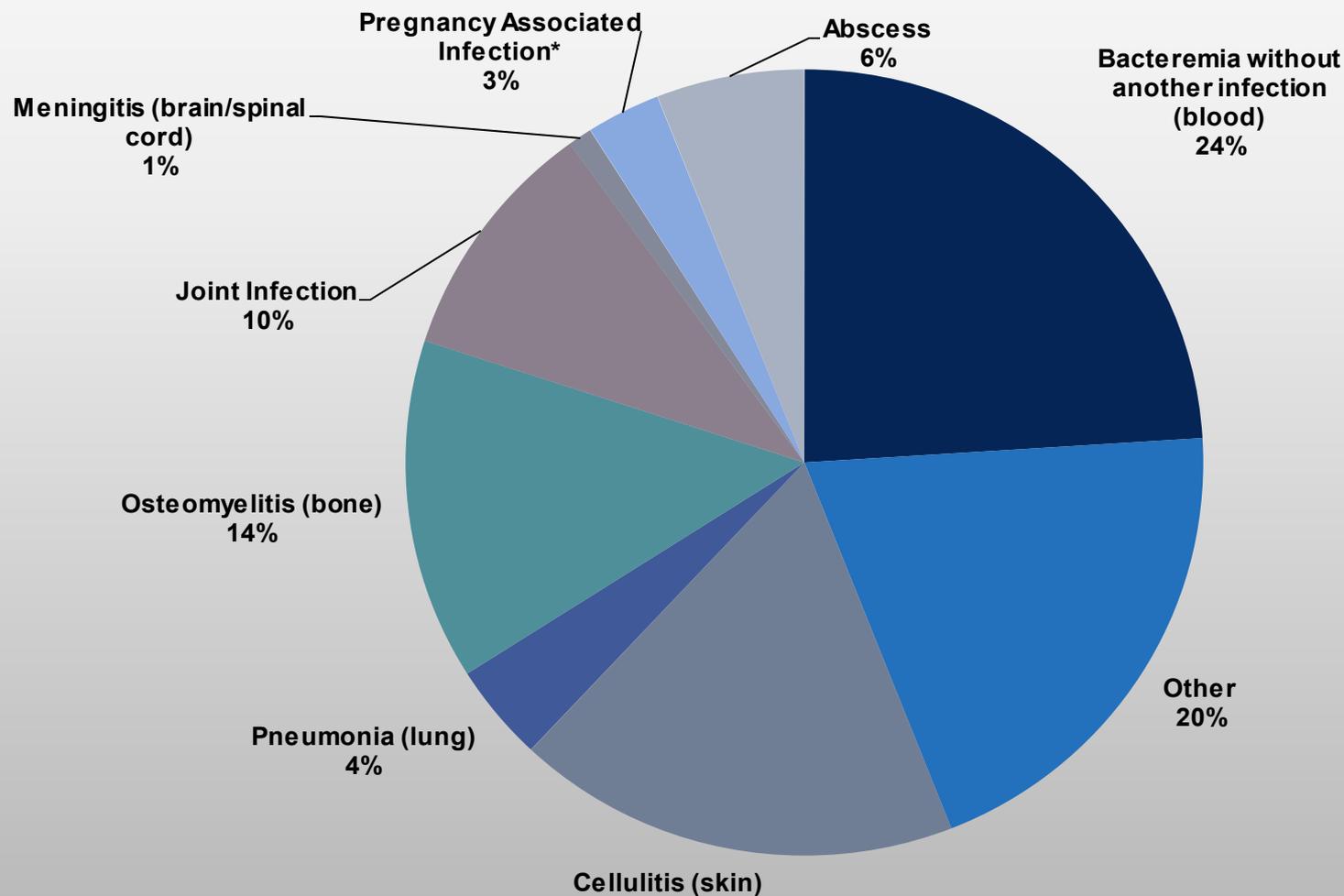
Incidence of Invasive Group B Streptococcal Disease by Gender and Age Group, Minnesota, 2013

Characteristic	Cases (n=597)	Incidence per 100,000 persons
Gender		
Male	331	12.4
Female	266	9.8
Age Group		
Under 1 yr.	30	44.4
1-4 yrs.	0	0
5-9 yrs.	1	0.3
10-19 yrs.	3	0.4
20-29 yrs.	21	2.9
30-39 yrs.	30	4.4
40-49 yrs.	54	7.4
50-59 yrs.	131	16.8
60-69 yrs.	135	25.3
70+ yrs.	192	38.2

Invasive Group B Streptococcal Disease Cases and Deaths by Age Group, Minnesota, 2013

Age Group	Cases	Deaths	% Died
Under 1 yr.	30	1	3%
1-4 yrs.	0	0	0%
5-9 yrs.	1	0	0%
10-19 yrs.	3	0	0%
20-29 yrs.	21	0	0%
30-39 yrs.	30	1	3%
40-49 yrs.	54	0	0%
50-59 yrs.	131	4	3%
60-69 yrs.	135	5	4%
70+ yrs.	192	10	5%
Total	597	21	4%

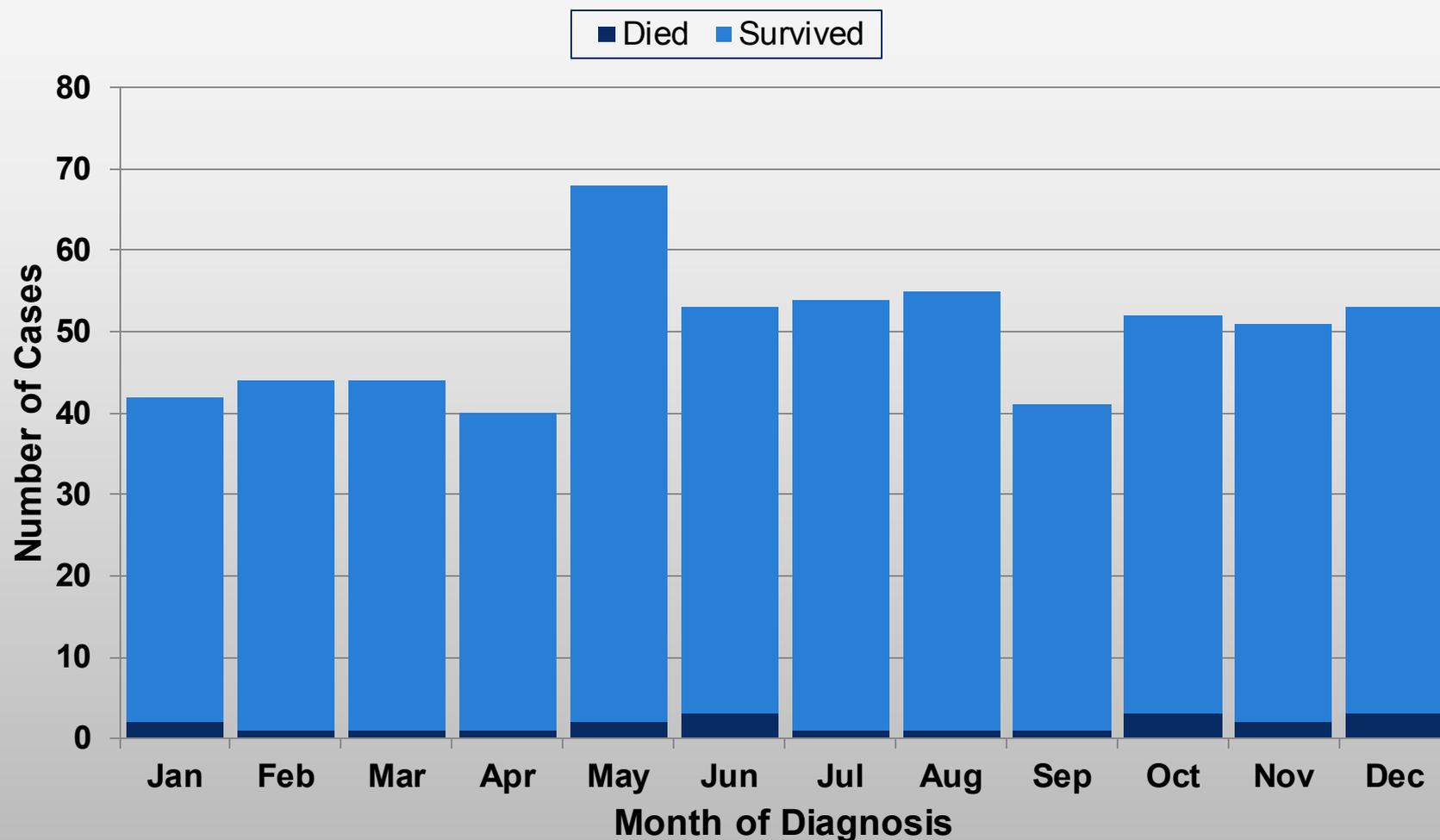
Invasive Group B Streptococcal Disease by Type of Infection/Syndrome, Minnesota 2013



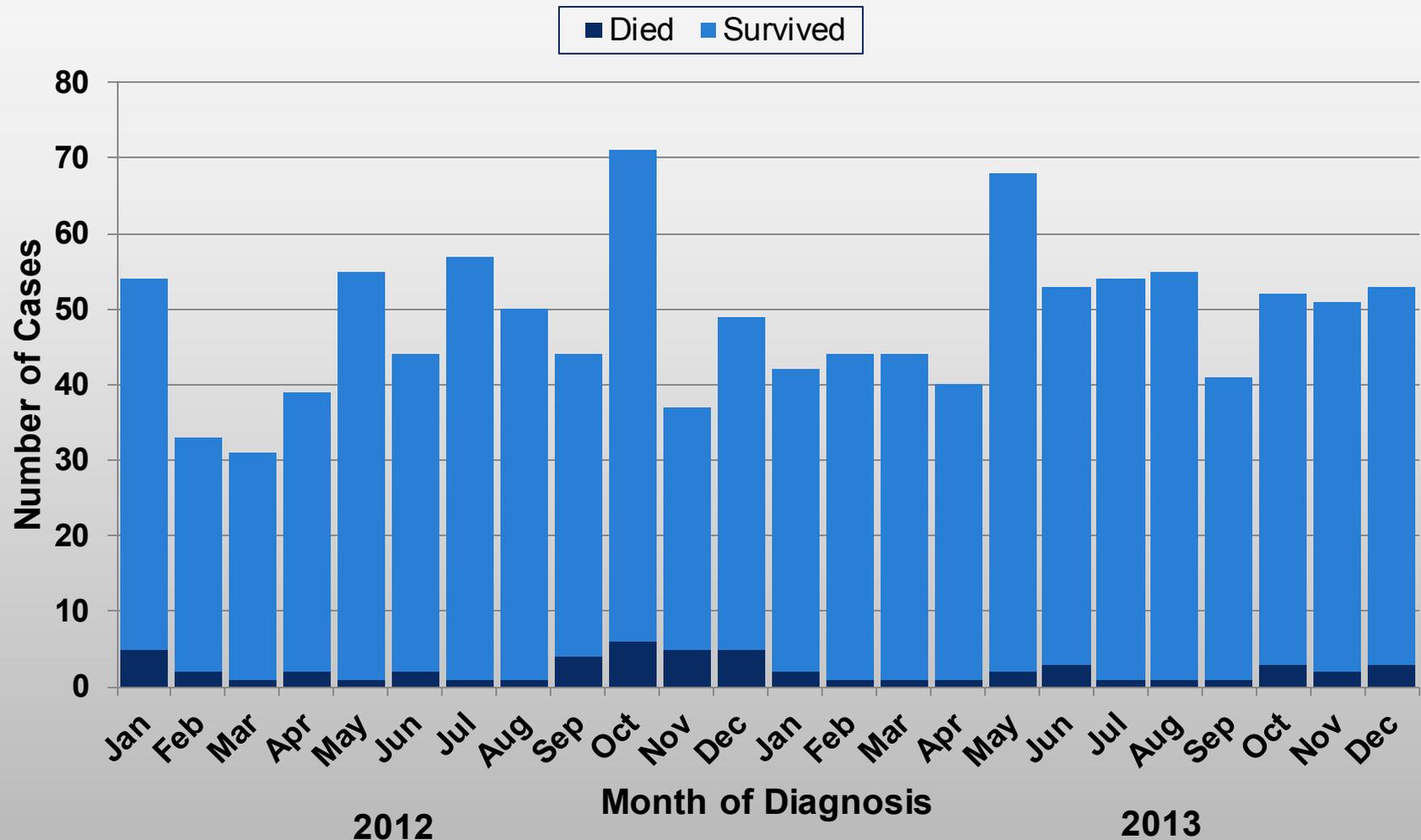
This chart represents 752 infections among 597 cases. (Some cases had >1 infection.)

