
RHODE ISLAND
DEPARTMENT OF HEALTH

Invasive Pneumococcal Disease Surveillance 2014-2018

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.

Prevention of Invasive Pneumococcal Disease

- The best way to prevent pneumococcal disease is vaccination
  - 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.
    - Recommended for
      - All adults 65 years or older
      - Anyone who is 2 years or older at high risk for disease.
      - Adults 19 - 64 years old who smoke cigarettes or who have asthma.

Data Overview: Invasive Pneumococcal Disease

- In 2018, there were 59 cases of IPD reported in Rhode Island. This represents an 8% decrease in reported cases when compared to 2017 (64 cases).
- The highest incidence rate is in those 80 years and older (26.6 per 100,000 population in 2018).
- Kent County had the highest rate of cases in 2018.
- 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, 2014-2018

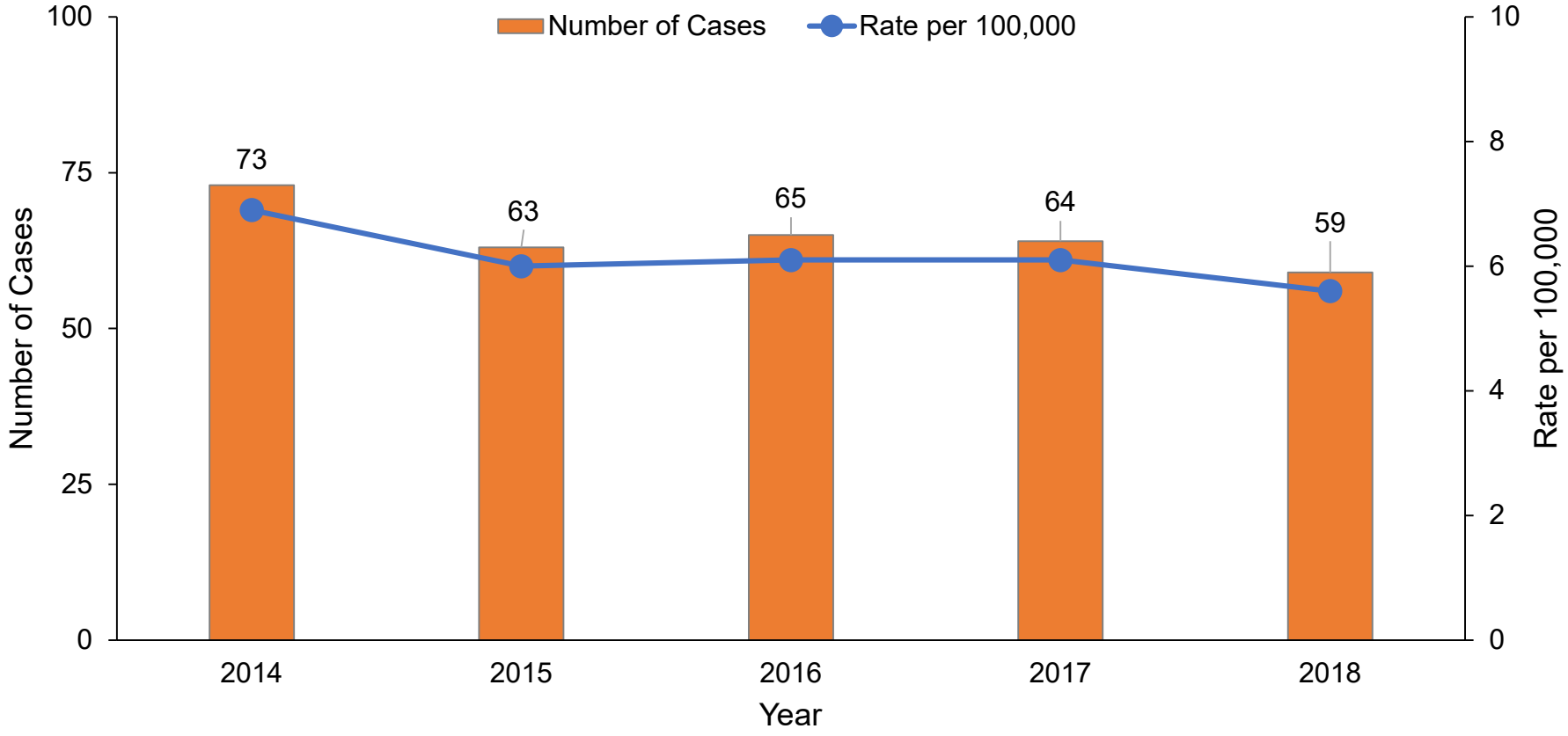

Figure 1: In 2018, there were 59 cases of Invasive Pneumococcal Disease (IPD) in Rhode Island with a rate of 5.6 cases per 100,000 population.

Rate of Invasive Pneumococcal Disease, by Age Group, Rhode Island, 2018

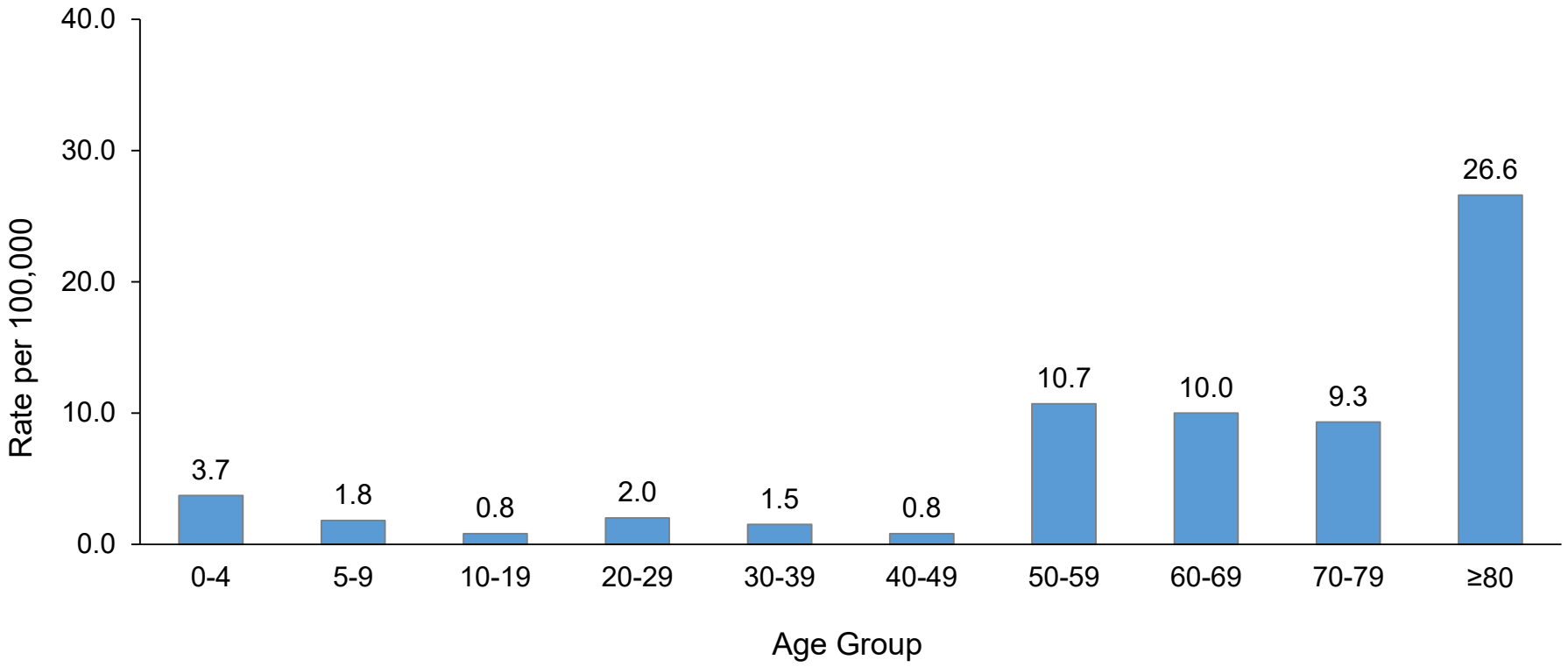

Figure 2: People 80 years and older had the highest rate of IPD in 2018 (26.6 cases per 100,000 population). Due to high pneumococcal vaccination coverage rates in RI, children have low incidence rates.

