# Evidence check

4 June 2020

Rapid evidence checks are based on a simplified review method and may not be entirely exhaustive, but aim to provide a balanced assessment of what is already known about a specific problem or issue. This brief has not been peer-reviewed and should not be a substitute for individual clinical judgement, nor is it an endorsed position of NSW Health.

## Workforce reconfiguration

## Rapid review question

What is the evidence regarding temporary workforce reconfigurations such as splitting of teams and establishing social distancing protocols within teams to minimise staff exposure to COVID-19?

## In brief

- Workforce reconfigurations of split teams, or creating smaller ‘sub teams’ and establishing social distancing protocols within teams have been described for a range of specialties including general surgery, oncology, radiology, cardiology, emergency departments and dialysis units.
- A modelling study describes a desynchronisation strategy with two medical teams working on alternate seven day periods. The findings of the strategy is that it’s associated with reduced infection rates among the healthcare workforce.
- Different approaches tried in various settings have been described in the literature including the following.
    - An account from the University of Washington on the use of separate and sub-teams (inpatient care, operating care, and clinic care teams) to ensure continuity of care and minimise exposure of healthcare workers.
    - The University of Wisconsin has used a restructuring ‘team of teams’ framework that focuses on network of networks approach to enable communication, staffing redesign, synchronising work cycles and clinical and educational changes to minimise staff exposure to COVID-19.
    - Hospitals in Singapore have used sub-teams which function separately and do not come into contact with each other to ensure emergency surgery can continue if one team if quarantined or infected, and a fixed-team based strategy in the emergency department, where several nursing and doctor sub-teams were created, resulting in longer shift hours but longer rest periods between rostered days.
    - Many of the specialties have halted inter-hospital and cross-institutional rotations of medical staff to reduce interactions, where previously staff were scheduled to cover several hospitals within a hospital network.

- A simulation study, conducted on the basis of the 2005 influenza and 2003 SARS outbreaks, showed temporary workforce restructuring reduced interactions between medical doctors and different wards and limited disease spread.

## Limitations

This review excluded workforce restructuring for: capacity management and redeployment in response to surge preparedness; or for minimising workforce burnout. Evidence is of low quality, and based on single case experiences with no reports of outcomes associated. Some systems have proscribed practising in multiple locations during COVID-19 but there is no evidence available on the effect of that practice.

## Background

Healthcare workers experience high risk of COVID-19 infection.(1) The Chinese National Health Commission reported that 3,300 healthcare workers were infected, whilst Italy recorded 350 healthcare workers were infected with COVID-19 as of early March 2020.(2)

There are risks associated with longer working hours and in situations of heightened stress such as caring for patients who are infectious. Regular donning and doffing of full personal protection equipment adds to fatigue and psychological stress.(3) One way to minimise infection among staff is to use workforce practices that limit exposure, either through shift patterns, rostering or specialisation.

Previous evidence checks have focused on redeploying staff and mental health of healthcare workers.

## Methods

PubMed and EPPI websites were searched on 19 May 2020, additional studies were added that were screened for eligibility during daily evidence check searches. Searches included COVID-19 and past disease outbreaks. Search terms have been included in the appendix.

## Results

**Table 1: Evidence regarding functional workforce reconfiguration to minimise staff exposure and preserve the healthcare workforce**

| Study | Summary | Link |
|---|---|---|
| **Peer reviewed sources** | | |
| Modelling strategies to organize healthcare workforce during pandemics: application to COVID-19<br><br>Sanchez-Taltavull, et al. 2020 (4) | • The models were designed to determine if desynchronisation of medical teams by dichotomising the workers may protect the workforce.<br>• The studies model workforce productivity depending on the infection rate, the presence of reinfection and the efficiency of home office. As an application example, theory was applied to COVID-19.<br>• The results of the models reveal that a desynchronisation strategy in which two medical teams work alternating for seven days reduces the infection rate of the healthcare workforce. | Preprint-modelling |
| Controlling nosocomial infection based on structure of hospital social networks<br><br>Ueno, et al. 2008 (5) | • A simulated social network in a hospital in Tokyo, explored effective containment strategies against nosocomial infection.<br>• The observed social networks in the hospital have hierarchical and modular structure in which dense substructure such as departments, wards, and rooms, are globally but only loosely connected.<br>• The social network study demonstrates that healthcare workers, particularly medical doctors, are main vectors (i.e. transmitters) of diseases on these networks. Intervention methods that restrict interaction between medical doctors and their visits to different wards shrink the final epidemic size more than intervention methods that directly protect patients, such as isolating patients in single rooms. | Modelling study |