** Mother had one of the following infections: Endometriosis, Septic Abortion, Choriamnionitis, or Placental Infection with fetal demise.

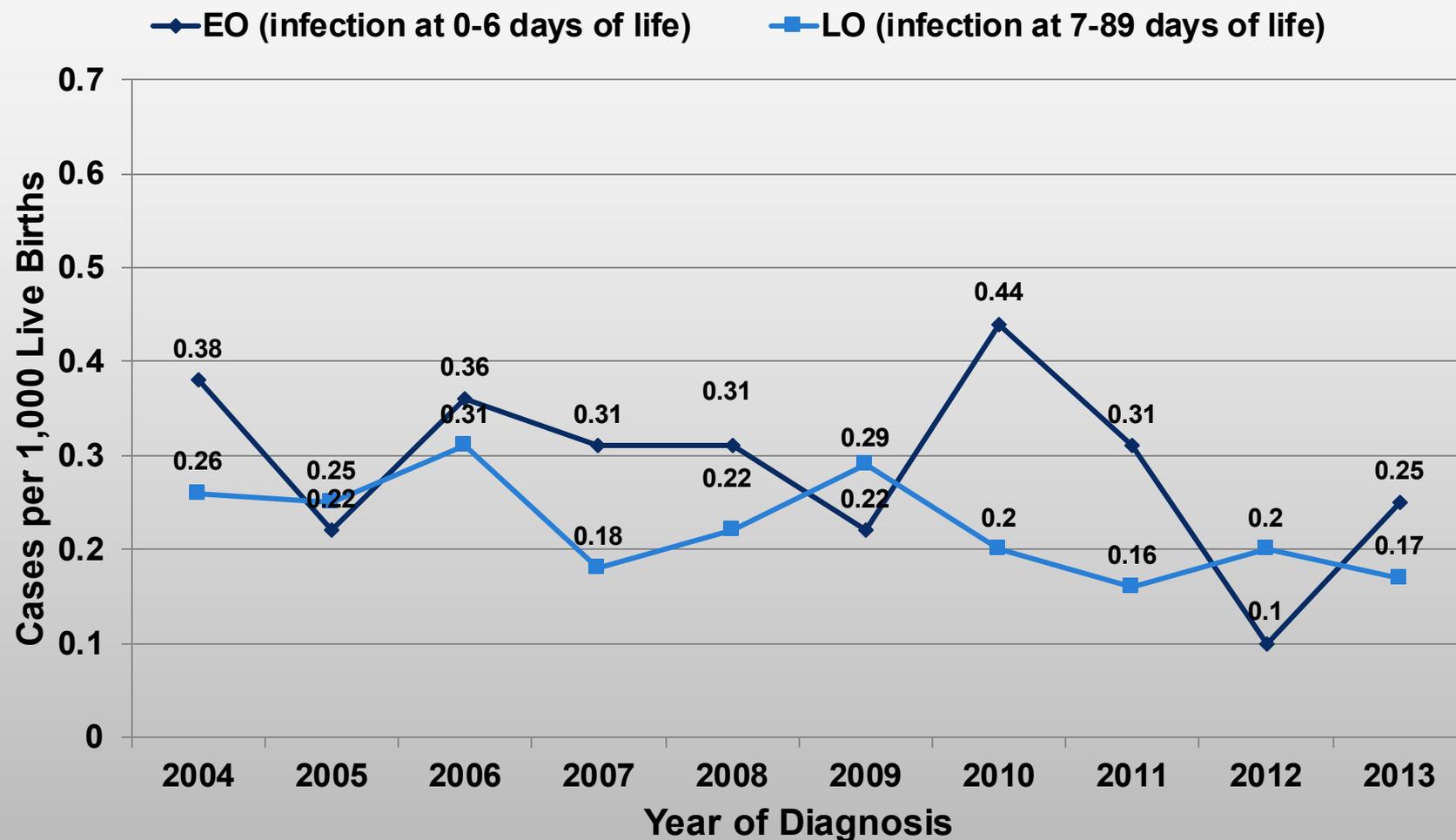
Cases of Invasive Group B Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2013



Cases of Invasive Group B Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2012-2013



Incidence of Invasive Early and Late-Onset Group B Streptococcal Disease, Minnesota, 2004-2013

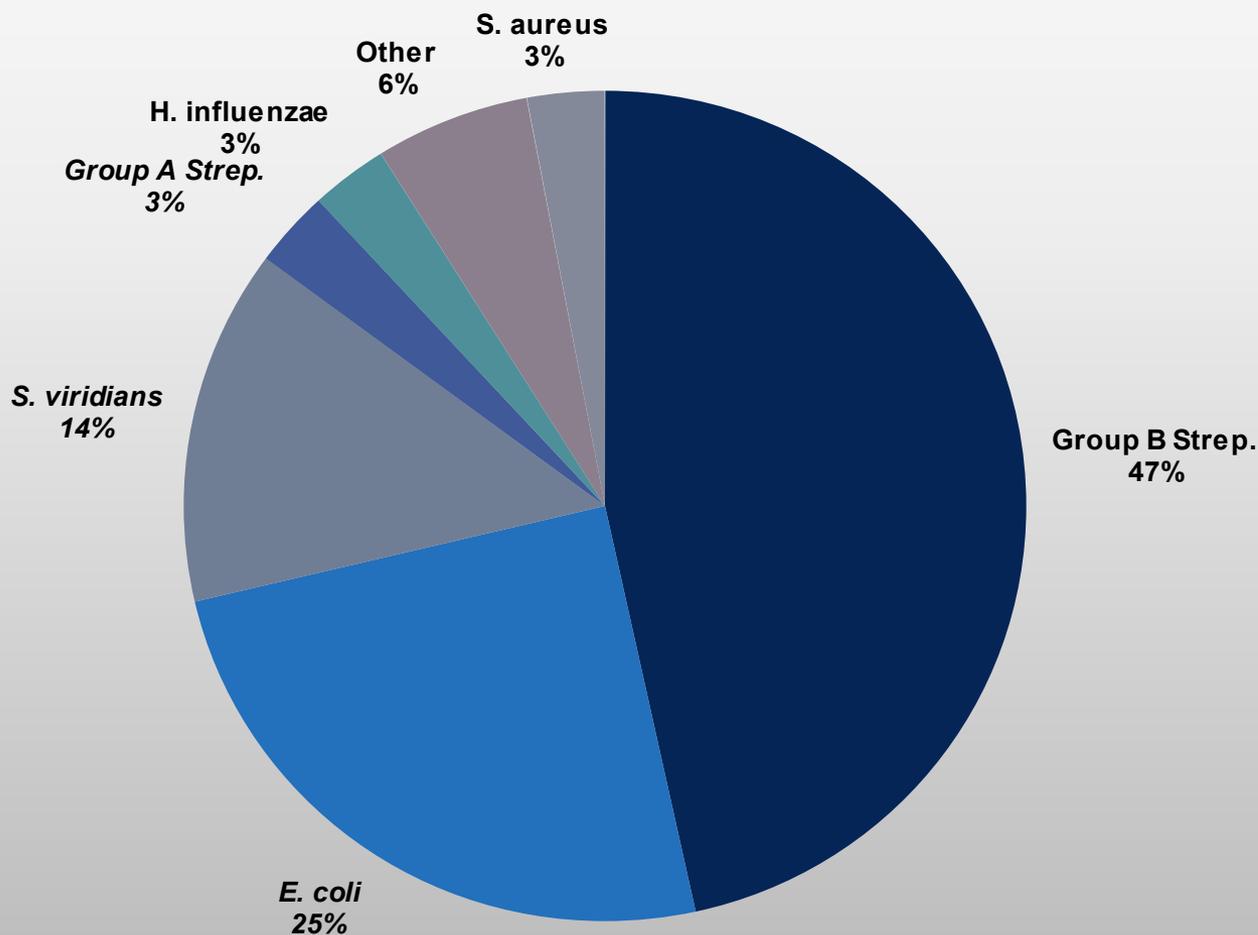


Early-Onset* Group B Streptococcal Disease by Race, Gestational Age and Outcome, Minnesota, 2013

Characteristic	Cases (n=17)	Percent
Race		
White	14	82%
Black	0	--
Other	3	18%
Gestational Age		
Under 32 weeks	2	12%
32-37 weeks	5	30%
Full-term	10	58%
Outcome		
Died	1	94%
Survived	16	6%

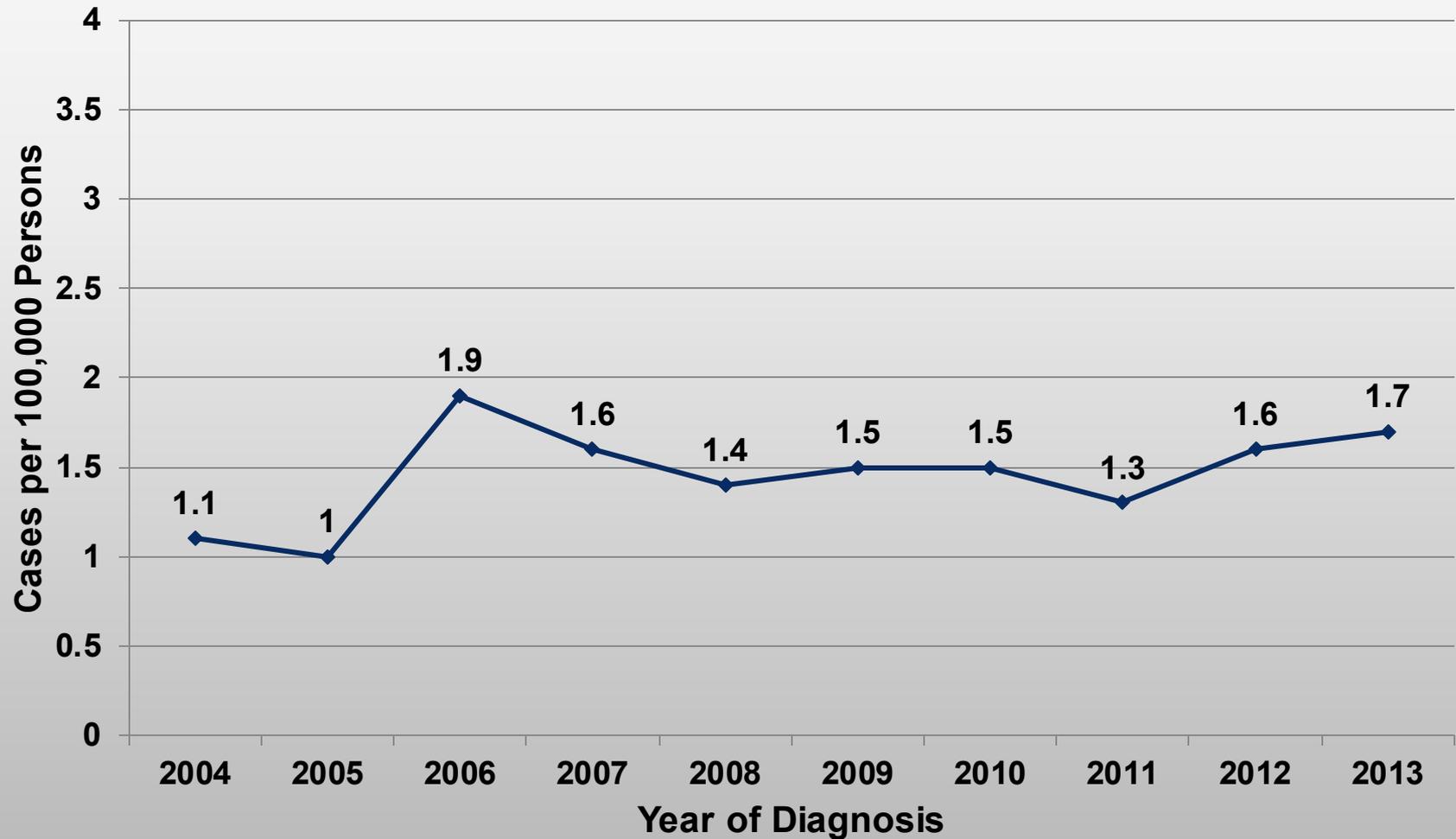
* onset 0-6 days of life

Invasive Neonatal Sepsis Disease in First 6 Days of Life by Pathogen, Minnesota, 2013*



* This chart represents 36 cases.

