**Supplementary Table 1. Serotype distribution by HIV status and race/ethnicity with and without imputing missing serotype information, 2008–2018**

|  |  |  |
| --- | --- | --- |
|  | Incidence among adults diagnosed with HIV Cases/100,000 persons | Incidence among adults diagnosed without HIV Cases/100,000 persons |
| 2008-2009 | 2011-2012 | 2017-2018 | 2008-2009 | 2011-2012 | 2017-2018 |
| Number of cases | UnimputedColumn %† | ImputedColumn %‡ | Number of cases | UnimputedColumn %† | ImputedColumn %‡ | Number of cases | UnimputedColumn %† | ImputedColumn %‡ | Number of cases | UnimputedColumn %† | ImputedColumn %‡ | Number of cases | UnimputedColumn %† | ImputedColumn %‡ | Number of cases | UnimputedColumn %† | ImputedColumn %‡ |
| Black, non-Hispanic |   |   |  |  |  |  |   |  |  |   |   |  |  |  |  |   |  |  |
|  All IPD\* | 348 |  |  | 288 |  |  | 236 |  |  | 901 |  |  | 731 |  |  | 824 |  |  |
|  PCV13 IPD | 155 | 44.5% | 44.7% | 93 | 32.3% | 32.7% | 41 | 17.4% | 17.0% | 419 | 46.5% | 46.7% | 252 | 34.5% | 34.8% | 201 | 24.4% | 24.3% |
|  PPSV23-unique IPD | 84 | 24.1% | 24.6% | 95 | 33.0% | 33.0% | 98 | 41.5% | 41.9% | 257 | 28.5% | 28.5% | 282 | 38.6% | 38.3% | 337 | 40.9% | 40.7% |
|  NVT IPD | 109 | 31.3% | 31.3% | 100 | 34.7 | 34.0% | 97 | 41.1% | 41.1% | 225 | 25.0% | 24.6% | 197 | 26.9% | 26.8% | 286 | 34.7% | 35.0% |
|  Missing | 55 |  |  | 27 |  |  | 24 |  |  | 113 |  |  | 68 |  |  | 88 |  |  |
| White, non-Hispanic |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  All IPD\* | 83 |  |  | 77 |  |  | 87 |  |  | 3202 |  |  | 2872 |  |  | 2606 |  |  |
|  PCV13 IPD | 48 | 57.8% | 57.4% | 33 | 42.9% | 43.7% | 28 | 32.2% | 31.3% | 1798 | 56.2% | 56.4% | 1163 | 40.5% | 40.9% | 762 | 29.2% | 29.1% |
|  PPSV23-unique IPD | 19 | 22.9% | 23.4% | 30 | 39.0% | 39.1% | 38 | 43.7% | 44.4% | 824 | 25.7% | 25.7% | 1050 | 36.6% | 36.3% | 1076 | 41.3% | 41.18% |
|  NVT IPD | 16 | 19.3% | 19.1% | 14 | 18.2% | 18.4% | 21 | 24.1% | 24.2% | 580 | 18.1% | 17.8% | 659 | 22.9% | 22.8% | 768 | 29.5% | 29.76% |
|  Missing | 8 |  |  | 8 |  |  | 10 |  |  | 407 |  |  | 253 |  |  | 299 |  |  |
| Hispanic |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  All IPD\* | 33 |  |  | 24 |  |  | 35 |  |  | 356 |  |  | 319 |  |  | 368 |  |  |
|  PCV13 IPD | 17 | 51.5% | 52.8% | 12 | 50.0% | 50.0% | 10 | 28.6% | 28.6% | 208 | 58.4% | 58.8% | 159 | 49.8% | 50.4% | 127 | 34.5% | 34.4% |
|  PPSV23-unique IPD | 8 | 24.2% | 25.0% | 7 | 29.2% | 30.8% | 15 | 42.9% | 42.9% | 84 | 23.6% | 23.7% | 82 | 25.7% | 25.6% | 147 | 39.9% | 39.8% |
|  NVT IPD | 8 | 24.2% | 25.0% | 5 | 20.8% | 19.2% | 10 | 28.6% | 28.6% | 64 | 18.0% | 17.7% | 78 | 24.5% | 24.3% | 94 | 25.5% | 25.8% |
|  Missing | 2 |  |  | 1 |  |  | 6 |  |  | 58 |  |  | 33 |  |  | 61 |  |  |

