

# Analysis of Centralized Efficiency Improvement Practices in Australian Public Health Systems

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**Aim:** Analysis of centralized efficiency improvement practices in Australian public health systems.

**Introduction:** Public health systems seek to maximize outcomes generated for resources used through efficiency improvement (EI) in response to funding and demand pressures. Despite this focus, evidence for EI approaches at the whole-of-system level is lacking in the literature. There is an urgent need for evidence-based approaches to centralized EI to address these pressures. This study aims to address this gap by answering the research question “How is EI conceptualized and managed by central public health system management entities in Australia?”

**Material and Methods:** Document analysis was selected due to its suitability for systematically searching and appraising health system documentation, with this study following Altheide’s approach focusing on whole-of-system strategic plan and management framework documents originating from Australian public health organizations.

**Results:** Conceptualization of efficiency varied substantially with no consistent definition identified, however common attributes included resource use, management, service and delivery. Forty-two of 43 documents contained approaches associated with improving efficiency at the whole of system level.

**Discussion:** While no comprehensive framework for centralized EI was evident, we identified nine core approaches which together characterize centralized EI. Together these approaches represent a comprehensive evidence-based approach to EI at the whole of system level.

**Conclusion:** The approaches to whole-of-system EI identified in this study are likely to be highly transferable across health systems internationally with approaches including strategic priority setting, incentivization, performance support, use of EI evidence, digital enablement and workforce capability development.

**Keywords:** efficiency, public health, health management

## Introduction

Public health systems internationally continue to be challenged by increasing demand for health care, compounded by pressures to enhance health outcomes amidst the current climate of uncertainty and tightening government finances.<sup>1–3</sup> These pressures necessitate a focus on maximizing value in terms of health outcomes achieved for resources invested.<sup>4</sup> Health systems therefore require cost-specific improvement practices that do not negatively impact either the quality of outcomes achieved or the experiences of staff and consumers. Despite this requirement, efficiency and cost are not always consistently connected to care quality and experiences in the context of improvement, with many approaches focusing largely on reducing cost and achieving budget results with little regard to other outcomes.<sup>5,6</sup> Our recent rapid systematic review of 82 publications found that inefficiencies in public health systems can be driven by a range of factors including workforce pressures, waste, low-value activity, limited evidence for efficient practices and reactive approaches to cost control, as well as shortfalls in conceptualization of efficiency among healthcare workers.<sup>7,8</sup> Health system managers must be cautious when seeking to manage service cost alone, as this can lead to false representations of efficiency, unsustainable short-term improvements and detrimental impacts to service quality and stakeholder experience.<sup>7,8</sup>

Value is addressed in differing ways between health systems internationally with a three-fold focus on patient, technical and allocative value in the UK, a focus on integrating fragmented system elements to improve performance and outcomes in the US, and a balance between health outcomes, efficiency and experience in Australia. The World Health Organization describes efficiency as cutting across the broad health system goals of equity, access and outcomes; improved efficiency should enable greater outcomes to be achieved with the same or fewer resources while also contributing to health system's financial stability.<sup>9</sup> Despite different ways of characterizing value, the underlying theme of maximizing health outcomes for resources invested remains consistent.<sup>10,11</sup> Where resources are limited, the importance of maximizing outcomes achieved with available resources is key to ensuring health systems are able to respond to requirements for performance improvement, transformation and reform.<sup>3,12</sup> This further heightens the imperative for public health systems to understand how to undertake deliberate, coordinated action to improve efficiency.<sup>13</sup>

The inclusion of efficiency in health system performance management frameworks and indicators is commonplace in health systems internationally, however frameworks for centralized EI management in public health systems at the whole-of-system level are lacking in the literature.<sup>8,14</sup> In practice, the extent to which EI priorities translate to the policy and performance frameworks required to operationalize them is unclear.<sup>15,16</sup> The consistency with which EI targets and processes are defined and included within common governance and management instruments such as budgets, service level agreements and key performance indicators at a whole-of-system level is also unclear.<sup>17</sup> This results in a lack of clarity as to how EI is positioned by system management policies and frameworks in public health systems, as well as uncertainty of the extent to which system-wide EI is linked to service quality, experience and value outcomes.<sup>8</sup> To address this issue, there may be potential for centralized approaches to support planned, coordinated efficiency improvement (EI) across healthcare systems and organisations internationally; however, evidence of such models in the literature is limited.<sup>8,10</sup> This results in a lack of guidance for individuals and teams involved in EI work at a whole of system level.<sup>8,18</sup> This further heightens the imperative for public health systems to understand how to undertake deliberate, coordinated action to improve efficiency.<sup>13</sup>