Rate of Invasive Pneumococcal Disease by Sex and Year, Rhode Island, 2014-2018

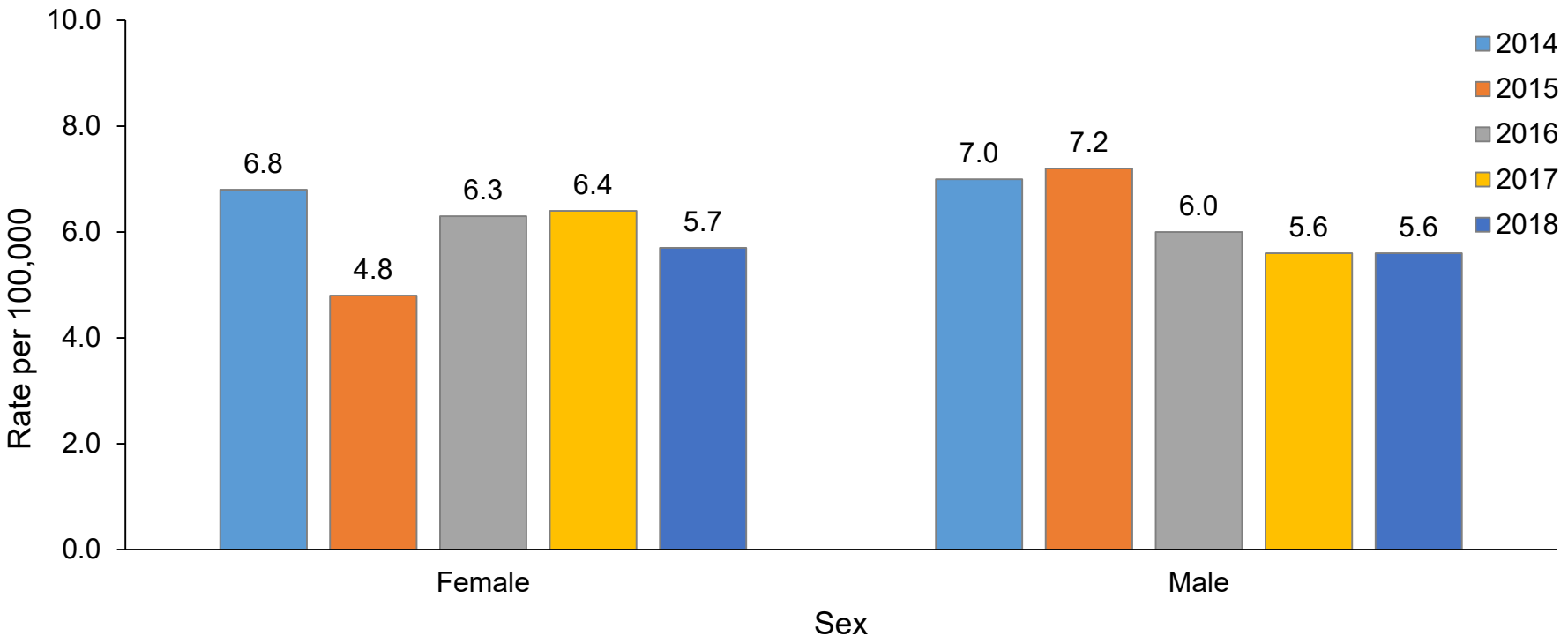

Figure 3: Females have had slightly higher rates of IPD than males over the past three years. In 2018, the rate for females was 5.7 cases per 100,000 population and the rate for males was 5.6 cases per 100,000 population.

