INVASIVE BACTERIAL DISEASE SURVEILLANCE REPORT, 2017

Emerging Infections Program

Active Bacterial Core Surveillance (ABCs)

Minnesota Department of Health

Diseases Included

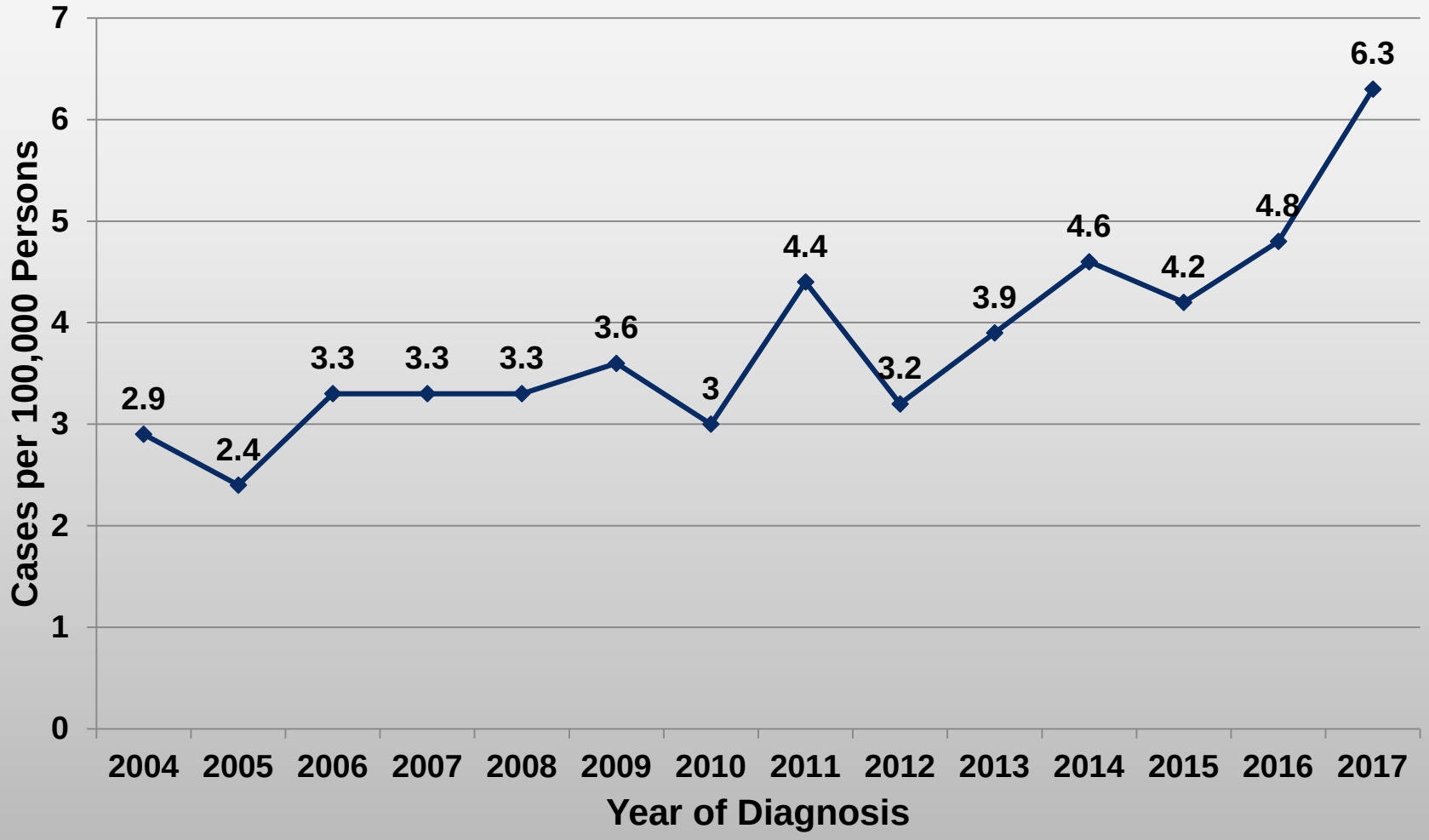
Surveillance Methods

- 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, 2004-2017



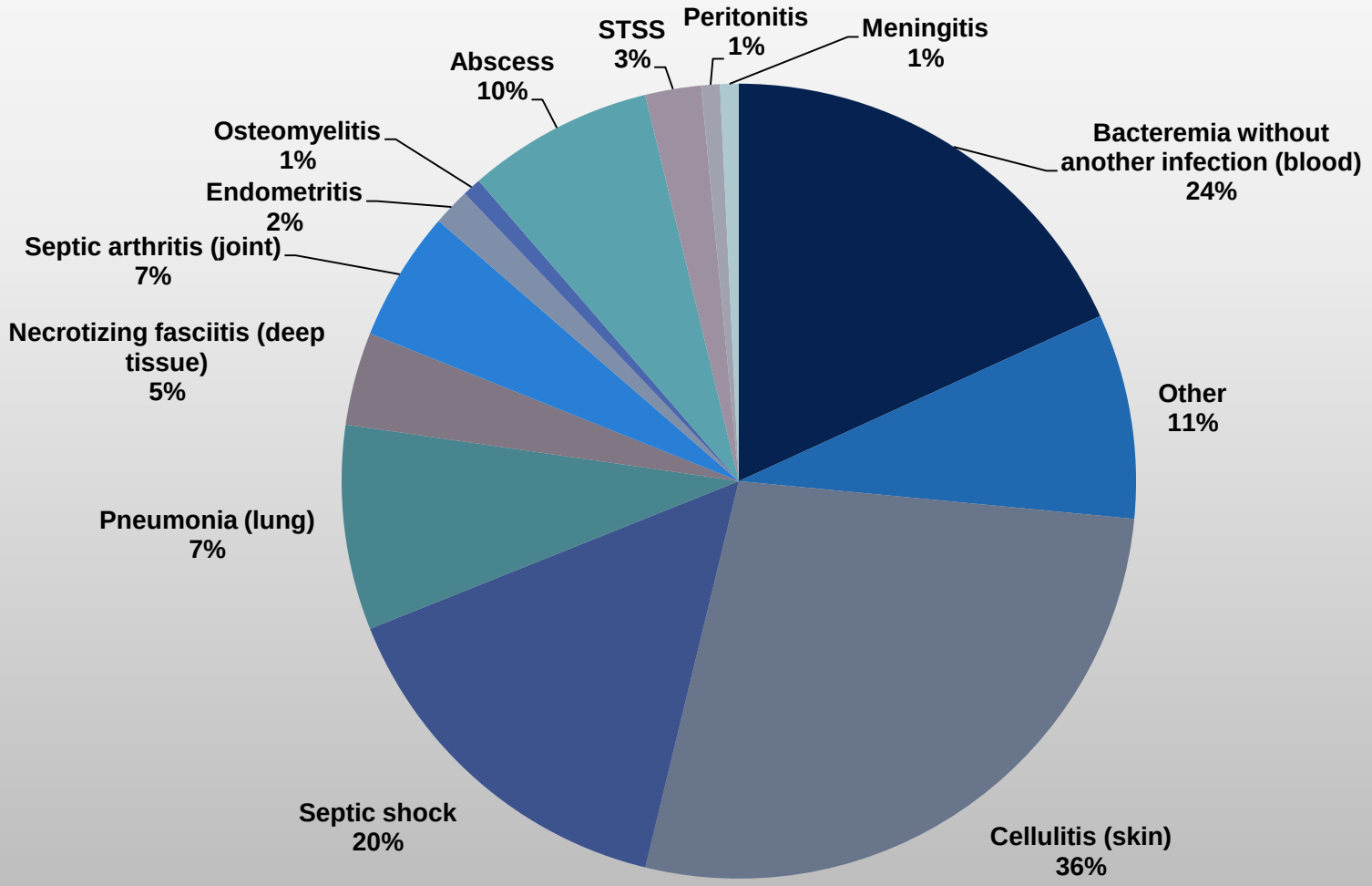
Incidence of Invasive Group A Streptococcal Disease by Gender and Age Group, Minnesota, 2017

Characteristic	Cases (n= 359)	Incidence per 100,000 persons
Gender		
Male	187	6.5
Female	172	6.0
Age Group		
Under 1 yr.	5	6.2
1-4 yrs.	9	2.8
5-9 yrs.	7	1.8
10-19 yrs.	11	1.5
20-29 yrs.	27	3.5
30-39 yrs.	28	3.3
40-49 yrs.	35	4.9
50-59 yrs.	55	7.1
60-69 yrs.	71	11.6
70+ yrs.	111	20.1

Invasive Group A Streptococcal Disease Cases and Deaths by Age Group, Minnesota, 2017

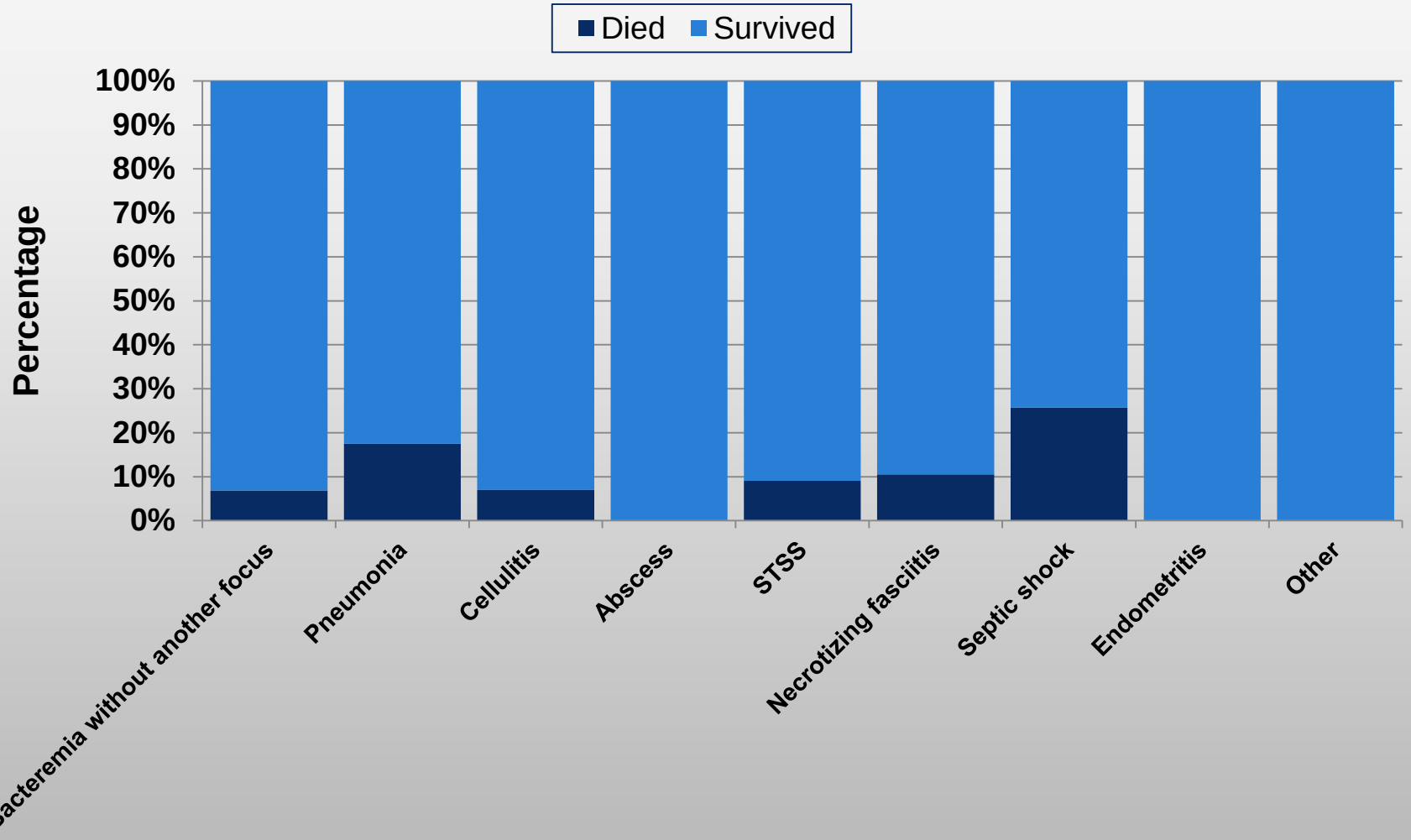
Age Group	Cases	Deaths	% Died
Under 1 yr.	5	0	0%
1-4 yrs.	9	0	0%
5-9 yrs.	7	0	0%
10-19 yrs.	11	0	0%
20-29 yrs.	27	2	7.4%
30-39 yrs.	28	2	7.1%
40-49 yrs.	35	2	5.7%
50-59 yrs.	55	7	12.7%
60-69 yrs.	71	5	7.0%
70+ yrs.	111	16	14.4%
Total	359	34	9.5%

Invasive Group A Streptococcal Disease by Type of Infection/Syndrome, Minnesota, 2017

