APPENDIX 1: GRADE RESOURCE USE TABLES

Author(s): Karen Lee, MA; Vijay Shukla, PhD; **Reviewer(s)**: John Conly, MD; Carmem Pessoa-Silva, MD, PhD
Date: 2011-03-24
Question: What is the impact of H1N1 on the use of facial masks and eyewear equipment use?
Settings: Hospital setting
Bibliography: Murray et al. Facial protective equipment, personnel, and pandemic: impact of the pandemic (H1N1) 2009 virus on personnel and use of facial protective equipment. Infect Control Hosp Epidemiol 2010; 31(10):1011-1016

TABLE 1A

	Quality Assessment						Use of Physical Interventions In Pandemic Year (2009)		Quality	Comment
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Mean resource use per case**[2,3,4]	**Mean resource use per case per isolation day**[5]	**Quality**	**Comment**
Impact and use of personal facial protective equipment (follow-up mean 6 months[1]; assessed with: Resources)										
Resources used	Observational studies	Very serious[2]	No serious inconsistency	Very serious[6]	No serious imprecision	None	Surgical masks 155	Surgical masks 64	⊕OOO **VERY LOW**	• In adherence with 2009 PHAC recommendations to use surgical masks and protective eyewear within 2 m of patients with influenza-like illness and the use of N95 respirator during any aerosol-generating medical procedure • Setting: VCH (serving 1 million; 3 facilities: 1,079 beds); 865 suspected and confirmed cases over 2009 pandemic period • Estimates of resource use obtained from VCH central supply department
							N95 200	N95 82		
							Eyewear 14	Eyewear 6		

PHAC = Public Health Agency of Canada; VCH = Vancouver Coastal Health.

[1] Patients in hospital followed during the pandemic period from June 28 through Dec 19, 2009 (weeks 27 to 51).
[2] Longitudinal real-world follow-up study with no control group.
[3] Resources have been calculated and reported as the mean unit per hospitalized case, confirmed or suspected (n=865), as requested by WHO.
[4] Mean length of stay for patients during this time period was 8.9 days for confirmed cases, and 1.8 days of isolation for suspected cases (5.4 days for confirmed cases).
[5] Resources have been reported as the mean unit per day of isolation of confirmed or suspected cases (n= 2,101) of 1.8 days.
[6] Resource use based on Public Health Agency of Canada recommendations, which are specific to Canada and may not be generalizable to other jurisdictions, although the authors feel the results are in line with other jurisdictions for this time period. The authors note that actual resource use differs from recommendations (i.e., higher than expected), but have provided details for why this might have occurred.

Author(s): Karen Lee, MA; Vijay Shukla, PhD; **Reviewer(s)**: John Conly, MD; Carmem Pessoa-Silva, MD, PhD
Date: 2011-04-19
Question: Should Infection control interventions be used for spread of respiratory syncytial virus (RSV) nosocomial infection (NI)?
Settings: Hospital
Bibliography: Macartney et al. Nosocomial respiratory syncytial virus infections: The cost-effectiveness and cost-benefit of infect control. Pediatrics 2000; 106(3):520-526.

TABLE 1B

	Quality Assessment						No. of Patients or Units		Effect	Quality	Comment
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Infection control interventions**	**Control**			
Nosocomial RSV infections (follow-up mean 8 seasons[1]; measured with: infection per 1,000 days at risk; Better indicated by lower values)											
No. infected	Observational studies	Serious[2]	No serious inconsistency	No serious indirectness[3]	No serious imprecision	• Reporting bias[4] • Strong association[5] • Dose response gradient[6]	2065[7]	1604[8]	10 infected cases per season[9] 40 cases	⊕⊕OO **LOW**	
Resource use	Observational study	Small sample (N = 10) over 24 hours	Single study	Serious[10,11]	Serious[12]	None	Gloves 52/pt day	-	NA	⊕OOO **VERY LOW**	• Gloves mean cost per RSV season $3,335 (sensitivity analyses: $2,223 to $4,446)[13] • Gowns mean cost per RSV season $7,759 (sensitivity analyses: $5,173 to $10,345) • TOTAL (includes personnel, materials, RSV tests): $15,627 (sensitivity analyses: $9,418 to $24,577) • PPE recommendations included gloves and gown when caring for patients
							Gowns 15/pt day	-	NA		
							Length of stay 25.8-31.9 days	20.2-22.5	NA		

	Quality Assessment						No. of Patients or Units		Effect	Quality	Comment
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Infection control interventions**	**Control**			
Nosocomial RSV infections (follow-up mean 8 seasons[1]; measured with: infection per 1,000 days at risk; Better indicated by lower values)											
Cost per infection prevented	Calculation[13,14]	Prone to same limitations as inputs	Prone to same limitations as inputs	Prone to same limitations as inputs	Prone to same limitations as inputs	None	-	-	$1,563 per infection prevented ($942 to $2,458)	-	

NA = not applicable; pt = patient; RSV = respiratory syncytial virus.