The Australian public healthcare system is distinguished by a complex array of funding and service responsibilities split between the Federal and State governments. Service cost and price are set independently at a Federal level, while State governments administrate funding and performance management for Local Hospital Networks within each state which manage delivery of tertiary care health services within their jurisdictions, with funding administered by State governments who are also responsible for their performance management.<sup>19</sup> The State Department or Ministry of Health acts as a statewide system management entity, utilizing policy and performance frameworks implemented to agree and monitor performance against activity and financial performance metrics.<sup>20</sup> These federal and state-based systems within the Australian public health system provide examples of centralized multi-state governance models which are explored in this study in the context of EI. As evidence for such centralized models in the literature is extremely limited in this context, the Australian system provides a unique opportunity to address this gap in the literature by exploring current practices for centralized EI at the whole of system level.

In the context of ever-increasing demand and constrained resources, there is an urgent need to understand how public health systems are responding to the contemporary challenges posed by increasing requirements for improved outcomes, experiences and efficiency.<sup>3</sup> To address the knowledge gap regarding how health systems may support EI practices, a document analysis was undertaken in the Australian healthcare system. The document analysis sought to identify how Australian public health systems centrally define and manage EI at the whole-of-system level through documented processes, priorities and performance requirements. This study aims to answer the research question "How is EI conceptualized and managed through policy and performance frameworks across central public health system management entities in Australia?"

This study contributes to the gap in the literature on whole-of-system approaches to EI by identifying and synthesizing definitions and approaches to system-wide, centralized EI in Australian public health systems. This provides a consolidated view of how efficiency is currently conceptualized, established as a strategic priority and centrally driven through performance management frameworks. The findings of this study can be applied to public health systems internationally within the context of value-based care, providing evidence for the importance of and scope for including

EI in the governance mechanisms by which healthcare organisations design and deliver services while driving improvements in outcomes gained for resources invested.

## Materials and Methods

Document analysis was selected due to its suitability for systematically searching and appraising health system documentation, such as strategic and policy documents, relevant to addressing the research question.<sup>21–23</sup> This study followed Altheide's approach to document analysis due to its application in contemporary healthcare document analysis studies, with the unit of analysis being any specific content relating to EI, measurement, support or conceptualization.<sup>23–25</sup> The study is reported using the Standard for Reporting Qualitative Research (SPQR) guideline.<sup>26</sup>

## Identification and document selection

To ensure all relevant data sources were searched, a list of departments and agencies meeting eligibility criteria was compiled with each identified source systematically searched. A list of search terms based on a recent literature review was agreed by the authors and applied by one author (JW) to each website to identify an initial range of documents for potential inclusion.<sup>8</sup> These terms included efficient/efficiency, value performance and finance/financial in combination with improvement and support. Each website was also hand-searched for potentially relevant documents. The list of websites searched is outlined in [Box 1](#) below:

The websites of the following organisations were searched to identify policy, strategic and framework documents relevant to centralized EI in public health systems. The search was restricted to Australian Federal and State public health administration entities. Key websites included central system management, performance and policy entities. Search terms included efficiency, value, performance and finance in combination with improvement and support. A timeframe of 2010 onwards was applied. Documents focusing on environmental rather than financial sustainability and documents classified as guidelines, plans and reports were excluded.

### Box 1 Search Strategy

1. NSW Health
2. NSW Health Agency for Clinical Innovation
3. NSW Clinical Excellence Commission
4. eHealth NSW
5. HealthShare NSW
6. Australian Government Department of Health
7. Australian Digital Health Agency
8. Australian Independent Hospital Pricing Authority
9. Australian National Health Funding Body
10. Victoria Department of Health (Previously Victoria Health and Human Services)
11. Safer Care Victoria
12. Queensland Health
13. Northern Territory Health
14. Western Australia Department of Health
15. Western Australia Health Support Services
16. South Australia Health
17. ACT Health
18. Tasmanian Department of Health
19. Grattan Institute
20. Australian Government Productivity Commission
21. Australian Health Research Alliance

## Eligibility Criteria

### Inclusion Criteria

Sources: Strategic, policy and framework documents which set out system governance and priorities from Australian State, Territory and Federal health system administration departments and associated agencies were eligible, as such entities lead strategic, policy and guideline setting across organisations within their broader systems.

Document type and publication date: Documents published from 2010 onwards were included to broadly align with the current paradigm of value-based healthcare and explore contemporary material. Documents labelled as policies, strategic plans and frameworks were included as these represent the instruments of health system management.

Content: Eligible content related to conceptualization of EI, principles and processes of improvement and alignment of EI with other strategic and service outcomes were included in the analysis.

