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Abstract

The COVID-19 pandemic brought attention to scarce clinical resource allocation via secondary population-based triage (S-PBT) throughout the international healthcare community.

Experiences overseas highlighted the importance of coordinated and consistent approaches to allocating resources when facing overwhelming demand, particularly for critical care. Noting the importance of consistency and the system of devolved governance deployed in Australia, this study aimed to identify and analyse sources of high-level policy that affect Australia's health system preparedness for the operationalisation of S-PBT. Of the 39 documents reviewed, 17 contained potential references to S-PBT. There was a lack of clear recommendations and guidance to inform S-PBT operationalisation and, where provided, advice conflicted between documents. Many jurisdictions did not detail how S-PBT would be operationalised and failed to delineate stakeholder responsibilities. These results are important as they reveal a lack of high-level jurisdictional policy preparedness for coordinated and consistent S-PBT operationalisation. These results offer insights and opportunities for enhanced disaster preparedness as clinicians, policymakers and academics critically reflect on pandemic responses. The results show a need for enhanced preparedness around the management of overwhelming demand and clinical resource management in Australia.

Australian high-level public policy preparedness for population-based triage during the pandemic

Peer reviewed

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Introduction

For many countries, the COVID-19 pandemic generated significant surges in demand for in-patient and critical care and health systems faced collapse. Traditionally, health resources are allocated to patients in an order determined by clinical acuity. However, pandemics create such significant demand that traditional triage models cannot drive scarce resource allocation decisions, especially if resource allocation will result in patients being denied care on the basis of availability (Burkle 2002, 2006).

In such circumstances, population-based triage (PBT) becomes necessary. There are 2 tiers of PBT in pandemic settings or bioagent events: primary population-based triage (P-PBT) and secondary population-based triage (S-PBT) (Burkle 2002, 2006). P-PBT sorts the population according to infection status to prevent further transmission or contamination and S-PBT sorts the population according to the clinical condition of individuals, their context within the population and health resource availability (Burkle 2002, 2006; Bielajs *et al.* 2008; Burkle & Burkle 2005). S-PBT thereby overcomes the limitations of traditional triage as it prioritises the patients most likely to benefit from available resources and may guide withdrawing resources after a 'trial-of-therapy' has failed (Burkle 2006; Bielajs *et al.* 2008; Burkle & Burkle 2005; Christian *et al.* 2006a; Christian *et al.* 2006b; Powel, Christ & Birkhead 2008).

S-PBT has not been implemented and recorded on a scale earning significant global attention prior to the COVID-19 pandemic, but the construct of PBT itself is not new. Early work identifying and exploring the construct emerged 2 decades prior to the COVID-19 pandemic (Burkle 2002, 2006), yet no proposed S-PBT protocol has been adequately validated or demonstrated to improve health resource allocation and overall mortality (Christian *et al.* 2009, Christian *et al.* 2011, Kanter 2015, Guest *et al.* 2009, Cheung *et al.* 2012). This carries significant weight due to the ethical, emotional, clinical and professional implications associated

with S-PBT decisions. Regardless, the pandemic drove S-PBT into operationalisation for the first time on a large-scale and with significant visibility; a reality first experienced in the pandemic by the Italian health system (Faggioni, Gonzalez-Melado & De Pietro 2021).

Australia recorded 28,631 confirmed COVID-19 cases in 2020. Of this, 72% occurred in Victoria, demonstrating that Australia evaded case numbers seen elsewhere during the early pandemic (National Notifiable Diseases Surveillance System 2021, State of Victoria Department of Health and Human Services 2021). In the same period, there were 20 million cases in the United States of America, 10 million cases in India, 7 million cases in Brazil, nearly 3 million cases in the United Kingdom and 2 million cases in Italy (World Health Organization 2022). Although S-PBT did not become necessary during Australia's early experiences of the pandemic, it is critical to consider Australia's policy preparedness as the threat from COVID-19 and other emerging infectious diseases remains.

