

# Emergency Preparedness and Response: School Dismissals to Reduce Transmission of Pandemic Influenza

## Summary Evidence Table for Modeling Studies

<b>Study</b> Author, Year Population Modeled (location, size)	<b>Model Characteristics</b> Pandemic Modeled: Ro, Severity Modeling of Childcare	<b>Intervention</b> Trigger Scale Duration Social Distancing Comparison	<b>Effectiveness Measures</b>	<b>Reported Baseline</b>	<b>Reported Effects</b>	<b>Value Used in Summary [95%CI]</b>
Andradottir 2011  Mid-sized North American city Hamilton, Ontario Canada  Pop'l= 649,565	Modeled H1N1 2009  Ro=1.4  No severity parameters  Childcare Modeled: 0-4 years, 50% in daycare, 50% on playground; rolling dismissal just like school	School Dismissal  Population threshold of 0.01% symptomatic; once threshold passed, if 5 cases in either school or daycare, trigger dismissal  Duration of 5 days; but once threshold passed again, dismissal again; actual duration of dismissal closer to duration of pandemic  Social Distancing: people automatically reduce contacts in the workplace, neighborhood and community after becoming aware of outbreak; school dismissal also accompanied by 20% reduction in community and workgroup contact rates  Comparison: baseline pandemic	Clinical attack rate  *Economic measures	Clinical attack rate: 34.1%	Changes in clinical attack rate: 24.0-34.1 = -10.1%	Changes in clinical attack rate: 24-34.1 = -10.1%

School Dismissals to Reduce Transmission of Pandemic Influenza, Modeling Studies – Evidence Table

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Barrett 2011  New River Valley region, SW Virginia  Population 150,000	Modeled H5N1 age specific attack rates;  Ro : NR  Childcare: NR; but only modeled age groups 0-18, 19-64, and 65+; assume no childcare modeled	School Dismissal  1% of community infected  All schools in the community  Duration of 2 week dismissals, but schools are likely re-dismissed once threshold passed again; would result in a much longer dismissal  Sick individuals will not go to work  Compared to 1. Baseline pandemic; 2. Individual strategies adopted based on the person's socioeconomic status	Attack rate  *Economic measures	AR: 26.3%	Changes in attack rate:  15.7-26.3 = -10.6%	Changes in attack rate:  -10.6%
Carrat 2006  France  Stylized community of 10,000 people	Did not model after specific pandemic;  Ro= 2.07  Childcare: NR  Depending on age, case fatality rate range from 1-4%  Childcare assumed not modeled: age structure 0-18, 19-64 and 65+; no specifics for childcare age children	School dismissal  0.5% of the population infected will trigger school dismissal  All schools in community; R  Duration: end of the pandemic; reopen 10 days after last observed case mean=101 days  Compared to baseline pandemic with no interventions	Infection attack rate  Mortality  Hospitalization  Workdays lost	Infection attack rate: 46.8%  Mortality: 0.36%  Workdays lost: 137	Infection attack rate: 9.7%  Mortality: 0.081  Workdays lost : 324	Change in clinical attack rate (calculated from infection attack rate): 6.79-32.8 = -25.97%  Reduction in mortality: 0.081-0.36 = -0.28%  Increase in workdays lost: 324-137 = 187  Decrease in hospitalization: -1.73%