### Exclusion Criteria

Documents originating from organisations supervised by State, Territory and Federal departments fitting the definition of Local Hospital Networks (LHNs) under the National Health Reform Agreement were excluded in order to maintain the focus of this study on centralized system-wide approaches, as central ministries and departments are responsible for system management of Local Hospital Networks under the Agreement.<sup>19</sup> As such, documents originating from single facilities within these broader geographical organisations were excluded. Reference guides, project plans, presentations and communications material were excluded in addition to documents without clear content relating to EI when examined were excluded.

## Data Extraction and Analysis

One author (JW) manually analyzed each document for content specifically referring to efficiency and extracted relevant information according to the eligibility criteria, with a data extraction record used to document findings. The following data were extracted: Organisation, system/service level, title, year published, document type, document function and core content relating to EI. The data extraction record was used to systematically analyze the data from each reviewed document. A second author (JB) independently conducted a manual analysis of the documents, with JB and JW meeting to compare results to validate the accuracy and comprehensiveness of the extracted data. A narrative synthesis approach was applied to the extracted data to address the research question, establishing key themes for structured exploration of extracted content.<sup>27,28</sup> The data extraction record enabled the analysis to proceed by grouping information specific to efficiency definitions and central support approaches in separate groups to address both elements of the research question. All data in each group were systematically examined and findings condensed into boxes to provide a concise representation of the complexity of data extracted. These findings were discussed and agreed upon by the authors prior to being finalized.

## Results

The search covered websites across 21 organisations, yielding a set of 53 documents, which the authors screened and collectively discussed to determine suitability for inclusion based on inclusion/exclusion criteria. One duplicate was removed. Forty-three documents from 18 organisations were included in the final review. Two documents were published in 2022, 13 in 2021, four in 2020, five in 2019 and 2018, three in 2017, five in 2016, three in 2015 and three in 2013. Twenty-three of the 43 included documents were classified as frameworks, while the remaining 20 documents were classified as strategic plans. The primary purpose of 20 documents was to outline organizational strategic priorities, nine were developed to improve or recommend capability in specific practice areas, 10 set out management frameworks and the remaining four set out business rules and legislative requirements for public health system administration.

## Characterizing Efficiency

Sixteen documents (30%) provided a definition of efficiency, while the remaining 32 (70%) did not. Efficiency measures were specified in just over half ( $n = 27$ ) of documents. Document focus areas related to EI were identified in almost all documents ( $n = 42$ ) and 33 documents referred directly to improving efficiency. Specific measures relating to efficiency were identified in

24 documents. Of the 21 organisations included in the study, relevant documents were included from 18 organisations, while searches of websites of the remaining five organisations did not identify any documents, with content specifying or related to EI at whole-of-system or centralized levels. Thirty-six documents were obtained from public health system management organisations, three from government health administration organisations, three from non-government organisations and two from public health system supporting organisations. A list of included documents is shown in Table 1 below:

## Defining Efficiency

Twenty definitions for efficiency were identified in total. Efficiency was defined using a range of terms, with no two definitions being identical or closely similar. This included variations in the definition between documents originating from

**Table 1** List of Included Documents

Document Source	Document Name	Year
NSW Agency for Clinical Innovation	Understanding program evaluation: An ACI Framework <sup>29</sup>	2013
NSW Agency for Clinical Innovation	Understanding the use of health economics: An ACI Framework <sup>30</sup>	2013
NSW Agency for Clinical Innovation	Knowledge management: An ACI approach <sup>31</sup>	2013
ACT Health	ACT Health Directorate Strategic Plan 2020–25 <sup>32</sup>	2019
ACT Health	ACT Health Governance Framework 2018–2023 <sup>33</sup>	2018
Australian Digital Health Agency	Australia's National Digital Health Strategy <sup>34</sup>	2017
Australian Department of Health	ADDENDUM TO NATIONAL HEALTH REFORM AGREEMENT 2020–2025 <sup>35</sup>	2020
Independent Hospital Pricing Authority	Pricing Framework for Australian Public Hospital Services 2022–23 <sup>36</sup>	2021
NSW Health Clinical Excellence Commission	Healthcare Safety and Quality Capabilities <sup>37</sup>	2021
NSW Health	NSW Health Analytics Framework <sup>38</sup>	2016
eHealth NSW	eHealth Strategy for NSW Health 2016–2026 <sup>39</sup>	2016
NSW Healthshare	HealthShare Strategic Plan 2020–2024 <sup>40</sup>	2020
NSW Health	NSW Health Commissioning for Better Value Strategy 2021–24 <sup>41</sup>	2021
NSW Health	Financial Requirements and Conditions of Subsidy (Government Grants) <sup>42</sup>	2021
NSW Health	NSW Framework for New Health Technologies and Specialised Services <sup>43</sup>	2018
NSW Health	Future Health: Guiding the next decade of care in NSW 2022–2032 <sup>44</sup>	2022
NSW Health	HEALTH PROFESSIONALS WORKFORCE PLAN 2012–2022 REVISED 2015 <sup>45</sup>	2015
NSW Health	RESOURCE EFFICIENCY STRATEGY 2016 TO 2023 <sup>46</sup>	2016
NSW Health	Corporate governance and accountability compendium- Section 7 Finance <sup>47</sup>	2019
Northern Territory Health	NT HEALTH WORKFORCE STRATEGY 2019–2022 <sup>48</sup>	2019
Northern Territory Health	Strategic plan 2018–2022 <sup>49</sup>	2018
Northern Territory Health	Service Plan 2021–22: NT Regional Health Services Plan <sup>50</sup>	2021
Northern Territory Health	Service Plan 2021–2022: Performance Framework <sup>51</sup>	2021
Queensland Health	Optimising the allied health workforce for best care and best value <sup>52</sup>	2019
Queensland Health	Destination 2030: Great Care for Central Queenslanders <sup>53</sup>	2017
Queensland Health	Queensland Health Performance and Accountability Framework 2020–2021 <sup>54</sup>	2020