High-level and even seemingly non-clinical policy is relevant in applications of S-PBT due to the structure of disaster and healthcare governance in Australia. Hospitals are not independent enterprises and do not operate with complete autonomy as in other countries or health systems. The Australian Government and respective state and territory governments share ultimate responsibility and provide the overall framework for healthcare delivery within respective jurisdictions (Australian Institute of Health and Welfare 2018). Between individual hospitals and services, variations in care and service delivery are accepted if they comply with regulations and standards determined by local health networks as well as government (Australian Institute of Health and Welfare 2018). Although resource allocation at the level of individual patients is often considered a clinical decision made by clinicians, the health system structure in Australia means processes such as S-PBT are heavily influenced by policy arising from government.

A previous review of pandemic plans available in Australia in 2009 identified significant variability across jurisdictions that could undermine effective pandemic responses (Itzwerth, Moa & MacIntyre 2018). The review identified that existing policies showed significant variations and gaps that were considered detrimental in pandemic responses. Since that review, many documents have been updated and, critically, this previous study did not consider S-PBT preparedness. Australia's current policy preparedness for S-PBT during pandemics has therefore not been critically reviewed in the literature. The objective of this research is to identify and examine government and medical professional body sources of policy that would inform S-PBT operationalisation within Australia's health systems, reflecting the overall approach to health system governance and disaster preparedness.

Methods

Qualitative document analysis was conducted according to the 5 stages described by Altheide and Schneider (2013): define relevant documents, develop data collection protocol, code and organise data, analyse data and report findings.

Relevant documents were those published by the Australian Government or relevant professional body informing healthcare provision during pandemics. An initial review identified pandemic influenza, disaster and COVID-19 plans as primary sources of relevant policy. Key terms included 'pandemic', 'pandemic plan', 'influenza plan' and 'COVID-19 response'. These were used to search the website of each government body (Australian Government and each state and territory government), respective departments of health and professional medical bodies (College of Intensive Care Medicine, Australian and New Zealand Intensive Care Society, Australasian College of Emergency Medicine, Royal Australian College of Physicians, Royal Australian College of Surgeons). The search for relevant documents was conducted on 27 July 2021. Policies referenced within identified documents were also considered for review. Legislation and local (health service or hospital) policies were excluded.

Two authors independently reviewed and coded each document. Preliminary codes were derived from theoretical principles identified or related concepts to reduce the likelihood of references to PBT being missed. Codes were refined, with consensus between reviewers, after an initial pass of documents to ensure abstract references were captured while reducing unnecessary coding and analysis of data. Codes included exposure screening and minimising exposure, patient cohorting, surge resource management, critical care rationing, critical care triage and jurisdictional responsibilities or delegations. Coded phrases were extracted into Microsoft Excel™ spreadsheets and grouped according to code or theme. Data analysis aimed to identify whether each document informed S-PBT, the degree to which documents directly informed practice and any relationships between data extracted between documents. After performing analysis independently, discussion between all reviewers occurred until unanimous agreement was achieved. Analysis was conducted over a period concluding in October 2021.

Results

This study will not directly replicate word-for-word extracts of documents. Rather, results are presented as a summary of relevant document sources, an analysis of the terminology used when documents refer to S-PBT and a critical appraisal of the guidance provided around S-PBT operationalisation.

Document sources

A total of 39 documents was reviewed of which 17 contained references to S-PBT (see Table 1). Of these 17 documents, 3 (18%) came from the Australian Government, 13 (76%) came from state or territory governments and 1 (6%) came from a professional medical society. Six of the 17 documents had a revision or publication date during the COVID-19 pandemic.

References to S-PBT were found in 4 documents from Western Australia (WA), 3 from New South Wales (NSW), 2 each from South Australia (SA) and Victoria and 1 each from Queensland and Tasmania. No references to S-PBT were identified in

1. At the time of publishing, COVID-19 case reporting and presentation had evolved and is no longer presented in the form of this dataset.

Table 1: Publicly available policy documents informing secondary population-based triage operationalisation in Australia.