Incidence of Invasive *Haemophilus influenzae* Disease, Minnesota, 2004-2013



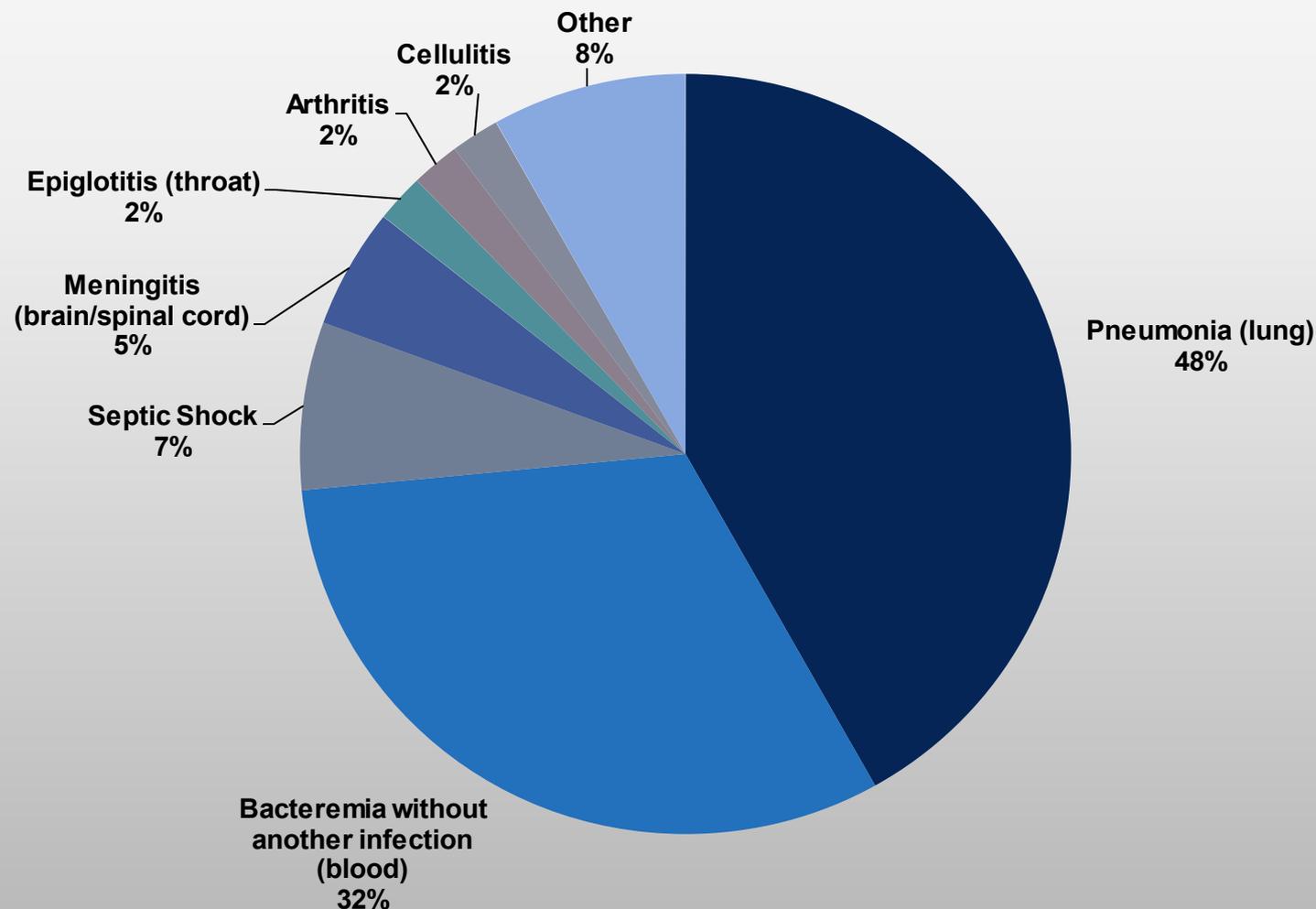
Incidence of Invasive *Haemophilus influenzae* Disease by Gender and Age Group, Minnesota, 2013

Characteristic	Cases (n=91)	Incidence per 100,000 persons
Gender		
Male	43	1.61
Female	48	1.77
Age Group		
Under 1 yr.	4	5.92
1-4 yrs.	8	2.85
5-9 yrs.	0	--
10-19 yrs.	0	--
20-29 yrs.	4	0.55
30-39 yrs.	2	0.29
40-49 yrs.	5	0.69
50-59 yrs.	10	1.28
60-69 yrs.	19	3.56
70+ yrs.	39	7.70

Incidence of Invasive *Haemophilus influenzae* Disease by Gender and Age Group, Minnesota, 2013

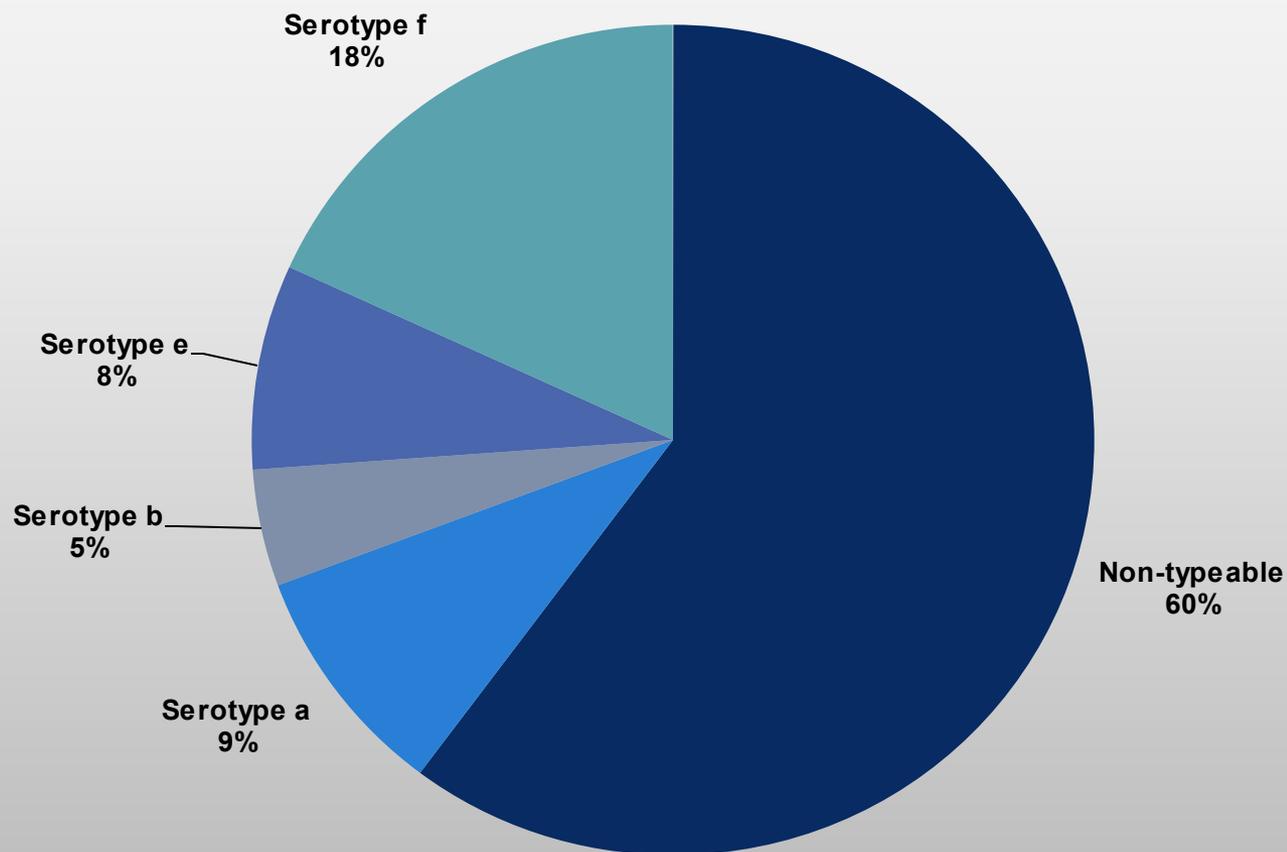
Characteristic	Cases (n=91)	Incidence per 100,000 persons
Gender		
Male	43	1.61
Female	48	1.77
Age Group		
Under 1 yr.	4	5.92
1-4 yrs.	8	2.85
5-9 yrs.	0	--
10-19 yrs.	0	--
20-29 yrs.	4	0.55
30-39 yrs.	2	0.29
40-49 yrs.	5	0.69
50-59 yrs.	10	1.28
60-69 yrs.	19	3.56
70+ yrs.	39	7.70

Invasive *Haemophilus influenzae* Disease by Type of Infection/Syndrome, Minnesota 2013



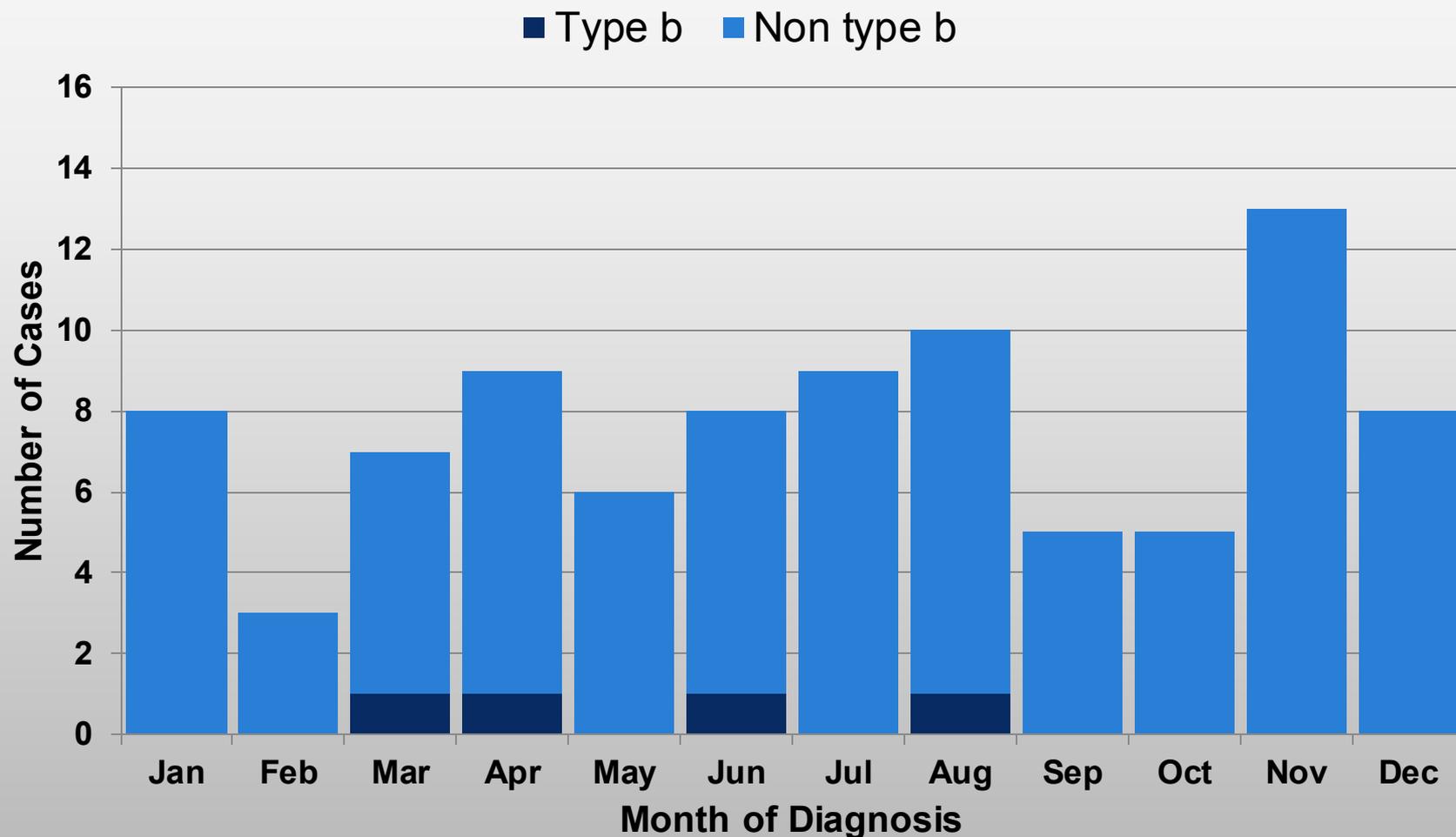
This graph represents 98 infections in 91 cases (some cases had > 1 infection).

