





Invasive Pneumococcal Disease Surveillance 2013-2017

Rhode Island Department of Health

Division of Preparedness, Response, Infectious
Disease and Emergency Medical Services

Center for Acute Infectious Disease Epidemiology



About Invasive Pneumococcal Disease

- *Streptococcus pneumoniae* can cause many types of infections. Some of these infections, such as pneumonia, meningitis and bacteremia, can be life threatening.
- Invasive pneumococcal disease (IPD) occurs when a normally sterile site, such as cerebrospinal fluid (CSF) or blood, becomes infected with *Streptococcus pneumoniae*.
- Children less than 2 years of age, individuals with certain health conditions or immunosuppression, and those 65 years of age or older are at higher risk for becoming infected.
- The best way to prevent pneumococcal disease is by getting vaccinated.
 - The pneumococcal conjugate vaccine (PCV13) protects against the 13 types of pneumococcal bacteria that cause most of the severe illness in children and adults. This is the pneumococcal vaccine routinely used to vaccinate young children.
 - The pneumococcal polysaccharide vaccine (PPSV23) protects against 23 types of pneumococcal bacteria. It is recommended for all adults 65 years or older and for anyone who is 2 years or older at high risk for disease. PPSV23 is also recommended for adults 19 through 64 years old who smoke cigarettes or who have asthma.



Data Overview: Invasive Pneumococcal Disease

- In 2017, there were 64 cases of IPD reported in Rhode Island. This represents a 2% decrease in reported cases when compared to 2016 (65 cases).
- The highest incidence rate is in those 80 years and older (30.8 per 100,000 population in 2017).
- Washington County had the highest rate of cases in 2017.
- There is a slight seasonal trend in IPD, with cases often peaking in the winter and fewer cases occurring in the summer.

