





Invasive Pneumococcal Disease Surveillance 2012-2016

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 2016, there were 65 reported cases of IPD reported in Rhode Island. This represents a 3% increase in reported cases when compared to 2015 (63 cases).
- The highest incidence rate is in those 80 years and older (27.3 per 100,000 population in 2016).
- Bristol County had the highest rate of cases in 2016.
- 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, 2012-2016

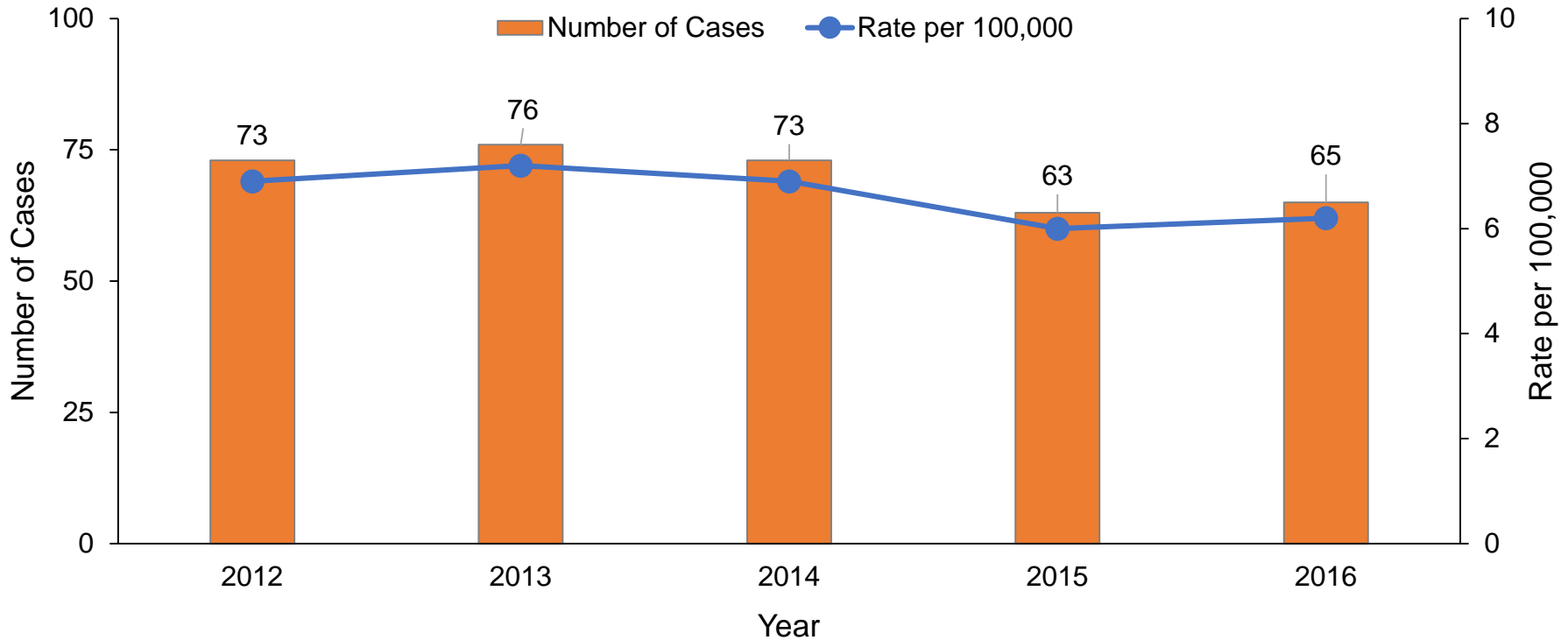


Figure 1: In 2016, there were 65 cases of Invasive Pneumococcal Disease (IPD) in Rhode Island with a rate of 6.2 cases per 100,000 population.