Invasive *Haemophilus influenzae* Disease by Serotype, Minnesota 2013 (n=91*)

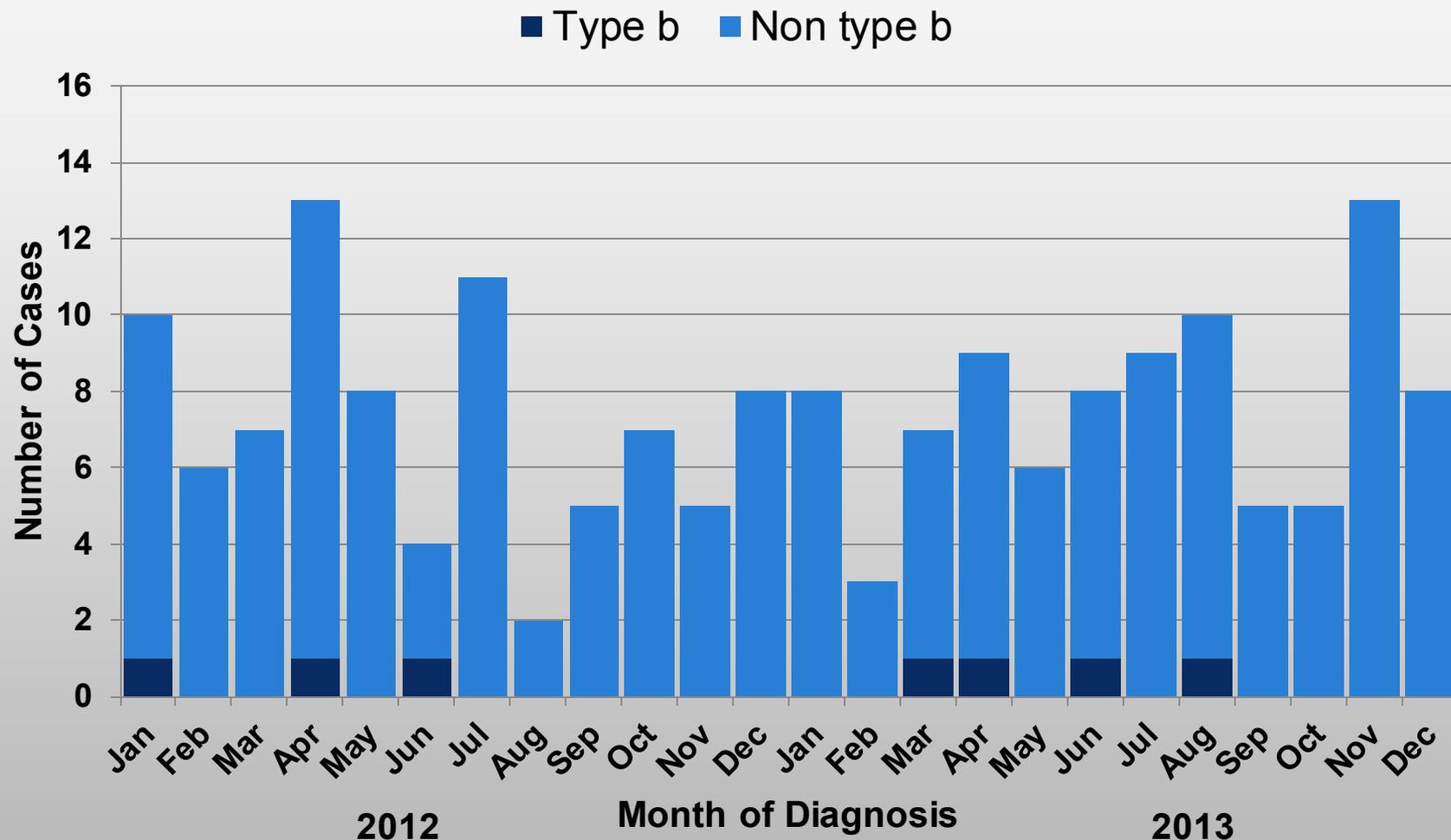


* 3 case isolates not available for serotyping

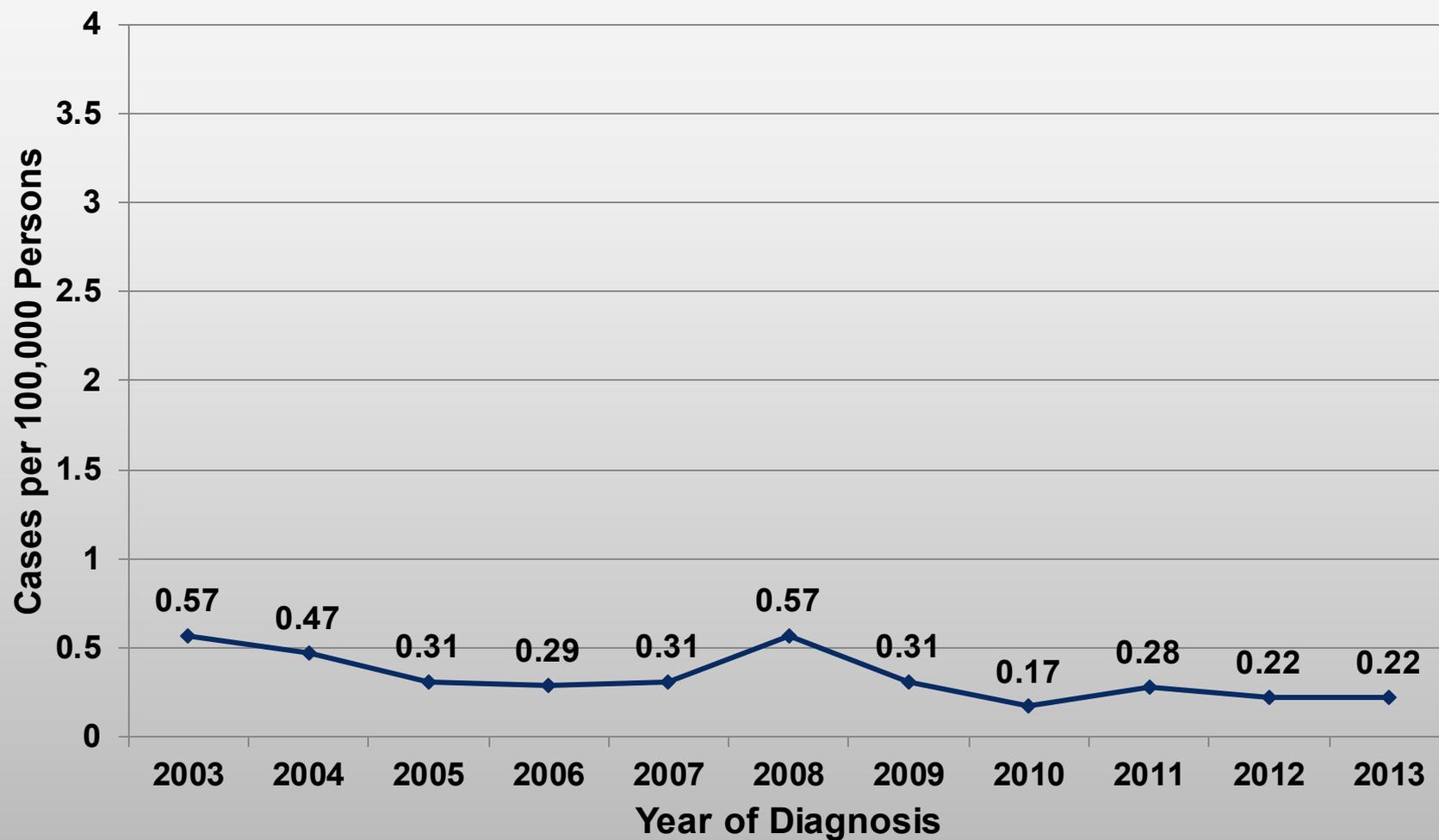
Cases of Invasive *Haemophilus influenzae* Disease by Month of Diagnosis, Serotype and Outcome, Minnesota, 2013



Cases of Invasive *Haemophilus influenzae* Disease by Month of Diagnosis and Serotype, Minnesota, 2012-2013



Incidence of Invasive *Neisseria meningitidis* Disease, Minnesota, 2003-2013



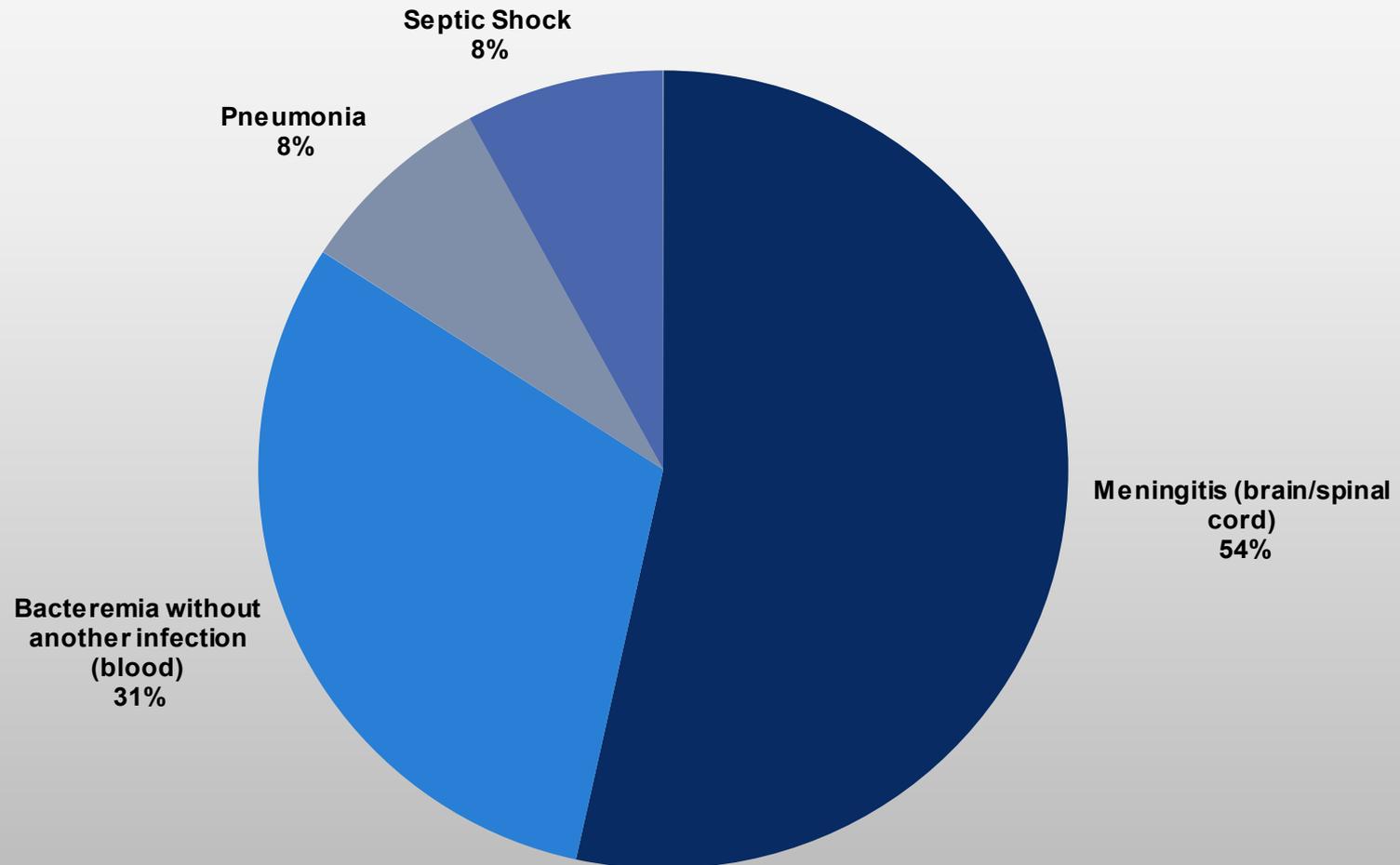
Incidence of Invasive *Neisseria meningitidis* Disease by Gender and Age Group, Minnesota, 2013

