

INVASIVE BACTERIAL DISEASE SURVEILLANCE REPORT, 2010

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

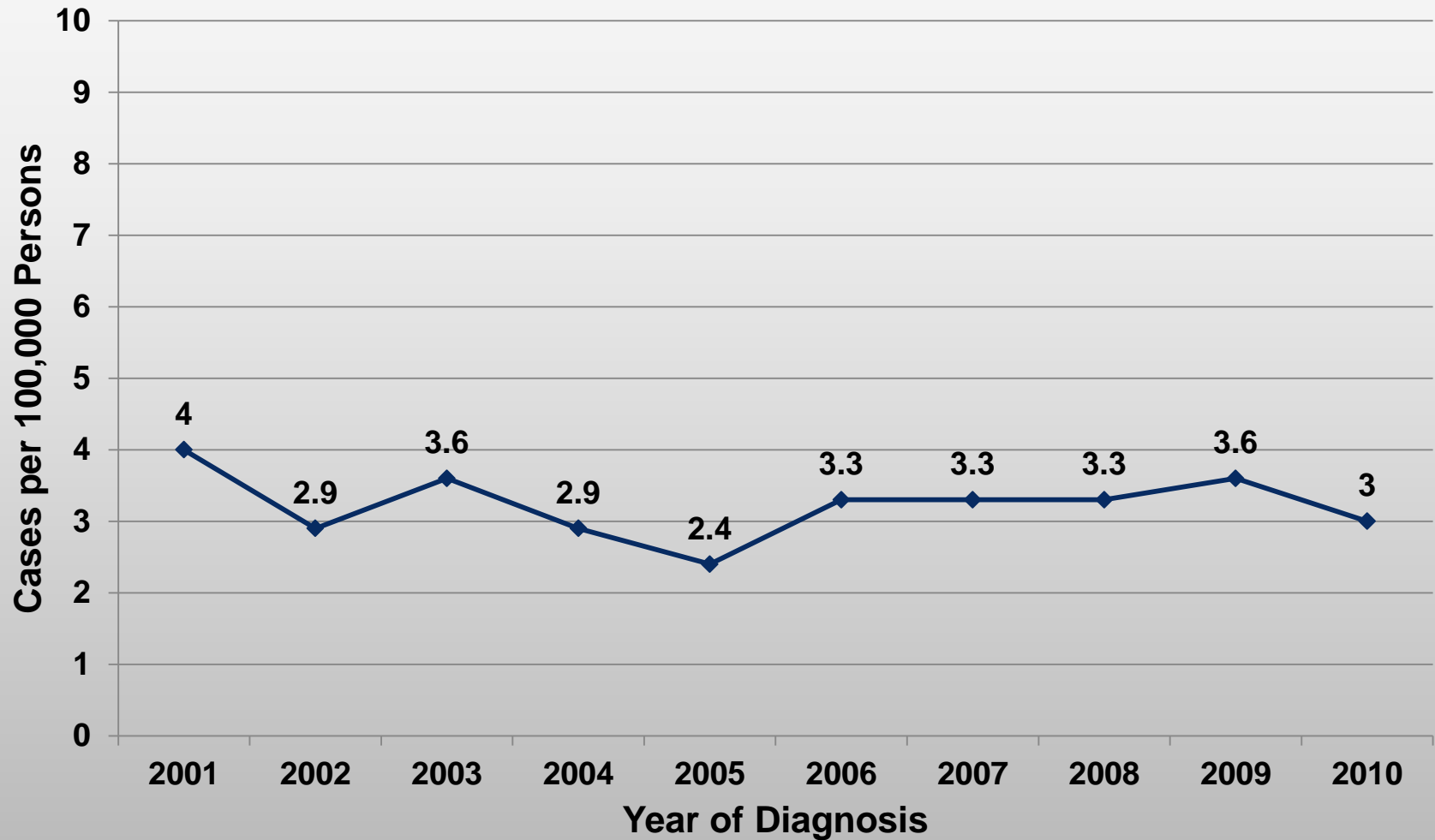
Surveillance Methods

- 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). *Haemophilus influenzae*.
- 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 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 41 million.

Incidence of Invasive Group A Streptococcal Disease, Minnesota, 2001-2010



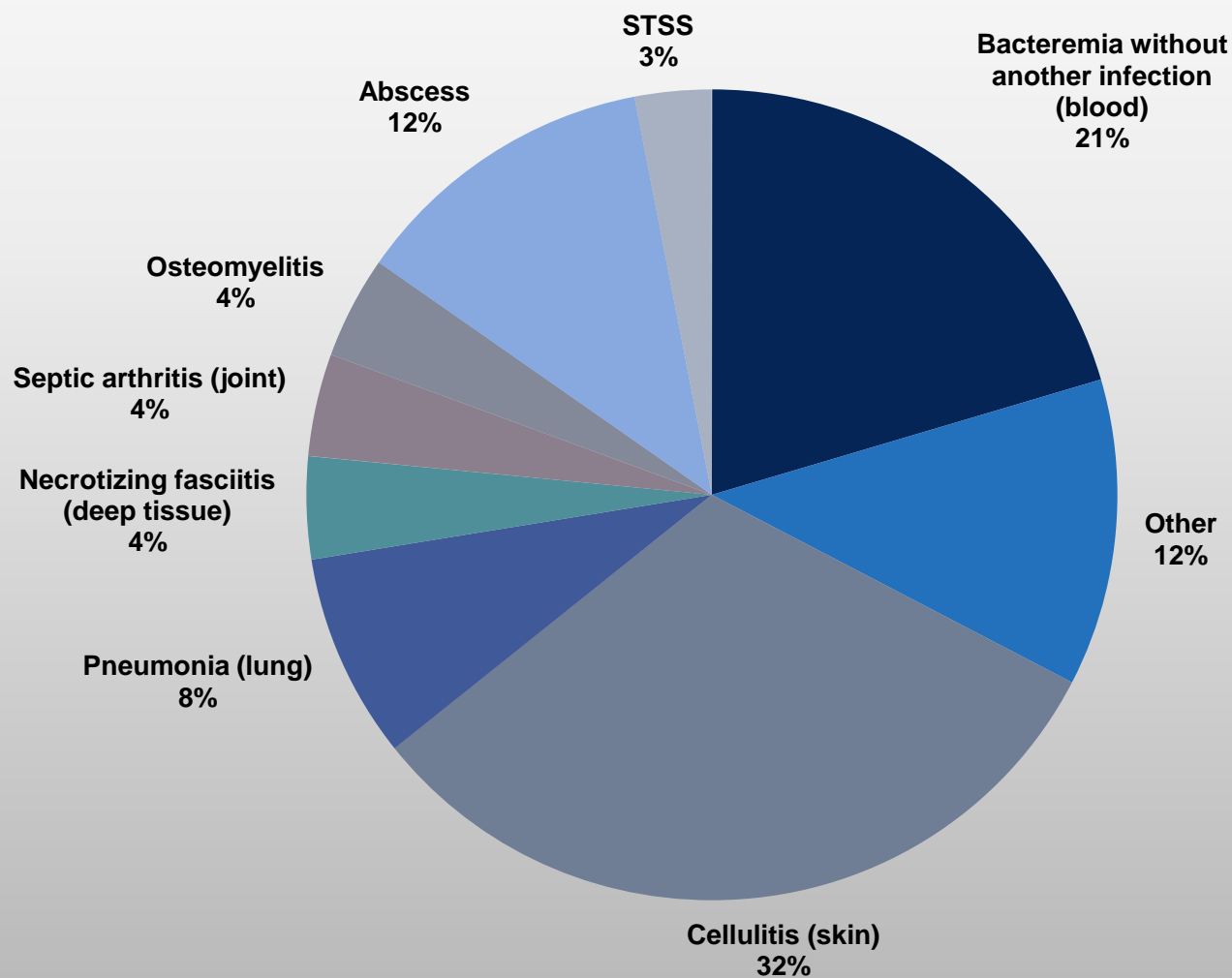
Incidence of Invasive Group A Streptococcal Disease by Gender and Age Group, Minnesota, 2010

Characteristic	Cases	Incidence per 100,000 persons
Gender		
Male	84	3.2
Female	74	2.8
Age Group		
Under 1 yr.	2	2.7
1-4 yrs.	10	3.4
5-9 yrs.	9	2.6
10-19 yrs.	4	0.6
20-29 yrs.	8	1.1
30-39 yrs.	17	2.6
40-49 yrs.	19	2.5
50-59 yrs.	23	3.1
60-69 yrs.	20	4.3
70+ yrs.	46	9.7

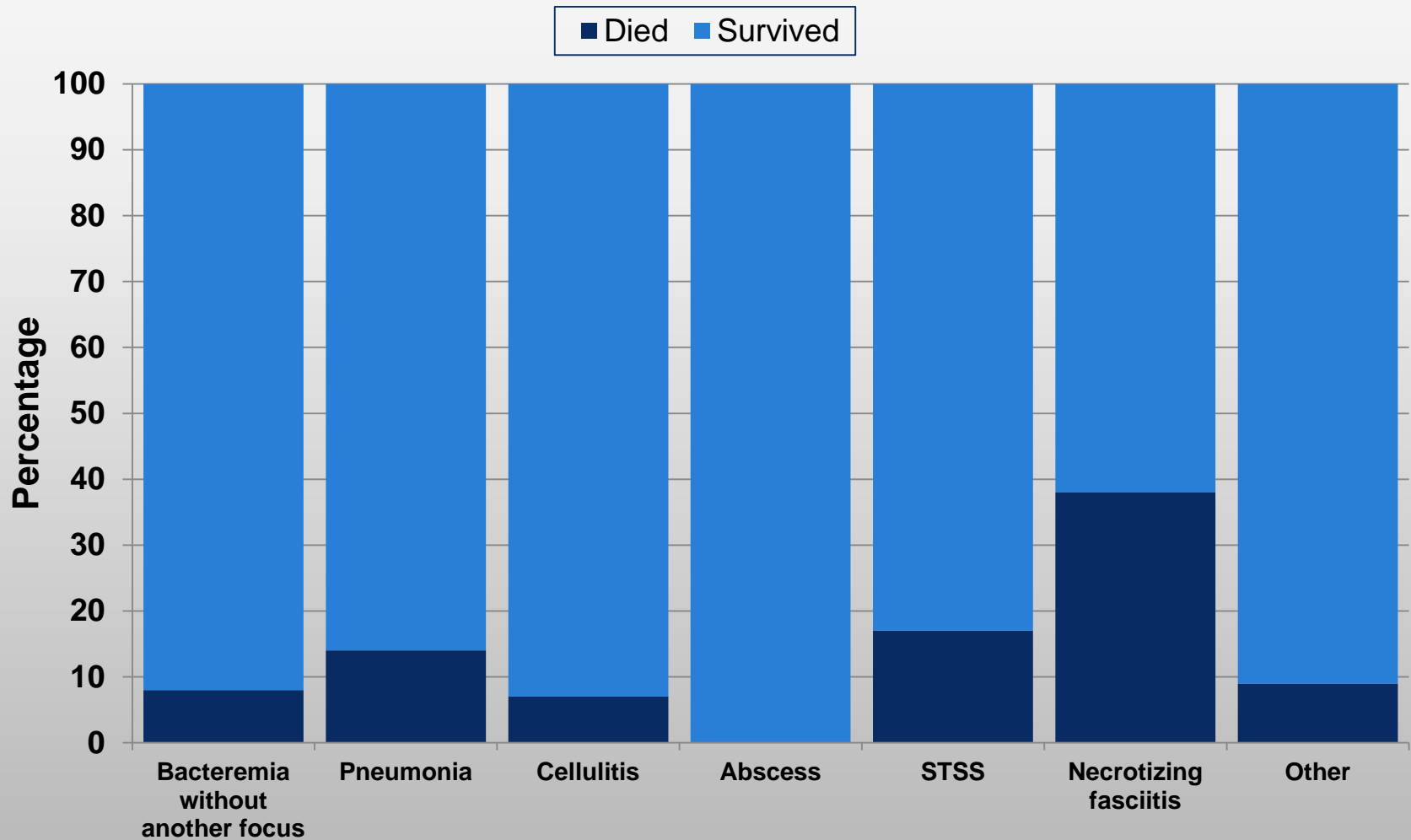
Invasive Group A Streptococcal Disease Cases and Deaths by Age Group, Minnesota, 2010

Age Group	Cases	Deaths	% Died
Under 1 yr.	2	0	0%
1-4 yrs.	10	0	0%
5-9 yrs.	9	0	0%
10-19 yrs.	4	1	25%
20-29 yrs.	8	0	0%
30-39 yrs.	17	0	0%
40-49 yrs.	19	1	5%
50-59 yrs.	23	3	13%
60-69 yrs.	20	2	10%
70+ yrs.	46	6	13%
Total	158	13	8%

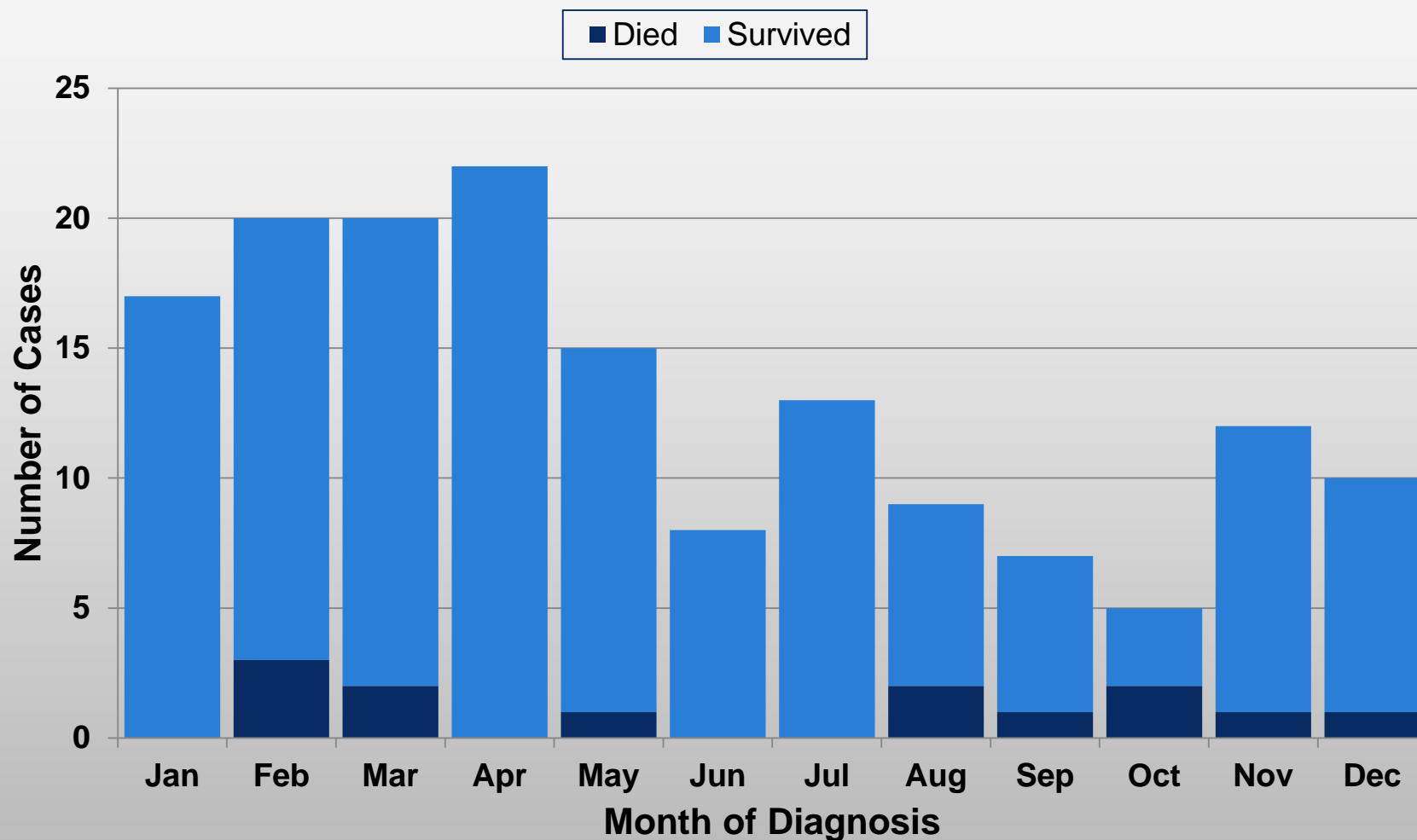
Invasive Group A Streptococcal Disease by Type of Infection/Syndrome, Minnesota, 2010