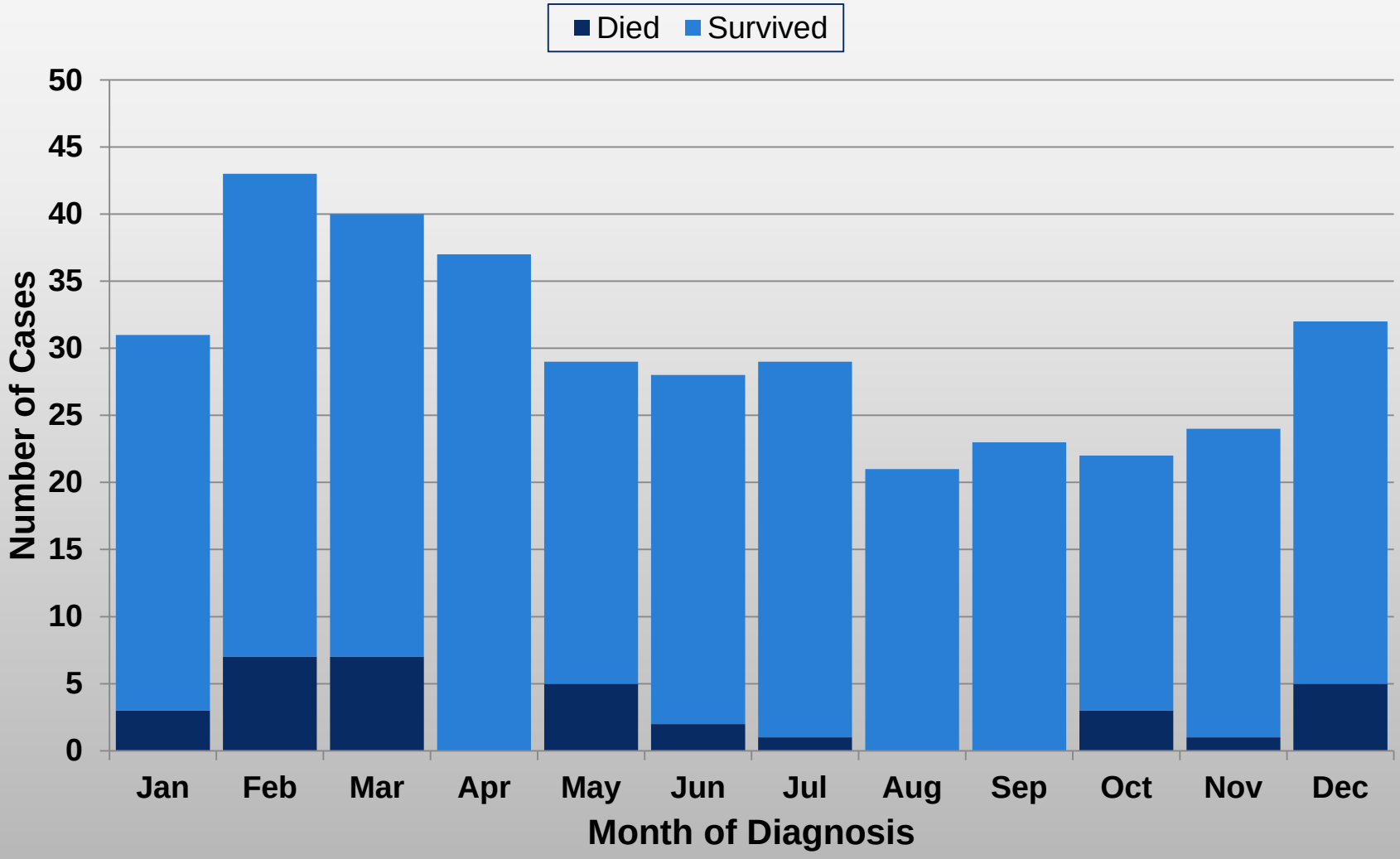


This chart represents 374 infections among 277 cases (some cases had >1 infection).

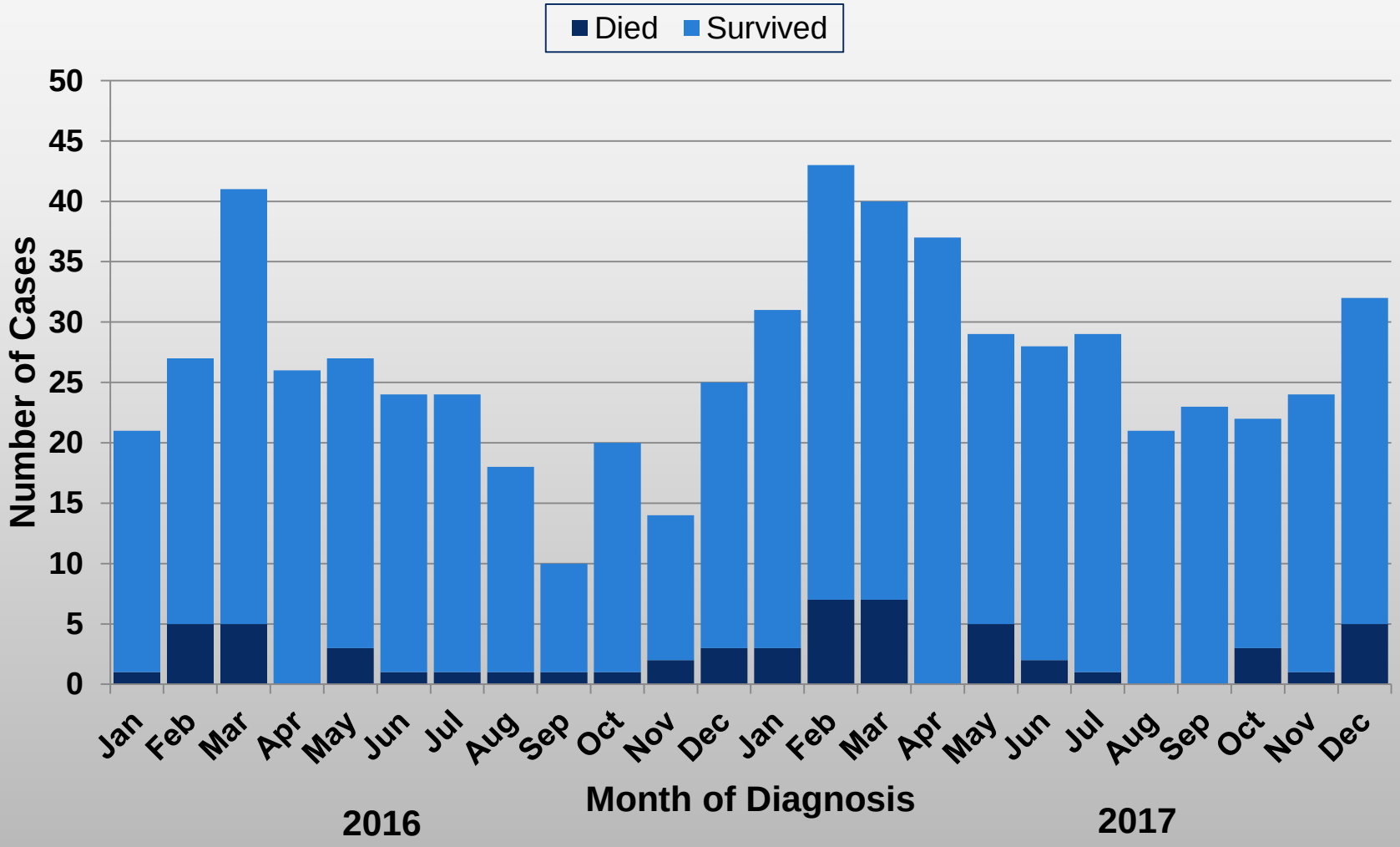
Outcome of Invasive Group A Streptococcal Disease by Type of Infection/Syndrome, Minnesota, 2017



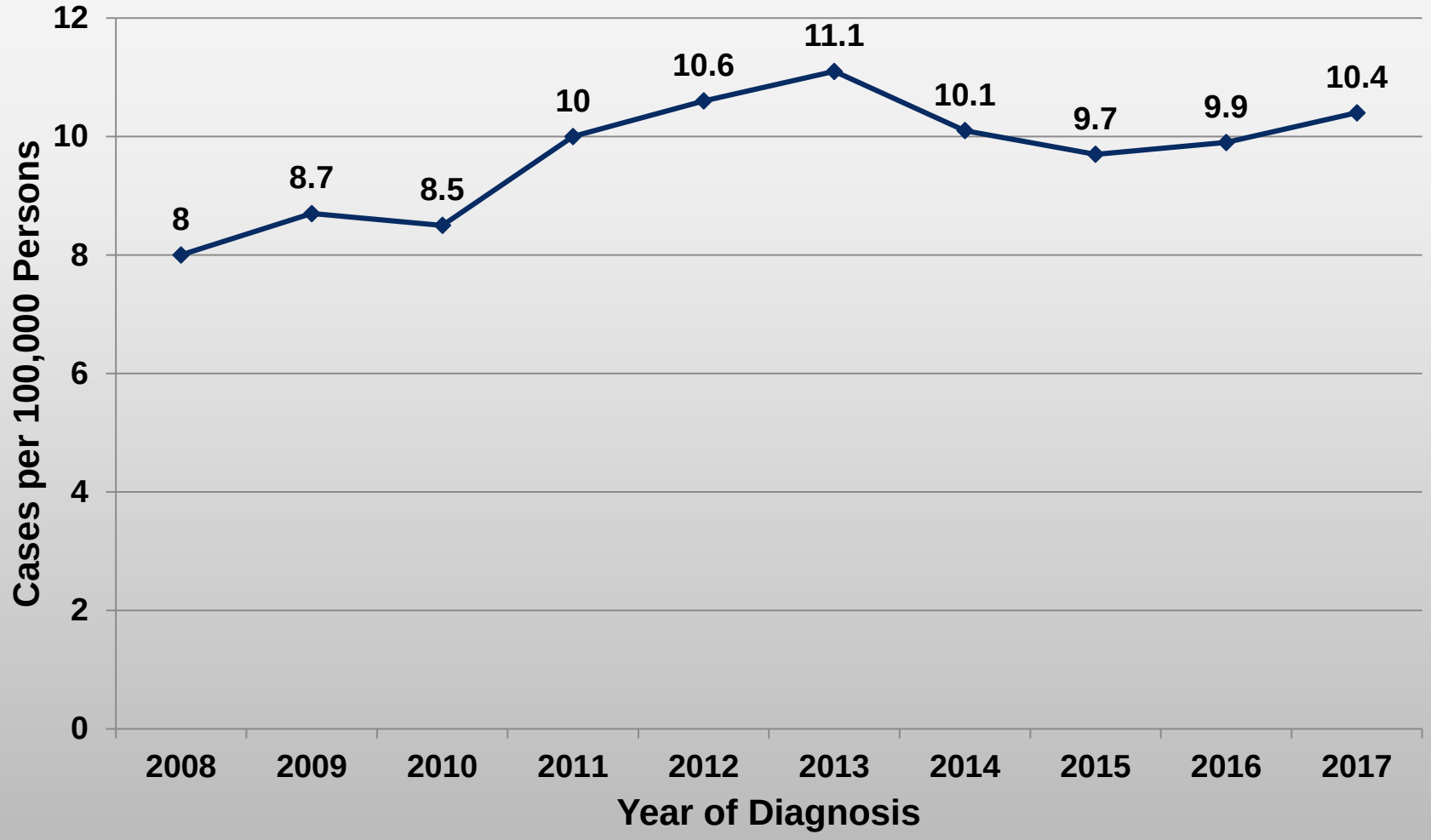
Cases of Invasive Group A Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2017



Cases of Invasive Group A Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2016-2017



Incidence of Invasive Group B Streptococcal Disease, Minnesota, 2008-2017



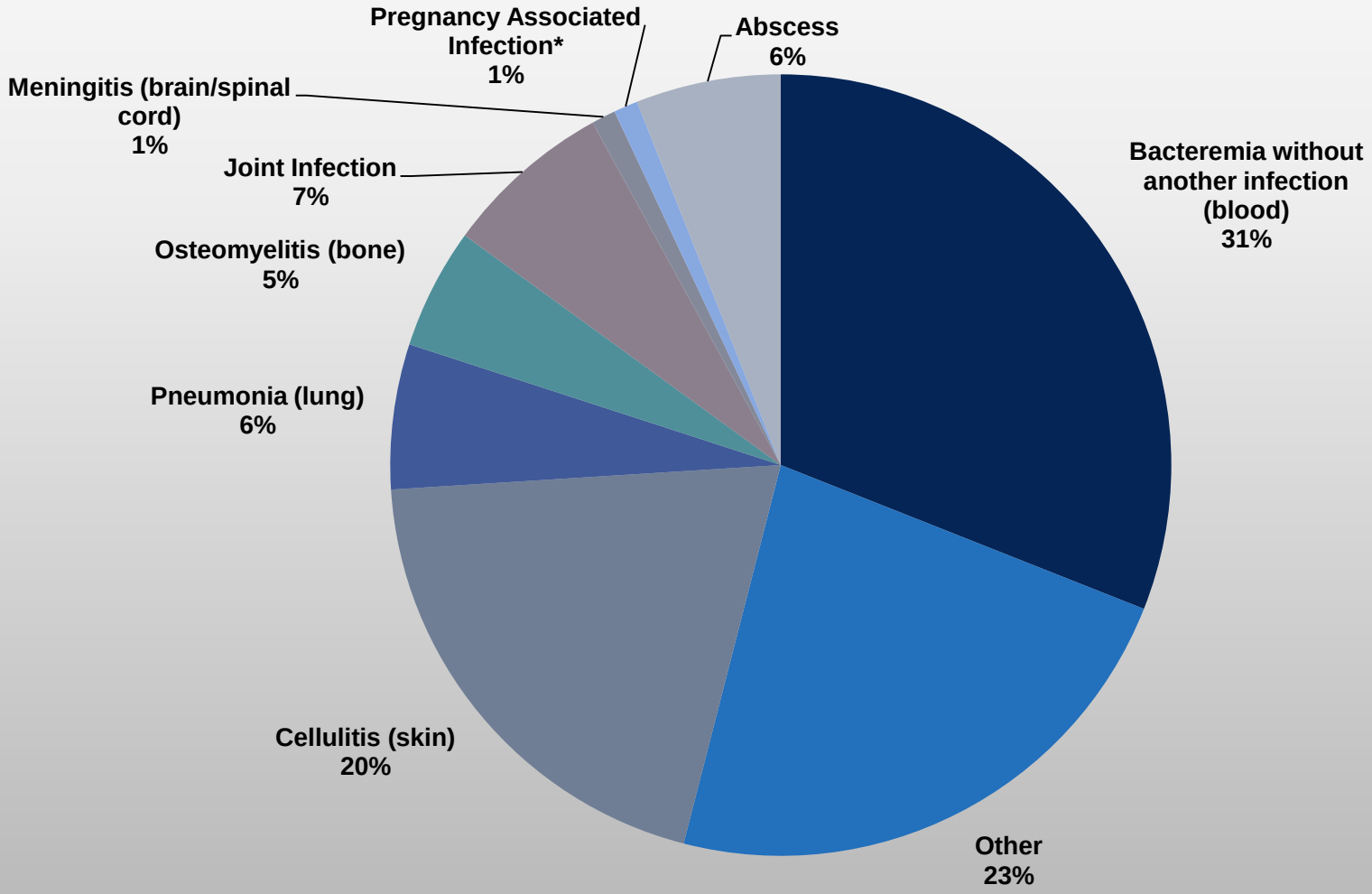
Incidence of Invasive Group B Streptococcal Disease by Gender and Age Group, Minnesota, 2017