Rate of Invasive Pneumococcal Disease, by Age Group, Rhode Island, 2016

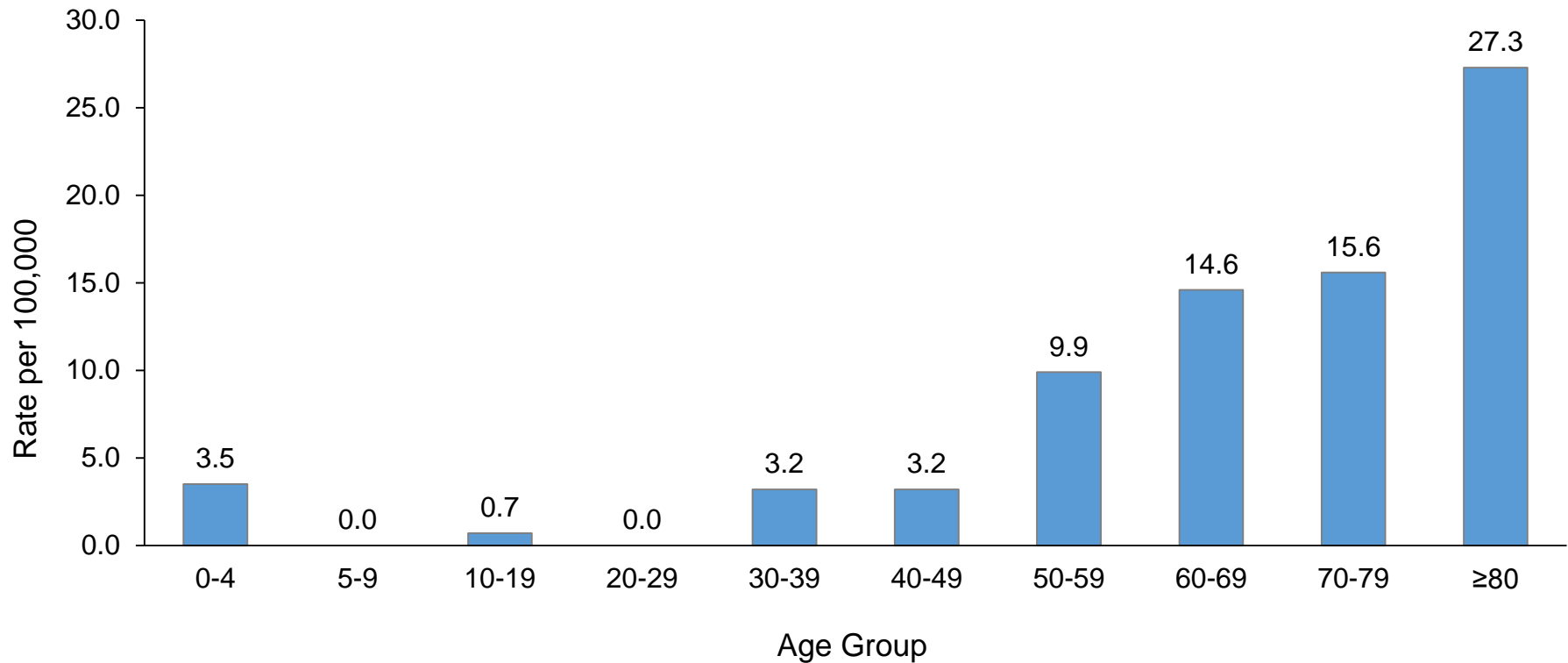


Figure 2: People 80 years and older had the highest rate of cases in 2016 (27.3 cases per 100,000 population). Due to high pneumococcal vaccination coverage rates in RI, children have low incidence rates.

