

INVASIVE BACTERIAL DISEASE SURVEILLANCE REPORT, 2015

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

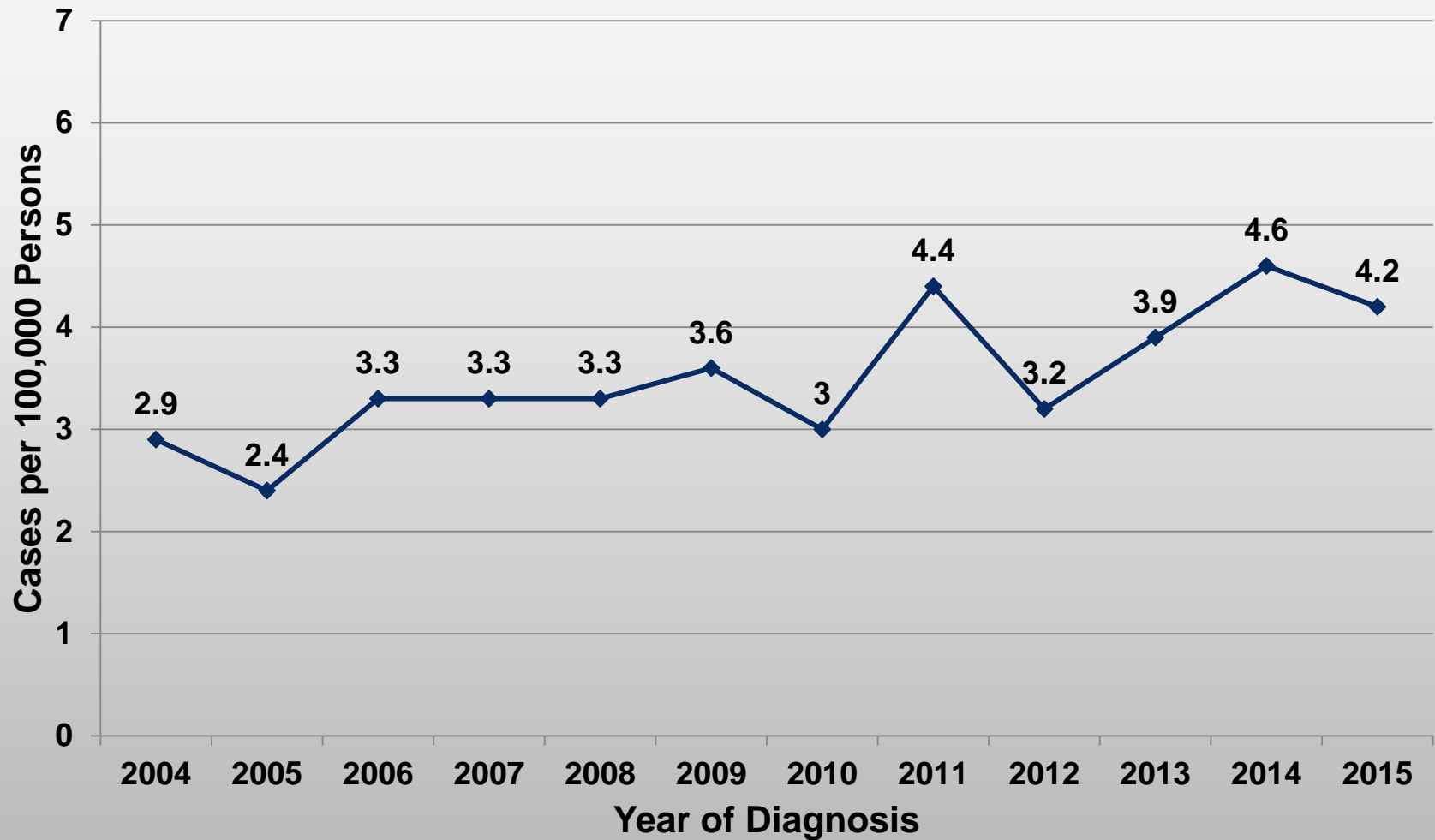
Surveillance Methods

- 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, 2004-2015



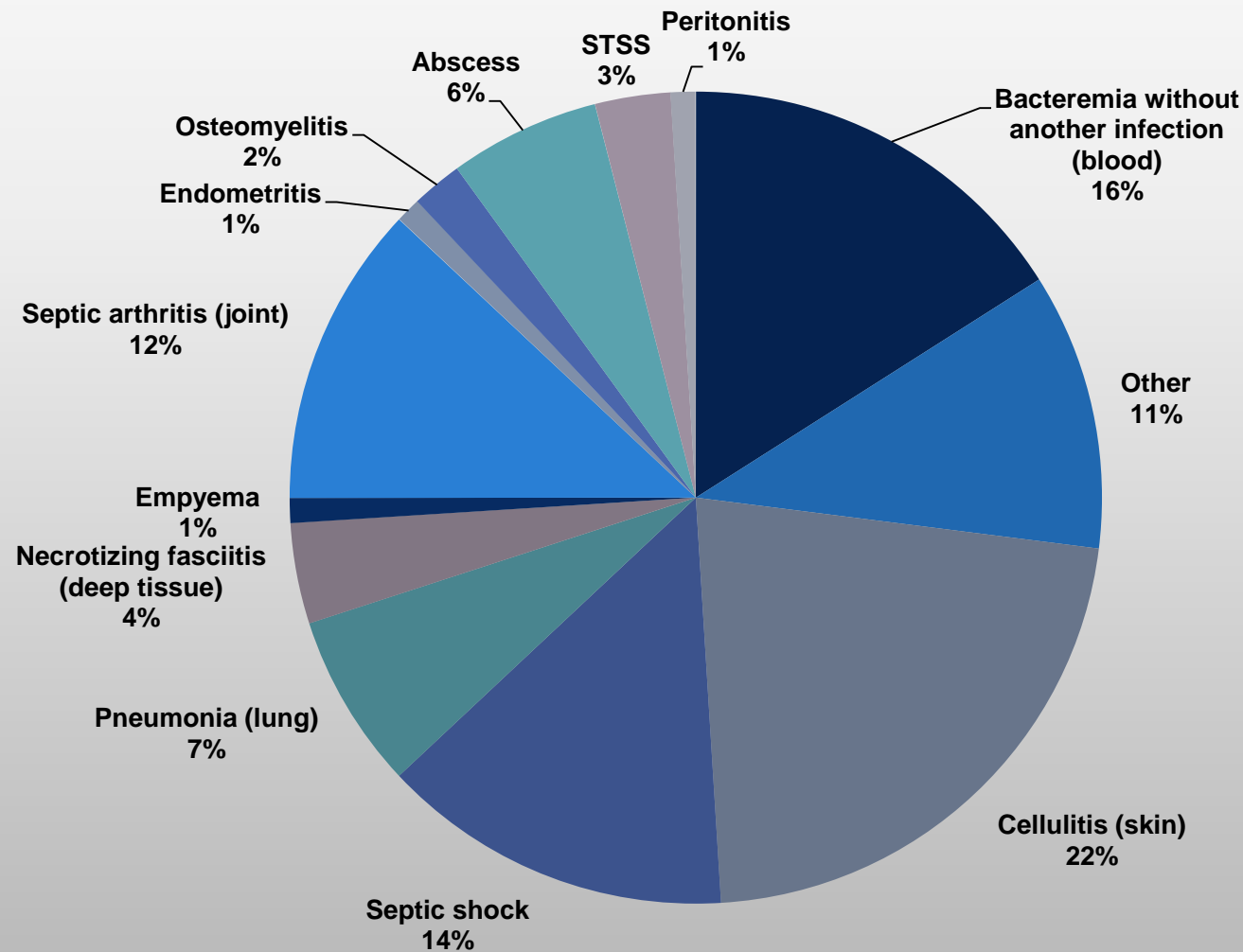
Incidence of Invasive Group A Streptococcal Disease by Gender and Age Group, Minnesota, 2015

Characteristic	Cases (n=236)	Incidence per 100,000 persons
Gender		
Male	130	4.6
Female	106	3.7
Age Group		
Under 1 yr.	1	1.3
1-4 yrs.	12	3.8
5-9 yrs.	12	3.2
10-19 yrs.	8	1.2
20-29 yrs.	19	2.4
30-39 yrs.	27	3.4
40-49 yrs.	32	4.5
50-59 yrs.	31	3.9
60-69 yrs.	38	6.6
70+ yrs.	56	10.7

Invasive Group A Streptococcal Disease Cases and Deaths by Age Group, Minnesota, 2015

Age Group	Cases	Deaths	% Died
Under 1 yr.	1	0	0%
1-4 yrs.	12	0	0%
5-9 yrs.	12	0	0%
10-19 yrs.	8	1	12.5%
20-29 yrs.	19	0	0%
30-39 yrs.	27	1	3.7%
40-49 yrs.	32	2	6.2%
50-59 yrs.	31	3	9.7%
60-69 yrs.	38	4	10.5%
70+ yrs.	56	3	23%
Total	236	14	5.9%

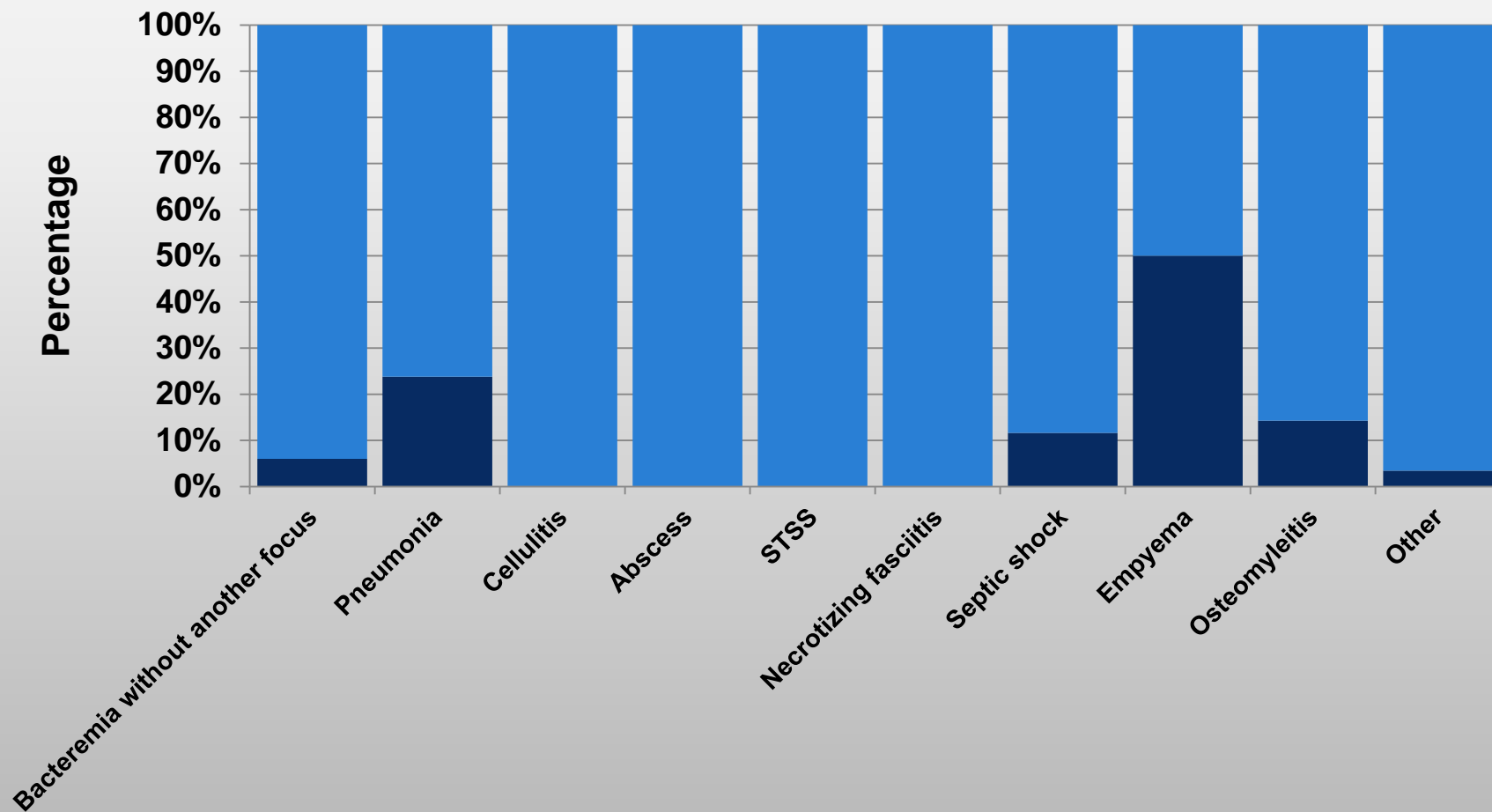
Invasive Group A Streptococcal Disease by Type of Infection/Syndrome, Minnesota, 2015