[1] Four seasons before interventions and four seasons after interventions.
[2] Before-after study subject to time bias.
[3] Study was not downgraded for indirectness due to its naturalistic design. Results cannot be applied to other viral infections and epidemic setting.
[4] Single study.
[5] Consistently lower infection rate observed post intervention.
[6] Study has demonstrated relationship between infection rate and RSV exposure strata.
[7] Number of patients hospitalized due to RSV NI post-intervention phase (860 infected per 82,196 patient days at risk).
[8] Number of patients hospitalized due to RSV NI pre-intervention phase (88 infected per 90,174 patient days at risk).
[9] Cases per 1,000 hospital-day exposure.
[10] Resource use associated with RSV may not be directly generalizable to pandemic respiratory viruses.
[11] Study was conducted specifically for a pediatric population.
[12] Resource use was based on 10 patients for a 24-hour period in 1996.
[13] Costs reported as 1996 USD. US $1 (1996) = US$1.35 (2011).
[14] Costs estimated resource use and hospital charges for financial burden of RSV.

Author(s): Karen Lee, MA; Vijay Shukla, PhD; **Reviewer(s)**: John Conly, MD; Carmem Pessoa-Silva, MD, PhD
Date: 2011-03-24
Question: Personal protective equipment used in 24 hours for influenza pandemic
Settings: Hospital
Bibliography: Phin et al. Personal protective equipment in an influenza pandemic: a UK simulation exercise. J Hos Infect 2009; 71(1):15-21

TABLE 1C

	Quality Assessment						Use of Physical Interventions[1]	Quality	Comment
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Mean resource use per case[2,3]**		
PPE in an influenza pandemic (follow-up 24 hours; assessed with: PPE use)									
Resources used	Observational studies[4]	Very serious[5]	No serious inconsistency	Very serious[6,7]	Serious imprecision[8]	None	Surgical masks 22 Gloves 41 pairs Disposable apron 26 Gown 0.45 Eye goggles 0.45 FFP3 respirator 0.45 Visor 0.03	⊕OOO **VERY LOW**	• Methodology included a simple before and after comparison • Simulation ran over only 24 hours • Personal protective equipment based on Dept of Health (England) guidance for routine care in cohorted or isolated area (within 1 m), including surgical mask, gloves, and eye protection and gown if risk of splashes; use of gown, gloves, particulate respirator, and eye protection during aerosol generation procedure • Study did not take place during a pandemic period when RU will be ubiquitous and staff awareness heightened; this might alter compliance and consumption of PPE. • Based on a 29-bed acute medical ward used to provide cohorted care to influenza patients in a pandemic • Ward complement includes 14 nurses, 5 health case assistants, 4 domestic staff.

PPE = Personal protective equipment; RU = resource use.

[1] Resources have been reported as the mean unit per day per number of beds in the facilities (N = 29).
[2] Simulation exercise with no control group.
[3] Resources have been reported as the mean unit per isolated case (N = 29).
[4] A UK simulation exercise for 24 hours by all staff on an acute general medicine ward, who wore PPE and adopted the procedure described in UK pandemic influenza guidance.
[5] Simulation exercise without control group, subject to biases of observational studies.
[4] Simulation exercise in UK. Not clear whether the results will be valid in other jurisdictions, as this study represents a case for high-level respiratory precautions.
[6] Resource use based on Department of Health guidelines, which are specific to England and may not be generalizable to other jurisdictions.
[7] Sample size is very small. Data were obtained from 29 patients during a 24-hour period.

