





Invasive Pneumococcal Disease Surveillance 2011-2015

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 < 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 and 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 2015, there were 62 reported cases of IPD reported to in Rhode Island. This represents a 15% decrease in reported cases when compared to 2014 (73 cases).
- The highest incidence rate is in those ≥ 80 years old (21.4 per 100,000 population in 2015).
- Newport County had the highest rate of cases over the past three years.
- 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, RI, 2011-2015

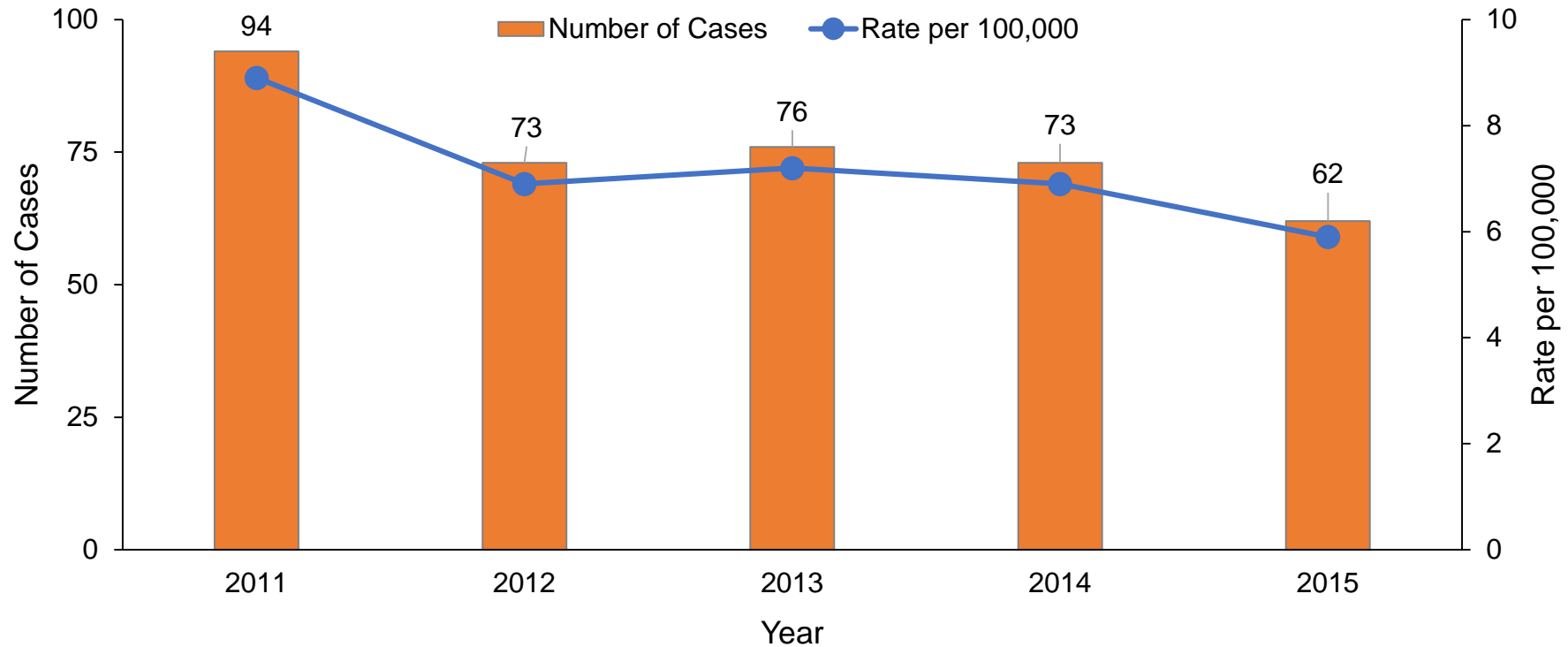


Figure 1: In 2015, there were 62 cases of Invasive Pneumococcal Disease (IPD) in RI with a rate of 5.9 cases per 100,000 population.