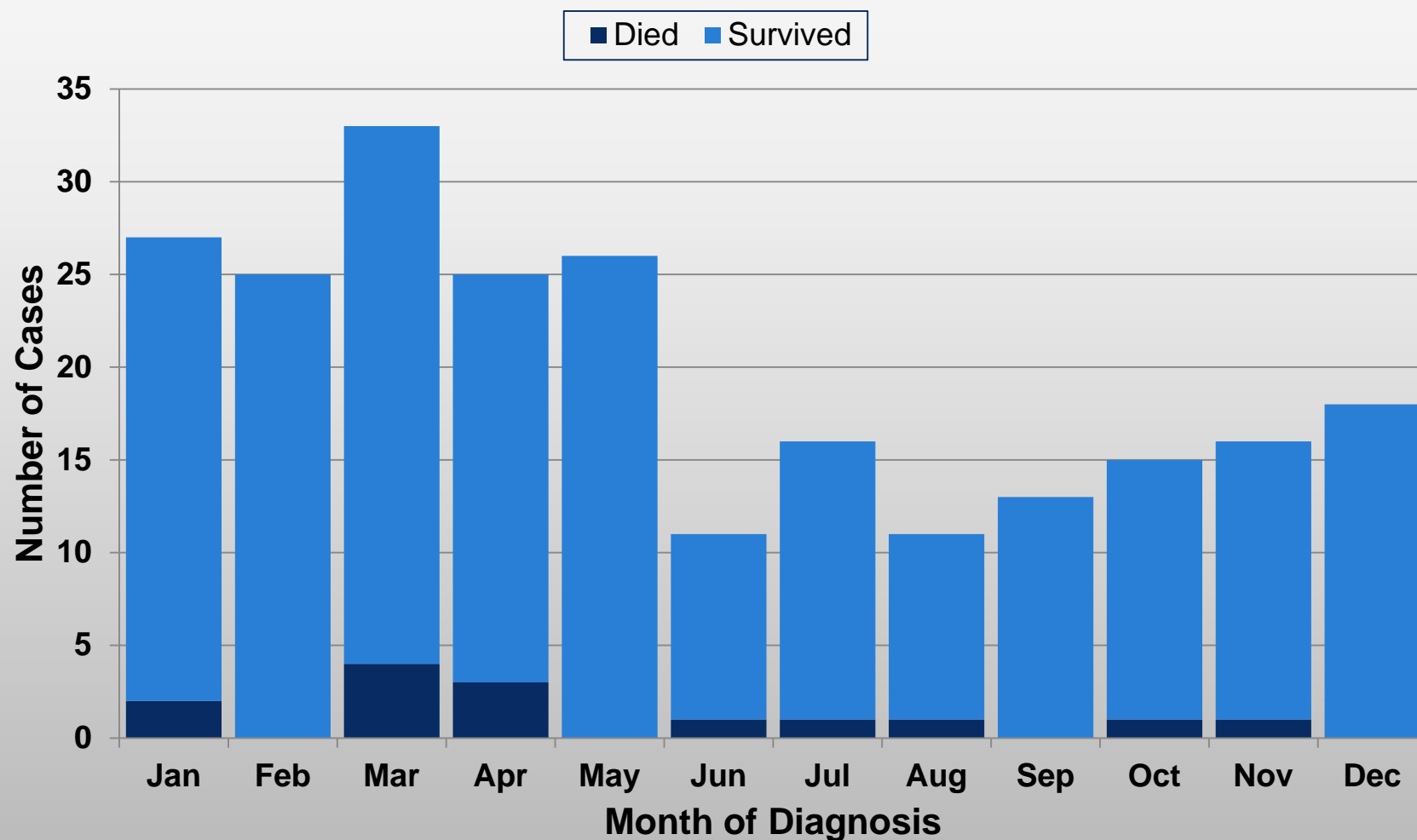
This chart represents 312 infections among 236 cases (some cases had >1 infection).

Outcome of Invasive Group A Streptococcal Disease by Type of Infection/Syndrome, Minnesota, 2015

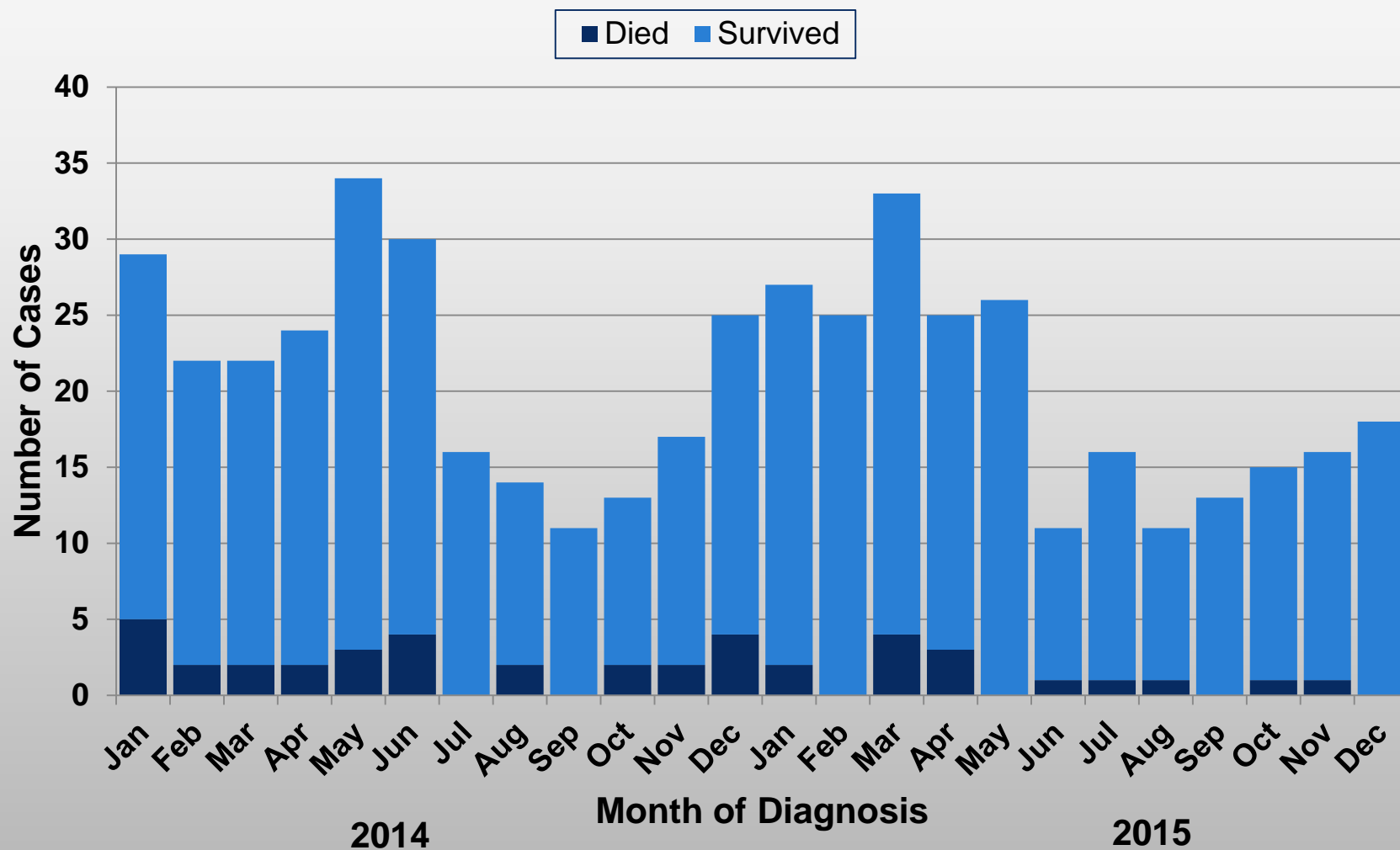
■ Died ■ Survived



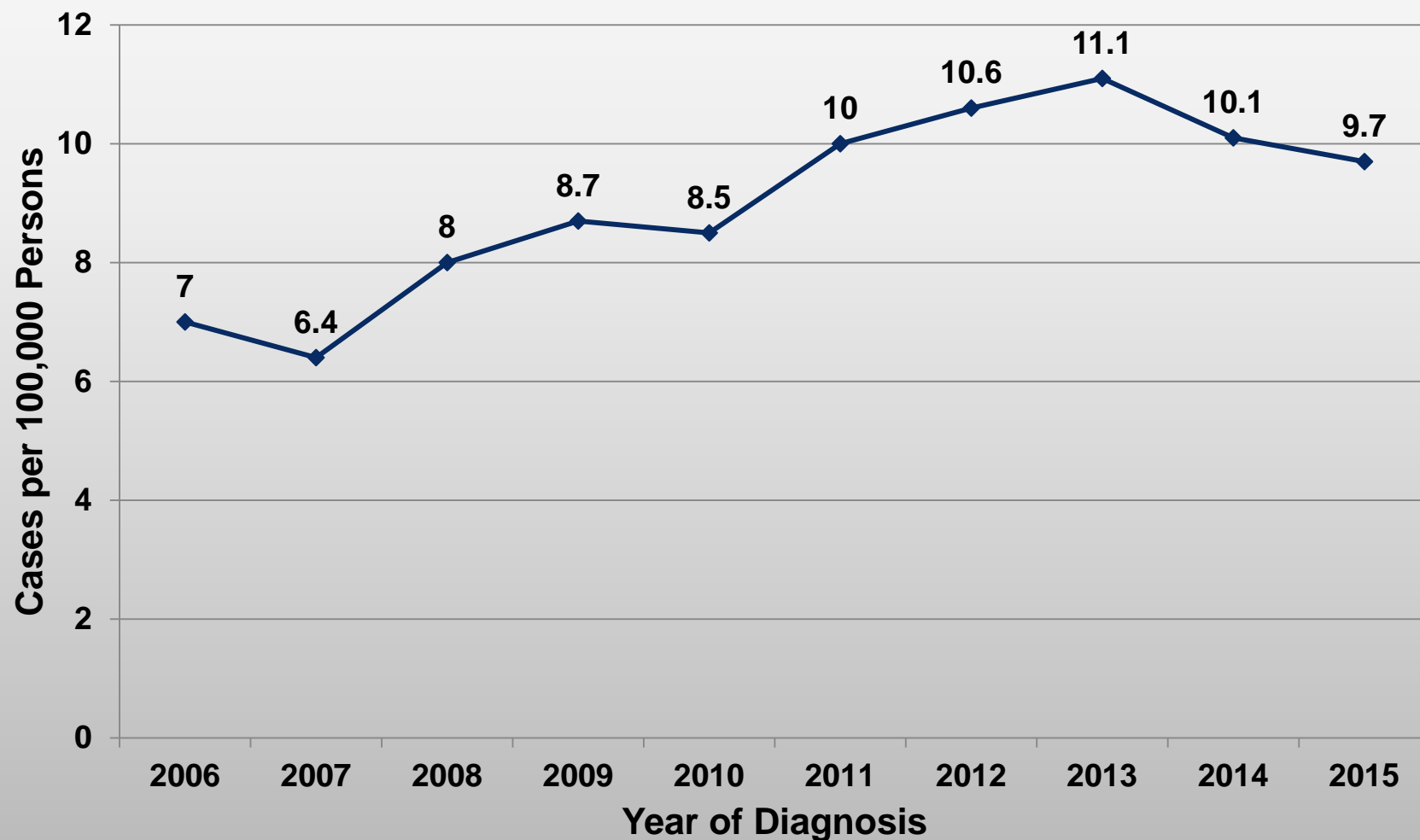
Cases of Invasive Group A Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2015



Cases of Invasive Group A Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2014-2015



Incidence of Invasive Group B Streptococcal Disease, Minnesota, 2006-2015



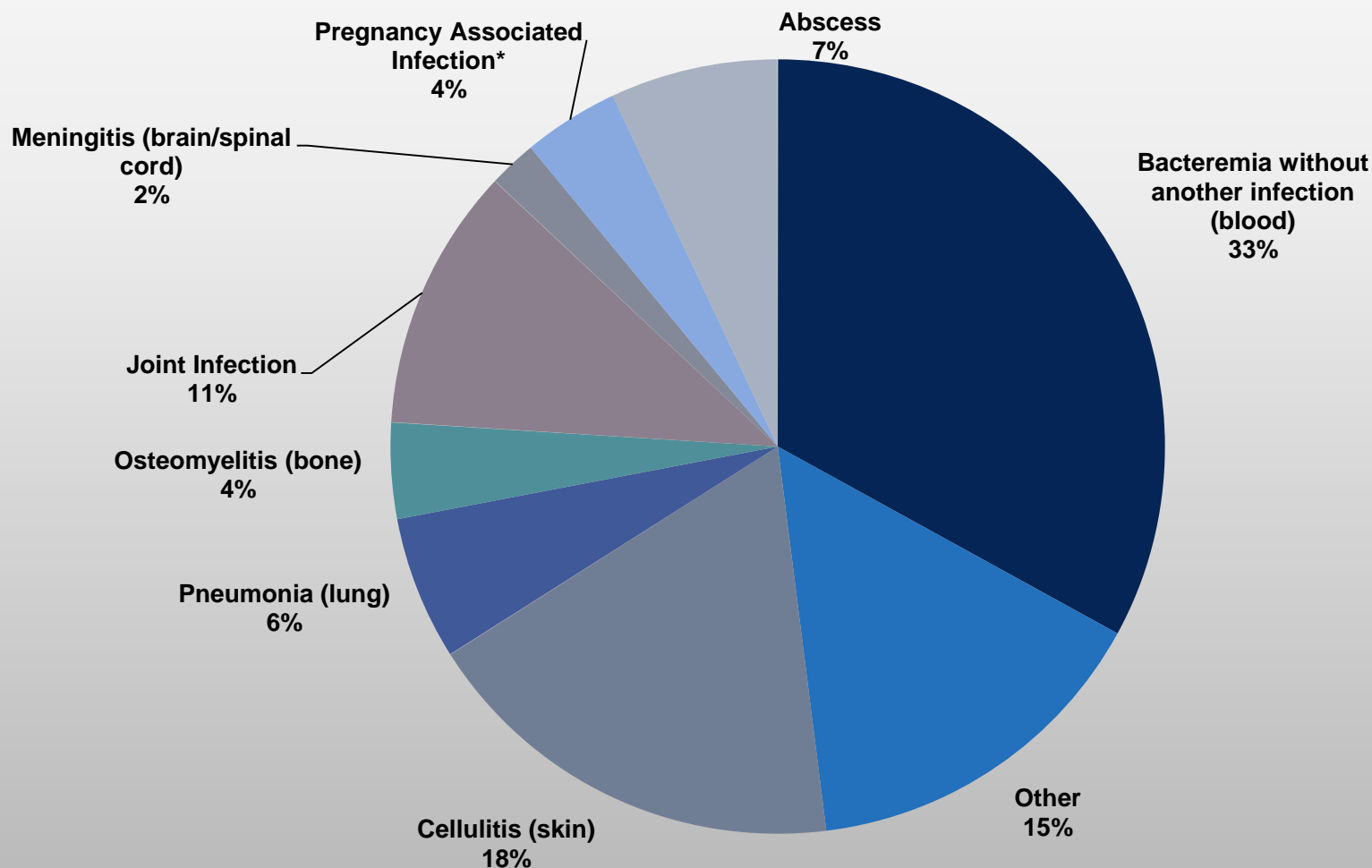
Incidence of Invasive Group B Streptococcal Disease by Gender and Age Group, Minnesota, 2015

Characteristic	Cases (n=527)	Incidence per 100,000 persons
Gender		
Male	290	10.7
Female	237	8.6
Age Group		
Under 1 yr.	39	56.2
1-4 yrs.	0	0
5-9 yrs.	0	0
10-19 yrs.	1	0.1
20-29 yrs.	9	1.2
30-39 yrs.	38	5.3
40-49 yrs.	39	5.6
50-59 yrs.	93	11.8
60-69 yrs.	113	19.6
70+ yrs.	195	36.8

