## Supplementary Digital Content

## Household transmission of 2009 pandemic influenza A(H1N1): a systematic review and meta-analysis

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Wkly Reptransmission of 2009 pandemic influenza A (H1N1) Virus – Kenya, June-July 2009included in the calculation.Carcione, D.Euro Surveill2010Association between 2009 eseasonal influenza vacine and influenza A(H1N1) outbreak in a complex of school in Paris, France, June 2009 and pandemic influenza A(H1N1) outbreak in a community outbreak of Social networks in shaping disease transmission during a community outbreak of 2009 H1N1 pandemic influenzaSingle outbree household cor followed up, S calculated.Chan, P.P.Ann Acad Med Singapore2010Outbreak of novel influenza A (H1N1) 2009) inked to a dance clubSingle outbree households of school- dismissed students during pandemic (H1N1) 2009Single outbree households of school- dismissed students during pandemic (H1N1) 2009de Serres, G.Emerg Infect Dis2010Contagious period for pandemic (H1N1) 2009More complete study publisheDill, C.E.Disaster Med Public C.A.2011Serial intervals and the temporal distribution of secondary infections in Germany, 2009More complete study publisheDonnelly, C.A.Clin Infect Dis2011Serial intervals and the<	Author	Journal	Year	Title	Reason for exclusion
Seasonal influenza vaccine and influenza-like illness during the 2009 pandemic: preliminary results of a large households transmission study in Western Australiastudy publisheCarrillo- Santisteve, P.Euro Surveill20102009 pandemic influenza A(H1N1) outbreak in a complex of school in Paris, France, June 2009Single outbrea household cor complex of school in Paris, France, June 2009Single outbrea household cor complex of school in Paris, Single outbrea scalculated.Cauchemez, S.Proc Natl Acad Sci USA2011Role of social networks in shaping disease transmission during a community outbreak of 2009 H1N1 pandemic influenzaInformation to SIR not includ transmission during a community outbreak of 2009 H1N1 pandemic influenzaChan, P.P.Ann Acad Med Singapore2010Outbreak of novel influenza dance clubSingle outbrea touseholds of school- dismissed students during pandemic (H1N1) 2009Single outbrea tousehold of followed up, S calculated.Cohen, N.J.Emerg Infect Dis Health2010Contagious period for pandemic (H1N1) 2009More complete study publishe touseholds of 2009 pandemic influenza A (H1N1) implications of rate reported, equivalent to fDonnelly, C.A.Clin Infect Dis C.A.2011Serial intervals and the temporal distribution of secondary infections within households of 2009 pandemic influenza A (H1N1): implications for influenza control recommendationsData to extrac tousehold cor followed a US navy vesselFaber, M.Gesundheitswesen2009Investigation of a family oub			2009	transmission of 2009 pandemic influenza A (H1N1) Virus – Kenya,	Less than 5 households were included in the SIR calculation.
Santisteve, P.A(H1N1) outbreak in a complex of school in Paris, France, June 2009household cor followed up, S calculated.Cauchemez, S.Proc Natl Acad Sci USA2011Role of social networks in 	ione, D.	Euro Surveill	2010	seasonal influenza vaccine and influenza-like illness during the 2009 pandemic: preliminary results of a large households transmission study in	More complete report of this study published elsewhere <sup>19</sup>
