醫院管理局
HOSPITAL AUTHORITY

Infectious Disease Control Training Centre
傳染病控制培訓中心

NUHS
National University Health System

MDRO outbreaks and Control during the COVID-19 Pandemic

Professor Dale Fisher

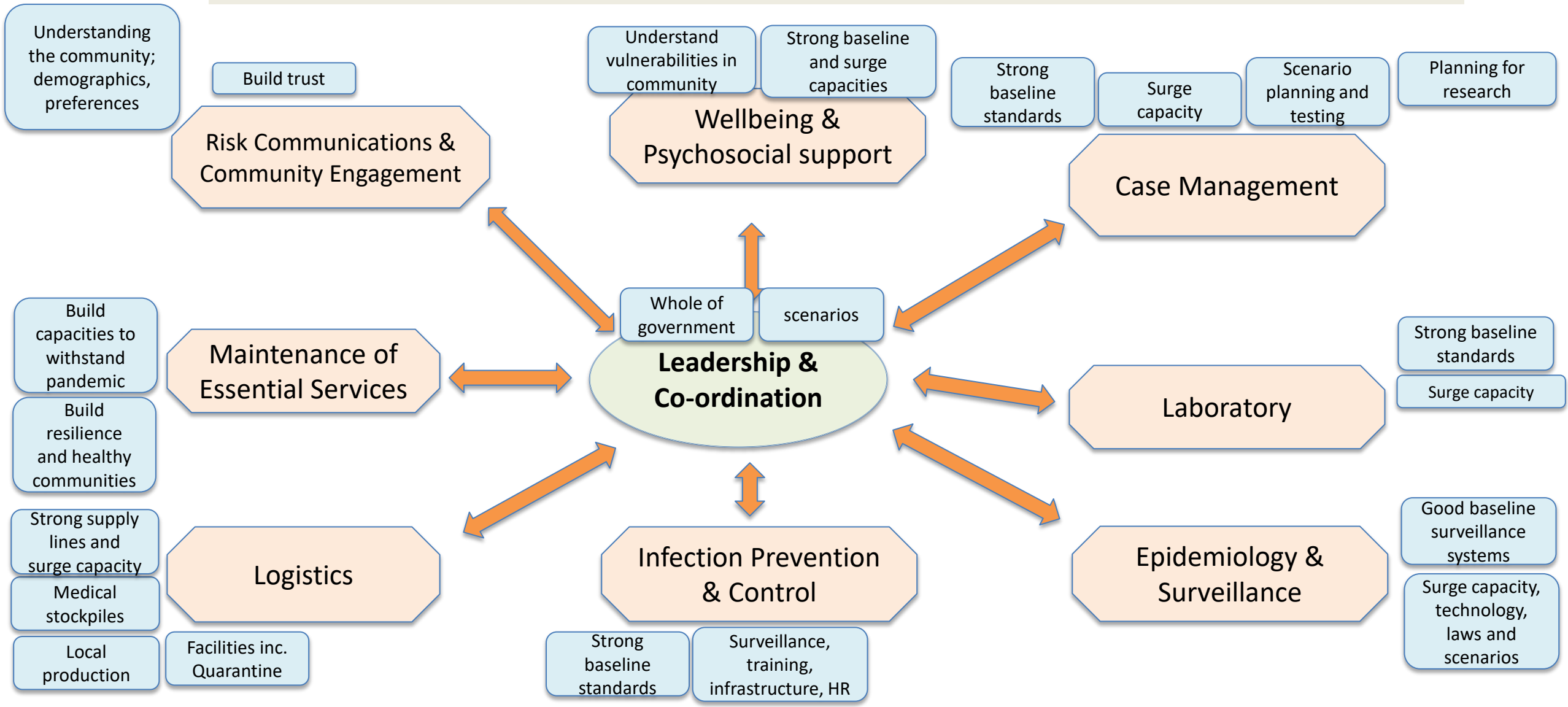
National University Hospital
National University of Singapore
Group Chief of Medicine, NUHS
Global Outbreak Alert and Response Network

Research

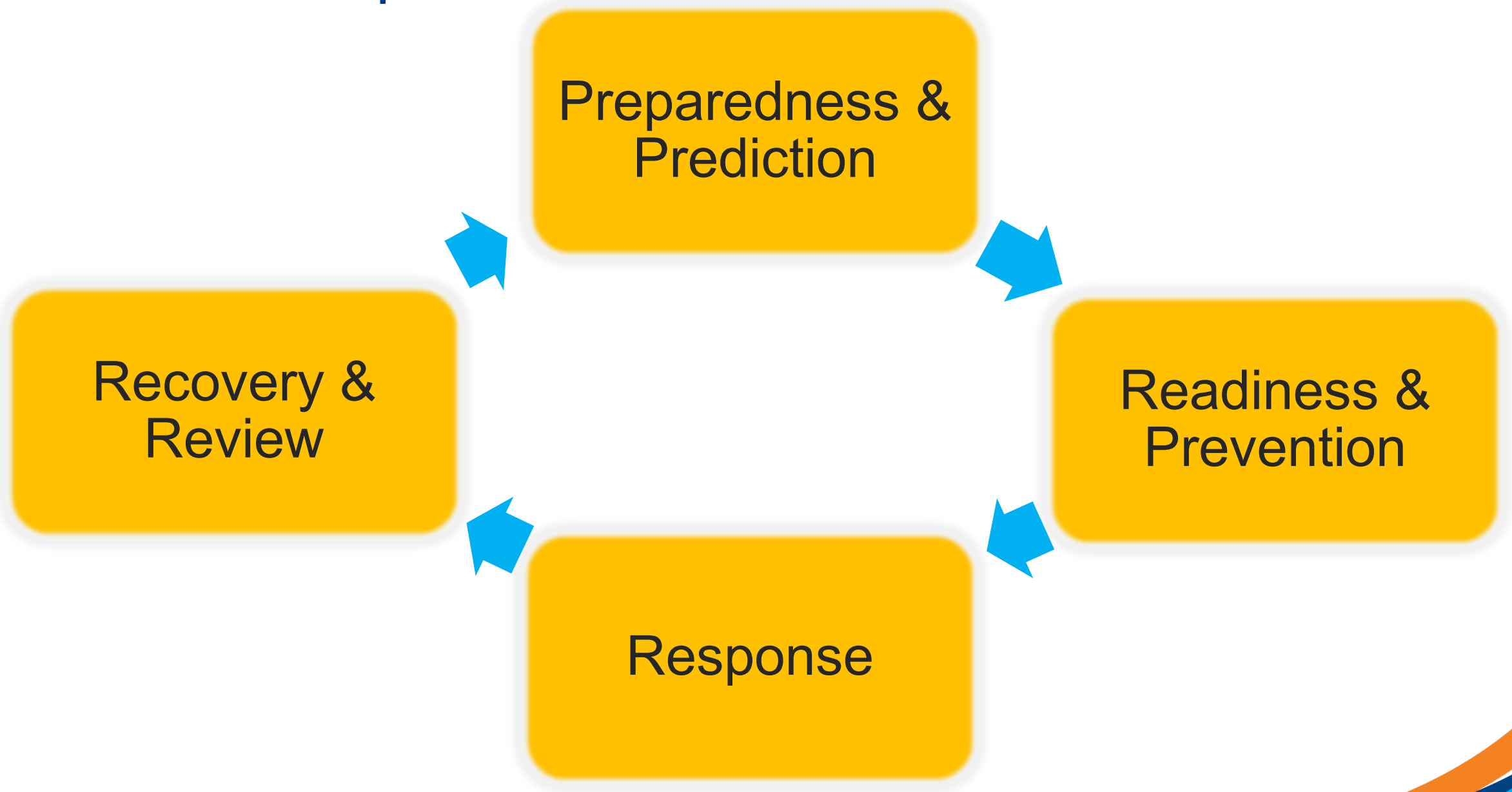
Clinical Care

Education

Preparing for and Responding to an Outbreak

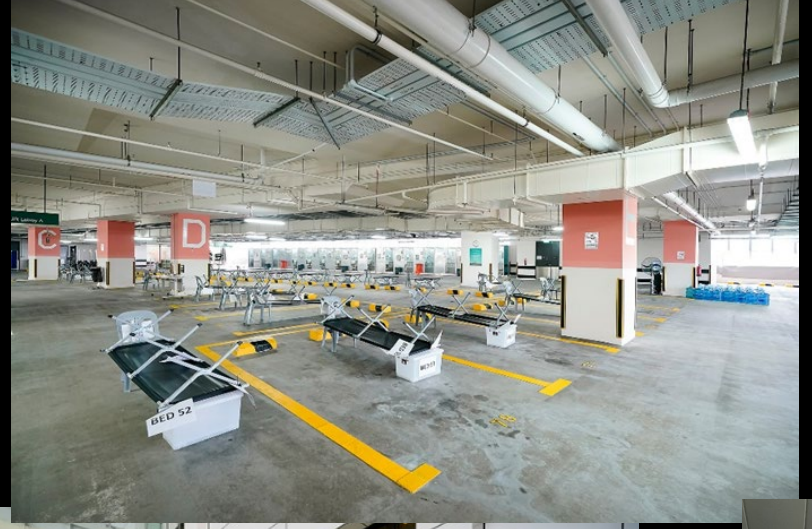


More than response….