Rate of Invasive Pneumococcal Disease by Age Group, RI, 2015

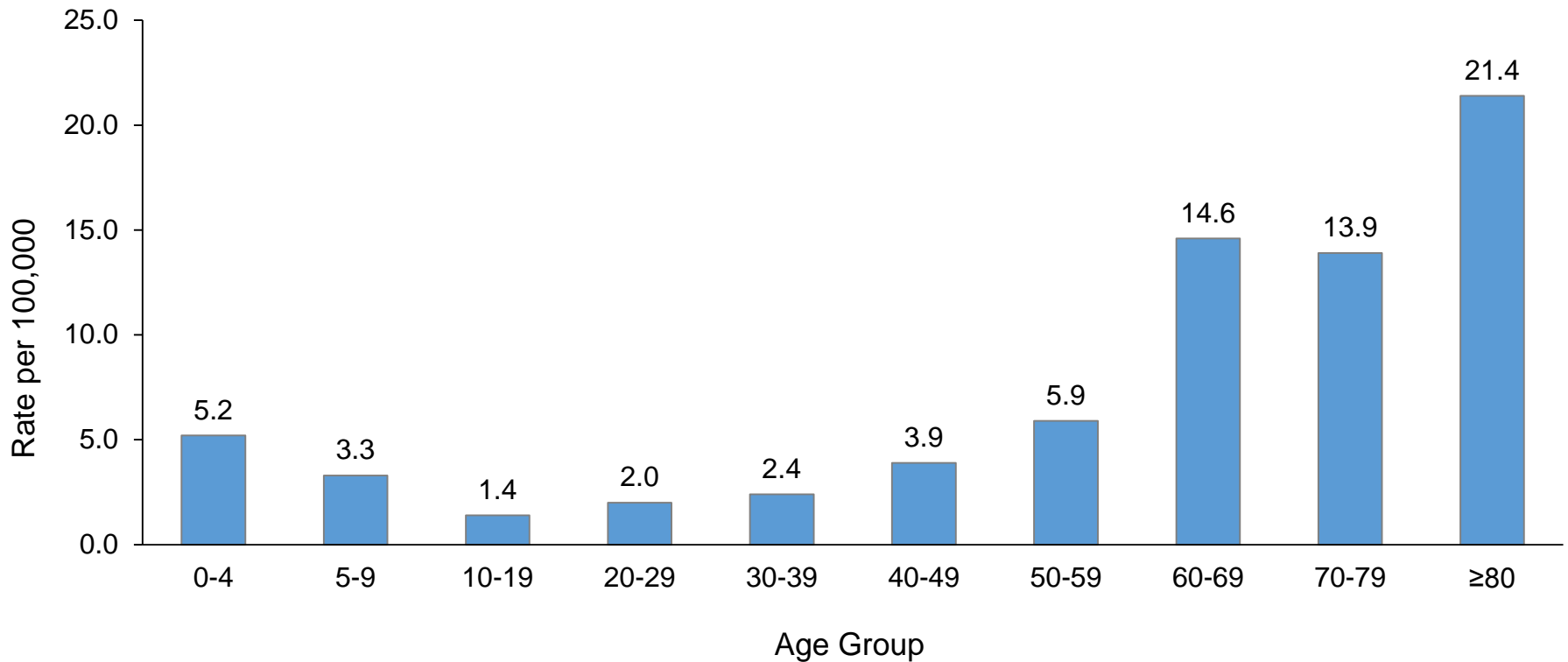


Figure 2: People 80 years and older had the highest rate of cases in 2015 (21.4 cases per 100,000 population). Due to high pneumococcal vaccination coverage rates in RI, children have relatively low incidence rates.