| Study | Summary | Link |
|---|---|---|
| **Peer reviewed sources** | | |
| Emergency restructuring of a general surgery residency program during the coronavirus disease 2019 pandemic: the University of Washington experience<br><br>Nassar, et al. 2020 (6) | • An organisational case study describes general surgery resident allocation in the University of Washington by dividing patient care into separate inpatient care, operating care, and clinic care teams. Separate teams made up of all resident levels work in each setting for a 1-week period.<br>• By creating this emergency structure, they limited the number of surgery residents with direct patient contact and have created teams working in isolation from one another to optimise physical distancing while still performing required work.<br>• Key elements to consider<br>  ○ Physical distancing – inter-team isolation, intra-team distancing, virtual handoffs and digital communication, specified workstations, virtual rounding and assigned bedside rounds<br>  ○ Team structure – larger teams, functionally independent teams, capability to withstand member loss and residents of all levels per team<br>  ○ Macrostructure – supplement members affected by illness or subject to self-isolation with research residents, fluidity to deconstruct remaining large teams and reconstruct smaller teams as needed and inclusion of at-home residents in the workforce<br>  ○ Conceptual points – resident and faculty buy-in, swift conception and assembly, committee for triaging and implementation of revisions. | Special communication |

| Study | Summary | Link |
|---|---|---|
| **Peer reviewed sources** | | |
| Blueprint for restructuring a department of surgery in concert with the health care system during a pandemic: the University of Wisconsin experience<br><br>Zarzaur, et al. 2020 (7) | • Organisational case study describes an administrative restructuring leveraging a team-of-teams approach, which provides a framework for deploying the workforce needed to deliver all necessary urgent healthcare and critical care to patients in the system, and consider implications for the future.<br>• This team-of-teams concept is a more fluid structure in which information flows in a 'network of networks' approach dependant on the free flow of information among and between various teams, as well as a clearly communicated mission. Teams must have a shared consciousness of how and why. | Special communication |
| COVID-19 and the general surgical department - measures to reduce spread of SARS-COV-2 among surgeons<br><br>Yeo, et al. 2020 (8) | • Singapore experience, with a focus on surgical services order to ensure continuity of surgical services in the event of healthcare worker COVID-19 transmission. Each specialty team (colorectal, upper gastrointestinal, trauma, breast and endocrine, hepatobiliary, vascular, thoracic and plastics surgery) is divided into two or more sub-teams.<br>• These sub-teams function separately and do not come into contact with one another. This ensures that emergency and essential elective surgery can still go on, even if one sub-team is infected or quarantined. Inter-hospital rotation of surgical residents has also been halted to reduce the chance of cross-hospital interaction and potential transmission of COVID-19 between healthcare workers. | Editorial |

| Study | Summary | Link |
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| **Peer reviewed sources** | | |
| Splitting healthcare teams may help to reduce disruption in patient care<br><br>Soo, 2020 (9) | • Split teams minimise exposure and cross-contamination among healthcare professionals which in turn reduce disruption to patient care.<br>• There is minimal physical contact between the separate teams and only one team provides inpatient services. The inpatient team is further geographically confined within their ward areas of cover.<br>• The split team concept applies to other areas such as outpatient clinics, oncology nursing, pharmacy, patient service associates, administrative staff, and clinical research staff.<br>• Furthermore, work stations are separated by at least one metre, with only members from the same team sharing adjacent work spaces. In the outpatient setting, the clinic areas are also split with separate registration counters, triage, venepuncture service, consultation rooms, isolation rooms, lavatories and treatment areas.<br>• In addition, healthcare workers with acute respiratory infection or fever with possible COVID-19 exposure are initially assessed to determine the need for testing.<br>• Split teams may not be feasible in hospital systems where resources are limited, but every effort should be made for healthcare professionals to be separated physically, much like social distancing. | Perspective |
| A call to arms: a perspective of safe general surgery in Singapore during the COVID-19 pandemic<br><br>Chew, et al. 2020 (10) | • As part of a multi-pronged hospital responses in Singapore to COVID-19, this correspondence broadly describes that staff segregation for departments was implemented to ensure business continuity plans could continue.<br>• The segregation of teams ensured that departments would remain functional should anyone fall ill.<br>• Also, stepwise reduction of elective work in public hospitals was implemented to allow for deployment of manpower to frontline departments such as emergency departments and intensive care units. | Correspondence |

