

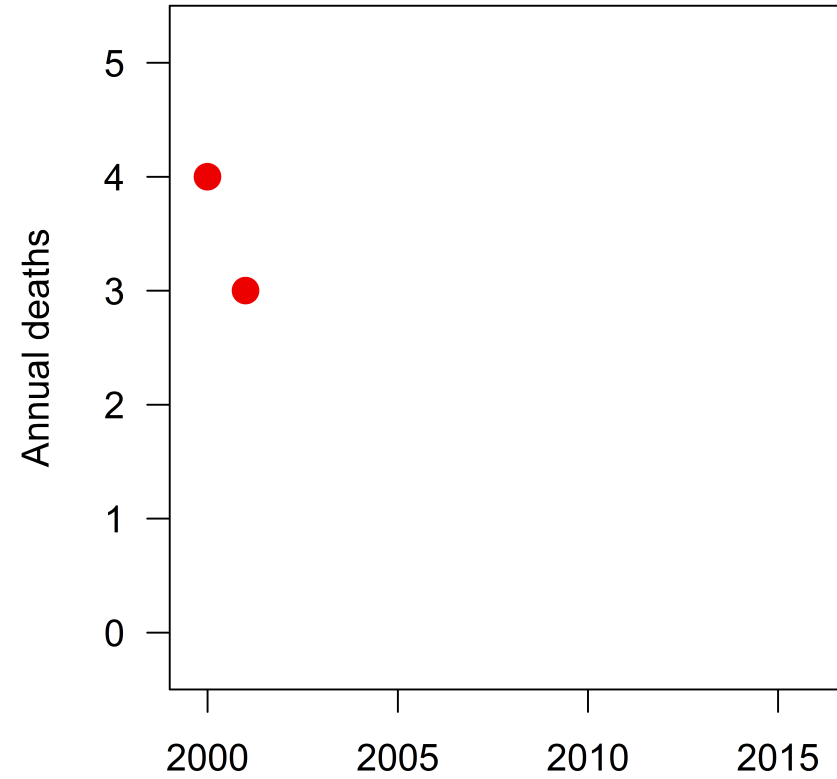
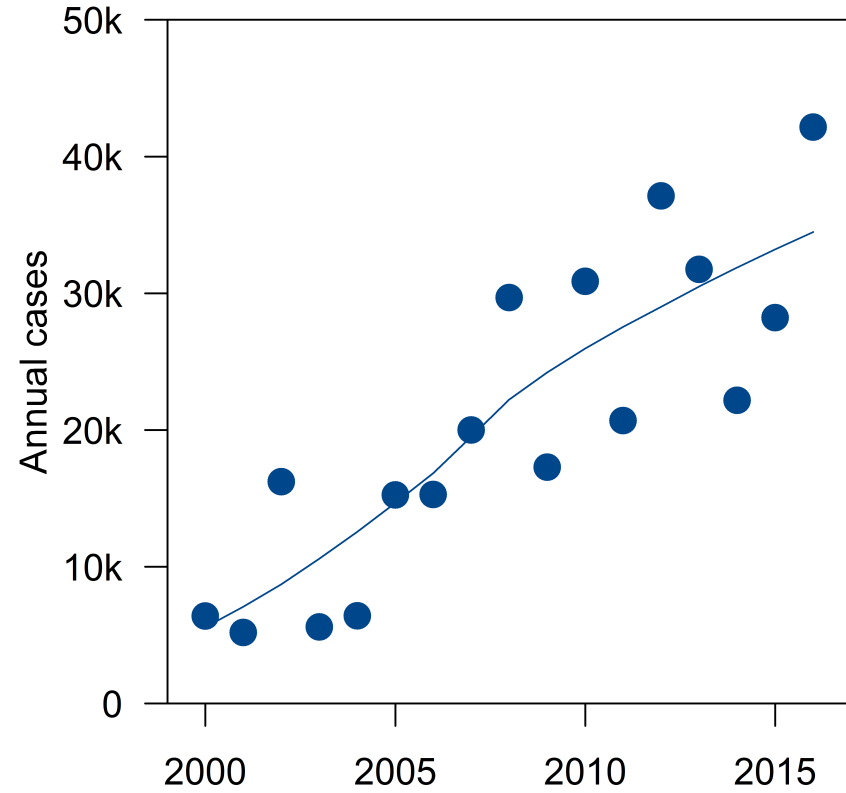
Controlling hand foot and mouth disease in preschools