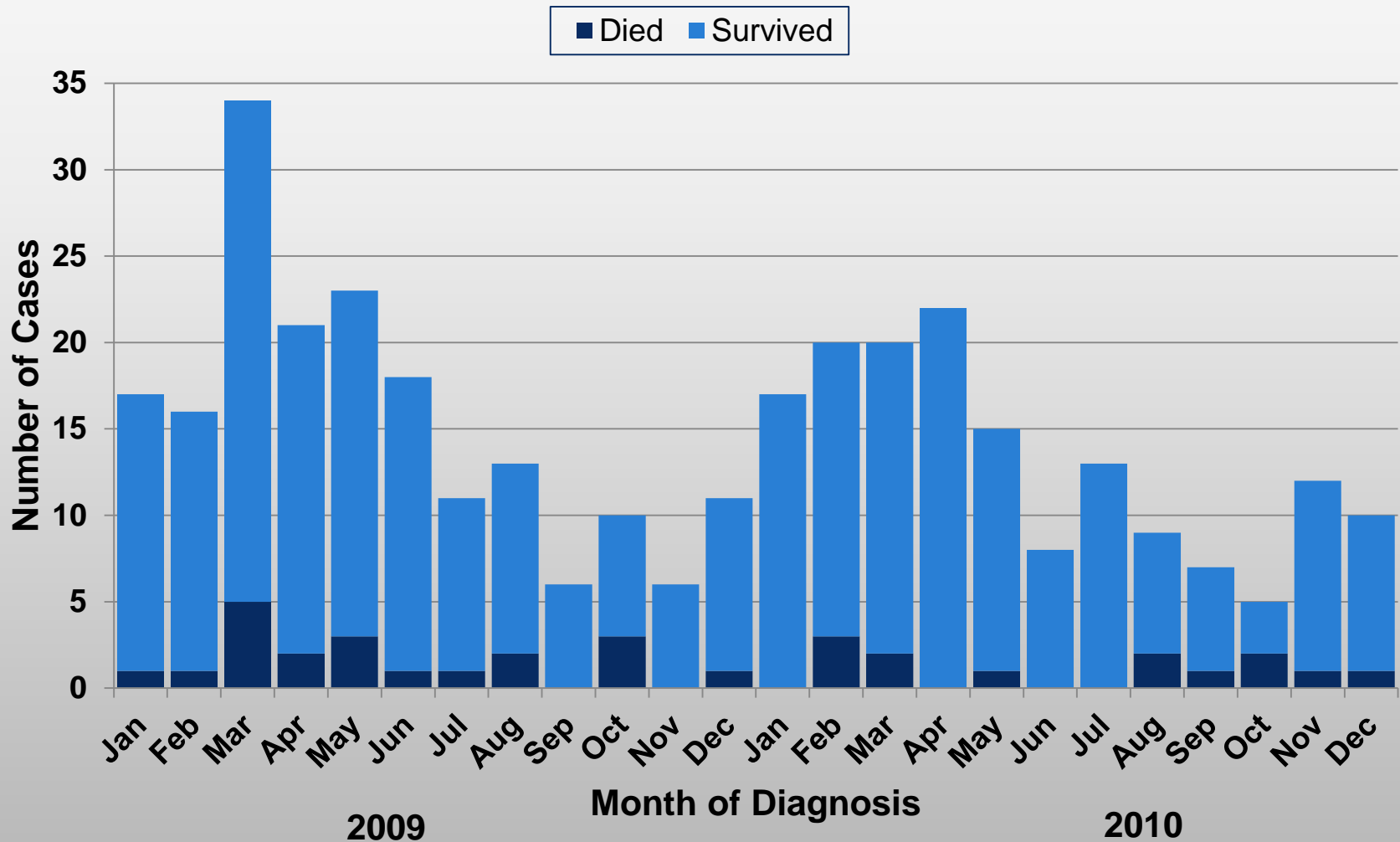
Outcome of Invasive Group A Streptococcal Disease by Type of Infection/Syndrome, Minnesota, 2010



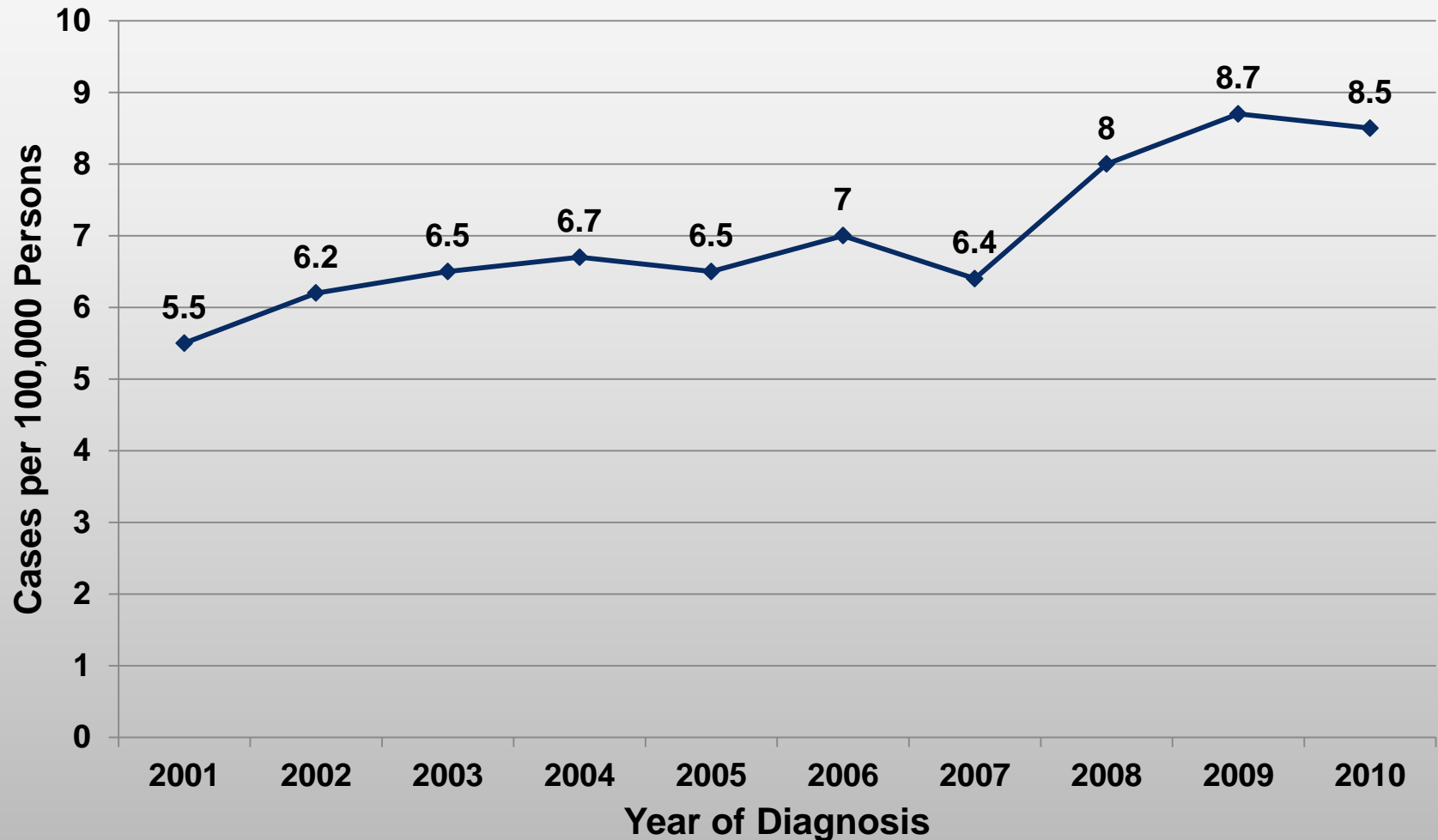
Cases of Invasive Group A Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2010



Cases of Invasive Group A Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2009-2010



Incidence of Invasive Group B Streptococcal Disease, Minnesota, 2001-2010



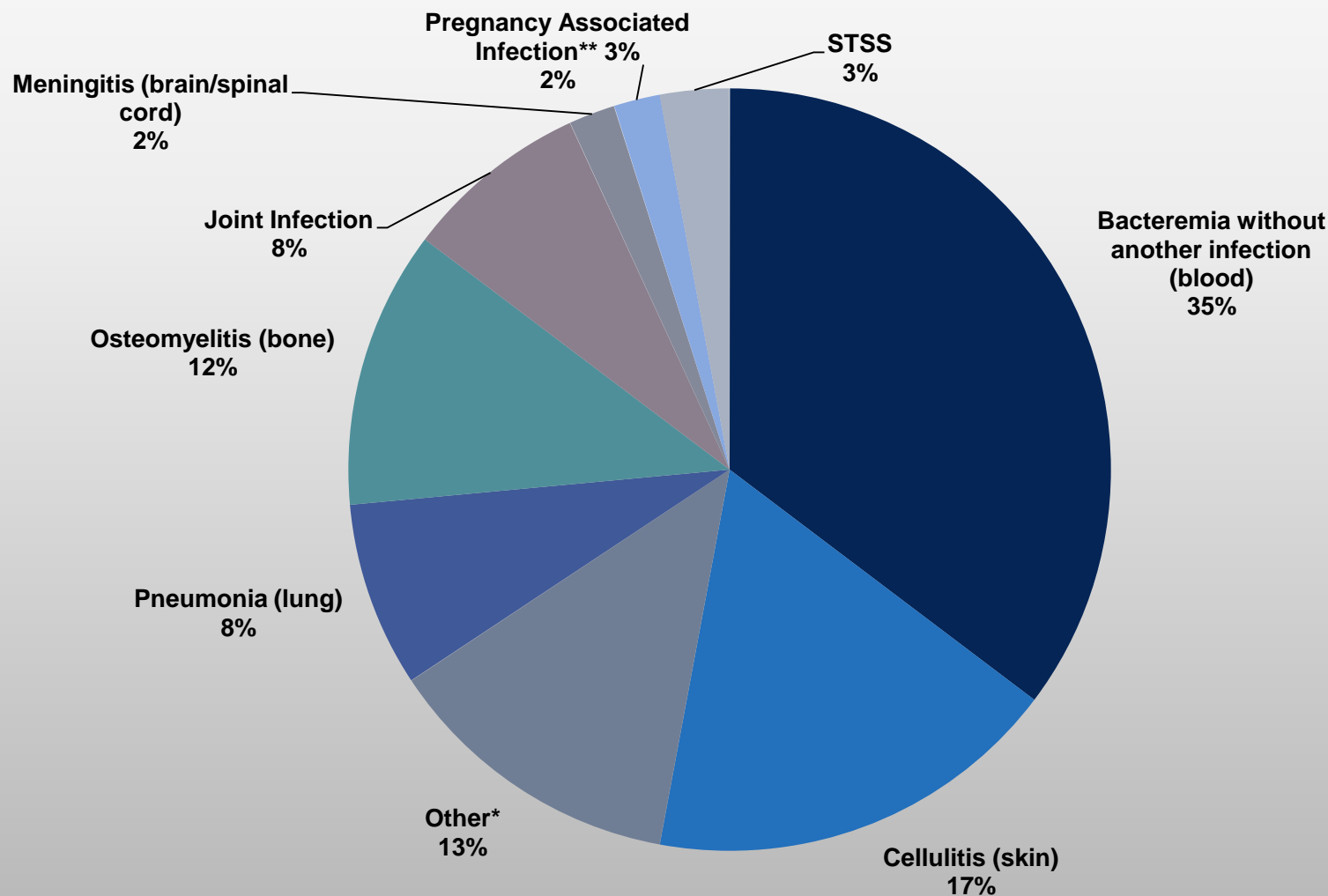
Incidence of Invasive Group B Streptococcal Disease by Gender and Age Group, Minnesota, 2010

Characteristic	Cases (n=448)	Incidence per 100,000 persons
Gender		
Male	242	9.2
Female	206	7.8
Age Group		
Under 1 yr.	47	64.4
1-4 yrs.	0	0
5-9 yrs.	0	0
10-19 yrs.	2	0.3
20-29 yrs.	16	2.1
30-39 yrs.	31	4.7
40-49 yrs.	33	4.3
50-59 yrs.	94	12.8
60-69 yrs.	81	17.6
70+ yrs.	144	30.4

Invasive Group B Streptococcal Disease Cases and Deaths by Age Group, Minnesota, 2010

Age Group	Cases	Deaths	% Died
Under 1 yr.	47	2	4%
1-4 yrs.	0	0	--
5-9 yrs.	0	0	--
10-19 yrs.	2	0	0%
20-29 yrs.	16	0	0%
30-39 yrs.	31	1	3%
40-49 yrs.	33	1	3%
50-59 yrs.	94	3	3%
60-69 yrs.	81	4	5%
70+ yrs.	144	13	9%
Total	448	24	5%