Author(s): Karen Lee, MA; Vijay Shukla, PhD; **Reviewer(s)**: John Conly, MD; Carmem Pessoa-Silva, MD, PhD
Date: 2011-03-24
Question: Cost-effectiveness Green 1 strategy versus Green 0 strategy for pandemics? [1]
Settings: hospital setting
Bibliography: Dan et al. Cost effectiveness analysis of hospital infection control response to an epidemic respiratory virus threat. Emerg Infect Dis 2009;15(2):1909-1916

TABLE 1D-i

	Quality Assessment						Outcome (No. of Patients or Cost)		Difference	Quality	Comment
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Health care resources (Green)[1]**	**Control (Green 0; no additional measures)**			
CEA of hospital infection control response to an epidemic respiratory virus threat (assessed with: Incremental cost per death averted by following Green strategy)											
No. infected	Observational studies[2]	Very serious[3]	No serious inconsistency	Very serious[3]	No serious imprecision	Very strong association[4]	H1N1: 316	2,580	(2,264)	⊕OOO **VERY LOW**	
							Spanish flu: 624	3,210	(2,586)		
							SARS: 105	825	(720)		
Deaths	Modelling exercise	Inherent limitations with modelling	Not considered; single study	Based on case-fatality data from Singapore	No ranges reported	None	H1N1: 1	10	(9)	⊕OOO **VERY LOW**	• Simulation exercise
							Spanish flu: 31	161	(130)		
							SARS: 11	83	(72)		
Cost[5]	Derived from operational costs	Details on costs inputs based alert policy not provided	Jurisdiction specific	Obtained from Singapore sources[6.7]	No ranges reported	None[8]	H1N1: $326,430	$25,200	$301,230	⊕OOO **VERY LOW**	• Costs reported in USD
							Spanish flu: $468,000	$80,000	$388,000		
							SARS: $220,500	$99,200	$121,300		
Cost per case prevented	Calculation	Prone to same limitations as inputs	Prone to same limitations as inputs	Prone to same limitations as inputs	Serious[9]	Minimal details were provided with respect to sensitivity analyses			H1N1: $133	-	• Results sensitive to rate of exposure, transmissibility, fatality rate, transmission from
									Spanish flu: $150		
									SARS: $168		

	Quality Assessment						Outcome (No. of Patients or Cost)		Difference	Quality	Comment
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Health care resources (Green)**[1]	**Control (Green 0; no additional measures)**			
CEA of hospital infection control response to an epidemic respiratory virus threat (assessed with: Incremental cost per death averted by following Green strategy)											
Cost per death avoided	Calculation	Prone to same limitations as inputs	Prone to same limitations as inputs	Prone to same limitations as inputs	Serious[9]	Minimal details were provided with respect to sensitivity analyses			H1N1: $33,470 Spanish flu: $2,985 SARS: $1,685	-	atypical cases • Reported cost-effectiveness estimates could not be replicated. Values present recalculated estimates.

CEA = cost-effectiveness analysis; SARS = severe acute respiratory syndrome; USD = US dollars.

[1] Singapore Ministry of Health evaluated the impact of different alert levels. Based on hospital measures, the levels are defined as follows: Green 0 (or no additional measures) = triage and isolation of patient, use of personal protective equipment as appropriate (WHO alert level 1); Green 1 = full PPE for suspected cases, tracing contacts for confirmed cases, and antiviral treatment for confirmed cases (WHO alert level 2-3).

[2] Impact of an outbreak from a single index case that was not detected by hospital surveillance and was found in general ward was modelled.

[3] Clinical data were generated by modelling of undetected single index case.

[4] A patient with undiagnosed infection at base case with no protection measure will result in 2580 infected patients at 30 days in this model.

[5] Costs reported in 2009 USD. US$1 (2009) = US$1.02 (2011)

[6] Resource use based on Disease Outbreak Response System and may not be generalizable to other jurisdictions.

[7] Costs were obtained from Operations and Finance Departments from hospitals; might not be reflective of other facilities. Limited information provided on methodology; information from direct charges and assumptions around indirect costs.

[8] Harms and attendant costs of antivirals were not included, nor was the use of antiviral prophylaxis.

[9] Analyses sensitive to case-fatality rate, exposure rate, and secondary attack rate.

