**Supplementary Table 1: Comparison of characteristics of HIV-infected and -uninfected influenza-positive index cases, Klerksdorp and Pietermaritzburg in South Africa, 2013-2014**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Characteristic** | **HIV infected****n/N (%)****N=28** | **HIV uninfected (%)****N=59** | **Univariate****OR (95% CI)** | **p** |
| Age group (years) <1 1-4  5-14 15-24 25-44 45-64 ≥65 | 1/28 (4)1/28 (4)2/28 (7)1/28 (4)17/28 (61)6/28 (21)0/28 (0) | 1/59 (2)17/59 (29)20/59 (34)13/59 (22)5/59 (8)3/59 (5)0/59 (0) | 13.0 (0.4-405)0.8 (0.1-13.4)1.3 (0.1-15.8)Reference44.2 (4.6-425.7)26.0 (2.2-304.7)Not included | 0.1440.8540.837Reference0.0010.009 |
| Female | 20/28 (71) | 32/59 (54) | 2.1 (0.8-5.5) | 0.121 |
| Pietermaritzburg site | 15/28 (54) | 27/59 (46) | 1.4 (0.6-3.4) | 0.495 |
| Enrolled in 2014  | 20/28 (71) | 38/59 (64) | 1.4 (0.5-3.7) | 0.517 |
| Alcohol usea | 8/20 (40) | 5/21 (24) | 2.1 (0.6-8.2) | 0.269 |
| Smokinga | 3/20 (15) | 5/21 (24) | 0.6 (0.1-2.8) | 0.474 |
| Underlying medical condition (not HIV) d | 2/28 (7) | 0/59 (0) | 11.2 (0.5-242.0)c | 0.123 |
| Currently taking treatment for tuberculosis | 2/23 (9) | 1/56 (2) | 5.4 (0.5-62.9) | 0.178 |
| Received influenza vaccine | 0/24 (0) | 1/55 (2) | 0.7 (0.1-18.9)c | 0.856 |
| Influenza type A (vs B) | 24/28 (86) | 53/59 (90) | 1.5 (0.4-5.7) | 0.579 |
| Influenza type and subtype  A(H1N1)pdm09 A(H3N2) A(unsubtyped) B | 6/28 (21)17/28 (61)1/28 (4)4/28 (14) | 11/59 (19)40/59 (68)2/59 (3)6/59 (10) | Reference0.8 (0.2-2.4)0.9 (0.1-12.3)1.2 (0.2-6.1) | Reference0.6690.9480.807 |
| Influenza cycle threshold (Ct) value <30 | 21/28 (75) | 41/58 (71) | 1.2 (0.4-3.5) | 0.674 |
| Viral coinfectionb | 5/28 (18) | 13/59 (22) | 0.8 (0.2-2.4) | 0.650 |
| Pneumococcal colonisation | 6/14 (43) | 29/39 (74) | 0.25 (0.1-0.9) | 0.036 |
| Sore throat | 13/24 (54) | 22/56 (39) | 1.8 (0.7-4.8) | 0.221 |
| Runny nose | 21/24 (88) | 44/56 (79) | 1.9 (0.5-7.5) | 0.337 |
| Headache | 16/24 (67) | 25/56 (45) | 2.5 (0.9-6.7) | 0.075 |
| Myalgia | 7/24 (29) | 11/56 (20) | 1.7 (0.6-5.1) | 0.353 |
| **Household characteristics** |  |  |  |  |
| >3 people per room | 8/28 (29) | 18/59 (31) | 0.9 (0.3-2.5) | 0.853 |
| Number in household (excluding index case) 2-3 4-6 7+ | 14/28 (50)11/28 (39)3/28 (11) | 16/59 (27)38/59 (64)5/59 (8) | Reference0.9 (0.3-2.5)0.5 (0.3-0.8) | Reference0.6440.027 |
| Child <5 years in the house (excluding index case) | 9/28 (32) | 14/59 (24) | 1.5 (0.6-4.1) | 0.410 |
| ≥2 secondary cases in household | 2/28 (7) | 16/59 (27) | 0.2 (0.04-0.9) | 0.021 |
| Smoke exposure in home  | 3/19 (16) | 4/38 (11) | 1.6 (0.3-7.9) | 0.574 |
| Home has a tap inside | 4/19 (21) | 14/39 (36) | 0.5 (0.1-1.7) | 0.241 |
| Soap available for hand washing | 10/19 (53) | 20/38 (53) | 0.6 (0.3-3.0) | 0.969 |
| Cook with electric stove | 18/19 (95) | 36/39 (92) | 1.5 (0.1-15.4) | 0.721 |

OR – Odds ratio, CI – confidence interval

Data missing for alcohol use (n=4), smoking (n=4), current tuberculosis treatment (n=8), received influenza vaccine (n=9), influenza cycle threshold value (n=1), pneumococcal colonization (n=39), symptoms (sore throat, runny nose, headache and myalgia) (n=7), smoke exposure in home (n=30), tap inside home (n=29), soap available (n=30), cook with electric stove (n=29). Additional factors evaluated but not found to be associated with HIV status of the index case: sharing eating utensils with contacts, avoiding contact with household members, sharing a bed with the index case.

aIndividuals aged >15 years

bTest positive on polymerase chain reaction for at least one of parainfluenza virus types 1-3, respiratory syncytial virus, enterovirus, human metapneumovirus, adenovirus or human rhinovirus

cEstimated using Firth logistic regression

dAsthma, other chronic lung disease, chronic heart disease, liver disease, renal disease, diabetes mellitis, immunocompromising conditions excluding HIV infection, neurological disease or pregnancy. Comorbidities were considered absent in cases for which the medical records stated that the patient had no underlying medical condition or when there was no direct reference to that condition.