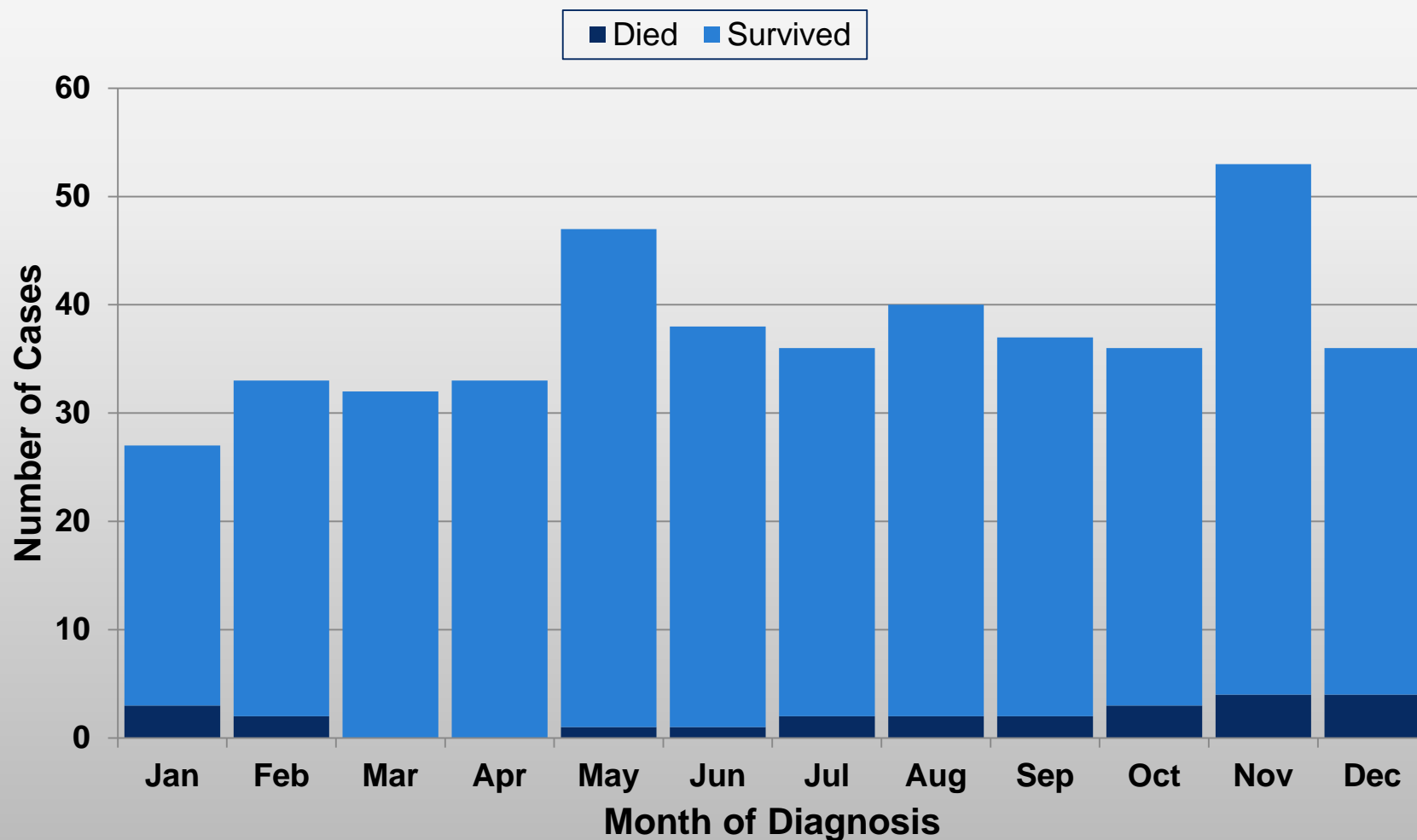
Invasive Group B Streptococcal Disease by Type of Infection/Syndrome, Minnesota 2010



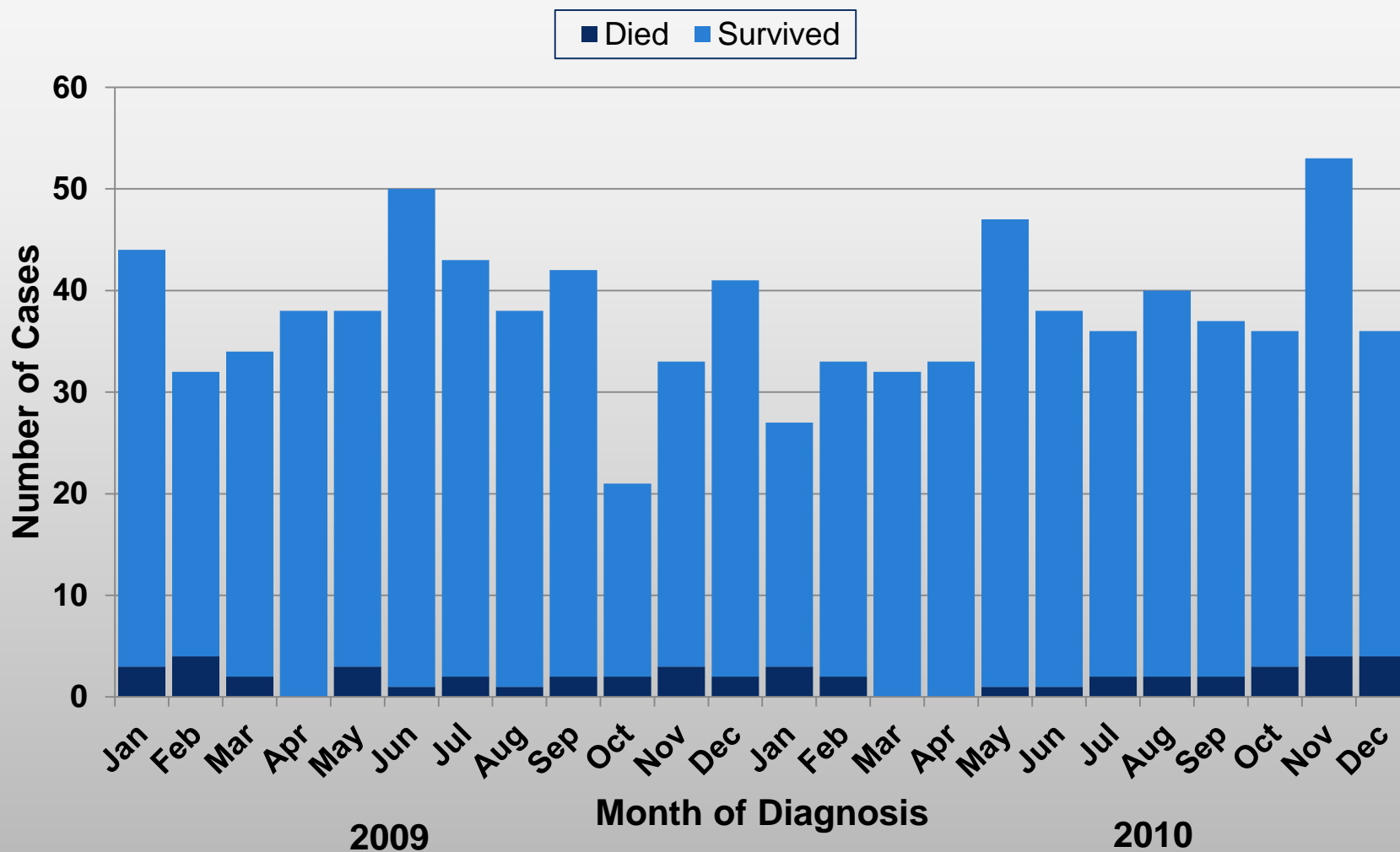
This chart represents 470 infections among 448 cases. (Some cases had >1 infection.)

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

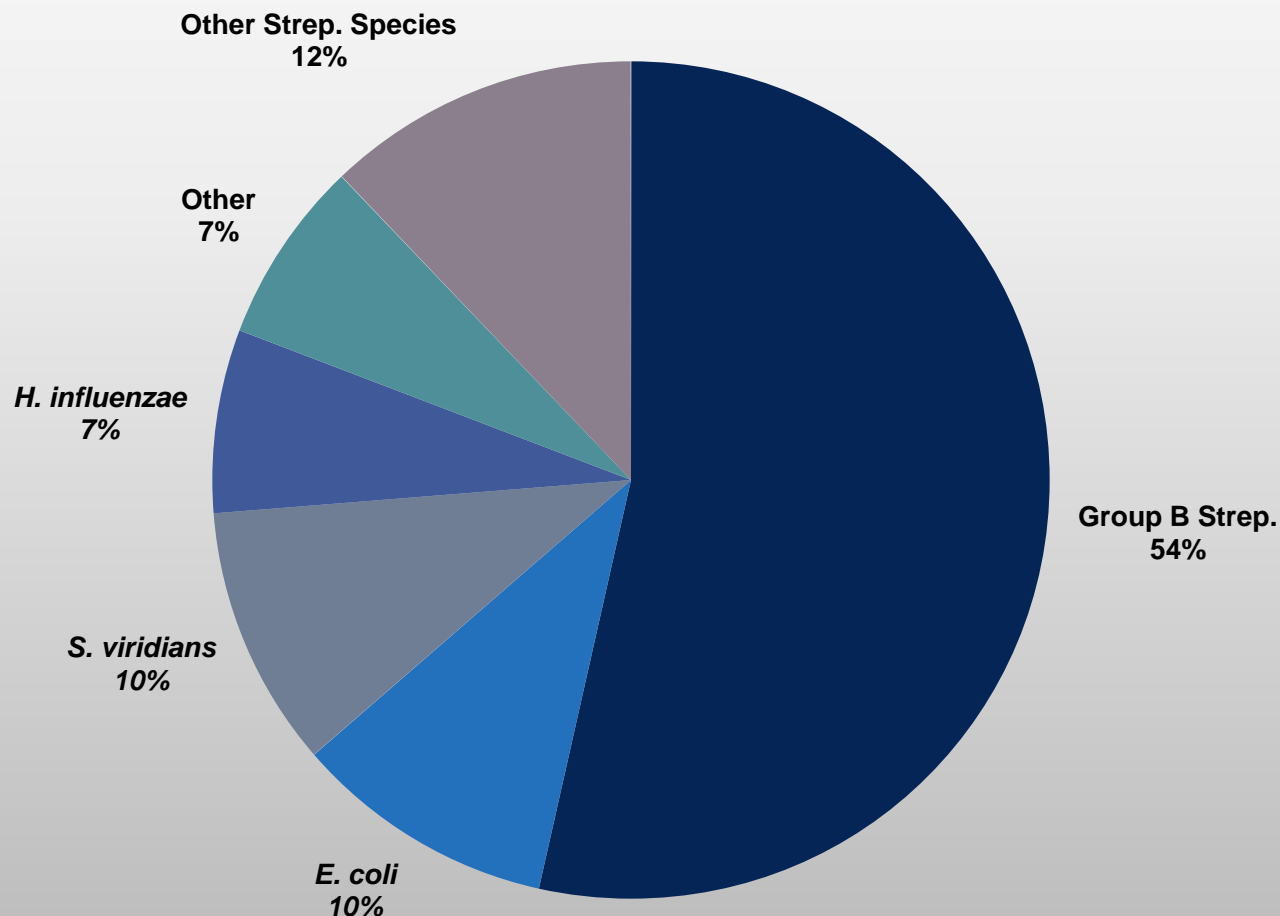
Cases of Invasive Group B Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2010



Cases of Invasive Group B Streptococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2009-2010

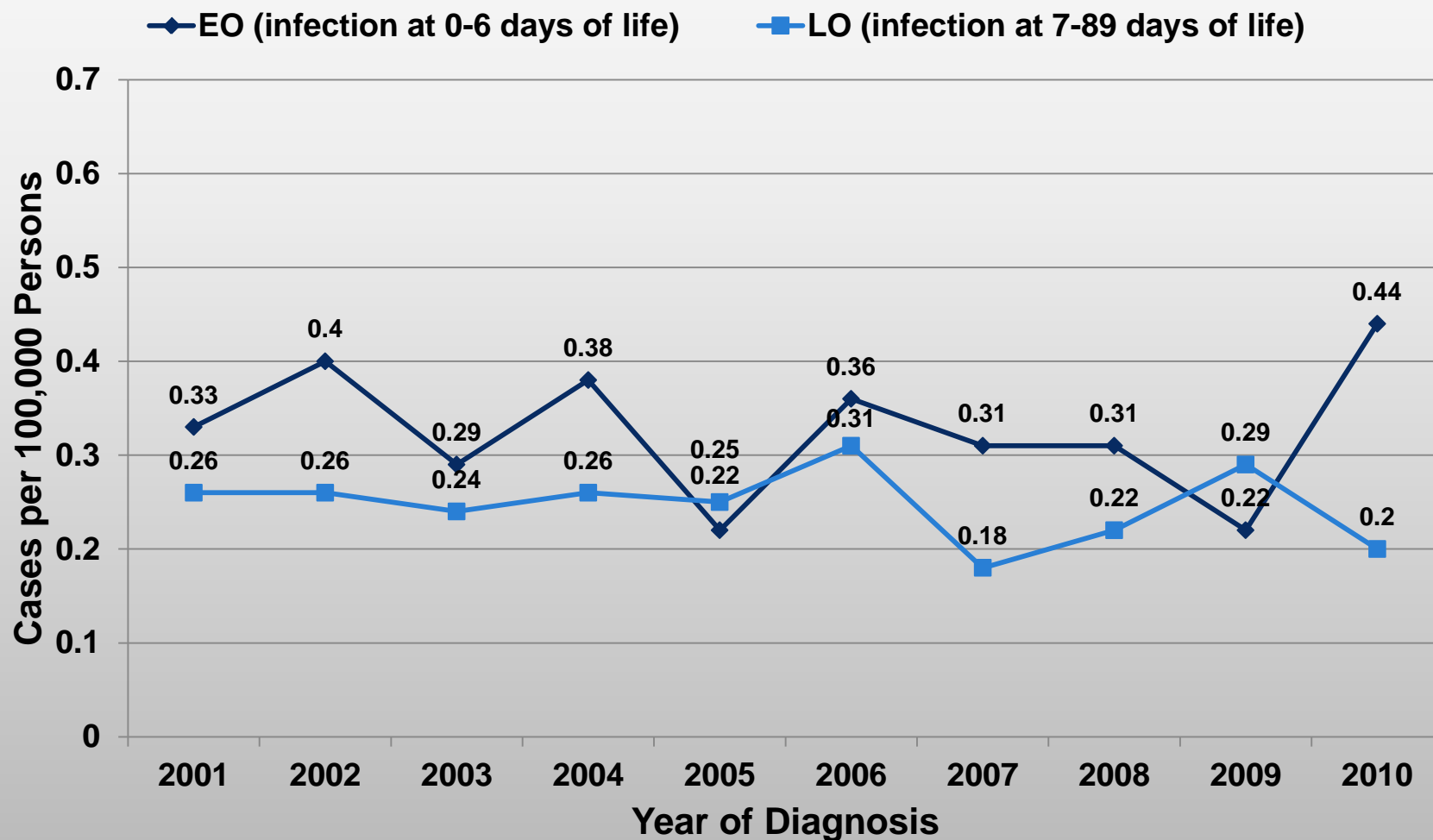


Invasive Neonatal Sepsis Disease in First Six Days of Life by Pathogen, Minnesota, 2010*



* This chart represents 58 cases.