(Continued)

**Table 1** (Continued).

Document Source	Document Name	Year
Queensland Health	System Outlook to 2026 for a sustainable health service <sup>55</sup>	2016
Queensland Health	Digital Health 2031: A digital vision for Queensland's health system <sup>56</sup>	2021
South Australia Health	SA Health Performance Framework <sup>57</sup>	2021
South Australia Health	State Public Health Plan 2019–2024 <sup>58</sup>	2018
Tasmanian Department of Health	Digital Health Transformation – Improving Patient Outcomes <sup>59</sup>	2022
Tasmanian Department of Health	Health Workforce 2040 <sup>60</sup>	2021
Tasmanian Department of Health	Tasmanian Health Service 2020–21 Service Plan (May 2021 Amendment) <sup>61</sup>	2021
Victoria Health and Human Services	Decision making framework for funding policy <sup>62</sup>	2016
Victoria Health and Human Services	Policy and funding guidelines 2020–21 Policy guide <sup>63</sup>	2020
Victoria Health and Human Services	CAPABILITY FOR INNOVATION AND IMPROVEMENT STRATEGY 2017–20 <sup>64</sup>	2017
Victoria Health and Human Services	Victorian health services Performance Monitoring Framework 2019–20 <sup>65</sup>	2019
Western Australia Department of Health	Clinical Services Framework 2020 Addendum <sup>66</sup>	2021
Western Australia Department of Health	2021–22 Key Performance Indicators (KPIs) and Targets <sup>67</sup>	2021
Western Australia Department of Health	Better health, better care, better value WA Health Reform Program 2015–2020 <sup>68</sup>	2015
Australian Health Research Alliance	AHRA: National Framework for Health Systems Improvement and Sustainability 2018 <sup>69</sup>	2018
Grattan Institute	Incentives for efficiency <sup>70</sup>	2021
Australian Government Productivity Commission	Efficiency in Health <sup>71</sup>	2015

the same organisation. Despite the variation in definitions, several common terms were identified. The term “resources” was identified in 10 definitions, “service” in six definitions, “deliver” in seven, “management” in three and “value” in two. Financial terms appeared in six definitions, with “cost” identified four times and “budget” identified twice. Additionally, two documents from the same organisation provided a related definition of value as “outcomes and experience relative to the costs of achieving them”.<sup>41,44</sup> All definitions identified in the analysis are shown in [Box 2](#) below:

## Improving Efficiency

42 of 43 documents contained approaches associated with improving efficiency at the whole of system level, of which 29 used the term efficiency directly. No comprehensive framework or approach for centralized public health system support or management of EI was identified. A range of high-level themes were identified including establishing strategic priorities, including efficiency in system performance management frameworks, improving infrastructure efficiency, driving change through funding models and financial incentives, data and analytics, staff capability development and use of evidence. Establishing efficiency and sustainability as strategic priorities was identified in six documents, as was establishing EI performance measures and targets. Specific digital enablement and workforce capability approaches to EI were identified in 13 documents. A summary list of approaches is provided in [Table 2](#).