**Supplementary table 2: Characteristics of index case and household contacts associated with household secondary infection risk (SIR) individuals testing influenza positive on day 12 visit, Klerksdorp and Pietermaritzburg in South Africa, 2013-2014**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Characteristic** | **SIRa** **n/N (%)** | **Univariate****OR (95% CI)** | **p** | **Multivariable****OR (95% CI)** | **p** |
| **Index case characteristics** |  |  |  |  |  |
| Age group (years) <1 1-4  5-14 15-24 25-44 45-64 ≥65 | 0/6 (0)26/62 (42)19/86 (22)13/56 (23)21/85 (25)4/38 (11)0/0 (0) | Not estimated2.5 (1.2-5.4)Reference1.1 (0.4-2.5)1.2 (0.5-2.8)0.4 (0.1-2.6)Not estimated | 0.016Reference0.8840.7420.343 | Not estimated3.3 (1.1-9.7)Reference1.9 (0.7-5.7)4.8 (1.1-22.7)1.6 (0.2-14.9)Not included | 0.032Reference0.2320.0480.684 |
| Sex Male Female | 32/122 (26)51/211 (24) | 1.1 (0.6-2.1)Reference | 0.736Reference |  |  |
| Site Klerksdorp Edendale | 55/177 (31)28/156 (18) | 2.1 (1.2-4.0)Reference | 0.033Reference |  |  |
| Year 2013 2014 | 21/108 (19)62/225 (28) | Reference1.6 (0.8-2.9) | Reference 0.143 |  |  |
| HIV status Uninfected Infected | 64/220 (29)19/113 (17) | Reference0.5 (0.2-1.2) | Reference0.112 | Reference0.3 (0.1-0.9) | Reference0.042 |
| HIV status Uninfected Infected, receiving ART Infected, not receiving ART  | 64/215 (30)14/77 (18)5/36 (14) | Reference0.5 (0.2-1.6)0.4 (0.1-0.8) | Reference0.2570.016 |  |  |
| Non HIV underlying illnessd Absent Present | 83/326 (25)0/7 (0) | Not estimated |  |  |  |
| Currently taking treatment for tuberculosis No Yes | 66/281 (23)9/15 (60) | Reference4.9 (2.2-10.9) | Reference0.002 |  |  |
| Alcohol usec No Yes | 24/89 (27)5/43 (12) | 2.8 (0.9-8.0)Reference | 0.038Reference |  |  |
| Smokingc No Yes | 25/108 (23)4/24 (17) | 1.5 (0.5-4.8)Reference | 0.476Reference |  |  |
| Influenza type A B | 71/288 (24)12/39 (31) | Reference1.4 (0.5-4.3) | Reference0.517 |  |  |
| Influenza type and subtype  A(H3N2) A(H1N1)pdm09 B A (Unsubtyped) | 57/219 (26)12/65 (18)12/39 (31)2/10 (20) | 1.6 (0.7-3.3)Reference1.9 (0.6-6.6)1.1 (0.2-7.9) | 0.242Reference0.2750.921  |  |  |
| Influenza cycle threshold (Ct) value  <30 ≥30 | 68/243 (28)14/88 (16) | 2.1 (1.0-4.1)Reference | 0.042Reference | 2.4 (1.1-5.2)Reference | 0.031Reference |
| Pneumococcal colonisation Yes No | 38/131 (29)24/75 (32) | 0.9 (0.4-2.1)Reference | 0.744Reference |  |  |
| Viral coinfectionb Yes No | 18/64 (28)65/269 (24) | 1.2 (0.6-2.4)Reference | 0.553Reference |  |  |
| Received influenza vaccine Yes No | 0/5 (0)74/298 (25) | Not estimated |  |  |  |
| Sore throat Yes No | 23/135 (17)53/173 (31) | 0.5 (0.2-0.9)Reference | 0.030Reference |  |  |
| Myalgia Yes No | 9/64 (14)67/244 (27) | 0.4 (0.1-1.2)Reference | 0.119Reference |  |  |
| **Household contact characteristics** |  |  |  |  |  |
| Age group (years) <1 1-4  5-14 15-24 25-44 45-64 ≥65 | 3/6 (50)14/28 (50)20/82 (24)11/76 (14)18/84 (21)11/40 (28)6/17 (35) | 3.1 (0.8-12.7)3.1 (1.2-8.1)Reference0.5 (0.2-1.2)0.8 (0.4-1.8)1.2 (0.5-3.0)1.7 (0.6-5.1) | 0.1130.023Reference0.1210.6680.7340.348 | 1.5 (0.4-5.4)3.7 (1.3-10.5)Reference0.5 (0.2-1.1)0.8 (0.4-1.9)1.1 (0.4-3.5)2.0 (0.6-7.4) |  0.5030.016Reference0.0880.6350.8160.253 |
| Sex Male Female | 28/109 (26)50/200 (25) | 1.0 (0.6-1.8)Reference | 0.893Reference |  |  |
| HIV status Uninfected Infected | 41/140 (29)5/26 (19) | Reference0.6 (0.2-1.9) | Reference0.351 |  |  |
| Non HIV underlying illnessd Absent Present | 80/321 (25)3/12 (25) | Reference1.0 (0.3-3.6) | Reference0.995 |  |  |
| Alcohol usec No Yes | 33/145 (23)11/57 (19) | Reference0.8 (0.4-1.8) | Reference0.614 |  |  |
| Smokingc No Yes | 37/169 (22)7/33 (21) | Reference1.0 (0.4-2.5) | Reference0.934 |  |  |
| Received influenza vaccine Yes No | 2/12 (17)60/259 (23) | Reference1.5 (0.3-7.5) | Reference0.611 |  |  |
| Share a bed with the index case Yes No | 32/86 (37)48/226 (21) | 2.2 (1.2-3.9)Reference | 0.008Reference | 2.7 (1.4-5.3)Reference | 0.004Reference |
| Number of people in household  3-4 4-7 >7 | 15/85 (18)46/195 (24)22/53 (42) | Reference1.4 (0.7-3.1)3.3 (1.1-9.6) | Reference0.3440.027 | Reference1.7 (0.6-4.9)4.2 (1.1-16.4) | Reference0.2990.035 |
| Number of children aged <5 years in house≤2 >2 | 70/315 (22)13/18 (72) | Reference9.1 (3.1-26.4) | Reference<0.001 |  |  |