| Study | Summary | Link |
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| **Peer reviewed sources** | | |
| Academic radiology departmental operational strategy related to the coronavirus disease 2019 (covid-19) pandemic<br><br>Prabhakar, et al. 2020 (11) | • Departmental radiology experience of shifting to an operational structure and cultural shift in response to COVID-19, noting that without appropriate risk mitigation strategies, radiologists are significantly at risk for either contracting or spreading the virus. To respond to these risks, they created an inter-team social distancing plan for the department with a core mission of minimising radiologist physical contact with referring providers, hospital staff, and each other. | Opinion |
| Take proactive measures for the pandemic COVID-19 infection in the dialysis facilities<br><br>Lee, et al. 2020 (12) | • Taiwanese experience of preparing dialysis facilities for COVID-19.<br>• Includes information on the National Health Command Centre suggestion for all medical facilities to plan division of medical staff to patient groups in a 'fixed team care' and dividing work groups. When infections occur, an activation of this model could minimise the staff-patient and staff-staff exposure. | Article |
| From SARS to COVID-19: the Singaporean experience<br><br>Lin, et al. 2020 (13) | • Singaporean experience of the workplace, employers were encouraged to conduct regular temperature and health monitoring for employees, as well as to implement business continuity plans, e.g. work from home or segregated teams to reduce mixing of workers. | Pre-print |

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| Emergency department 'outbreak rostering' to meet challenges of COVID-19<br><br>Chua et al. 2020 (14) | • Outbreak response roster was implemented in a Singaporean emergency department, with a fixed-team based strategy, accounting for concerns of limiting transmission, maintaining service standards and preventing burnout.<br>• Intervention<br>  ○ Limiting contact among staff. Separate teams were created with doctors divided according to seniority and experience. Each team was led by a senior consultant who had worked through the SARS period, nurses were split into teams that worked the same 12 hours shifts as doctors.<br>  ○ Maintaining buffer capacity. Learnings from SARS outbreak increased the number of teams to five, after balancing buffer capacity against number of staff per team to meet anticipated workload.<br>  ○ Preventing staff burn-out. The outbreak roster meant manpower was no longer in concert with daily patient arrival trends. Sifts, infection-control precautions and complex decision-making led to increased time spent on regular symptoms. Therefore, shifts were increased from 8 to 12 hours. While these were longer, 12 hours shifts allowed for enough rest days for teams in the scenario where none of the teams were quarantined.<br>• Overcoming challenges<br>  ○ To evaluate physician views on the outbreak roster, a poll was conducted for all senior and junior doctors in the seventh week. 78.2% of the physicians in the department participated in the poll. 87% of respondents voted to continue with the 12 hours shifts. Reasons cited for this included fewer handovers leading to better patient safety, less interaction between teams for better staff protection and minimising wastage of PPE. Overall, most physicians polled also felt that they had enough rest time.<br>• Inter-team communication. Decrease of face-to-face meetings, use of secure messaging platforms for information dissemination and discussions. Hospital management instructions and news communicated by email.<br>• Continued education. Meetings cancelled, educational activities were online and clinical teaching which was limited to members within each team. | Report |