Rate of Invasive Pneumococcal Disease by County and Year, Rhode Island, 2014-2018

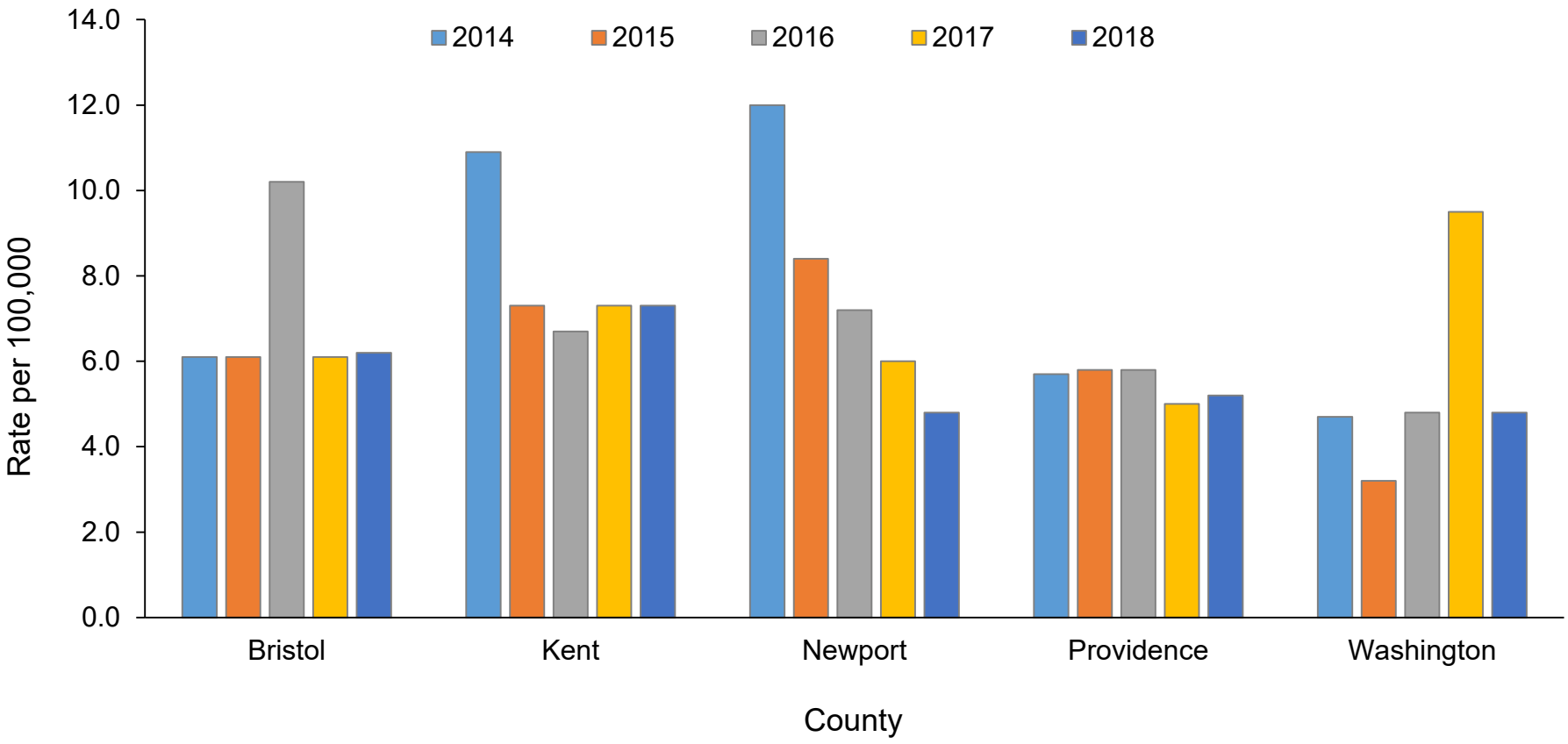

Figure 4: In 2018, Kent County had the highest rate of IPD (7.3 cases per 100,000 population).