Characteristic	Cases (n=12)	Incidence per 100,000 persons
Gender		
Male	3	0.11
Female	9	0.33
Age Group		
Under 1 yr.	3	4.44
1-4 yrs.	1	0.36
5-9 yrs.	1	0.28
10-19 yrs.	1	0.14
20-29 yrs.	2	0.28
30-39 yrs.	0	0
40-49 yrs.	1	0.14
50-59 yrs.	2	0.26
60-69 yrs.	0	0
70+ yrs.	1	0.20

Invasive *Neisseria meningitidis* Disease Cases and Deaths by Age Group, Minnesota, 2013

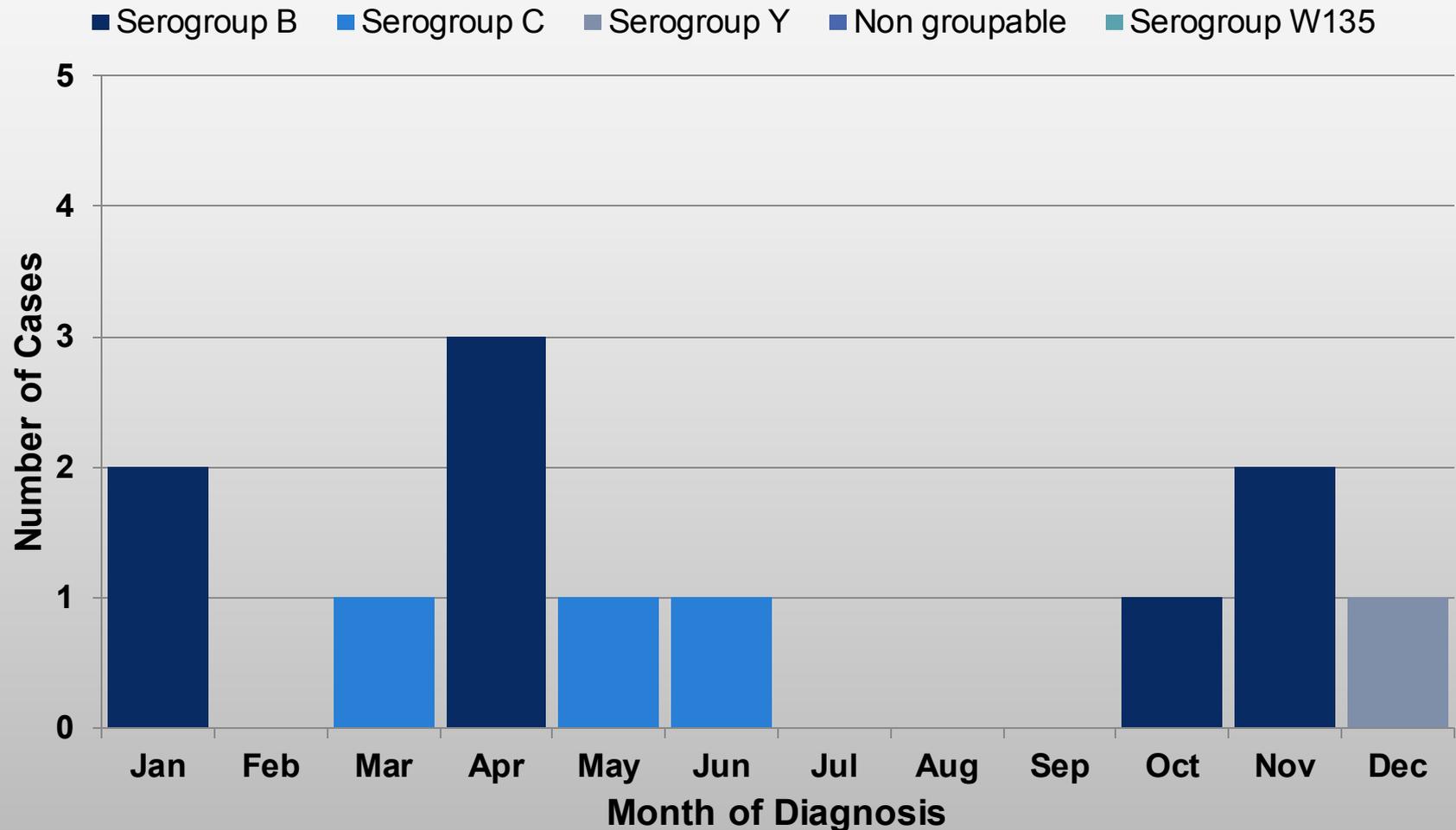
Age Group	Cases	Deaths	% Died
Under 1 yr.	3	1	33%
1-4 yrs.	1	0	0%
5-9 yrs.	1	0	0%
10-19 yrs.	1	0	0%
20-29 yrs.	2	0	0%
30-39 yrs.	0	0	--
40-49 yrs.	1	0	0%
50-59 yrs.	2	0	0%
60-69 yrs.	1	0	0%
70+ yrs.	1	0	0%
Total	12	1	8%

Invasive *Neisseria meningitidis* by Type of Infection/Syndrome, Minnesota 2013*

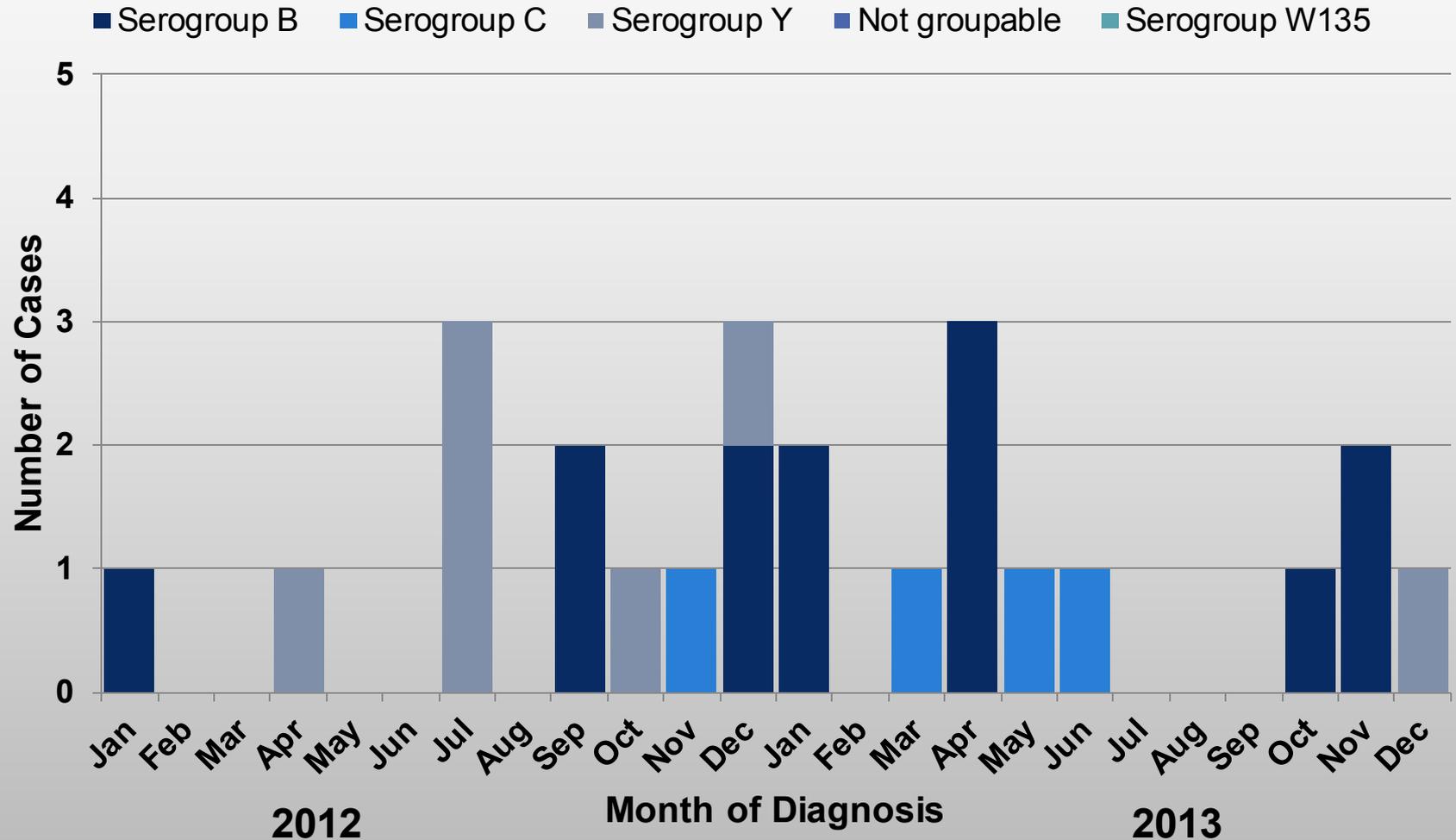


*This chart represents 13 infections among 12 cases (one case had > 1 infection).