Characteristic	Cases (n=576)	Incidence per 100,000 persons
Gender		
Male	331	12.0
Female	245	8.8
Age Group		
Under 1 yr.	35	50.0
1-4 yrs.	0	0
5-9 yrs.	0	0
10-19 yrs.	7	1.0
20-29 yrs.	20	2.7
30-39 yrs.	51	6.9
40-49 yrs.	51	7.7
50-59 yrs.	77	9.9
60-69 yrs.	112	17.9
70+ yrs.	223	40.5

Invasive Group B Streptococcal Disease Cases and Deaths by Age Group, Minnesota, 2017

Age Group	Cases	Deaths	% Died
Under 1 yr.	35	0	0%
1-4 yrs.	0	0	0%
5-9 yrs.	0	0	0%
10-19 yrs.	7	0	0%
20-29 yrs.	20	0	0%
30-39 yrs.	51	1	2%
40-49 yrs.	51	2	4%
50-59 yrs.	77	3	4%
60-69 yrs.	112	11	10%
70+ yrs.	223	15	7%
Total	576	32	6%

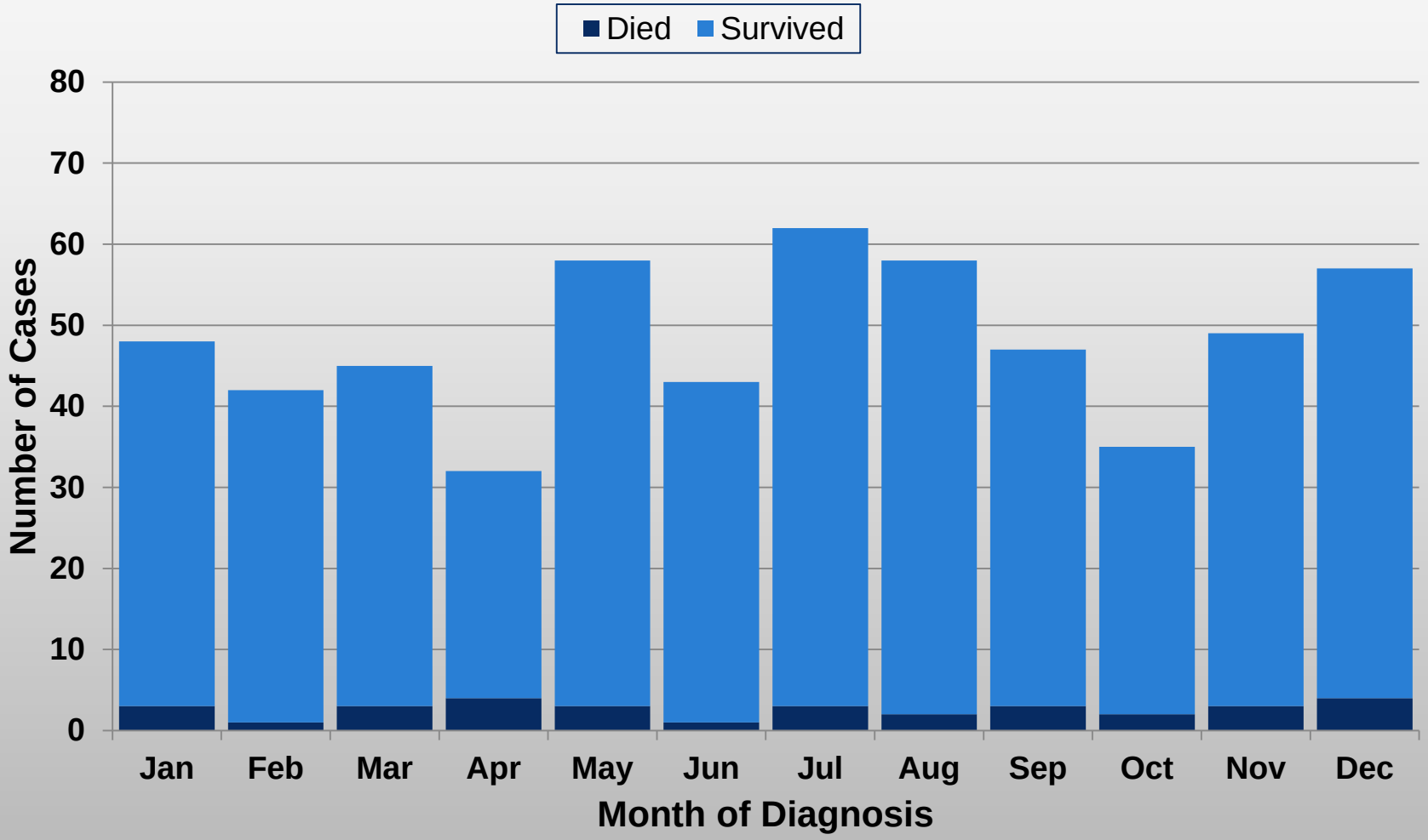
Invasive Group B Streptococcal Disease by Type of Infection/Syndrome, Minnesota 2017



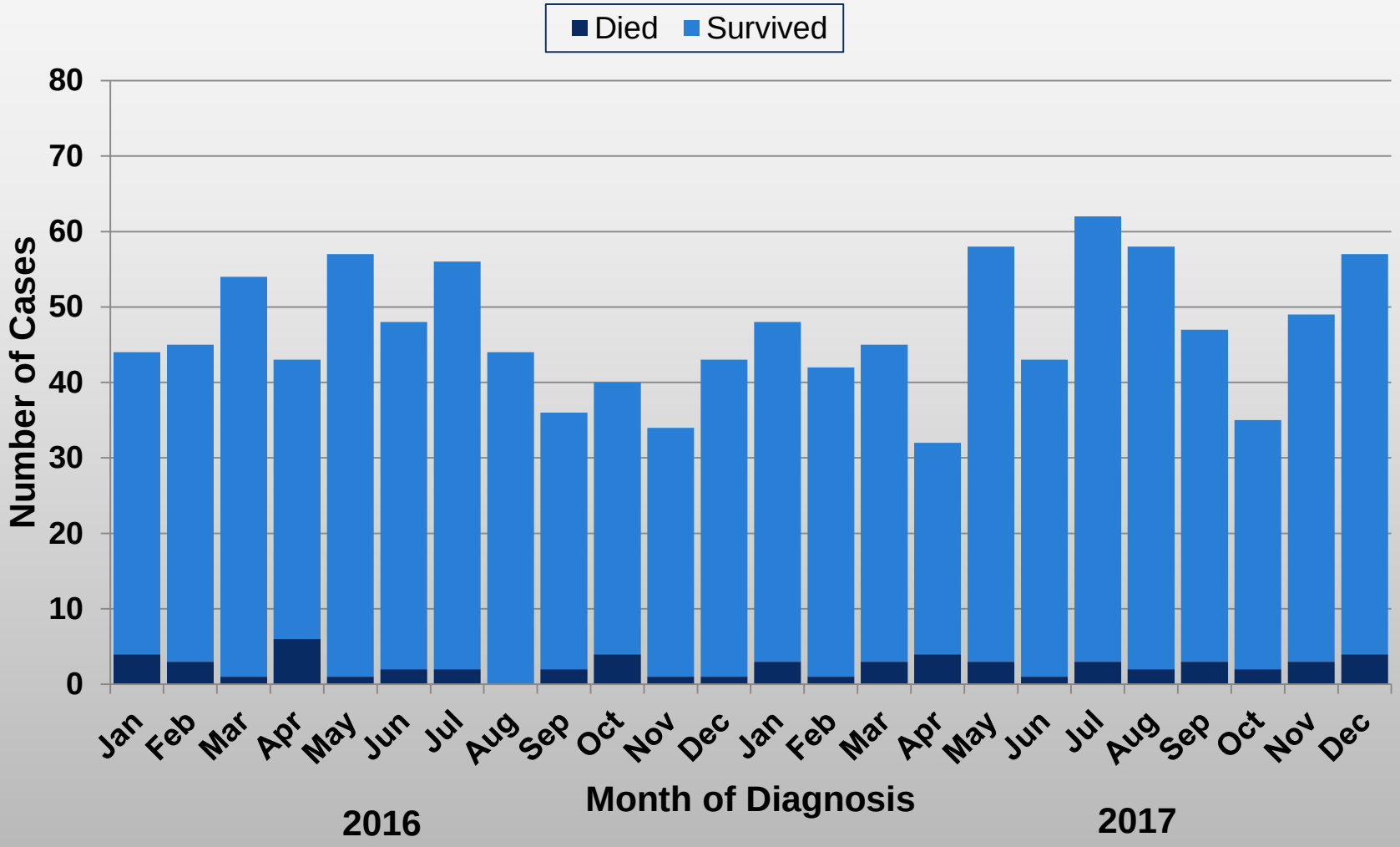
This chart represents 634 infections among 544 cases. (Some cases had >1 infection.)

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

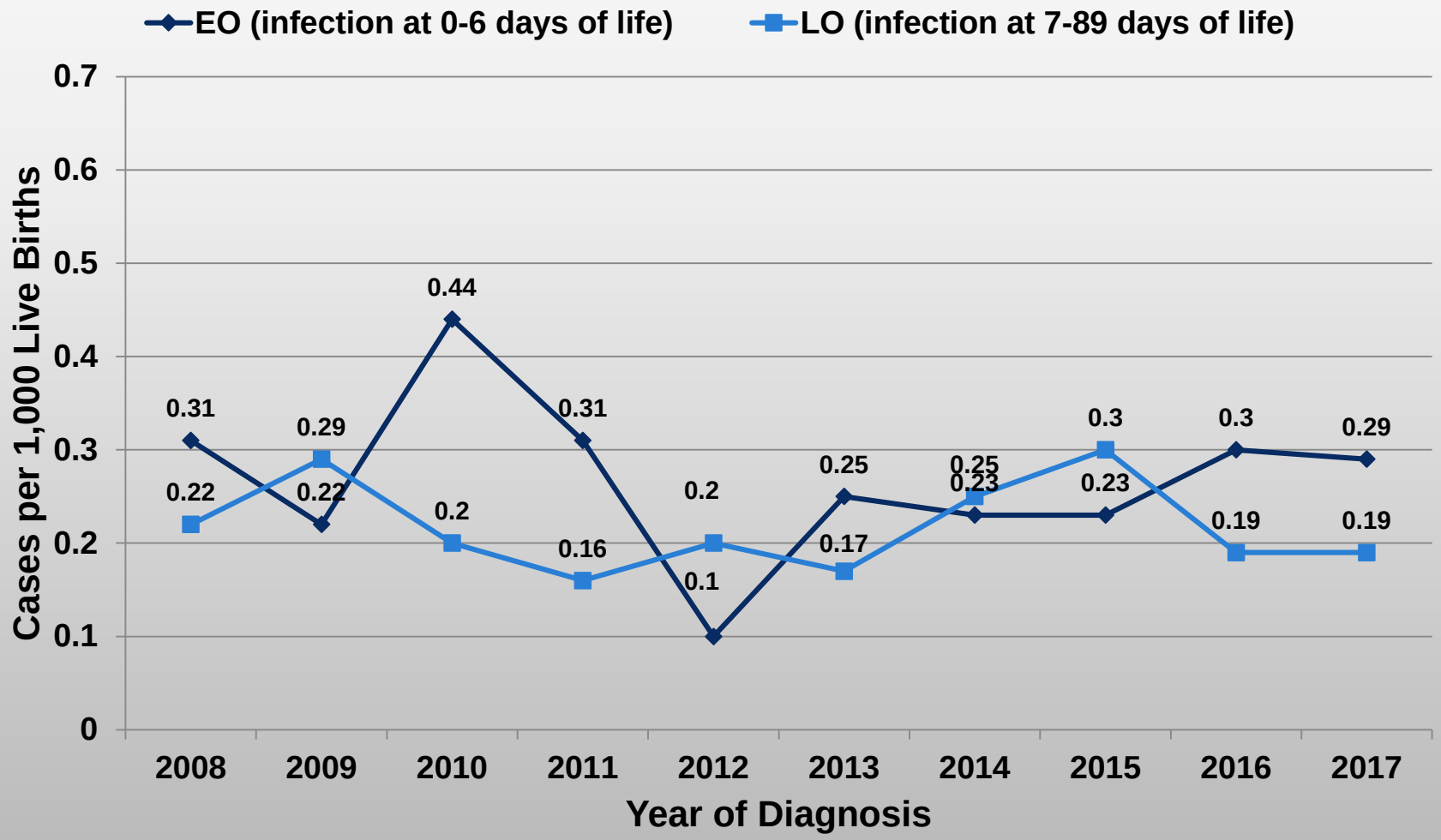
Cases of Invasive Group B Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2017



Cases of Invasive Group B Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2016-2017



Incidence of Invasive Early and Late-Onset Group B Streptococcal Disease, Minnesota, 2008-2017