Reported Cases of Invasive Pneumococcal Disease by Month and Year, Rhode Island, 2014-2018

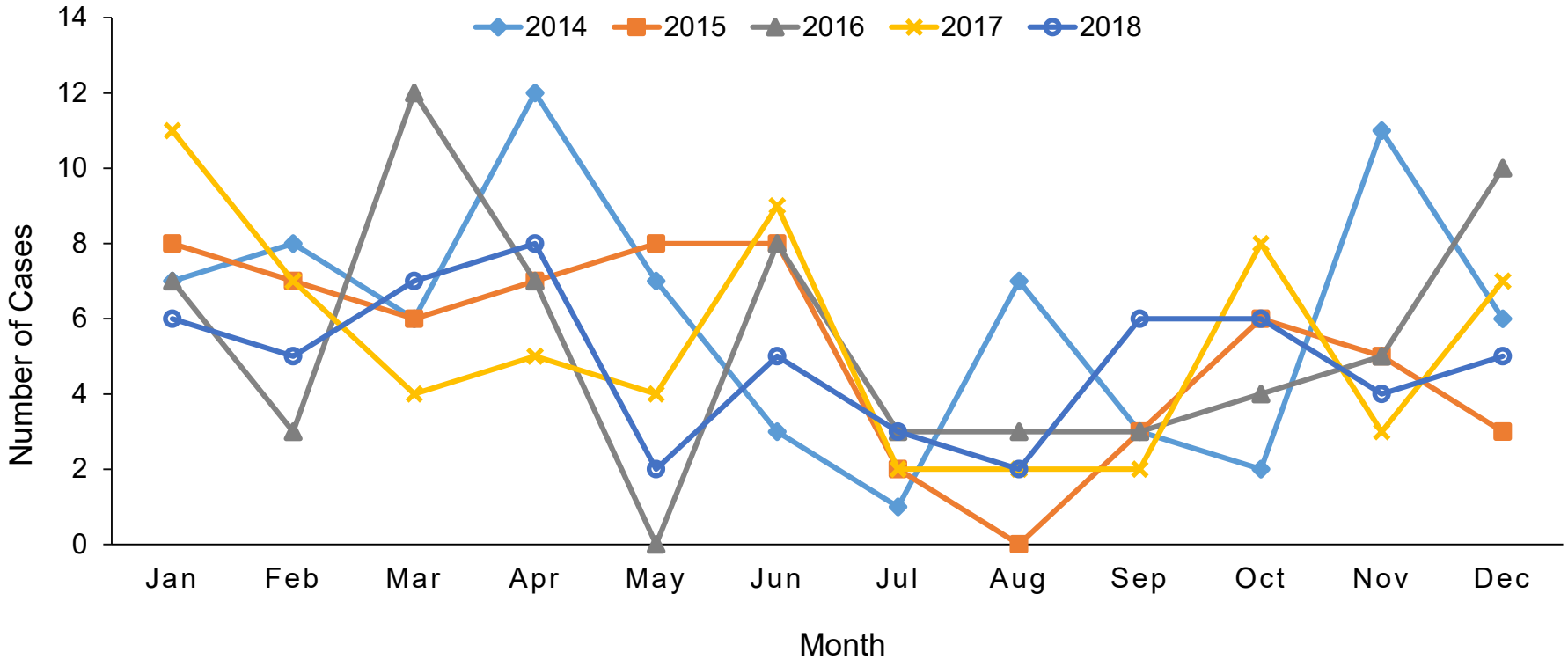

Figure 5: Historically, the highest number of cases occurs in the winter months (November though February) while the fewest cases occur in the summer months (July and August). However, in 2014, there were seven cases in August, though no relationship among the cases was found.

