**Table S1. Methods of laboratory testing**

|  |  |
| --- | --- |
| **First author (Year)** | **Method of laboratory testing** |
| Ali (2016) 1 | RT-PCR |
| Ampofo (2006) 2 | 7-valent direct fluorescent antibody (DFA) staining (Simufluor respiratory screen). |
| Bennet (2016) 3 | Immunofluorescence and viral isolation prior to October 2007, RT-PCR for the remainder of the study period. |
| Bhat (2005) 4 | Rapid diagnostic test or enzyme immunoassay, isolation of virus in tissue-cell culture, direct or indirect immunofluorescent-antibody staining, RT-PCR analysis, or immunohistochemistry. |
| Broor (2014) 5 | RT-PCR |
| Budge (2014) 6 | Real-time monoplex RT-PCR analysis of nasal swabs. |
| Cohen (2016) 7 | RT-PCR |
| Cox (2012) 8 a,b | Viral culture, immunofluorescence antibody staining, RT-PCR, or rapid diagnostic test. |
| Dawood (2010) 9 b | Viral culture, direct or indirect fluorescent antibody staining, rapid antigen test, or RT-PCR. |
| Griffin (2004) 10 c | Viral culture or RT-PCR. |
| Grijalva (2006) 11 b,c | Viral culture or RT-PCR. |
| Grijalva (2007) 12 b,c | Viral culture or RT-PCR. |
| Iwane (2004) 13 c | Viral culture or RT-PCR. |
| Ji (2010) 14 | Fluorescent monoclonal antibody assay. |
| Libster (2010) 15  | RT-PCR |
| Madhi (2014) 16 | RT-PCR |
| McMorrow (2015) 17 | RT-PCR |
| Montes (2005) 18 | RT-PCR |
| Nelson (2014) 19 | Immunofluorescence (IF) test and/or conventional viral culture in one of the 12 Hong Kong hospitals with pediatric patients (Prince of Wales Hospital). In the other 11 hospitals, infants with influenza were identified using diagnostic codes in a hospitalization database. Incidence rates were adjusted for over- and under-diagnosis based on the comparison of diagnostic codes with laboratory data in the one surveillance hospital in this study (Prince of Wales Hospital).  |
| Poehling (2006) 20 c | Two consecutive positive RT-PCRs or a positive viral culture. |
| Poehling (2013) 21 c | Two consecutive positive RT-PCRs or a positive viral culture. |
| Proff (2009) 22 | Viral culture, RT-PCR, or direct immunofluorescent antibody (DFA) staining, or rapid diagnostic tests. |
| Silvennoinen (2011) 23 | Influenza A or B antigens in nasopharyngeal aspirates by one-incubation, monoclonal time-resolved fluoroimmunoassay, viral culture, or rapid diagnostic test. |
| Stein (2010) 24 | RT-PCR |
| Tapia (2016) 25 | RT-PCR |
| Yu (2013) 26 | RT-PCR |
| Zhang (2016) 27 | RT-PCR |