S.USAshaping disease transmission during a community outbreak of 2009 H1N1 pandemic influenzaSIR not includeChan, P.P.Ann Acad Med Singapore2010Outbreak of novel influenza A (H1N1-2009) linked to a dance clubSingle outbread households of scalculated.Cohen, N.J.Emerg Infect Dis2011Respiratory Illness in households of school- dismissed students during pandemic (H1N1) 2009Data to extract included in thisOther, C.E.Disaster Med Public Health2009Novel influenza A (H1N1) outbreak on board a US 			2010	A(H1N1) outbreak in a complex of school in Paris,	Single outbreak study, household contacts were not followed up, SIR cannot be calculated.
SingaporeA (H1N1-2009) linked to a dance clubhousehold cor followed up, S calculated.Cohen, N.J.Emerg Infect Dis2011Respiratory Illness in households of school- dismissed students during pandemic (H1N1) 2009Data to extract included in thisde Serres, G.Emerg Infect Dis2010Contagious period for pandemic (H1N1) 2009More complete study publisheDill, C.E.Disaster Med Public Health2009Novel influenza A (H1N1) outbreak on board a US navy vesselConfined outb 	hemez,		2011	shaping disease transmission during a community outbreak of 2009 H1N1 pandemic	Information to extract a crude SIR not included in the article
Cohen, N.J.Emerg Infect Dis2011Respiratory Illness in households of school- dismissed students during pandemic (H1N1) 2009Data to extract included in thisde Serres, G.Emerg Infect Dis2010Contagious period for pandemic (H1N1) 2009More complete study publisheDill, C.E.Disaster Med Public Health2009Novel influenza A (H1N1) outbreak on board a US navy vesselConfined outb settings. Seco rate reported, equivalent to rDonnelly, 			2010	A (H1N1-2009) linked to a	Single outbreak study, household contacts were not followed up, SIR cannot be calculated
Dill, C.E.Disaster Med Public2009Novel influenza A (H1N1) outbreak on board a US navy vesselConfined outb settings. Seco rate reported, equivalent to rDonnelly, C.A.Clin Infect Dis2011Serial intervals and the temporal distribution of secondary infections within households of 2009 	en, N.J.	Emerg Infect Dis	2011	households of school- dismissed students during	Data to extract a SIR not included in this report.
Healthoutbreak on board a US navy vesselsettings. Seco rate reported, equivalent to hDonnelly, 	erres, G.	Emerg Infect Dis	2010		More complete report of the study published elsewhere <sup>35</sup>
C.A. temporal distribution of study publishe secondary infections within households of 2009 pandemic influenza A (H1N1): implications for influenza control recommendations Faber, M. Gesundheitswesen 2009 Investigation of a family cluster of influenza A/H1N1 infections in Germany, 2009 Ghani, A.C. PLoS Curr 2009 The Early Transmission More complete Dynamics of H1N1pdm Study publishe	C.E.		2009	outbreak on board a US	Confined outbreak in military settings. Secondary infectivit rate reported, but not equivalent to household SIR
cluster of influenza A/H1N1 included in this infections in Germany, 2009 Ghani, A.C. PLoS Curr 2009 The Early Transmission More complete Dynamics of H1N1pdm study publishe	nelly,	Clin Infect Dis	2011	temporal distribution of secondary infections within households of 2009 pandemic influenza A (H1N1): implications for influenza control	More complete report of the study published elsewhere <sup>20,24,32</sup>
Dynamics of H1N1pdm study publishe	r, M.	Gesundheitswesen	2009	cluster of influenza A/H1N1 infections in Germany,	Data to extract a SIR not included in this report.
Kingdom	ni, A.C.	PLoS Curr	2009	Dynamics of H1N1pdm Influenza in the United	More complete report of the study published elsewhere <sup>36</sup>
Gould, D. Evid Based Nurs 2010 Hand hygiene and Commentary, facemask use within 36 study. hours of index patient symptom onset reduces flu transmission to household	d, D.	Evid Based Nurs	2010	facemask use within 36 hours of index patient symptom onset reduces flu	Commentary, not an original study.