| Study | Summary | Link |
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| **Peer reviewed sources** | | |
| Preparing IR for COVID-19: the Singapore experience<br><br>Gogna, et al. 2020 (15) | • Previously, staff were scheduled to cover several hospitals within a hospital network to allow optimal allocation of expertise to patients regardless of the patient's physical location. Staff are now segregated to remain within one designated hospital.<br>• Cross-institutional movement of staff is tightly controlled to minimize risk of cross-infection, and approval from the Ministry of Health is required for any cross-movement.<br>• For neurointervention, the existing practice provided on-call coverage on a city-wide basis from a pool of five credentialed neurointerventionists for all public hospitals in Singapore. This practice was altered, and the three public hospitals providing neurointervention are now exclusively serving their own hospitals. As this entails high on-call frequency for the neurointerventionists, they are given relief from their day time service work whenever feasible. | Article |

| Study | Summary | Link |
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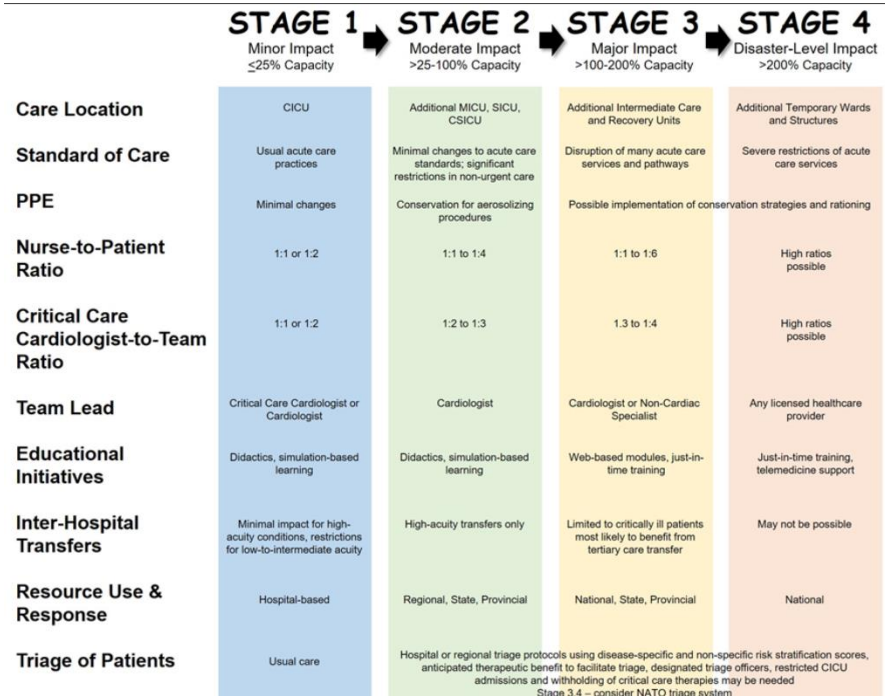
| **Peer reviewed sources** | | |
| Disruptive modifications to cardiac critical care delivery during the Covid-19 pandemic: an international perspective<br><br>Katz, et al. 2020 (16) | • The paper proposes a framework that builds upon an American College of Chest Physicians an endorsed model in which a 25% capacity surge is considered minor while a surge eclipsing 200% is considered a disaster. The 4-component pandemic classification system can complement staffing and adaptive structural decisions.<br>• Relevant to inter-team isolation are the inter-hospital transfers, and staff ratios.<br>  <br> | Article |

# Appendix

## PubMed

1. ((workforce[Title/Abstract] AND structure[Title/Abstract]) OR ("healthcare team*"[Title/Abstract])) OR ("hospital[Title/Abstract] AND structure"[Title/Abstract]) AND (COVID-19[Title/Abstract])) OR (Coronavirus [Title/Abstract])) OR (Coronavirus [MeSH Terms])) OR (sars-cov-2[Title/Abstract]))
2. ((workforce[Title/Abstract] AND structure[Title/Abstract]) OR ("healthcare team*"[Title/Abstract])) OR ("hospital[Title/Abstract] AND structure"[Title/Abstract]) AND “pandemics"[MeSH Terms] OR pandemic*[title/abstract])

## EPPI website

Workforce OR healthcare team AND nosocomial OR infection

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