Invasive Group B Streptococcal Disease Cases and Deaths by Age Group, Minnesota, 2015

Age Group	Cases	Deaths	% Died
Under 1 yr.	39	4	10%
1-4 yrs.	0	0	0%
5-9 yrs.	0	0	0%
10-19 yrs.	1	0	0%
20-29 yrs.	9	1	11%
30-39 yrs.	38	1	3%
40-49 yrs.	39	1	3%
50-59 yrs.	93	4	4%
60-69 yrs.	113	7	6%
70+ yrs.	195	7	4%
Total	527	25	5%

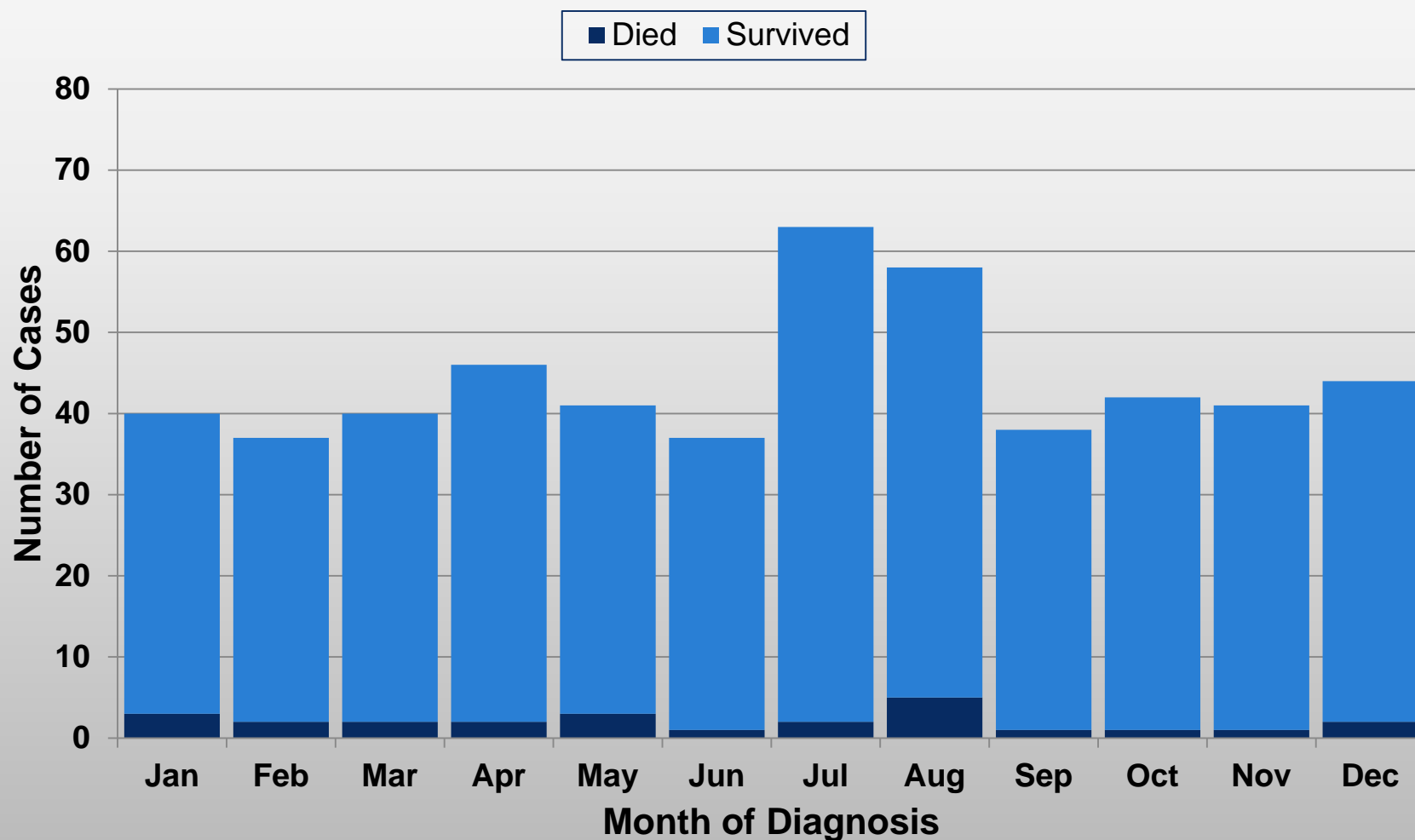
Invasive Group B Streptococcal Disease by Type of Infection/Syndrome, Minnesota 2015



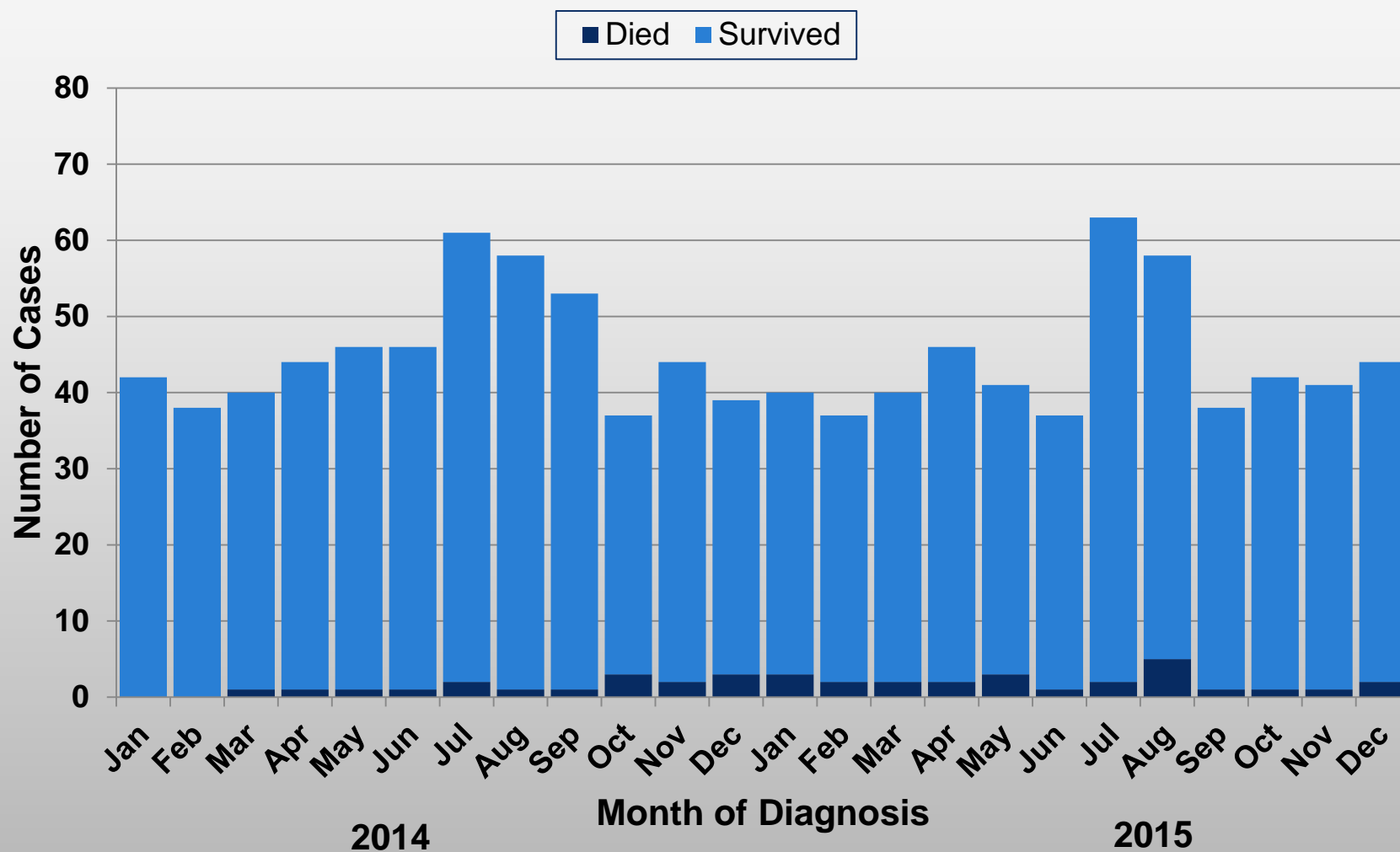
This chart represents 595 infections among 527 cases. (Some cases had >1 infection.)

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

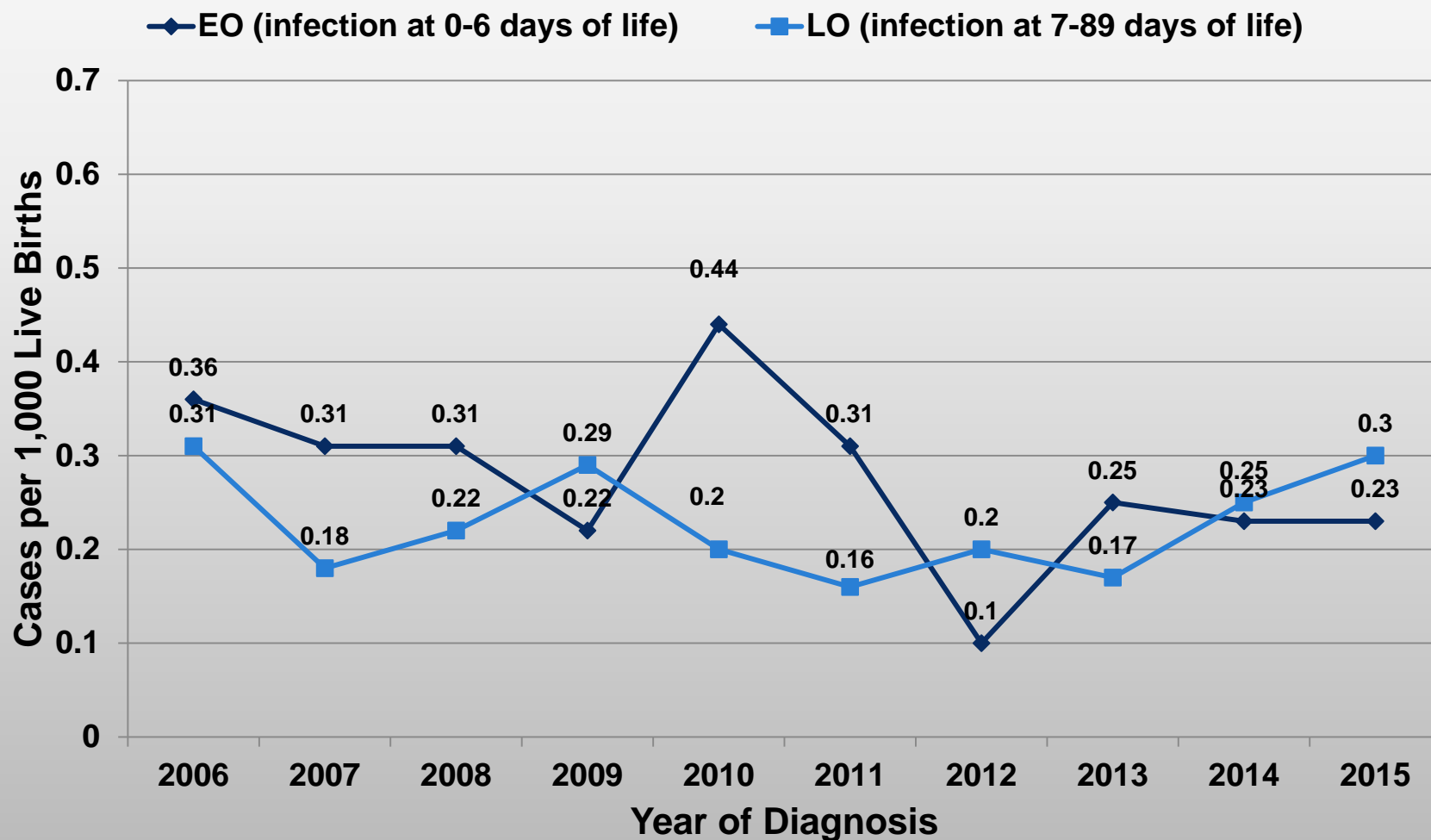
Cases of Invasive Group B Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2015



Cases of Invasive Group B Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2014-2015



Incidence of Invasive Early and Late-Onset Group B Streptococcal Disease, Minnesota, 2006-2015

