**Supplementary Table S1. Differences among included and excluded patients, by year of presentation**

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2012 | 2013 | 2014 |
| Characteristic | Included | Excluded | *p* | Included | Excluded | *p* | Included | Excluded | *p* |
|  | n (%) | n (%) |  | n (%) | n (%) |  | n (%) | n (%) |  |
| Total | 3,683 (90%) | 432 (10%) |  | 2,042 (86%) | 329 (14%) |  | 3,074 (86%) | 496 (14%) |  |
| Season1 |  |  |  |  |  |  |  |  |  |
| Out-Of-Season | 0 (0%) | 184 (100%) |  | 0 (0%) | 230 (100%) |  | 0 (0%) | 299 (100%) |  |
| During Season | 3,683 (94%) | 248 (6%) | <0.01 | 2,042 (95%) | 99 (5%) | <0.01 | 3,074 (94%) | 197 (6%) | <0.01 |
| Gender |  |  |  |  |  |  |  |  |  |
| Female | 1,874 (90%) | 205 (10%) |  | 1,116 (87%) | 173 (13%) |  | 1,629 (87%) | 250 (13%) |  |
| Male | 1,786 (89%) | 219 (11%) |  | 920 (86%) | 156 (14%) |  | 1,441 (86%) | 242 (14%) |  |
| Missing | 23 (74%) | 8 (26%) | 0.03 | 6 (100%) | 0 (0%) | 0.463 | 4 (50%) | 4 (50%) | 0.008 |
| Age Group |  |  |  |  |  |  |  |  |  |
| <5 | 387 (91%) | 39 (9%) |  | 143 (80%) | 35 (20%) |  | 262 (78%) | 73 (22%) |  |
| 5-9 | 666 (87%) | 97 (13%) |  | 296 (85%) | 51 (15%) |  | 459 (87%) | 69 (13%) |  |
| 18-44 | 1,445 (91%) | 146 (9%) |  | 848 (86%) | 136 (14%) |  | 1,260 (86%) | 199 (14%) |  |
| 45-64 | 834 (89%) | 101 (11%) |  | 546 (88%) | 74 (12%) |  | 784 (88%) | 102 (12%) |  |
| 65+ | 351 (90%) | 40 (10%) |  | 209 (86%) | 33 (14%) | 0.128 | 309 (86%) | 49 (14%) |  |
| Missing | 0 (0%) | 9 (100%) | <0.01 |  |  |  | 0 (0%) | 4 (100%) | <0.01 |
| Influenza |  |  |  |  |  |  |  |  |  |
| Negative | 2,221 (88%) | 312 (12%) |  | 1,601 (84%) | 299 (16%) |  | 2,183 (84%) | 410 (16%) |  |
| Positive | 1,462 (92%) | 119 (8%) |  | 441 (94%) | 30 (6%) | <0.01 | 891 (91%) | 86 (9%) | <0.01 |
| Missing | 0 (0%) | 1 (100%) | <0.01 | 0 (0%) | 0 (0%) |  | 0 (0%) | 0 (0%) |  |
| Type/Subtype |  |  |  |  |  |  |  |  |  |
| Negative | 2,221 (88%) | 312 (12%) |  | 1,601 (84%) | 227 (12%) |  | 2,183 (84%) | 367 (14%) |  |
| A(H1N1)pdm09Pdm09 | 37 (95%) | 2 (5%) |  | 160 (97%) | 5 (3%) |  | 414 (91%) | 40 (9%) |  |
| A(H3N2) | 1,013 (92%) | 92 (8%) |  | 99 (89%) | 10 (9%) |  | 349 (92%) | 31 (8%) |  |
| B | 406 (94%) | 24 (6%) |  | 174 (95%) | 10 (5%) |  | 111 (89%) | 14 (11%) |  |
| A(Ns) | 1 (50%) | 1 (50%) |  | 7 (70%) | 3 (30%) |  | 13 (93%) | 1 (7%) |  |
| Mixed | 5 (100%) | 0 (0%) |  | 1 (100%) | 0 (0%) |  | 4 (100%) | 0 (0%) |  |
| Missing | 0 (0%) | 1 (100%) | <0.01 | 0 (0%) | 0 (0%) | <0.01 | 0 (0%) | 0 (0%) | <0.01 |
| Vaccination Status |  |  |  |  |  |  |  |  |  |
| Unvaccinated | 2,853 (95%) | 144 (5%) |  | 1,440 (88%) | 192 (12%) |  | 2,268 (91%) | 235 (9%) |  |
| Vaccinated | 830 (97%) | 27 (3%) |  | 602 (95%) | 30 (5%) |  | 806 (91%) | 80 (9%) |  |
| Missing | 0 (0%) | 261 (100%) | <0.01 | 0 (0%) | 107 (100%) | <0.01 | 0 (0%) | 181 (100%) | <0.01 |
| Network |  |  |  |  |  |  |  |  |  |
| ASPREN | 1,539 (87%) | 236 (13%) |  | 1,084 (81%) | 254 (19%) |  | 1,609 (84%) | 316 (16%) |  |
| VicSPIN | 684 (96%) | 26 (4%) |  | 314 (87%) | 45 (13%) |  | 497 (96%) | 19 (4%) |  |
| SPNWA | 1,460 (90%) | 170 (10%) | <0.01 | 644 (96%) | 30 (4%) | <0.01 | 968 (86%) | 161 (14%) | <0.01 |
| 1. Where the season began when a positive case had been reported for two consecutive weeks at least two weeks after the annual vaccination campaign (mid-March) and ended after the peak when no cases had been reported for at least three weeks.  |