Incidence of Invasive Early and Late-Onset Group B Streptococcal Disease, Minnesota, 2001-2010

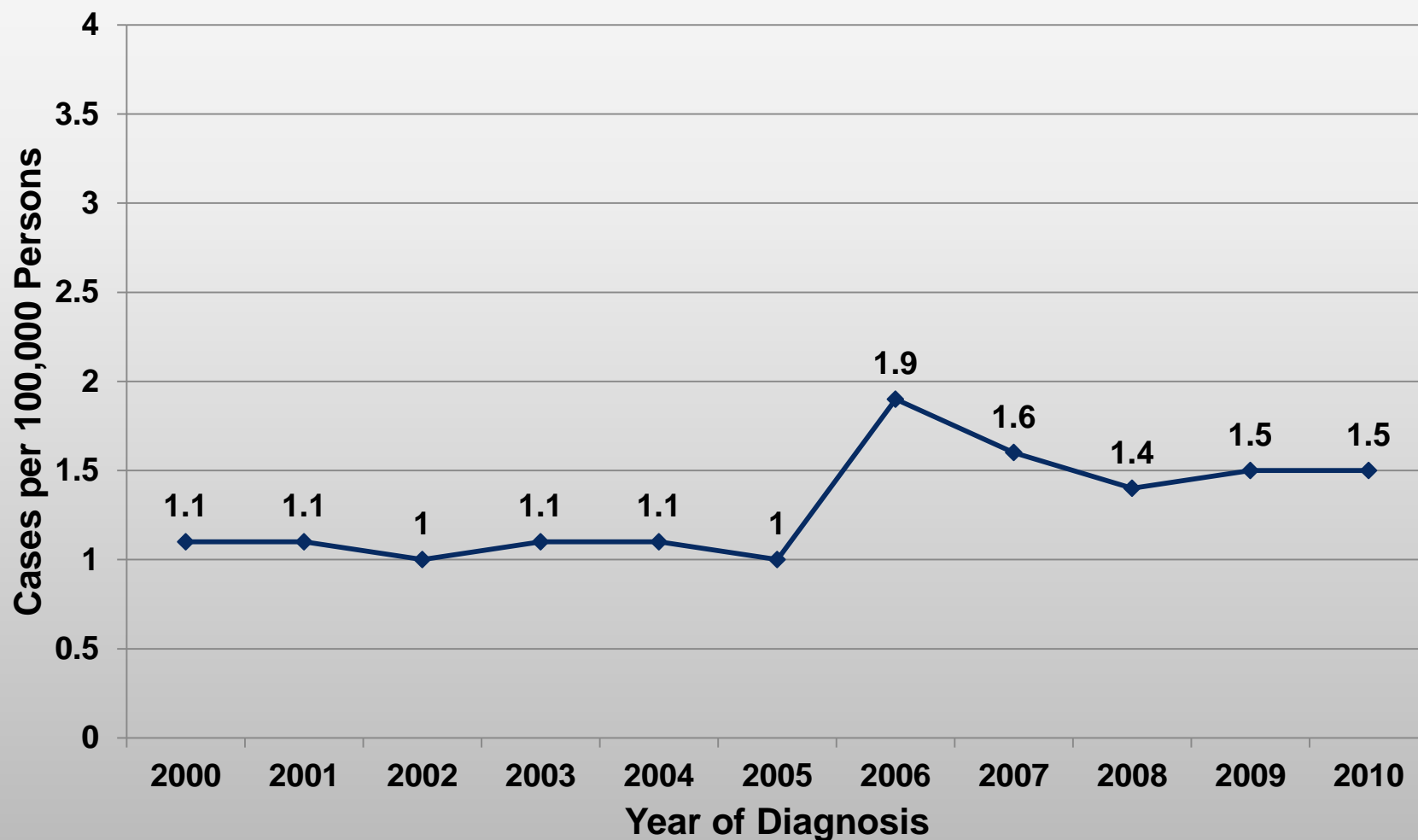


Early-Onset* Group B Streptococcal Disease by Race, Gestational Age and Outcome, Minnesota, 2010

Characteristic	Cases (n=31)	Percent
Race		
White	22	71%
Black	4	13%
Other	5	16%
Gestational Age		
Under 32 weeks	4	13%
32-37 weeks	4	13%
Full-term	22	71%
Unknown	1	3%
Outcome		
Died	1	3%
Survived	30	97%

* onset 0-6 days of life

Incidence of Invasive *Haemophilus influenzae* Disease, Minnesota, 2000-2010



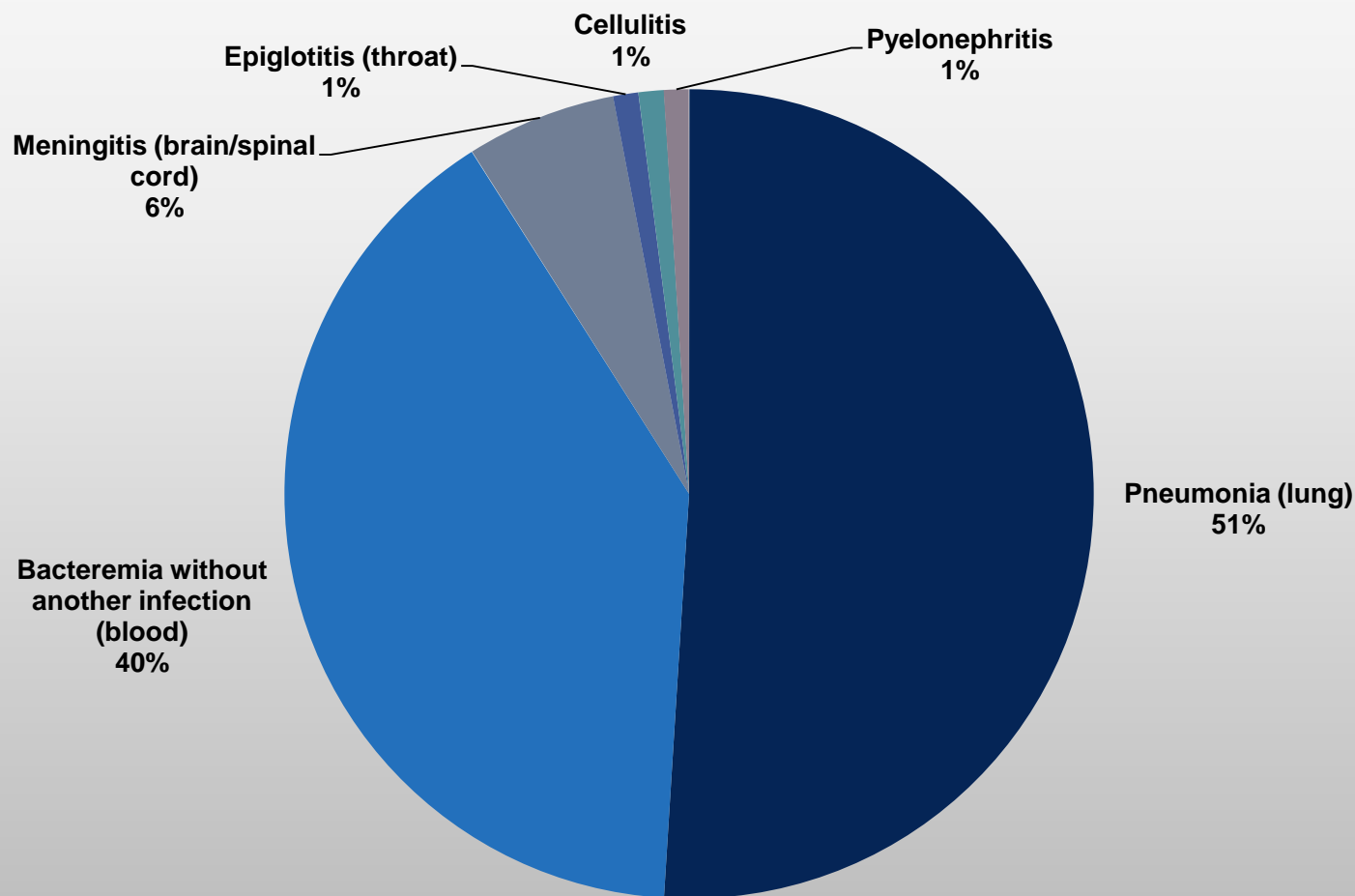
Incidence of Invasive *Haemophilus influenzae* Disease by Gender and Age Group, Minnesota, 2010

Characteristic	Cases	Incidence per 100,000 persons
Gender		
Male	34	1.30
Female	47	1.78
Age Group		
Under 1 yr.	5	6.85
1-4 yrs.	4	1.37
5-9 yrs.	0	--
10-19 yrs.	5	0.71
20-29 yrs.	1	0.13
30-39 yrs.	2	0.30
40-49 yrs.	6	0.77
50-59 yrs.	3	0.41
60-69 yrs.	11	2.39
70+ yrs.	44	9.28

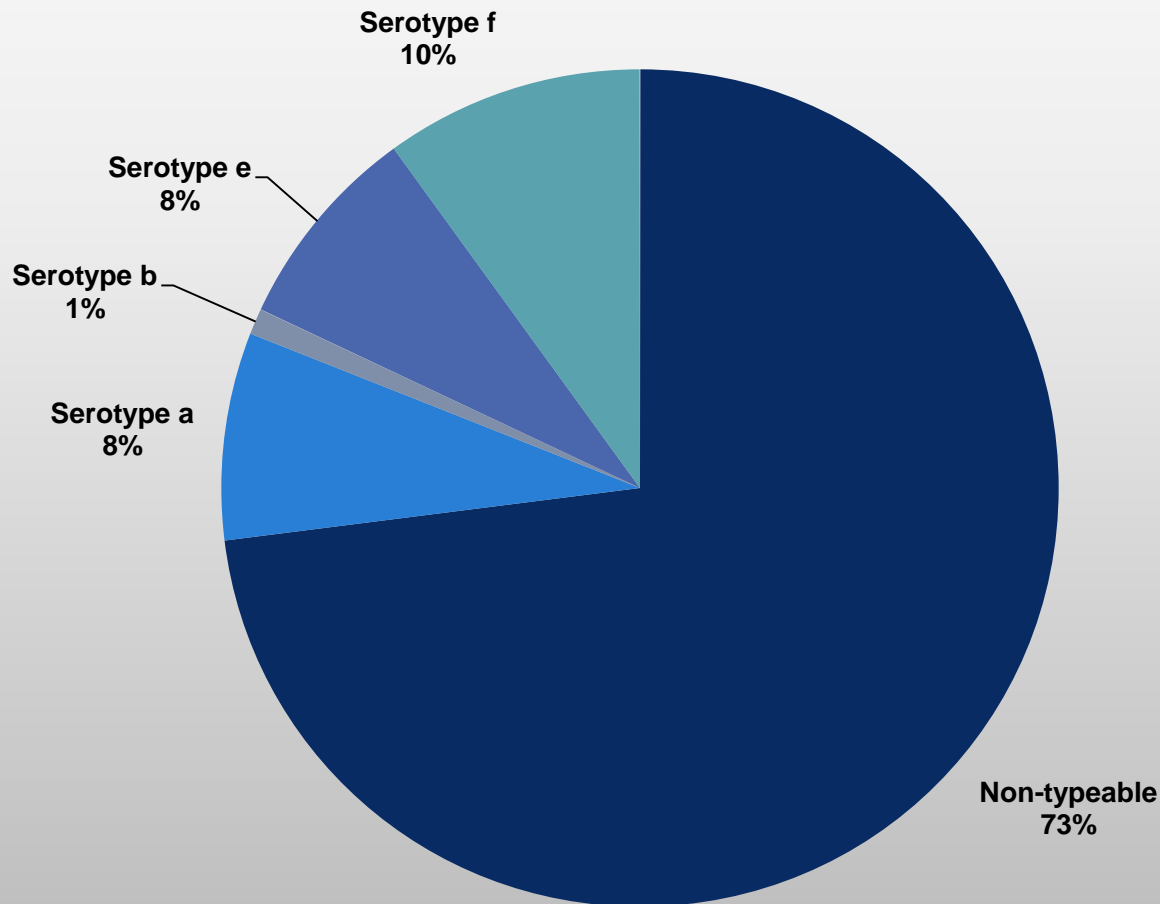
Invasive *Haemophilus influenzae* Disease Cases and Deaths by Age Group, Minnesota, 2010

Age Group	Cases	Deaths	% Died
Under 1 yr.	5	0	0%
1-4 yrs.	4	0	0%
5-9 yrs.	0	0	0%
10-19 yrs.	5	0	0%
20-29 yrs.	1	1	100%
30-39 yrs.	2	0	0%
40-49 yrs.	6	0	0%
50-59 yrs.	3	0	0%
60-69 yrs.	11	1	9%
70+ yrs.	44	9	21%
Total	81	11	14%

Invasive *Haemophilus influenzae* Disease by Type of Infection/Syndrome, Minnesota 2010