Preparedness sets the scene for the response

- **Infrastructure**
  - Isolation and quarantine capacity
  - Surge capacity in the healthcare sector; expandability, convertibility, adaptability
  - Attention to the settings of the underprivileged….homeless shelters, dormitories, prisoners,
  - Attention to workplaces and other settings; ventilation, markets, food processing, cruise ships
- **Human resources**
  - Provide experiences, trainings, development in outbreak response and its various aspects (including leaders)
- **Ensure Legislative Capacity to implement interventions when needed (ID Act)**
- **Leadership and coordination**
  - National Centres for infectious disease (PHE, CDC, RKI)
    - Surveillance, advice trainings, research
    - To work with government public health departments
  - Develop scenarios and frameworks for roles and interfaces
- **Examine all the necessary capacities to ensure capacities and surge plans; RCCE, labs, case management, IPC, security, epi, contact tracing, data management**
- **Stockpiling…….drugs, PPE**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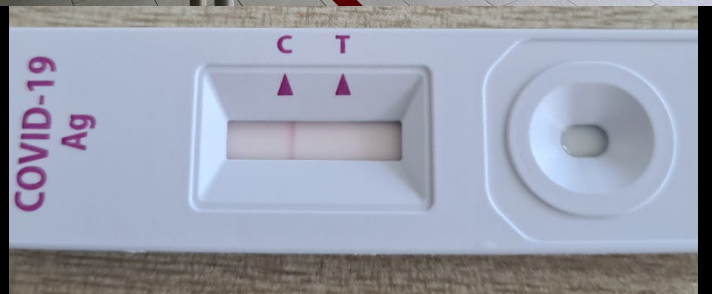
REGISTRATION
EXIT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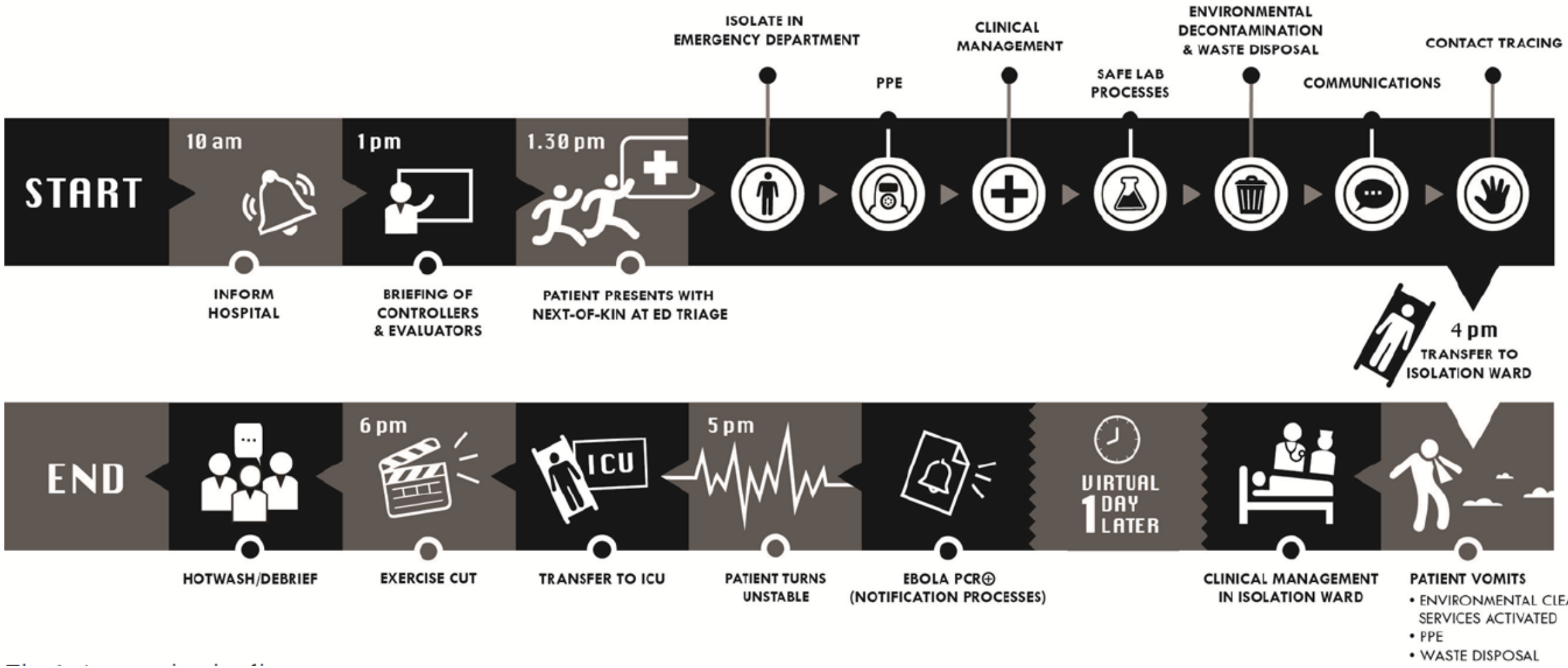


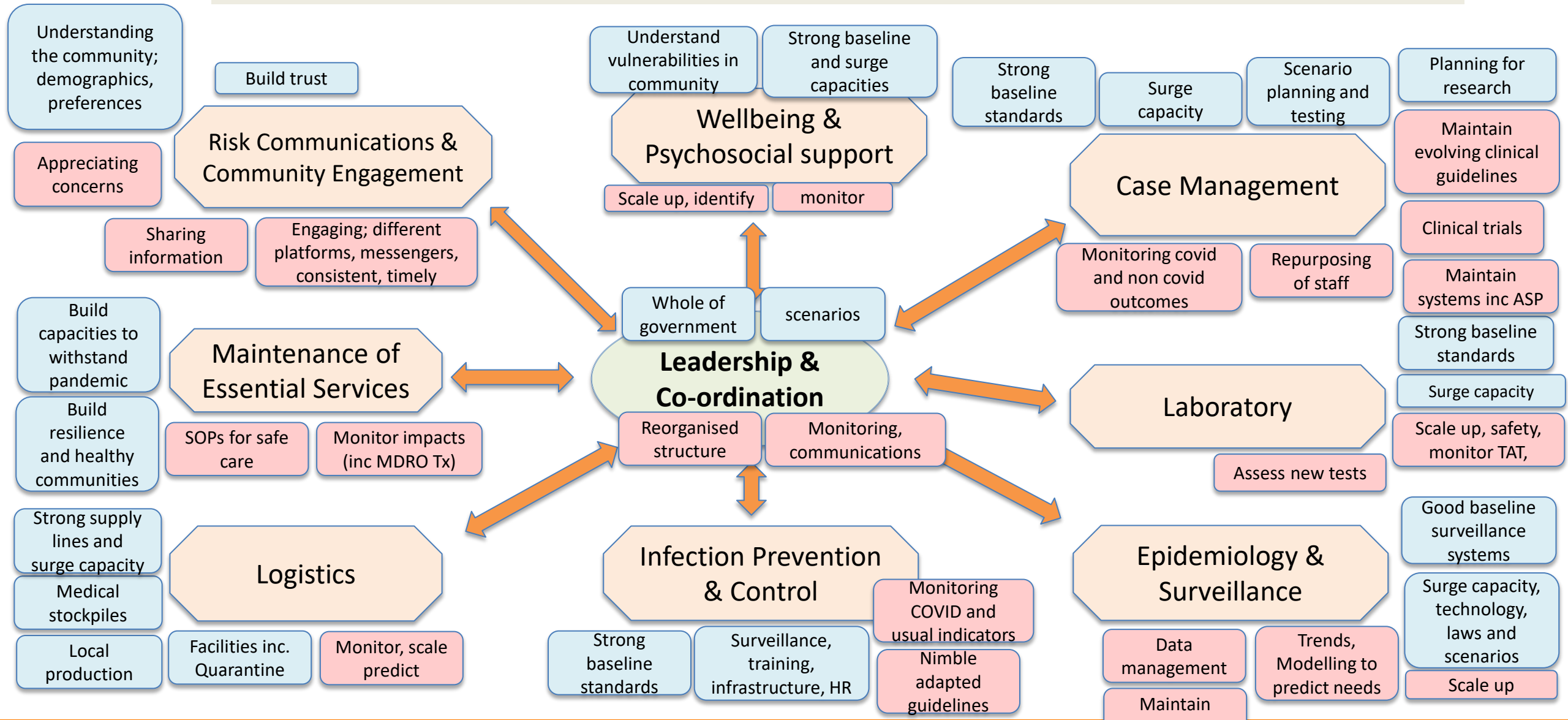
Pandemic Preparedness: Nationally-Led Simulation to Test Hospital Systems

