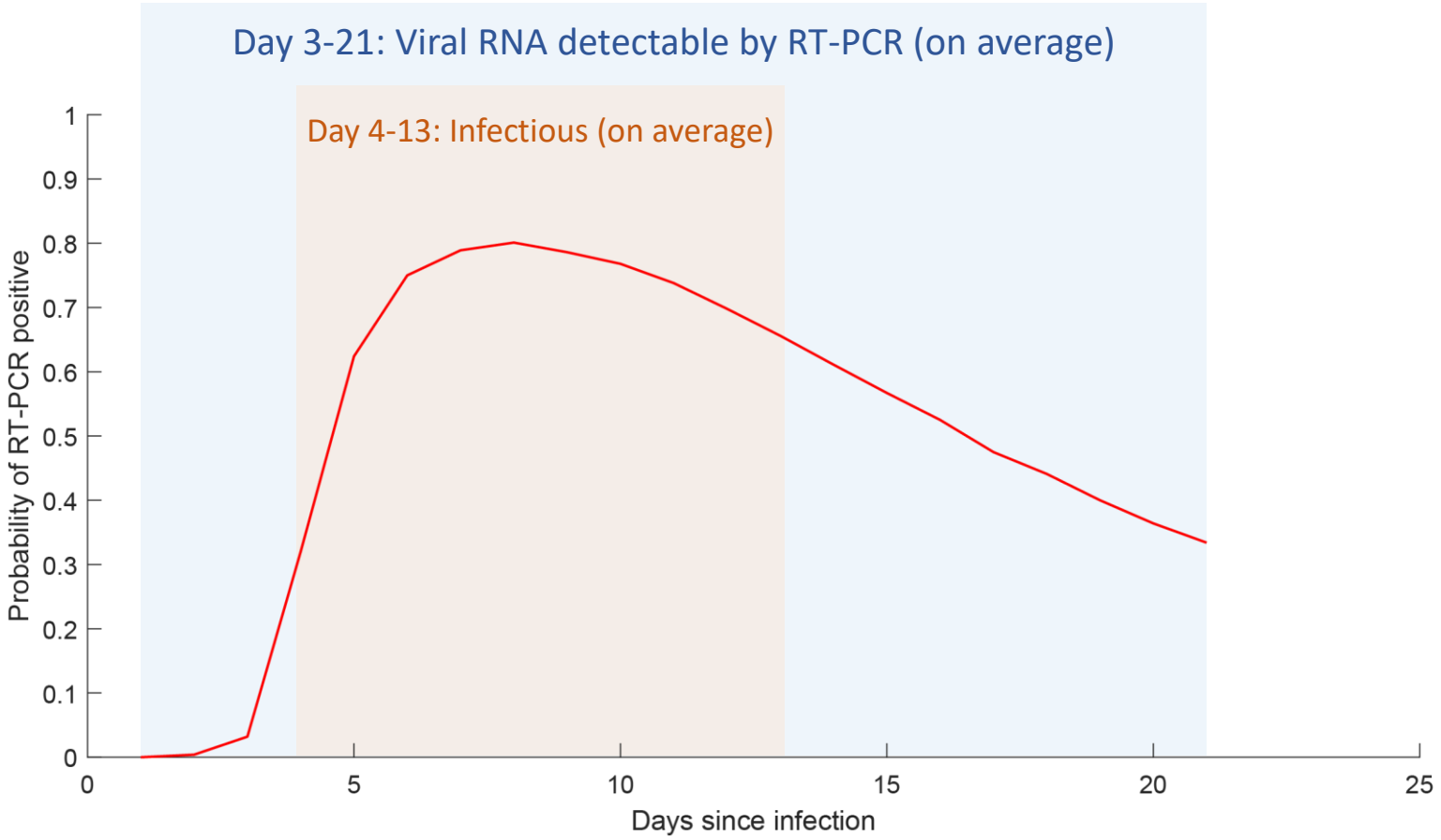
LKS Faculty of Medicine
The University of Hong Kong
香港大學李嘉誠醫學院

HKUMed WHO Collaborating Centre for Infectious Disease Epidemiology and Control updates on the Universal Community Testing Programme (UCTP) and vaccine procurement

港大醫學院世衛傳染病流行病學及控制合作中心
簡布有關「普及社區檢測計劃」及疫苗採購事宜的最新概況

If a person is infected by SARS-CoV-2:

1) Viral RNAs are **detectable** by RT-PCR on **3-21 days since infection**
2) The person is **infectious** on **4-13 days since infection**
3) The person is likely to develop symptoms on **5-6 days after infection**
   (i.e. the **mean incubation period**)



Kucirka LM and Lauer SA et al, Ann Intern Med, 2020

An approximate estimation of PCR positives detected by UCTP

$$n_{pos}$$

$$= \frac{n_{daily\ confirmed} \times t_{duration\ detection} \times p_{avg\ PCR\ sensitivity}}{p_{reporting} \times N_{population}} \times n_{test}$$

$$= \frac{10 \times 19 \times 0.65}{0.25 \times 745 \times 10^4} \times 12.8 \times 10^4 = 8.5\ (3.8 - 16.4)$$