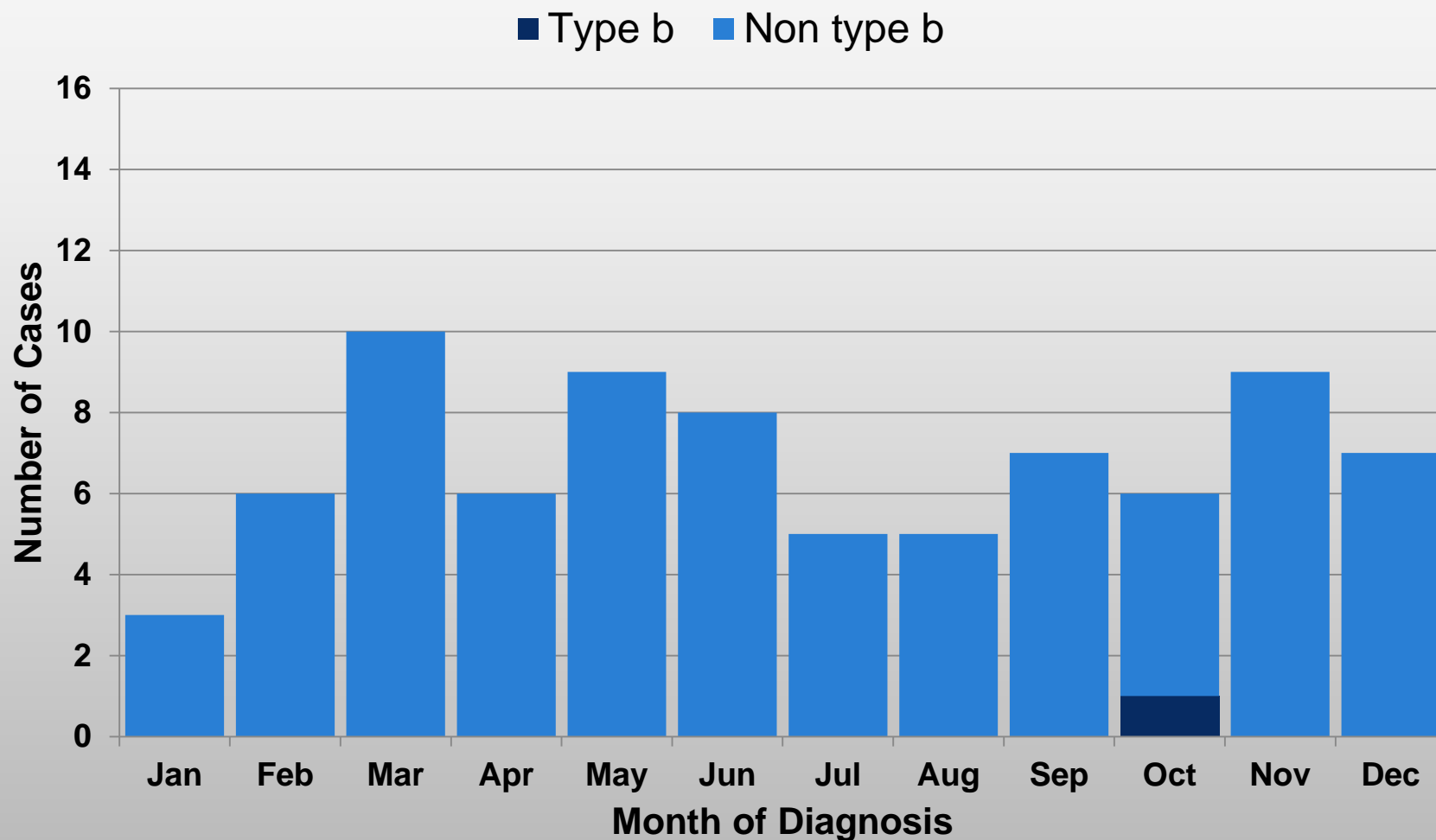


Invasive *Haemophilus influenzae* Disease by Serotype, Minnesota 2010 (n=78*)

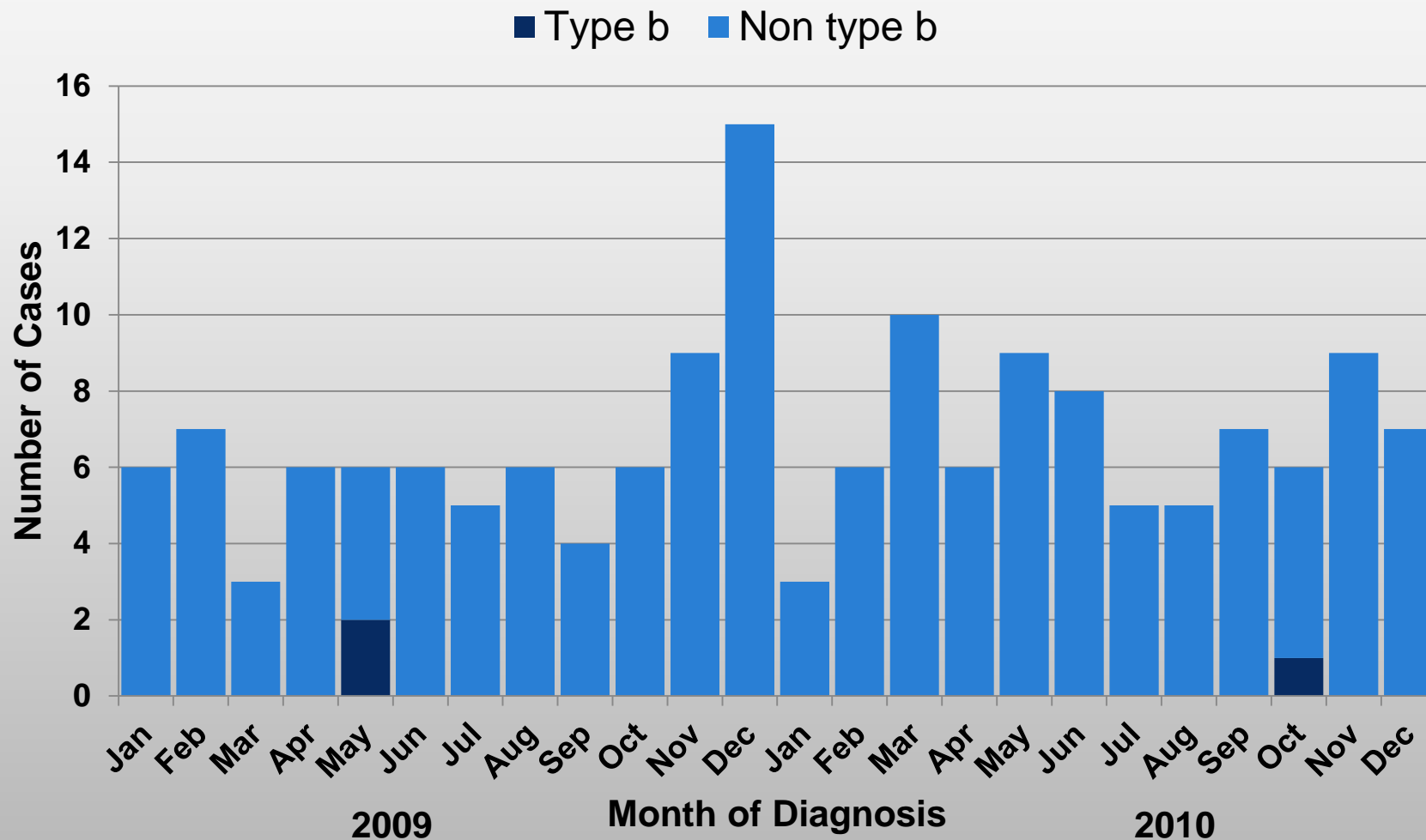


* 3 case isolates not available for serotyping

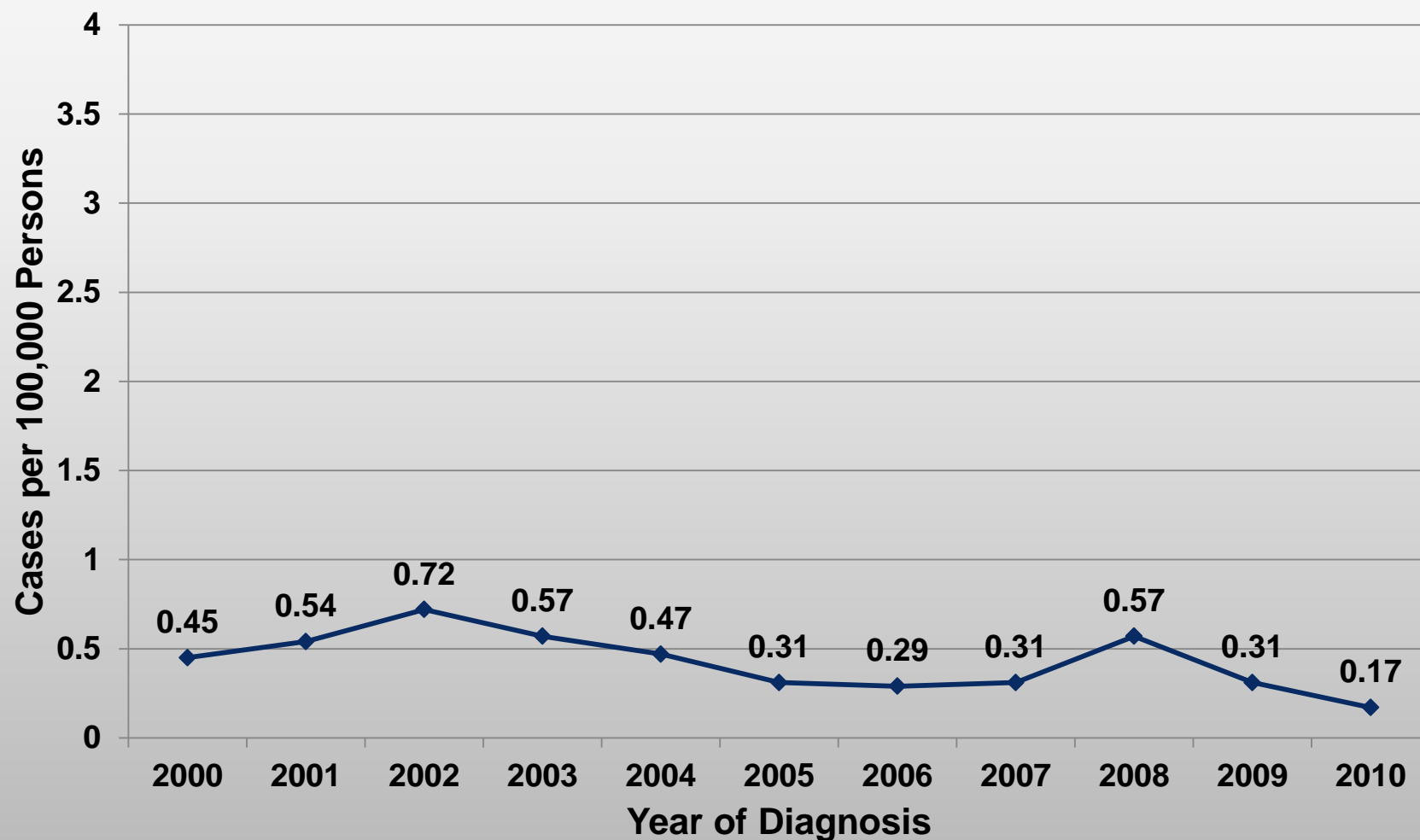
Cases of Invasive Haemophilus influenzae Disease by Month of Diagnosis, Serotype and Outcome, Minnesota, 2010



Cases of Invasive Haemophilus influenzae Disease by Month of Diagnosis and Serotype, Minnesota, 2009-2010



Incidence of Invasive *Neisseria meningitidis* Disease, Minnesota, 2000-2010



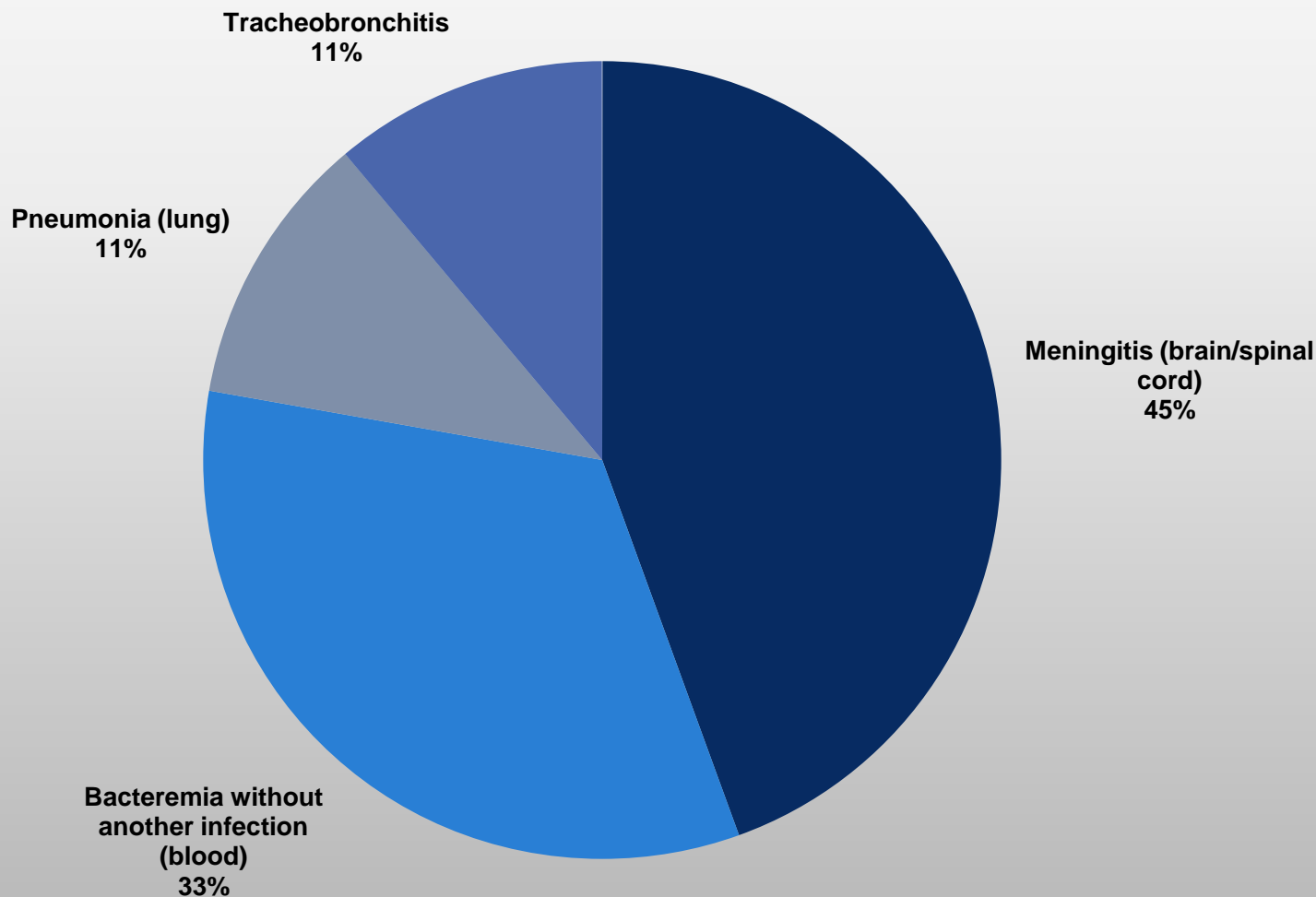
Incidence of Invasive *Neisseria meningitidis* Disease by Gender and Age Group, Minnesota, 2010

Characteristic	Cases (n=9)	Incidence per 100,000 persons
Gender		
Male	1	0.04
Female	8	0.30
Age Group		
Under 1 yr.	2	2.74
1-4 yrs.	1	0.34
5-9 yrs.	0	0
10-19 yrs.	0	0
20-29 yrs.	1	0.13
30-39 yrs.	0	0
40-49 yrs.	2	0.26
50-59 yrs.	0	0
60-69 yrs.	1	0.22
70+ yrs.	2	0.42