Rate of Invasive Pneumococcal Disease by Sex and Year, Rhode Island, 2012-2016

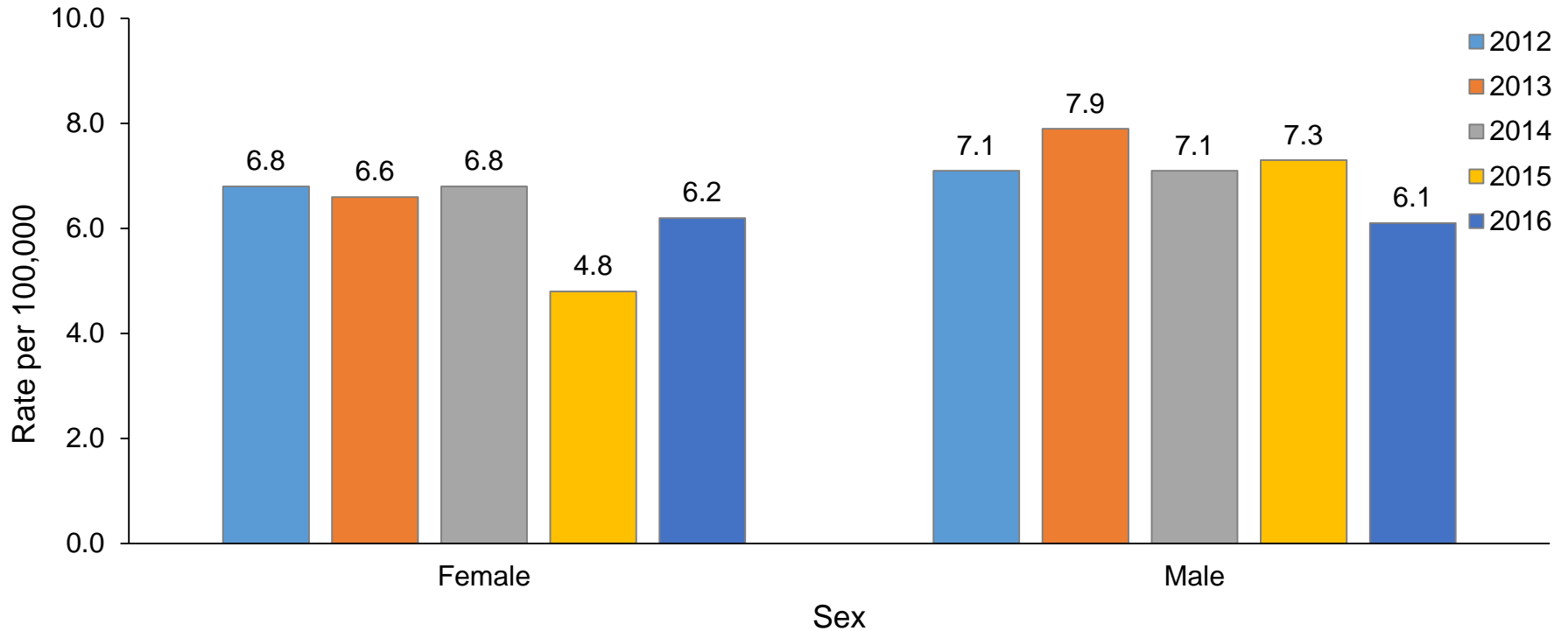


Figure 3: Males had higher rates of IPD than females in four of the past five years. In 2016, the rate for females was 6.2 cases per 100,000 population and the rate for males was 6.1 cases per 100,000 population.

Rate of Invasive Pneumococcal Disease by County and Year, Rhode Island, 2012-2016