$n_{daily\ confirmed}$: the number of daily confirmed cases (i.e. assuming 10 local cases daily)

$t_{duration\ detection}$: the detectable duration (i.e. 19 days, assuming it's detectable on Day 3-21)

$p_{avg\ PCR\ sensitivity}$: the average RT-PCR sensitivity (i.e. 0.65 on Day 3-21)

$p_{reporting}$: the case reporting rate (i.e. assuming 1 of 4 cases is reported to CHP)

$N_{population}$: the total population of Hong Kong

n_{test}: the number of tests performed

An approximate estimation of the total number of PCR positives

$$n_{total\ pos}$$

$$= \frac{n_{daily\ confirmed} \times t_{duration\ detection} \times p_{avg\ PCR\ sensitivity}}{p_{reporting} \times N_{population}} \times N_{population}$$

$$= \frac{10 \times 19 \times 0.65}{0.25} = 494\ (451 - 540)$$

An approximate estimation of the total number of infectious individuals among PCR positives

$$n_{total\ infectious\ |\ pos}$$

$$= \frac{n_{daily\ confirmed} \times t_{infectious\ duration} \times p_{avg\ PCR\ sensitivity}}{p_{reporting} \times N_{population}} \times N_{population}$$

$$= \frac{10 \times 10 \times 0.7}{0.25} = 280\ (248 - 315)$$

An approximate estimation of the total number of infectious individuals

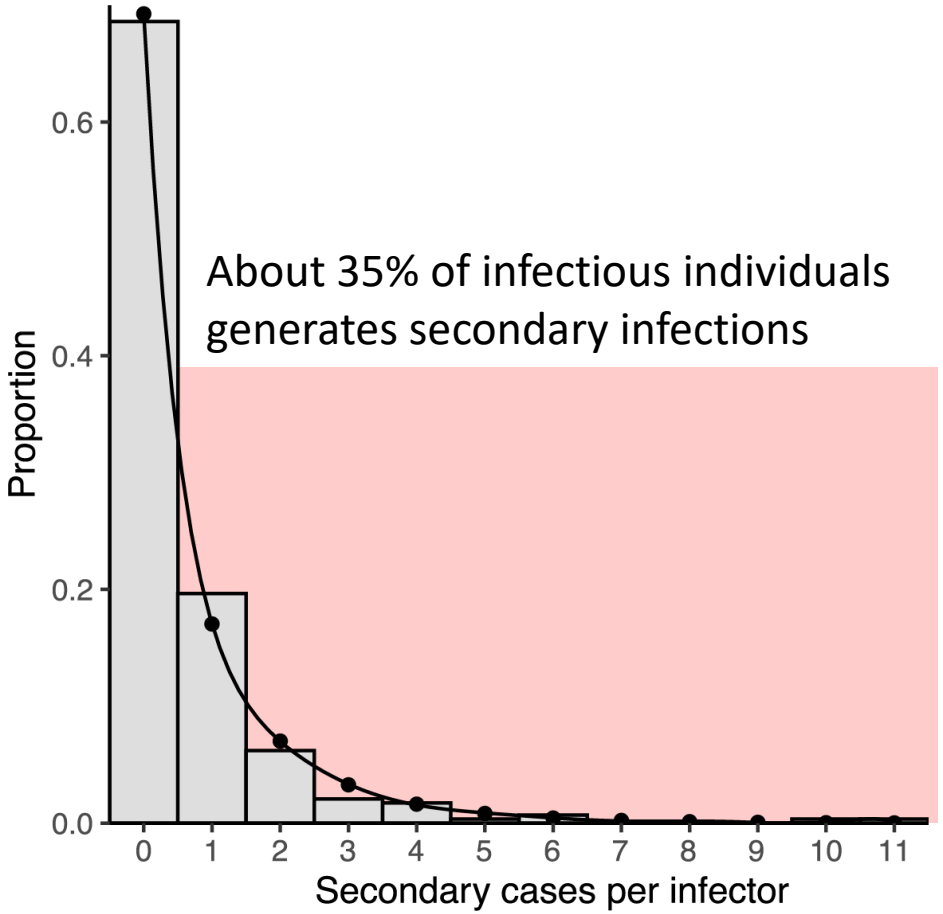
$$n_{total\ infectious}$$

$$= \frac{n_{daily\ confirmed} \times t_{infectious\ duration}}{p_{reporting} \times N_{population}} \times N_{population}$$

$$= \frac{10 \times 10}{0.25} = 400\ (362 - 442)$$

Under active case finding and quarantine

The total number of infectious individuals: 400 (362-442)
The total number of infectious individuals who generates secondary infections: 140 (127-155)



Adam D et al, In press, 2020