**Supplementary Table S2. Vaccine effectiveness estimates within age groups and types/subtypes, 2012-2014**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | Influenza-positive | Influenza negative | VE (95%CL) |
| Year | Model | Type/subtype | Vaccinated cases | Unvaccinated cases | Vaccinated non-cases | Unvaccinated noncases | Complete case analysis | Imputed analysis |
| 2012 | All patients | A&B | 254 | 1,210 | 579 | 1,648 | 38% (24,49) | 38% (25,49) |
|  |  | A(H1N1)pdm09 | 5 | 32 |  |  | 54% (-28,83) | 54% (-28,83) |
|  |  | A(H3N2) | 206 | 814 |  |  | 30% (14,44) | 31% (14,44) |
|  |  | B | 43 | 368 |  |  | 56% (37,70) | 56% (37,70) |
|  | Children, <5y | A&B | 5 | 116 | 16 | 250 | 7% (-178,69) | 6% (-180,69) |
|  |  | A(H1N1)pdm09 | 0 | 6 |  |  |  |  |
|  |  | A(H3N2) | 4 | 94 |  |  | -1% (-235,70) | -1% (-237,70) |
|  |  | B | 1 | 17 |  |  |  |  |
|  | Children, <18y | A&B | 24 | 486 | 41 | 502 | 45% (3,68) | 44% (2,68) |
|  |  | A(H1N1)pdm09 | 0 | 10 |  |  |  |  |
|  |  | A(H3N2) | 15 | 284 |  |  | 32% (-31,64) | 31% (-33,65) |
|  |  | B | 9 | 194 |  |  | 53% (-5,79) | 52% (-5,78) |
|  | Working-age adults, 18-64y | A&B | 151 | 674 | 359 | 1,096 | 31% (13,45) | 31% (14,45) |
|  | A(H1N1)pdm09 | 4 | 22 |  |  | 61% (-20,87) | 60% (-23,87) |
|  |  | A(H3N2) | 122 | 493 |  |  | 25% (4,42) | 25% (4,42) |
|  | B | 25 | 161 |  |  | 48% (18,67) | 48% (19,67) |
|  | Elderly, 65+y | A&B | 79 | 48 | 176 | 48 | 56% (27,73) | 55% (27,73) |
|  |  | A(H1N1)pdm09 | 1 | 0 |  |  |  |  |
|  |  | A(H3N2) | 69 | 35 |  |  | 45% (5,69) | 45% (6,68) |
|  |  | B | 9 | 13 |  |  | 80% (49,92) | 79% (47,92) |
| 2013 | All patients | A&B | 69 | 372 | 533 | 1,068 | 60% (45,70) | 59% (45,70) |
|  |  | A(H1N1)pdm09 | 25 | 136 |  |  | 59% (33,74) | 58% (33,74) |
|  |  | A(H3N2) | 16 | 84 |  |  | 67% (39,82) | 66% (38,82) |
|  |  | B | 26 | 148 |  |  | 57% (30,73) | 57% (30,73) |
|  | Children, <5y | A&B | 0 | 19 | 5 | 119 |  |  |
|  |  | A(H1N1)pdm09 | 0 | 9 |  |  |  |  |
|  |  | A(H3N2) | 0 | 3 |  |  |  |  |
|  |  | B | 0 | 8 |  |  |  |  |
|  | Children, <18y | A&B | 4 | 112 | 28 | 295 | 67% (-2,89) | 65% (-7,88) |
|  |  | A(H1N1)pdm09 | 1 | 26 |  |  |  |  |
|  |  | A(H3N2) | 0 | 20 |  |  |  |  |
|  |  | B | 3 | 67 |  |  |  |  |
|  | Working-age adults, 18-64y | A&B | 54 | 247 | 355 | 738 | 53% (35,66) | 53% (35,67) |
|  | A(H1N1)pdm09 | 21 | 107 |  |  | 56% (27,73) | 56% (27,73) |
|  | A(H3N2) | 13 | 59 |  |  | 56% (17,77) | 56% (18,77) |
|  | B | 18 | 76 |  |  | 49% (13,71) | 50% (14,71) |
|  | Elderly, 65+y | A&B | 11 | 13 | 150 | 35 | 85% (59,94) | 83% (56,94) |
|  |  | A(H1N1)pdm09 | 3 | 3 |  |  |  |  |
|  |  | A(H3N2) | 3 | 5 |  |  |  |  |
|  |  | B | 5 | 5 |  |  | 85% (38,97) | 84% (31,96) |
| 2014 | All patients | A&B | 188 | 711 | 647 | 1,577 | 44% (31,55) | 43% (29,54) |
|  |  | A(H1N1)pdm09 | 70 | 352 |  |  | 55% (39,67) | 54% (38,66) |
|  |  | A(H3N2) | 94 | 261 |  |  | 26% (1,45) | 25% (-1,44) |
|  |  | B | 19 | 93 |  |  | 54% (21,73) | 54% (22,73) |
|  | Children, <5y | A&B | 2 | 56 | 13 | 210 |  |  |
|  |  | A(H1N1)pdm09 | 2 | 28 |  |  |  |  |
|  |  | A(H3N2) | 0 | 26 |  |  |  |  |
|  |  | B | 0 | 2 |  |  |  |  |
|  | Children, <18y | A&B | 13 | 216 | 52 | 462 | 62% (23,81) | 59% (19,79) |
|  |  | A(H1N1)pdm09 | 4 | 84 |  |  | 76% (15,93) | 67% (-0,89) |
|  |  | A(H3N2) | 9 | 94 |  |  | 27% (-69,68) | 29% (-62,69) |
|  |  | B | 0 | 37 |  |  |  |  |
|  | Working-age adults, 18-64y | A&B | 125 | 474 | 426 | 1,036 | 45% (30,57) | 44% (28,56) |
|  | A(H1N1)pdm09 | 54 | 258 |  |  | 53% (35,66) | 53% (34,66) |
|  | A(H3N2) | 54 | 157 |  |  | 30% (1,51) | 27% (-3,49) |
|  | B | 12 | 55 |  |  | 56% (16,77) | 57% (18,78) |
|  | Elderly, 65+y | A&B | 50 | 20 | 169 | 78 | 7% (-73,50) | 7% (-72,50) |
|  |  | A(H1N1)pdm09 | 12 | 9 |  |  | 52% (-24,82) | 48% (-33,79) |
|  |  | A(H3N2) | 31 | 10 |  |  | -13% (-150,49) | -7% (-136,52) |
|  |  | B | 7 | 1 |  |  |  |  |