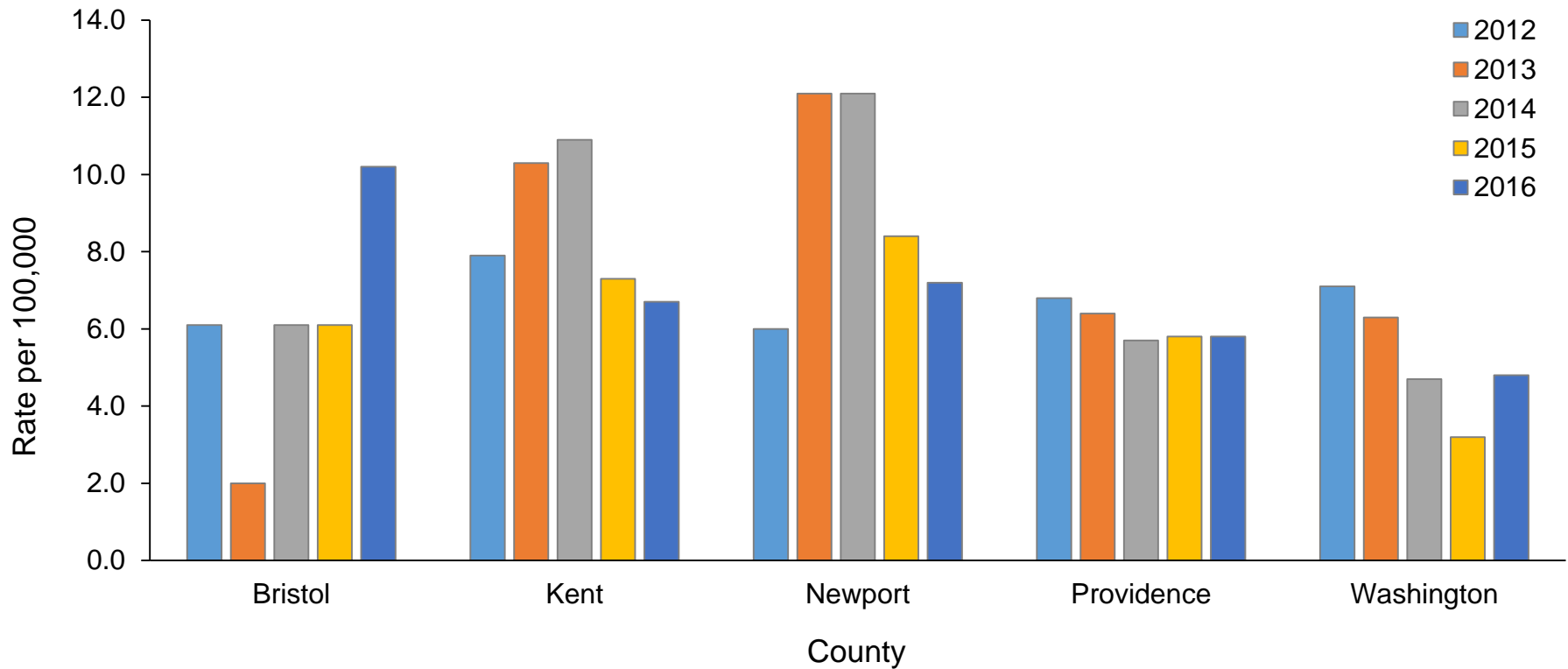


Figure 4: In 2016, Bristol County had the highest rate of IPD (10.2 cases per 100,000 population), while Washington County had the lowest rate of cases (4.8 cases per 100,000).

Reported Cases of Invasive Pneumococcal Disease by Month and Year, Rhode Island, 2012-2016