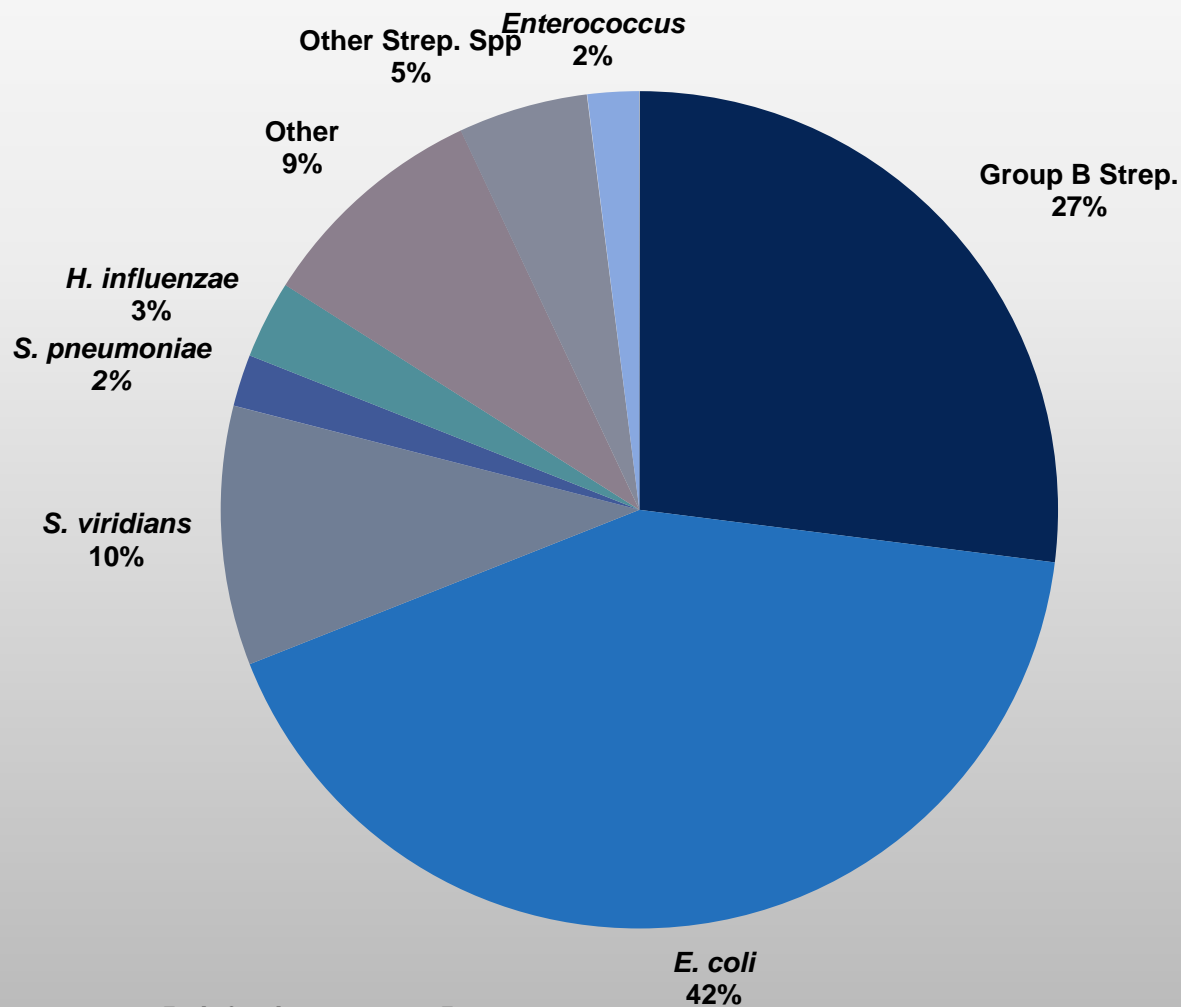


Early-Onset* Group B Streptococcal Disease by Race, Gestational Age and Outcome, Minnesota, 2015

Characteristic	Cases (n=16)	Percent
Race		
White	10	63%
Black	3	19%
Asian	1	6%
American Indian	1	6%
Unknown	1	6%
Gestational Age		
Under 32 weeks	4	25%
32-37 weeks	2	13%
Full-term	10	63%
Outcome		
Died	3	19%
Survived	13	81%

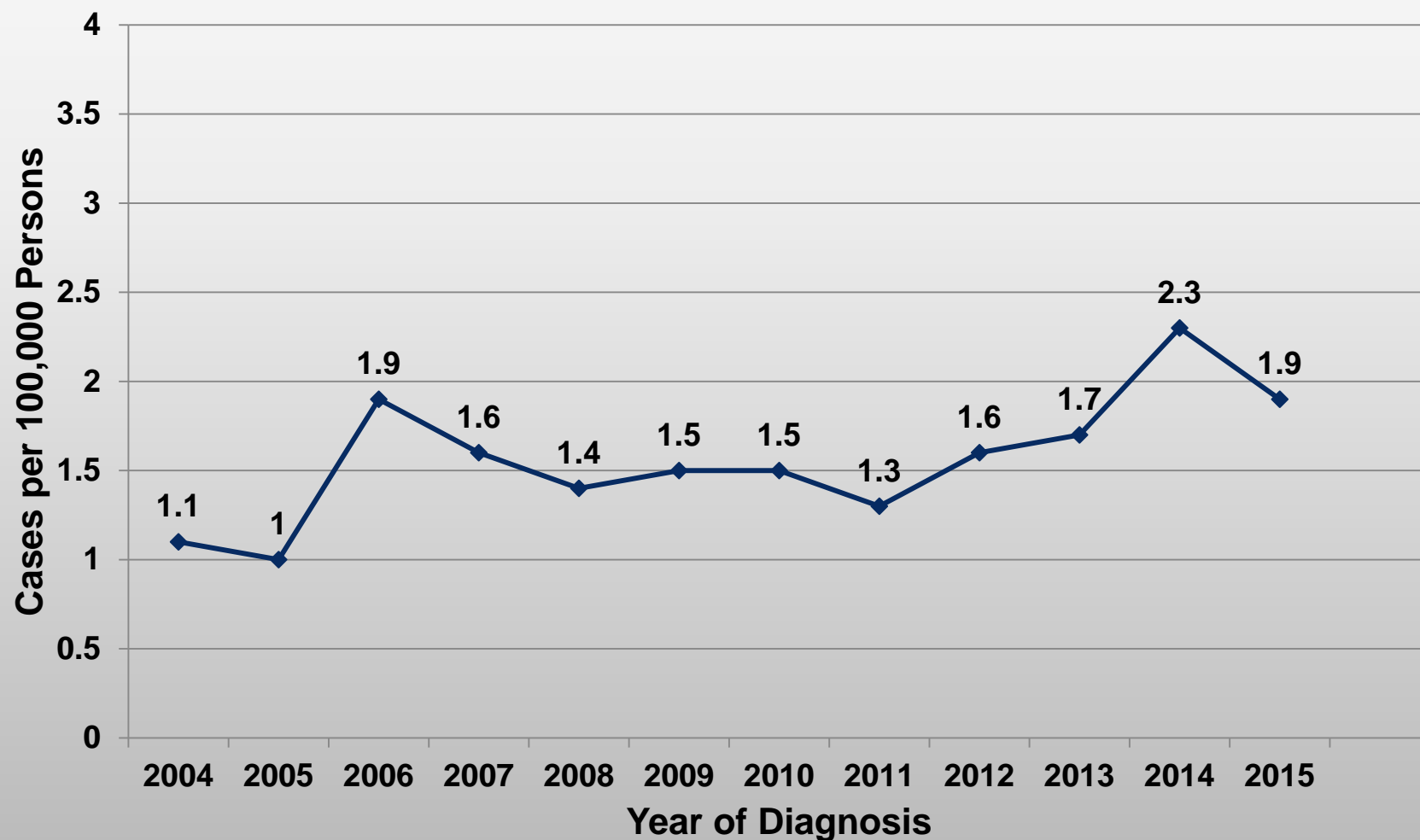
* onset 0-6 days of life

Invasive Neonatal Sepsis Disease in First 6 Days of Life by Pathogen, Minnesota, 2015*



* This chart represents 59 infections among 58 cases.

Incidence of Invasive *Haemophilus influenzae* Disease, Minnesota, 2004-2015



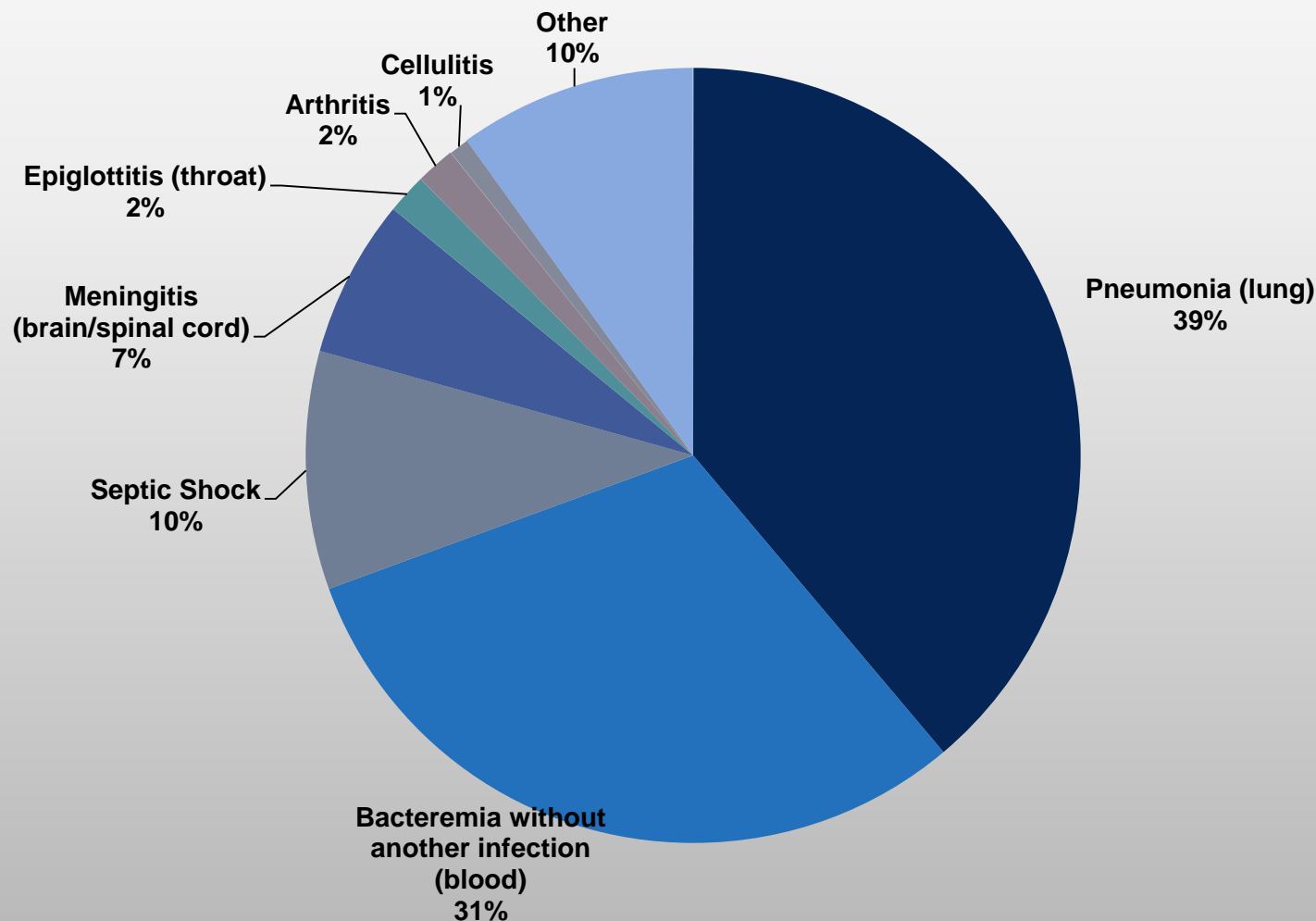
Incidence of Invasive *Haemophilus influenzae* Disease by Gender and Age Group, Minnesota, 2015

Characteristic	Cases (n=104)	Incidence per 100,000 persons
Gender		
Male	46	1.68
Female	58	2.14
Age Group		
Under 1 yr.	7	10.09
1-4 yrs.	4	1.43
5-9 yrs.	3	0.83
10-19 yrs.	0	0
20-29 yrs.	4	0.55
30-39 yrs.	3	0.42
40-49 yrs.	3	0.44
50-59 yrs.	14	1.77
60-69 yrs.	21	3.64
70+ yrs.	45	8.5

Invasive *Haemophilus influenzae* Disease Cases and Deaths by Age Group, Minnesota, 2015

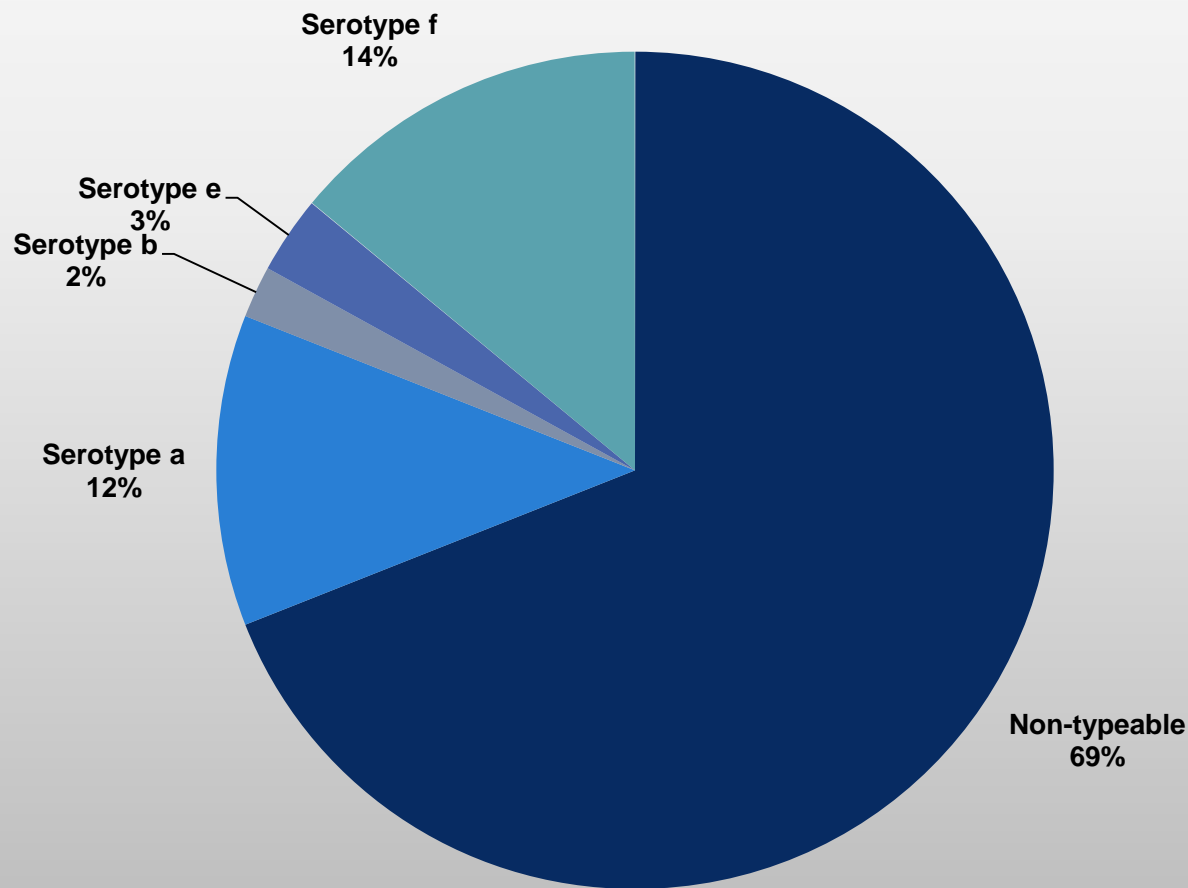
Age Group	Cases	Deaths	% Died
Under 1 yr.	7	1	1%
1-4 yrs.	4	0	--
5-9 yrs.	3	0	--
10-19 yrs.	0	0	--
20-29 yrs.	4	0	--
30-39 yrs.	3	0	--
40-49 yrs.	3	1	1%
50-59 yrs.	14	1	1%
60-69 yrs.	21	4	3%
70+ yrs.	45	11	9%
Total	104	18	17%