Rate of Invasive Pneumococcal Disease by Sex and Year, RI, 2011-2015

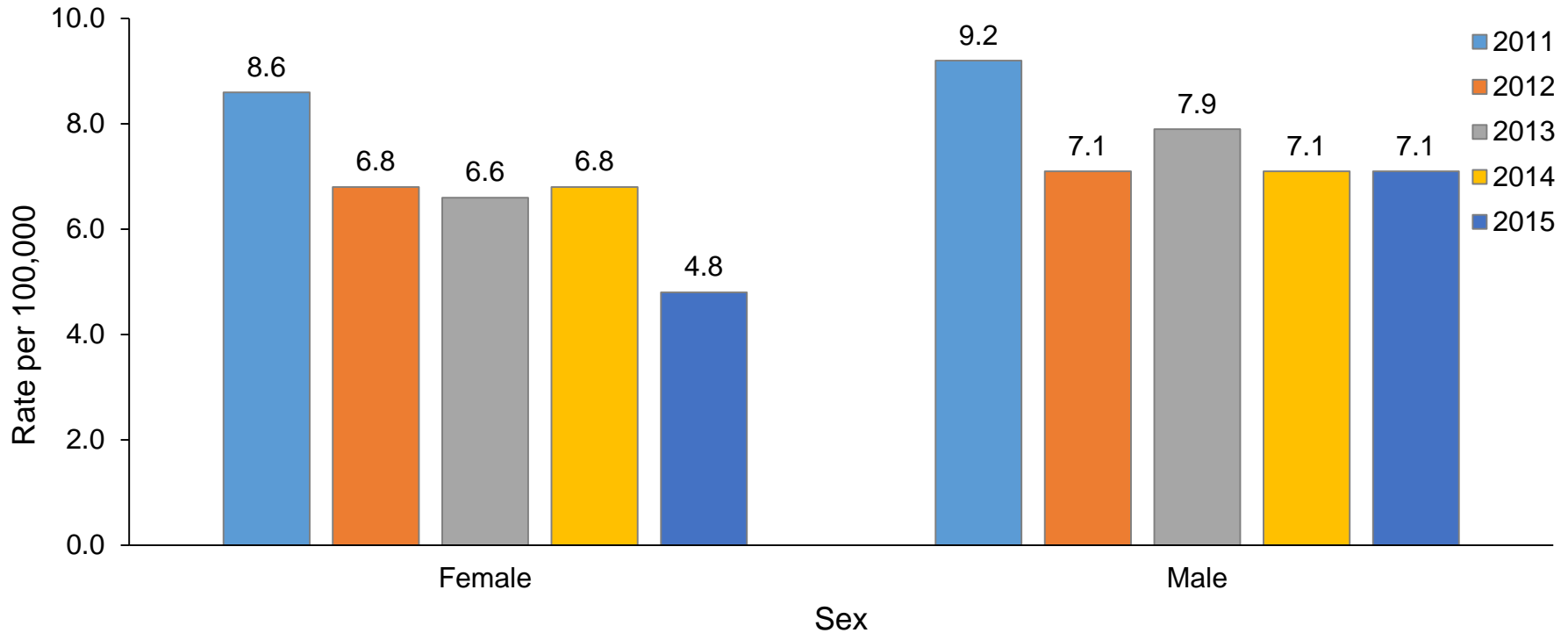


Figure 3: Males had higher rates of IPD than females in all years. In 2014, the rate for males was 7.1 cases per 100,000 population and the rate for females was 4.8 cases per 100,000 population.