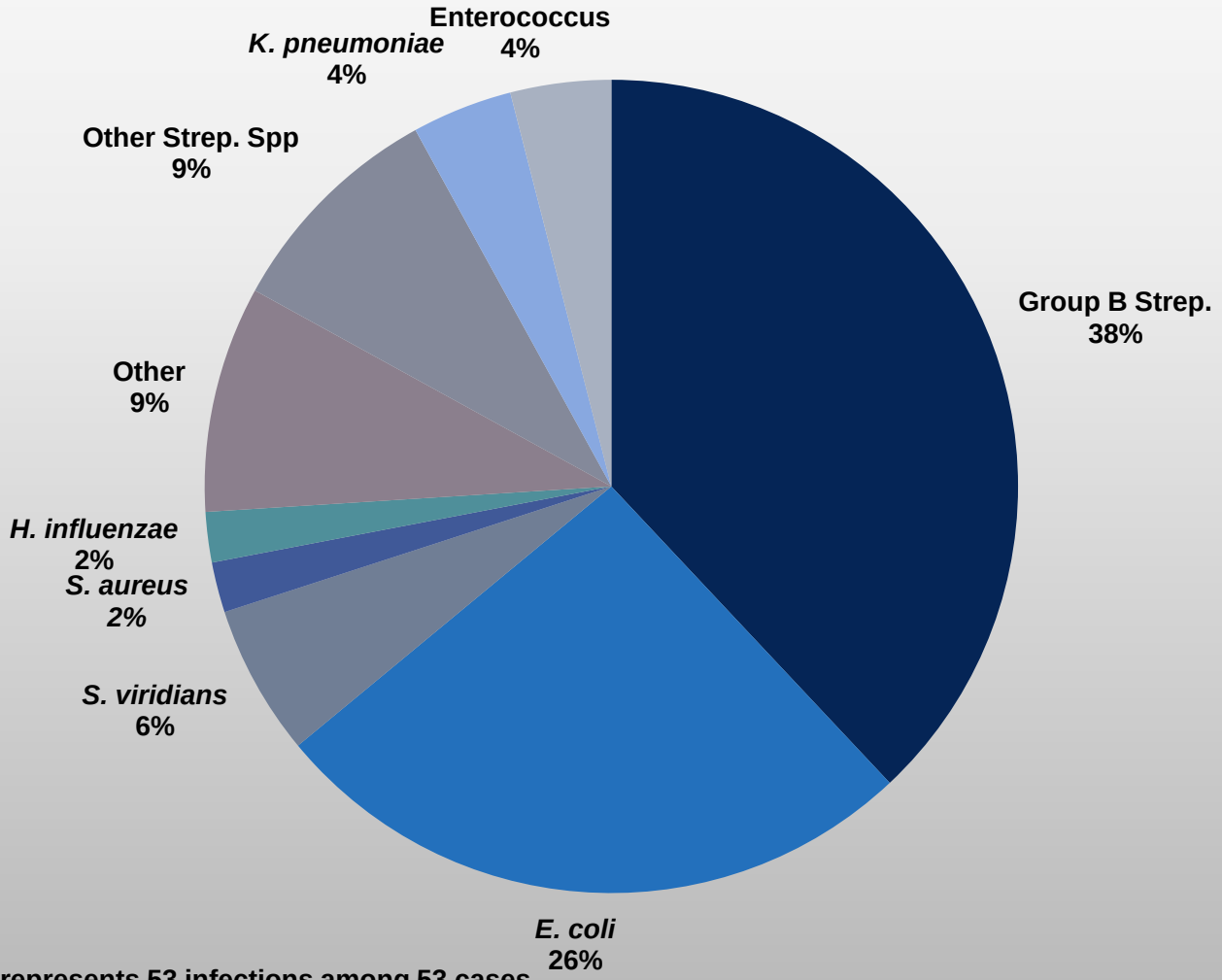


Early-Onset* Group B Streptococcal Disease by Race, Gestational Age and Outcome, Minnesota, 2017

Characteristic	Cases (n=20)	Percent
Race		
White	12	60%
Black	3	15%
Asian	2	10%
Pacific Islander	1	5%
Multiple Races	2	10%
Gestational Age		
Under 32 weeks	5	25%
32-37 weeks	3	15%
Full-term	12	60%
Outcome		
Died	0	0%
Survived	20	100%

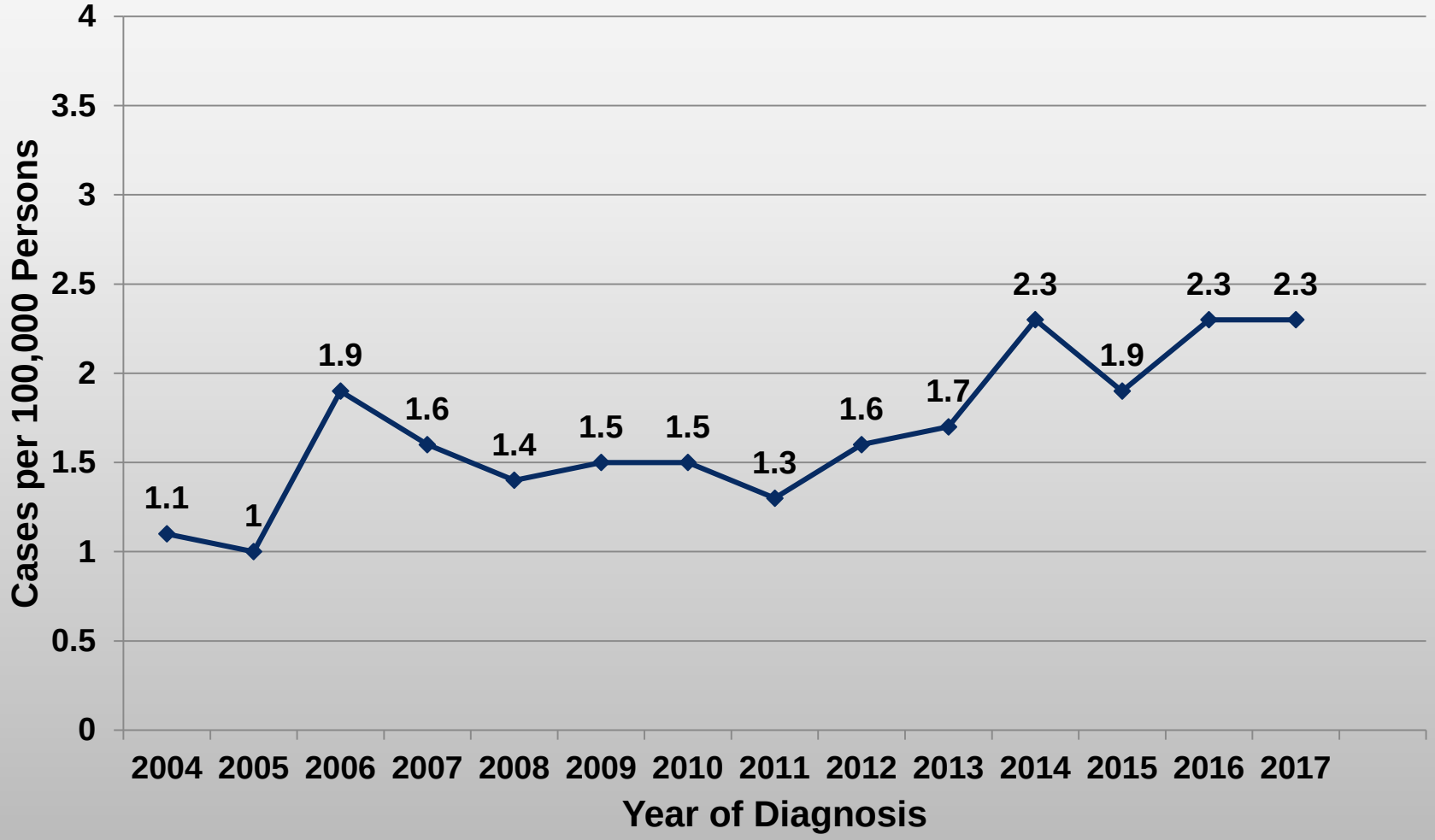
* onset 0-6 days of life

Invasive Neonatal Sepsis Disease in First 6 Days of Life by Pathogen, Minnesota, 2017*



* This chart represents 53 infections among 53 cases.

Incidence of Invasive *Haemophilus influenzae* Disease, Minnesota, 2004-2017



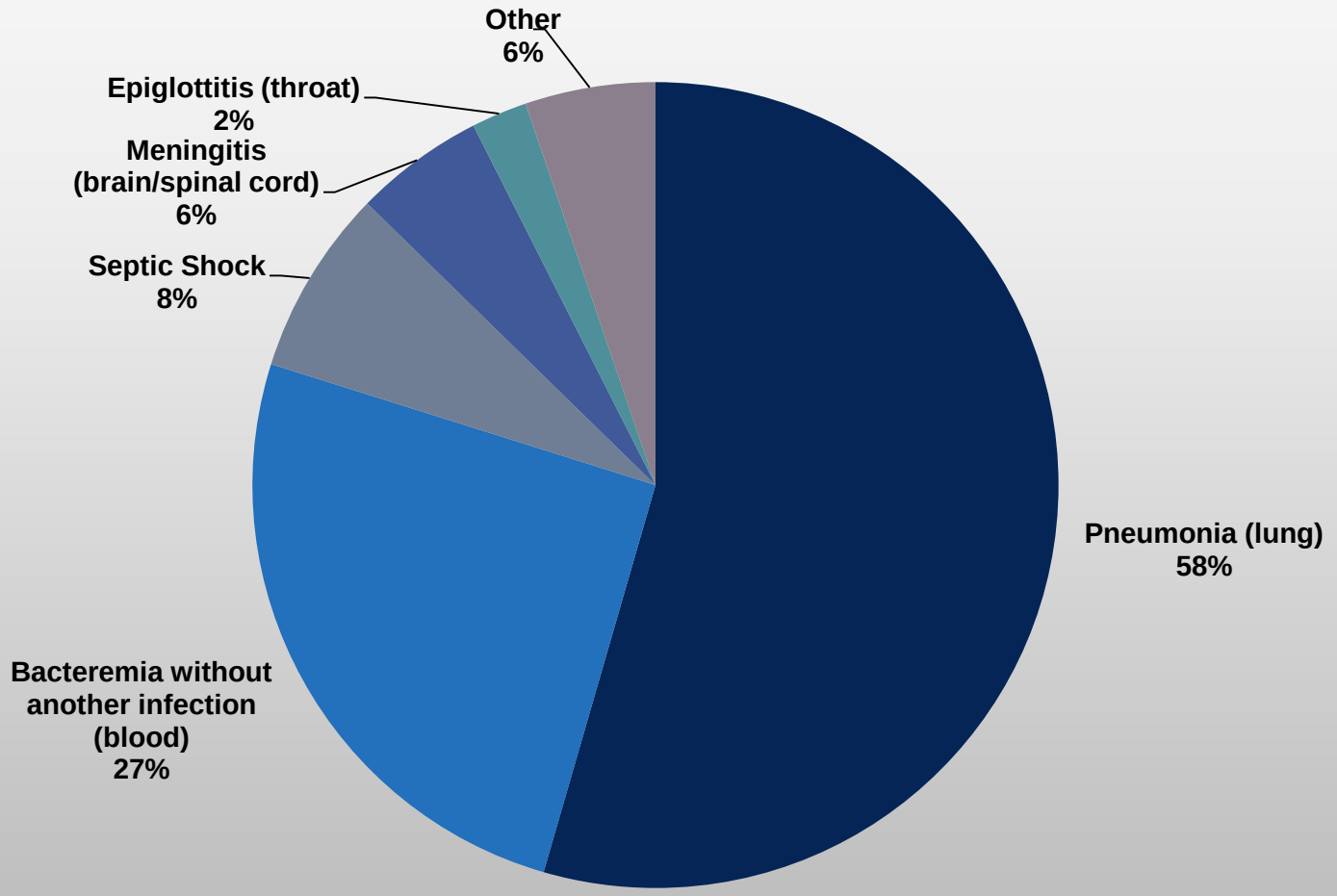
Incidence of Invasive *Haemophilus influenzae* Disease by Gender and Age Group, Minnesota, 2017

Characteristic	Cases (n=125)	Incidence per 100,000 persons
Gender		
Male	53	1.93
Female	72	2.60
Age Group		
Under 1 yr.	9	12.87
1-4 yrs.	10	3.54
5-9 yrs.	2	0.56
10-19 yrs.	1	0.14
20-29 yrs.	4	0.55
30-39 yrs.	5	0.67
40-49 yrs.	4	0.60
50-59 yrs.	13	1.67
60-69 yrs.	22	3.52
70+ yrs.	55	9.98

Invasive *Haemophilus influenzae* Disease Cases and Deaths by Age Group, Minnesota, 2017

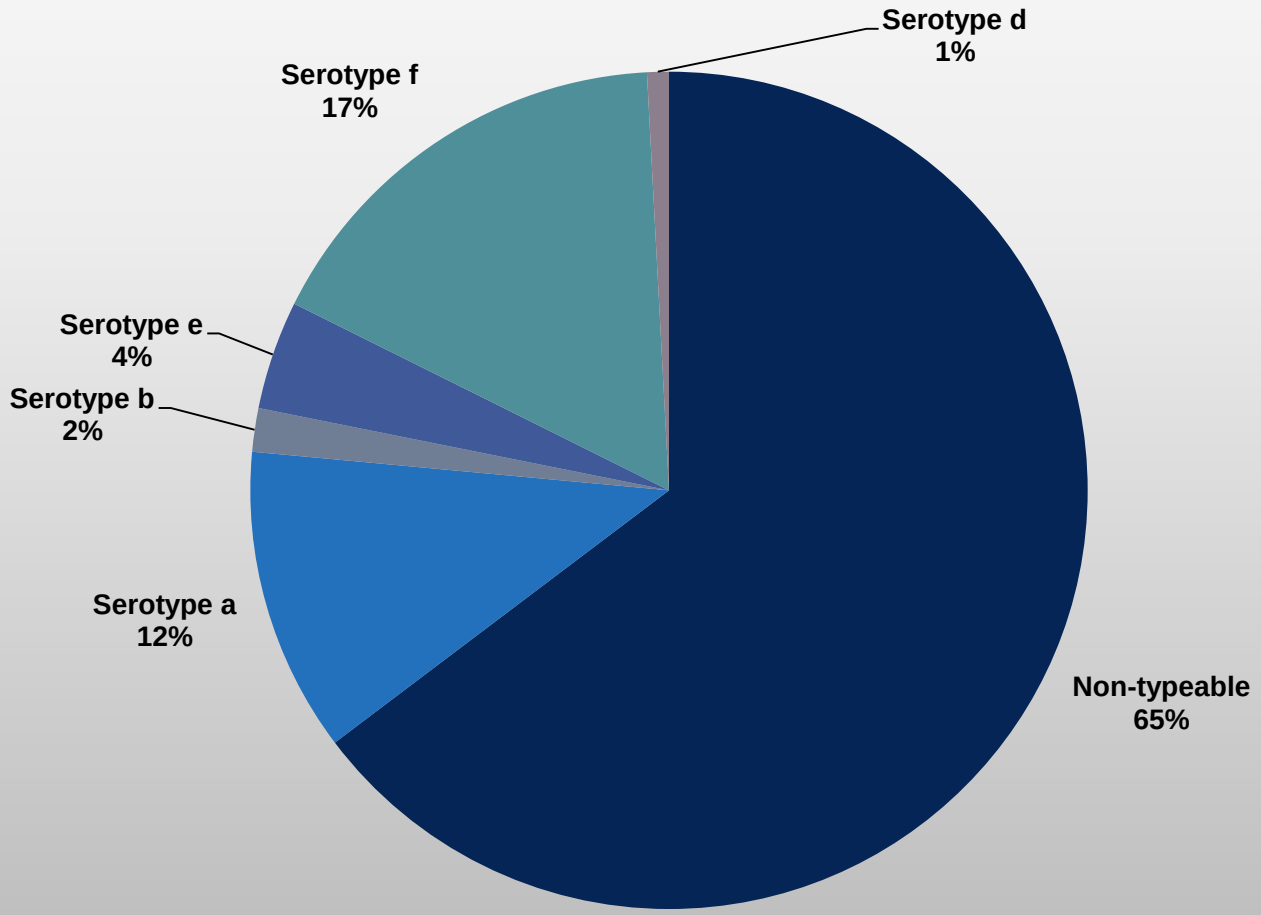
Age Group	Cases	Deaths	% Died
Under 1 yr.	9	0	--
1-4 yrs.	10	0	--
5-9 yrs.	2	0	--
10-19 yrs.	1	0	--
20-29 yrs.	4	0	--
30-39 yrs.	5	0	--
40-49 yrs.	4	0	--
50-59 yrs.	13	2	2%
60-69 yrs.	22	0	--
70+ yrs.	55	6	5%
Total	125	8	6%