## Establish Strategic Priorities for Improving Efficiency

The identification of EI as a strategic priority was identified at a federal level as a key reform principle as well as at a state level in documents from obtained from the Northern Territory, Queensland, Tasmania, New South Wales and Victoria. Recommendations were made for improving efficiency including development of models and methods to assess effectiveness, efficiency and cost-effectiveness of models of care as well as optimizing knowledge translation, scalability,

**Box 2** Definitions of Efficiency

- Allocation of resources to provide best outcomes<sup>71</sup>
- Cost effectiveness<sup>71</sup>
- Extent to which the inputs used to produce a given output are minimised<sup>71</sup>
- The right mix of health outputs is being produced<sup>71</sup>
- Delivering services within allocated budgets<sup>68</sup>
- Ensuring value for money<sup>68</sup>
- Achieving financial sustainability<sup>68</sup>
- Effectiveness and efficiency of outcomes and services against key indicators<sup>68</sup>
- Efficient and effective allocation of resources to deliver safe and cost-effective services<sup>65</sup>
- Ensuring best use of resources to further the aims of the organisation<sup>33</sup>
- Management of cost and environmental impact<sup>46</sup>
- Management of time and resources<sup>72</sup>
- Maximised service capacity and capability<sup>55</sup>
- Resource utilisation<sup>47</sup>
- Deliver the best value from available resources (Technical efficiency)<sup>29</sup>
- Making the right decisions about how to use resources to maximise health and wellbeing over time<sup>71</sup>
- Ensure the right combination and number of services are being achieved (Allocative efficiency)<sup>62</sup>
- Available resources are maximised to deliver sustainable, high-quality health care<sup>54</sup>
- The right care is delivered at a minimum cost and human and physical capital and technology are maintained and renewed, while innovation occurs to improve efficiency and respond to emerging needs<sup>61</sup>
- Resources are optimally used and managed to deliver sustainable, high-quality health care and services evidence strong financial accountability and sustained successful budget management<sup>57</sup>

**Table 2** Summary of System-Level Management Approaches to EI

Approach Theme	Specific Approaches Identified
Establish strategic priorities for improving efficiency	<ul style="list-style-type: none"> <li>• Establish efficiency and financial sustainability as strategic priorities<sup>35,44,49,53,61,63</sup></li> <li>• Deliver quality, cost and experience requirements concurrently by setting a whole-of-system focus driven at a local level<sup>66</sup></li> </ul>
Embed EI in performance management frameworks and measures	<ul style="list-style-type: none"> <li>• Establish EI performance measures and targets within performance frameworks<sup>42,47,54,57,65,67</sup></li> <li>• Establish planning and performance monitoring frameworks<sup>32</sup></li> <li>• Establish a central Performance, Reporting and Data division<sup>33</sup></li> <li>• Establish efficiency benchmarking and reporting standards<sup>68</sup></li> </ul>
Improve infrastructure efficiency	<ul style="list-style-type: none"> <li>• Provide cost-effective technological infrastructure<sup>34,39</sup></li> <li>• Develop a plan for effective and efficient physical resource use<sup>46</sup></li> <li>• Optimise digital human resource and patient information management systems<sup>60</sup></li> </ul>
Implement funding models and financial levers which support EI	<ul style="list-style-type: none"> <li>• Shift service design principles from outputs to outcomes and demonstrate alignment between investment and desired results<sup>41</sup></li> <li>• Implement activity-based funding model<sup>36</sup></li> <li>• Include efficiency savings in budget structure<sup>50</sup></li> <li>• Use price setting and grants to optimise resource allocation<sup>62</sup></li> <li>• Include financial incentives and/or penalties in pricing models<sup>51,69,70</sup></li> </ul>

(Continued)



**Table 2** (Continued).

Approach Theme	Specific Approaches Identified
Provide data, analytics and digital enablement for EI	<ul style="list-style-type: none"> <li>• Provide data insights to identify and measure opportunities<sup>40,59</sup></li> <li>• Supporting decision-making and reduce variability in care through provision of data and analytics<sup>48,52,56</sup></li> <li>• Develop a centralised analytics framework<sup>38</sup></li> <li>• Use digital approaches to workforce optimisation, waste reduction, expenditure visibility and communication<sup>59</sup></li> </ul>
Develop capability and skills for EI	<ul style="list-style-type: none"> <li>• Develop clinical, people management, leadership and financial management skills<sup>45</sup></li> <li>• Implement improvement frameworks for identification, sharing and implementation of best practice and associated work cultures<sup>55,64,69</sup></li> <li>• Provide a framework for health economics evaluation<sup>72</sup></li> <li>• Provide a framework for knowledge sharing<sup>31</sup></li> <li>• Establish workforce capability framework outlining efficiency-specific qualities and proficiency across roles and seniority<sup>37</sup></li> <li>• Provide a centralised framework to support decision-making for new health technologies<sup>43</sup></li> </ul>
Generate and apply evaluation and evidence for EI approaches	<ul style="list-style-type: none"> <li>• Consider existing projects to inform and scale future work<sup>41</sup></li> <li>• Identify optimisation-enabling factors including digital, workforce, funding, infrastructure and partnership in future planning<sup>55</sup></li> <li>• Invest in evaluation and evidence-building for cost-effectiveness of public health strategies<sup>58</sup></li> <li>• Provide a framework for evaluating projects and programs to determine outcomes gained for resources invested<sup>29</sup></li> <li>• Provide external recommendations for high-level EI opportunities including assessment models, effective governance and knowledge sharing<sup>69,71</sup></li> </ul>