Lionel HW Lum, [1]*MBBS, MRCP (UK)*, Hishamuddin Badaruddin, [2]*BMBS, MPH, FAMS*, Sharon Salmon, [3]*BN, MPH, PhD*, Jeffery Cutter, [2]*MBBS, MMed (PH), FAMS*, Aymeric YT Lim, [4]*MBBS, FRCS (Glasgow), FAMS*, Dale Fisher, [1,5]*MBBS, FRACP, DTM&H*

The Readiness Phase is the final “dressed rehearsal”

- **Establish what we know and gear toward incoming information**
- **Whole of government- Impact on all sectors**
- **Review all SOPs and create new scenarios**
- **Ensure early identification……case definitions, triage, testing, isolation**
- **Review surge**
- **Engagement of the community and HCWs …..all stakeholders**

Preparing for and Responding to an Outbreak




AMBULA
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Infection Control & Hospital Epidemiology (2020), 1–3
doi:10.1017/ice.2020.309

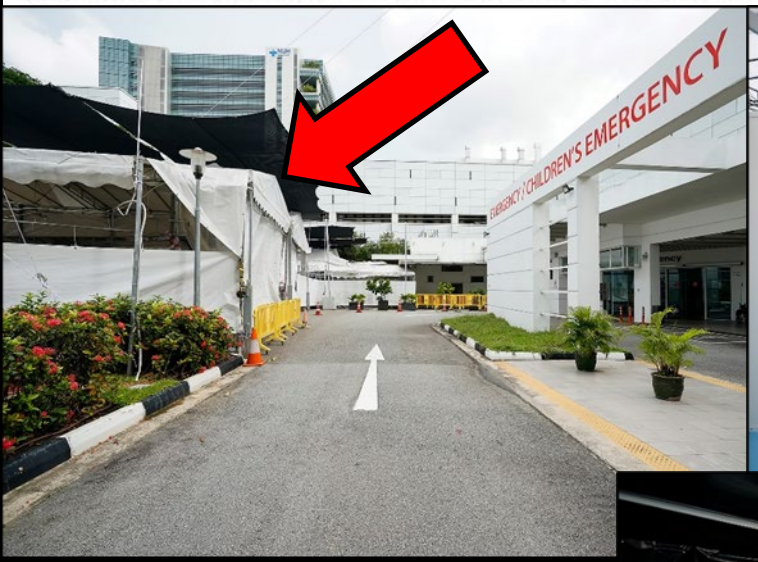
SHEA

Letter to the Editor

A safe and efficient, naturally ventilated structure for COVID-19 surge capacity in Singapore

Natasha Bagdasarian MD, MPH[1,2], Ian Mathews MBBS, MCEM, MMed[3], Alexander J. Y. Ng MBBS[3], Eugene H. Liu MD, MPhil, FRCA[2,4], Clara Sin MBA[5], Malcolm Mahadevan MBBS, FRCP, FRCS[3] and Dale A. Fisher MBBS, FRACP[1,2]

[1]Division of Infectious Diseases, Department of Medicine, National University Hospital, National University Health System, Singapore, Singapore, [2]Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore, [3]Emergency Medicine Department, National University Hospital, National University Health System, Singapore, Singapore, [4]Department of Anesthesia, National University Hospital, National University Health System, Singapore, Singapore and [5]Hospital Operations, National University Hospital, National University Health System, Singapore, Singapore




OPERATION
PLEASE
OBSERVE
SAFE DISTANCING


Row 18
Red 13-18
Hall 1
2


FEVER TENT

SINGAPORE AIRLINES CABIN CREW WILL SERVE HOSPITAL PATIENTS

MATTHEW KLINT / APRIL 8, 2020 / 6 COMMENTS

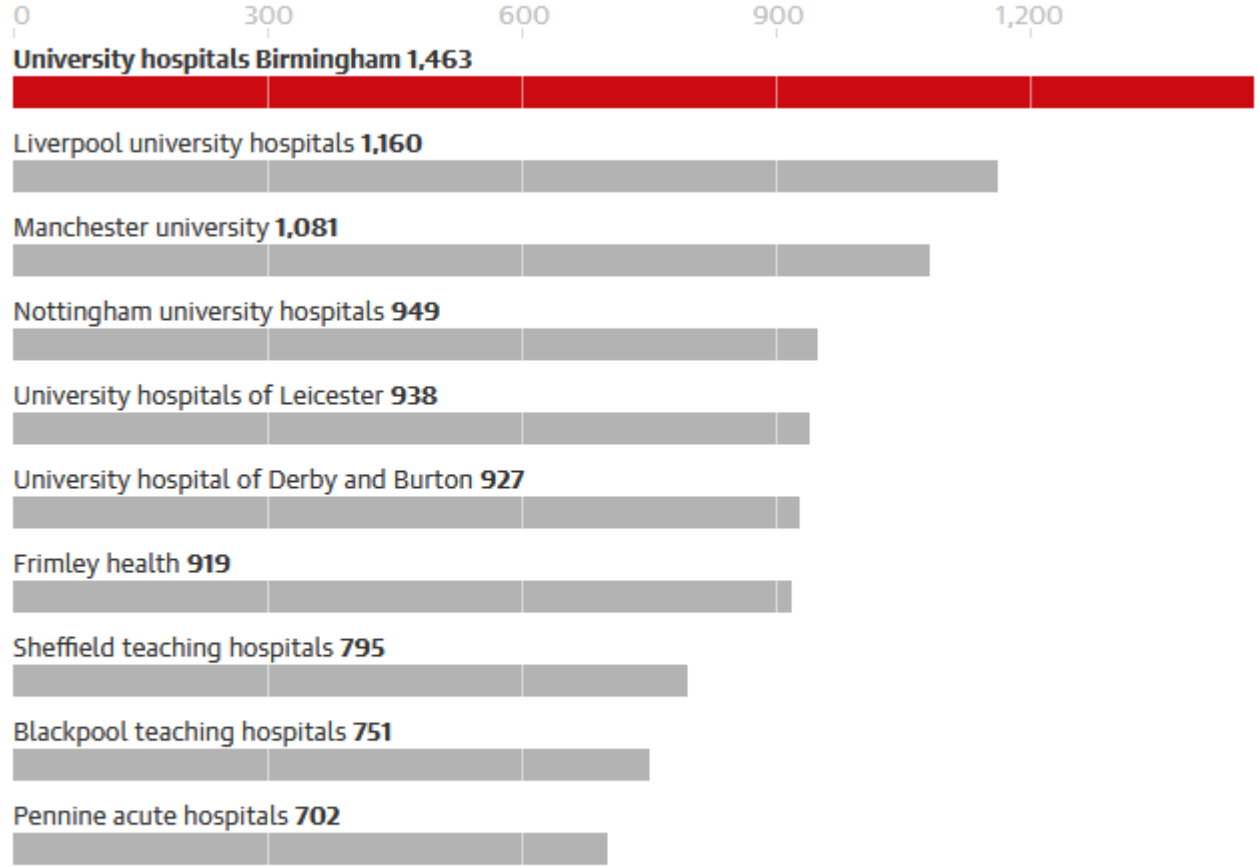
Up to 8,700 patients died after catching Covid in English hospitals

Exclusive: official NHS data reveals 32,307 people contracted the virus while in hospital since March 2020