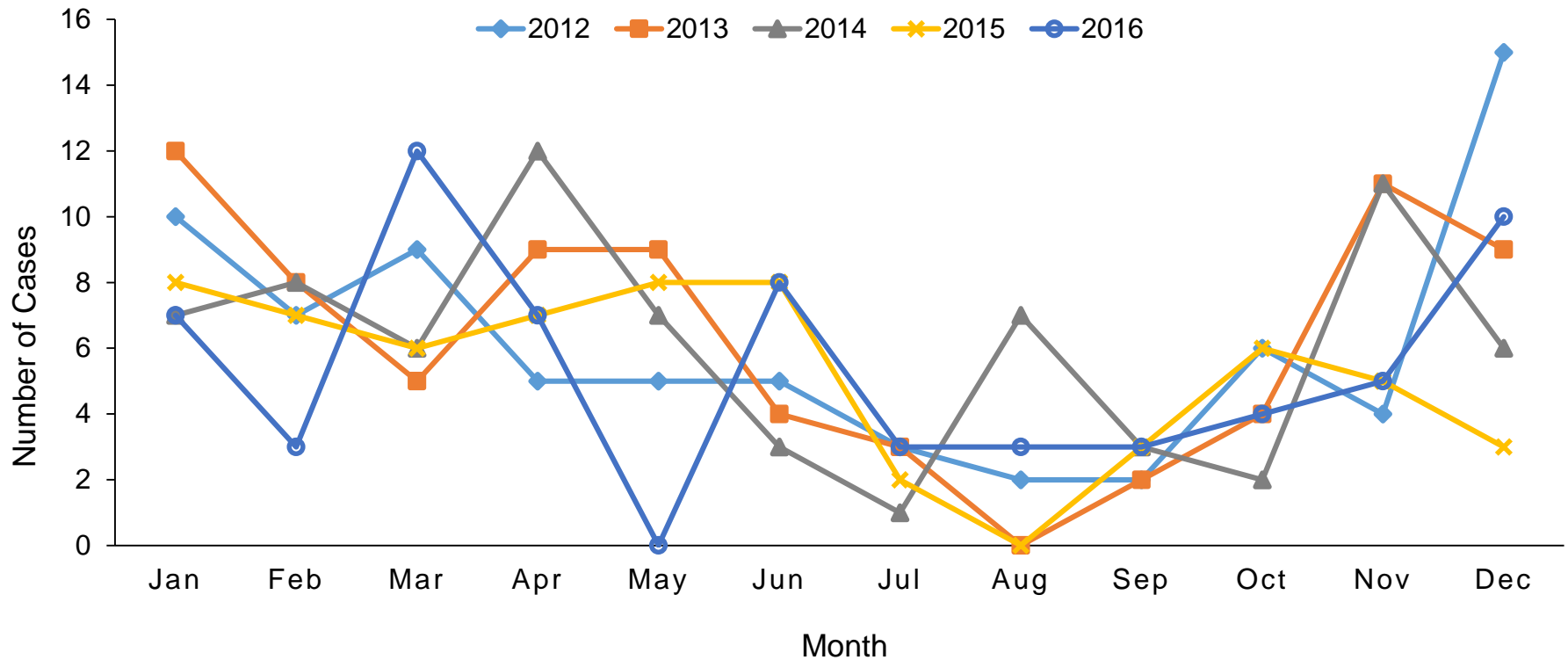


Figure 5: Over the past five years, the highest number of cases occur in the winter months (December, January, February) while the fewest cases occur in the summer months (July and August). However, in 2014, there were seven cases in August, though no relationship among the cases was found.

Invasive Pneumococcal Disease Frequency and Rates by Year, Rhode Island, 2012-2016



Table 1. Frequency by Year

	2012	2013	2014	2015	2016
Number of Cases	73	76	73	63	65

Table 2. Rate by Year

	2012	2013	2014	2015	2016
Rate per 100,000	6.9	7.2	6.9	6.0	6.2

Invasive Pneumococcal Disease Frequency by Age Group and Year, Rhode Island, 2012-2016



Table 3. Frequency by Age Group and Year

	2012	2013	2014	2015	2016
0-4	1	0	4	3	2
5-9	1	1	2	2	0
10-19	1	1	3	2	1
20-29	4	1	0	3	0
30-39	6	5	4	3	4
40-49	12	7	4	6	5
50-59	13	15	14	9	15
60-69	12	11	19	15	15
70-79	8	19	7	8	9
≥80	15	16	16	12	14
Total	73	76	73	63	65

Invasive Pneumococcal Disease Rates by Age Group and Year, Rhode Island, 2012-2016



Table 4. Rate by Age Group and Year

	2012	2013	2014	2015	2016
0-4	1.7	0.0	7.0	5.2	3.5
5-9	1.7	1.7	3.3	3.3	0
10-19	0.7	0.7	2.1	1.4	0.7
20-29	2.7	0.7	0.0	2.0	0
30-39	4.8	4.0	3.2	2.4	3.2
40-49	7.8	4.5	2.6	3.9	3.2
50-59	8.6	9.9	9.2	5.9	9.9
60-69	11.7	10.7	18.5	14.6	14.6
70-79	13.9	32.9	12.1	13.9	15.6
≥80	29.2	31.2	31.2	23.4	27.3

Invasive Pneumococcal Disease Frequency and Rates by Sex and Year, RI, 2012-2016



Table 5. Frequency by Sex and Year

	2012	2013	2014	2015	2016
Female	37	36	37	26	34
Male	36	40	36	37	31
Total	73	76	73	63	65

Table 6. Rate by Sex and Year

	2012	2013	2014	2015	2016
Female	6.8	6.6	6.8	4.8	6.2
Male	7.1	7.9	7.1	7.3	6.1

Invasive Pneumococcal Disease Frequency By County and Year, Rhode Island, 2012-2016



Table 7. Frequency by County and Year

	2012	2013	2014	2015	2016
Bristol	3	1	3	3	5
Kent	13	17	18	12	11
Newport	5	10	10	7	6
Providence	43	40	36	37	37
Washington	9	8	6	4	6
Total	73	76	73	63	65

Invasive Pneumococcal Disease Rates by County and Year, Rhode Island, 2012-2016



Table 8. Rate by County and Year

	2012	2013	2014	2015	2016
Bristol	6.1	2.0	6.1	6.1	10.2
Kent	7.9	10.3	10.9	7.3	6.7
Newport	6.0	12.1	12.1	8.4	7.2
Providence	6.8	6.4	5.7	5.8	5.8
Washington	7.1	6.3	4.7	3.2	4.8