Funded by NMRC HSR

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- Daily screening of all pre-schoolers
- Isolation of infected children for 10d
- School closure following outbreak

In-depth interviews

Semi-structured interview of

17 parents

4 principals

21 teachers

in English or Mandarin

Translated/transcribed and analysed using applied thematic analysis in NVivo

Prevention impacts daily school life

Banning of

- parental access,
- outdoor play,
- playing with other age groups;

Encouraging playing by self

'Naming and shaming'

Derided by parents and teachers

- Parents don't see the point: will not influence their decision making
- Teachers find it demoralising: feel no agency over outbreaks

Isolation of sick children

Supported by teachers

But note that parents 'cheat'

- Not sharing diagnoses and sending kids to school even when sick,
- Exerting pressure to return early, citing reasons why child needs to be at school

Closure 'effective but onerous'

- Teachers support infection 'break'
- But causes friction with parents
- Substantial impacts on leave or alternative care

Economic impact

Cost: to schools

Length of closure	1 day	5 days	10 days
Average direct cost	\$840	\$2340	\$4420
Average staff hours	18	68	141
Average total cost	\$1040	\$3070	\$5930

Annual closures	Total cost
30	\$180 000
100	\$590 000

Cost: to families

- One random child selected per family.
- Among all the random children, **35%** of them have stayed at home due to HFMD.
- Average number of days absent from school due to HFMD is **6.8 days**.
- Caregivers on average takes **4d of paid leave, 1.7d of unpaid leave** and **2.1d working from home**.
- Average daily cost for staying at home due to HFMD is **\$320**.
- Average total cost for staying at home due to HFMD is **\$2800**, including
 - Medication & consultation
 - Employed parent taking time off
 - Hiring babysitter
 - Transportation
 - Lost of school fees (indirect)

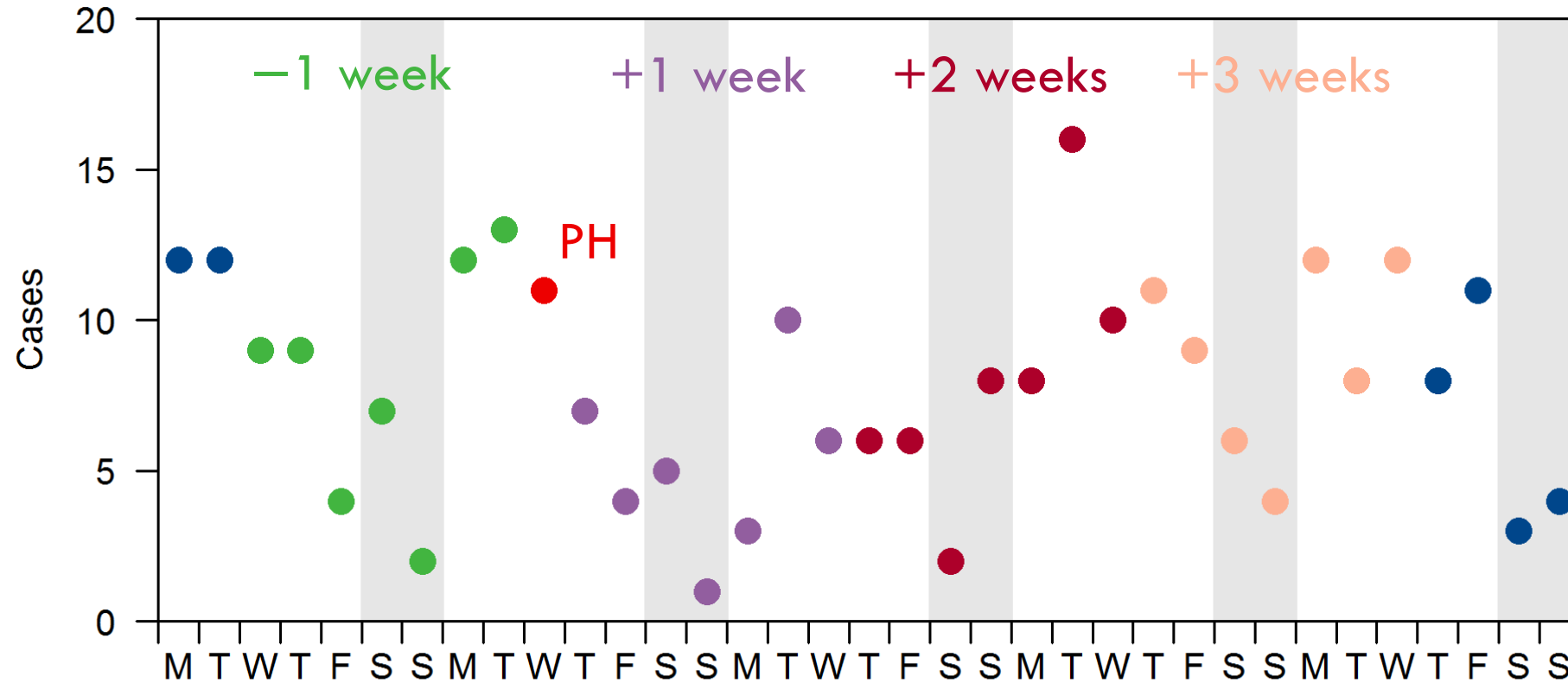
Annual cases	Total cost
20 000	\$56 000 000
30 000	\$84 000 000