RT-PCR: reverse-transcriptase polymerase chain reaction

**Table S2. Information reported on influenza vaccination coverage in pregnant women in locations where the studies included were conducted**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **First author (Year)** | **Text from article on influenza vaccination coverage in pregnant women** | **Location** | **Time period** | **Pandemic or seasonal influenza**  |
| Ali (2016) 1 | No information provided in text.  | Sindh Province, Pakistan | October 2011 to June 2014 | Seasonal |
| Ampofo (2006) 2 | No information provided in text.  | Salt Lake City, Utah, United States | July 2001 to June 2004 | Seasonal |
| Bennett (2016) 3 | No information provided in text.  | Stockholm, Sweden | 1998–1999 to 2013–2014 | Pandemic H1N1 and seasonal |
| Bhat (2005) 4 | No information provided in text.  | United States | September 2003 to May 2004 | Seasonal  |
| Broor (2014) 5 | No information provided in text.  | Haryana State, India | August 2009 to July 2011 | Pandemic H1N1 and seasonal |
| Budge (2014) 6 | No information provided in text.  | Department of Cajamarca, Peru | May 2009 to September 2011 | Pandemic H1N1 and seasonal |
| Cohen (2016) 7 | No information provided in text.  | Gauteng Province, KwaZulu-Natal Province, Mpumalanga Province, South Africa | January 2010 to December2013 | Seasonal |
| Cox (2012) 8  | No information provided in text.  | United States  | April 2008 to April 2010 | Pandemic H1N1 and seasonal |
| Dawood (2010) 9 | No information provided in text.  | United States | 2003–2004 to 2007–2008  | Seasonal |
| Griffin (2004) 10 | No information provided in text.  | Davidson County, Tennessee; Hamilton County, Ohio; and MonroeCounty, New York, United States | 2000–2001 to 2003–2004  | Seasonal  |
| Grijalva (2006) 11  | No information provided in text.  | Davidson County, Tennessee, United States | 2003–2004  | Seasonal |
| Grijalva (2007) 12  | No information provided in text.  | Davidson County, Tennessee; Hamilton County, Ohio; and MonroeCounty, New York, United States | 2004–2005  | Seasonal |
| Iwane (2004) 13  | No information provided in text. | Davidson County,Tennessee; Monroe County, New York; United States | 2000–2001  | Seasonal |
| Ji (2010) 14 | “Influenza vaccination is not routinely recommended in China and immunization of children is uncommon.” | Jiangsu province, China | Jan 2007 to December 2008 | Seasonal |
| Libster (2010) 15  | No information provided in text. | Buenos Aires, Argentina | May 2009 to July 2009 | Pandemic H1N1 |
| Madhi (2014) 16 | This was an RCT of influenza vaccination of pregnant women in South Africa. Only data from the HIV-uninfected comparator group were included in this systematic review. | Soweto, South Africa | 2011 to 2012 | Seasonal |
| McMorrow (2015) 17 | No information provided in text.  | Nairobi and Lwak, Kenya | January 2008 to December 2012 | Pandemic H1N1 and seasonal |
| Montes (2005) 18 | No information provided in text.  | Regions of Basque Country, Spain | July 2001 to June 2004 | Seasonal |
| Nelson (2014) 19 | “The vaccination uptake rate among pregnant women in Hong Kong is low in general, and ranged between 1.7 and 4.9% from various studies reported during this period.” | Hong Kong (China) | April 2005 to March 2011  | Pandemic H1N1 and seasonal |
| Poehling (2006) 28  | No information provided in text.  | Davidson County, Tennessee; Hamilton County, Ohio; and MonroeCounty, New York, United States | 2000–2001 to 2003–2004  | Seasonal |
| Poehling (2013) 21  | No information provided in text.  | Davidson County, Tennessee; Hamilton County, Ohio; and MonroeCounty, New York, United States | 2004–2005 to 2008–2009  | Seasonal |
| Proff (2009) 22 | No information provided in text.  | Colorado, United States | 2004 to 2008 (October 1 to May 31 annually) | Seasonal |
| Silvennoinen (2011) 23 | “Immunization of pregnant women is an alternative approach to protect young infants along with their mothers, but so far the immunization rates of pregnant women against seasonal influenza have remained relatively low.” | Finland | July 1988 to June 2004 | Seasonal |
| Stein (2010) 24 | No information provided in text. | Israel | July 12, 2009 to December 24, 2009 | Pandemic H1N1 |
| Tapia (2016) 25 | This was an RCT of influenza vaccination of pregnant women in Mali. Only data from the comparator group were included in this systematic review. Influenza vaccine was not part of the national immunization program at the time the trial was conducted.  | Bamako, Mali | September 12, 2011 to January 28, 2014 | Seasonal |
| Yu (2013) 26 | “Seasonal influenza vaccination is not included in the national immunization program, and individuals must purchase it themselves. China CDC currently recommends annual influenza vaccination for persons with chronic illness, pregnant women, individuals aged <5 or ≥60 years old, health care workers, and close contacts of high-risk individuals, an estimated population of 570 million. China does not currently have the capacity to produce this much influenza vaccine.” | Jingzhou City, Hubei Province, China | April 2010 to April 2012 | Seasonal |
| Zhang (2016) 27 | No information provided in text. | Suzhou District, China | April 2011 to March 2014 | Seasonal |