Invasive *Haemophilus influenzae* Disease by Type of Infection/Syndrome, Minnesota 2015



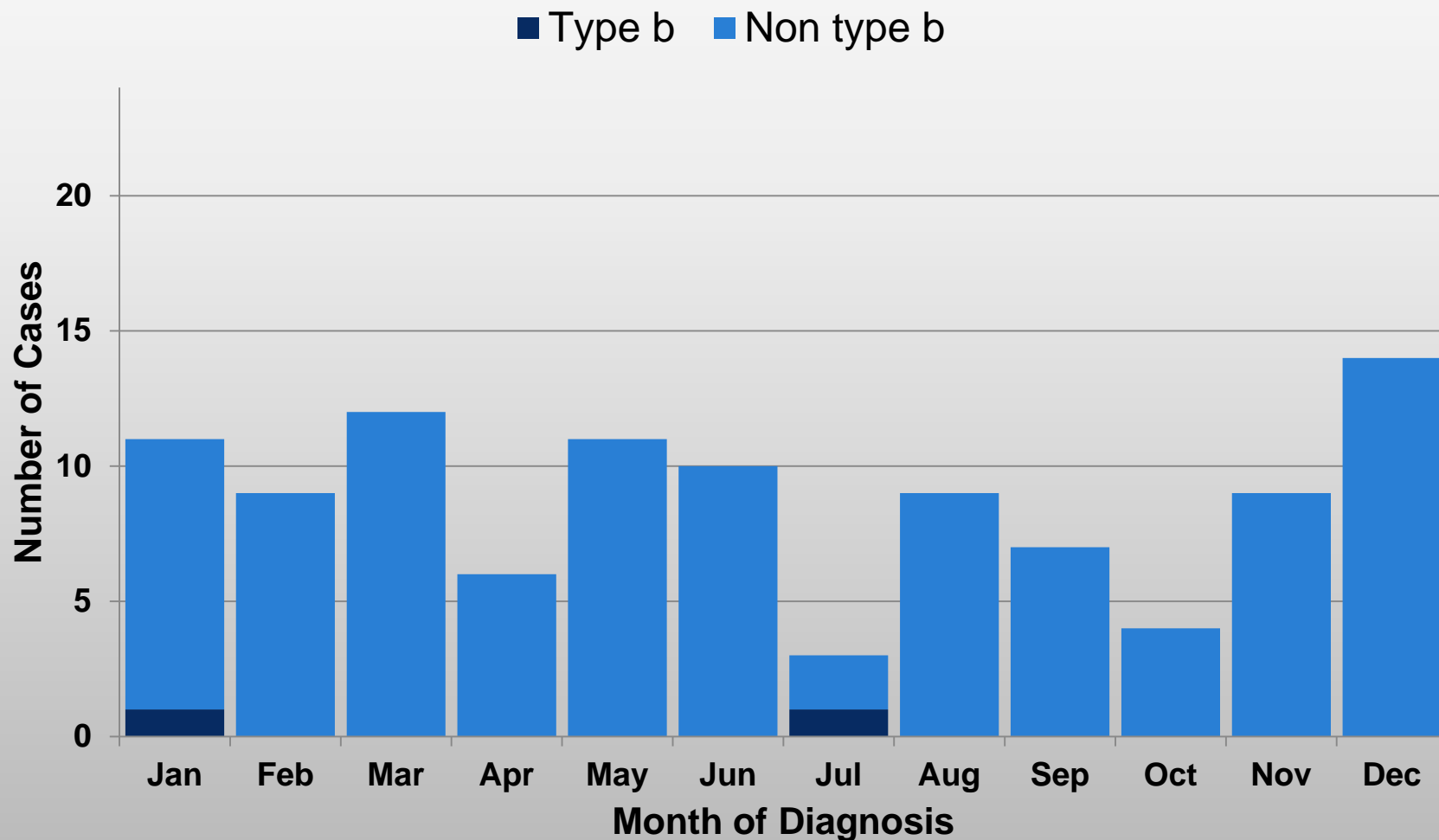
This graph represents 121 infections in 104 cases (some cases had > 1 infection).

Invasive *Haemophilus influenzae* Disease by Serotype, Minnesota 2015 (n=104*)

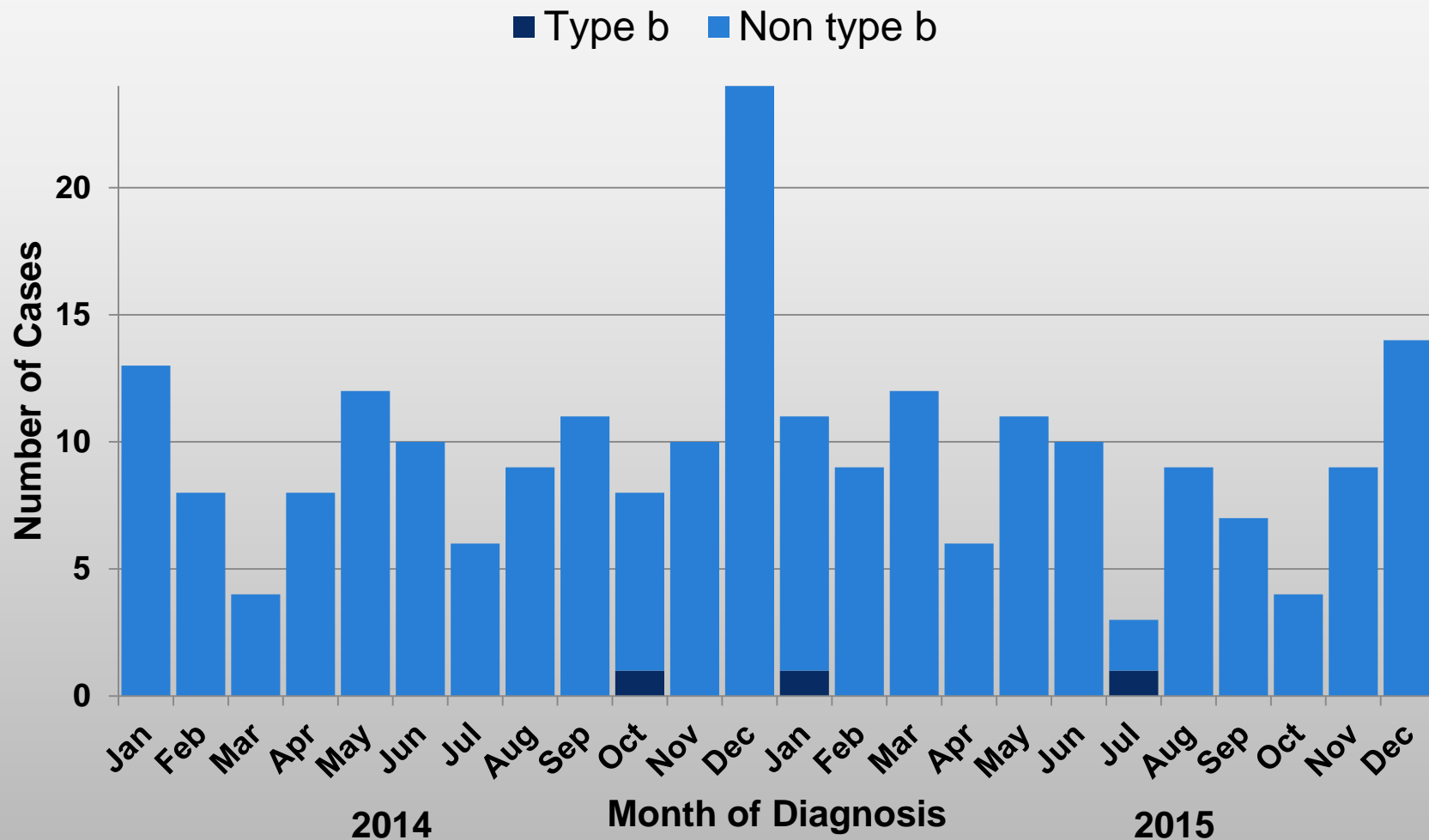


* 4 case isolates not available for serotyping

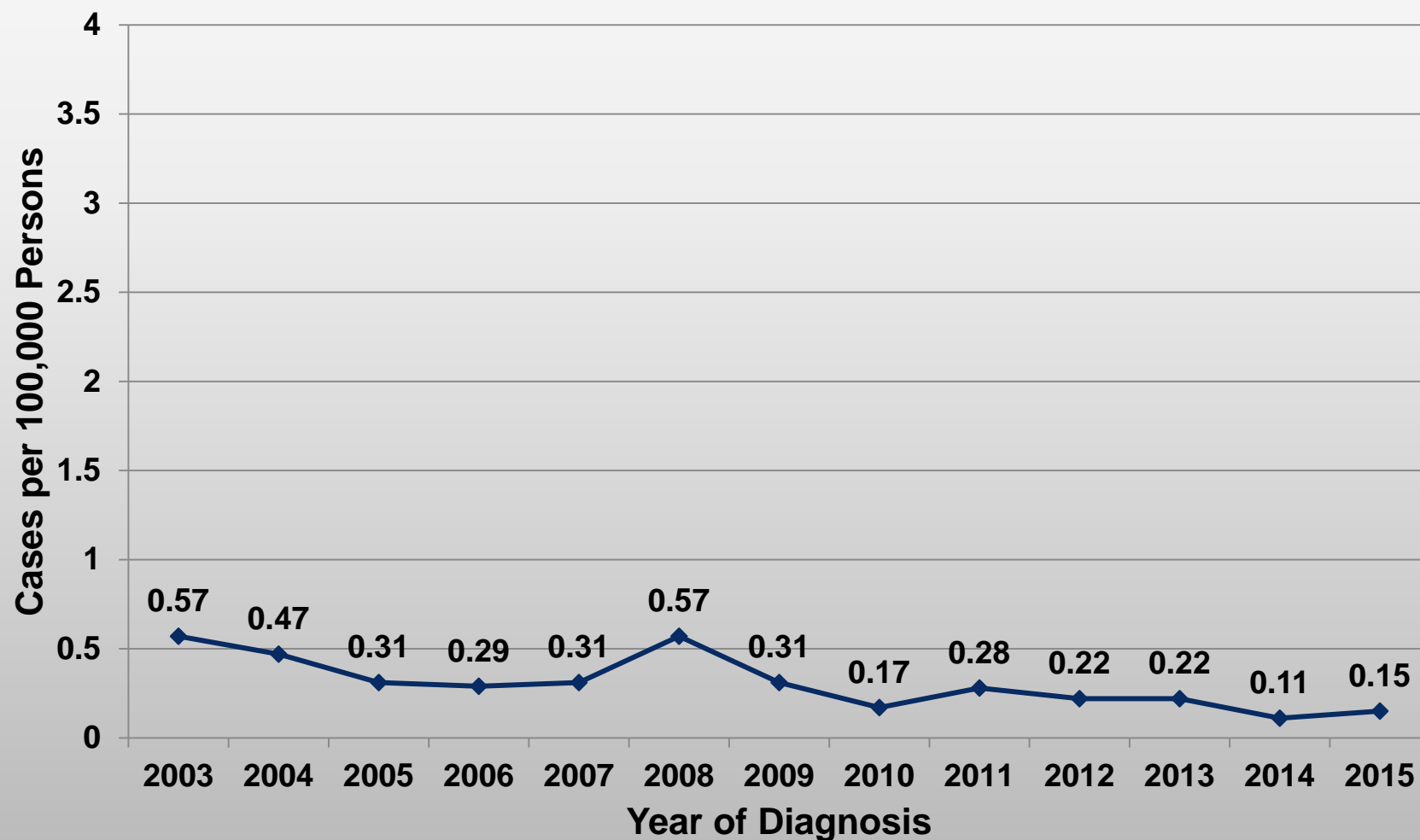
Cases of Invasive *Haemophilus influenzae* Disease by Month of Diagnosis and Serotype, Minnesota, 2015



Cases of Invasive *Haemophilus influenzae* Disease by Month of Diagnosis and Serotype, Minnesota, 2014-2015