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Chao 2010 Seattle, US Popl~560,000	1957 and H1N1 Pandemic Modeled Ro=1.2,1.4, 1.6, 1.8, 2, 2.2, 2.4 No severity parameters; Childcare: preschool age children belong to a playgroup or a preschool; not dismissed separate from schools	Case ascertained in either school or community could trigger school dismissal Delay to activation modeled: 30 days after 1 <sup>st</sup> case detected All schools, including preschools and daycares, but not playgroups Duration: 60 days or end of pandemic During dismissal, all school contacts stopped, more time spent in household, neighborhood, and community Comparison: No intervention	Daily Prevalence of Influenza (delay to peak)	Illness prevalence: Ro=2.0, 60 day dismissal; 6%	Illness prevalence: Ro=2.0, 60 day dismissal; <1% School dismissal on its own could be effective, but epidemic may spike immediately upon ending the intervention	No data points available
Davey 2008 USA Small community Popl= 10,000	Modeled 1958 pandemic for its base case; Modeled 1918 pandemic by scaling to 1.5 times baseline infectivity Ro: 1.6 for baseline, 2.0 for 1918, and various others No severity parameters Children go to school or preschool; assumed all closed;	School Dismissal 10, 30 or 100 incident cases in the community trigger SD; All schools in community Duration: until 0 or 3 new cases within a 7 day period; once threshold reached again, school dismissed again All school contacts reduced by 90% or 60% (compliance) Comparison: no intervention	Infection attack rate;	Infection attack rate; Ro=1.4, 27.8% Ro=1.6, 49.6% Ro=2.0, 82.3%	Infection attack rate; Ro=1.4, 2.2% Ro=1.6, 22.7% Ro=2.0, 61%	Changes in clinical attack rate (calculated from infection attack rate); Ro=1.4; -12.8% Ro=1.6; -13.45% Ro=2; -5.15%

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	showed increased days at home due to school dismissal for children under 11					
Davey & Glass 2008  US  Stylized community of 10,000	Modeled 1958 pandemic with their milder case; Modeled 1918 pandemic with their severe case  Ro=1.6 for mild case; Ro=2.0 for severe case  2% mortality, but did not model death under interventions  Childcare modeled; upon school dismissal, assumed to be closed as well	School Dismissal  10 cases in community trigger SD  All schools in community  Schools dismissed until 0, 1, 2, or 3 new cases found in community in a 7 day period; once open, if threshold for SD reached again, school dismissed again  Tested different compliance levels (50 to 90%, incremental of 10%) to strategies that reduced children or adults school, work, and community contacts  Compared to no intervention	Infection attack rate  Peak attack rate	Infection attack rate; Ro=1.6, 50% compliance with children social distancing; 49.6% Ro=2.0, 50% compliance with children social distancing; 71.4%  Peak attack rate; Ro=1.6, same scenario; 8.4% Ro=2.0, same scenario; 17%	Infection attack rate; Ro=1.6; same scenario; 10% Ro=2.0; same scenario; 56.3%  Peak attack rate; Ro=1.6; same scenario; 0.8% Ro=2.0; same scenario; 8%	Change in clinical attack rate (calculated from infection attack rate): Ro=1.6; -19.8% Ro=2; -7.55%

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Ferguson 2006 USA Popl= 300 million Great Britain Popl= 58.1 million	Modeled 1957 pandemic for mild scenario; Modeled 1918 pandemic for severe scenario Ro=1.7, 2.0 No severity parameter Childcare not specifically mentioned; age stratified into 10 year brackets, but no mention of childcare for younger children	School dismissal Rolling SD: 1 day after 1 case in school detected Blanket SD: 1 day after 1 case in a school detected, all schools within 10km dismissed Duration: 3 weeks per each time school dismissed; once threshold breached again, school dismissed again Social Distancing: 10% reactive workplace closure occurs with SD Comparison to no intervention	Clinical Attack Rate Peak Clinical Attack Rate Delay in peak	Clinical Attack Rate; Ro=1.7, 27% Ro=2.0, 34% Peak Clinical Attack Rate; Ro=1.7, 1.2% Ro=2.0, 1.9%	Clinical Attack Rate; Ro=1.7, 24% Ro=2.0, 32% Peak Clinical Attack Rate; Ro=1.7, 0.9% Ro=2.0, 1.4% Delay to peak; Ro=1.7, +13 days Ro=2.0, +9 days	Change in clinical attack rate: Ro=1.7 Rolling SD: -3% Blanket SD: -4.7% Ro=2.0 Rolling SD: -2% Blanket SD: -2.8% Reduction in PAR: Ro=1.7, -0.3% Ro=2.0, -0.5% Delay to peak: Ro=1.7, +13 days Ro=2.0, +9 days
Germann 2006 USA Popl= 281 million	Modeled viral strain had age-dependent attack rate pattern between that of the 1957 and 1968 pandemic strains; For Ro=1.9, disease course mirrored that of 1957 pandemic; Ro=1.6, 1.9, 2.1, 2.4 No severity parameters Childcare modeled; when school dismissal in effect, all school related mixing groups	School Dismissal 7 days after nationwide pandemic alert issued due to 10,000 symptomatic individual nationwide All schools in the nation SD to the end of the pandemic Social Distancing: assumption that social behavior will be affected, reduction of long-range travel to 1% of normal frequency, concentration of interactions within households Comparison to no intervention	Clinical attack rate	Clinical attack rate; Ro=1.6, 32.6% Ro=1.9, 43.5% Ro=2.1, 48.5% Ro=2.4, 53.7%	Clinical attack rate; Ro=1.6, 1.0% Ro=1.9, 29.3% Ro=2.1, 37.9% Ro=2.4, 46.4%	Change in clinical attack rate: Ro=1.6; -31.6% Ro=1.9; -14.2% Ro=2.1; -10.6% Ro=2.4; -7.3%