## eTable 1: Articles excluded after reviewing the full-length text

			contacts	
Janusz, K.B.	Clin Infect Dis	2011	Influenza-like illness in a community surrounding a school-based outbreak of 2009 pandemic influenza A (H1N1)	Household survey to track FARI performed, however SIR data not included.
Kelly, H.	Euro Surveill	2009	Interim analysis of pandemic influenza (H1N1) 2009 in Australia: surveillance trends, age of infection and effectiveness	Surveillance report. Information to extract a crude SIR not included in the article.
Klick, B.	Epidemiol	2011	of seasonal vaccination Transmissibility of seasonal and pandemic influenza in a cohort of households in Hong Kong in 2009	Only serological evidence of infections reported in this study.
Lee, D.H.	Am J Infect Control	2010	Risk factors for laboratory- confirmed household transmission of pandemic H1N1 2009 infection	Households were grouped according to available RT- PCR samples and matching home addresses. No other household contacts were followed up. Households were only included in the study if transmission occurred.
Marchbanks, T.L.	Clin Infect Dis	2011	An outbreak of 2009 pandemic influenza A (H1N1) virus infection in an elementary school in Pennsylvania	Household contact rates of FARI reported, however cannot classify as secondary transmission due to lack of temporal sequence.
Peltola, V.	Influenza Other Respi Viruses	2011	Pandemic influenza A(H1N1) virus in households with young children	Study faced unavoidable selection bias due to the focus on children younger than 1.5 years and faced an extraordinarily limited sample size
Simmerman, J.M.	Clin Infect Dis	2010	Influenza virus contamination of common household surfaces during the 2009 influenza A (H1N1) pandemic in Bangkok, Thailand: implications for contact transmission	More complete report of the study published elsewhere <sup>40</sup>
Yang, Y.	Science	2009	The transmissibility and control of pandemic influenza A (H1N1) virus	SIR reported, but source of the estimate never shown, thus crude SIR and sample size could not be extracted.
Zhang, Y.	Zhonghua Liu Xing Bing Xue Za Zhi	2009	Pattern on the spread of novel influenza A(H1N1) and qualitative assessment of containment in mainland China	Information to extract a crude SIR not included in the article.

	Definition
Carcione et al 2011 <sup>19</sup>	"A household was defined as a group of two or more people living together in a domestic residence; residential institutions, such as boarding schools, hostels or prisons were excluded. A household contact was defined as any person who had resided in the same household as the index case for at least one night during the household exposure period (one day before to seven days after onset of illness in the index case)."
Cauchemez et al 2009 <sup>20</sup>	"household members, who were defined as the index patient plus any person who had stayed overnight in the house at least one night within 7 days before or after the date of symptom onset in the index patient."
France et al 2010 <sup>24</sup>	"Household contacts were defined as all persons who spent ≥2 nights per week in the household"
Looker et al 2010 <sup>29</sup>	"Household contacts were any other people living in the household"
Loustalot et al 2011 <sup>30</sup>	"Household contacts were defined as persons who reportedly spent at least 2 nights per week in the household of the index case"
Morgan et al 2010 <sup>32</sup>	"Household members were defined as persons who lived at the same address as a case-patient who had laboratory-confirmed pandemic (H1N1) 2009 infection"
Papenburg et al 2010 <sup>35</sup>	"A household contact was defined as someone living in the home of a primary case patient"
Pebody et al 2011 <sup>36</sup>	"A household contact was any person who lived in the same household as a confirmed primary case-patient and ≥1 overnight stay after onset of illness in the person who was the primary case-patient"
Savage et al 2011 <sup>38</sup>	"Household contacts were defined as persons who had close contact (≥1 hour exposure within two meters) with a laboratory-confirmed case in a household setting (Shared, common accommodation in terms of both sleeping and eating at least one meal)."
Sikora et al 2010 <sup>39</sup>	"Household contacts were defined as any individual self-reporting to reside in the same household."
Simmerman et al 2011 <sup>40</sup>	"Eligible index cases' households must have had at least two other members aged ≥1 month who planned to sleep inside the house for a period of at least 21 days from the time of enrollment."
Suess et al 2010 <sup>41</sup>	"A household was defined as a domestic unit consisting of the members of a family who live together including nonrelatives and intimate partnersParticipants living in one household with the respective index patient were termed "household members" or "household contacts"."
van Boven et al 2010 <sup>43</sup>	"Household contacts were defined as persons living in the same residence as the index case."