- Coronavirus - latest updates
- See all our coronavirus coverage

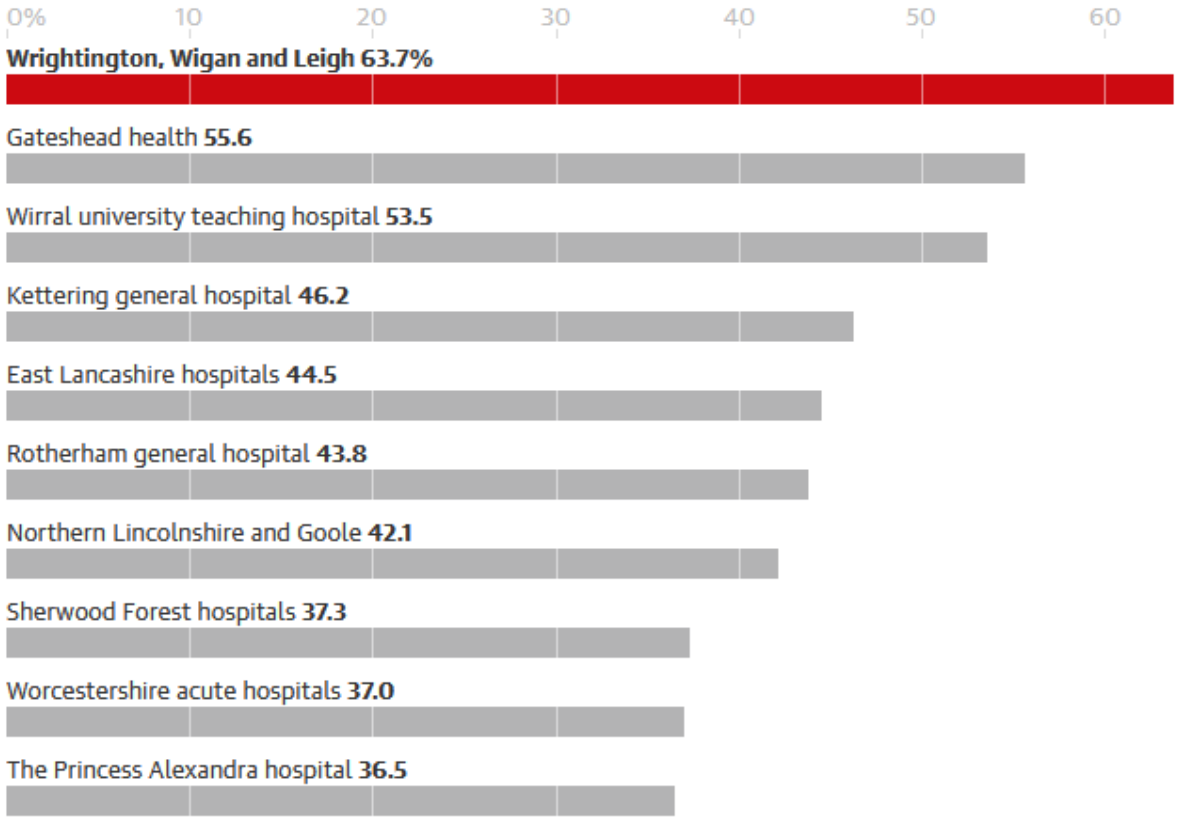
The Guardian obtained the data under freedom of information laws from 81 of England's 126 acute hospital trusts. Forty-five trusts refused to disclose their death figures. Photograph: Peter Byrne/PA

NHS trusts with the highest number of hospital-acquired Covid-19 infections

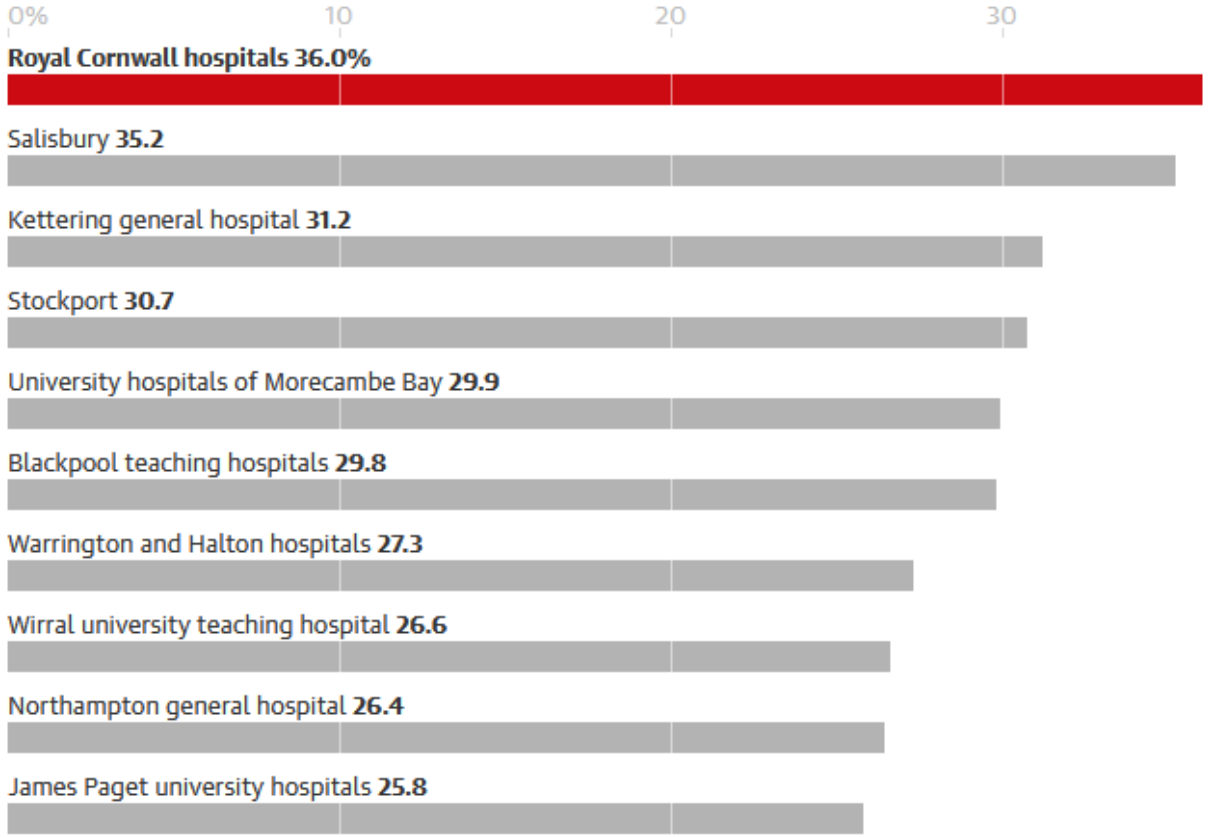


Guardian graphic | Source: The Guardian. Eighty of 123 acute trusts in England answered FOI requests for numbers of patients who caught Covid in hospital during the pandemic. In most cases, figures covered 1 March 2020-1 March 21, but a small number of trusts provided figures based on slightly different dates. Data shown counts both 'probable' (detected 8-14 days after admission) and 'definite' (15 days+) nosocomial infections and deaths, as defined by NHS England

Percentage of patients that caught Covid-19 in hospital who then died



Percentage of all Covid deaths where patient was infected in hospital



Was there excess MDRO transmission/outbreaks during the pandemic?

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Was there excess MDRO transmission/outbreaks during the pandemic?

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Drivers to MDROs, and their transmission in hospitals - endemic rates & outbreaks

- **IPC**
  - Leadership de-emphasises usual measures
  - Infrastructure modification and adapted use
  - Workflows, SOPs
  - Overcrowding
  - Availability and appropriate use of supplies
    - PPE
    - HH products
    - Training and audits
- **Poor surveillance**
  - deprioritised
- **Poor antimicrobial use**
  - Empiric use
  - audits

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REVIEW

MDRO transmission in acute hospitals during the COVID-19 pandemic

Louisa Sun Jin[a,b] *and Dale Fisher*[b,c]

Were antibiotics used poorly during the pandemic?