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	dismissed as well, including playgroups and preschool					
Glass 2006  USA small town Popl: 10,000	Modeled 1957 pandemic;  Ro=1.6  No severity parameter  Preschool modeled; all children lumped together when schools dismissed with all classes canceled, presumably including preschool	School Dismissal  1 day after 10 symptomatic cases in the community  All schools in community  Duration: end of pandemic  Social distancing: tested different social distancing scenarios with different compliance level	Scenario: SD with 90% compliance  Infection attack rate  Peak attack rate  Delay to peak	Scenario: SD with 90% compliance  Infection attack rate; 50.18%  Peak attack rate; 7.03%  Time to peak: 35 days	Scenario: SD with 90% compliance  Infection attack rate; 39.16%  Peak attack rate; 3.29%  Time to peak: 48 days	Scenario: SD with 90% compliance  Change in clinical attack rate (calculated from infection attack rate): -5.51%  Change in peak attack rate: -3.74%  Delay to peak: +13 days
Glass 2007  Australia Popl= 1 million households (2.6 million individuals)	Modeled age specific attack rate from either 1957 or 1968 pandemics; paired with different Ro  Ro of 1.5 or 2.5 applied to either 1957 or 1968 age specific attack rate  No severity parameters  No specific mention of childcare facilities	School Dismissal  SD implemented at start of the pandemic; also tested different percentage of children infected as triggers  Duration: end of pandemic  Social Distancing: all children kept at home during school hours  Comparison: no intervention	Attack rate  Peak attack rate  Delay to peak	Attack rate: Ro=1.5, 58%  AR in Children, 84%	Attack rate: Ro=1.5, 38%  AR in Children, 32%	Change in attack rate (couldn't distinguish if infection or clinical attack rate) Ro=1.5; -20%