IPD, invasive pneumococcal disease; NVT, non-vaccine type; PCV13, 13-valent pneumococcal conjugate vaccine; PPSV23, 23-valent pneumococcal polysaccharide vaccine

\*Excluding those missing serotype information

†Proportion of each serotype group based on patients with information on serotype group and race/ethnicity available.

‡Proportion of each serotype after cases missing information on serotype or race/ethnicity were redistributed based on the distribution of cases with information available.

**Supplementary Table 2. Invasive pneumococcal disease (IPD) incidence among adults ≥19 years with or without HIV diagnosis by race/ethnicity and serotype group, 2008–2018**

|  |  |  |
| --- | --- | --- |
|   | Incidence among adults diagnosed with HIV Cases/100,000 persons | Incidence among adults diagnosed without HIV Cases/100,000 persons |
| 2008-2009(a) | 2011-2012(b) | % change (95%CI)(b) – (a) | 2017-2018(c) | % change (95%CI)(c) – (a) | 2008-2009(a) | 2011-2012(b) | % change (95%CI)(b) – (a) | 2017-2018(c) | % change (95%CI)(c) – (a) |
| Black, non-Hispanic |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|  All IPD | 517.8 | 360.2 | -30.4% | (-39.9, -19.5) | 249.8 | -51.8% | (-58.9, -43.8) | 20.2 | 14.1 | -30.0% | (-36.1, -23.7) | 13.8 | -31.7% | (-37.3, -25.7) |
|  PCV13 IPD | 231.4 | 117.9 | -49.1% | (-60.3, -35.7) | 42.4 | -81.7% | (-87.2, -75.2) | 9.4 | 4.9 | -47.8% | (-54.9, -39.7) | 3.4 | -64.5% | (-69.8, -58.8) |
|  PPSV23-unique IPD | 127.6 | 119.0 | -6.7% | (-29.1, 23.1) | 104.6 | -18.0% | (-37.8, 8.2) | 5.8 | 5.4 | -6.0% | (-19.5, 9.59) | 5.6 | -2.5% | (-15.8, 12.9) |
|  NVT IPD | 160.1 | 122.3 | -23.6% | (-41.1, -1.2) | 102.8 | -35.8% | (-50.8, -16.9) | 5.0 | 3.8 | -23.8% | (-36.3, -9.4) | 4.8 | -2.6% | (-16.8, 14.1) |
| White, non-Hispanic |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|  All IPD | 142.9 | 123.9 | -13.3% | (-35.5, 16.5) | 131.3 | -8.1% | (-31.4, 22.9) | 14.9 | 12.1 | -18.6% | (-22.2, -14.8) | 10.8 | -27.4% | (-30.7, -24.0) |
|  PCV13 IPD | 82.1 | 54.1 | -34.1% | (-57.7, -0.2) | 41.1 | -49.9% | (-68.9, -23.4) | 8.4 | 5.0 | -40.9% | (-44.9, -36.9) | 3.1 | -62.5% | (-65.5, -59.67) |
|  PPSV23-unique IPD | 33.4 | 48.4 | 44.8% | (-15.7, 159.0) | 58.4 | 74.6% | (6.4, 205.6) | 3.8 | 4.4 | 14.8% | (5.6, 24.9) | 4.4 | 16.0% | (6.9, 25.9) |
|  NVT IPD | 27.4 | 22.8 | -16.7% | (-60.5, 68.6) | 31.8 | 16.4% | (-37.1, 124.1) | 2.7 | 2.8 | 4.2% | (-6.1, 15.5) | 3.2 | 21.0% | (9.9, 33.4) |
| Hispanic |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|  All IPD | 157.5 | 100.9 | -35.9% | (-62.9, 5.9) | 135.2 | -14.2% | (-45.2, 35.49) | 11.6 | 8.3 | -28.6% | (-37.8, -18.2) | 8.7 | -25.2% | (-34.3, -14.9) |
|  PCV13 IPD | 83.1 | 50.4 | -39.3% | (-73.0, 22.8) | 38.6 | -53.5% | (-79.69, -6.28) | 6.8 | 4.2 | -38.8% | (-49.4, -26.3) | 3.0 | -56.1% | (-64.2, -46.9) |
|  PPSV23-unique IPD | 39.4 | 31.0 | -21.2% | (-74.7, 129.3) | 57.9 | 47.2% | (-32.6, 286.33) | 2.7 | 2.1 | -22.9% | (-41.9, 1.7) | 3.4 | 25.5% | (-0.4, 60.8) |
|  NVT IPD | 39.4 | 19.4 | -50.7% | (-90.2, 47.8) | 38.6 | -1.9% | (-60.75, 175.95) | 2.1 | 2.0 | -2.3% | (-27.7, 32.3) | 2.1 | 8.7% | (-17.9, 44.7) |