OR – Odds ratio, CI – confidence interval. For each characteristic, all available data were included in the analysis. Odds ratios and p values for all variables included in the multivariable models are displayed in the two right hand columns of the table. No pairwise interactions were included in the multivariable models as no interaction terms were found significant. Additional factors evaluated but not found to be associated with SIR: pneumococcal colonisation, viral coinfection, index case myalgia, index case runny nose, crowding (≥3 people per room), sharing eating utensils with the index case, avoiding contact with the sick household member.

Missing data: Out of 87 index cases included in the analysis data were missing for alcohol use (n=4), smoking (n=4), current tuberculosis treatment (n=8), received influenza vaccine (n=8), influenza cycle threshold value (n=1), pneumococcal colonization (n=34), symptoms (sore throat, runny nose, headache and myalgia) (n=7). Out of 333 household contacts included in the analysis data were missing for contact sex (n=24), contact HIV status (n=167), contact alcohol use (n=15), contact smoking (n=15), contact influenza vaccine receipt (n=62), contact sharing a bed with index (n=21).

aSecondary infection risk (SIR)=Number of secondary cases in the household/number of exposed household contacts

bTest positive on polymerase chain reaction for at least one of parainfluenza virus types 1-3, respiratory syncytial virus, enterovirus, human metapneumovirus, adenovirus or human rhinovirus

cSelf reported, among individuals aged >15 years

dAsthma, other chronic lung disease, chronic heart disease, liver disease, renal disease, diabetes mellitis, immunocompromising conditions excluding HIV infection, neurological disease or pregnancy. Comorbidities were considered absent in cases for which the medical records stated that the patient had no underlying medical condition or when there was no direct reference to that condition.

**Supplementary table 3: Reported symptoms among household contacts testing influenza positive by age group, Klerksdorp and Pietermaritzburg in South Africa, 2013-2014**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Symptom** | **All ages****N=58****n (%)** | **<5 years****N=11****n (%)** | **≥5 years****N=47****n (%)** | **p** |
| Fever | 29 (50) | 7 (64) | 22 (47) | 0.315 |
| Cough | 42 (72) | 11 (100) | 31 (66) | 0.023 |
| Nasal congestion | 39 (67) | 11 (100) | 28 (60) | 0.010 |
| Sore throat | 27 (47) | 5 (45) | 22 (47) | 0.935 |
| Muscle pains | 21 (36) | 1 (9) | 20 (43) | 0.038 |
| Headache | 32 (55) | 3 (27) | 29 (62) | 0.039 |
| Diarrhoea | 13 (22) | 1 (9) | 12 (26) | 0.239 |
| Any symptom | 46 (79) | 11 (100) | 35 (74) | 0.060 |
| ≥2 symptoms | 41 (71) | 10 (91) | 31 (66) | 0.102 |
| Fever and cough | 28 (48) | 7 (64) | 21 (45) | 0.257 |