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Gojovic 2009 Canada London, Ontario Modeled pop'l= 10,391	H1N1 2009 Pandemic Modeled Ro: 1.8 Childcare Modeled: Daycares, Preschool 0-4yos diagnosis of an infection in a daycare resulted in its closure or diagnosis of an infection in a school or daycare resulted in closure of all schools and daycare	School Dismissal School Reactive diagnosis of an infection in a school resulted in its closure or diagnosis of an infection in a school or daycare resulted in closure of all schools and daycare. Scale: Rolling and Community Blanket Duration: 7, 14, and 300 days Comparison: no intervention	Pandemic Influenza Attack Rate	Baseline (no vacc, no SC): AR=21.7%	7 day Rolling SD (no vacc): AR=4.5% 14 day Rolling SD: AR=3.6% 14 day Blanket SD: AR= 3.3 300 day Blanket SD AR=3.1	Change in attack rate (couldn't distinguish if infection or clinical attack rate); Ro=1.8; Rolling SD, 1wk, -22.4% 2wk, -24.5% Blanket SD, 2wk, -25.2%
Haber US urban community	Pandemic Model: 1957-8 Ro: 2.7	School Dismissal Reactive When prevalence of illness for children in the school exceeded 10,15 or 20% Duration: 7,14,21 days Comparison: no intervention	Clinical Attack Rate	Baseline: AR=32.1	7 day closure @ 10% sick AR= 28.8 @>10% sick, 14 day closure AR =26.5% @20% AR=31.9	CAR; Ro=2.7; -3.3% 0.288 CI =(0.278-0.297)
Halder 2010a Albany, Australia Stylized community of 30,000 people	Modeled H1N1 pandemic Ro=1.4, 1.5, 1.6 No severity parameter Modeled childcare; for rolling school dismissal, childcare did not close with schools; for blanket dismissal, childcare closed with schools	School dismissal only; Various triggers tested; for rolling school dismissal, 1 case in elementary school and 2 cases in high school will trigger school dismissal; for blanket school dismissal, 0.1% of community infected will trigger school dismissal; 1 to 4 wks	Clinical attack rate Peak incidence rate	CAR; Ro=1.4, 27.9% Ro=1.5, 32.5% Ro=1.6, 37.2% PAR; Ro=1.4, 82 cases/10,000 Ro=1.5, 121 Ro=1.6, 159	Rolling SD; CAR; Ro=1.4, 23.5 - 27.9 = -4.4% Ro=1.5, 29.3 - 32.5 = -3.2% Ro=1.6, 34.1-37.2= -3.1% PAR; Ro=1.4, 53-82 = -29 cases/10,000 Ro=1.5, 74-121=-47 cases/10,000	CAR; Ro=1.4; -4.4% Ro=1.5; -3.2% Ro=1.6; -3.1%

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		When school dismissed, all school contacts severed and time spent in household; no additional contact in communities  Comparison to unmitigated pandemic			Ro=1.6, 100-159=-59 cases/10,000	
Halder 2010b  Albany, AU Comm of 30,000	H1N1  Ro: 1.5, 2.0, 2.5  No severity  Childcare modeled (detail offered by Milne 08); This study applied SD directly to 6-12 and 13-17 age groups; Childcare not closed; SD reduced attack rates among school age children; also ppl from other age groups	Cases per day (range tested) in community activate school policies: Individual school dismissal (ISD): 1 diagnosed case in a primary school; >2 diagnosed cases in high school  Simultaneous school dismissal (SSD): cases per day (range tested) in community  Individual vs. simultaneous school dismissal  2, 4, 8 weeks tested  Symptomatic individuals withdraw to home: 50% of adult; 90% of children  Baseline epidemic: no interventions; has withdraw behavior	Clinical attack rates  Peak daily incidence	Ro = 1.5: 32.5% 120 cases/10,000 Ro = 2.0; 49.9% Ro = 2.5; 58.8% 564 cases/10,000 PAR: cases/10,000 2wk: 56-120=-64; 8wk:33-120=-87 PAR: cases/10,000 2wk: -184 cases; 4wk: -194 cases; 8wk: -214 cases	Clinical attack rate: Ro =1.5: Rolling SD: 2wk: 25-32.5= -7.5%; 8wk: 19-32.5= -13.5% Blanket SD: 2wk:24.7-32.5= -7.8% 8wk:18.3-32.5= -14.2%  Ro = 2.5; Rolling SD: 2wk:55.8-58.8= -3%; 8wk: 54.5-58.8= -4.3%; Blanket SD: 2wk:55.7-58.8= -3.1% 8wk: 54.2-58.8= -4.6%  Peak attack rate: Ro = 1.5; cases/10,000 2wk: 56-120= -64; 8wk:33-120= -87 Ro=2.5 cases/10,000 2wk: -184 cases 8wk: -214 cases	CAR; Ro = 1.5: Rolling SD: 2wk: -7.5% 4wk: -9.8% 8wk: -13.5% Blanket SD: 2wk: -7.8%  Ro = 2.0 Rolling SD: 2wk: -4.9% 8wk: -8.9% Blanket SD: 2wk: -4.7%  Ro = 2.5 Rolling SD: 2wk: -3% 8wk: -4.3%