Modelling of effect of closure

HFMD is legally notifiable by physicians and childcare teachers, as well as actively screened for in preschool-aged children.

- i. Aggregate reported HFMD cases from 2003 to 2012, with the number of daily cases stratified by age;
- ii. All ~9000 HFMD outbreaks in childcare centres and kindergartens in Singapore, during the period 2011 to 2016 – cumulative number of cases per day, enrollment size, whether the school were closed due to outbreak, date of closure and reopening.

Analysis 1: closure due to public holidays



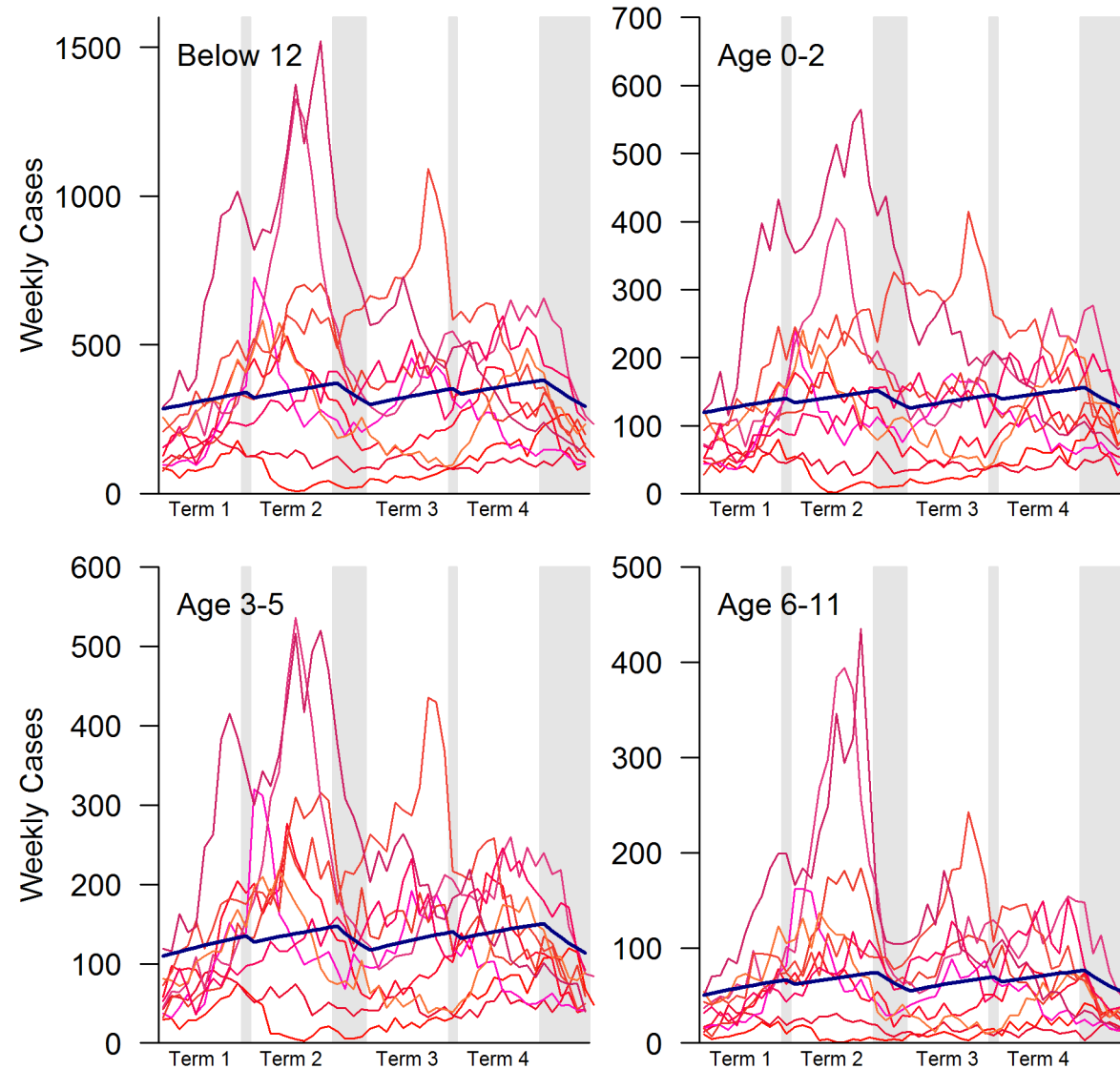
Estimates	+1 week	+2 weeks	+3 weeks
Transmissibility on PH vs normal day	<u>0.47</u> (0.38, 0.56)	<u>0.66</u> (0.57, 0.75)	<u>1.00</u> (0.91, 1.10)

Transmissibility was:

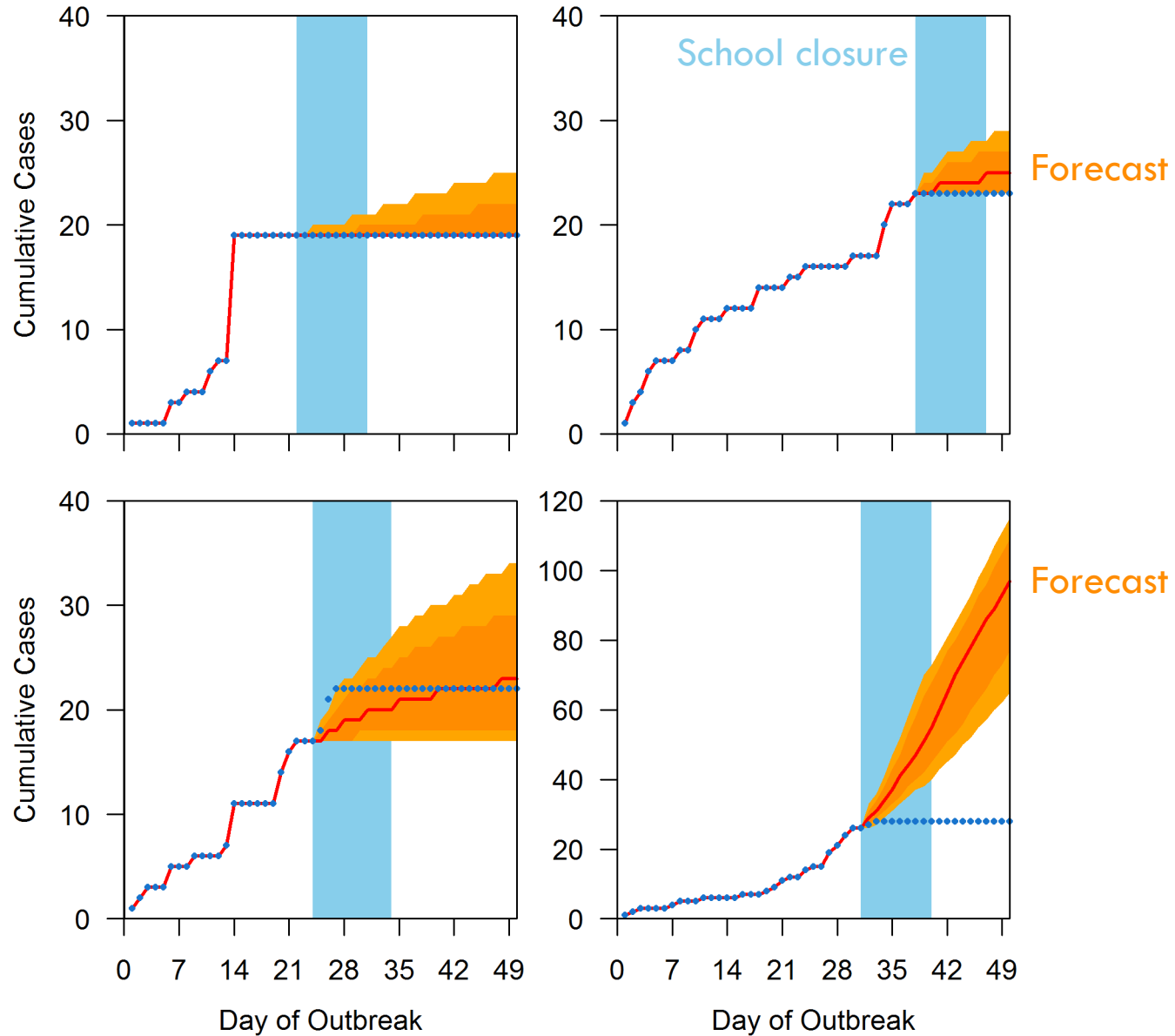
- Reduced by **53%** in the one week following a public holiday;
- Reduced only by **34%** in the second week;
- **No reduction** in the third week.