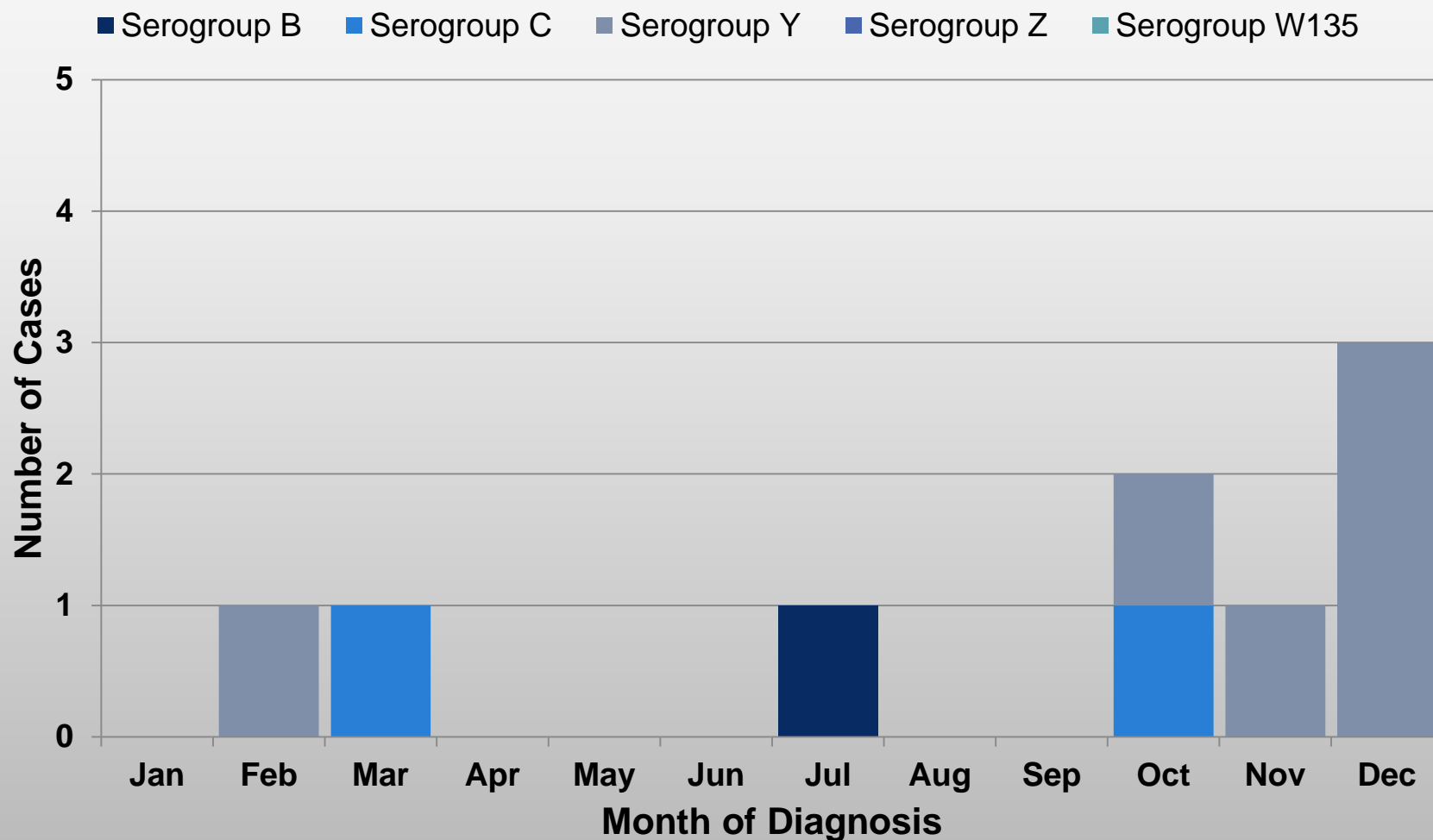
Invasive *Neisseria meningitidis* Disease Cases and Deaths by Age Group, Minnesota, 2010

Age Group	Cases	Deaths	% Died
Under 1 yr.	2	1	50%
1-4 yrs.	1	0	0%
5-9 yrs.	0	0	--
10-19 yrs.	0	0	--
20-29 yrs.	1	0	0%
30-39 yrs.	0	0	--
40-49 yrs.	2	0	0%
50-59 yrs.	0	0	--
60-69 yrs.	1	0	0%
70+ yrs.	2	0	0%
Total	9	1	11%

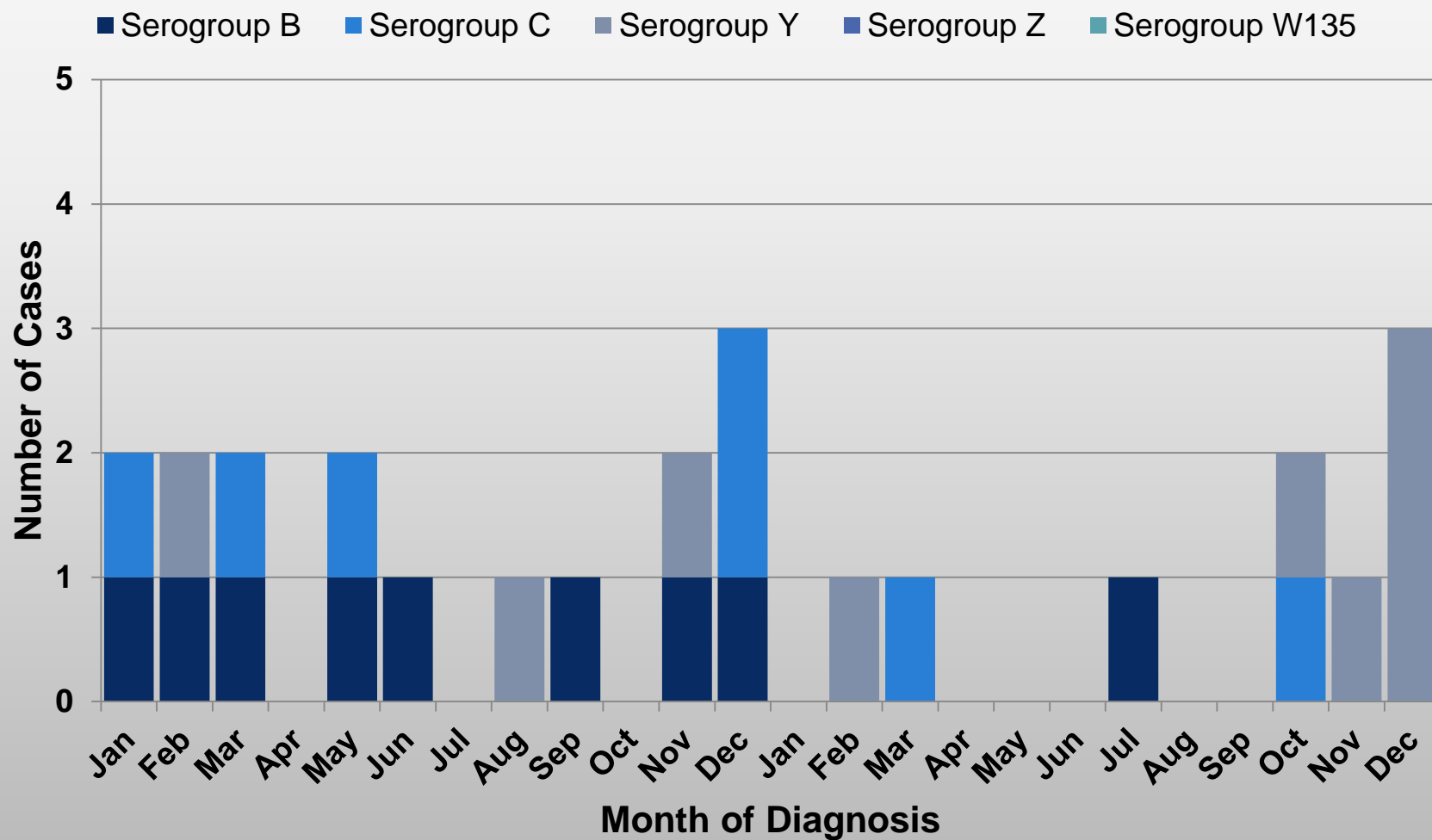
Invasive *Neisseria meningitidis* by Type of Infection/Syndrome, Minnesota 2010



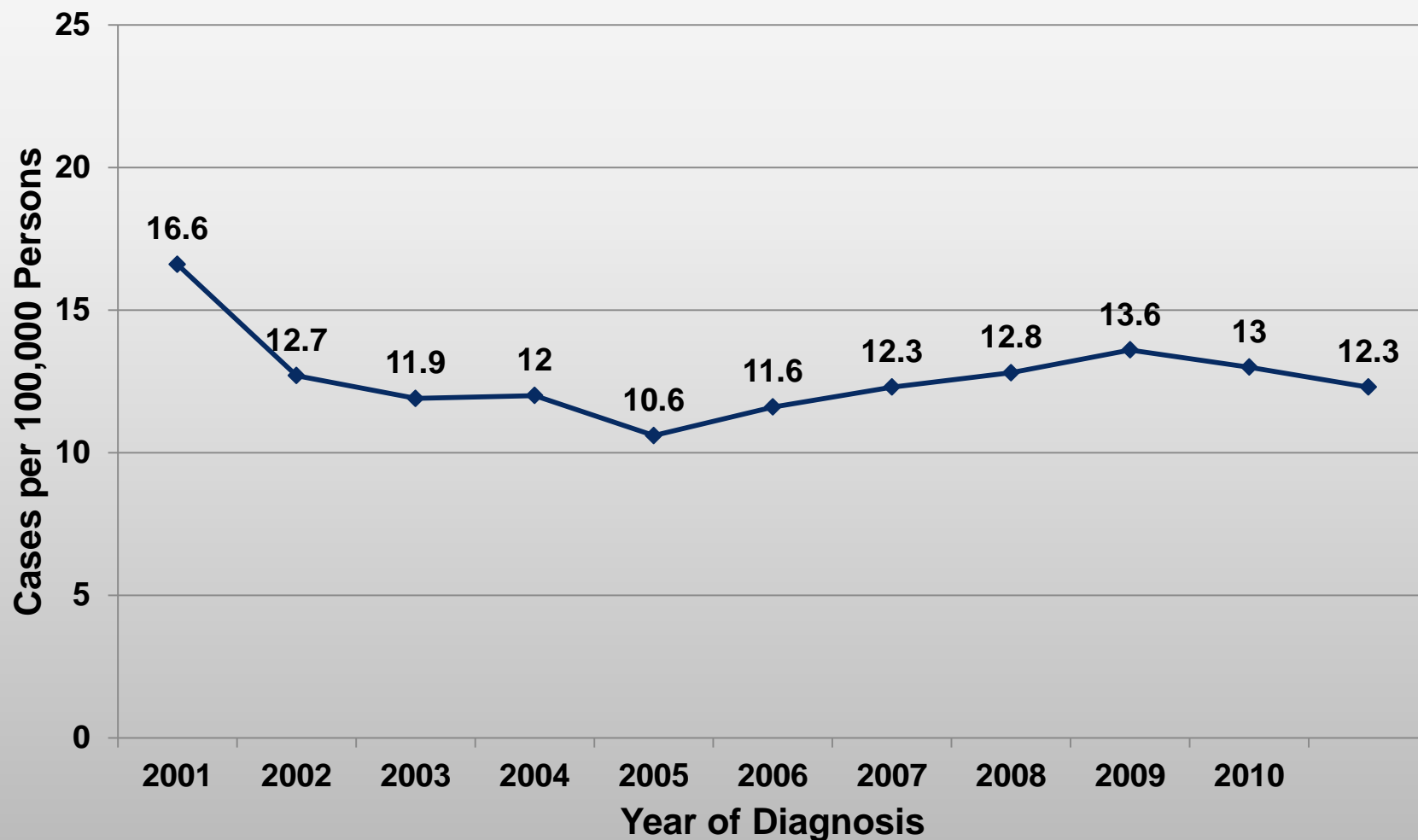
Cases of Invasive *Neisseria meningitidis* Disease by Month of Diagnosis and Serotype, Minnesota, 2010



Cases of Invasive *Neisseria meningitidis* Disease by Month of Diagnosis and Serotype, Minnesota, 2009-2010



Incidence of Invasive Pneumococcal Disease, Minneapolis-St. Paul Metropolitan Area, 2000-2001 and Minnesota, 2002-2010



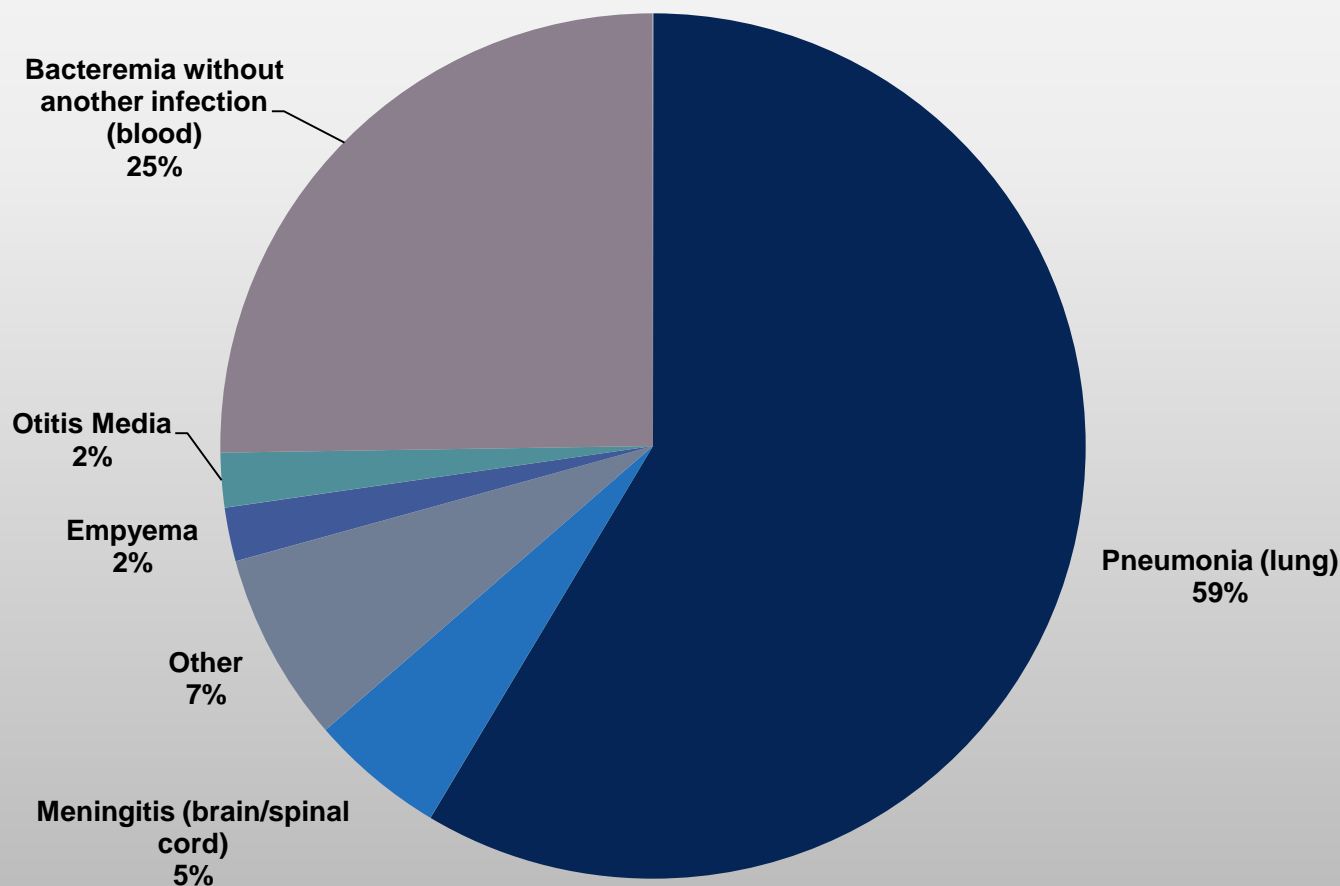
Incidence of Invasive Pneumococcal Disease by Gender and Age Group, Minnesota, 2010