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House 2009  England	H1N1 2009 Pandemic Modeled Ro= 1.1,1.4, 2.0  Standard Age-structured epidemic model with Polymod age-groupmixing Childcare: not modeled	School Dismissal  Community preemptive Demand on local hospital adult ICU beds is above capacity  Scale: rolling SD in the entire nation  Duration= 1-4 weeks  Comparison: none	Reduction in Peak Cases  Relative Peak daily incidence in children, adults, and the elderly		1-4 week closures reduce the peak incidence by between 30-70%  Impact of SD is greater on the peak incidence in children than in adults. The results for the elderly resemble those for adults	
Kelso 2009  Albany, AU Comm of 30,000	Calibrated against seasonal H3N1 in 1977 in Tecumseh, Michigan  Ro modeled: 1.5, 2.5, 3.5  No severity measures  Childcare modeled separately; as all parameters inherited from Milne 2008, and all childcare closed with schools per Milne 2008, assumed same conditions implemented here	Tested intervention delays on effectiveness of strategies; pre-emptive, and also 0-8 wks after 1 index case identified  All schools  Closed to the end of the pandemic  Once school dismissed, students and teachers spend their daytime cycles at home: no contacts at school, and no additional contacts in community; if one child stays home alone, then one adult stays home as well  No intervention, basic pandemic served as comparison; 80% of infected become symptomatic, 50% of adults and 90% of children (6-17) withdraw to home when symptomatic	Clinical attack rates; peak daily attack rate  For Ro of 1.5, school dismissal could not reduce attack rate below 10%, which the authors set as threshold at which pandemic is controlled; could reduce peak daily cases from 90 to below 35 cases per 10,000 if introduced within 4 wks of outbreak; for higher Ro, combination strategies needed to be	Ro=1.5 Clinical attack rate: 33.3%; Peak daily attack rate: 87 per 10,000 ppl Peak attack day: 57 Ro=2.5 CAR: 64.8% PAR: 481 per 10,000 ppl PAD: 29; Ro=3.5 CAR: 73.2% PAR: 856 per 10,000 ppl PAD: 20	No specific numbers given; all results presented in graphs  Description regarding single interventions given in range of values  Specific value given for multi-component interventions	N/A