Analysis 2: closure due to school vacations

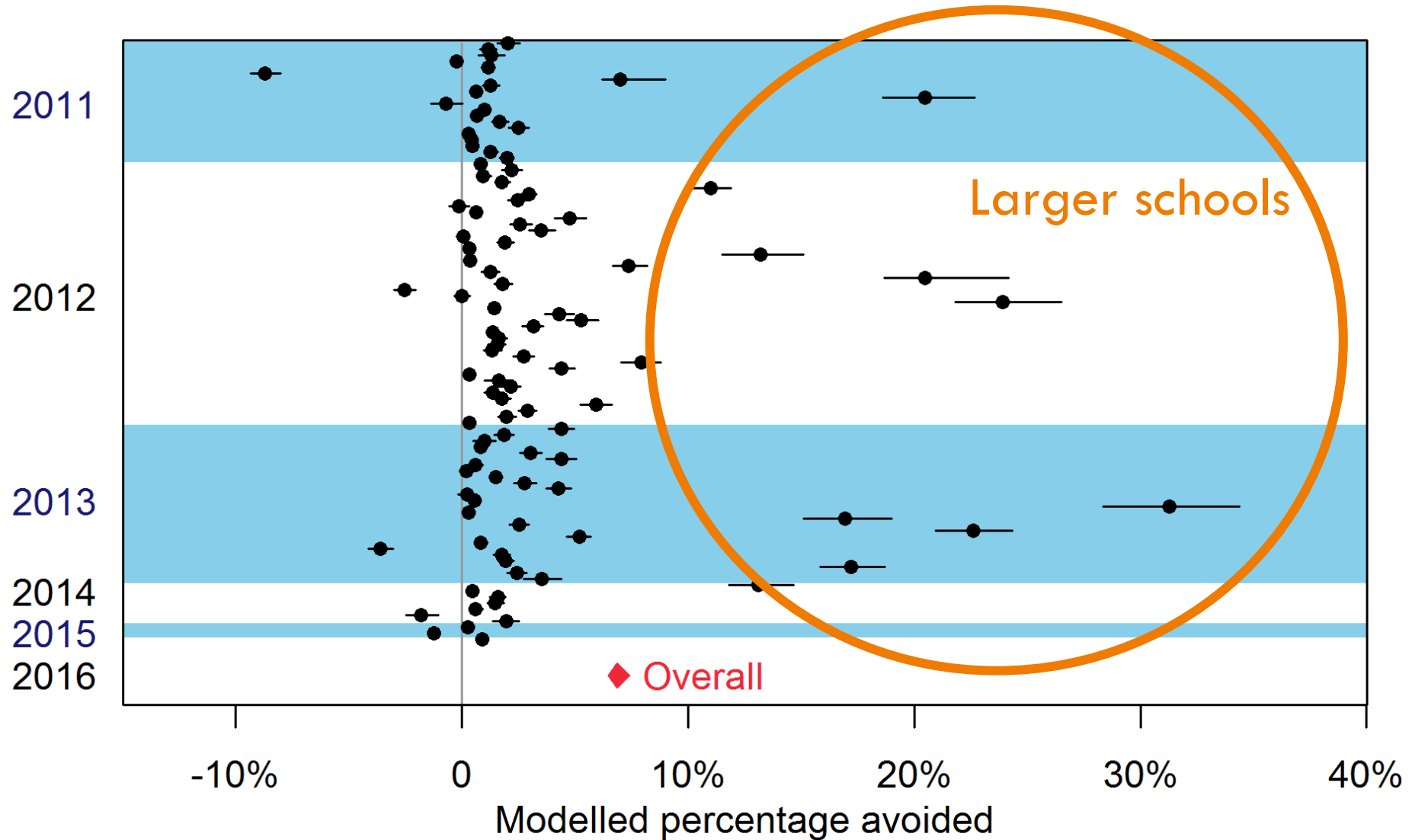
During vacations,
transmissibility was
reduced to
93% for children <12;
94% for age 0 to 2;
93% for age 3 to 5;
90% for age 6 to 11,
relative to term time.