Reported Cases of Invasive Pneumococcal Disease by Year, Rhode Island, 2013-2017

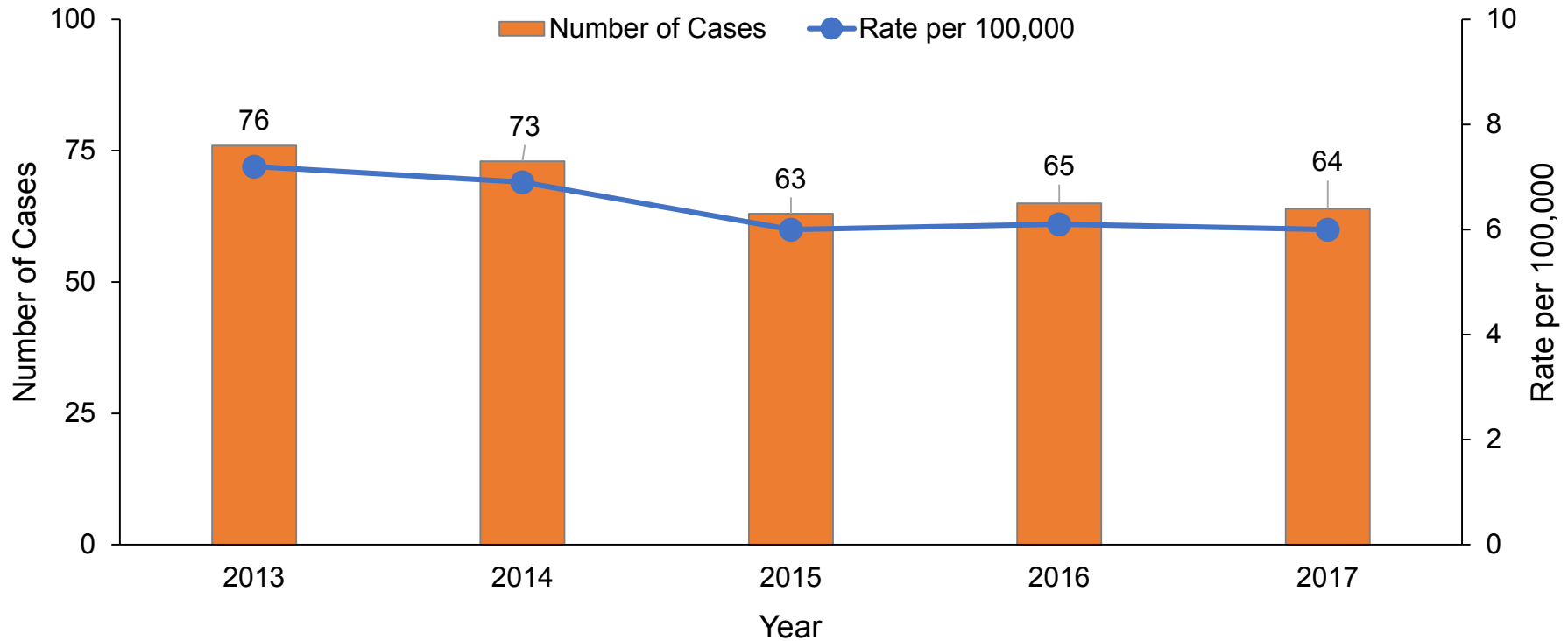


Figure 1: In 2017, there were 64 cases of Invasive Pneumococcal Disease (IPD) in Rhode Island with a rate of 6.0 cases per 100,000 population.