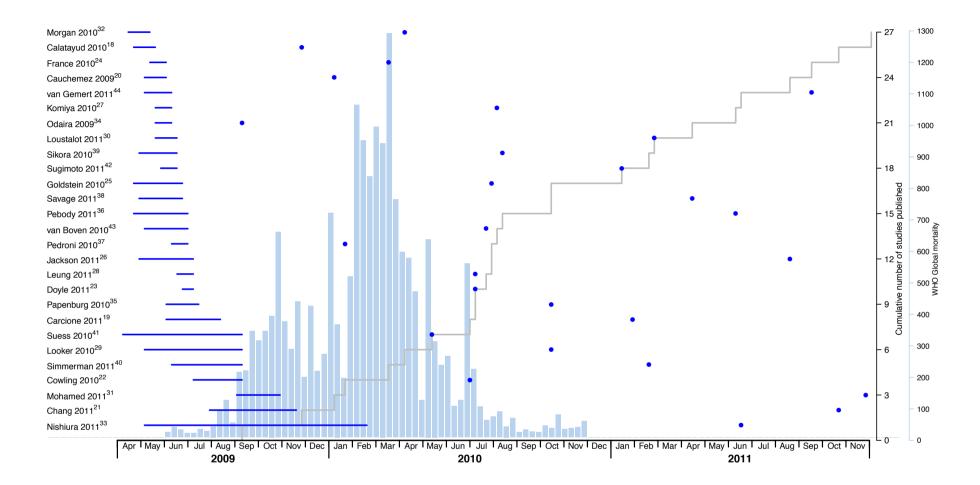
## eTable 2: Definitions of household contact used in different studies.

eTable 3: Proportion of household contacts with confirmed pH1N1 among all household contacts reporting various clinical signs, symptoms and syndromes.

	Cowling 2010 <sup>22</sup>			Papenburg 2010 <sup>35</sup>		
	No. with sign/symptom	pH1N1	positive	No. with sign/symptom	pH1N1	positive
	n	n	(%)	n	n	(%)
Cough	33	8	(24.2%)	59	38	(64.4%)
Fever ≥37.8°C	15	5	(33.3%)	35	30	(85.7%)
Sore throat	26	6	(23.1%)			
Headache	33	4	(12.1%)			
Myalgia	24	3	(12.5%)			
Diarrhoea				22	11	(50.0%)
Nausea				8	7	(87.5%)
Runny nose	36	4	(11.1%)			
FARI*	13	8	(61.5%)	34	31	(91.2%)
ARI**	39	4	(10.3%)	61	42	(68.9%)
Total	130	9	(6.9%)	119	45	(37.8%)

\* Febrile Acute Respiratory Illness (FARI) was defined as fever (≥37.8°C) plus cough and/or sore throat.

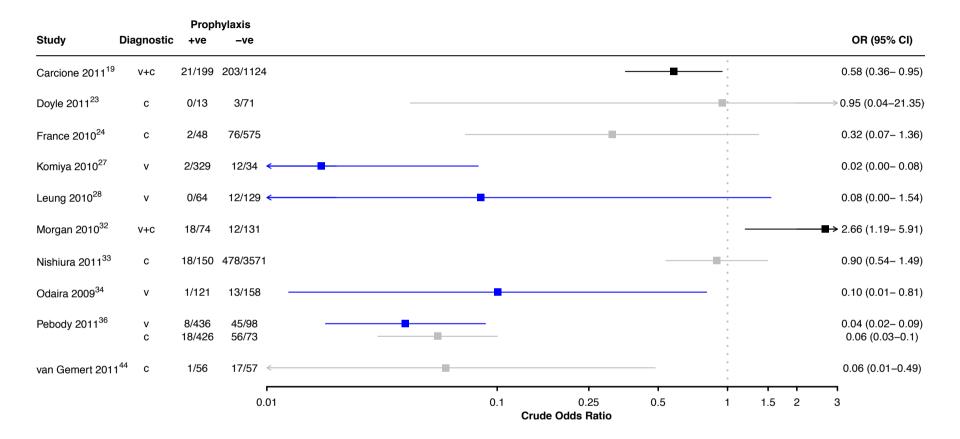
\*\* Acute Respiratory Illness (ARI) was defined as the presence of at least two of the following symptoms: fever or feverishness, cough, sore throat, rhinorrhea, aches or pains in muscles, headache and phlegm