Jurisdiction document title*	Description and summary
Australian Government	
Australian Health Management Plan for Pandemic Influenza (Australian Government Department of Health 2019)	Outlines national health response to pandemic influenza. 2nd version published 2019; 232 pages.
Australian Health Sector Emergency Response Plan for Novel Coronavirus (COVID-19) (Australian Government Department of Health 2020)	Outlines COVID-19 specific arrangements to supplement national arrangements for the communicable diseases. Published 2020; 56 pages.
Emergency Response Plan for Communicable Disease Incidents of National Significance (Australian Government Department of Health 2018)	Outlines national approach to communicable disease emergencies not covered by a disease-specific plan. Published 2016; 51 pages.
New South Wales	
Influenza Pandemic – Providing Critical Care (New South Wales Health 2010)	Outlines the provision of critical care during a pandemic influenza. Published 2010; 44 pages.
New South Wales Health Services Functional Area Supporting Plan (NSW HEALTHPLAN) (New South Wales Health 2014)	Outlines health emergency resource management. 4th version published 2014; 54 pages.
NSW Health Influenza Pandemic Plan (New South Wales Health 2016)	Outlines health preparedness and response for an influenza pandemic. Published 2016; 57 pages.
Queensland	
Queensland Health Pandemic Influenza Plan (Queensland Health 2018)	Outlines arrangements for responding to an influenza pandemic. 3rd version published 2018; 59 pages.
South Australia	
Pandemic Influenza Plan (South Australia Health 2018)	Outlines strategic response to pandemic influenza. 5th version published 2018; 48 pages.
SA Health Viral Respiratory Disease Pandemic Response Plan (South Australian Health 2020)	Outlines state health management plan for viral respiratory illness pandemics. 6th version published 2020; 52 pages.
Tasmania	
Tasmanian Health Action Plan for Pandemic Influenza 2016 (Tasmanian Government Department of Health and Human Services 2016)	Outlines state government approach to preparedness and response. 2nd version published 2016; 118 pages.
Victoria	
COVID-19 Pandemic plan for the Victorian Health Sector (State of Victoria Department of Health 2020)	Outlines health sector management plan for a pandemic. Published 2020; 32 pages.
Victorian health management plan for pandemic influenza (State of Victoria Department of Health 2014)	Outlines state health response to an influenza pandemic. Published 2014; 121 pages.
Western Australia	
Framework to guide decision making on the appropriateness of intensive care management during the COVID-19 pandemic (Government of Western Australia Department of Health 2020a)	Outlines advice to clinical decision-makers regarding allocation or denial of ICU care. Published 2020; 4 pages.
Infectious Disease Emergency Management Plan (Government of Western Australia Department of Health 2017)	Outlines management plan for general infectious disease emergencies. Published 2017; 24 pages.
State Health Emergency Response plan (Government of Western Australia Department of Health 2018)	Outlines state health emergency response. Published 2018; 35 pages.
Western Australian Government Pandemic Plan (Government of Western Australia Department of Health 2020b)	Outlines state whole-of-government response to a pandemic. 5th version published 2020; 41 pages.
Australian and New Zealand Intensive Care Society	
Guiding principles for complex decision-making during Pandemic COVID-19 (Australian and New Zealand Intensive Care Society 2020)	Outlines professional body recommendations for allocating scarce critical care resources due to COVID-19. Published 2020; 10 pages.

*Note: documents referenced in this table are included in the reference list.

documents from the Australian Capital Territory (ACT). No documents from the Northern Territory (NT) were found.

NSW, WA and the Australian and New Zealand Intensive Care Society (ANZICS) each produced a document that specifically addressed the provision and continuation of intensive care during a pandemic. All other references to S-PBT were identified within documents outlining the health response to an infectious disease pandemic, primarily an influenza pandemic.

Terminology

No documents directly used the term ‘secondary population-based triage’. Data extracted from the documents primarily referred to triaging critical care, alternative or modified models of care and altered admission or discharge criteria or processes. References to triaging overwhelmingly related to standard triage or P-PBT and the identification and isolation of suspected or confirmed cases. Distinguishing whether a reference to triaging related to standard triage, P-PBT or S-PBT required critique of the context and the intended triage outcome.