All models adjusted for vaccination status, age group (<5, 5-17, 18-64, 65+), calendar time (spline) and network (fixed effect). VE is only presented for models with at least 3 vaccinated and unvaccinated cases.

**Supplementary Table S3. Comparison of published estimates in each network and pooled estimates generated in this study, 2012.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | SPNWA [[3](#_ENREF_3)] | VicSPIN [[2](#_ENREF_2)] | ASPREN [[10](#_ENREF_10)] | Pooled estimate |
| A&B | 49% (30, 63) | 45% (8,66) | 23% (− 4,43) | 38% (24,49) |
| H1 | 8% (−868, 91) |  |  | 54% (-28,83) |
| H3 | 46% (21, 63) | 35% (-11,62) | 13% (− 20,36)\* | 30% (14,44) |
| B | 54% (26, 71) |  | 53% (5,77) | 57% (37,70) |
| Children <5y | 24% (−216, 82) |  |  | 7% (-178,69) |
| Children <18y | 62% (0, 85) |  | 12% (− 125,66) | 45% (3,68) |
| 18-64 | 47% (19, 65) |  | 12% (− 22,36) | 31% (13,45) |
| Elderly >65y | 62% (15, 83) |  | 67% (23,86) | 56% (28,73) |

\*Influenza A not H1