**Table S3. Incidence estimates of laboratory-confirmed influenza hospitalizations among infants under six months of age**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **First author (Year)** | **Time period** | **Number of cases** |  **Denominator** | **Rate per 10,000****(95% CI)** | **Adjustment** |
| Ampofo (2006) 2 | July 2001 to June 2004 | 65 | 25,710 | 25.3 per 10,000 population(16.1–37.5) | None |
| Bennet (2016) 3 | 1998–1999 to 2013–2014 | -- a | -- a | 14.4 per 10,000 population b | None |
| Broor (2014) 5 | August 2009 to July 2011 | -- a | -- a | 17.8 per 10,000 population (6.3–51.9) | Adjusted for missed hospitalizations at non-study hospitals by dividing the unadjusted incidence by the proportion of hospitalizations among area residents occurring at study facilities. |
| Cohen (2016) 7 | January 2010 to December2013 | -- a | -- a | 43.4 per 10,000 population (34.4–53.9) c | Adjusted for non-enrollment on weekends and due to refusal. Adjusted SARI case numbers were then multiplied by the age- and HIV exposure status–specific detection rate for influenza. |
| Cox (2012) 8  | 2008–2009 | 188 | 156,129 | 12.0 per 10,000 population (10.4–13.9 d) | None |
| 2009–2010 | 328 | 162,376 b | 20.2 per 10,000 population (18.1–22.5 d) | None |
| Dawood (2010) 9  | 2003–2004  | 357 | 120,608 b | 29.6 per 10,000 population (26.7–32.8 d) | None |
| 2004–2005 | 166 | 129,688 b | 12.8 per 10,000 population (11.0–14.9 d) |
| 2005–2006 | 205 | 169,421 b | 12.1 per 10,000 population (10.5–13.8 d) |
| 2006–2007 | 141 | 151,613 b | 9.3 per 10,000 population (7.9–10.9 d) |
| 2007–2008 | 252 | 155,556 b | 16.2 per 10,000 population (14.3–18.3 d) |
| Griffin (2004) 10 | 2000–2001 to 2003–2004  | -- a | -- a | 43.0 per 10,000 population e,f | None |
| Grijalva (2006) 11  | 2003–2004  | 37 | 4,056 | 91.2 per 10,000 population (67.0–145.0) | None |
| Grijalva (2007) 12  | 2004–2005  | 63 | 14,368 | 43.8 per 10,000 population (38.9–52.1) | None |
| Iwane (2004) 13  | 2000–2001  | 21 d | 8,591 | 24.0 per 10,000 population (10.0–38.0) | None |
| Ji (2010) 14 | 2007  | 15 | 24,261 | 6.2 per 10,000 population (3.1–9.3) | None |
| 2008 | 15 | 23,886 | 6.3 per 10,000 population (3.1–9.5) |
| Libster (2010) 15  | May 2009 to July 2009 | 83 | 41,180 | 20.2 per 10,000 population (16.2–24.2 d) | None |
| Madhi (2014) 16 | 2011–2012 | 1g | 1,023  | 9.8 per 10,000 population (0.49–48.2d) h | None |
| McMorrow (2015) 17 | 2008  | -- a | -- a | 0 | Rates adjusted by the proportion influenza positive among hospitalized children meeting the acute lower respiratory tract illness (ALRI) case definition to all hospitalized children who met the ALRI case definition but did not have a laboratory result/sample collected. |
| 2009 | -- a | -- a | 259 per 10,000 person-years (97–689) |
| 2010 | -- a | -- a | 47 per 10,000 person-years (7–335) |
| 2011 | -- a | -- a | 0 |
| 2012 | -- a | -- a | 0 |
| January 2008 to December 2012 | -- a | -- a | 76 per 10,000 person-years (32–182)  |
| Montes (2005) 18 | 2001–2002 | 9 | 1765 d | 51.0 per 10,000 population (24.9–93.6 d) | None |
| 2002–2003 | 0 | 1820 d | 0 |
| 2003–2004 | 13 | 1781 d | 73.0 per 10,000 population (40.6–121.7 d) |
| July 2001 to June 2004 e | 22 | 5366 d | 41.0 per 10,000 population (26.4–61.1 d) |
|  |  |  |  |  |  |