Invasive *Haemophilus influenzae* Disease by Type of Infection/Syndrome, Minnesota 2017



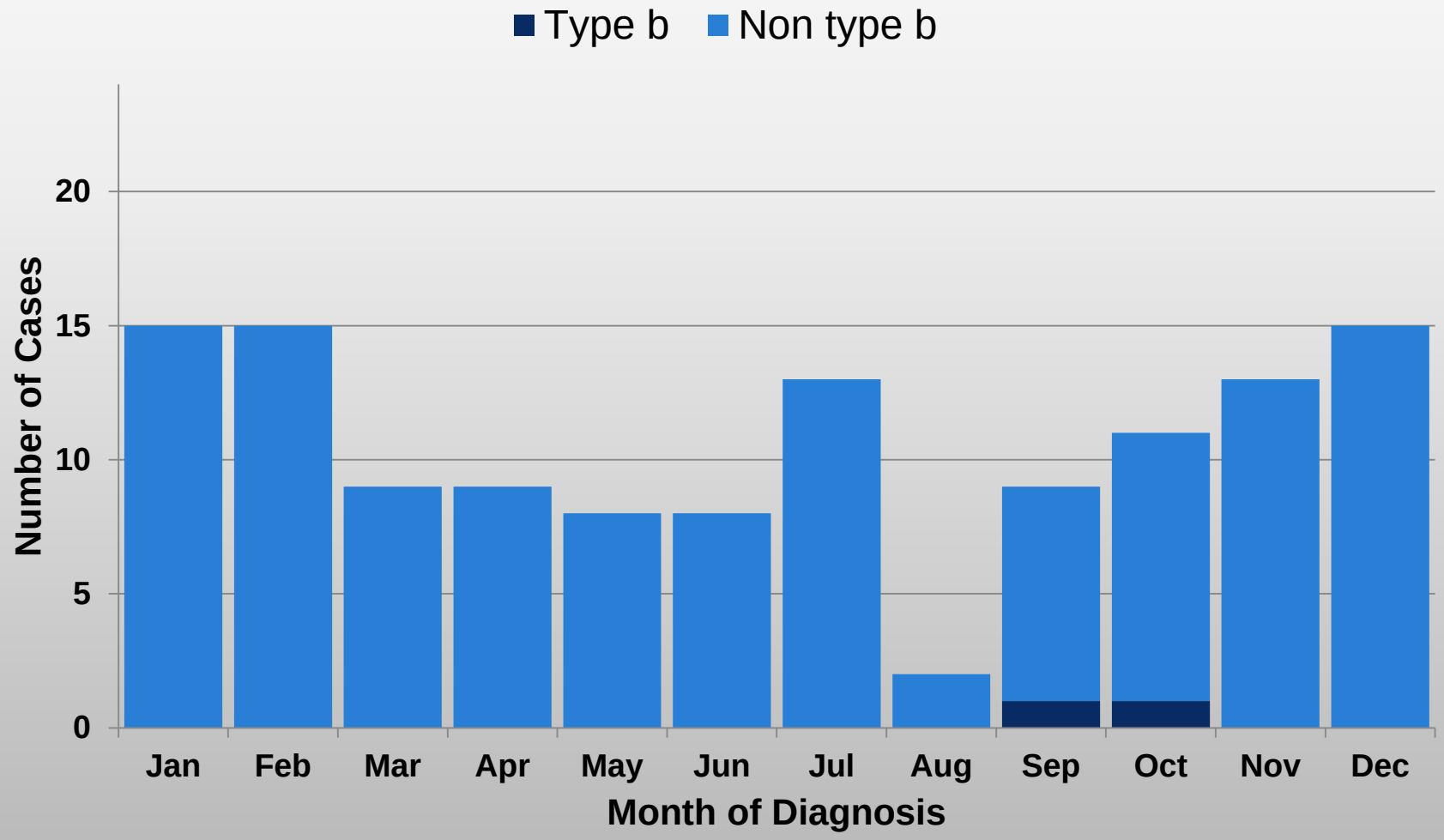
This graph represents 134 infections in 125 cases (some cases had > 1 infection).

Invasive *Haemophilus influenzae* Disease by Serotype, Minnesota 2017 (n=119*)

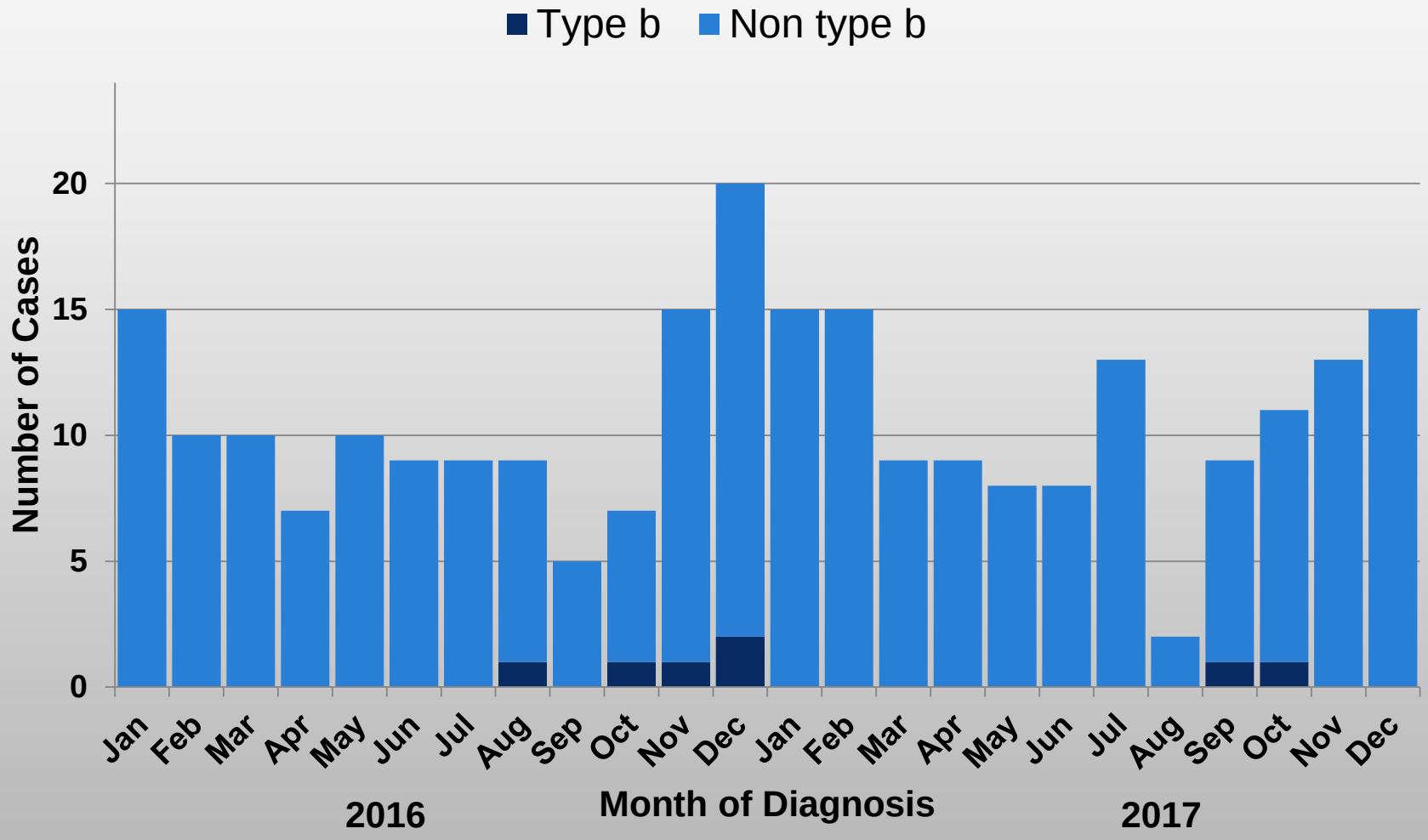


* 6 case isolates not available for serotyping

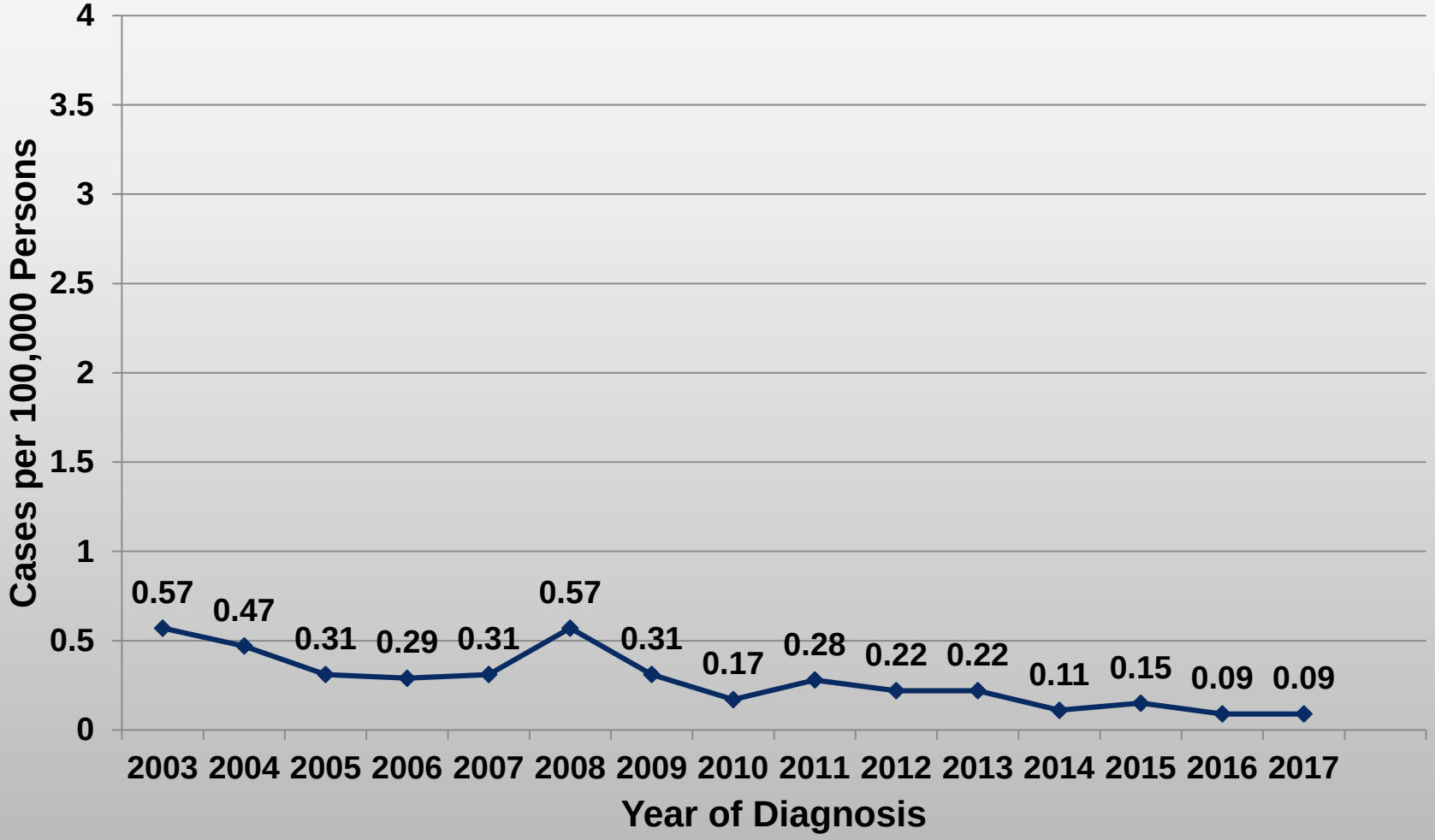
Cases of Invasive *Haemophilus influenzae* Disease by Month of Diagnosis and Serotype, Minnesota, 2017



Cases of Invasive *Haemophilus influenzae* Disease by Month of Diagnosis and Serotype, Minnesota, 2016-2017