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			implemented as soon as possible to reduce clinical attack rate and peak attack rates			
Lee 2010  Allegheny County, PA; 1,242,755 pop	Calibrated against the 1957 pandemic to arrive at the basic scenario of Ro 1.4, attack rate of 33%  Multiplier applied to the basic pandemic of Ro 1.4 to arrive at Ro of 1.7, 1.9, and 2.4  No severity measures  Did not mention daycare in the model	Testing for threshold used 1, 5, 10 diagnosed cases in schools or 0.1, 0.2, 0.5, 1, or 1.5% of general pop diagnosed to trigger school dismissal  Case(s) in school used for school by school dismissal; Prevalence in community used to dismiss all schools in community  Both school by school and blanket community dismissal studied  Different duration tested, ranging from 1 to 16 weeks  School dismissal will cut contacts at school, but not influence community contact rate  Baseline epidemic without intervention; 67% of infected people become symptomatic; 50% of sick students and workers stay home and cut all community contacts unless they see a doctor; 40% of sick people visit medical facilities	Infection attack rate (IAR); peak day; peak attack rate	Ro=1.4; IAR: 35.1% Peak day: 68 Peak incidence: 0.97%  Ro=1.7; IAR: 40.2% Peak day: 56 Peak incidence: 1.28%  Ro=1.9 IAR: 43.2% Peak day: 56 Peak incidence: 1.58%  Ro=2.4 IAR: 53% Peak day: 44 Peak incidence: 2.45%	Sample effect estimates: Rolling School Dismissal: Ro = 1.4, 1 wk; IAR: 33.7-35.1 = -1.4% Peak day: 76-68 = 8 Peak incidence reduction: -0.02% 4 wk; IAR: 31.8-35.1 = -3.3% Peak day: 84-68 = 16 Peak incidence reduction: -0.16%  Ro = 1.9, 1wk; IAR: 42.7-43.2 = -0.5% Peak day: 60-56 = 4 Peak incidence reduction: -0.13% 4wk: IAR: 41.4-43.2 = -1.8% Peak day: 68-56 = 12 Peak incidence reduction: -0.31%	Clinical Attack Rate, (calculated from Infection Attack Rate); Ro=1.4; Rolling SD; 1wk; -0.93%; 2wk; -1.27%; 16wk; -10.47%; Blanket SD; 2wk; -0.07%  Ro=1.7; Rolling SD; 1wk: +0.27%; 16 wk: -7.47%; Blanket SD; 1wk; +0.47%  Ro=1.9; Rolling SD; 1wk: -0.33%; 2wk; -0.53% 16wk: -8.87%; Blanket SD; 2wk; +0.13%  Ro=2.4; Rolling SD; 1wk; -0.13%; 16wk: -7.2%

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Lofgren 2008  Simplified elementary school with 200 students	Not modeled based on any pandemic; No Ro; No severity  Infected students at each time step (20 minutes) shed infective particles; uninfected students become infected depending on the number of particles at their location  Entire simulation is an elementary school, no childcare	School closes when 2, 10 or 35% of students become sick  Entire school  Didn't specify for SD scenario  Only modeled the school  Each student starts with a health score of 100; sick student drop 5 points per hour; once health score falls under 60, student send home; once health score above 70, return to school; if go below 60 again, go home again	Total unique infections  Total sick days  Mean number of students sent home (not due to school dismissal)  Average health score	Did not provide	Closing school when 2% of students symptomatic significantly reduced the number of unique infections, halting the spread of disease  Did not result in significant change of total sick days  SD as 2% of students become sick produced the highest average health score	N/A
Milne 2008  Albany, Australia Stylized community of 30,000	Calibrated against serologic infection rates reported for H3N2 in 1977-78 in Tecumseh, Michigan  Ro of 1.5, 2.0, 2.5 tested  No severity measures  Childcare modeled separately, closed at the same time and the schools	School dismissal  Before the first case introduced into Australia  All schools, childcare facilities , and adult educational institutions closed  Duration of the pandemic  When school closes, all daytime contacts for students and teachers moved to home; no additional contact in the community  Comparison to baseline: 50% of adults and 90% of children stay home when symptomatic;	Illness attack rates  Peak daily attack rate, cases/10,000  Peak attack day	Illness attack rates: Ro = 1.5, 33.2% Ro=2.0, 54.9% RO=2.5, 64.8%  Peak daily attack rate: Ro=1.5, 0.89% Ro=2.0, 2.79% Ro=2.5, 4.74%  Peak attack day: Ro=1.5, 58 Ro=2.0, 37 Ro=2.5, 28	Illness attack rates: Ro=1.5, 13-33 = -20% Ro=2.0, 45-55 = -10% Ro=2.5, 60-65 = -5%  Peak daily attack rate: Ro=1.5, 0.02%-0.89% = -0.69% Ro=2.0, 1.46%-2.79% = -1.33% Ro=2.5, 3.21%-4.74% = -1.53%	CAR; Ro=1.5; -20% Ro=2.0; -10% Ro=2.5; -5%