Rate of Invasive Pneumococcal Disease, by Age Group, Rhode Island, 2017

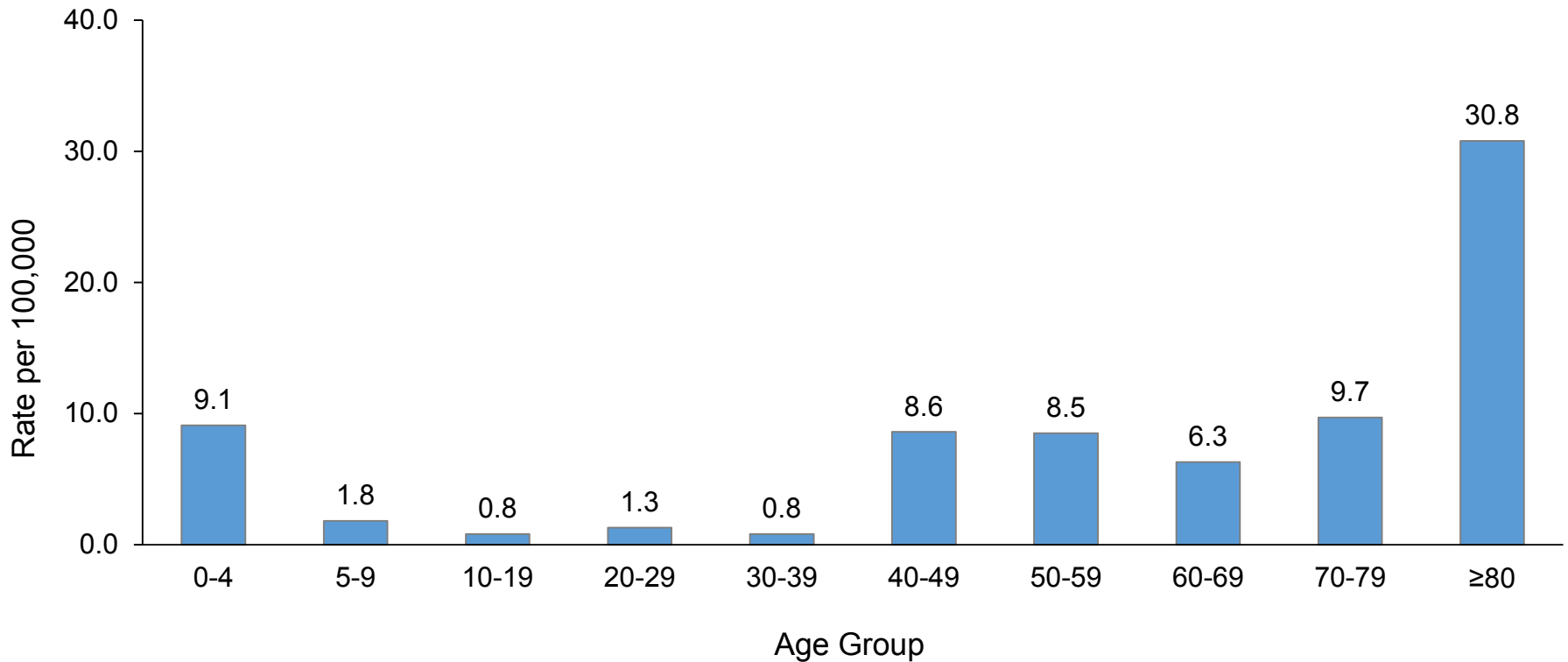


Figure 2: People 80 years and older had the highest rate of cases in 2017 (30.8 cases per 100,000 population). Due to high pneumococcal vaccination coverage rates in RI, children have low incidence rates.

Rate of Invasive Pneumococcal Disease by Sex and Year, Rhode Island, 2013-2017

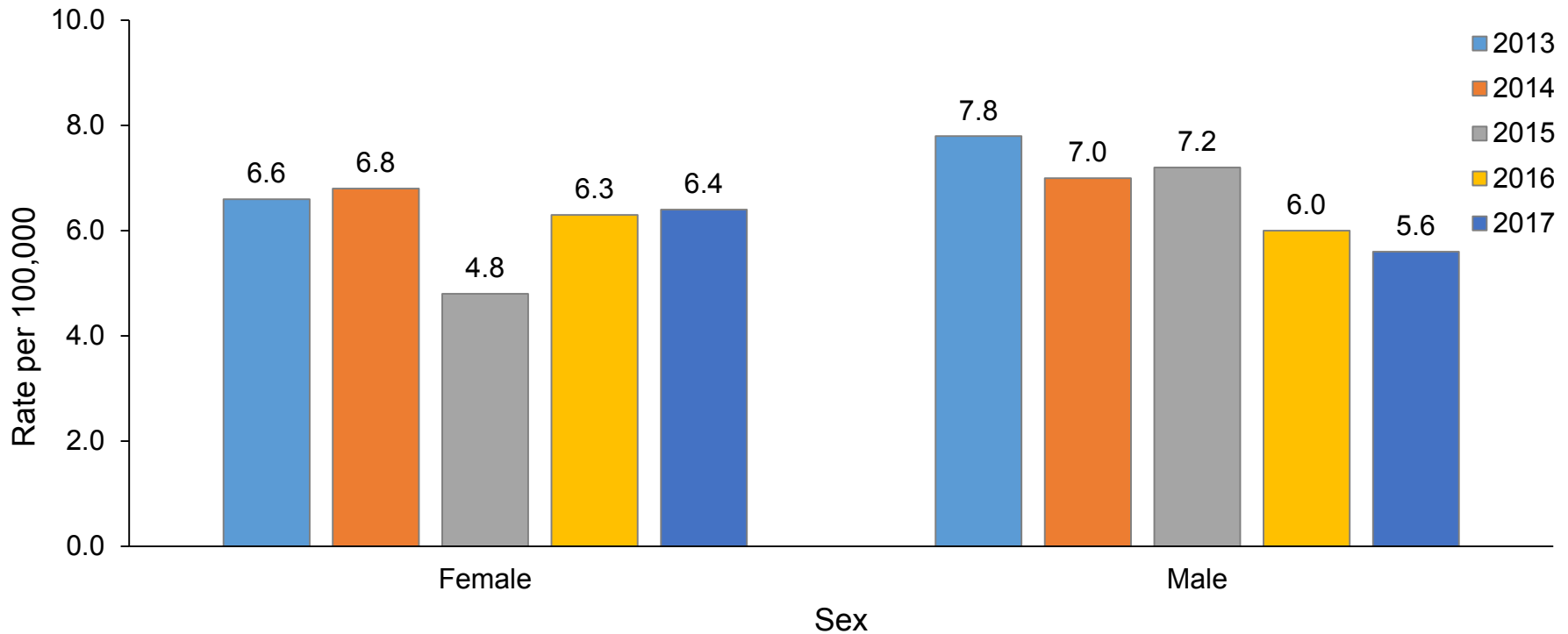


Figure 3: Males had higher rates of IPD than females in three of the past five years. In 2017, the rate for females was 6.4 cases per 100,000 population and the rate for males was 5.6 cases per 100,000 population.