Author(s): Karen Lee, MA; Vijay Shukla, PhD; **Reviewer(s)**: John Conly, MD; Carmem Pessoa-Silva, MD, PhD
Date: 2011-03-24
Question: Cost-effectiveness of Yellow strategy versus Green 1 strategy (no additional measures) for pandemics?
Settings: Hospital setting
Bibliography: Dan et al. Cost effectiveness analysis of hospital infection control response to an epidemic respiratory virus threat. Emerg Infect Dis 2009;15(12):1909-1916

TABLE 1D-ii

	Quality Assessment						Outcome (No. of Patients or Cost)				
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Health care resources (Yellow)[1]**	**Control (Green 1)**	**Difference**	**Quality**	**Comment**
CEA of hospital infection control response to an epidemic respiratory virus threat (assessed with: Incremental cost per death averted by following Yellow strategy)											
No. infected	Observational studies[2]	Very serious[3]	No serious inconsistency	Very serious[4]	No serious imprecision	Very strong association[7]	H1N1: 59	316	(257)	⊕OOO **VERY LOW**	
							Spanish flu: 120	624	(504)		
							SARS: 43	105	(62)		
Death	Modelling exercise	Inherent limitations with modelling	Not considered; single study	Based on case-fatality data from Singapore	No ranges reported	None	H1N1: 0.2	1	(0.8)	⊕OOO **VERY LOW**	• Simulation exercise
							Spanish flu: 6	31	(25)		
							SARS: 4	11	(7)		
Cost[5]	Derived from operational costs	Details on cost inputs-based alert policy not provided	Jurisdiction specific	Obtained from Singapore sources[6,7]	No ranges reported	None[8]	H1N1: $1,485,500	$326,430	$1,159,070	⊕OOO **VERY LOW**	• Costs reported in USD
							Spanish flu: $2,212,000	$468,000	$2,468,000		
							SARS: $1,188,000	220,500	$967,500		
Cost per case prevented	Calculation	Prone to same limitations as inputs	Prone to same limitations as inputs	Prone to same limitations as inputs	Serious[9]	Minimal details were provided with respect to sensitivity analyses			H1N1: $3,221	-	• Results sensitive to rate of exposure, transmissibility, fatality rate, transmission from atypical cases
									Spanish flu: $2,472		
									SARS: $11,146		

	Quality Assessment						Outcome (No. of Patients or Cost)				
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Health care resources (Yellow)[1]**	**Control (Green 1)**	**Difference**	**Quality**	**Comment**
CEA of hospital infection control response to an epidemic respiratory virus threat (assessed with: Incremental cost per death averted by following Yellow strategy)											
Cost per death avoided	Calculation	Prone to same limitations as inputs	Prone to same limitations as inputs	Prone to same limitations as inputs	Serious[9]	Minimal details were provided with respect to sensitivity analyses			H1N1: $827,907 Spanish flu: $49,829 SARS: $121,241	-	• Reported cost-effectiveness estimates could not be replicated. Values present recalculated estimates.

CEA = cost-effectiveness analysis; PPE = personal protective equipment; SARS = severe acute respiratory syndrome.

[1] Singapore Ministry of Health evaluated the impact of different alert levels. Based on hospital measures, the levels are defined as follows: Green 1 = full PPE for suspected cases, tracing contacts for confirmed cases, and antiviral treatment for confirmed cases (WHO alert level 2-3); Yellow = PPE for health care workers: for middle-risk PPE, included N95 mask, gown, and gloves (eye protection if risk of splashes); PPE including N95 mask in all patient areas, and gown and gloves, and eye protection if risk of splashes; if high-risk activity (high probability of close contact to aerosol-generating procedures), then PPE included N95 mask in all patient areas, and gown and gloves, and eye protection if contact tracing for confirmed cases, visitor restriction, restricted movement of patients and health care workers (WHO Alert level 4).

[2] Impact of an outbreak from a single index case that was not detected by hospital surveillance and was found in general ward was modelled.

[3] Clinical data were generated by modelling of undetected single index case.

[4] A patient with undiagnosed infection at base case with no protection measure will result in 2,580 infected patients at 30 days in this model.

[5] Costs reported in 2009 USD. US$1 (2009) = US$1.02 (2011).

[6] Resource use based on Disease Outbreak Response System and may not be generalizable to other jurisdictions.

[7] Costs were obtained from Operations and Finance Departments from hospitals; might not be reflective of other facilities. Limited information provided on methodology; information from direct charges and assumptions regarding indirect costs.

[8] Harms and attendant costs of antivirals were not included; nor was the use of antiviral prophylaxis.

[9] Minimal details were provided with respect to sensitivity analyses.