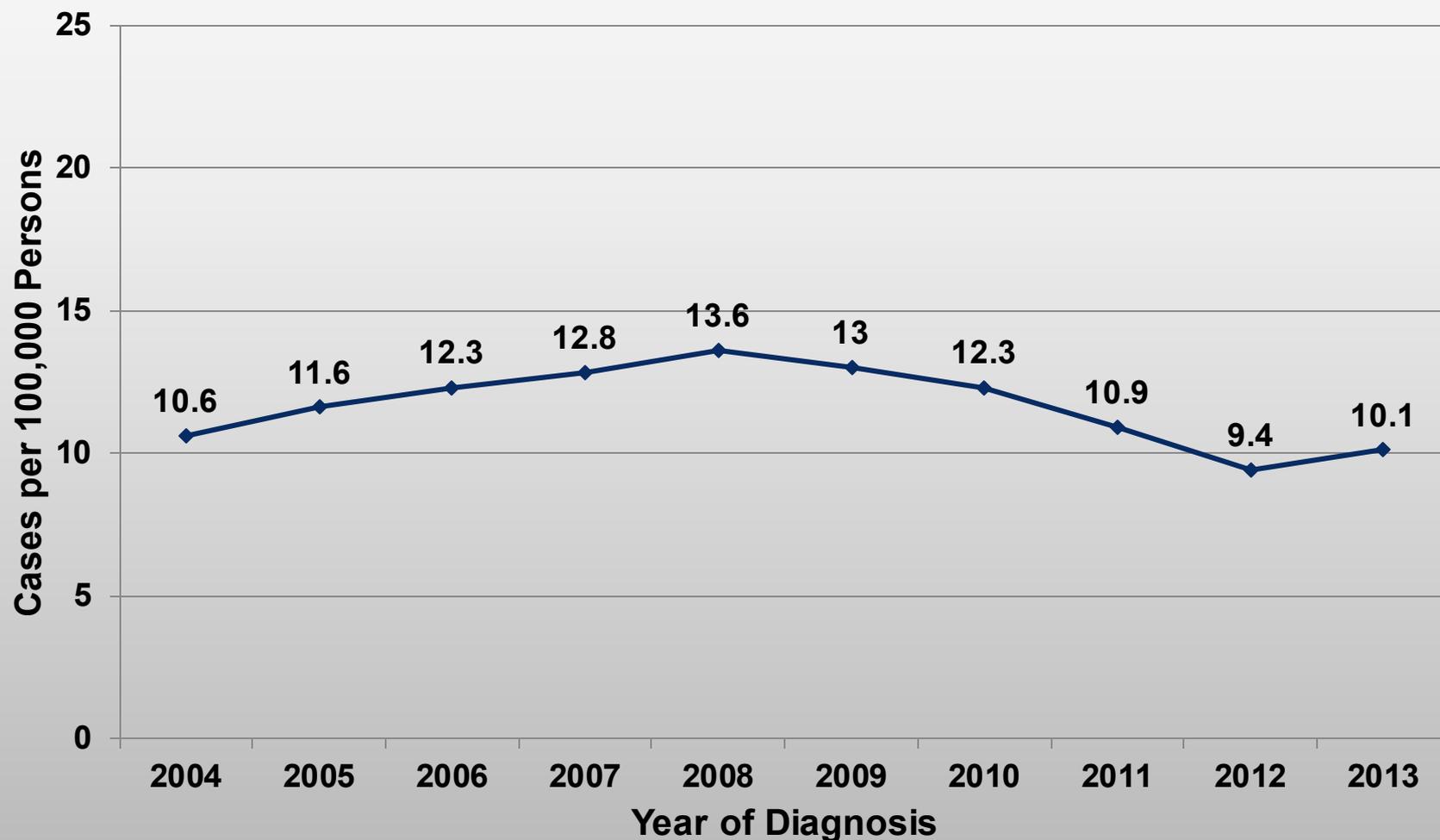
Cases of Invasive *Neisseria meningitidis* Disease by Month of Diagnosis and Serotype, Minnesota, 2013



Cases of Invasive *Neisseria meningitidis* Disease by Month of Diagnosis and Serotype, Minnesota, 2012-2013



Incidence of Invasive Pneumococcal Disease, Minnesota, 2004-2013



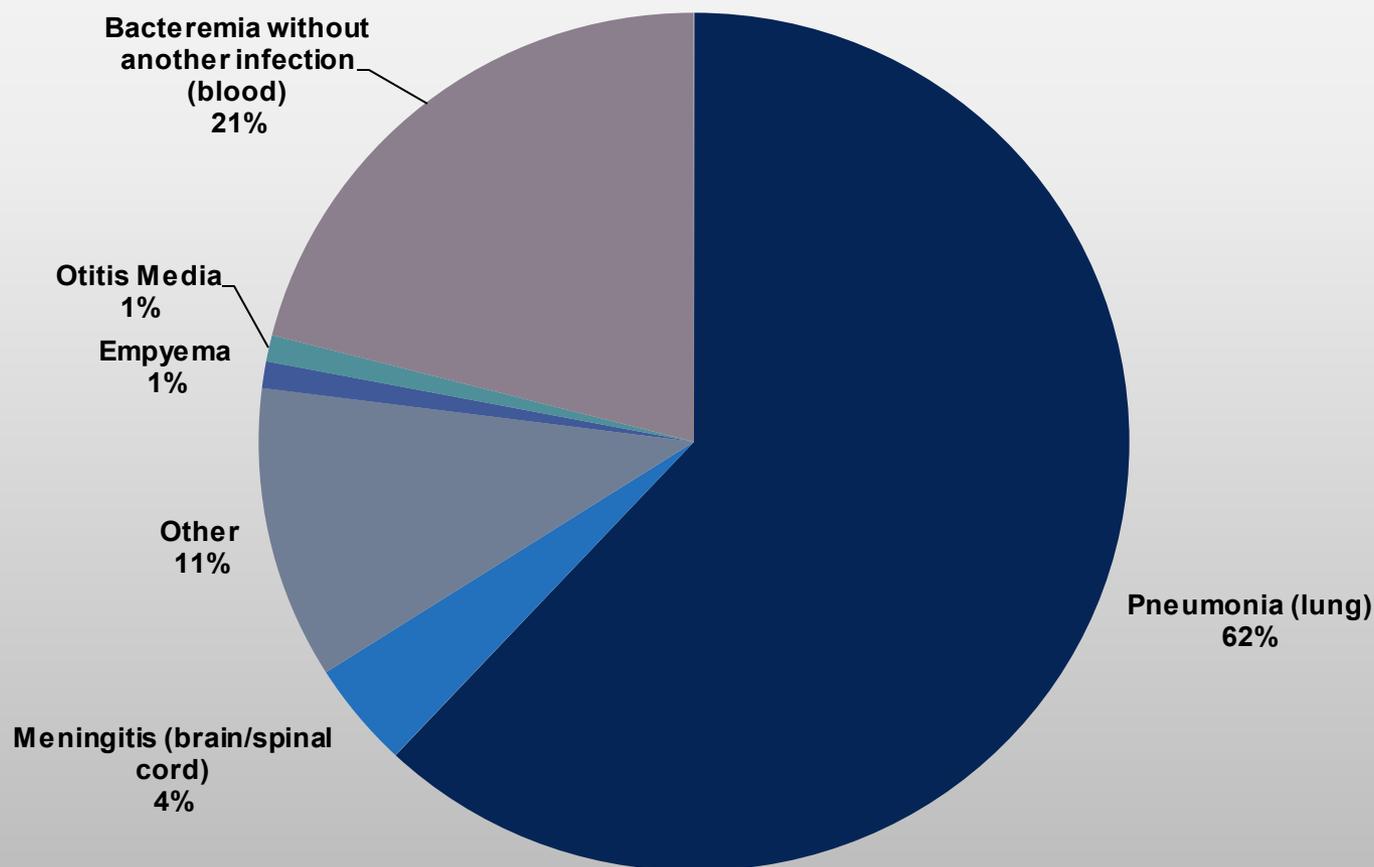
Incidence of Invasive Pneumococcal Disease by Gender and Age Group, Minnesota, 2013

Characteristic	Cases (n=542)	Incidence per 100,000 persons
Gender		
Male	267	10.0
Female	275	10.2
Age Group		
Under 1 yr.	13	19.2
1-4 yrs.	32	11.4
5-19 yrs.	11	1.0
20-29 yrs.	13	1.8
30-39 yrs.	30	4.4
40-49 yrs.	38	5.2
50-64 yrs.	150	13.8
65-79 yrs.	148	28.6
80+ yrs.	107	50.2

Invasive Pneumococcal Disease Cases and Deaths by Age Group, Minnesota, 2013

Age Group	Cases	Deaths	% Died
Under 1 yr.	13	1	8%
1-4 yrs.	32	0	0%
5-19 yrs.	11	0	0%
20-29 yrs.	13	1	8%
30-39 yrs.	30	1	3%
40-49 yrs.	38	2	5%
50-64 yrs.	150	13	9%
65-79 yrs.	148	13	9%
80+ yrs.	107	26	24%
Total	542	57	11%

Invasive Pneumococcal Disease by Type of Infection/Syndrome, Minnesota 2013*



*This chart represents 569 infections among 542 cases (some cases had > 1 infection).

Invasive Pneumococcal Isolates by Serotype Included in 13-Valent Conjugate Vaccine* by Age Group, Minnesota, 2013

Age Group	Isolates	# included in PCV-13	% included in PCV-13
Under 1 yr.	13	3	23%
1-4 yrs.	29	2	7%
5-19 yrs.	10	2	20%
20-29 yrs.	13	6	46%
30-39 yrs.	29	6	21%
40-49 yrs.	37	11	30%
50-64 yrs.	146	40	27%
65-79 yrs.	139	32	23%
80+ yrs.	104	19	18%
Total	520	121	23%

*Serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 23F

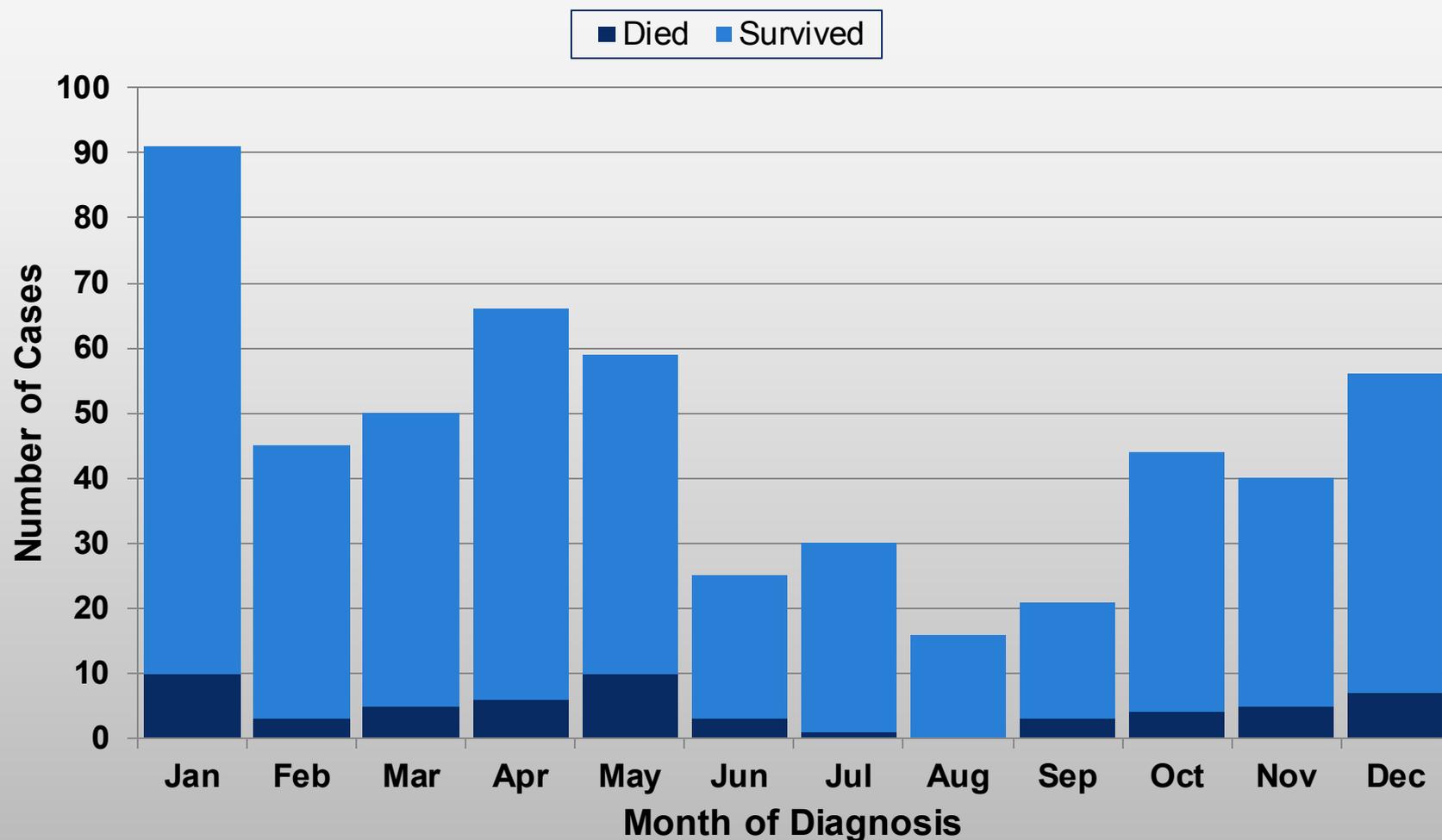
Invasive Pneumococcal Isolates by Resistance to Antimicrobial Agents, Minnesota, 2013 (n=518 viable isolates)