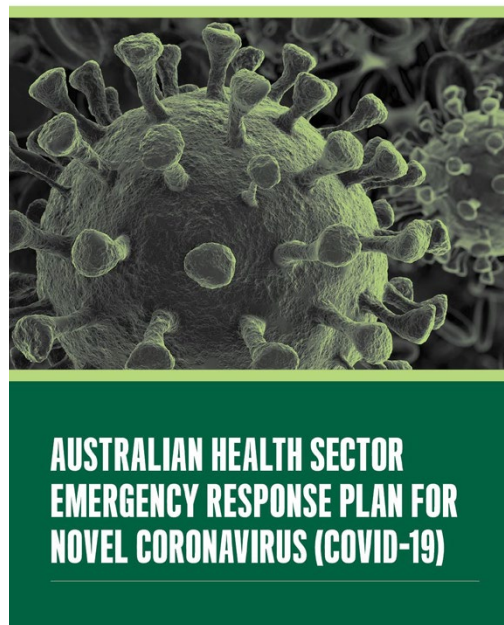
References to S-PBT were occasionally identified in documents discussing ‘alternate models of care’, but this required distinction between whether the intention was to avoid critical shortages (that is, related to increasing surge capacity) or allocate scarce resources. Similar distinctions were required when analysing data extracts that discussed modified or altered admission or discharge criteria or processes.

Practical guidance

The documents published by the Australian Government provided that, if required, triage algorithms and documents governing changes to standards or models of care would be developed in conjunction with state and territory governments that would remain responsible for implementation (Australian Government Department of Health 2019, Australian Government Department of Health 2020, Australian Government Department of Health 2018).

Each state and territory accepted this responsibility and outlined that pandemic health responses were to be overseen by the state or territory departments of health. Nearly all governments explicitly outlined a system of further devolved governance within their jurisdiction. State governments were to maintain strategic oversight within the department but defer operational responsibility to local authorities. In doing so, these state governments directed local health authorities to prepare policies and procedures to manage local surges in demand for in-patient and critical care services. The NSW, Tasmanian and Victorian governments explicitly stated that collaboration between the state government and local health jurisdictions would be relied on to achieve a consistent approach but maintained onward delegation.

Many of the state-level government documents acknowledged the potential requirement for S-PBT; however, there was significant variation in the quality and quantity of guidance around S-PBT operationalisation. In WA, in documents pre-dating the pandemic and in one Queensland Government



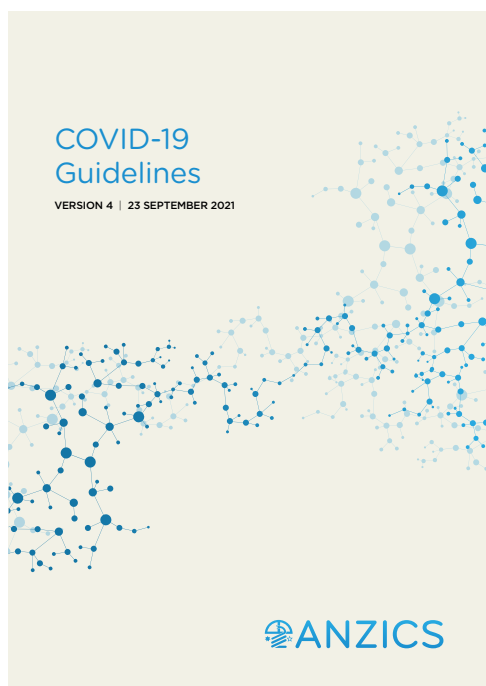
The Health Sector Emergency Response Plan to Novel Coronavirus guides Australia's health sector response to pandemics.

document, the potential for S-PBT was acknowledged but they provided no further guidance or relevant discussion (Queensland Health 2018, Government of Western Australia Department of Health 2017, Government of Western Australia Department of Health 2018). Tasmania reiterated ethical principles detailed in Australian Government documents but provided no further guidance (Tasmanian Government Department of Health and Human Services 2016). SA noted that guidance around service operationalisation delivery limitations and triage algorithms would be provided if required but did not discuss implementation (South Australia Health 2018, 2020). Finally, Victoria noted a reliance on the national development of a triage protocol (State of Victoria Department of Health 2020).

One document each from NSW, WA and ANZICS detailed practical considerations or recommendations for S-PBT operationalisation. The document from New South Wales Health (2010) endorsed 2 proposed protocols to guide S-PBT within the state. The document endorsed using a statewide protocol, outlined protocol administration (including who should be involved, the nature of acceptable decision-making tools), detailed documentation requirements and deferred providing medicolegal and professional protections to individual employers. Importantly, this document endorsed the use of illness severity quantification (ISQ) tools to inform decisions.