Incidence of Invasive *Neisseria meningitidis* Disease, Minnesota, 2003-2017



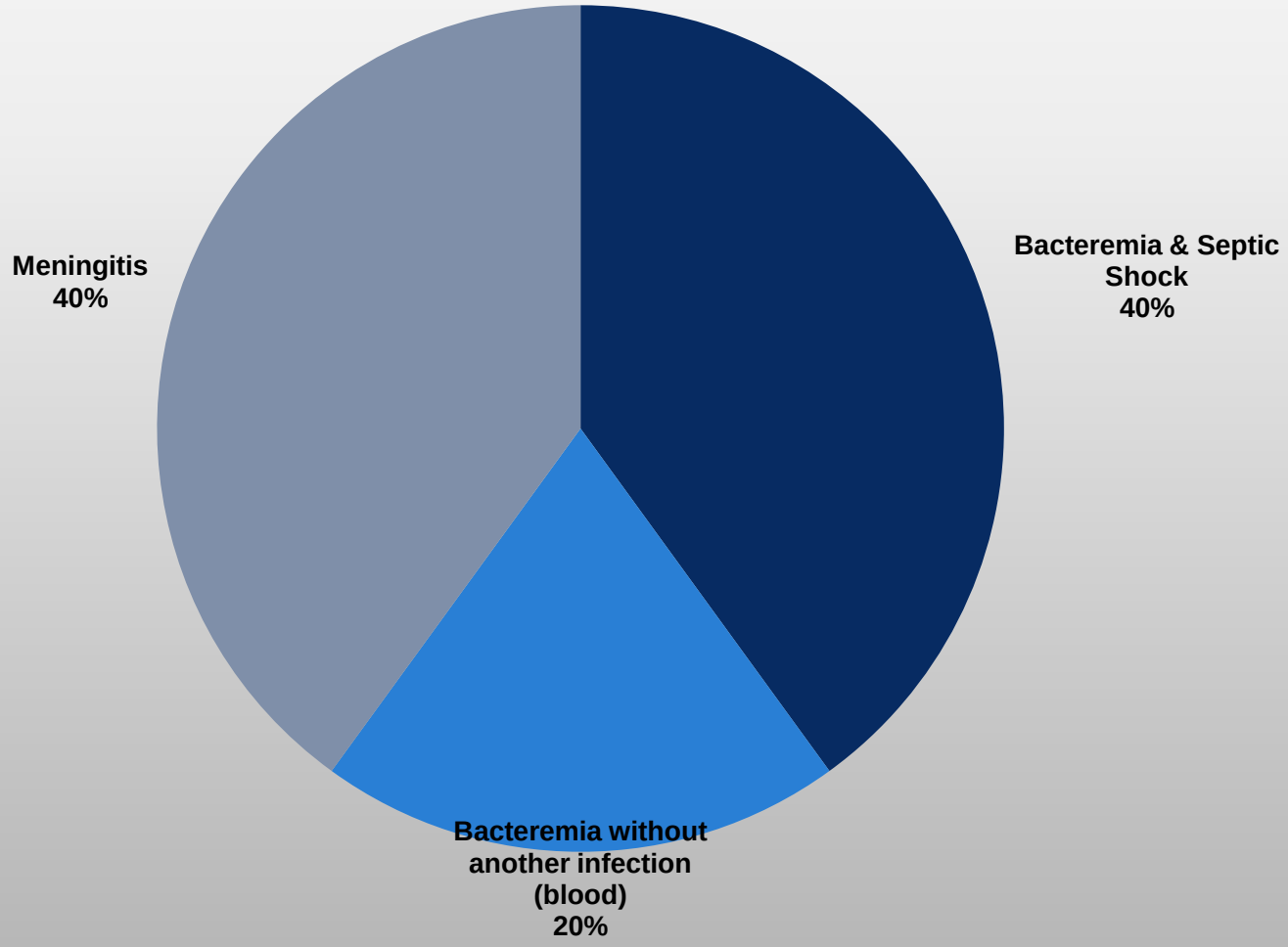
Incidence of Invasive *Neisseria meningitidis* Disease by Gender and Age Group, Minnesota, 2017

Characteristic	Cases (n=5)	Incidence per 100,000 persons
Gender		
Male	2	0.07
Female	3	0.11
Age Group		
Under 1 yr.	0	0
1-4 yrs.	0	0
5-9 yrs.	1	0.28
10-19 yrs.	0	0
20-29 yrs.	0	0
30-39 yrs.	0	0
40-49 yrs.	0	0
50-59 yrs.	1	0.13
60-69 yrs.	1	0.16
70+ yrs.	2	0.36

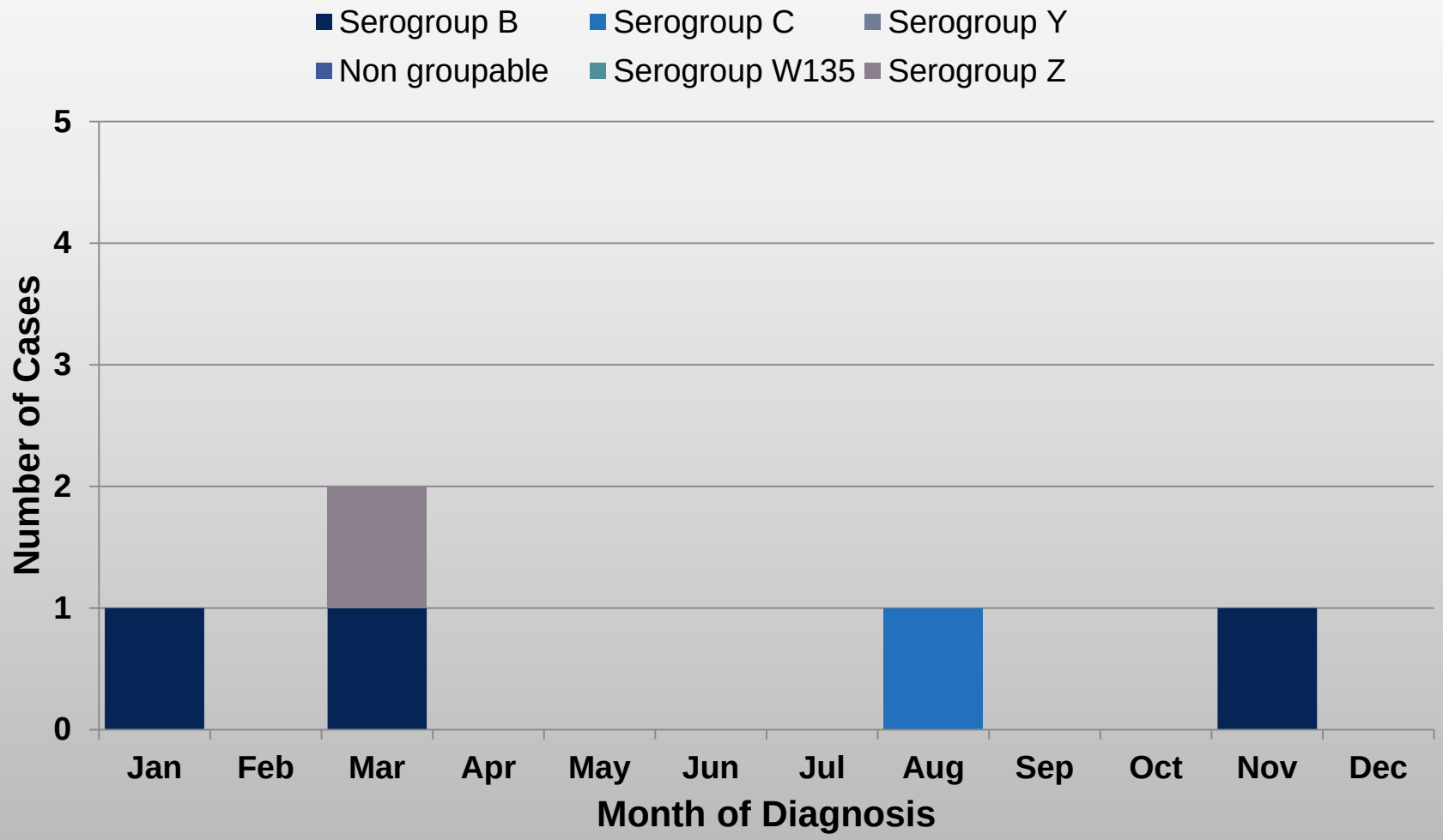
Invasive *Neisseria meningitidis* Disease Cases and Deaths by Age Group, Minnesota, 2017

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

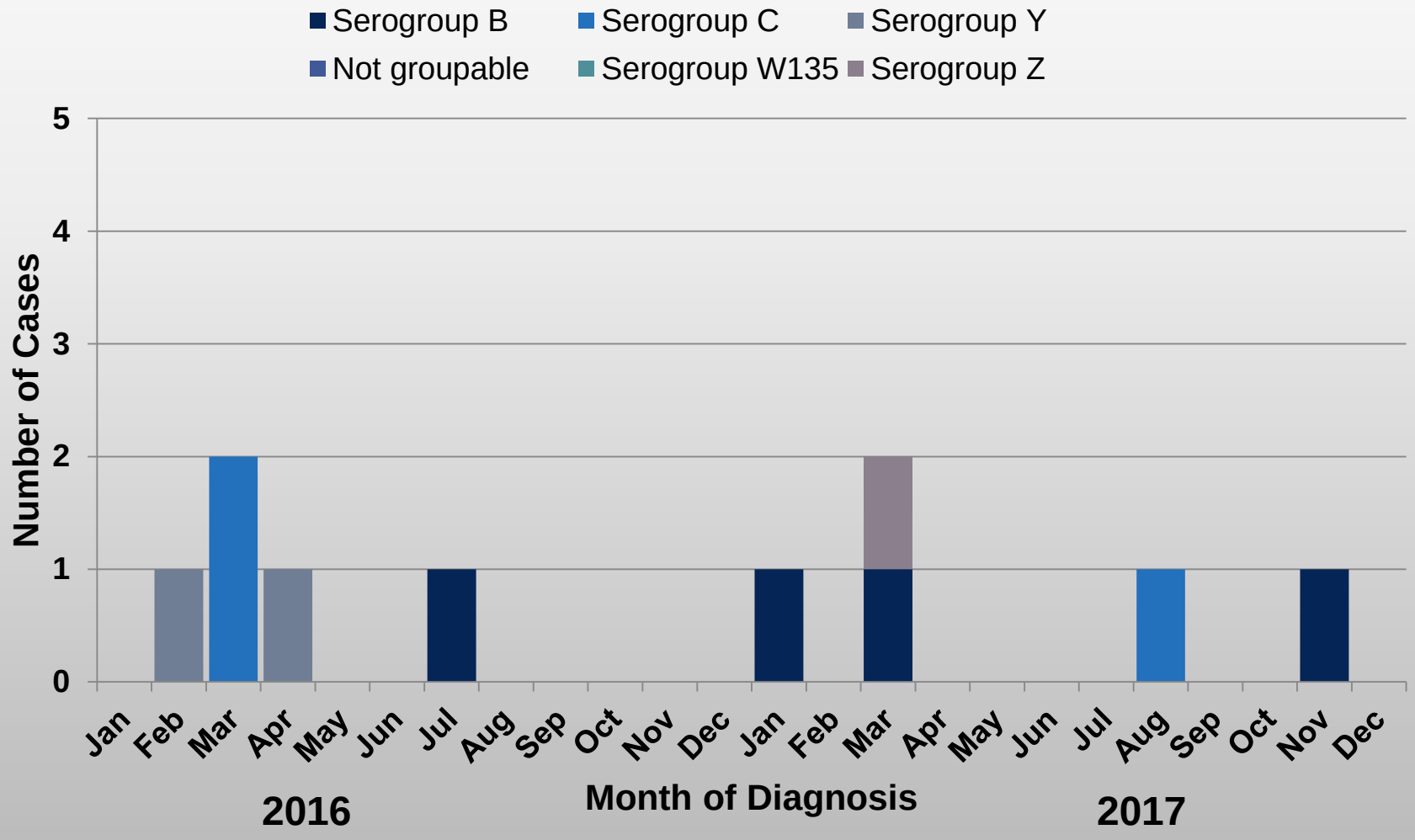
Invasive *Neisseria meningitidis* by Type of Infection/Syndrome, Minnesota 2017



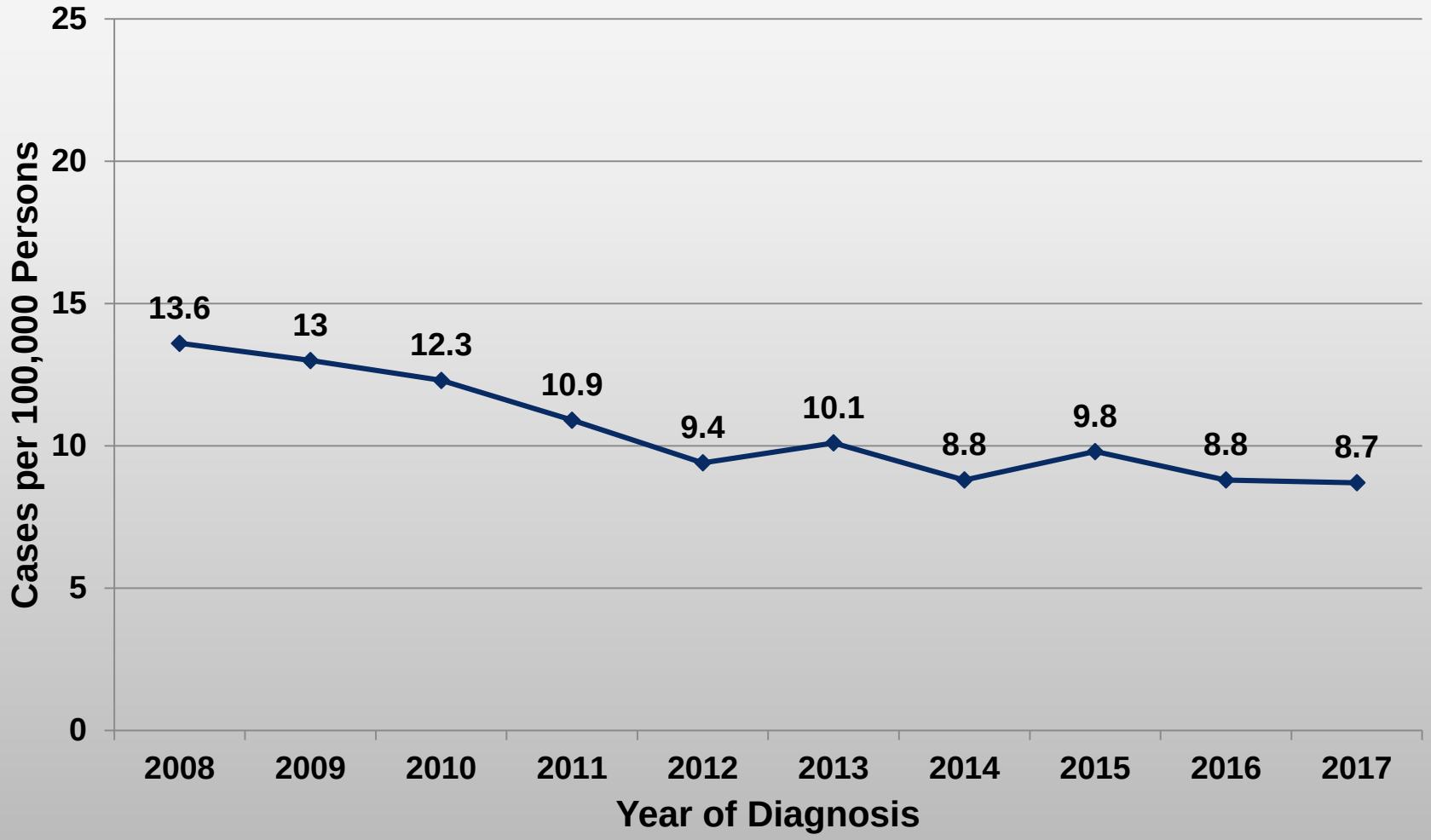
Cases of Invasive *Neisseria meningitidis* Disease by Month of Diagnosis and Serotype, Minnesota, 2017