- **Are empiric antibiotics needed?**

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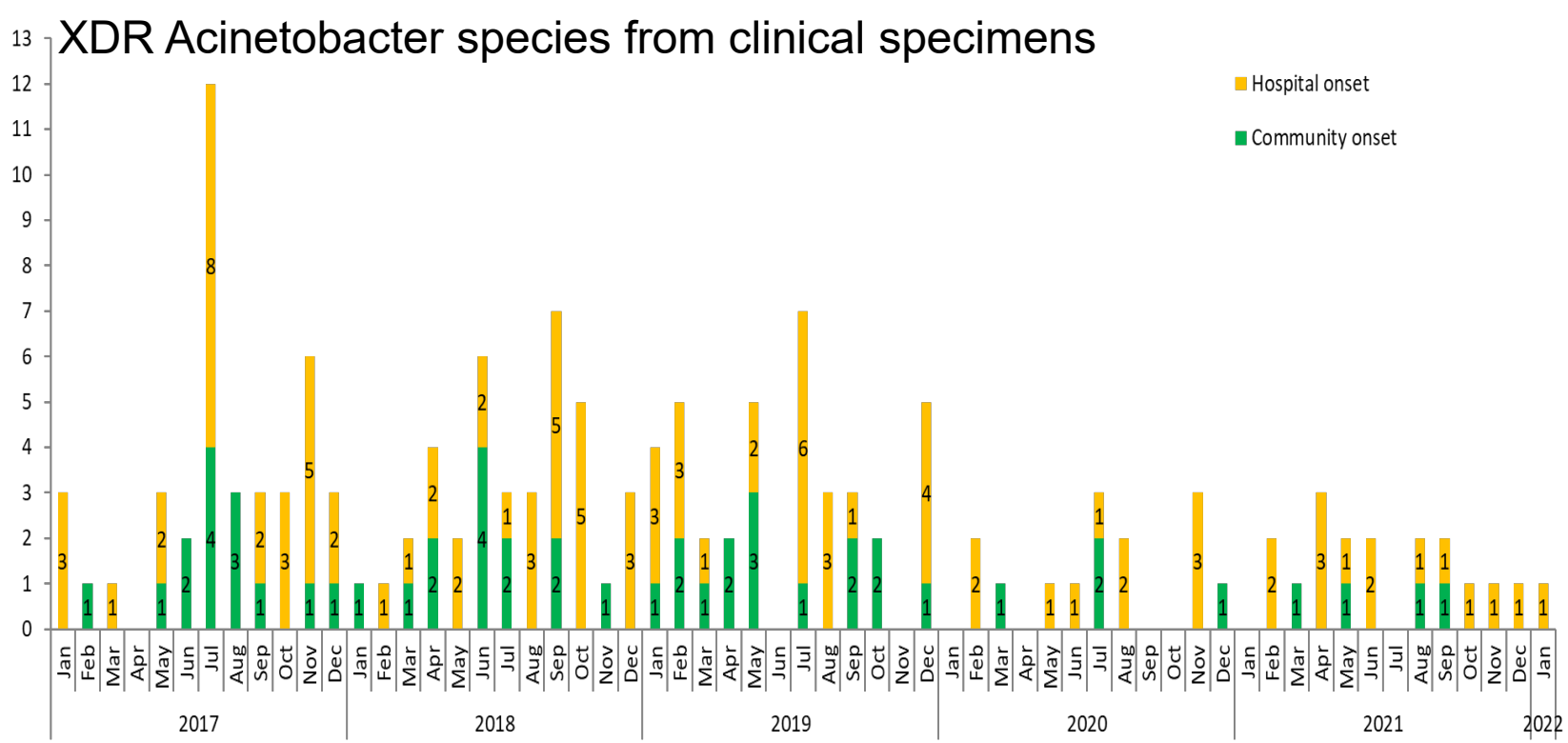
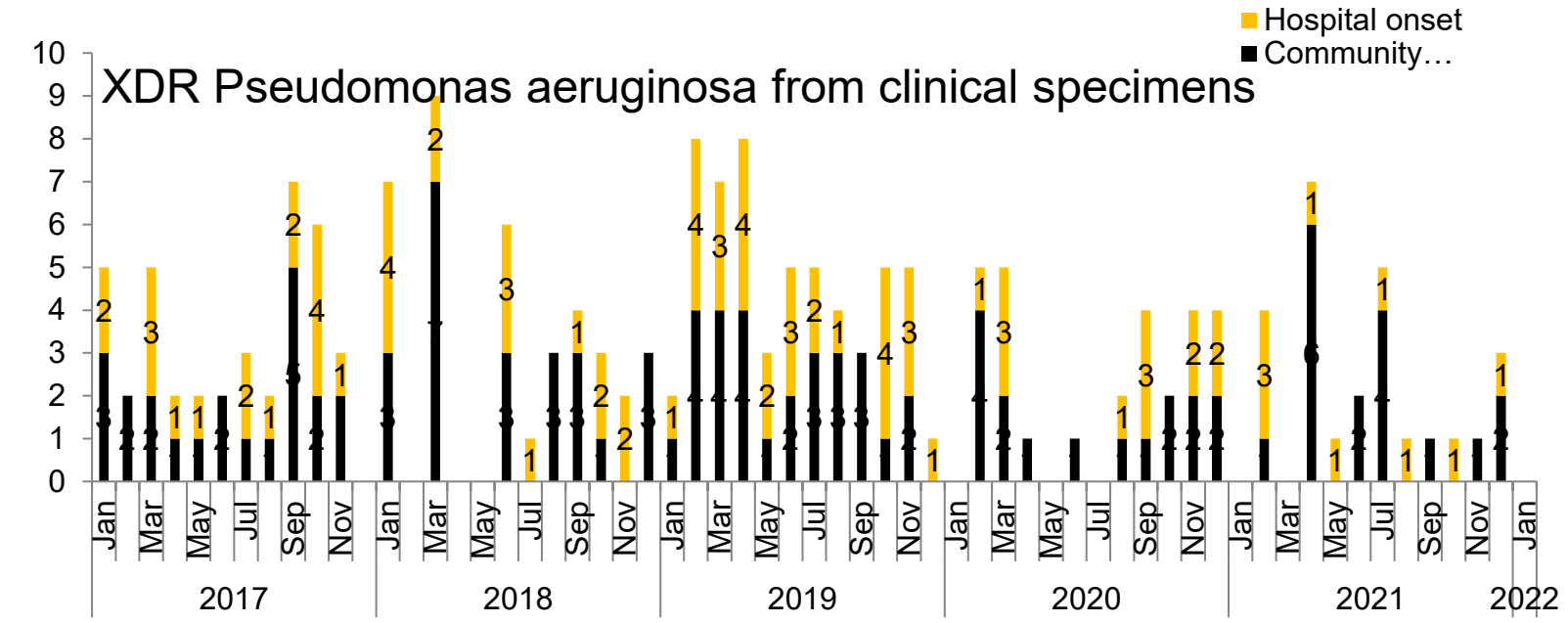
Surveillance during the pandemic

- Our experience demonstrates an unintended consequence of discontinuing MDRO surveillance in this population and highlights a need for education, monitoring, and reinforcement of foundational infection prevention measures to ensure optimal outcomes.

Infection Prevention and Control Measures during COVID-19 and their potential impact on transmission of MDROs

IPC measures	Potential positive impacts	Practical issues and risks for increased MDRO transmission
PPE	- Enhances precautions - Renewed trainings - Prolonged use decreases risk of self-contamination	- Shortage of supply and diversion of use - Conflicting guidance, confusion, decreased adherence - Prolonged use increases risk of contamination of PPE and spread to patients - glove use reduces hand hygiene
Infrastructure modifications/ adaptations	Nil	- Isolation rooms now for COVID-19 may have environmental reservoirs of MDROs - MDRO patients displaced into shared wards and toilet facilities - Less able to implement contact precautions on MDRO pts - Increased crowding
Patient isolation and cohorting, dedicated COVID-19 centres or units	- Generally enhanced precautions across different locations of the hospital - Less disruption in non-COVID-19 areas	- More frequent patient transfers between wards and facilities due to COVID-19 status – outbreaks may involve in multiple wards or centres - Neglecting MDRO status in COVID-19 or non-COVID-19 units
Modified case-mix, outpatient control	- Decreased outpatient load and electives - Decreased MDRO carriers attending hospital - Controlled patient and visitor movements	- COVID-19 patients may need longer hospital stays, increasing the risk of HA MDRO infections
Reassignment of HCWs	- New teams of staff share IPC skills and knowledge	- Redeployed or urgently hired staff unfamiliar and untrained in IPC - Understaffed and overworked compromises good IPC and HH
MDRO surveillance	- Existing HCAI surveillance systems can be linked to newly established COVID-19, to aid in outbreak investigation and ongoing surveillance	- Usual surveillance and reporting resources diverted into epidemiological surveillance and management of COVID-19 cases
Environmental disinfection	- Enhanced cleaning schedules	- Cleaning schedules diverted away from non-COVID-19 areas


XDR Acinetobacter species from clinical specimens
Hospital onset
Community onset
2017
2018
2019
2020
2021
2022