**eFigure 1:** Participant recruitment dates (solid horizontal lines), eventual publication dates of studies included in the review (points) and the cumulative proportion of studies published (gray line) compared to the histogram of confirmed pH1N1 deaths reported to the World Health Organization (underlying histogram).

	Age(y)	No. Cases	No. Contacts		SIR (95%CI)
Overall					
Carcione 2011 <sup>19</sup>	-	286	1589		0.18 (0.16–0.20)
Cauchemez 2009 <sup>20</sup>	-	78	600		0.13 (0.10–0.16)
Cowling 2010 <sup>22</sup>	-	30	115		0.26 (0.18-0.35
Morgan 2010 <sup>32</sup>	-	32	256	<b>-</b>	0.12 (0.09–0.17)
Odaira 2009 <sup>34</sup>	-	14	293	<b></b>	0.05 (0.03-0.08)
Papenburg 2010 <sup>35</sup>	-	61	119		0.51 (0.42-0.60)
Pebody 2011 <sup>36</sup>	-	115	704		0.16 (0.14–0.19)
Savage 2011 <sup>38</sup>	-	51	253	<b>_</b>	0.20 (0.15-0.26)
Children					
Carcione 2011 <sup>19</sup>	≤ 15	120	467		0.26 (0.22-0.30
Cauchemez 2009 <sup>20</sup>	≤ 18	41	224		0.18 (0.14–0.24
Cowling 2010 <sup>22</sup>	≤ 15	18	54		0.33 (0.21–0.48
Morgan 2010 <sup>32</sup>	≤ 18	18	124		0.14 (0.09–0.22
Papenburg 2010 <sup>35</sup>	≤ 17	26	47		0.55 (0.40–0.70
Pebody 2011 <sup>36</sup>	≤ 15	49	194		0.25 (0.19–0.32
Savage 2011 <sup>38</sup>	≤ 15	25	59		0.42 (0.30-0.56
Adults					
Carcione 2011 <sup>19</sup>	≥ 16	162	1089		0.15 (0.13–0.17
Cauchemez 2009 <sup>20</sup>	≥ 19	36	376		0.10 (0.07–0.13
Cowling 2010 <sup>22</sup>	≥ 16	12	61	·	0.20 (0.11-0.32
Morgan 2010 <sup>32</sup>	≥ 19	14	132		0.11 (0.06–0.17
Papenburg 2010 <sup>35</sup>	≥ 18	35	72		0.49 (0.37–0.61
Pebody 2011 <sup>36</sup>	≥ 16	71	525		0.14 (0.11–0.17
Savage 2011 <sup>38</sup>	≥ 16	25	145		0.17 (0.12-0.24
				0 0.1 0.2 0.3 0.4 0.5 0.4 Secondary Infection Risk (95% CI)	6

**eFigure 2**: Secondary infection risks (SIR<sub>ARI</sub>) according to report of acute respiratory illness.



**eFigure 3**: Crude odds ratios for the effect of antiviral prophylaxis on risk of pH1N1 among household contacts assessed by virologic testing (v), clinical acute respiratory illness (c), or both (v+c). Odds ratios were estimated in studies with a zero cell by adding 0.5 as a standard correction.