Rate of Invasive Pneumococcal Disease by County and Year, Rhode Island, 2013-2017

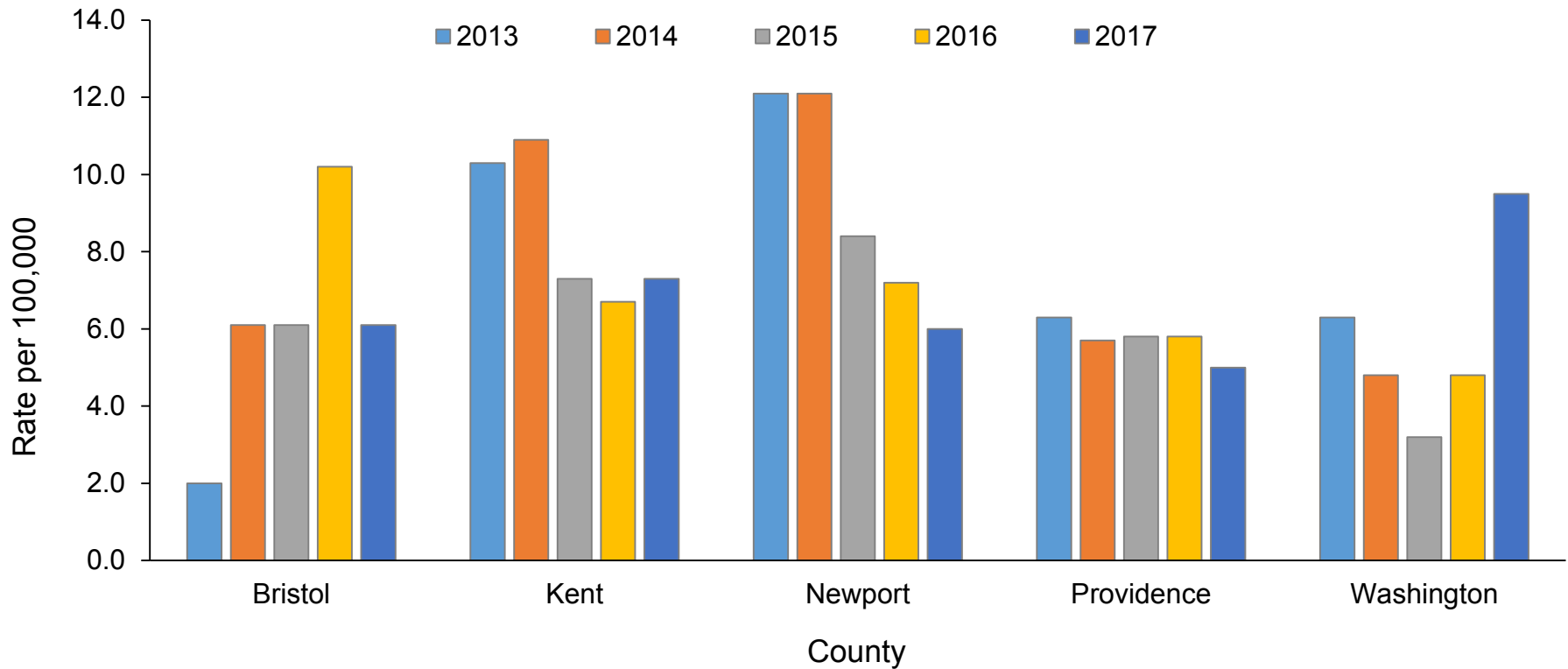


Figure 4: In 2017, Washington County had the highest rate of IPD (9.5 cases per 100,000 population), while Providence County had the lowest rate of cases (5.0 cases per 100,000).