Characteristic	Cases	Incidence per 100,000 persons
Gender		
Male	350	13.4
Female	299	11.3
Age Group		
Under 1 yr.	31	42.5
1-4 yrs.	56	19.2
5-19 yrs.	24	2.3
20-29 yrs.	26	3.5
30-39 yrs.	34	5.1
40-49 yrs.	116	14.9
50-64 yrs.	125	12.5
65-79 yrs.	122	26.2
80+ yrs.	115	56.2

Invasive Pneumococcal Disease Cases and Deaths by Age Group, Minnesota, 2010

Age Group	Cases	Deaths	% Died
Under 1 yr.	31	1	3%
1-4 yrs.	56	0	0%
5-19 yrs.	24	0	0%
20-29 yrs.	26	1	4%
30-39 yrs.	34	1	3%
40-49 yrs.	116	7	6%
50-64 yrs.	125	15	12%
65-79 yrs.	122	14	12%
80+ yrs.	115	24	21%
Total	649	63	10%

Invasive Pneumococcal Disease by Type of Infection/Syndrome, Minnesota 2010*



*This chart represents 684 infections among 649 cases

Invasive Pneumococcal Isolates by Serotype Included in 13-Valent Conjugate Vaccine* by Age Group, Minnesota, 2010

Age Group	Isolates	# included in PCV-13	% included in PCV-13
Under 1 yr.	29	19	66%
1-4 yrs.	54	35	65%
5-19 yrs.	24	17	71%
20-29 yrs.	25	17	68%
30-39 yrs.	34	15	44%
40-49 yrs.	112	32	29%
50-64 yrs.	123	86	70%
65-79 yrs.	116	54	47%
80+ yrs.	108	42	39%
Total	625	317	51%

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

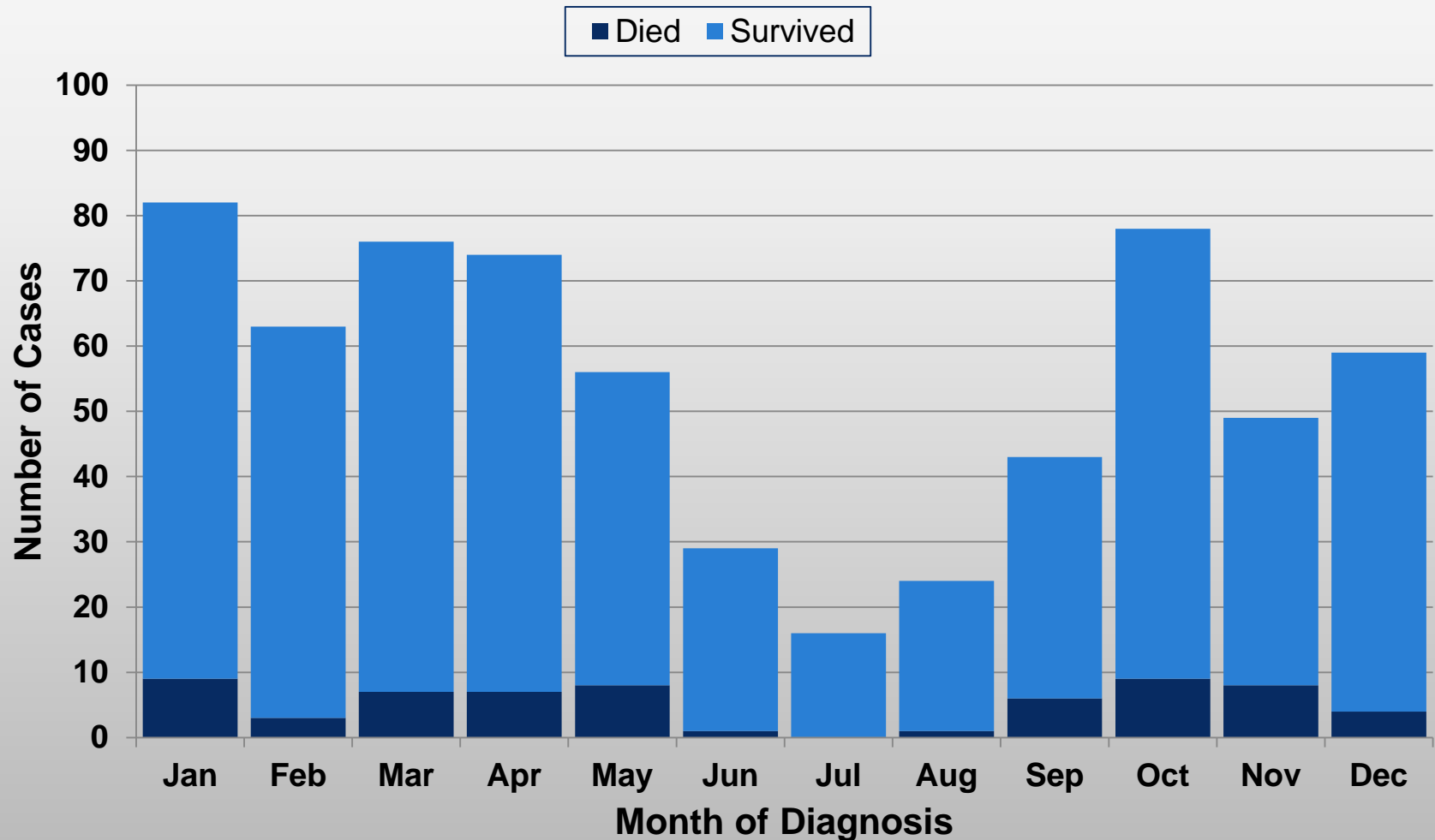
Invasive Pneumococcal Isolates by Resistance to Antimicrobial Agents, Minnesota, 2010

	Total Resistant Isolates	% Resistant Isolates
Penicillin resistance (R)*		
Meningitis breakpoints	146	23%
Non-meningitis breakpoints	4	1%
Resistance to drug classes**		
R to 1 drug class	91	15%
R to 2-3 drug classes	49	8%
R to 4-5 drug classes	76	12%
Total	625	35%

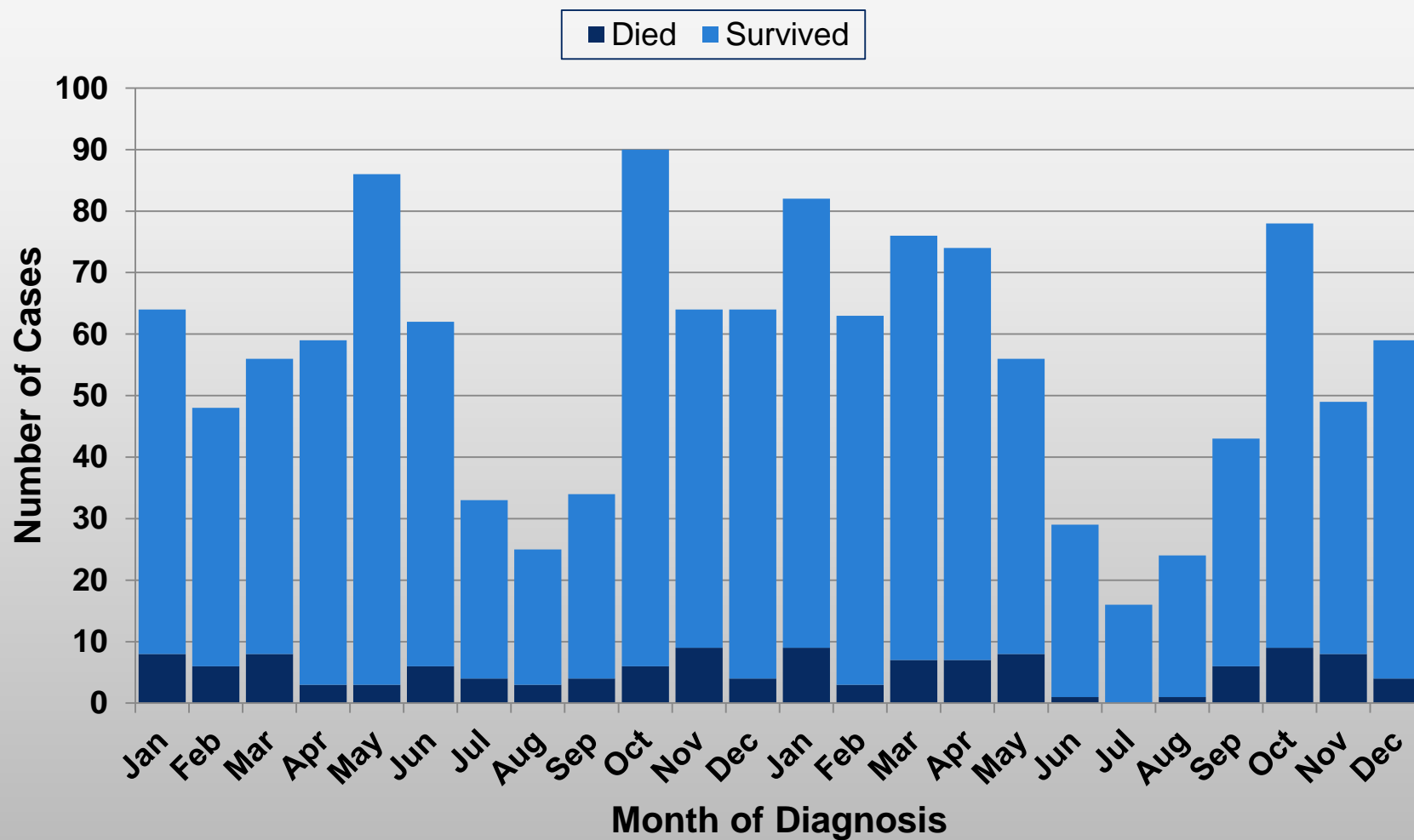
* Isolates with MIC \geq 0.12 μ g/ml are Penicillin-R for meningitis, \geq 8 μ g/ml for non-meningitis.

** 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, 2010



Cases of Invasive Pneumococcal Disease by Month of Diagnosis and Outcome, Minnesota, 2009-2010



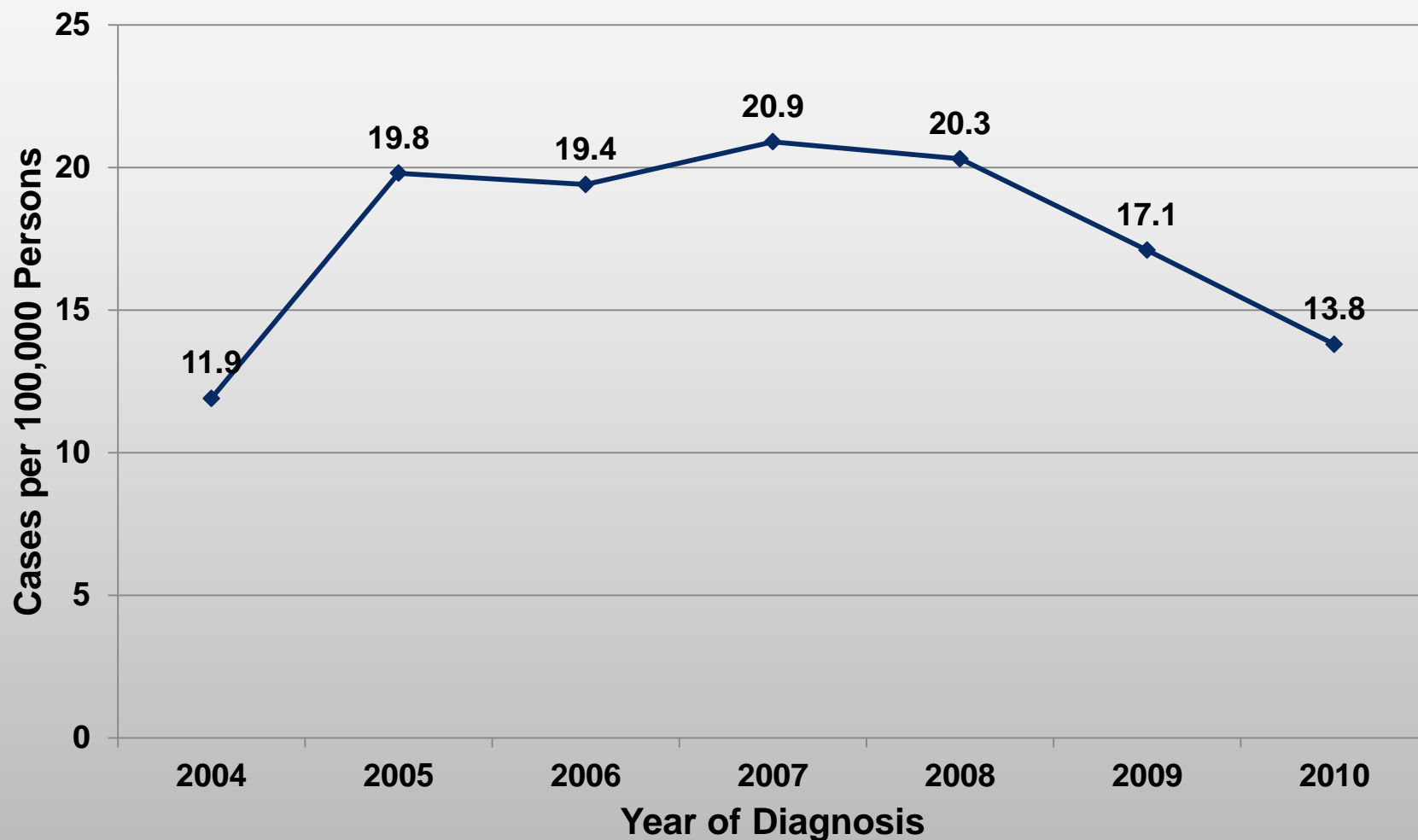
Invasive MRSA Surveillance Methods

- 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 41 million.