implementation, adoption and diffusion of best practice.<sup>35,53</sup> It was suggested that collaboration with internal and external partners can build shared accountability for service deliverables, thereby promoting value with a focus on outcomes and sustainability.<sup>44</sup> Strategic priorities also supported EI through setting a strategic direction to establish a system-wide efficiency plans and performance measures to achieve efficient and sustainable services where these were not already in place.<sup>49,61,65</sup>

## Embed EI in Performance Management Frameworks and Measures

The inclusion of efficiency elements in performance management and system governance documents was identified in documents from the state public health systems of New South Wales, Queensland, South Australia, Victoria, Western Australia and the Australian Capital Territory. This included the specification of performance metrics, the service area each metric related to and the frequencies at which they were to be reported.<sup>42,47,57,65,67,68</sup> This was also supported by an overarching focus on effective resource allocation and utilization.<sup>54</sup> Use of a centralized function to coordinate and report on EI requirements across the public health system was identified as a driver of these functions.<sup>33,42</sup>

## Improve Infrastructure Efficiency

Improving the efficiency of infrastructure was a direction noted in documents arising from supporting agencies in New South Wales, Tasmania and the Australian Digital Health Agency with a specific digital, resource or workforce focus, as opposed to being identified in overarching strategic plans and performance frameworks arising from frontline service agencies. This included striving towards digitally enabled models of care and asset management to drive improved accessibility, quality, safety and efficiency.<sup>34,46</sup> Also included was the importance of providing information and communications technology which promotes workforce engagement, streamlines workflows and enables timely access to information.<sup>39,46,60</sup>



## Implement Funding Models and Financial Levers Which Support EI

A mix of state, supporting and independent advisory organisations across New South Wales, the Northern Territory, the Independent Hospital Pricing Authority, Victoria, the Australian Health Research Alliance and the Grattan Institute advocated for the use of funding models and levers to promote EI. Changing service design from outputs to outcomes was suggested as a fundamental shift towards efficiency.<sup>41</sup> Activity-based funding models were represented as a catalyst for improving efficiency up to a common standard.<sup>36</sup> Including efficiency savings in budgets was identified as a means to link EI and financial performance, while grants were recognized as a means to support smaller or unique services.<sup>50,62</sup> The use of financial incentives and penalties to encourage more efficient practices while discouraging less efficient practices was recommended from an independent advisory perspective.<sup>69,70</sup>

## Provide Data, Analytics and Digital Enablement for EI

Documents from supporting agencies promoted the use of data to provide insights and identify opportunities to improve and measure efficiency.<sup>40,59</sup> It was suggested that workforce optimization, reduced waste, visibility over expenditure, access to funding and staff communication could all be digitally enabled to promote EI.<sup>40</sup> In turn, decision-making could also be improved through access to data across areas including access, waste, variability, staffing and future planning.<sup>48,52,56</sup> One document from New South Wales suggested that consistent application of data insights could be supported through the use of a statewide analytics framework.<sup>38</sup>

## Develop Capability and Skills for EI

Documents from Queensland, New South Wales, Victoria and the Australian Health Research Alliance identified the need to develop workforce EI skills to identify and measure opportunities, use data and analytics and ensure consistent EI approaches across the system.<sup>38,55,56</sup> This included both clinical and financial management skills, supported by improvement frameworks and cultures.<sup>30,45,64</sup> Frameworks for knowledge management, quality and technology assessment were similarly presented.<sup>31,37,43</sup> The capability for collaboration and partnership-building was also identified as an enabler of EI.<sup>55,69</sup> Training and development in the use of EI implementation tools represents an additional focus area for central capability development.

## Generate and Apply Evidence for EI Approaches

South Australia, Queensland, New South Wales as well as federal and advisory agencies promoted the importance of generating and applying evidence for EI. This included the use of current and past projects to inform future work and the use of data to inform continuous improvement.<sup>41</sup> Understanding factors which are associated with EI and was considered within the context of evidence-based EI.<sup>55,58</sup> Three documents advocated and provided approaches for specific work towards building evidence for efficient and cost-effective practices.<sup>37,58,69</sup> The Australian Government Productivity Commission proposed detailed areas to investigate for EI opportunities on the basis of a comprehensive review including pharmaceutical subsidy review, technology assessment process review and sharing of assessment findings and including a safety and quality aspects in price-setting.<sup>71</sup> This study did not identify the application of any case studies or examples of centralized EI being used in practice for the purpose of informing future strategic or governance document development, representing an opportunity for future such documents to be informed by examples of previous evidence and experience.