The document by Australian and New Zealand Intensive Care Society (2020), produced in response to the pandemic, outlined recommendations for the operationalisation of S-PBT. This document outlined policy and practical recommendations for S-PBT operationalisation, including the considerations that

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The COVID-19 Guidelines are a valuable resource for critical-care healthcare workers preparing, training and delivering care for patients.

should and should not inform allocation decisions, how allocation determinations should be reached and who should be involved in allocating critical care resources. This document explicitly asserted that clinical prioritisation is best done by subjective assessments conducted by experienced intensivists rather than ISQ tools. Finally, the document outlined the importance of clinicians being protected from legal or professional consequences if practicing according to endorsed policies and calls for jurisdictional authorities to endorse such policies.

On review, the relevant document from WA served to reiterate and endorse the recommendations provided by the ANZICS document within the WA jurisdiction but provided no further instructions (Government of Western Australia Department of Health 2020a).

Discussion

In Australia, responsibility for disaster management lies with state and territory governments. The Australian Government does not have the statutory authority to direct states and territories in matters of disaster management and adopts an advisory and supportive role, if required (Australian Government Department of Health and Ageing 2011). Devolved governance within state and territory jurisdictions means that ultimate responsibility for operational aspects rests with jurisdictional health authorities or even individual hospitals. This approach has pertinent implications for S-PBT operationalisation.

Terminology used throughout selected documents was heterogeneous and often ambiguous, resulting in the reader

relying on context to identify whether specific details informed S-PBT operationalisation. References to triage, models of care and rationing variably related to S-PBT. This could stem from a lack of clear conceptual and practical understanding of S-PBT and its operationalisation, which has remained mostly unchallenged prior to the pandemic. Inconsistencies in the language and terminology used in documents from both levels of government are likely fuelled by ambiguity and attempts to contextualise an unclear concept in jurisdiction-specific documents.

There is a significant lack of practical guidance within the identified documents that carries significant weight given the roles and responsibilities of the Australian Government and state and territory governments in disaster management. Only one state government provided a robust and descriptive plan for S-PBT operationalisation within its jurisdiction; however, the detailed approach adopted frameworks yet to be validated by empirical evidence and, in some instances, directly conflicts with guidelines provided by ANZICS as a body of clinical stakeholders.

The document produced by ANZICS provides many recommendations but, on its own, is not sufficient to enable S-PBT operationalisation. Importantly, this document serves to inform the allocation of intensive care resources only, which is only one, although a very prominent, application of S-PBT in a pandemic. Additionally, governments and health systems are not obliged to adopt these recommendations and adherence to these guidelines may expose clinicians to liability. Most documents do not address clinician protection and indemnification, while some defer this responsibility to employers. This leaves significant room for uncertainty and the potential for profoundly inconsistent protections within and between jurisdictions.

This analysis suggests that, as at the time of document collection, S-PBT operationalisation lacked central coordination and cross-jurisdictional consistency. This is evidenced by the overall absence of rigorous or comprehensive policy detailing the practical aspects of S-PBT. Additionally, documents failed to clearly delineate the responsibilities and inputs of the Australian and state governments and local health authorities.

Future revisions of pandemic plans in Australia should aim to address S-PBT operationalisation, adopt clear and consistent terminology, consider the evidence available to inform endorsed approaches, clarify the scope and permissible variability between operational plans and detail the source and limits of protections for clinicians.

Limitations

There are limitations to this study, including that only publicly available documents were identified and included. Additionally, decentralised responsibility for health responses means that documents most clearly outlining S-PBT operationalisation may have been at the local level and these were not included. However, there are significant findings in relation to consistent and coordinated policy preparedness. Finally, despite care in identifying potentially relevant documents, it cannot be guaranteed that relevant documents were not missed.

Conclusion

This review aimed to assess the policy preparedness to operationalise S-PBT in response to COVID-19 across Australia. Documents significantly lacked practical guidance and, where that did exist, there were often conflicts between documents. Many jurisdictions do not address S-PBT at all and that must be remedied. Documents that did address S-PBT should be revised and consider the evidence available to inform this critical facet of pandemic management. Document revisions should adopt standardised and consistent terminology when discussing S-PBT to reduce heterogeneity and ambiguity. Finally, policies should address protection and indemnity for clinicians who may be required to undertake S-PBT given the marked variation in protections detailed and a lack of clarity around where protection will come from.

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