Rate of Invasive Pneumococcal Disease by County and Year, RI, 2011-2015

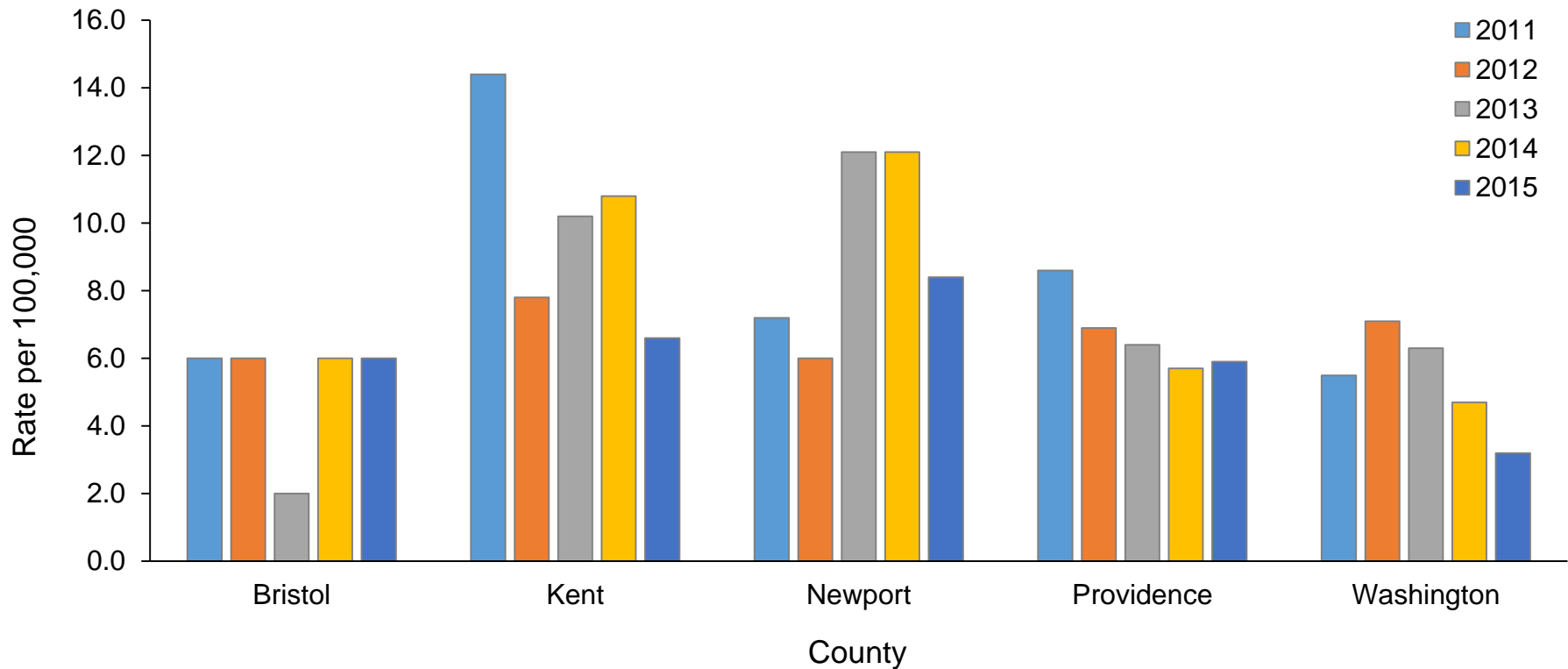


Figure 4: For the third consecutive year, Newport County had the highest rate of IPD (8.4 cases per 100,000 population). In 2015, Washington County had the lowest rate of cases (3.2 per 100,000).