Analysis 3: closure due to HFMD outbreak

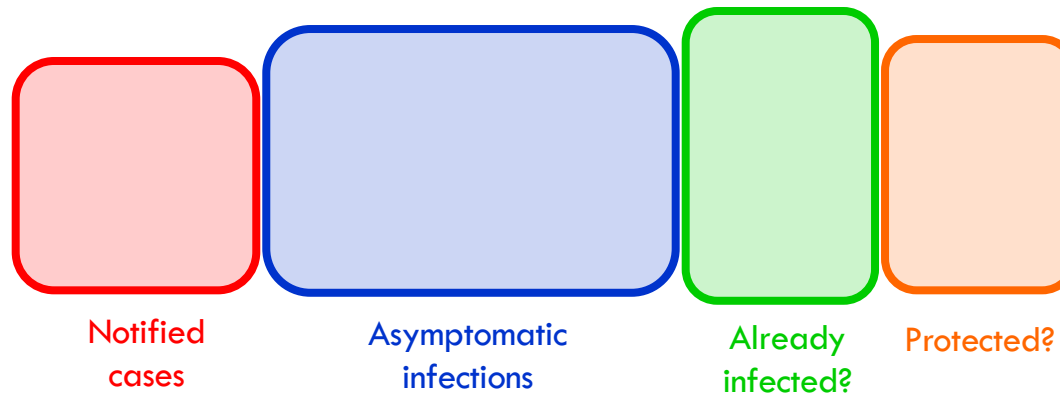
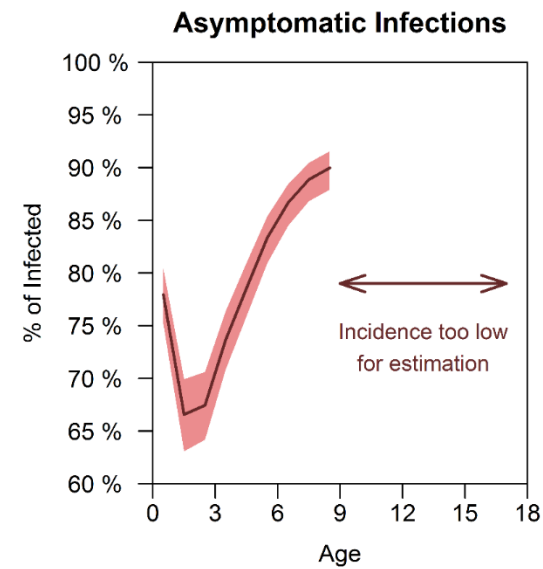
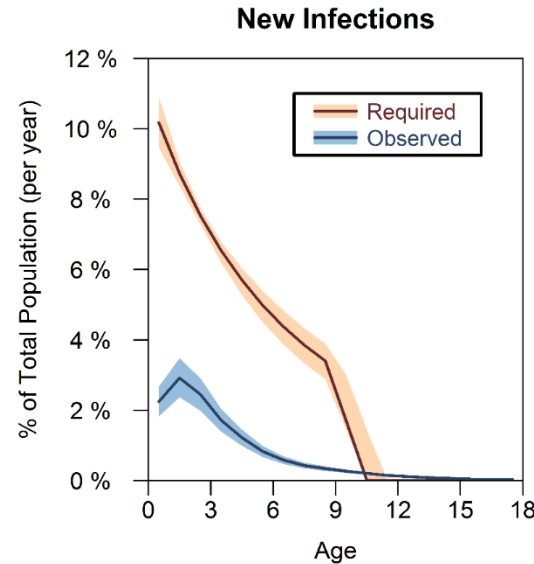
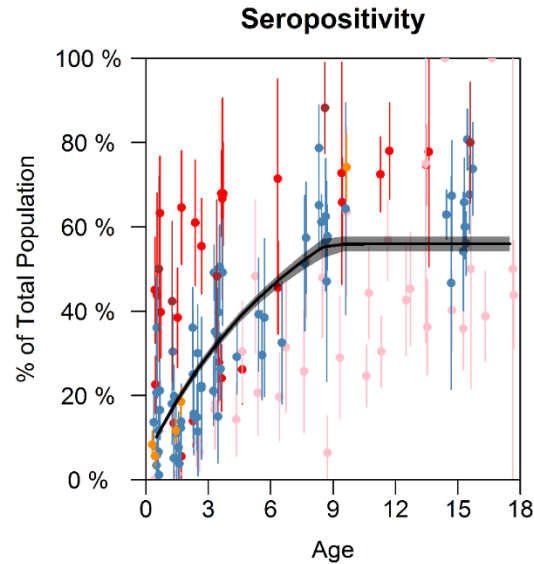


Analysis 3: closure due to HFMD outbreak



Around 7–8% reduction in cases due to closure

Why so little effect?



Asymptomatic rate
~60 to 70% in
preschool aged
kids

Take homes:

Although we found that school closure in response to outbreaks **does have a positive effect** in reducing transmission, **the effect is small.**

Outbreak-driven (unplanned) closures cause **disruptions** to parents/families.

Routine use of school closure outside of public health emergencies may not warrant the impact on families and could be relaxed.

Presentation adapted from the following papers:

- Chen et al (2018) The Effect of School Closure on Hand, Foot, and Mouth Disease Transmission in Singapore: A Modeling Approach. *Am J Trop Med Hyg* 99:1625-32
- Koh et al (2018). Severity and burden of hand, foot and mouth disease in Asia: a modelling study. *BMJ Global Health* 3:e000442.
- Siegel et al (2017). The impact of hand, foot and mouth disease control policies in Singapore: A qualitative analysis of public perceptions. *J Public Health Policy* 38:271-87.
- Koh et al (2016). The Epidemiology of Hand, Foot and Mouth Disease in Asia: A Systematic Review and Analysis. *Pediatr Infect Dis J* 35:e285-300.