Cases of Invasive *Neisseria meningitidis* Disease by Month of Diagnosis and Serotype, Minnesota, 2016-2017



Incidence of Invasive Pneumococcal Disease, Minnesota, 2008-2017



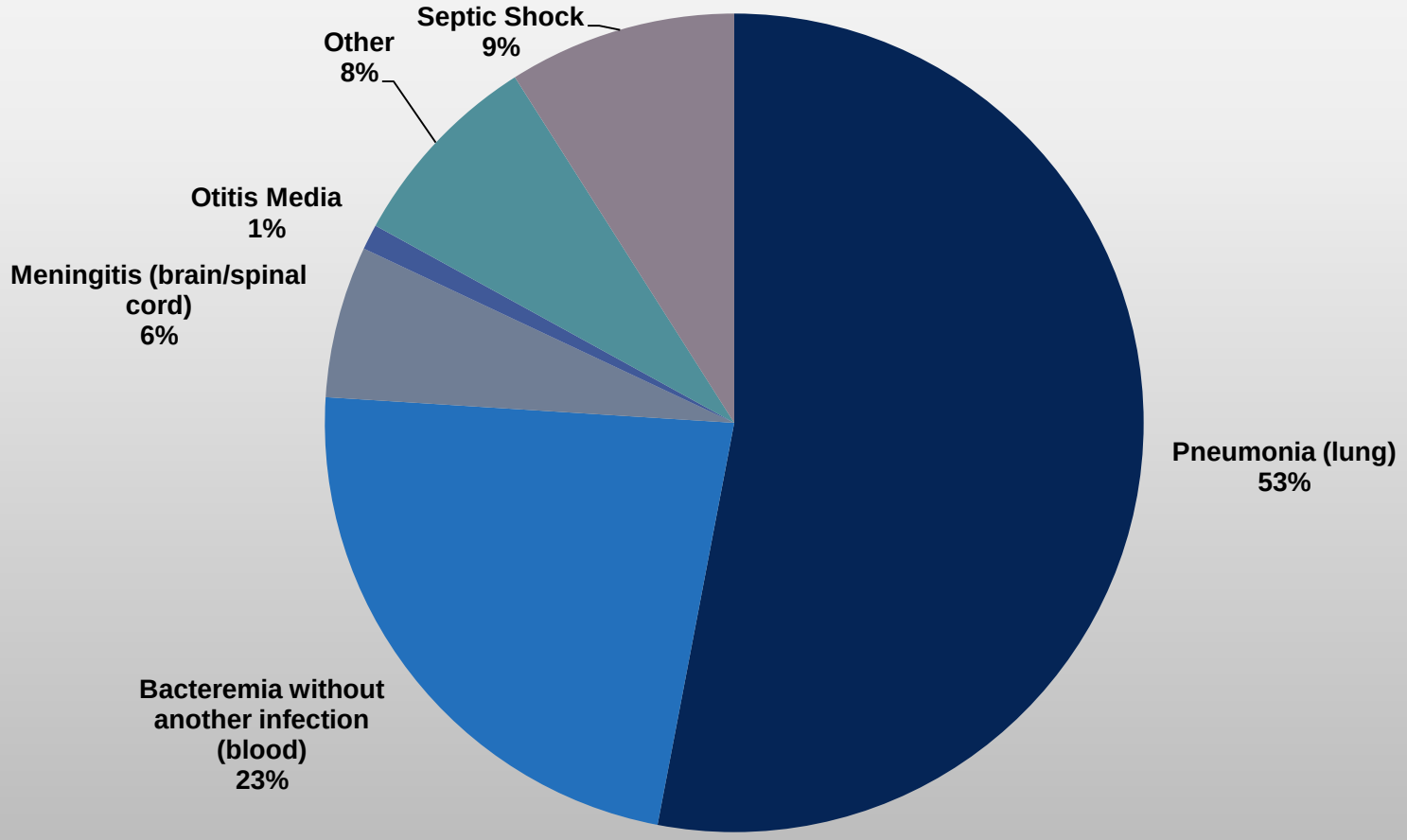
Incidence of Invasive Pneumococcal Disease by Gender and Age Group, Minnesota, 2017

Characteristic	Cases (n=481)	Incidence per 100,000 persons
Gender		
Male	253	9.2
Female	228	8.2
Age Group		
Under 1 yr.	8	11.4
1-4 yrs.	22	7.7
5-19 yrs.	15	1.4
20-29 yrs.	8	1.1
30-39 yrs.	18	2.4
40-49 yrs.	38	5.7
50-64 yrs.	148	13.2
65-79 yrs.	135	22.1
80+ yrs.	89	40.4

Invasive Pneumococcal Disease Cases and Deaths by Age Group, Minnesota, 2017

Age Group	Cases	Deaths	% Died
Under 1 yr.	8	0	0%
1-4 yrs.	22	1	5%
5-19 yrs.	15	2	13%
20-29 yrs.	9	0	0%
30-39 yrs.	18	1	6%
40-49 yrs.	38	1	3%
50-64 yrs.	148	13	9%
65-79 yrs.	135	15	11%
80+ yrs.	89	14	16%
Total	481	47	10%

Invasive Pneumococcal Disease by Type of Infection/Syndrome, Minnesota 2017*



*This chart represents 558 infections among 481 cases (some cases had > 1 infection).

Invasive Pneumococcal Isolates by Serotype Included in 13-Valent Conjugate Vaccine* by Age Group, Minnesota, 2017

Age Group	Isolates	# included in PCV-13	% included in PCV-13
Under 1 yr.	14	2	14%
1-4 yrs.	20	3	15%
5-19 yrs.	14	3	21%
20-29 yrs.	8	0	0%
30-39 yrs.	17	3	18%
40-49 yrs.	33	4	12%
50-64 yrs.	141	41	29%
65-79 yrs.	121	18	15%
80+ yrs.	86	13	15%
Total	454	87	19%

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

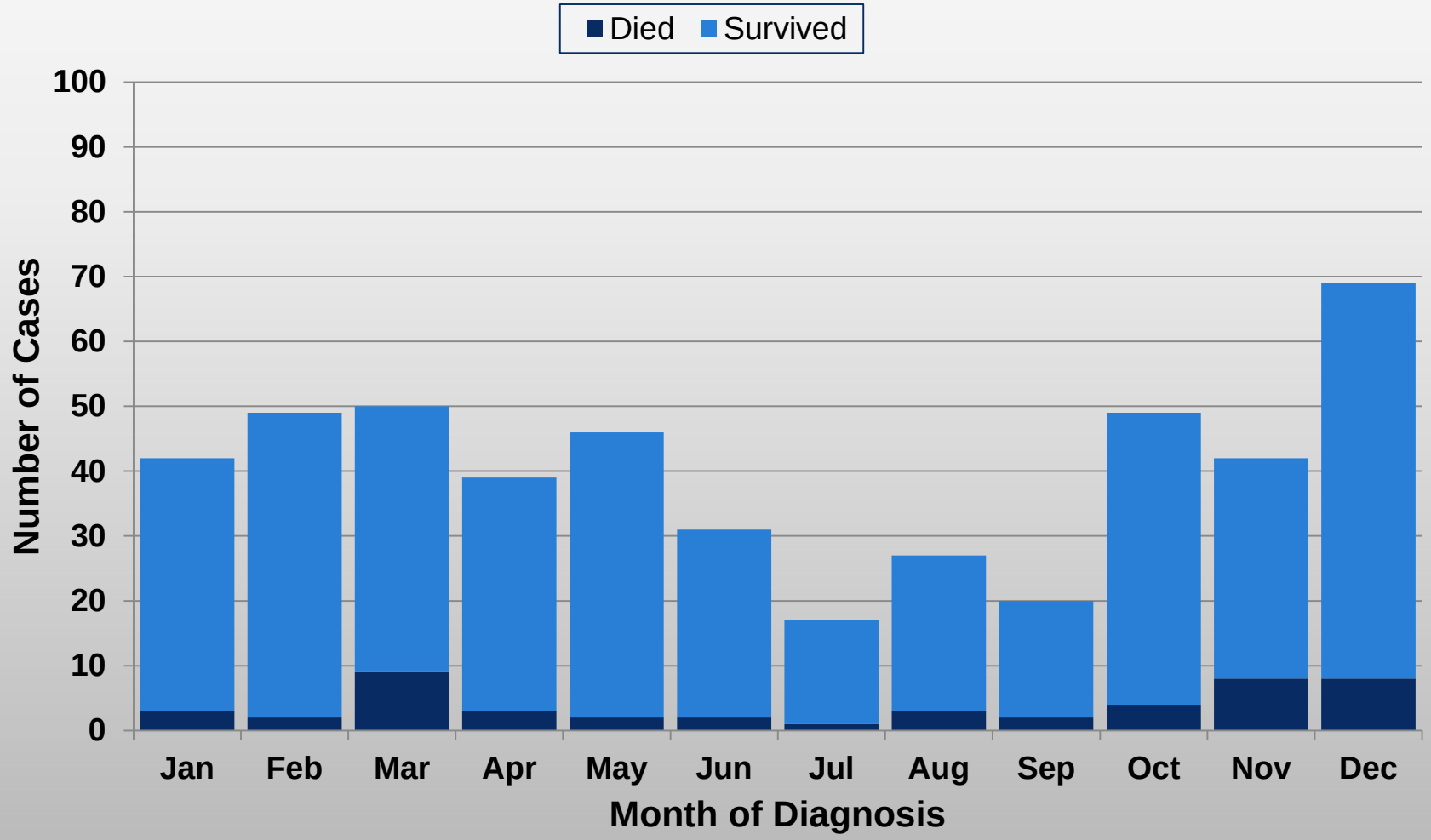
Invasive Pneumococcal Isolates by Resistance to Antimicrobial Agents, Minnesota, 2017 (n=454 viable isolates)

	Total Resistant Isolates	% Resistant Isolates
Penicillin resistance (R)*		
Meningitis breakpoints	79	17%
Non-meningitis breakpoints	1	<1%
Resistance to drug classes**		
No resistance	266	59%
R to 1 drug class	121	27%
R to 2-3 drug classes	54	12%
R to 4-5 drug classes	13	3%

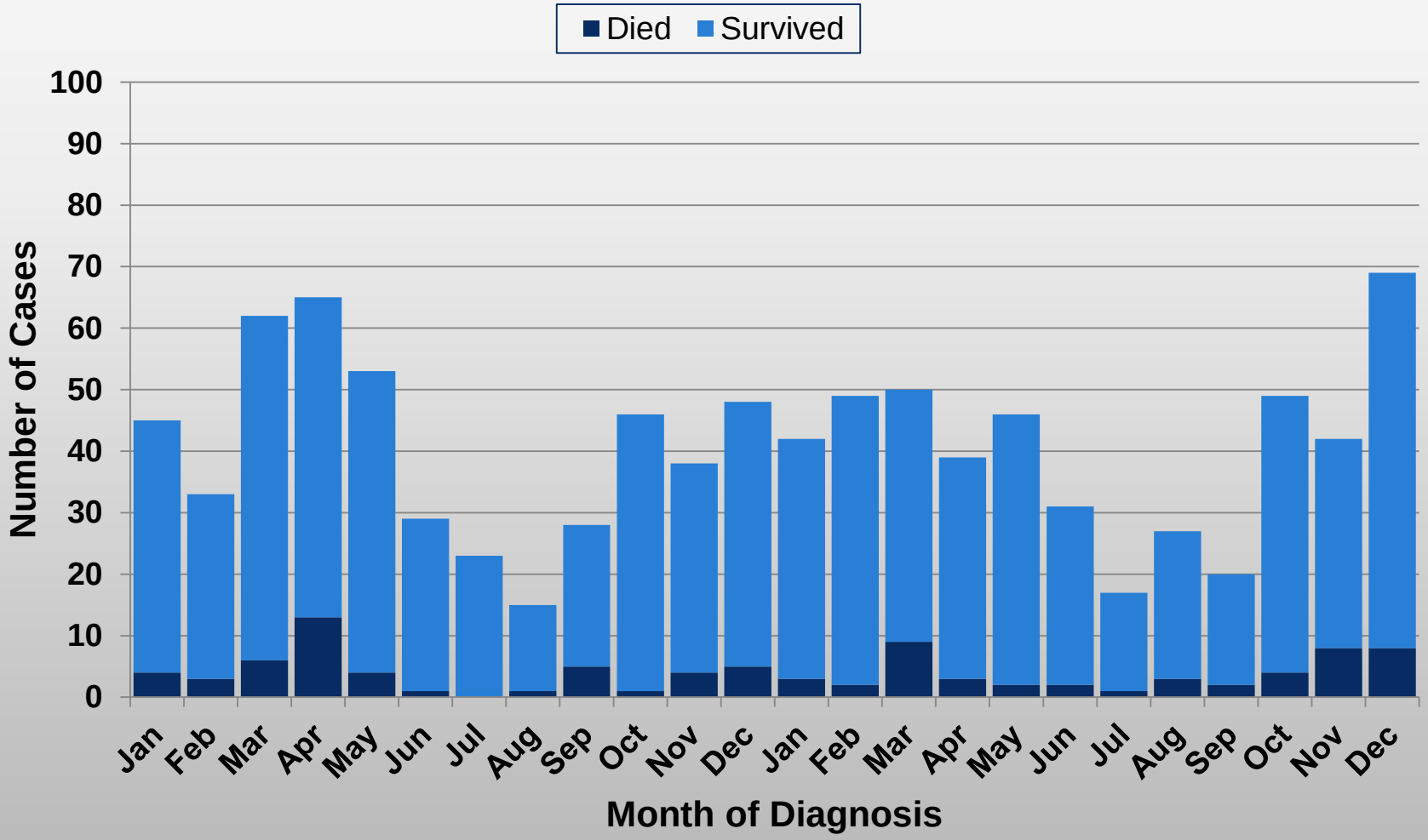
* **Isolates with MIC ≥ 0.12 µg/ml are Penicillin-R for meningitis, ≥ 8 µg/ml for non-meningitis.**