Reported Cases of Invasive Pneumococcal Disease by Month and Year, Rhode Island, 2013-2017

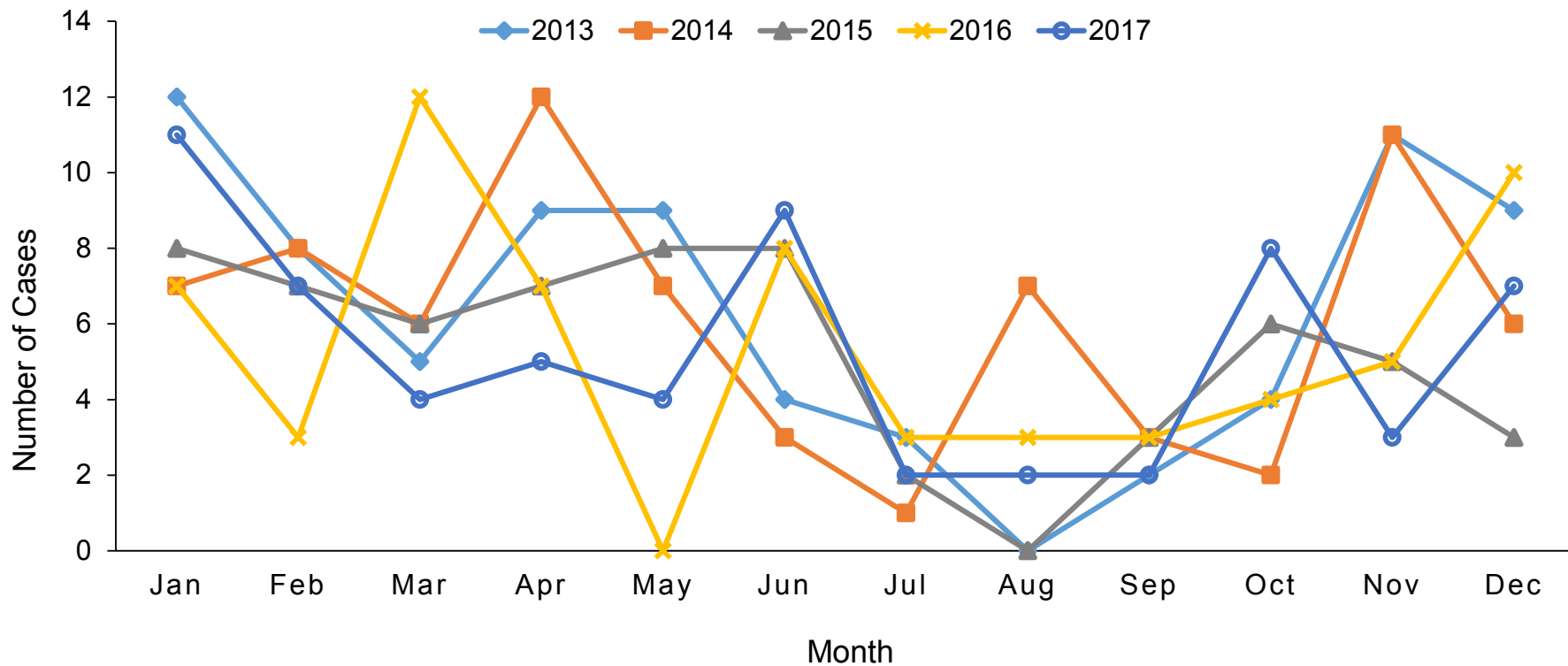


Figure 5: Historically, the highest number of cases occur in the winter months (November, December, January, February) while the fewest cases occur in the summer months (July and August). However, in 2014, there were seven cases in August, though no relationship among the cases was found.