Author(s): Karen Lee, MA; Vijay Shukla, PhD; **Reviewer(s)**: John Conly, MD; Carmem Pessoa-Silva, MD, PhD
Date: 2011-03-24
Question: Cost-effectiveness of Orange strategy versus no additional measures for pandemics?
Settings: Hospital setting
Bibliography: Dan et al. Cost effectiveness analysis of hospital infection control response to an epidemic respiratory virus threat. Emerg Infect Dis 2009;15(12):1909-1916

TABLE 1D-iii

	Quality Assessment						Outcome (No. of Patients or Cost)		Difference	Quality	Comment
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Health care resources (Orange)** [1]	**Control (Yellow)**			
CEA of hospital infection control response to an epidemic respiratory virus threat (assessed with: Incremental cost per death averted by following Orange strategy)											
No. infected	Observational studies[2]	Very serious[3]	No serious inconsistency	Very serious[4]	No serious imprecision	Very strong association[4]	H1N1: 24	59	(35)	⊕OOO **VERY LOW**	
							Spanish flu: 59	120	(61)		
							SARS: 12	43	(31)		
Death	Modelling exercise	Inherent limitations with modelling	Not considered — single study	Based on case-fatality data from Singapore	No ranges reported	None	H1N1: 0.1	0.2	(0.1)	⊕OOO **VERY LOW**	• Simulation exercise
							Spanish flu: 2.95	6	(3.05)		
							SARS: 1.2	4	(2.8)		
Cost[5]	Derived from operational costs	Details on costs inputs based alert policy not provided	Jurisdiction specific	Obtained from Singapore sources[6,7]	No ranges reported	None[8]	H1N1: $1,836,000	$1,485,500	$350,500	⊕OOO **VERY LOW**	• Costs reported in USD
							Spanish flu: $2,856,000	$2,212,000	$644,000		
							SARS: $1,537,000	$1,188,000	$349,000		
Cost per case prevented	Calculation	Prone to same limitations as inputs	Prone to same limitations as inputs	Prone to same limitations as inputs	Serious[9]	Minimal details were provided with respect to sensitivity analyses			H1N1: $7,153	-	• Results sensitive to rate of exposure, transmissibility, fatality rate, transmission from atypical cases
									Spanish flu: $7,541		
									SARS: $8,041		

	Quality Assessment						Outcome (No. of Patients or Cost)		Difference	Quality	Comment
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Health care resources (Orange)** [1]	**Control (Yellow)**			
CEA of hospital infection control response to an epidemic respiratory virus threat (assessed with: Incremental cost per death averted by following Orange strategy)											
Cost per death avoided	Calculation	Prone to same limitations as inputs	Prone to same limitations as inputs	Prone to same limitations as inputs	Serious[9]	Minimal details were provided with respect to sensitivity analyses			H1N1: $2,503,600	-	• Reported cost-effectiveness estimates could not be replicated. Values present recalculated estimates.
									Spanish flu: $153,333		
									SARS: $7,541		

CEA = cost-effectiveness analysis; PPE = personal protective equipment; SARS = severe acute respiratory syndrome; USD = US dollars.

[1] The Singapore Ministry of Health evaluated the impact of different alert levels. Based on hospital measures, the levels are defined as follows: Yellow = PPE for health care workers: for middle-risk, PPE included N95 mask, gown, and gloves (eye protection if risk of splashes), PPE including N95 mask in all patient areas, and gown and gloves, and eye protection if risk of splashes; if high-risk activity (high probability of close contact to aerosol-generating procedures), then PPE included N95 mask in all patient areas, and gown and gloves, and eye protection; if contact tracing for confirmed cases, visitor restriction, restricted movement of patients and health care workers (WHO Alert level 4). Orange: for middle risk, PPE included N95 mask, gown, and gloves (eye protection if risk of splashes); full PPE for health care workers in high-risk contact (high probability of close contact to aerosol-generating procedures), including N95 mask, gown and gloves, and eye protection, and visitor restriction; no inter-hospital movement of patients or health care workers, prophylaxis for contacts (WHO Alert level 5).

[2] Impact of an outbreak from a single index case that was not detected by hospital surveillance and was found in general ward was modelled.

[3] Clinical data are generated by modelling of undetected single index case.

[4] A patient with undiagnosed infection at base case with no protection measure will result in 2,580 infected patients at 30 days, based on this model.