Invasive Pneumococcal Disease Frequency and Rates by Year, Rhode Island, 2014-2018

Table 1. Frequency by Year					
	2014	**2015**	**2016**	**2017**	**2018**
Number of Cases	73	63	65	64	59

Table 2. Rate by Year					
	2014	**2015**	**2016**	**2017**	**2018**
Rate per 100,000	6.9	6.0	6.1	6.1	5.6

Invasive Pneumococcal Disease Frequency by Age Group and Year, Rhode Island, 2014-2018

Table 3. Frequency by Age Group and Year					
	2014	**2015**	**2016**	**2017**	**2018**
0-4	4	3	2	5	2
5-9	2	2	0	1	1
10-19	3	2	1	1	1
20-29	0	3	0	2	3
30-39	4	3	4	1	2
40-49	4	6	5	11	1
50-59	14	9	15	13	16
60-69	19	15	15	8	13
70-79	7	8	9	7	7
≥80	16	12	14	15	13
Total	**73**	**63**	**65**	**64**	**59**

Invasive Pneumococcal Disease Rates by Age Group and Year, Rhode Island, 2014-2018

Table 4. Rate by Age Group and Year					
	2014	**2015**	**2016**	**2017**	**2018**
0-4	7.3	5.5	3.7	9.2	3.7
5-9	3.5	3.5	0	1.8	1.8
10-19	2.2	1.5	0.8	0.8	0.8
20-29	0.0	1.9	0	1.3	2.0
30-39	3.2	2.3	3.1	0.8	1.5
40-49	2.9	4.5	3.8	8.6	0.8
50-59	8.9	5.8	9.7	8.5	10.7
60-69	16.2	12.3	11.9	6.3	10.0
70-79	11.0	12.2	13.3	9.7	9.3
≥80	31.9	24.3	28.6	30.7	26.6

Invasive Pneumococcal Disease Frequency and Rates by Sex and Year, RI, 2014-2018

Table 5. Frequency by Sex and Year					
	2014	**2015**	**2016**	**2017**	**2018**
Female	37	26	34	35	31
Male	36	37	31	29	28
Total	**73**	**63**	**65**	**64**	**59**

Table 6. Rate by Sex and Year					
	2014	**2015**	**2016**	**2017**	**2018**
Female	6.8	4.8	6.3	6.4	5.7
Male	7.0	7.2	6.0	5.6	5.6

Invasive Pneumococcal Disease Frequency By County and Year, Rhode Island, 2014-2018

Table 7. Frequency by County and Year					
	2014	**2015**	**2016**	**2017**	**2018**
Bristol	3	3	5	3	3
Kent	18	12	11	12	13
Newport	10	7	6	5	4
Providence	36	37	37	32	33
Washington	6	4	6	12	6
Total	**73**	**63**	**65**	**64**	**59**

Invasive Pneumococcal Disease Rates by County and Year, Rhode Island, 2014-2018

Table 8. Rate by County and Year					
	2014	**2015**	**2016**	**2017**	**2018**
Bristol	6.1	6.1	10.2	6.1	6.2
Kent	10.9	7.3	6.7	7.3	7.3
Newport	12.0	8.4	7.2	6.0	4.8
Providence	5.7	5.8	5.8	5.0	5.2
Washington	4.7	3.2	4.8	9.5	4.8

Invasive Pneumococcal Disease Frequency by Month and Year, RI, 2014-2018

Table 9. Frequency by Month and Year					
	2014	**2015**	**2016**	**2017**	**2018**
Jan	7	8	7	11	6
Feb	8	7	3	7	5
Mar	6	6	12	4	7
Apr	12	7	7	5	8
May	7	8	0	4	2
Jun	3	8	8	9	5
Jul	1	2	3	2	3
Aug	7	0	3	2	2
Sep	3	3	3	2	6
Oct	2	6	4	8	6
Nov	11	5	5	3	4
Dec	6	3	10	7	5
Total	**73**	**63**	**65**	**64**	**59**