Incidence of Invasive *Neisseria meningitidis* Disease, Minnesota, 2003-2015



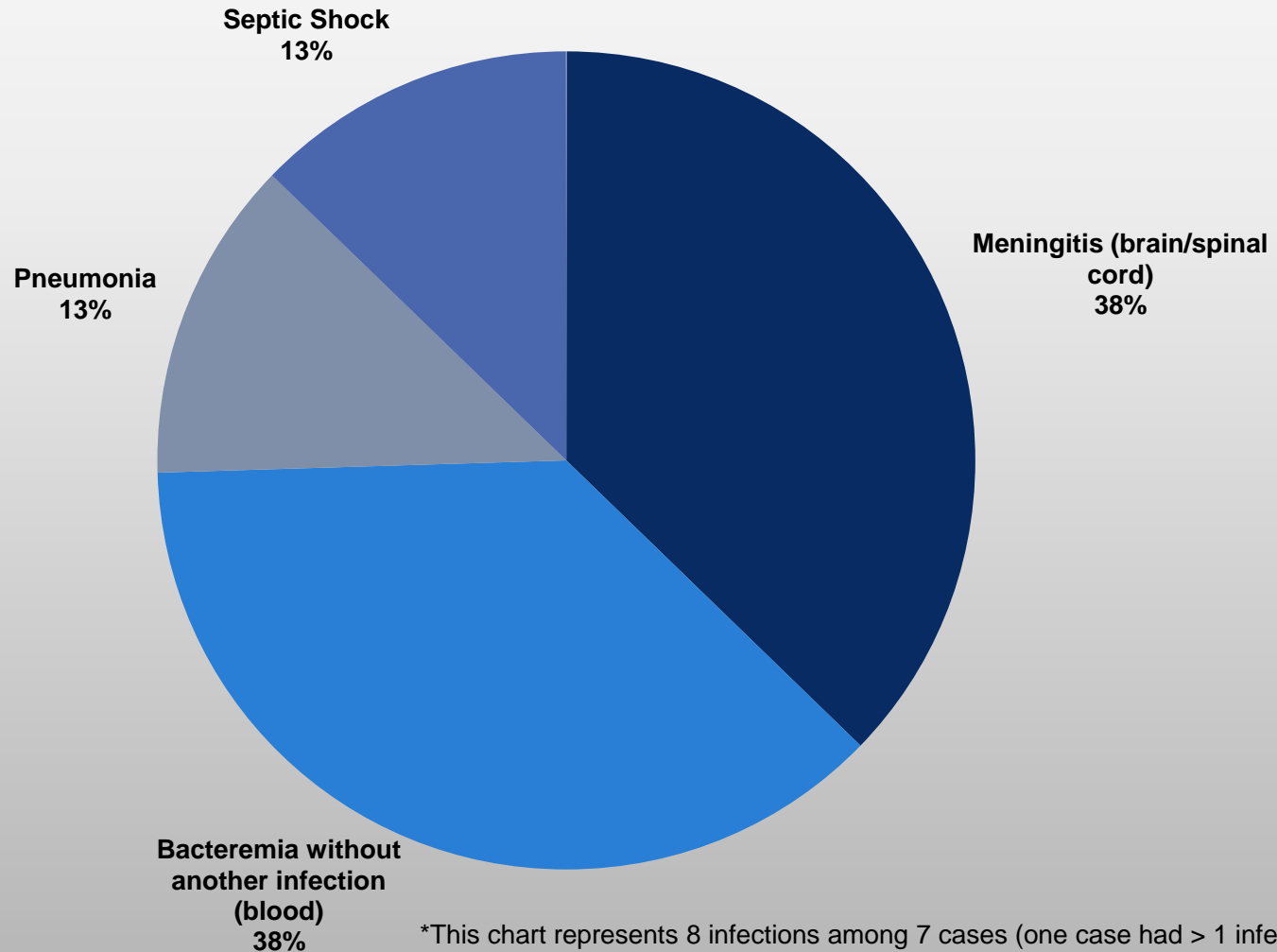
Incidence of Invasive *Neisseria meningitidis* Disease by Gender and Age Group, Minnesota, 2015

Characteristic	Cases (n=7)	Incidence per 100,000 persons
Gender		
Male	3	0.11
Female	4	0.15
Age Group		
Under 1 yr.	2	2.88
1-4 yrs.	1	0.36
5-9 yrs.	0	0
10-19 yrs.	1	0.14
20-29 yrs.	0	0
30-39 yrs.	1	0.14
40-49 yrs.	1	0.15
50-59 yrs.	1	0.13
60-69 yrs.	0	0
70+ yrs.	0	0

Invasive *Neisseria meningitidis* Disease Cases and Deaths by Age Group, Minnesota, 2015

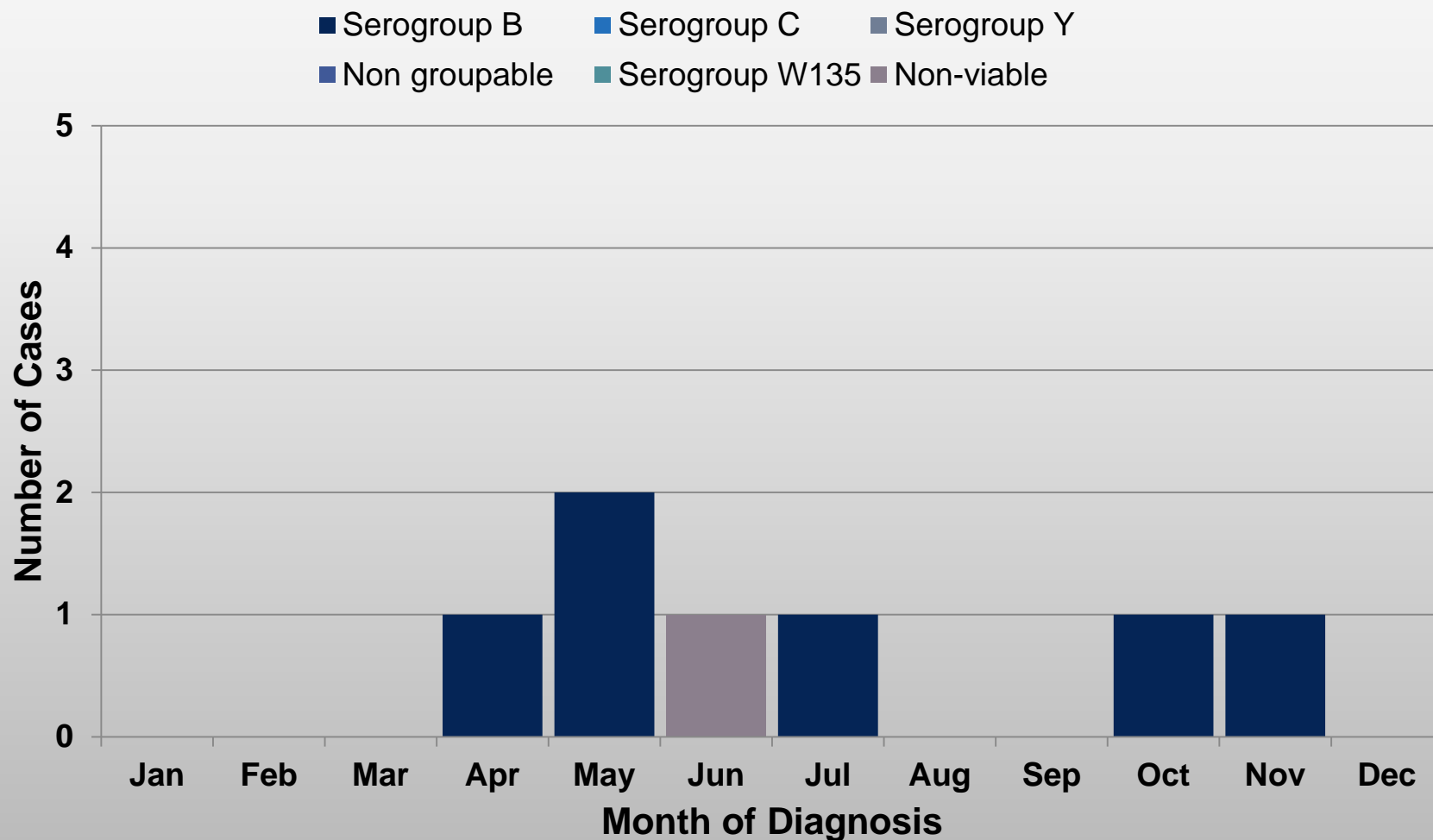
Age Group	Cases	Deaths	% Died
Under 1 yr.	2	0	--
1-4 yrs.	1	0	--
5-9 yrs.	0	0	--
10-19 yrs.	1	0	--
20-29 yrs.	0	0	--
30-39 yrs.	1	0	--
40-49 yrs.	1	0	--
50-59 yrs.	1	0	--
60-69 yrs.	0	0	--
70+ yrs.	0	0	--
Total	7	0	--

Invasive *Neisseria meningitidis* by Type of Infection/Syndrome, Minnesota 2015*

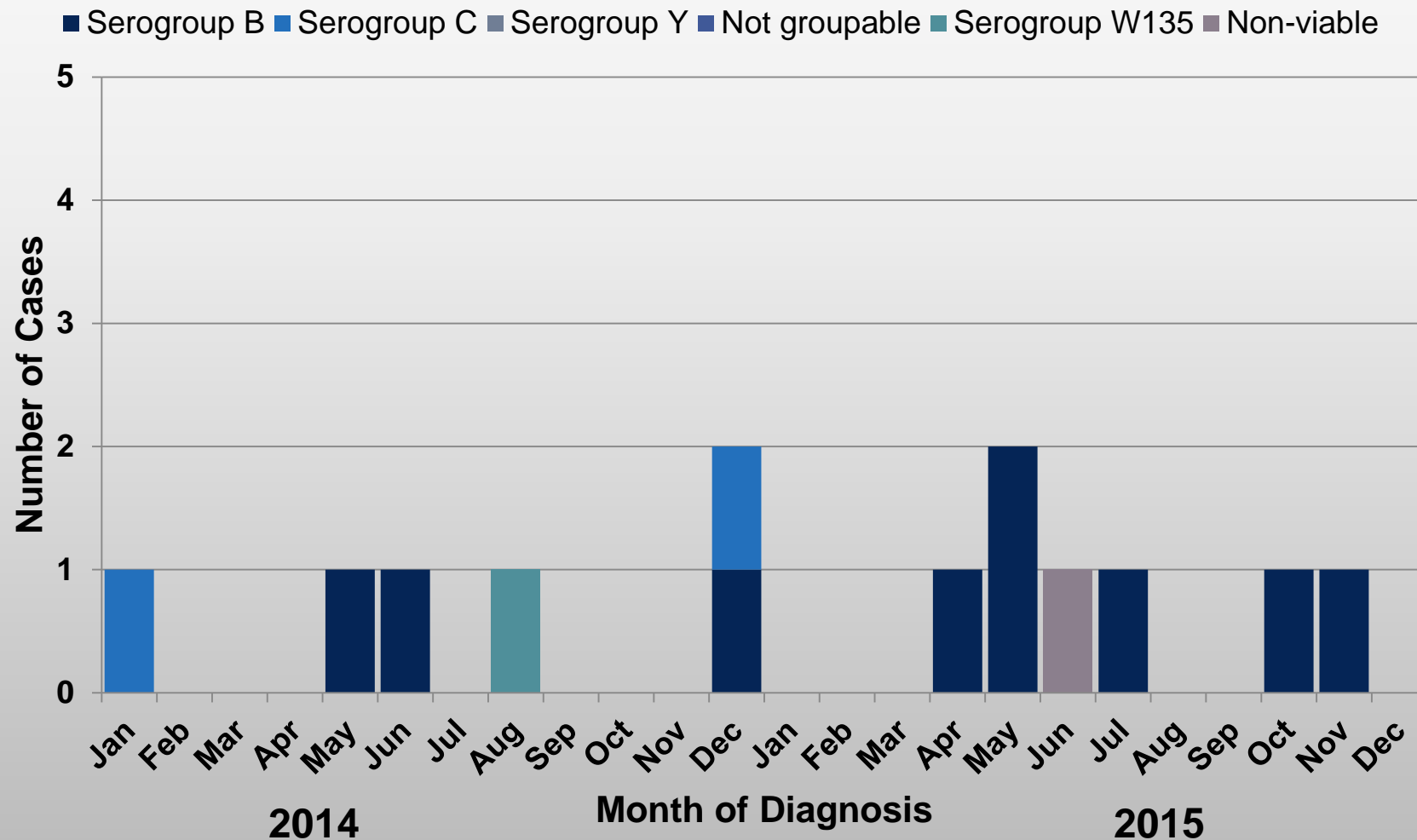


*This chart represents 8 infections among 7 cases (one case had > 1 infection).

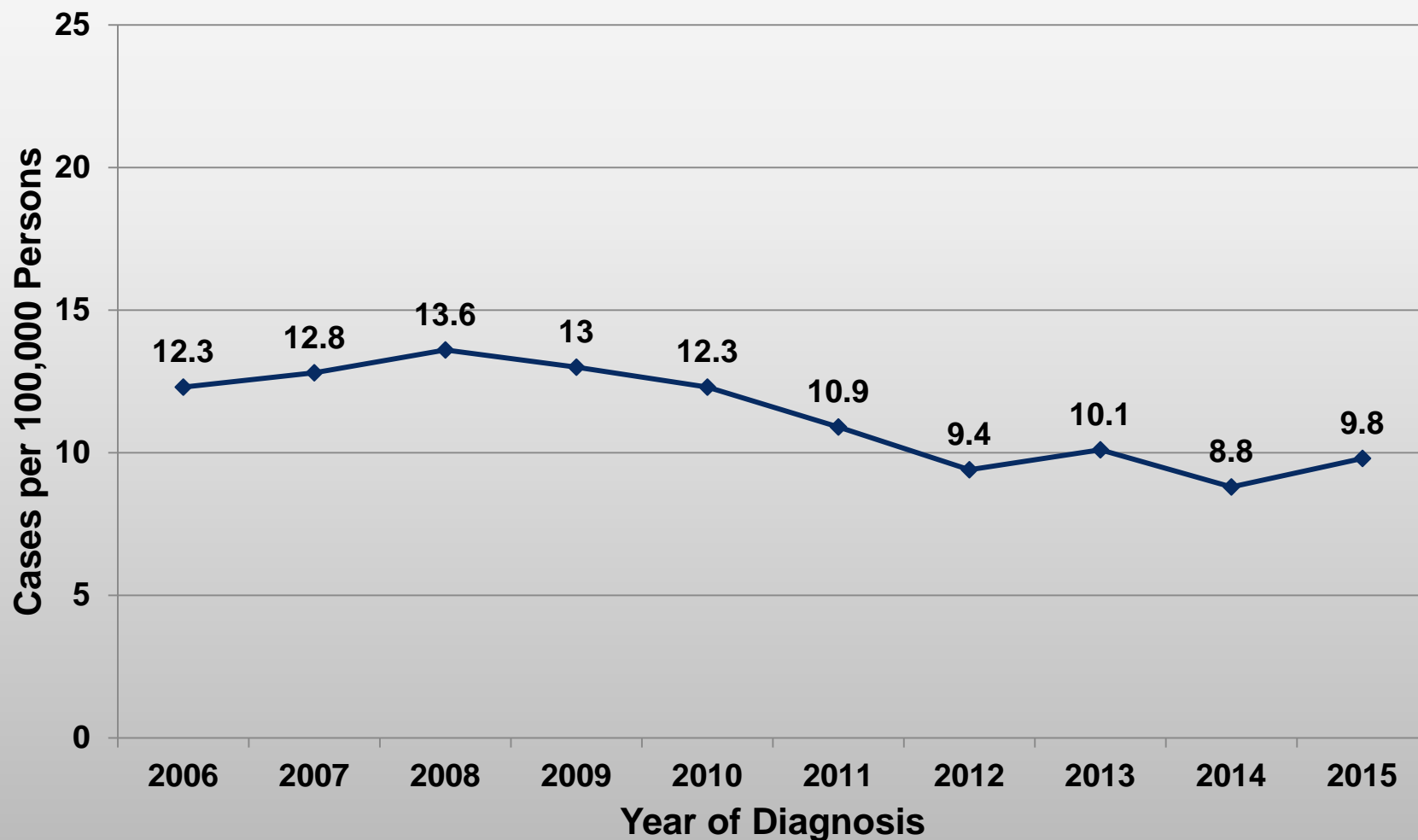
Cases of Invasive *Neisseria meningitidis* Disease by Month of Diagnosis and Serotype, Minnesota, 2015