** **Twelve drug classes assessed; R to beta-lactams was assessed by penicillin MIC ≥ 0.12 µg/ml.**

Cases of Invasive Pneumococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2017



Cases of Invasive Pneumococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2016-2017



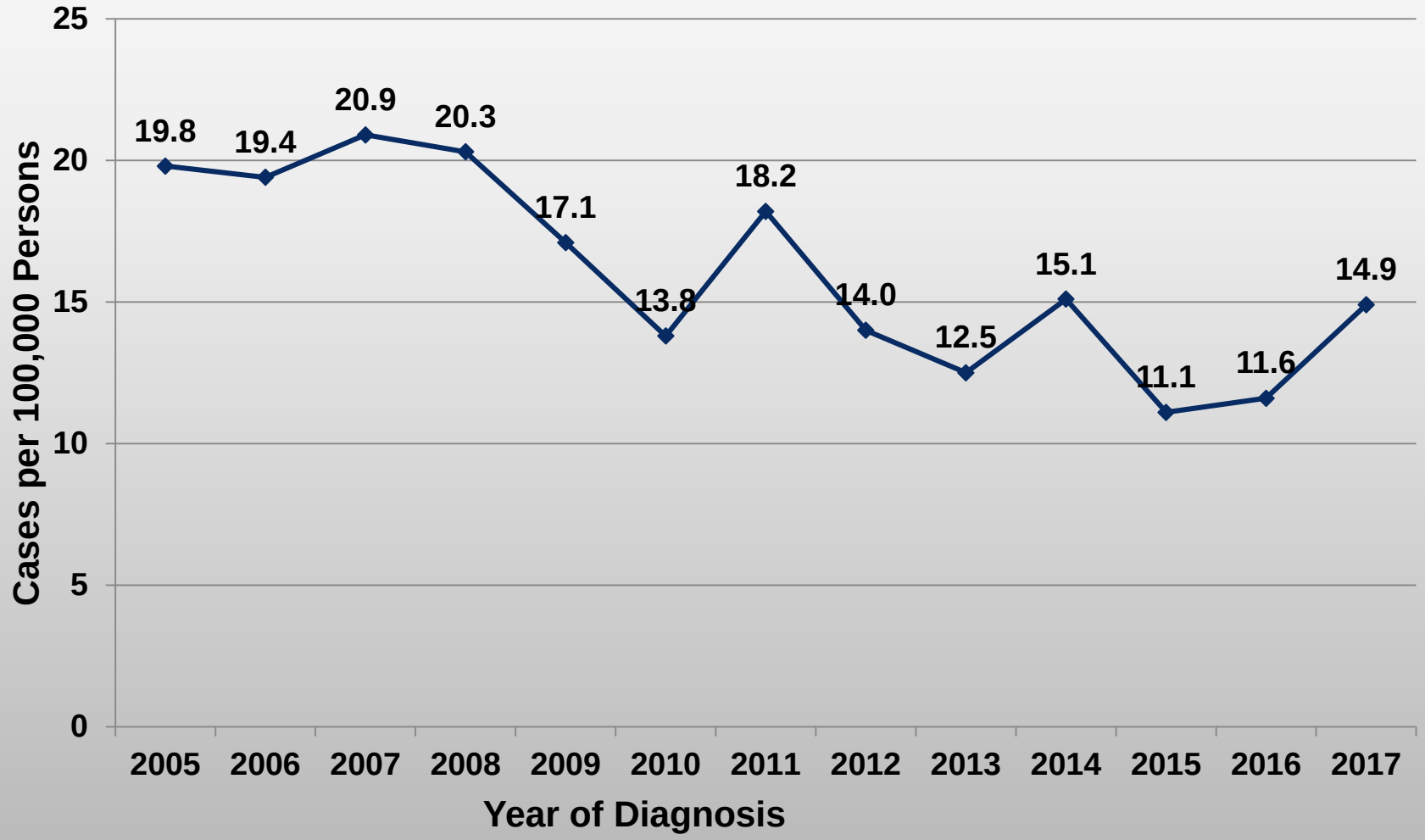
Invasive MRSA Surveillance Methods

- 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, 2004-2017



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

Incidence of Invasive MRSA Disease by Gender and Age Group, Ramsey and Hennepin Counties, Minnesota, 2017

Characteristic	Cases (n=249)	Incidence per 100,000 persons
Gender		
Male	142	17.5
Female	107	12.6
Age Group		
Under 1 yr.	1	0.9
1-4 yrs.	1	0.9
5-9 yrs.	0	0
10-19 yrs.	4	1.9
20-29 yrs.	10	3.7
30-39 yrs.	23	10.1
40-49 yrs.	21	9.1
50-59 yrs.	44	19.2
60-69 yrs.	50	34.9
70+ yrs.	95	69.9

Invasive MRSA Disease Cases and Deaths by Age Group, Ramsey and Hennepin Counties, Minnesota, 2017

Age Group	Cases	Deaths	% Died
Under 1 yr.	1	1	100%
1-4 yrs.	1	0	0%
5-9 yrs.	0	0	0%
10-19 yrs.	4	0	0%
20-29 yrs.	10	0	0%
30-39 yrs.	23	1	4.3%
40-49 yrs.	21	2	9.5%
50-59 yrs.	44	3	6.8%
60-69 yrs.	50	8	16.0%
70+ yrs.	95	18	18.9%
Total	249	33	13.3%

Incidence of Invasive MRSA Disease by Case Type, Ramsey and Hennepin Counties, Minnesota, 2017

Case Type	Cases	Incidence per 100,000 persons
Healthcare-associated	192	16.8
Community-associated	57	3.4

- 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.

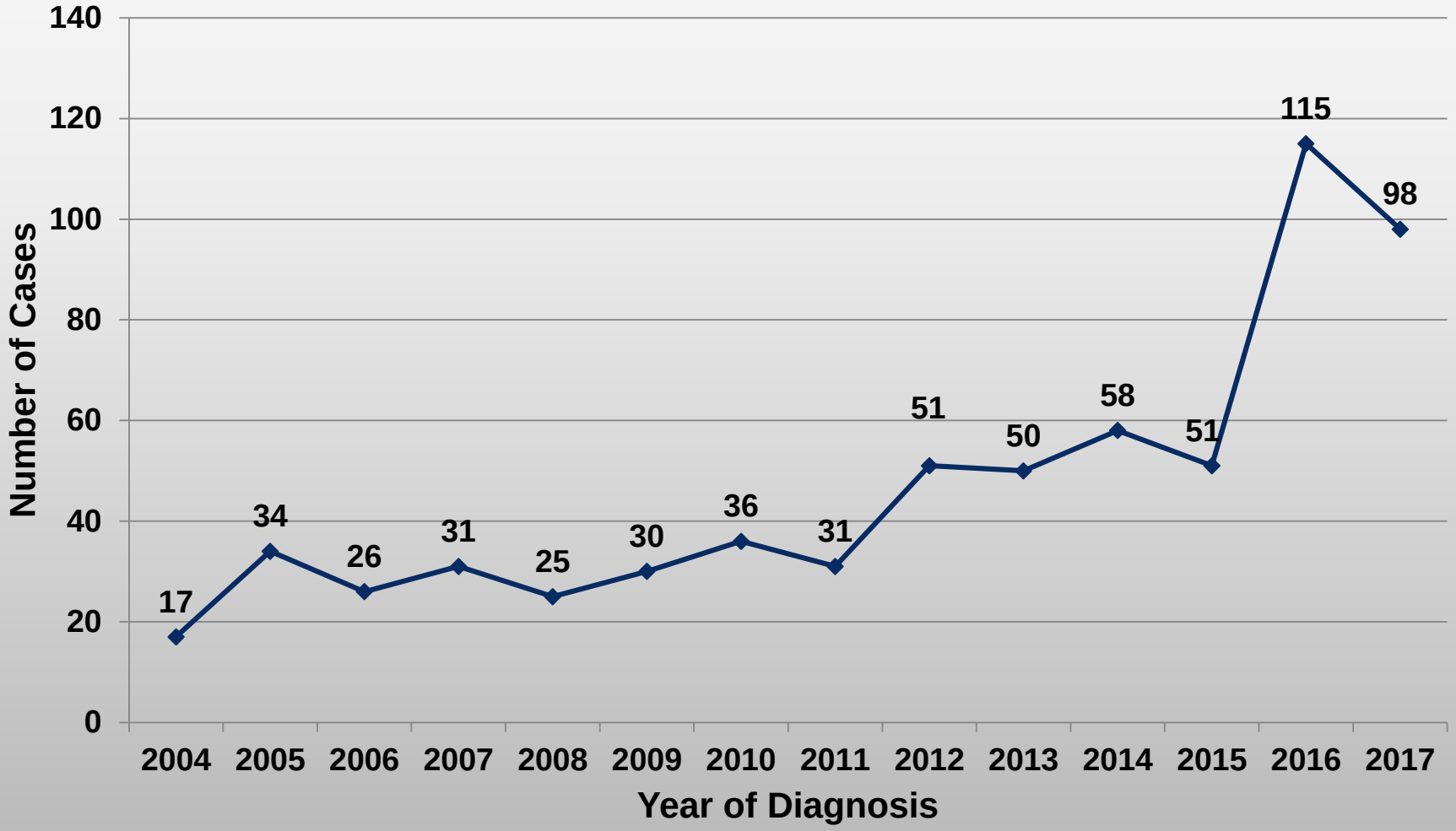
Invasive MRSA Disease by Type of Infection, Ramsey and Hennepin Counties, Minnesota, 2017

Type of Infection*	Cases
Bacteremia (blood)	192
Without another source of infection	74
With another source of infection	118
Septic arthritis (joint)	31
Pneumonia (lung)	38
Osteomyelitis (bone)	30
Cellulitis/skin abscess (skin)	30
Endocarditis (heart)	19
More than one infection type	136
Other infection**	89

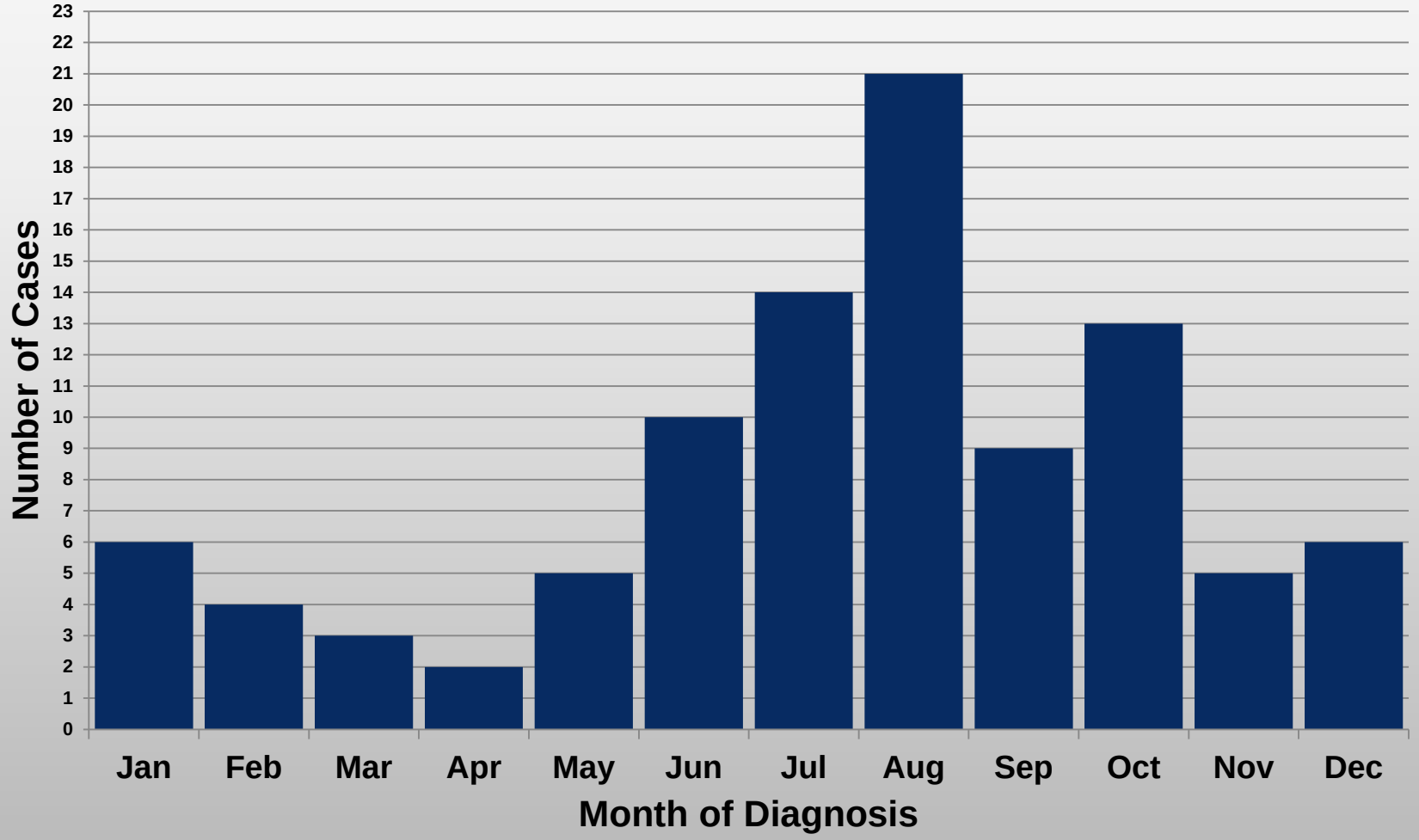
* Cases may have had more than 1 type of infections

** 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 Legionnaires' Disease Cases By Year, Minnesota, 2004 - 2017



Confirmed Legionnaires' Disease Cases by Month of Diagnosis, Minnesota, 2017



Confirmed Legionnaires' Disease Cases by Age Group and Gender, Minnesota, 2017

Age Group	Male	Female	Total
18-29 yrs.	1	1	2
30-39 yrs.	4	3	7
40-49 yrs.	7	1	8
50-59 yrs.	17	12	29
60-69 yrs.	25	2	27
70+ yrs.	19	6	25
Total	73 (74%)	25 (26%)	98