Underlying Medical Conditions, Invasive Pneumococcal Disease, Rhode Island, 2014-2018

	2014		2015		2016		2017		2018	
Cases	73		63		65		64		59	
Underlying Medical Condition	N	%	N	%	N	%	N	%	N	%
Yes	51	69.9	46	73.0	57	87.7	48	75.0	45	76.3
Alcohol Abuse	4	5.5	2	3.2	7	10.8	9	14.1	3	5.1
Asplenia	3	4.1	2	3.2	2	3.1	3	4.7	1	1.7
Cigarette Smoking	9	12.3	6	9.5	17	26.2	14	21.9	9	15.3
Diabetes Mellitus	6	8.2	11	17.5	12	18.5	13	20.3	15	25.4
Heart Disease, Chronic	20	27.4	14	22.2	17	26.2	19	29.7	15	25.4
Hemoglobinopathy	2	2.7	1	1.6	0	0.0	1	1.6	0	0
Immunosuppression	9	12.3	15	23.8	12	18.5	9	14.1	8	13.6
Liver Disease, Chronic	6	8.2	5	7.9	2	3.1	7	10.9	3	5.1
Lung Disease, Chronic	16	21.9	16	25.4	27	41.5	15	23.4	24	40.6
Malignancy, Hematologic	14	19.2	12	19.0	12	18.5	4	6.3	7	11.9
Malignancy, Solid Organ	7	9.6	4	6.3	9	13.8	9	14.1	7	11.9
Renal Failure, Chronic	1	1.4	2	3.2	4	6.2	3	4.7	2	3.4
No	20	27.4	16	25.4	8	12.3	15	23.4	14	23.7
Unknown	2	2.7	1	1.6	0	0.0	1	1.6	0	0

* Cases can have more than one underlying condition documented.

Primary Site of Disease, Invasive Pneumococcal Disease, Rhode Island, 2014-2018

	2014		2015		2016		2017		2018	
Cases	73		63		65		64		59	
	N	%	N	%	N	%	N	%	N	%
Primary Site of Disease										
Bacteremia with Pneumonia	51	69.9	41	65.1	48	73.8	44	68.8	42	71.2
Bacteremia without Focus	15	20.5	15	23.8	13	20.0	8	12.5	13	22.0
Meningitis	6	8.2	6	9.5	4	6.2	9	14.1	4	6.8
Other Site of Focus	1	1.4	1	1.6	0	0.0	3	4.7	0	0

Streptococcus pneumoniae Antibiotic Susceptibility Testing Results, Rhode Island, 2014-2018

Percent Susceptible	2014	2015	2016	2017	2018	5-Year Total	Number of Cases With Susceptibility Result Received for 5-Year Period
Penicillin							
Non-meningitis	98.4	100	94.3	98.1	96.0	97.3	266
Meningitis	82.0	76.0	75.5	86.5	80.0	80.1	
Ceftriaxone							
Non-meningitis	100	98.0	96.4	94.2	94.3	96.8	277
Meningitis	97.1	98.0	89.1	92.3	92.5	93.9	
Cefotaxime							
Non-meningitis	-	-	-	-	-	94.8	58
Meningitis	-	-	-	-	-	93.1	
Vancomycin	100	100	100	100	100	100	285
Cefepime	-	-	-	-	-	97.1	35
Clindamycin	93.6	82.9	88.1	86.7	93.6	89.2	222
Erythromycin	81.4	70.8	67.9	65.5	79.2	73.1	268
Levofloxacin	98.0	100	100	100	100	99.6	241
Linezolid	-	-	-	-	-	100	48
Meropenem	95.3	100	84.8	96.9	93.9	94.4	179
Tetracycline	85.7	82.6	87.5	87.0	93.6	87.2	243
TMP/Sulfa	-	-	-	-	-	78.5	65

* For all antibiotics, the minimum inhibitory concentration (MIC) results were used for antibiotic susceptibility classification using the 2019 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, 2018, U.S. Census Bureau.