| Nelson (2014) 19 | April 2005 to March 2011(0 to <2 months) | -- a | -- a | 65.6 per 10,000 person-years | Adjustment for over- and under-diagnosis of influenza. |
| April 2005 to March 2011(2 to <6 months) | -- a | -- a | 184.5 per 10,000 person-years |
| Poehling (2006) 20  | 2000–2001 | 20 | 8,333 d | 24.0 per 10,000 population (10.0–39.0) | Rate adjusted by multiplying the influenza burden for each age group and study year by age-specific rate of acute respiratory tract infection or fever estimated from the National Ambulatory Medical Care Survey (NAMCS) and the National Hospital Ambulatory Medical Care Survey (NHAMCS). |
| 2001–2002 | 37 | 8,605 d | 43.0 per 10,000 population (22.0–66.0) |
| 2002–2003 | 20 | 8,696 d | 23.0 per 10,000 population (9.0–38.0) |
| 2003–2004 | 103 | 14,306 d | 72.0 per 10,000 population (53.0–92.0) |
| 2000–2001 to 2003–2004 e | 180 | 40,000 d | 45.0 per 10,000 population (34.0–55.0) |
| Poehling (2013) 21  | 2004–2005 | -- a | -- a | 34.0 per 10,000 population (25.0–45.0) | The numerator of the rate was weighted for both the days of surveillance and the proportion of eligible children enrolled. |
| 2005–2006 | -- a | -- a | 24.0 per 10,000 population (10.0–40.0) |
| 2006–2007 | -- a | -- a | 20.0 per 10,000 population (9.0–33.0) |
| 2007–2008 | -- a | -- a | 43.0 per 10,000 population (25.0–63.0) |
| 2008–2009 | -- a | -- a | 16.0 per 10,000 population (7.0–26.0) |
| 2004–2005 to 2008–2009 e | 96 | 35,556 d | 27.0 per 10,000 population (21.0–33.0) |
| Proff (2009) 22 | 2004–2005 | 64 | 34,483 d | 18.6 per 10,000 population (14.4–23.6 d) | None |
| 2005–2006 | 81 | 34,527 d | 23.5 per 10,000 population (18.8–29.0 d) |
| 2006–2007 | 39 | 34,884 d | 11.2 per 10,000 population (8.1–15.1 d) |
| 2007–2008 | 79 | 35,049 d | 22.5 per 10,000 population (18.0–27.9 b) |
| Silvennoinen (2011) 23 | July 1988 to June 2004 | 88 | 31,884 d | 27.6 per 10,000 population (22.0–33.6) | None |
| Stein (2010) 24 | July 12, 2009 to December 24, 2009 | 30 | 9,375 d | 32.0 per 10,000 population (22.0–45.1) i | None |
| Tapia (2016) 25 | September 12, 2011 to January 28, 2014 | 1 j | 927 k | 10.9 per 10,000 person-years (5.4–53.2) h | None |
| Yu (2013) 26 | April 2010 to April 2012 | 156 | 6,240 d | 250.0 per 10,000 population (213.0–292.0) d,l | Adjusted for the size of the resident population in the two study districts and the age-specific proportion of all influenza-associated hospitalized patients at the four surveillance hospitals. |

a Not reported in original study and insufficient information to compute.

b Rate shown is a median across individual season rates. The range was: 69 per 10,000 population to 331 per 10,000 population.

c Among HIV unexposed and uninfected infants.

d Computed by review authors.

e 95% confidence intervals were not provided and cannot be computed due to insufficient information reported in the original study.f Mean across four influenza seasons

g Number of influenza hospitalizations among infants in the control arm. Personal communication: M Nunes, 7 Dec 2016

h Rate computed by review authors among infants in the control arm.

i For infants under three months of age.

j Number of influenza hospitalizations among infants in the control arm. Personal communication: M Tapia, 15 Dec 2016.

k Number of person-years contributed by 2,041 infants.

l Pooled across influenza seasons.

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