Cases of Invasive *Neisseria meningitidis* Disease by Month of Diagnosis and Serotype, Minnesota, 2014-2015



Incidence of Invasive Pneumococcal Disease, Minnesota, 2006-2015



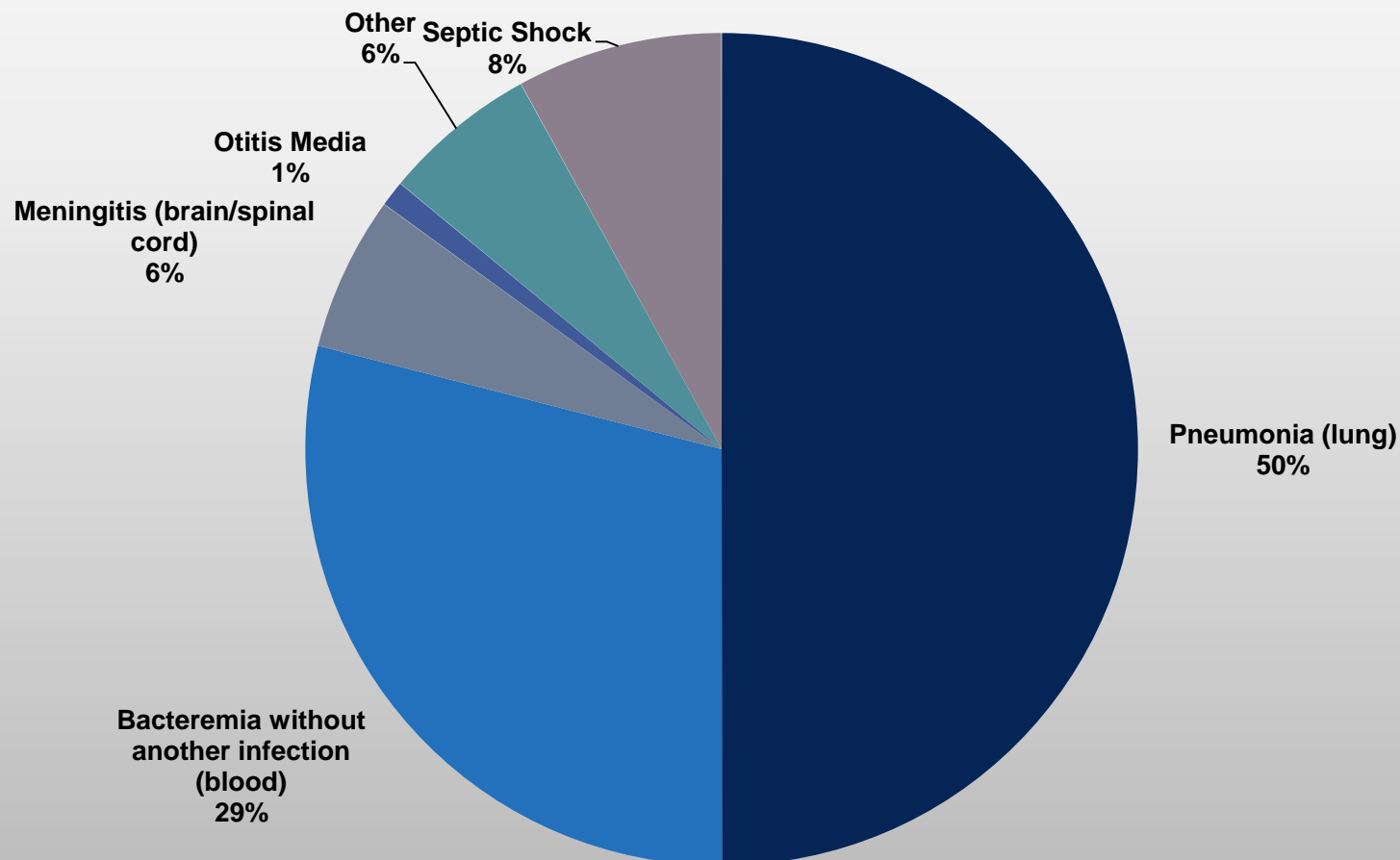
Incidence of Invasive Pneumococcal Disease by Gender and Age Group, Minnesota, 2015

Characteristic	Cases (n=534)	Incidence per 100,000 persons
Gender		
Male	277	10.2
Female	257	9.4
Age Group		
Under 1 yr.	20	28.8
1-4 yrs.	16	5.7
5-19 yrs.	20	1.9
20-29 yrs.	15	2.1
30-39 yrs.	28	3.9
40-49 yrs.	46	6.7
50-64 yrs.	153	13.7
65-79 yrs.	126	22.4
80+ yrs.	110	50.8

Invasive Pneumococcal Disease Cases and Deaths by Age Group, Minnesota, 2015

Age Group	Cases	Deaths	% Died
Under 1 yr.	20	0	0%
1-4 yrs.	16	0	0%
5-19 yrs.	20	0	0%
20-29 yrs.	15	1	7%
30-39 yrs.	28	1	4%
40-49 yrs.	46	4	9%
50-64 yrs.	153	10	7%
65-79 yrs.	126	13	10%
80+ yrs.	110	27	25%
Total	534	56	10%

Invasive Pneumococcal Disease by Type of Infection/Syndrome, Minnesota 2015*



*This chart represents 588 infections among 534 cases (some cases had > 1 infection).

Invasive Pneumococcal Isolates by Serotype Included in 13-Valent Conjugate Vaccine* by Age Group, Minnesota, 2015

Age Group	Isolates	# included in PCV-13	% included in PCV-13
Under 1 yr.	18	4	22%
1-4 yrs.	21	4	19%
5-19 yrs.	19	3	16%
20-29 yrs.	23	3	13%
30-39 yrs.	25	1	4%
40-49 yrs.	28	5	18%
50-64 yrs.	119	32	27%
65-79 yrs.	115	20	17%
80+ yrs.	85	16	19%
Total	453	88	19%

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

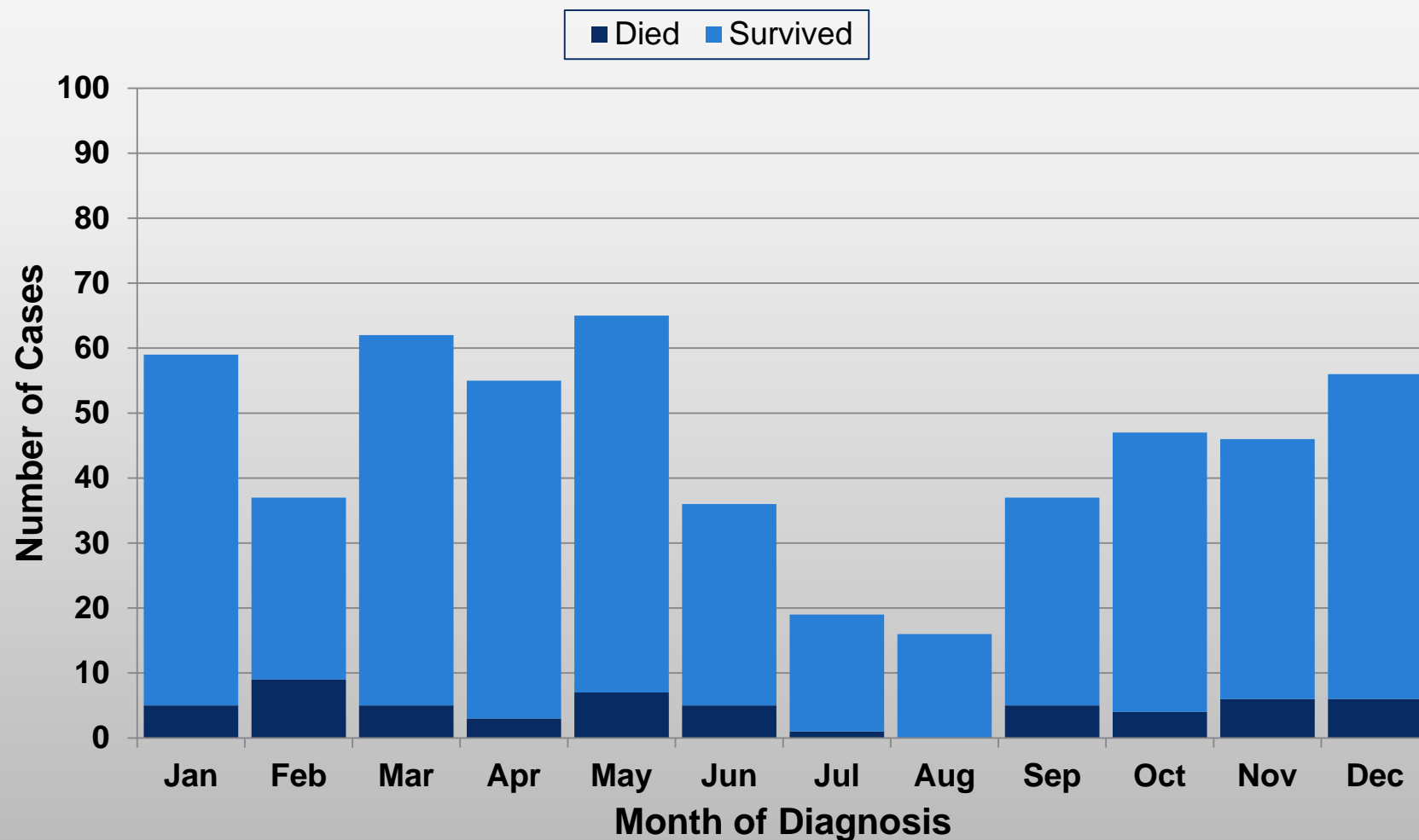
Invasive Pneumococcal Isolates by Resistance to Antimicrobial Agents, Minnesota, 2015 (n=499 viable isolates)

	Total Resistant Isolates	% Resistant Isolates
Penicillin resistance (R)*		
Meningitis breakpoints	98	20%
Non-meningitis breakpoints	5	1%
Resistance to drug classes**		
No resistance	280	56%
R to 1 drug class	137	27%
R to 2-3 drug classes	48	10%
R to 4-5 drug classes	34	7%

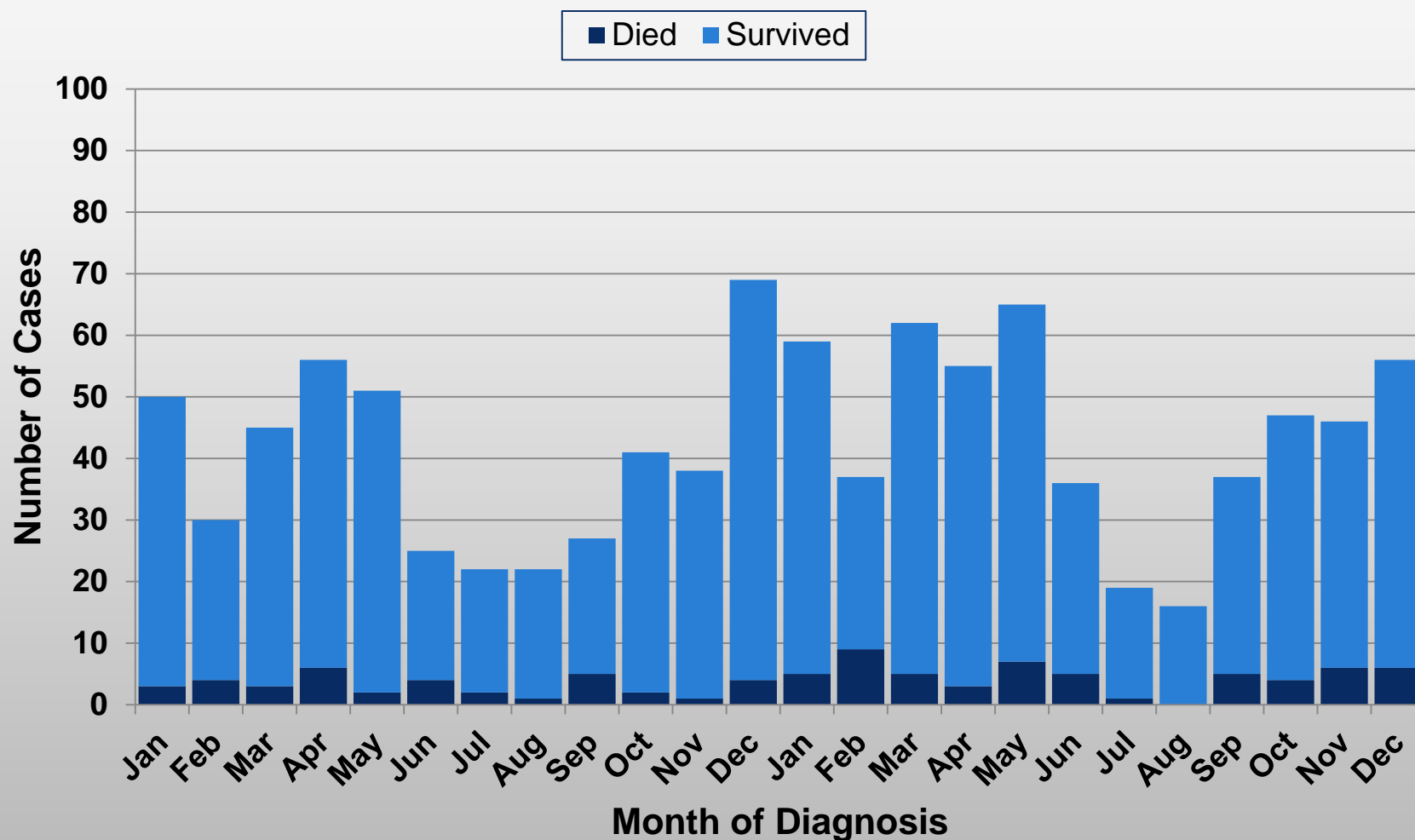
* Isolates with MIC \geq 0.12 μ g/ml are Penicillin-R for meningitis, \geq 8 μ g/ml for non-meningitis.