Hospital onset
Community…
XDR Pseudomonas aeruginosa from clinical specimens
2017
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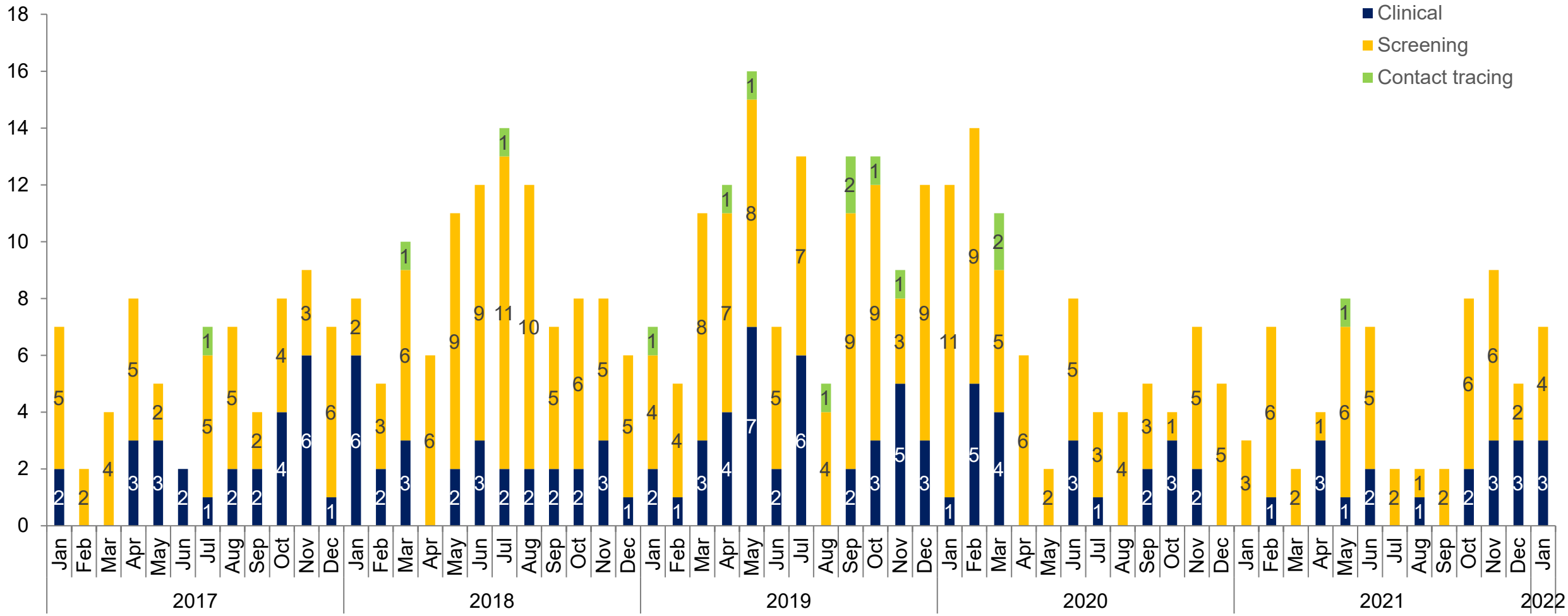
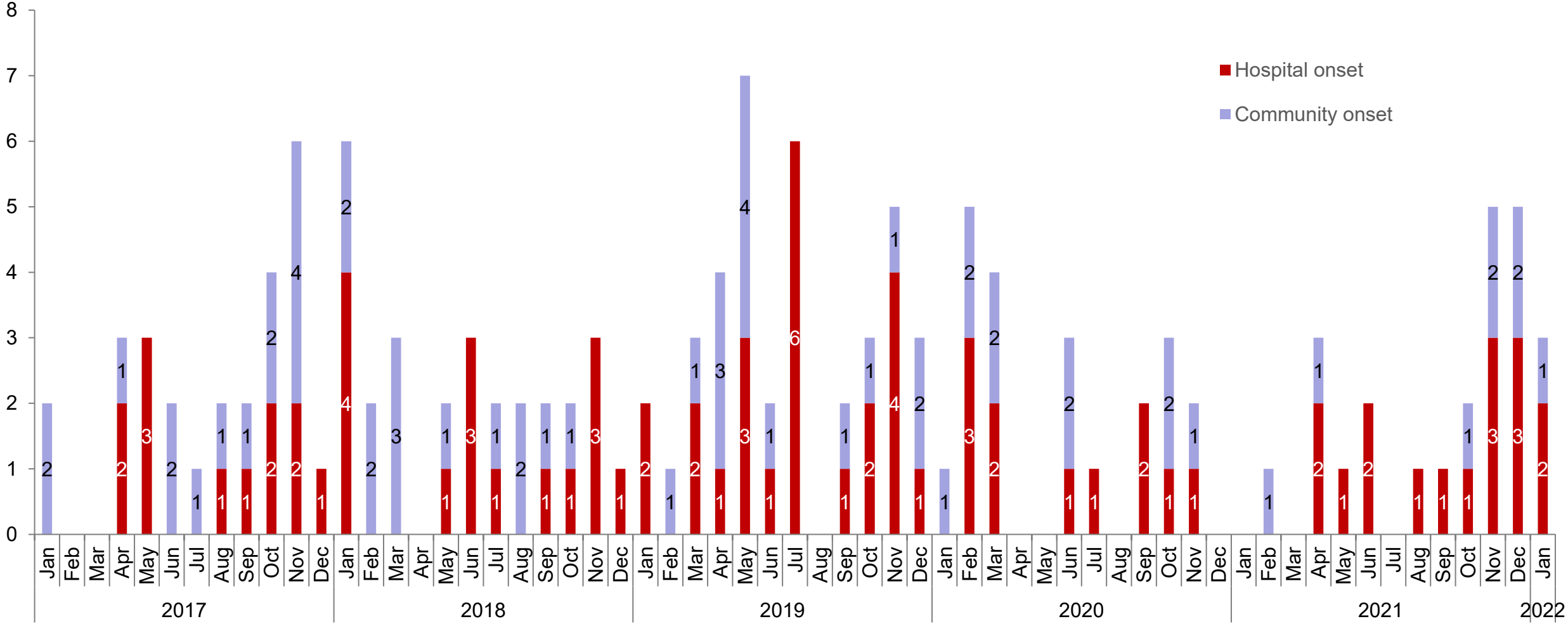
CP-CRE from all specimens