Invasive Pneumococcal Disease Frequency by Month and Year, RI, 2012-2016



Table 9. Frequency by Month and Year

	2012	2013	2014	2015	2016
Jan	10	12	7	8	7
Feb	7	8	8	7	3
Mar	9	5	6	6	12
Apr	5	9	12	7	7
May	5	9	7	8	0
Jun	5	4	3	8	8
Jul	3	3	1	2	3
Aug	2	0	7	0	3
Sep	2	2	3	3	3
Oct	6	4	2	6	4
Nov	4	11	11	5	5
Dec	15	9	6	3	10
Total	73	76	73	63	65

Underlying Medical Conditions, Invasive Pneumococcal Disease, Rhode Island, 2012-2016



	2012		2013		2014		2015		2016	
Cases	73		76		73		63		65	
Underlying Medical Condition										
Yes	59	80.8	68	89.5	51	69.9	46	73.0	57	87.7
Alcohol Abuse	10	13.7	8	10.5	4	5.5	2	3.2	7	10.8
Asplenia	1	1.4	1	1.3	3	4.1	2	3.2	2	3.1
Cigarette Smoking	16	21.9	16	21.1	9	12.3	6	9.5	17	26.2
Diabetes Mellitus	11	15.1	12	15.8	6	8.2	11	17.5	12	18.5
Heart Disease, Chronic	28	38.4	39	51.3	20	27.4	14	22.2	17	26.2
Hemoglobinopathy	0	0	0	0	2	2.7	1	3.2	0	0
Immunosuppression	11	15.1	11	14.5	9	12.3	15	23.8	12	18.5
Liver Disease, Chronic	8	11.0	6	7.9	6	8.2	5	7.9	2	3.1
Lung Disease, Chronic	16	21.9	28	36.8	16	21.9	16	25.4	27	41.5
Malignancy, Hematologic	5	6.8	3	3.9	14	19.2	12	19.0	12	18.5
Malignancy, Solid Organ	9	12.3	10	13.2	7	9.6	4	6.3	9	13.8
Renal Failure, Chronic	5	6.8	10	13.2	1	1.4	2	3.2	4	6.2
No	6	8.2	7	9.2	20	27.4	16	25.4	8	12.3
Unknown	8	11.0	1	1.3	2	2.7	1	1.6	0	0

* Cases can have more than one underlying condition documented.

Primary Site of Disease, Invasive Pneumococcal Disease, Rhode Island, 2012-2016



	2012		2013		2014		2015		2016	
Cases	73		76		73		63		65	
	#	%	#	%	%	%	#	%	#	%
Primary Site of Disease										
Bacteremia with Pneumonia	47	64.4	53	69.7	51	69.9	41	65.1	48	73.8
Bacteremia without Focus	20	27.4	19	25.0	15	20.5	15	23.8	13	20.0
Meningitis	4	5.5	3	4.0	6	8.2	6	9.5	4	6.2
Other Site of Focus	2	2.7	1	1.3	1	1.4	1	1.6	0	0

Streptococcus pneumoniae Antibiotic Susceptibility Testing Results, Rhode Island, 2012-2016



Percent Susceptible	2012	2013	2014	2015	2016	5-Year Total	Number of Cases With Susceptibility Result Received for 5-Year Period
Penicillin							
Non-meningitis	92.0	100	98.4	100	94.3	97.0	265
Meningitis	68.0	78.4	82.0	76.0	75.5	76.2	
Ceftriaxone							
Non-meningitis	98.2	100	100	98.0	96.4	98.6	288
Meningitis	94.6	96.7	97.1	98.0	89.1	95.1	
Cefotaxime							
Non-meningitis	-	-	-	-	-	96.6	88
Meningitis	-	-	-	-	-	95.5	
Vancomycin	100	100	100	100	100	100	290
Cefepime	-	-	-	-	-	94.8	58
Clindamycin	88.1	86.4	93.6	82.9	88.1	88.0	216
Erythromycin	74.1	70.9	81.4	70.8	67.9	73.2	269
Levofloxacin	100	98.2	98.0	100	100	99.2	244
Linezolid	-	-	-	-	-	100	74
Meropenem	96.9	100	95.3	100	84.8	95.6	180
Tetracycline	84.8	89.7	85.7	82.6	87.5	86.0	222
TMP/Sulfa	-	-	-	-	-	82.7	81

* For all antibiotics, the minimum inhibitory concentration (MIC) results were used for antibiotic susceptibility classification using the 2016 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. The population denominator is based on 2010 US Census Population.