** 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, 2015



Cases of Invasive Pneumococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2014-2015



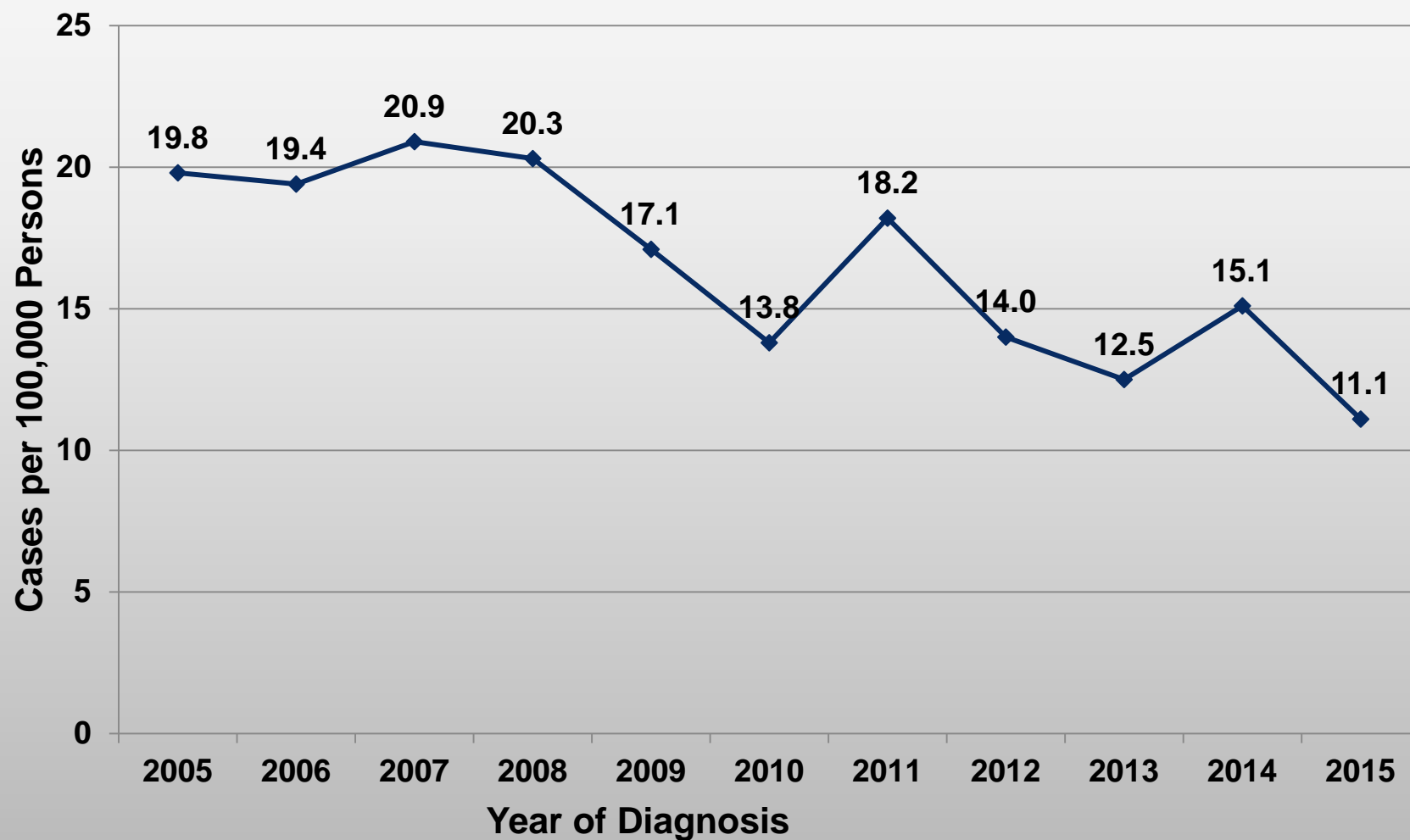
Invasive MRSA Surveillance Methods

- 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, 2004-2015



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

Incidence of Invasive MRSA Disease by Gender and Age Group, Ramsey and Hennepin Counties, Minnesota, 2015

Characteristic	Cases (n=194)	Incidence per 100,000 persons
Gender		
Male	105	12.1
Female	89	9.9
Age Group		
Under 1 yr.	2	1.7
1-4 yrs.	1	0.8
5-9 yrs.	1	0.9
10-19 yrs.	2	1.0
20-29 yrs.	12	4.4
30-39 yrs.	10	3.8
40-49 yrs.	19	8.9
50-59 yrs.	33	13.9
60-69 yrs.	40	22.0
70+ yrs.	74	49.3

Invasive MRSA Disease Cases and Deaths by Age Group, Ramsey and Hennepin Counties, Minnesota, 2015

Age Group	Cases	Deaths	% Died
Under 1 yr.	2	0	0%
1-4 yrs.	1	0	0%
5-9 yrs.	1	0	0%
10-19 yrs.	2	0	0%
20-29 yrs.	12	0	0%
30-39 yrs.	10	2	20.0%
40-49 yrs.	19	1	5.3%
50-59 yrs.	33	3	9.1%
60-69 yrs.	40	5	12.5%
70+ yrs.	74	13	17.6%
Total	194	24	12.4%

Incidence of Invasive MRSA Disease by Case Type, Ramsey and Hennepin Counties, Minnesota, 2015

Case Type	Cases	Incidence per 100,000 persons
Healthcare-associated	157	8.9
Community-associated	32	1.8

- 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.
- 5 cases could not be classified

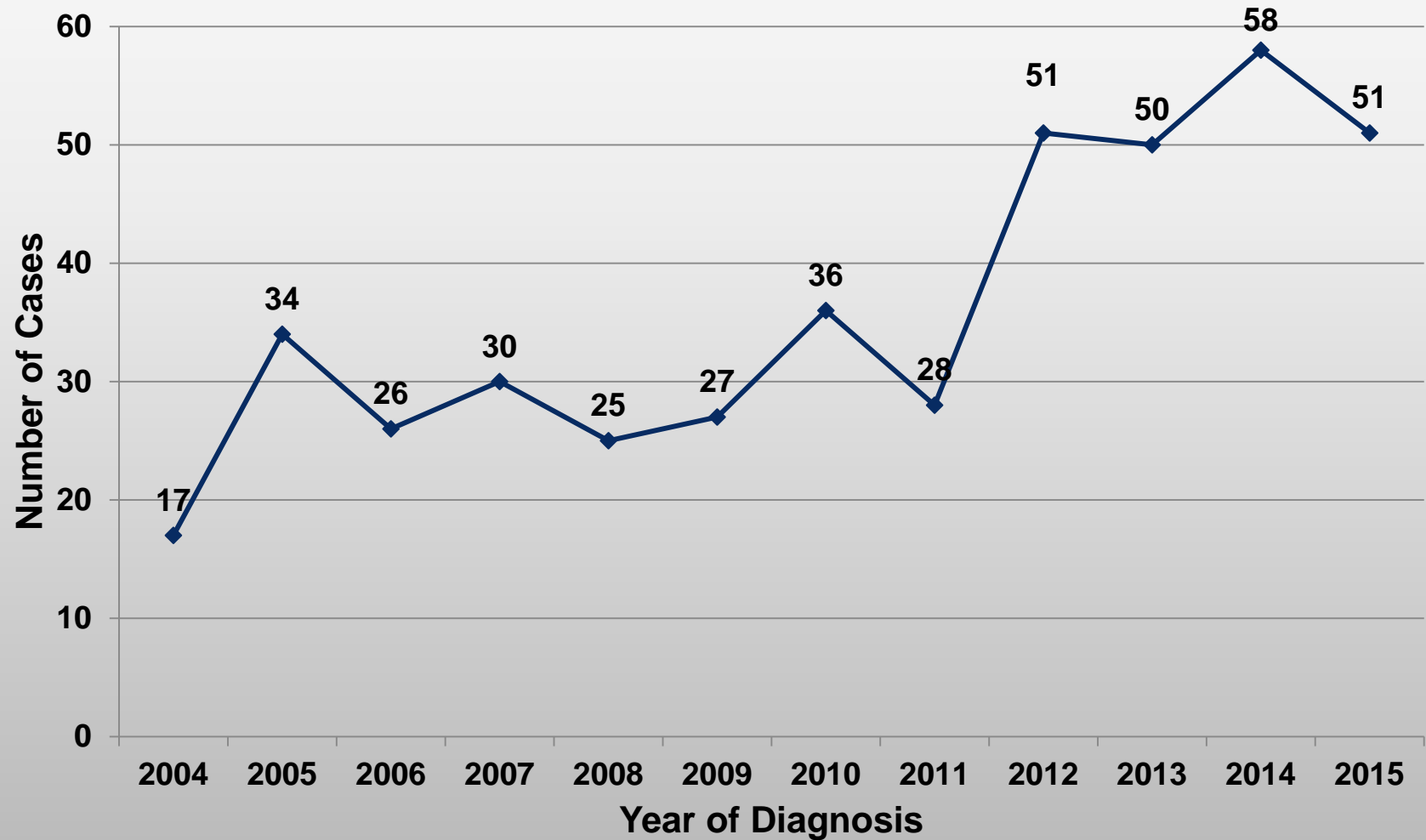
Invasive MRSA Disease by Type of Infection, Ramsey and Hennepin Counties, Minnesota, 2015

Type of Infection*	Cases
Bacteremia (blood)	148
Without another source of infection	62
With another source of infection	86
Septic arthritis (joint)	31
Pneumonia (lung)	34
Osteomyelitis (bone)	12
Cellulitis/skin abscess (skin)	31
Endocarditis (heart)	0
More than one infection type	112
Other infection**	78

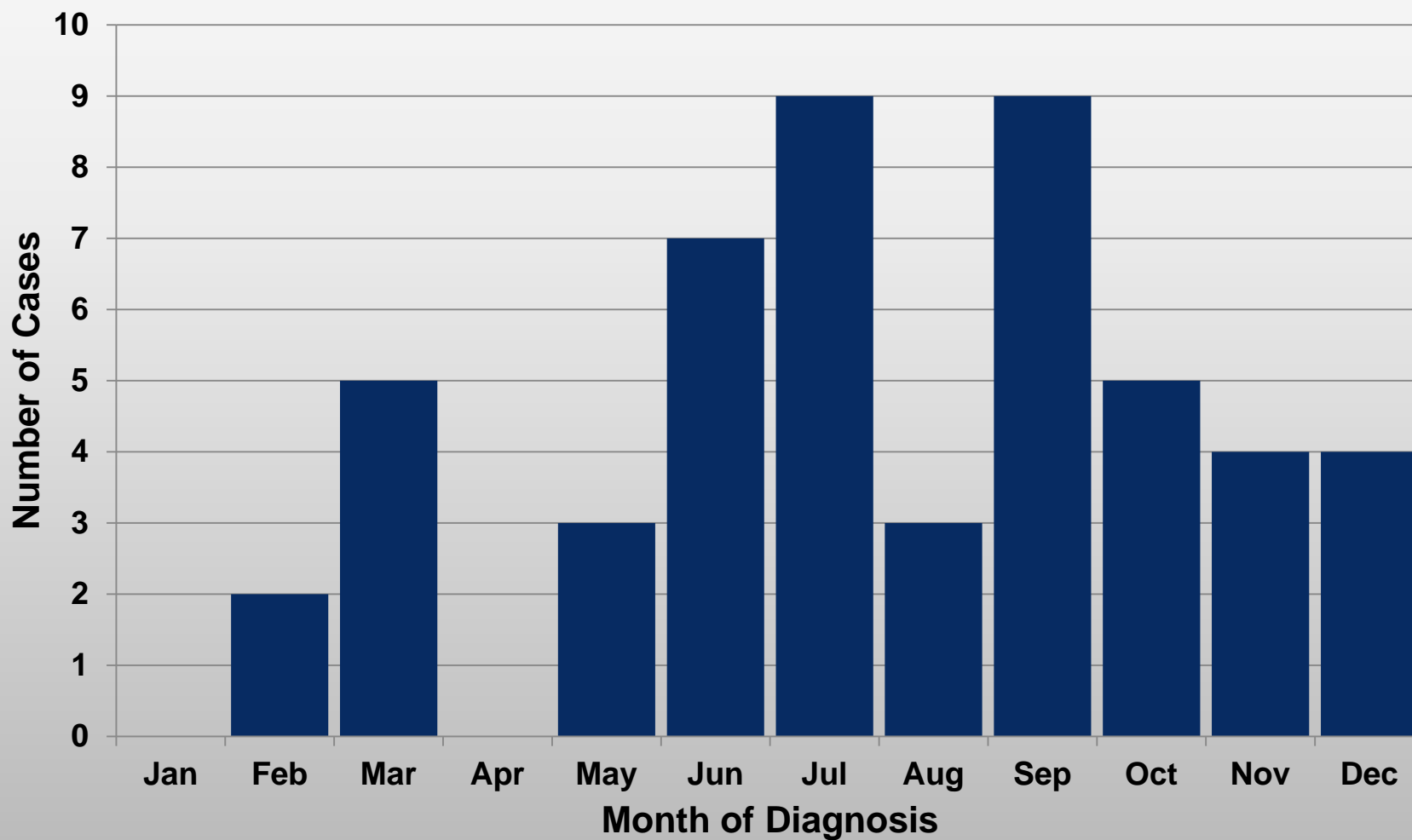
* Cases may have had more than 1 type of infections

** Other infections included bursitis, catheter site infection, chronic and/or pressure ulcers, empyema (pus), internal organ abscess, meningitis (brain/spinal cord), peritonitis, surgical incision or surgical site infections, septic emboli, septic shock, and urinary tract infections

Confirmed Legionellosis Cases Minnesota, 2004-2015



Confirmed Legionellosis Cases by Month of Diagnosis, Minnesota, 2015



Confirmed Legionellosis Cases by Age Group and Gender, Minnesota, 2015

Age Group	Male	Female	Total
18-29 yrs.	1	1	2
30-39 yrs.	3	0	3
40-49 yrs.	2	2	4
50-59 yrs.	5	5	10
60-69 yrs.	15	6	21
70+ yrs.	7	4	11
Total	33 (65%)	18 (35%)	51