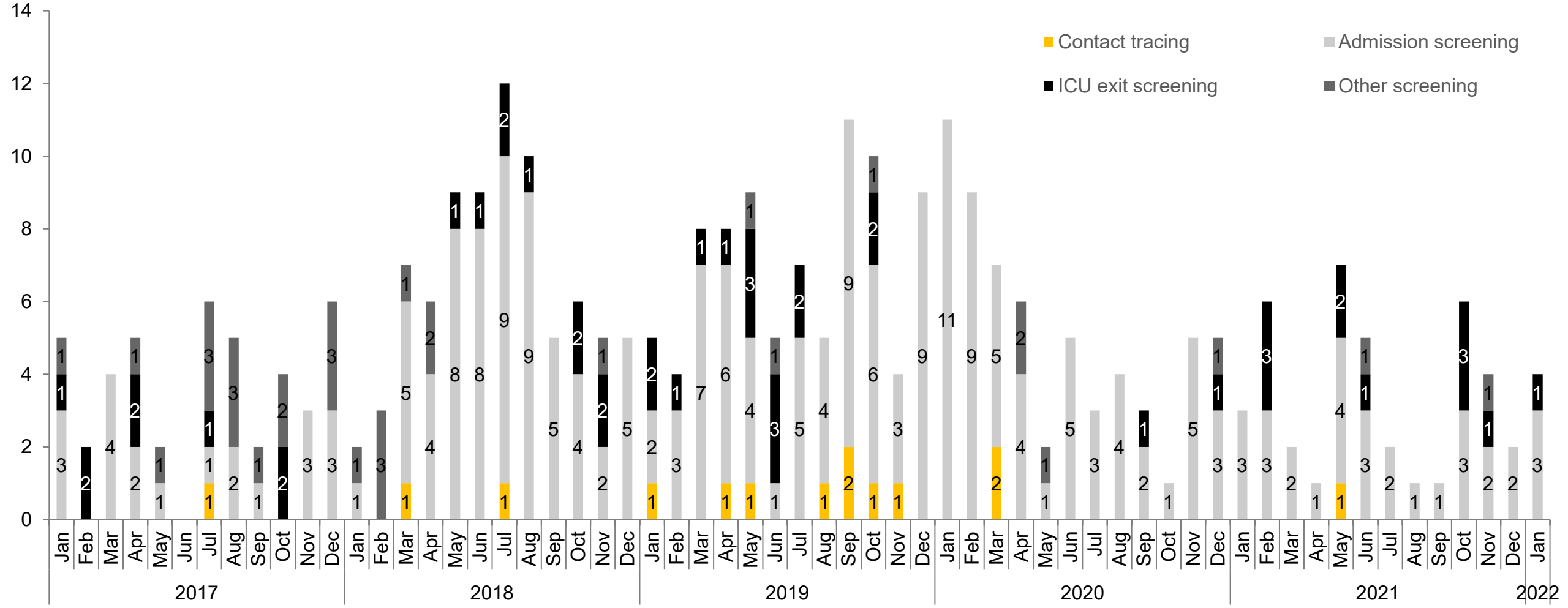


CP-CRE from clinical specimens



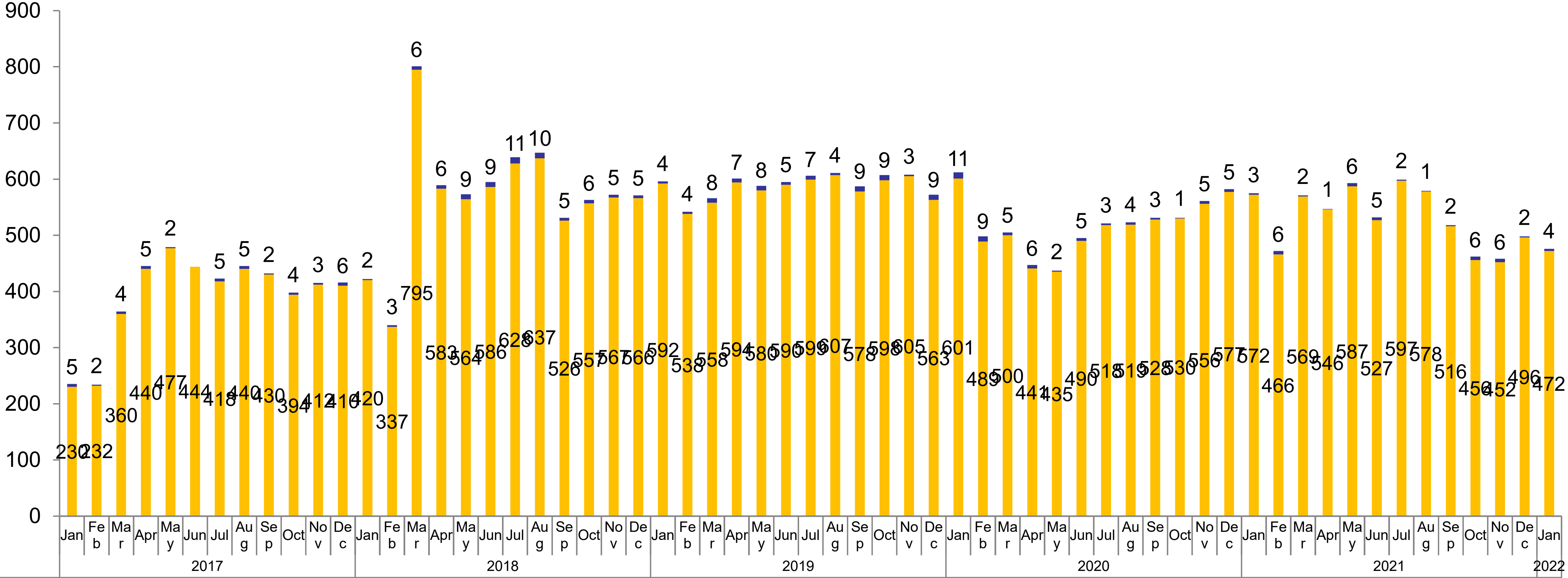
CP-CRE from screening specimens

From contact tracing/ICU exit screening/admission screening/other screening



CP-CRE from screening specimens

Denominator hospital-wide surveillance swabs



	Jan 2017	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
% positive from surv	2%	0%	1%	1%	0%	0%	1%	1%	0%	0%	0%	1%
CP-CRE detected (surv)	5	2	4	5	2		5	5	2	4	3	6
CP-CRE not detected (surv)	230	232	360	440	477	444	418	440	430	394	412	410

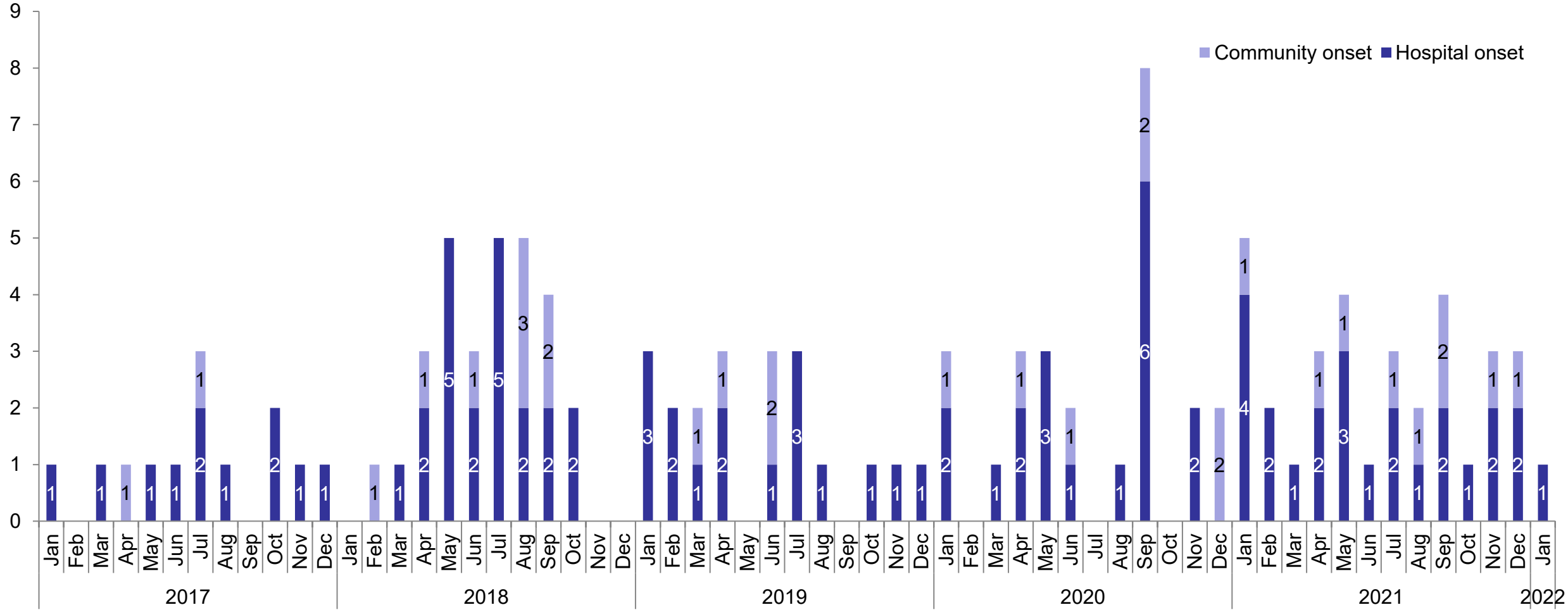
	Jan 2018	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
% positive from surv	0%	0%	0%	1%	2%	1%	2%	2%	0%	1%	0%	0%
CP-CRE detected (surv)	2	3	6	6	9	9	11	10	5	6	5	5
CP-CRE not detected (surv)	420	337	795	583	564	586	628	637	526	557	567	566

	Jan 2019	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
% positive from surv	0%	0%	1%	1%	1%	0%	1%	0%	1%	1%	0%	1%
CP-CRE detected (surv)	4	4	8	7	8	5	7	4	9	9	3	9
CP-CRE not detected (surv)	592	538	558	594	580	590	599	607	578	598	605	563

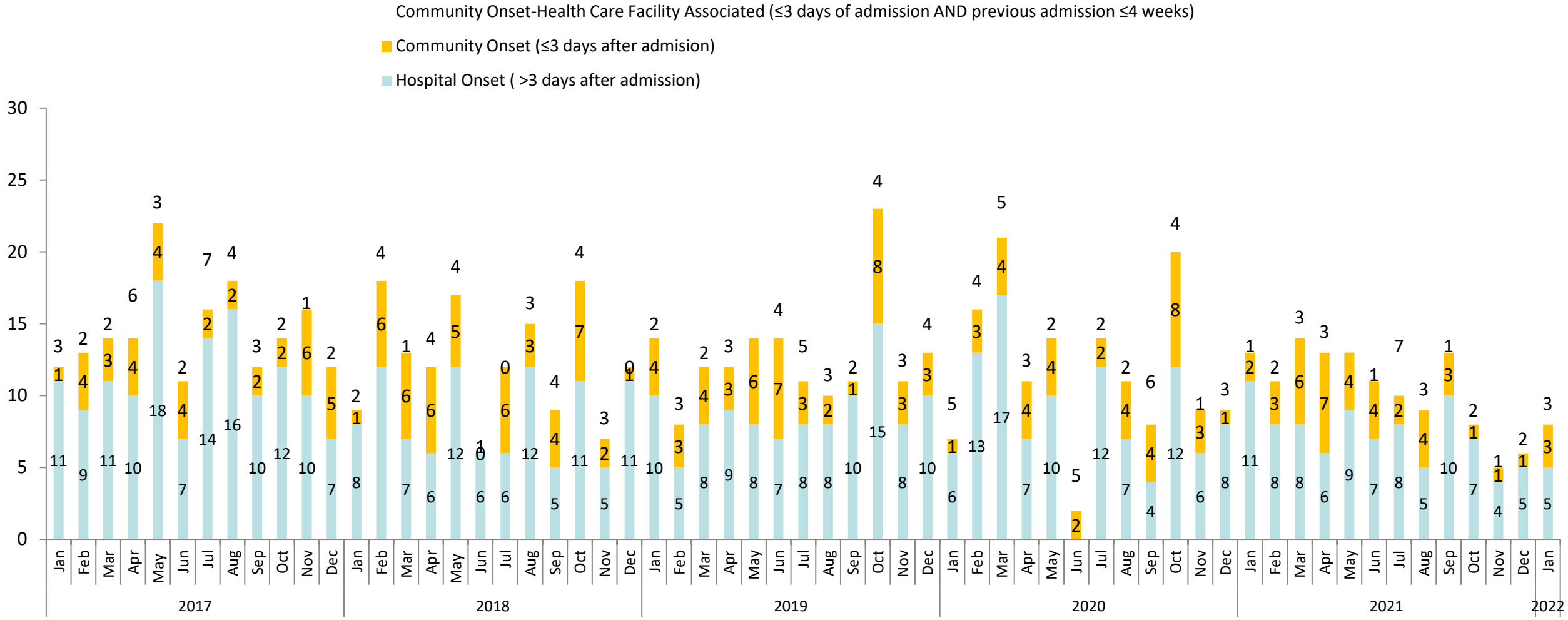
	Jan 2020	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
% positive from surv	2%	2%	0%	1%	0%	1%	0%	0%	0%	0%	0%	0%
CP-CRE detected (surv)	11	9	5	6	2	5	3	4	3	1	5	5
CP-CRE not detected (surv)	601	489	500	441	435	490	518	519	528	530	556	577