IPD, invasive pneumococcal disease; NVT, non-vaccine type; PCV13, 13-valent pneumococcal conjugate vaccine; PPSV23, 23-valent pneumococcal polysaccharide vaccine

**Supplementary Table 3. Proportion of vaccine-type serotypes among PWH aged ≥19 years by study period**

|  |  |  |  |
| --- | --- | --- | --- |
| **Serotypes** | **2008–2009, n (%)****N=486\*** | **2011–2012, n (%)****N=406†** | **2017–2018, n (%)****N=376‡** |
| **PCV13-type** | **228 (46.9)** | **146 (36.1)** | **81 (21.5)** |
| 19A | 103 (21.2) | 68 (16.8) | 17 (4.5) |
| 6C | 32 (6.6) | 27 (6.7) | 13 (3.5) |
| 7F | 26 (5.4) | 20 (5.0) | 6 (1.6) |
| 3 | 19 (3.9) | 15 (3.7) | 20 (5.3) |
| 6A | 11 (2.3) | 2 (0.5) | 0 (0) |
| 4 | 9 (1.9) | 5 (1.2) | 23 (6.1) |
| 23F | 9 (1.9) | 0 (0) | 0 (0) |
| 6B | 8 (1.6) | 0 (0) | 0 (0) |
| 9V | 8 (1.6) | 2 (0.5) | 1 (0.3) |
| 18C | 2 (0.4) | 0 (0) | 0 (0) |
| 19F | 1 (0.2) | 5 (1.2) | 1 (0.3) |
| 14 | 0 (0) | 2 (0.5) | 0 (0) |
| 1 | 0 (0) | 0 (0) | 0 (0) |
| 5 | 0 (0) | 0 (0) | 0 (0) |
| **PPSV23-unique type** | **117 (24.1)** | **138 (34.2)** | **163 (43.4)** |
|  **PCV15-unique type** | **36 (7.4)** | **37 (9.2)** | **42 (11.2)** |
| 22F | 23 (4.7) | 26 (6.4) | 28 (7.4) |
| 33F | 13 (2.7) | 11 (2.7) | 14 (3.7) |
|  **PCV20-unique type** | **44 (9.1)** | **63 (15.6)** | **64 (17.0)** |
| 8 | 2 (0.4) | 7 (1.7) | 9 (2.4) |
| 10A | 7 (1.4) | 10 (2.5) | 6 (1.6) |
| 11A | 22 (4.5) | 25 (6.2) | 18 (4.8) |
| 12F | 6 (1.2) | 4 (1.0) | 21 (5.6) |
| 15B/C | 7 (1.4) | 17 (4.2) | 10 (2.7) |
|  **Serotypes included in PPSV23 but not in PCV20** | **37 (7.6)** | **38 (9.4)** | **57 (15.2)** |
| 9N | 19 (3.9) | 19 (4.7) | 32 (8.5) |
| 17F | 10 (2.1) | 14 (3.5) | 9 (2.4) |
| 20 | 8 (1.6) | 5 (1.2) | 16 (4.3) |
| 2 | 0 (0) | 0 (0) | 0 (0) |
| **NVT** | **141 (29.0)** | **120 (29.7)** | **132 (35.1)** |
| 15A | 25 (5.1) | 18 (4.4) | 21 (5.6) |
| 16F | 23 (4.7) | 18 (4.4) | 17 (4.5) |
| 23A | 19 (3.9) | 18 (4.4) | 25 (6.7) |
| 35B | 16 (3.3) | 24 (5.9) | 10 (2.7) |
| 7C | 13 (2.7) | 10 (2.5) | 18 (4.8) |
| 31 | 11 (2.3) | 14 (3.5) | 9 (2.4) |
| 38 | 8 (1.7) | 5 (1.2) | 8 (2.1) |
| 23B | 8 (1.7) | 4 (1.0) | 7 (1.9) |
| 35F | 7 (1.4) | 3 (0.7) | 6 (1.6) |
| 34 | 3 (0.6) | 1 (0.3) | 3 (0.8) |