## Discussion

Efficiency has been recognized as a pillar of health service quality and value for decades, with the link between resources used and outcomes achieved being well established as hallmarks of efficiency.<sup>4,73</sup> The theme of Australian public health systems seeking to achieve greater or improved health outcomes for resources invested by improving efficiency was a common theme across the strategic plans and system management frameworks included in this study, with 43 documents from 18 organisations making direct reference to improving efficiency. Only 3 organisations included in the document search did demonstrate efficiency-related content in documents matching the inclusion criteria. This

indicates that the strategic prioritization of EI and the management of public health systems in a way which drives EI at a whole of system level are commonly established within Australian public health organisations.

Despite this high-level consensus on the inclusion of EI in strategic plans and system management frameworks, the way in which efficiency is defined across the system-level documents of Australian public health organisations is highly variable. Not only was a standard definition not identified, no two organisations or even any two documents from the same organisation defined efficiency in the same terms. This is at odds with the literature, in which definitions for efficiency in the context of healthcare are reasonably consistent.<sup>8</sup> At a higher level, the conceptualization of efficiency is more consistent across the documents included in this study, with several core themes evident across the range of identified definitions including resource use, service delivery, management and finances. These align well with contemporary definitions of efficiency and its central role within value.<sup>4,8</sup> Additionally, the desired impacts of improved efficiency were highlighted across the range of definitions identified, demonstrating that the purpose of improving efficiency is to maximize the use of resources to deliver the right mix and amount of sustainable high-quality services.<sup>4</sup>

For a range of the public health organisations included in the study to formally prioritize EI, efficiency was specified as a strategic priority and was subsequently included in performance management frameworks, with performance measures and targets required to achieve this priority clearly articulated. These themes were apparent in six strategic plans and six management frameworks, respectively, from the set of documents included in this study. These represent enabling steps which set the course of action for public health organisations towards improving efficiency, thereby supporting the development and implementation of service agreements and specific actions aimed at meeting performance targets.<sup>17,20</sup> This also underpins the development of system-wide policy to set a balance between resource use and outcomes achieved.<sup>74</sup> Centralized performance teams and reporting processes were identified to drive EI at a whole of system level to meet specified efficiency-related strategic priorities and performance targets.<sup>20,75</sup>

The utility of funding levers for supporting EI was noted across seven documents. This was underpinned by linking resources invested with outcomes achieved, activity delivered and investment impact. Financial incentives, penalties and grants were identified as mechanisms to incentivize targeted efficiency improvements, as was including the realization of efficiency benefits as a part of operating budgets. This can allow public health organizations to direct the use of fiscal resources in a manner which promotes efficiency, prioritizes the achievement of efficiency targets and encourages increases in desired activity and/or reductions in low-value activity.<sup>76,77</sup> A challenge was also recognized in relation to linking outcomes with financial levers, as outcome-based performance measures require further development.<sup>44</sup> Four documents highlighted the pursuit of cost-effective infrastructure, physical resources and information management systems as directions for improving efficiency, providing further insights into the potential for EI to be driven at an organisation-wide level through effective information and asset management processes.<sup>12</sup>

Six documents recognized the requirement for public health organisations to develop EI capability and skills of their workforces. Key to this direction was the provision of data and analytics, highlighting the scope for digital enablement of EI. This included EI decision support, opportunity identification and performance monitoring. Beyond digital supports, workforce development directions also included management and leadership skill development, knowledge sharing frameworks and delineation of efficiency skills required across various levels of seniority. These approaches are likely to promote stakeholder engagement in EI processes by ensuring efficiency messaging is made relevant and accessible for clinical and management staff, promoting staff involvement in EI decision-making and providing evidence of improvements achieved.<sup>78,79</sup>

Further to the association between sharing knowledge of EI approaches and their performance with improved EI engagement, six documents identified actions aimed at generating and applying evidence for successful EI strategies. These included investing in evaluation of current and past projects to identify lessons to apply in the future and identifying factors which support EI such as digital enablement, funding, infrastructure and partnerships. The use of this information to inform future projects was recommended, while common opportunities for EI in health organisations were also identified. Such use of evidence to improve resource utilization and outcomes realization is a key element of value.<sup>4,10</sup> This also links with the theme of developing capability and skills for EI, with evidence for approaches which collectively improve cost, quality and experience linked with stakeholder engagement in EI strategies.<sup>80,81</sup>