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		assumed a base level of social distancing behavior during pandemic, modeled by increased household contact rates				
Morimoto 2010  Sapporo City, Japan Pop'l = 1.9 million	1957 Ro= 1.6 Effective Rep (2.0 initially then reduced to 1.6) Stochastic Individual-based model (used Visual Fortran + ISML random# generator)	School Dismissal Community preemptive: (day following one in which a ward member is diagnosed in a med institution) All schools within a ward  Duration: until no patients were detected within the ward	Clinical attack rate;  Deaths  Delay to Peak	Clinical attack rate: 57.8%  Deaths: 4355	Clinical attack rate: 49.7%  Deaths: 3772  Delay to peak= 45 days	Change in clinical attack rate: Ro=2.0; -8.11%
Perlroth 2010  USA Popl=10,000	Pandemic Modeled: NR Ro=1.6, 2.1 Multi-agent based social contacts model developed by Sandia Labs	School Dismissal (SchD) Community Preemptive After 10 persons in community become symptomatic Duration: end of pandemic ( 2 generation times pass without newly diagnosed cases) Social Distancing: school contacts reduced by 90% during closure Comparison: No intervention	Cases  # of Cases Averted  *Economic Measures	Ro=1.6 +CFR=0.25 Case# = 2460 (25%) #Cases Averted = none Ro=2.1 and CFR= 1% Case# = 3515(35%)  #Cases Averted = none	Ro=1.6 +CFR=0.25 Case# = 1480 (15%) #Cases Averted = 975 Ro= 2.1 and CFR= 1% Case# = 3169 (33%) #Cases Averted = 350	CAR; Ro=2.1; -3.46%

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Roberts 2007  New Zealand City of Auckland Popl= 1 million	Pandemic Modeled: NR Ro= 1.1, 2.0,3.0 Structured Kermack-McKendrick Integral Equation Model Childcare Modeled: NR	School Dismissal  Community Preemptive Start of the epidemic with no delay Community (blanket) Duration: end Social Distancing + 100% compliance with School dismissal Comparison: No intervention	Reduction in transmission to revert Ro below 1, effectively ending the pandemic;	Reference: Ro=1.1 17.6% popl infected  Ro=2.0 79.7% popl infected  Ro=3.0 94% popl infected	@ Ro=1.1 transmission in school would have to be reduced to 63% of its baseline level ( no control) to prevent a pandemic  It is not achievable at Ro=2 or Ro=3, eliminating transmission at school would not reduce Ro below 1	
Sander 2009  USA Popl = nation ~307 million	Pandemic Modeled:NR Ro=1.5-2.6 avg=2.0 Stochastic Agent-based Individual-level Microsimulation Model Childcare Modeled: preschool age children attend small playgroups or larger daycare centers, 2.5 workdays per week lost per household with children < 12 if schools are closed	School Dismissal Community Preemptive Start of epidemic Community(blanket) Duration: 26 weeks Comparison: No intervention	Deaths  Illness Attack Rate  *Economic Costs	Deaths = 13 per 1000  IAR = 50%	Deaths = 10 per 1000  IAR = 39%	CAR; Ro=1.6; -30.5% Ro=2.0; -8%
Syspal 2009  Greece Popl=2000	H1N1 (Mexico) Pandemic Modeled Ro=1.51 Discrete-Time Stochastic Individual-based Simulation Model Childcare Modeled: NR	School Dismissal (60% compliance) Community Preemptive 1% popl infected Community (blanket) Duration: end of pandemic Comparison: No intervention	Illness Attack Rate	IAR= 34.5%	IAR = 3.7%	CAR; Ro=1.5; -30.8%