Reported Cases of Invasive Pneumococcal Disease by Month and Year, RI, 2011-2015

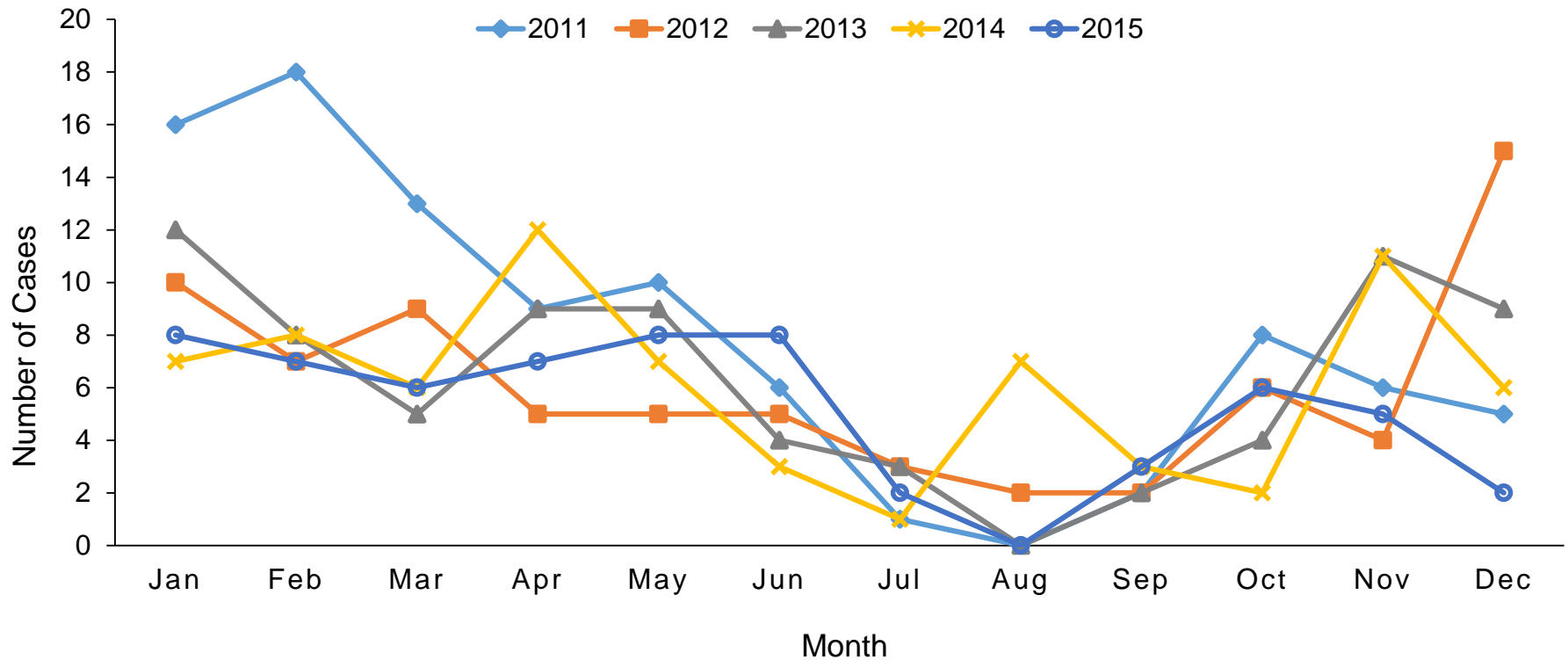


Figure 5: Over the past 5 years, the highest number of cases occurred in the winter months (January and February) while the fewest cases occurred in the summer months (July and August). However, in 2014, there were 7 cases in August, though no relationship among the cases was found.

Invasive Pneumococcal Disease Frequency and Rates by Year, RI, 2011-2015



Table 1. Frequency by Year

	2011	2012	2013	2014	2015
Number of Cases	94	73	76	73	62

Table 2. Rate by Year

	2011	2012	2013	2014	2015
Rate per 100,000	8.9	6.9	7.2	6.9	5.9

Invasive Pneumococcal Disease Frequency by Age Group and Year, RI, 2011-2015



Table 3. Frequency by Age Group and Year

	2011	2012	2013	2014	2015
0-4	5	1	0	4	3
5-9	2	1	1	2	2
10-19	2	1	1	3	2
20-29	3	4	1	0	3
30-39	3	6	5	4	3
40-49	14	12	7	4	6
50-59	20	13	15	14	9
60-69	21	12	11	19	15
70-79	7	8	19	7	8
≥80	17	15	16	16	11
Total	94	73	76	73	62

Invasive Pneumococcal Disease Rates by Age Group and Year, RI, 2011-2015



Table 4. Rate by Age Group and Year

	2011	2012	2013	2014	2015
0-4	8.7	1.7	0.0	7.0	5.2
5-9	3.3	1.7	1.7	3.3	3.3
10-19	1.4	0.7	0.7	2.1	1.4
20-29	2.0	2.7	0.7	0.0	2.0
30-39	2.4	4.8	4.0	3.2	2.4
40-49	9.1	7.8	4.5	2.6	3.9
50-59	13.2	8.6	9.9	9.2	5.9
60-69	20.4	11.7	10.7	18.5	14.6
70-79	12.1	13.9	32.9	12.1	13.9
≥80	33.1	29.2	31.2	31.2	21.4

Invasive Pneumococcal Disease Frequency and Rates by Sex and Year, RI, 2011-2015



Table 5. Frequency by Sex and Year

	2011	2012	2013	2014	2015
Female	47	37	36	37	26
Male	47	36	40	36	36
Total	94	73	76	73	62

Table 6. Rate by Sex and Year

	2011	2012	2013	2014	2015
Female	8.6	6.8	6.6	6.8	4.8
Male	9.2	7.1	7.9	7.1	7.1

Invasive Pneumococcal Disease Frequency By County and Year, RI, 2011-2015



Table 7. Frequency by County and Year

	2011	2012	2013	2014	2015
Bristol	3	3	1	3	3
Kent	24	13	17	18	11
Newport	6	5	10	10	7
Providence	54	43	40	36	37
Washington	7	9	8	6	4
Total	94	73	76	73	62

Invasive Pneumococcal Disease Rates by County and Year, RI, 2011-2015



Table 8. Rate by County and Year

	2011	2012	2013	2014	2015
Bristol	6.0	6.0	2.0	6.0	6.0
Kent	14.4	7.8	10.2	10.8	6.6
Newport	7.2	6.0	12.1	12.1	8.4
Providence	8.6	6.9	6.4	5.7	5.9
Washington	5.5	7.1	6.3	4.7	3.2