\*note: above table not included missing serotypes.

NVT, non-vaccine type; PCV13, 13-valent pneumococcal conjugate vaccine; PCV15, 15-valent pneumococcal conjugate vaccine; PCV20, 20-valent pneumococcal conjugate vaccine; PPSV23, 23-valent pneumococcal polysaccharide vaccine; PWH, People with HIV

\*Excludes 66 isolates missing serotype information

**†**Excludes 37 isolates missingserotype information

‡Excludes 40 isolates missing serotype information

**Supplementary Table 4. Proportion of vaccine-type serotypes among non-PWH aged ≥19 years by study period**

|  |  |  |  |
| --- | --- | --- | --- |
| **Serotypes** | **2008–2009, n (%)****N=5,292\*** | **2011–2012, n (%)****N=4,377†** | **2017–2018, n (%)****N=4,242‡** |
| **PCV13-type** | **2,884 (54.5)** | **1,780 (40.7)** | **1,220 (28.8)** |
| 7F | 973 (18.4) | 464 (10.6) | 63 (1.5) |
| 19A | 769 (14.6) | 437 (10.0) | 121 (2.9) |
| 3 | 504 (9.5) | 468 (10.7) | 650 (15.3) |
| 6C | 248 (4.7) | 260 (6.0) | 124 (2.9) |
| 4 | 77 (1.5) | 38 (0.9) | 114 (2.7) |
| 6A | 72 (1.4) | 13 (0.3) | 4 (0.1) |
| 1 | 68 (1.3) | 16 (0.4) | 1 (0.0) |
| 19F | 43 (0.8) | 41 (0.9) | 118 (2.8) |
| 9V | 41 (0.8) | 15 (0.3) | 7 (0.2) |
| 6B | 33 (0.6) | 5 (0.1) | 7 (0.2) |
| 14 | 26 (0.5) | 8 (0.2) | 7 (0.2) |
| 23F | 15 (0.3) | 10 (0.2) | 1 (0.0) |
| 18C | 10 (0.2) | 4 (0.1) | 2 (0.0) |
| 5 | 5 (0.1) | 1 (0) | 1 (0.0) |
| **PPSV23-unique type** | **1,394 (26.3)** | **1,568 (35.8)** | **1,751 (41.3)** |
|  **PCV15-unique type** | **562 (10.6)** | **649 (14.8)** | **584 (13.8)** |
| 22F | 396 (7.5) | 488 (11.2) | 429 (10.1) |
| 33F | 166 (3.1) | 161 (3.7) | 155 (3.7) |
|  **PCV20-unique type** | **574 (10.8)** | **635 (14.5)** | **715 (16.9)** |
| 8 | 143 (2.7) | 156 (3.6) | 209 (4.9) |
| 10A | 68 (1.3) | 47 (1.1) | 78 (1.8) |
| 11A | 127 (2.4) | 149 (3.4) | 161 (3.8) |
| 12F | 144 (2.7) | 174 (4.0) | 164 (3.9) |
| 15B/C | 92 (1.7) | 109 (2.5) | 103 (2.4) |
|  **Serotypes included in PPSV23 but not in PCV20** | **258 (4.9)** | **284 (6.5)** | **452 (10.7)** |
| 9N | 143 (2.7) | 164 (3.8) | 257 (6.1) |
| 17F | 62 (1.2) | 55 (1.3) | 44 (1.0) |
| 20 | 53 (1.0) | 65 (1.5) | 151 (3.6) |
| 2 | 0 (0) | 0 (0) | 0 (0) |
| **NVT** | **1,014 (19.2)** | **1,029 (23.5)** | **1,271 (30.0)** |
| 23A | 182 (3.4) | 165 (3.8) | 192 (4.5) |
| 16F | 150 (2.8) | 136 (3.1) | 160 (3.8) |
| 15A | 142 (2.7) | 142 (3.2) | 181 (4.3) |
| 35B | 118 (2.2) | 139 (3.2) | 191 (4.5) |
| 31 | 92 (1.7) | 81 (1.9) | 86 (2.0) |
| 23B | 76 (1.4) | 74 (1.7) | 134 (3.2) |