Invasive Pneumococcal Disease Frequency and Rates by Year, Rhode Island, 2013-2017



Table 1. Frequency by Year

	2013	2014	2015	2016	2017
Number of Cases	76	73	63	65	64

Table 2. Rate by Year

	2013	2014	2015	2016	2017
Rate per 100,000	7.2	6.9	6.0	6.1	6.0

Invasive Pneumococcal Disease Frequency by Age Group and Year, Rhode Island, 2013-2017



Table 3. Frequency by Age Group and Year

	2013	2014	2015	2016	2017
0-4	0	4	3	2	5
5-9	1	2	2	0	1
10-19	1	3	2	1	1
20-29	1	0	3	0	2
30-39	5	4	3	4	1
40-49	7	4	6	5	11
50-59	15	14	9	15	13
60-69	11	19	15	15	8
70-79	19	7	8	9	7
≥80	16	16	12	14	15
Total	76	73	63	65	64

Invasive Pneumococcal Disease Rates by Age Group and Year, Rhode Island, 2013-2017



Table 4. Rate by Age Group and Year

	2013	2014	2015	2016	2017
0-4	0.0	7.3	5.5	3.7	9.1
5-9	1.7	3.5	3.5	0	1.8
10-19	0.7	2.2	1.5	0.8	0.8
20-29	0.7	0.0	1.9	0	1.3
30-39	4.0	3.2	2.3	3.1	0.8
40-49	4.9	2.9	4.5	3.8	8.6
50-59	9.6	8.9	5.7	9.7	8.5
60-69	9.7	16.1	12.3	11.9	6.3
70-79	30.8	11.1	12.2	13.3	9.7
≥80	31.6	31.9	24.3	28.6	30.8

Invasive Pneumococcal Disease Frequency and Rates by Sex and Year, RI, 2013-2017



Table 5. Frequency by Sex and Year

	2013	2014	2015	2016	2017
Female	36	37	26	34	35
Male	40	36	37	31	29
Total	76	73	63	65	64

Table 6. Rate by Sex and Year

	2013	2014	2015	2016	2017
Female	6.6	6.8	4.8	6.3	6.4
Male	7.8	7.0	7.2	6.0	5.6

Invasive Pneumococcal Disease Frequency By County and Year, Rhode Island, 2013-2017



Table 7. Frequency by County and Year

	2013	2014	2015	2016	2017
Bristol	1	3	3	5	3
Kent	17	18	12	11	12
Newport	10	10	7	6	5
Providence	40	36	37	37	32
Washington	8	6	4	6	12
Total	76	73	63	65	64

Invasive Pneumococcal Disease Rates by County and Year, Rhode Island, 2013-2017



Table 8. Rate by County and Year

	2013	2014	2015	2016	2017
Bristol	2.0	6.1	6.1	10.2	6.1
Kent	10.3	10.9	7.3	6.7	7.3
Newport	12.1	12.1	8.4	7.2	6.0
Providence	6.3	5.7	5.8	5.8	5.0
Washington	6.3	4.8	3.2	4.8	9.5

Invasive Pneumococcal Disease Frequency by Month and Year, RI, 2013-2017



Table 9. Frequency by Month and Year

	2013	2014	2015	2016	2017
Jan	12	7	8	7	11
Feb	8	8	7	3	7
Mar	5	6	6	12	4
Apr	9	12	7	7	5
May	9	7	8	0	4
Jun	4	3	8	8	9
Jul	3	1	2	3	2
Aug	0	7	0	3	2
Sep	2	3	3	3	2
Oct	4	2	6	4	8
Nov	11	11	5	5	3
Dec	9	6	3	10	7
Total	76	73	63	65	64

Underlying Medical Conditions, Invasive Pneumococcal Disease, Rhode Island, 2013-2017