While each definition of efficiency identified in this study was different, a range of common elements across definitions can be used to infer how efficiency is currently defined in practice. These included generally a focus on maximizing resource use to achieve the best and most appropriate health outcomes, concepts which align closely with how value is currently conceptualized and the inclusion of efficiency as a core element of value.<sup>4,73</sup> Public health organisations seeking to specify efficiency-related content in system-level documentation should align with these concepts when defining efficiency within their local context. Although efficiency is consistently defined in the literature, the wide variation in definitions used in practice identified through this research highlights a need for a consistent definition for efficiency in the context of public health systems to be used in practice. By consolidating the range of definitions identified through this study, we propose the following definition: the optimal use of resources to maximize and balance clinical, cost and experience outcomes.

With EI recognized as an integral component in addressing the challenge of meeting increasing demand for outcomes with limited resources, the generation and application of evidence to identify and implement EI approaches which have proven to be successful is likely to be a key enabling factor.<sup>3,12</sup> Public health systems and organisations internationally can establish EI as a strategic and operational priority by embedding a focus on efficiency in strategic plans, performance management frameworks and service agreements.<sup>16,20</sup> This can be extended to including EI-specific funding levers such as incentivization and grants, which can support organisations to direct resources and service delivery towards more efficient activities and away from less-efficiency and lower-value activities.<sup>82</sup> Public health organisations seeking to establish EI as a strategic priority can consider these approaches as tools to motivate and manage towards change, using system management instruments such as service level agreements, budget structures and performance management frameworks to implement change.

In addition to setting strategic, funding and performance management priorities for EI, this study identified three additional themes for supporting EI across the public health systems. These were providing data and analytics to enable EI, develop staff capability and skills for EI and generate evidence for EI. These three themes are closely linked and mutually supportive for two reasons. Firstly, developing and sharing EI knowledge, data and evidence in a digitally enabled manner can facilitate the use of this information across the system or organisation, allowing replication and scaling of successful approaches. Secondly, this can be further promoted by investing in developing the capability of staff at all levels across the organisation to understand, engage with and lead EI work using data and evidence as key enablers. As staff engagement with EI is a key factor in EI success, equipping staff with the skills, information and evidence to drive EI will be a key determinant of EI performance.<sup>8,83</sup> Specific digital health and workforce plans can set out key timelines and actions to deliver this support. These enabling factors can support public health systems to achieve sustainable efficiency improvements which also improve service quality and stakeholder experience.<sup>74</sup>

Although the structure of health systems varies internationally, the imperatives to improve value, respond to increasing demand pressures and ensure capacity for reform by maximizing outcomes achieved for resources invested are shared across many public health systems.<sup>3</sup> This comes with a caveat, as performance measures for outcomes are in their infancy and are likely to vary across systems.<sup>44,71</sup> As each public health system sets out its strategic planning and governance documents according to its unique structural, funding and service delivery requirements, the approaches identified in this study may be used to inform specific approaches for EI which may be included in these documents. The approaches to whole-of-system EI identified in this study are likely to be highly transferable across health systems internationally with the key themes of funding levers, digital enablement and workforce capability development being widely established areas of practice.<sup>8</sup> The importance of building and applying evidence for EI approaches specific to the unique attributes of international health systems will support EI success at a local level.<sup>13</sup>

## Conclusions

This study addresses the gap in evidence regarding the efficiency-specific content and tools to support EI practice identified in the strategic plans and system management frameworks of Australian public health systems. It is evident that efficiency is commonly held as a strategic and operational priority across Australian public health systems, with efficiency-specific directions identified in the system-level plans and frameworks from 18 of 21 organisations included in this study. While significant variation in individual definitions of efficiency was noted, most definitions related to the

use of resources to deliver services and outcomes. This provides further evidence of the role of efficiency within the current focus on value.

Health systems can establish improving efficiency as a whole-of-system priority through the inclusion of efficiency aims and performance targets within strategic plans and performance management processes. The use of funding levers such as incentives and grants, as well as the provision of cost-effective resource and information management processes can, be used to direct efforts towards specific outcomes, enable change and reduce waste. Health systems can enable their workforces to understand and work towards improved efficiency by developing skills and capabilities and by providing data and analytics to identify opportunities, support decisions and measure impact. Investing in the generation and application of evidence for approaches which improve efficiency can allow public health organisations to benefit from learnings and experience to drive future improvements. Through deliberate, well-supported and clearly articulated EI initiatives, public health systems can support the maximization of outcomes and value achieved for resources invested.

## Ethics and Data Sharing Statements

This research did not require review or approval by an institutional review board or ethics committee as all information used in this research was publicly available.

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## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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