	Jan 2021	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2022
% positive from surv	0%	1%	0%	0%	1%	0%	0%	0%	0%	1%	1%	0%	0%
CP-CRE detected (surv)	3	6	2	1	6	5	2	1	2	6	6	2	4
CP-CRE not detected (surv)	572	466	569	546	587	527	597	578	516	456	452	496	472

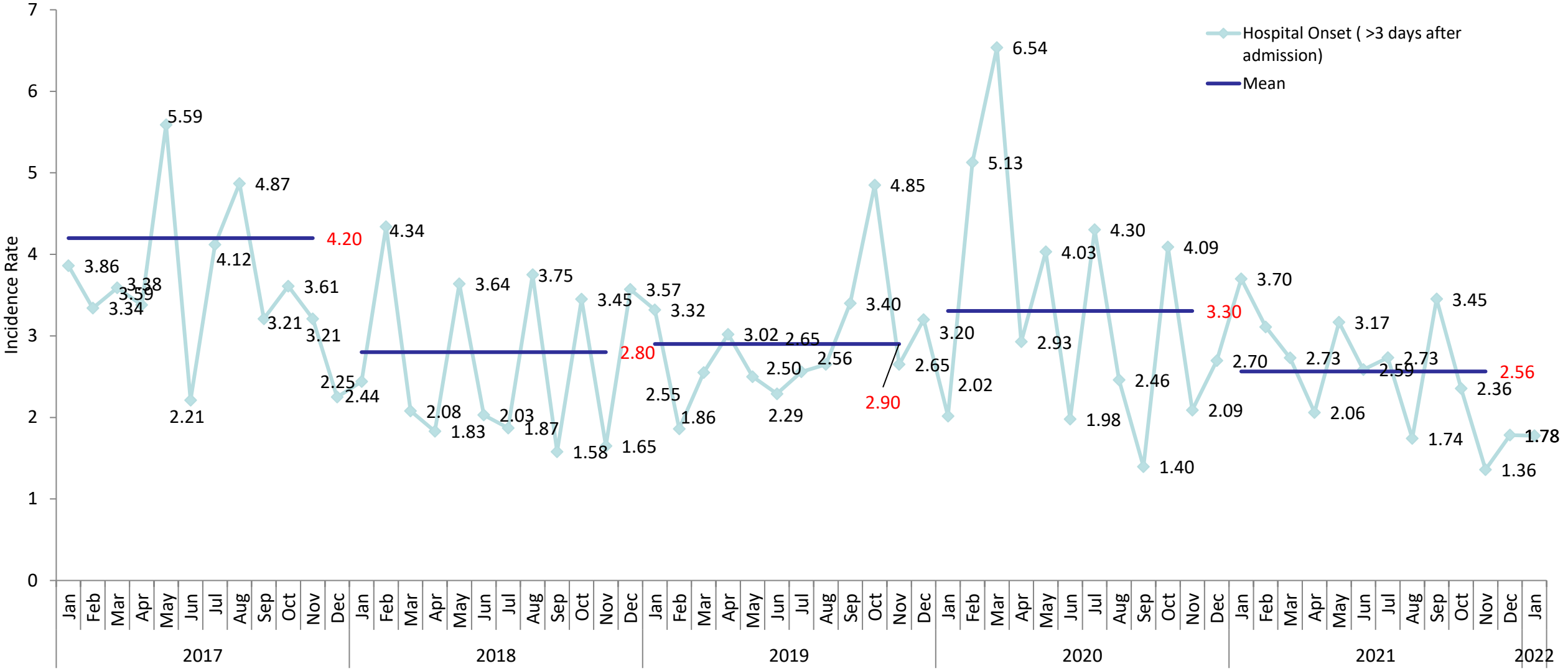
VRE from clinical specimens



Clostridioides difficile from clinical specimens

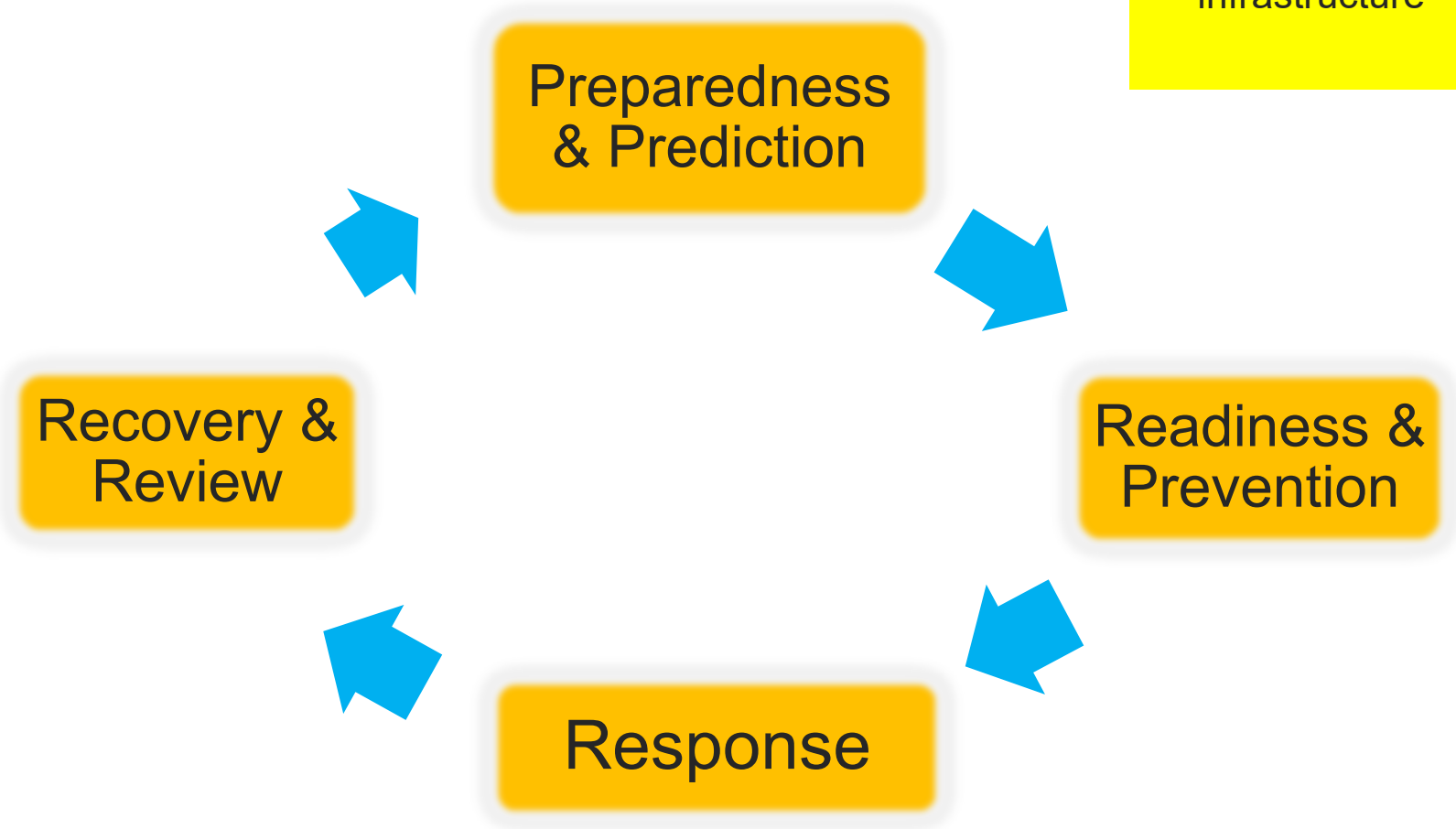


Clostridioides difficile incidence (per 10,000 patient days)



In Conclusion……..

- Adequate capacities
- training
- Surge
  - stockpiles
  - infrastructure



- Review surge status
- Just in time trainings
- SOP review
  - triage/workflows
  - infrastructure adaptation

Preparing for & Responding to an Outbreak

Non outbreak pathogen
- IPC
- Surveillance
- Antimicrobial stewardship