	2013		2014		2015		2016		2017	
Cases	76		73		63		65		64	
Underlying Medical Condition	N	%	N	%	N	%	N	%	N	%
Yes	68	89.5	51	69.9	46	73.0	57	87.7	48	75.0
<i>Alcohol Abuse</i>	8	10.5	4	5.5	2	3.2	7	10.8	9	14.1
<i>Asplenia</i>	1	1.3	3	4.1	2	3.2	2	3.1	3	4.7
<i>Cigarette Smoking</i>	16	21.1	9	12.3	6	9.5	17	26.2	14	21.9
<i>Diabetes Mellitus</i>	12	15.8	6	8.2	11	17.5	12	18.5	13	20.3
<i>Heart Disease, Chronic</i>	39	51.3	20	27.4	14	22.2	17	26.2	19	29.7
<i>Hemoglobinopathy</i>	0	0.0	2	2.7	1	1.6	0	0.0	1	1.6
<i>Immunosuppression</i>	11	14.5	9	12.3	15	23.8	12	18.5	9	14.1
<i>Liver Disease, Chronic</i>	6	7.9	6	8.2	5	7.9	2	3.1	7	10.9
<i>Lung Disease, Chronic</i>	28	36.8	16	21.9	16	25.4	27	41.5	15	23.4
<i>Malignancy, Hematologic</i>	3	3.9	14	19.2	12	19.0	12	18.5	4	6.3
<i>Malignancy, Solid Organ</i>	10	13.2	7	9.6	4	6.3	9	13.8	9	14.1
<i>Renal Failure, Chronic</i>	10	13.2	1	1.4	2	3.2	4	6.2	3	4.7
No	7	9.2	20	27.4	16	25.4	8	12.3	15	23.4
Unknown	1	1.3	2	2.7	1	1.6	0	0.0	1	1.6

* Cases can have more than one underlying condition documented.

Primary Site of Disease, Invasive Pneumococcal Disease, Rhode Island, 2013-2017



	2013		2014		2015		2016		2017	
Cases	76		73		63		65		64	
	N	%	N	%	N	%	N	%	N	%
Primary Site of Disease										
<i>Bacteremia with Pneumonia</i>	53	69.7	51	69.9	41	65.1	48	73.8	44	68.8
<i>Bacteremia without Focus</i>	19	25.0	15	20.5	15	23.8	13	20.0	8	12.5
<i>Meningitis</i>	3	3.9	6	8.2	6	9.5	4	6.2	9	14.1
<i>Other Site of Focus</i>	1	1.3	1	1.4	1	1.6	0	0.0	3	4.7

Streptococcus pneumoniae Antibiotic Susceptibility Testing Results, Rhode Island, 2013-2017



Percent Susceptible	2013	2014	2015	2016	2017	5-Year Total	Number of Cases With Susceptibility Result Received for 5-Year Period
Penicillin							267
<i>Non-meningitis</i>	100	98.4	100	94.3	98.1	98.1	
<i>Meningitis</i>	78.4	82.0	76.0	75.5	86.5	79.8	
Ceftriaxone							284
<i>Non-meningitis</i>	100	100	98.0	96.4	94.2	97.9	
<i>Meningitis</i>	96.7	97.1	98.0	89.1	92.3	94.7	
Cefotaxime							75
<i>Non-meningitis</i>	-	-	-	-	-	97.3	
<i>Meningitis</i>	-	-	-	-	-	97.3	
Vancomycin	100	100	100	100	100	100	291
Cefepime	-	-	-	-	-	97.7	44
Clindamycin	86.4	93.6	82.9	88.1	86.7	87.7	219
Erythromycin	70.9	81.4	70.8	67.9	65.5	71.5	270
Levofloxacin	98.2	98.0	100	100	100	99.2	245
Linezolid	-	-	-	-	-	100	60
Meropenem	100	95.3	100	84.8	96.9	95.6	180
Tetracycline	89.7	85.7	82.6	87.5	87.0	86.4	235
TMP/Sulfa	-	-	-	-	-	80.9	68

* For all antibiotics, the minimum inhibitory concentration (MIC) results were used for antibiotic susceptibility classification using the 2018 Clinical and Laboratory Standard Institute (CLSI) antibiotic susceptibility breakpoints for *S. pneumoniae* and CLSI guidance for the creation of antibiograms was utilized.



Notes on Data

- Case counts include patients classified as confirmed and probable cases.
- “Event Date” (used to classify cases by month and year) is generated based on the availability of data in the following order:
 1. Illness onset date
 2. Specimen collection date
 3. Date of report to public health agency
- Rate is calculated per 100,000 population.
- Population denominators are based on the Annual Estimates of the Resident Population: April 1, 2010-July 1, 2017, U.S. Census Bureau.