	Total Resistant Isolates	% Resistant Isolates
Penicillin resistance (R)*		
Meningitis breakpoints	90	17%
Non-meningitis breakpoints	16	3%
Resistance to drug classes**		
No resistance	294	57%
R to 1 drug class	149	29%
R to 2-3 drug classes	44	8%
R to 4-6 drug classes	31	6%

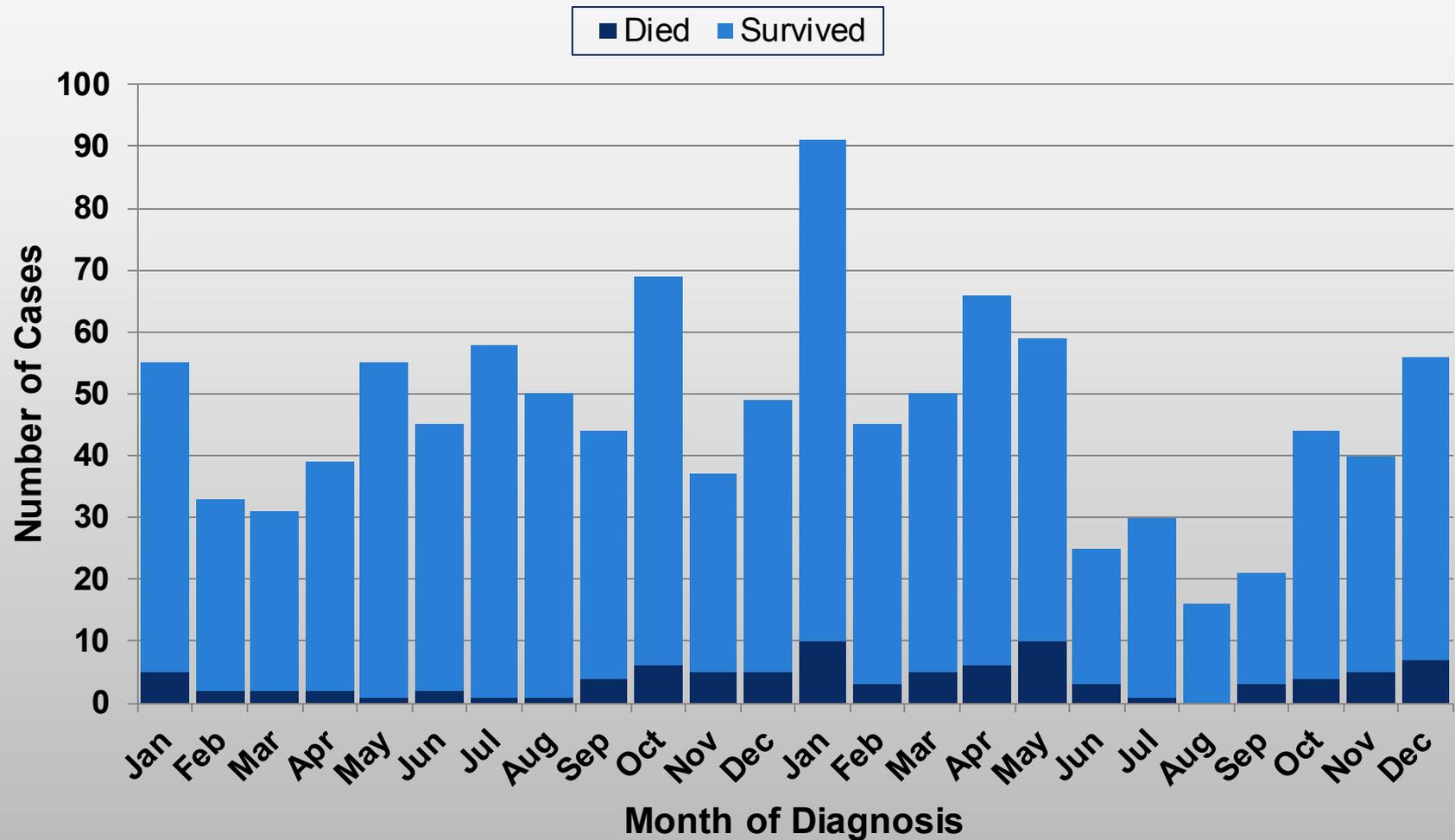
* Isolates with MIC \geq 0.12 μ g/ml are Penicillin-R for meningitis, \geq 8 μ g/ml for non-meningitis.

** Twelve drug classes assessed; R to beta-lactams was assessed by penicillin MIC \geq 0.12 μ g/ml.

Cases of Invasive Pneumococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2013



Cases of Invasive Pneumococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2011-2012



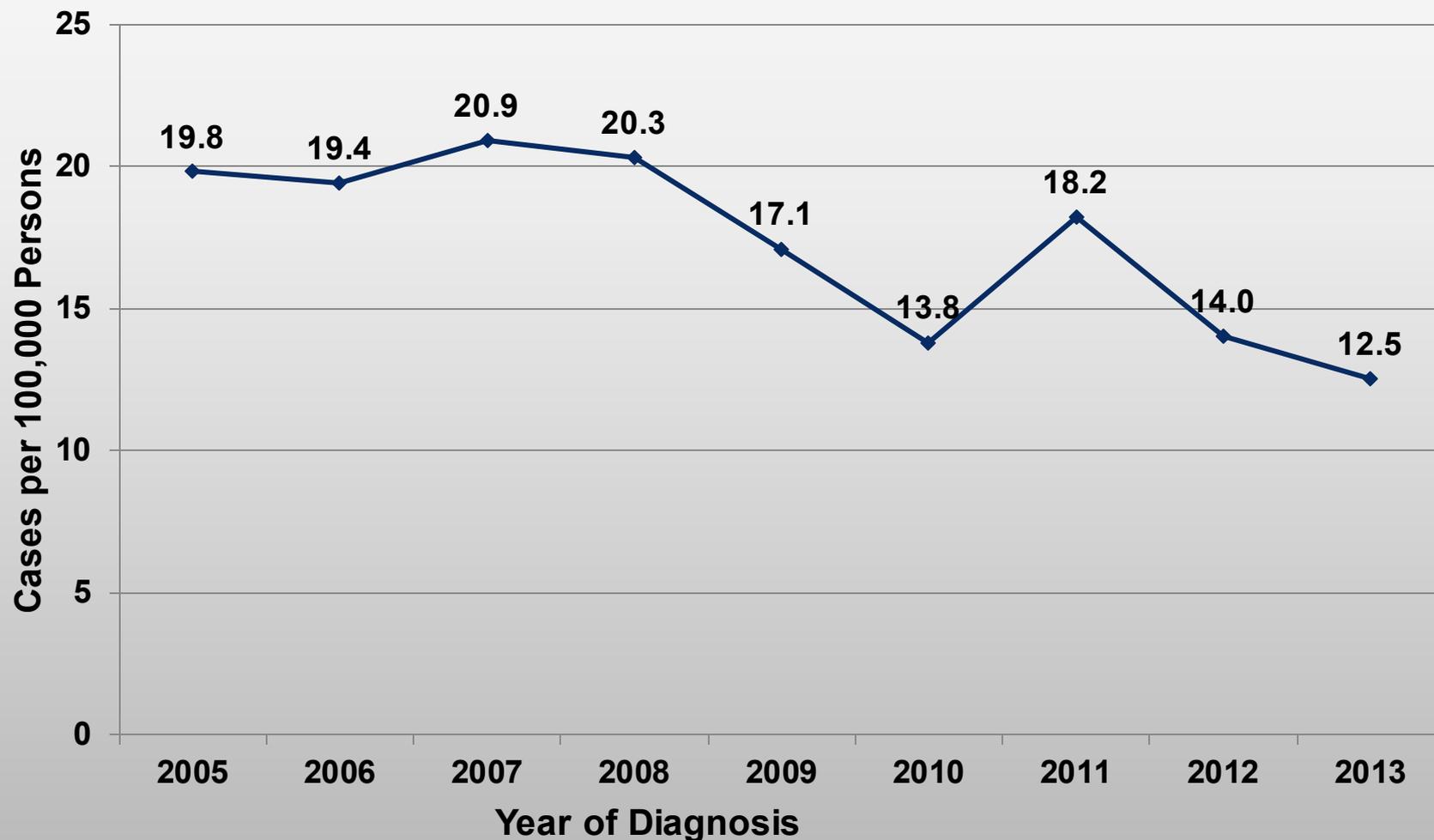
Invasive MRSA Surveillance Methods

- Cases include Hennepin and Ramsey County, Minnesota residents with invasive infections due to methicillin-resistant *Staphylococcus aureus* (MRSA).
- Invasive infections are from normally sterile body sites such as blood, cerebrospinal fluid and others. These usually cause serious illnesses (disease).
- All metro area hospitals and reference laboratories serving Minnesotans are contacted routinely to identify cases.

Invasive MRSA Surveillance Methods (cont.)

- Species confirmation, antibiotic resistance and other testing is performed by the MDH Public Health.
- Disease rates are based on census population data.
- The Centers for Disease Control and Prevention (CDC) includes these results from Minnesota and other states and regions in a network called Active Bacterial Core Surveillance (ABCs) which covers a population base of 42 million.

Incidence of Invasive MRSA Disease, Ramsey and Hennepin Counties, 2004-2013



* Data from years 2004-2007 includes Ramsey County only.

Incidence of Invasive MRSA Disease by Gender and Age Group, Ramsey and Hennepin Counties, Minnesota, 2013

Characteristic	Cases (n=213)	Incidence per 100,000 persons
Gender		
Male	126	15.1
Female	87	10.0
Age Group		
Under 1 yr.	3	12.5
1-4 yrs.	6	6.6
5-9 yrs.	1	0.9
10-19 yrs.	4	1.9
20-29 yrs.	10	3.7
30-39 yrs.	12	5.0
40-49 yrs.	26	11.7
50-59 yrs.	44	18.6
60-69 yrs.	45	28.2
70+ yrs.	62	44.2

Invasive MRSA Disease Cases and Deaths by Age Group, Ramsey and Hennepin Counties, Minnesota, 2013

Age Group	Cases	Deaths	% Died
Under 1 yr.	3	0	0%
1-4 yrs.	6	0	0%
5-9 yrs.	1	0	0%
10-19 yrs.	4	0	0%
20-29 yrs.	11	0	0%
30-39 yrs.	12	0	0%
40-49 yrs.	26	1	5.6%
50-59 yrs.	44	4	22.2%
60-69 yrs.	45	5	27.8%
70+ yrs.	62	8	44.4%
Total	213	18	8.4%

Incidence of Invasive MRSA Disease by Case Type, Ramsey and Hennepin Counties, Minnesota, 2013

Case Type	Cases	Incidence per 100,000 persons
Healthcare-associated	179	10.5
Community-associated	33	1.9

- Healthcare-associated if case had one or more of the following: MRSA infection was identified more than 3 days after hospital admission; history of hospitalization, surgery, dialysis or residence in a long-term care facility in the previous year; or, presence of an indwelling catheter.
- Community-associated: none of the previously mentioned criteria were met.