Incidence of Invasive MRSA Disease, Ramsey and Hennepin Counties*, 2004-2010



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

Incidence of Invasive MRSA Disease by Gender and Age Group, Ramsey and Hennepin Counties, Minnesota, 2010

Characteristic	Cases	Incidence per 100,000 persons
Gender		
Male	121	14.8
Female	108	12.8
Age Group		
Under 1 yr.	2	8.7
1-4 yrs.	2	2.1
5-9 yrs.	0	0
10-19 yrs.	3	1.5
20-29 yrs.	8	3.0
30-39 yrs.	18	7.5
40-49 yrs.	29	12.3
50-59 yrs.	41	18.1
60-69 yrs.	36	26.8
70+ yrs.	90	63.6

Invasive MRSA Disease Cases and Deaths by Age Group, Ramsey and Hennepin Counties, Minnesota, 2010

Age Group	Cases	Deaths	% Died
Under 1 yr.	2	0	0%
1-4 yrs.	2	0	0%
5-9 yrs.	0	0	--
10-19 yrs.	3	1	33%
20-29 yrs.	8	0	0%
30-39 yrs.	18	0	0%
40-49 yrs.	29	1	3%
50-59 yrs.	41	3	7%
60-69 yrs.	36	3	8%
70+ yrs.	90	21	23%
Total	229	29	13%

Incidence of Invasive MRSA Disease by Case Type, Ramsey and Hennepin Counties, Minnesota, 2010

Case Type	Cases	Incidence per 100,000 persons
Healthcare-associated	203	12.2
Community-associated	25	1.5

- **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.

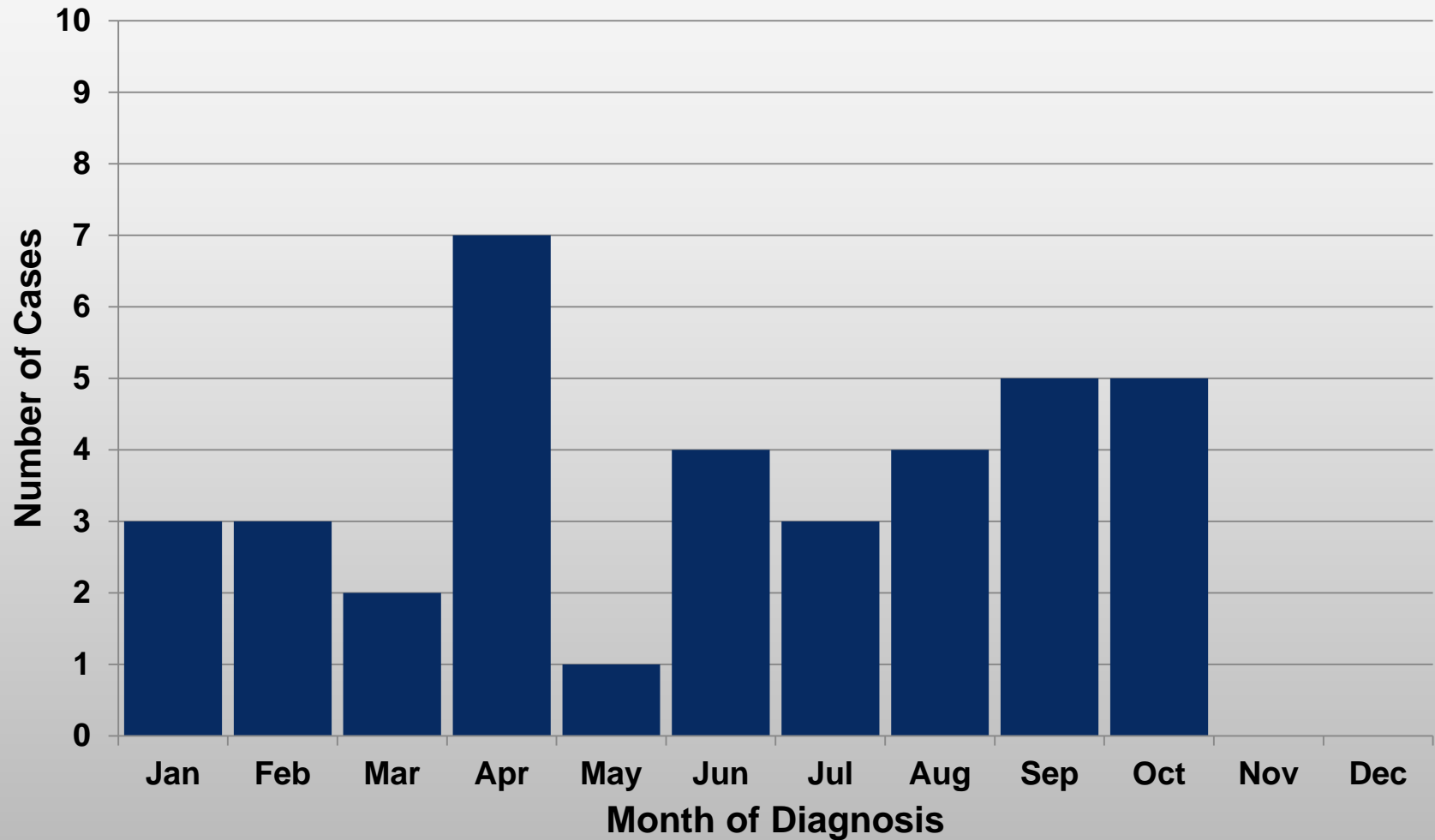
Invasive MRSA Disease by Type of Infection, Ramsey and Hennepin Counties, Minnesota, 2010

Type of Infection*	Cases
Bacteremia (blood)	131
Without another source of infection	61
With another source of infection	70
Pneumonia (lung)	23
Osteomyelitis (bone)	30
Cellulitis (skin)	13
Endocarditis (heart)	6
More than one infection type	89
Other infection**	55

* 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)

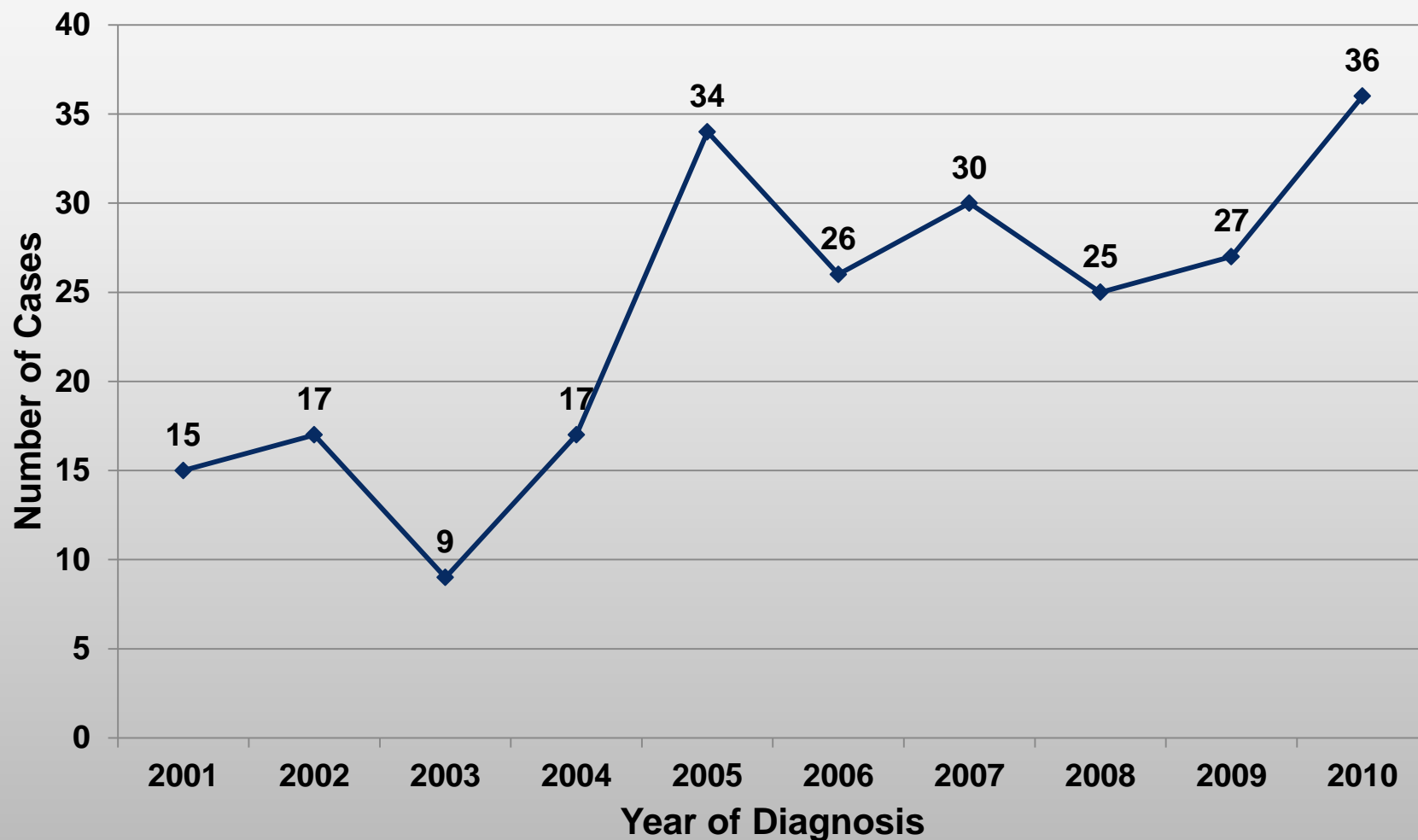
Cases of Legionellosis by Month of Diagnosis, Minnesota, 2010



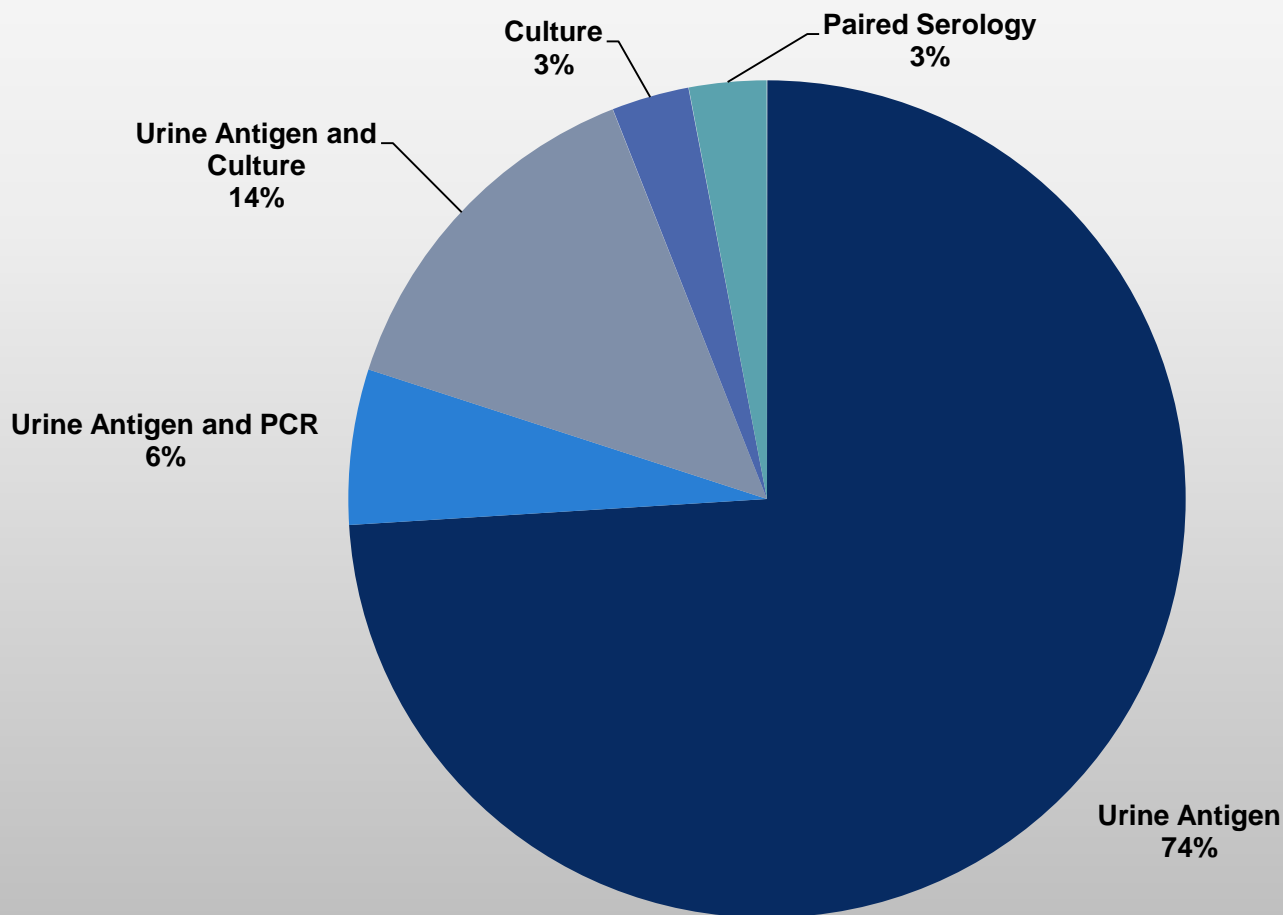
Confirmed Legionellosis Cases by Age Group and Sex, Minnesota, 2010

Age Group	Male	Female	Total
18-29 yrs.	1	0	1
30-39 yrs.	2	0	2
40-49 yrs.	4	1	5
50-59 yrs.	9	0	9
60-69 yrs.	7	4	11
70+ yrs.	6	2	8
Total	29 (81%)	7 (19%)	36

Confirmed Legionellosis Cases Minnesota, 2001-2010



Laboratory Tests Used to Diagnose Confirmed Cases of Legionellosis, Minnesota 2010



Additional unconfirmed cases

- 3 cases were tested by single serology alone (not confirmatory)
- 4 cases were tested by PCR alone (suspect case)