[5] Costs reported in 2009 USD. US$1 (2009) = US$1.02 (2011).

[6] Resource use based on Disease Outbreak Response System and may not be generalizable to other jurisdictions.

[7] Costs were obtained from hospital operations and finance departments; might not be reflective of other facilities. Limited information provided on methodology; information from direct charges and assumptions regarding indirect costs.

[8] Harms and attendant costs of antivirals were not included; nor was the use of antiviral prophylaxis.

[9] Minimal details were provided with respect to sensitivity analyses.

Author(s): Karen Lee, MA; Vijay Shukla, PhD; **Reviewer(s)**: John Conly, MD; Carmem Pessoa-Silva, MD, PhD
Date: 2011-03-24
Question: Social interventions in the community and hospital to reduce the spread of influenza pandemic.
Settings: Community/hospital setting
Bibliography: Perlroth et al. Health outcomes and cost of community mitigation strategies for an influenza pandemic in the US. Clin Infect Dis 2010; 50(2):165-74

TABLE 1E

	Quality Assessment						Health Care Resources[1]					
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Social distancing**	**Quarantine**	**School closure**	**Do nothing**	**Quality**	**Comment**
Resource use using social network agent based model[2] (assessed with: Cost per QALY)												
Cases	Observational studies[2]	Very serious[2]	No serious inconsistency	Very serious[2]	No serious imprecision	Assumed infection rate of 2.1	3,212	3,317	3,169	3,515	⊕OOO **VERY LOW**	
Total cost[3] (per person)	Observational study[4]	Very serious[5]	No serious inconsistency	• Based on US study of influenza tmt[6] • Pneumonia and influenza ICD-9 codes	None[7]	None	$420	$720	$1,330	$540	⊕OOO **VERY LOW**	• Costs based on 2007 study of Medstat Marketscan database for 2001-2003 • Costs were reported by age and risk group.
Quality adjusted life expectancy	Modelling exercise	Inherent limitations with modelling	Not considered – single study	May not accurately reflect loss in quality with influenza	Disutilities may be over-estimated	None[8]	20.159	20.158	20.161	20.153	⊕OOO **VERY LOW**	• Utility values based on published literature. Some disutilities associated with influenza symptoms appear large, potentially overestimating quality adjustment.

	Quality Assessment						Health Care Resources[1]				Quality	Comment
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Social distancing**	**Quarantine**	**School closure**	**Do nothing**		
Resource use using social network agent based model[2] (assessed with: Cost per QALY)												
Cost per case averted	Calculation	Prone same limitations as inputs	Prone same limitations as inputs	Prone same limitations as inputs	Serious[9]	None	$5,600	$15,300	$32,100	-	–	• Model based on previously developed model (agent-based, social network) • Assume case-fatality rate of 1%.
Cost per QALY	Calculation	Prone same limitations as inputs	Prone same limitations as inputs	Prone same limitations as inputs	Serious[9]	None	Dominant[10]	$36,000[10]	$98,750[10]	-	–	

QALY = quality-adjusted life-year; USD = US dollars.

[1] Study considered multi-layering interventions, but only the individual interventions have been reported in this table. When considering all treatment strategies and multi-layering options, social distancing, school closure, and antiretroviral treatment and prophylaxis were found to be dominant over all other multi-layer and single treatments.
[2] Modelling-based study. Data on different interventions, such as social distancing, school closure, household quarantine and antiviral treatment, taken from different sources to feed into model.
[3] Costs reported in 2009 USD. US$1 (2009) = US$1.02 (2011)
[4] Molinari N-A et al. The annual impact of seasonal influenza in the US: Measuring disease burden and cost. Vaccine 2007;25:5086-5096.
[5] Database study subject to bias due to lack of randomization. Large sample of claims were used (N = 179,718) to address potential biases and uncertainty.
[6] Resource use based on US study and may not be generalizable to other jurisdictions.
[7] Dataset included 179,718 medically attended cases from four influenza seasons (2000-2001,2001-2002, 2002-2003, 2003-2004) involving outpatient treatment, hospitalization, or death.
[8] Harms and attendant costs of antivirals were not included in reported values.
[9] Results were sensitive to infection rates, case-fatality rate, compliance. Results were sensitive to changes in parameters with cost per QALY estimates increasing to over $150,000 (compared with < $32,000 in the base case) when case fatality = 0.25% and infection rate is reduced to 1.6.
[10] Incremental cost per QALY estimates reported compared with doing nothing. Note, in study, all three options (quarantine, school closure, and social distancing) were ruled out by extended dominance compared with multi-layering treatment options.