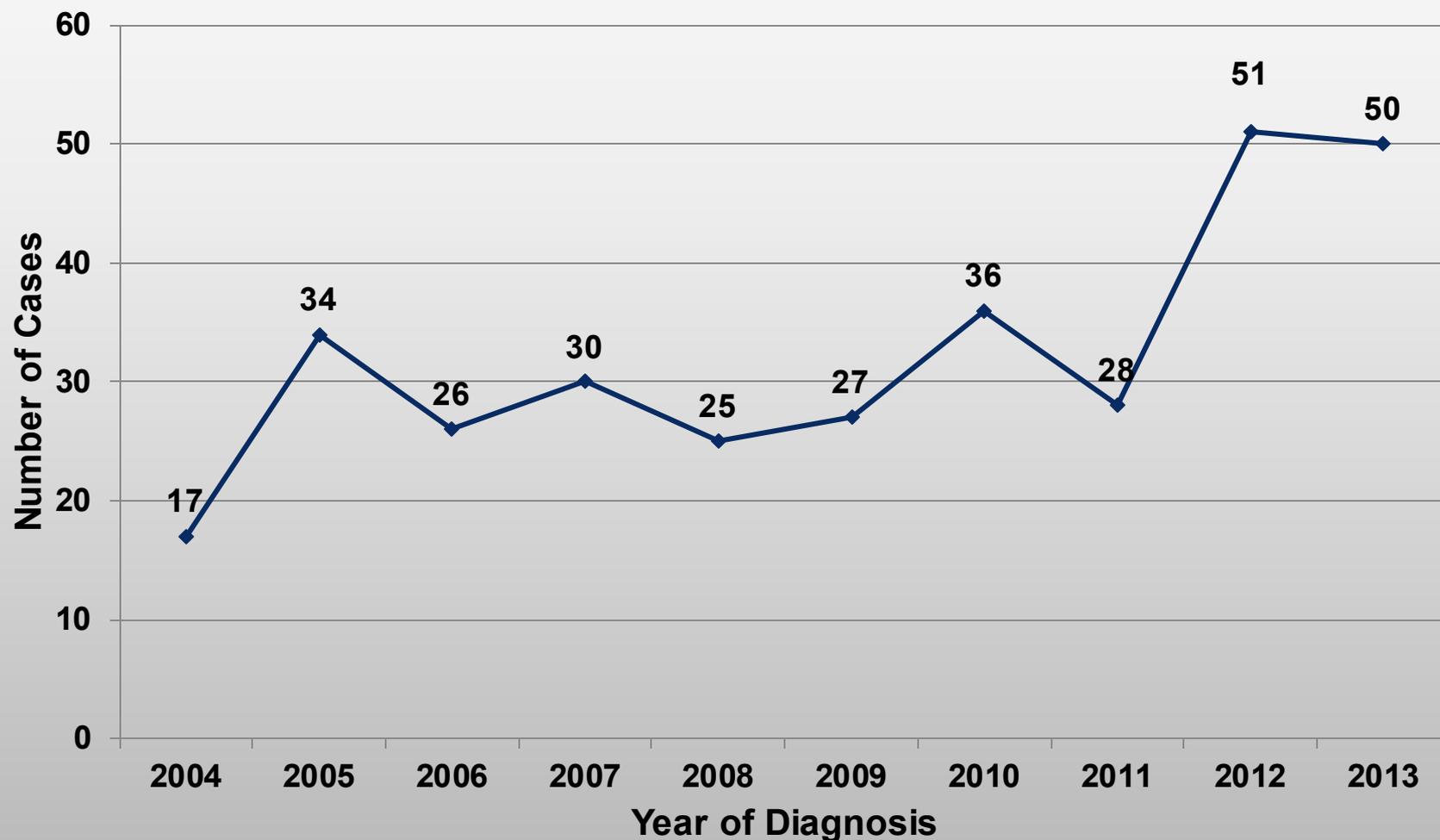
Invasive MRSA Disease by Type of Infection, Ramsey and Hennepin Counties, Minnesota, 2013

Type of Infection*	Cases
Bacteremia (blood)	146
Without another source of infection	50
With another source of infection	96
Pneumonia (lung)	26
Osteomyelitis (bone)	31
Cellulitis/skin abscess (skin)	41
Endocarditis (heart)	4
More than one infection type	82
Other infection**	110

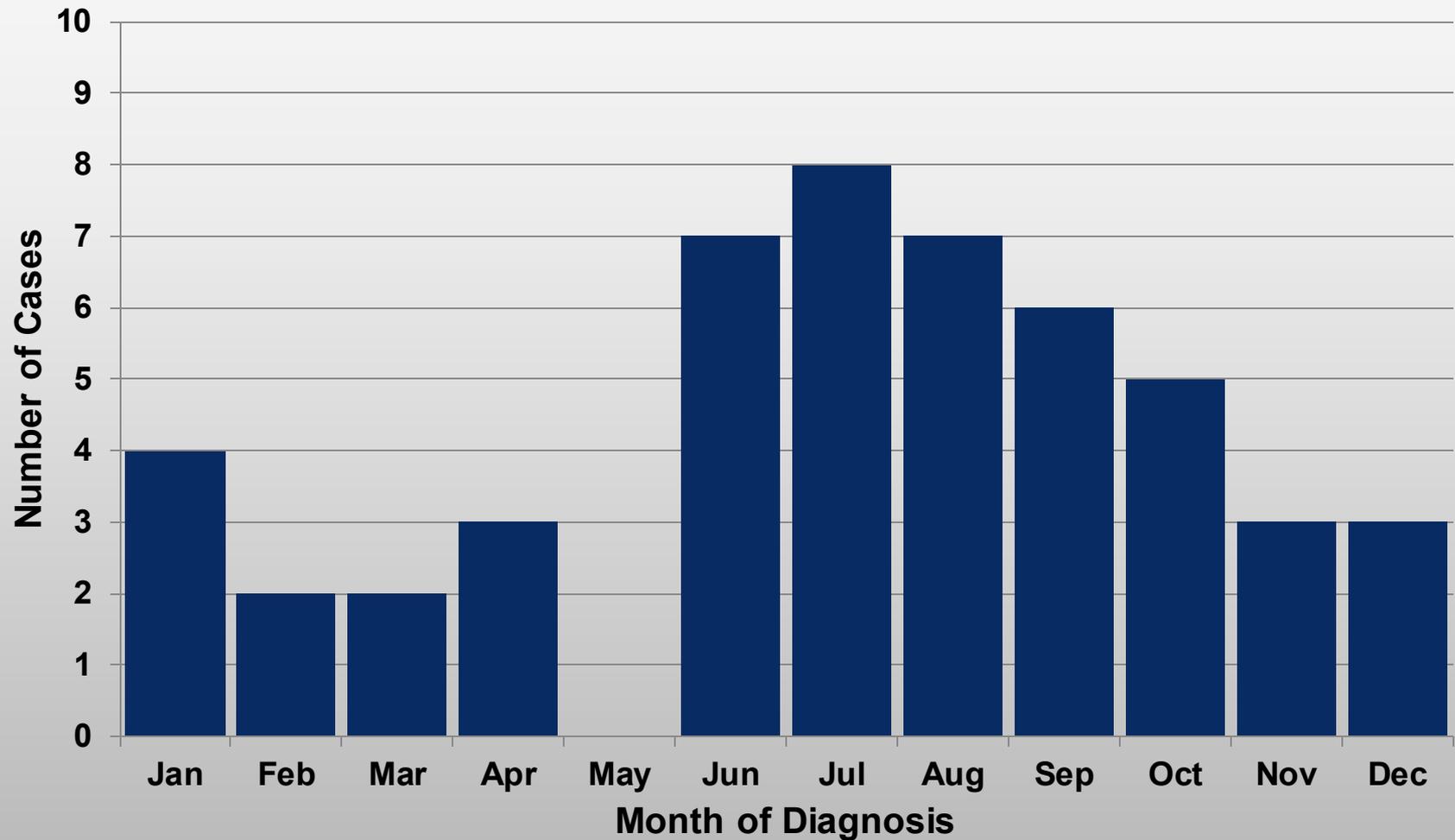
* Cases may have had more than 1 type of infections

** Other infections included urinary tract, internal organ abscess, empyema (pus), septic arthritis (joint), meningitis (brain/spinal cord)

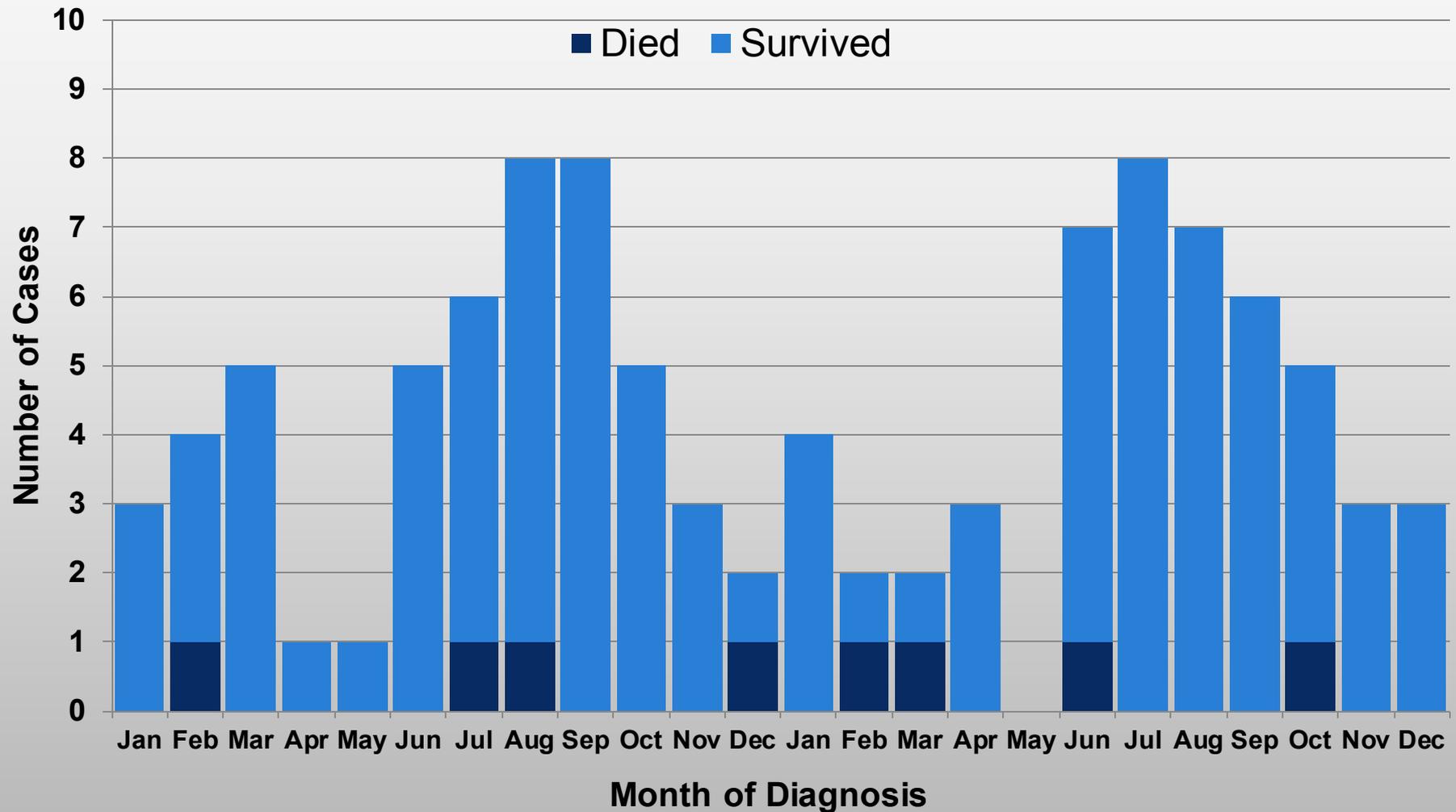
Confirmed Legionnaires' Disease Cases Minnesota, 2004-2013



Confirmed Legionnaires' Disease by Month of Diagnosis, Minnesota, 2013



Confirmed Legionnaires' Disease by Month of Diagnosis, Minnesota, 2012-2013



Confirmed Legionnaires' Disease Cases by Age Group and Gender, Minnesota, 2013

Age Group	Male	Female	Total
18-29 yrs.	0	2	2
30-39 yrs.	3	0	3
40-49 yrs.	5	1	6
50-59 yrs.	7	2	9
60-69 yrs.	8	3	11
70+ yrs.	12	7	19
Total	35 (70%)	15 (30%)	50

Possible Exposures Among Confirmed Legionnaires' Disease Cases, Minnesota 2013