NVT, non-vaccine type; PCV13, 13-valent pneumococcal conjugate vaccine; PCV15, 15-valent pneumococcal conjugate vaccine; PCV20, 20-valent pneumococcal conjugate vaccine; PPSV23, 23-valent pneumococcal polysaccharide vaccine; PWH, People with HIV

\*Excludes 704 isolates missing serotype information

**†**Excludes 406 isolates missingserotype information

‡Excludes 511 isolates missing serotype information

**Supplementary Table 5. Invasive pneumococcal disease (IPD) incidence due to serotypes 3 and 4 among adults ≥19 years with or without HIV diagnosis by age and serotype group, 2008–2018**

|  |  |  |
| --- | --- | --- |
|   | Incidence among adults diagnosed with HIV Cases/100,000 persons | Incidence among adults diagnosed without HIV Cases/100,000 persons |
| 2008-2009(a) | 2011-2012(b) | % change (95%CI)(b) – (a) | 2017-2018(c) | % change (95%CI)(c) – (a) | 2008-2009(a) | 2011-2012(b) | % change (95%CI)(b) – (a) | 2017-2018(c) | % change (95%CI)(c) – (a) |
| ≥19 year-olds (All) |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|  Serotype 3 | 11.7 | 8.2 | -29.7% | (-66.6, 33.1) | 9.7 | -17.5% | (-55.7, 53.2) | 1.4 | 1.3 | -13.1% | (-23.0, -2.1) | 1.7 | 15.5% | (3.6, 28.9) |
|  Serotype 4 | 5.7 | 2.8 | -51.7% | (-84.9, 55.2) | 11.2 | 95.2% | (-2.6, 394.8) | 0.2 | 0.1 | -53.9% | (-68.4, -32.9) | 0.3 | 33.2% | (0.7, 76.3) |

**Supplementary Table 6. Characteristics of serotype 4 cases among adults ≥19 years with or without HIV diagnosis by age and serotype group, 2008–2018**

|  |  |  |
| --- | --- | --- |
|  | Adults with HIV diagnosis (n=23)N (%) | Adults without HIV diagnosis (n=114)N (%) |
| Age group |  |  |
| 19–64 years  | 21 (91.3) | 104 (91.2) |
| ≥65 years | 2 (8.7) | 10 (8.8) |
| Site |  |  |
| CA | 10 (43.5) | 23 (20.2) |
| CO | 11 (47.8) | 65 (57.0) |
| GA | 0 | 0 |
| MD | 0 | 1 (0.9) |
| MN | 1 (4.3) | 0 |
| NM | 1 (4.3) | 25 (21.9) |
| OR | 0 | 0 |
| TN | 0 | 0 |
| Persons experiencing homelessness | 14 (60.9) | 38 (33.3) |