<b>Study</b> Author, Year Population Modeled (location, size)	<b>Model Characteristics</b> Pandemic Modeled: Ro, Severity Modeling of Childcare	<b>Intervention</b> Trigger Scale Duration Social Distancing Comparison	<b>Effectiveness Measures</b>	<b>Reported Baseline</b>	<b>Reported Effects</b>	<b>Value Used in Summary [95%CI]</b>
Vynnycky 2008 United Kingdom Popl:	1957 Pandemic Modeled Ro=1.8, 2.5, 3.5 Age-structured Model, WAIFW matrices Childcare Modeled: nurseries close with schools	School Dismissal Community Preemptive 50,100,200,1000 cases per 100,000 per week Community (blanket) Duration: reopen when the disease incidence dropped below the corresponding threshold incidence that triggered it Social Distancing: NR Comparison: no intervention	Reduction the size of epidemic		Ro= 1.8 Epi size reduction ~22% Ro= 2.5 or 3.5 Epi size reduction of <10%	CAR; Ro=1.8; -22%
Yasuda 2008 Japan Greater Tokyo Chuo Line divided into compartments Pop'l=8,800	Seasonal flu Ro= ~ 1.5 or 1.6 Severity: Seasonal flu Childcare: NR	Community preemptive (1 – 4 weeks after beginning of epidemic) Community (blanket) Duration: 2 wks Comparison: no intervention	Scenario: SD 1wk after outbreak; dismissed for 2wks; Infection attack rate; Peak week	Scenario: SD 1wk after outbreak; dismissed for 2wks; Infection attack rate: 33.13% Peak =6th wk	Scenario: SD 1wk after outbreak; dismissed for 2wks; Infection attack rate; 31.3% Peak week; 3 <sup>rd</sup> week	IAR; Ro=1.5; 2wk; - 1.8%
Yasuda 2009 Japan Greater Tokyo Chuo Line divided into compartments Pop'l=8,800	H1N1 2009 Ro= not given Severity = H1N1 2009 Did not mention childcare	School Dismissal; Community preemptive 1 week and 2 weeks after outbreak All schools in community (blanket) Duration: 7 days Social distancing: 1/3 of adults and 100% of students stay at home 48 hours after onset of symptoms Comparison: no intervention	Scenario: SD 1 wk after outbreak, close for 1 wk; Infection attack rate;	Scenario: SD 1 wk after outbreak, close for 1 wk; Infection attack rate: 36.49%	Scenario: SD 1 wk after outbreak, close for 1 wk; Infection attack rate: 20.59%	IAR; H1N1; 1wk; - 15.9%

<b>Study</b> Author, Year Population Modeled (location, size)	<b>Model Characteristics</b> Pandemic Modeled: R <sub>0</sub> , Severity Modeling of Childcare	<b>Intervention</b> Trigger Scale Duration Social Distancing Comparison	<b>Effectiveness Measures</b>	<b>Reported Baseline</b>	<b>Reported Effects</b>	<b>Value Used in Summary [95%CI]</b>
Zhang 2011  Singapore Pop <sup>1</sup> ~480,000	Seasonal flu  R <sub>0</sub> = ~1.9  Severity: seasonal flu  Did not mention childcare	School Dismissal;  Various triggers tested, as diagnosed%  Single class; individual school; all schools  Duration: tested various Social distancing: 100% students stay at home; 50% of symptomatic people stay home Comparison: no intervention	Scenario: SD of 2-10wks triggered by various % of pop diagnosed;  Infection attack rate;  Peak incidence;  Peak day;	Various scenarios;  Peak incidence: 42.45 per 1,000 people  Peak day: day 26	Scenario: SD 6wks triggered by 0.25% diagnosed;  Peak incidence: 30.75 per 1,000  Scenario: SD > 2wks triggered by 0.02% diagnosed; Peak day: 5 day delay	Lowest AR achieved by 10wk SD triggered at 0.02% diagnosed;  2wk SD least effective;  For duration < 6wks, a higher trigger leads to a lower AR; For duration > 6wks, a lower trigger leads to a lower AR;  Under all scenarios, after 8wks, extending SD didn't further reduce AR

Abbreviations

- AR, Attack rate
- CAR, Clinical attack rate
- CFR, Clinical fatality rate
- CI, Confidence Interval
- IAR, Infection attack rate
- PAD, Peak attack day
- PAR, Peak attack rate
- SD, School dismissal
- wk, week