Author(s): Karen Lee, MA; Vijay Shukla, PhD; **Reviewer(s)**: John Conly, MD; Carmem Pessoa-Silva, MD, PhD
Date: 2011-03-24
Question: Economic impact of quarantine in the community during SARS.
Settings: Community/hospital setting
Bibliography: Gupta et al. The economic impact of quarantine: SARS in Toronto as a case study. J Inf 2005; 50(5):386-393

TABLE 1F

	Quality Assessment						Cases (or Health Care Resources)			Quality	Comment
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Cases**	**Control**	**Difference[1]**		
Impact of quarantine on spread of SARS (assessed with: Number of people with SARS)											
Number of SARS cases	Observational studies[2]	Very serious[2]	No serious inconsistency	Very serious[2]	No serious imprecision	None	73	584	(511)	⊕OOO **VERY LOW**	• Aggregate of primary, secondary, tertiary, and quaternary infections • Assumes transmission rate of 8% • Modelled based on data from the Toronto case study • Educated estimates and data were used in the development of the model to inform transmission rate, population density, number of contacts, and incubation period of SARS.
Total costs[3]	Modelling	Inherent limitations with modelling	Not considered; single study	Very serious[4]	Very serious[5]	None	Direct costs $12 million	Direct costs $48 million	($36 million)	⊕OOO **VERY LOW**	• Costs reported in CAD • Educated estimates and data were used to estimate the cost of SARS and quarantine.
							Indirect costs $0.2 million	Indirect costs $24 million	($23.8 million)		
							TOTAL $12.2 million	TOTAL $72 million	($59.8 million)		

CAD = Canadian dollars; SARS = severe acute respiratory syndrome.
[1] Parentheses () indicate reduction in cases or cost savings.
[2] Modelling base studies on the impact of quarantine on spread of SARS. Rough estimates used for transmission of SARS in different situations to run the model. Results may also be subject to recall bias, as information was collected retrospectively by interview.
[3] Year and country of costs not explicitly stated, but appears to be CAD 2003. C$1 (2003) = US$0.98 (2011)
[4] Cost calculations based on a number of sources, as well as opinion. Costs and resource use were largely obtained from sources specific to Toronto and may not be generalizable to other jurisdictions.
[5] Cost inputs are based on a number of sources, including interviews with health care workers, which could be subject to recall bias.

Author(s): Karen Lee, MA; Vijay Shukla, PhD; **Reviewer(s)**: John Conly, MD; Carmem Pessoa-Silva, MD, PhD
Date: 2011-04-25
Question: Should health system resources be used for potential influenza pandemic?
Settings: Any setting
Bibliography: Putthasri et al. Capacity of Thailand to contain an emerging influenza pandemic. Emerg Infect Dis 2009; 15(3):423-432

TABLE 1G

	Quality Assessment						Use of Physical Interventions	Quality	Comment
Viewpoint: health system	**Design**	**Limitations**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Total expected resource use**[1,2]		
Potential health resources (measured with: Different health resources related to infrastructure, personnel and material[3])									
Resources required	Observational studies[4]	Very serious[5]	No serious inconsistency	Serious[6,7]	No serious imprecision	Reporting bias[8]	Disposable gowns: 1,377 N95 masks: 7,181 Surgical masks: 16,440 Plastic face shields: 567 Goggles: 961 Surgical gloves: 66,201	⊕OOO **VERY LOW**	• Major flaw of study: results combine 3 scenarios for transmission of infection (related to WHO Phase 4 and 5).[9] • Results not reported separately.

[1] Resource use estimates based on a mapping exercise using information obtained from surveys from different provinces and institutional settings.
[2] Simulation exercise with no control group.
[3] List of 39 resources generated through previous experiences, literature searches.
[4] Survey was conducted for potential resource use in different provinces of Thailand. Survey questionnaire was developed based on past experiences in Thailand and information available in literature.
[5] Survey study.
[6] Study was done in Thailand, which has a different health system to other countries.
[7] There is potential to have another survey on the same issue.
[8] Fourteen provinces participated in the survey.
[9] Phase 4 refers to human-to-human transmission from case patient to caregiver. Phase 5 refers to human-to-human transmission in localized clusters.