Invasive Pneumococcal Disease Frequency by Month and Year, RI, 2011-2015



Table 9. Frequency by Month and Year

	2011	2012	2013	2014	2015
Jan	16	10	12	7	8
Feb	18	7	8	8	7
Mar	13	9	5	6	6
Apr	9	5	9	12	7
May	10	5	9	7	8
Jun	6	5	4	3	8
Jul	1	3	3	1	2
Aug	0	2	0	7	0
Sep	2	2	2	3	3
Oct	8	6	4	2	6
Nov	6	4	11	11	5
Dec	5	15	9	6	2
Total	94	73	76	73	62

Underlying Medical Conditions, Invasive Pneumococcal Disease, Rhode Island, 2011 - 2015



	2011		2012		2013		2014		2015	
Cases	94		73		76		73		62	
Underlying Medical Condition										
Yes	80	85.1	59	80.8	68	89.5	51	69.9	45	72.6
Alcohol Abuse	8	8.5	10	13.7	8	10.5	4	5.5	2	3.2
Asplenia	3	3.2	1	1.4	1	1.3	3	4.1	2	3.2
Cigarette Smoking	14	14.9	16	21.9	16	21.1	9	12.3	6	9.7
Diabetes Mellitus	16	17.0	11	15.1	12	15.8	6	8.2	10	16.1
Heart Disease, Chronic	47	50.0	28	38.4	39	51.3	20	27.4	13	21.0
Hemoglobinopathy	1	1.1	0	0	0	0	2	2.7	1	1.6
Immunosuppression	10	10.6	11	15.1	11	14.5	9	12.3	14	22.6
Liver Disease, Chronic	3	3.2	8	11.0	6	7.9	6	8.2	5	8.1
Lung Disease, Chronic	37	39.4	16	21.9	28	36.8	16	21.9	15	24.2
Malignancy, Hematologic	8	8.5	5	6.8	3	3.9	14	19.2	11	17.7
Malignancy, Solid Organ	11	11.7	9	12.3	10	13.2	7	9.6	4	6.5
Renal Failure, Chronic	3	3.2	5	6.8	10	13.2	1	1.4	2	3.2
No	13	13.8	6	8.2	7	9.2	20	27.4	16	25.8
Unknown	1	1.1	8	11.0	1	1.3	2	2.7	1	1.6

* Cases can have more than one underlying condition documented.

Primary Site of Disease, Invasive Pneumococcal Disease, Rhode Island, 2011 - 2015



	2011		2012		2013		2014		2015	
Cases	94		73		76		73		62	
	#	%	#	%	#	%	%	%	#	%
Primary Site of Disease										
Bacteremia with Pneumonia	60	63.8	47	64.4	53	69.7	51	69.9	40	64.5
Bacteremia without Focus	31	33.0	20	27.4	19	25.0	15	20.5	15	24.2
Meningitis	3	3.2	4	5.5	3	4.0	6	8.2	6	9.7
Other Site of Focus	0	0	2	2.7	1	1.3	1	1.4	1	1.6

Streptococcus pneumoniae Antibiotic Susceptibility Testing Results, Rhode Island, 2011-2015



Percent Susceptible	2011	2012	2013	2014	2015	5-Year Total	Number of Cases With Susceptibility Result Received for 5-Year Period
Penicillin							275
Non-meningitis	96.9	92.0	100	98.4	100	97.5	
Meningitis	82.8	68.0	78.4	82.0	77.6	78.2	
Ceftriaxone							303
Non-meningitis	97.2	98.2	100	100	97.9	98.7	
Meningitis	95.8	94.6	96.7	97.1	97.9	96.4	
Cefotaxime							86
Non-meningitis	-	-	-	-	-	96.5	
Meningitis	-	-	-	-	-	95.3	
Vancomycin	100	100	100	100	100	100	309
Cefepime	-	-	-	-	-	94.5	55
Clindamycin	90.5	88.1	86.4	93.6	82.5	88.6	236
Erythromycin	82.4	74.1	70.9	81.4	70.2	76.3	283
Levofloxacin	98.6	100	98.2	98.0	100	98.9	273
Linezolid	-	-	-	-	-	100	72
Meropenem	97.9	96.9	100	95.3	100	98.0	195
Tetracycline	86.8	84.8	89.7	85.7	82.2	85.8	226
TMP/Sulfa	-	-	-	-	-	89.2	83

* 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.