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To cite this article: Julia M. Heberle, David S. Bedford, Christopher S. Chapman & Prabhu Sivabalan (10 Apr 2024): Developing enabling cost information during the COVID-19 crisis, Accounting Forum, DOI: [10.1080/01559982.2024.2326954](https://doi.org/10.1080/01559982.2024.2326954)

To link to this article: <https://doi.org/10.1080/01559982.2024.2326954>



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Published online: 10 Apr 2024.



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# Developing enabling cost information during the COVID-19 crisis

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## ABSTRACT

In this paper, we build upon the crisis literature and theorisation of enabling design principles to examine how cost information was calculated and used in response to the COVID-19 crisis in public hospitals in New South Wales (NSW) Australia. This study analyses how various actors sought to respond to demands for cost information that was immediate, intense, and dynamic as the pandemic unfolded. In response, we observed two costing processes emerging. One focussed on the immediate pandemic funding requirements whilst the second addressed future activity-based funding requirements. The crisis created a situation in which matters present in business-as-usual costing practice became more visible. The four enabling design principles help us to theorise the complex interactions between how cost information might be constructed differently to relate to different purposes relating to both internal and global transparency.

## ARTICLE HISTORY

Received 3 January 2023  
Accepted 2 March 2024

## KEYWORDS

Enabling control; health care costing; health care funding; COVID-19

## ACCEPTED BY

Massimo Sargiacomo and Anja Kern

## 1. Introduction

Prior literature clearly highlights the challenge of adapting accounting information and accountability processes during a crisis. Research has examined how accounting enabled (or impeded) organisational decision making (Colignon & Covaleski, 1988; Ezzamel & Bourn, 1990), and how control practices (Pasetti et al., 2021; Rikhardsson et al., 2021), such as budgeting (Becker et al., 2016; Makrygiannakis & Jack, 2016) were adapted and applied during periods of crises. Research also demonstrates the potentially complex shifts that crises can create in the ideology of accountability and control (Carr & Beck, 2023; Parker, 2020). Introducing themes arising from a recent special issue on the COVID-19 crisis, Leoni et al. (2022) draw out the importance of understanding how control practices designed for business-as-usual operating environments are adapted whilst under the pressure of a crisis situation. In a recent survey of practice, Ho et al. (2023) describe the COVID-19 crisis as creating a shock to transparency, finding that

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in their survey sample, organisations that were resilient to the crisis found ways to reconstruct a transparency of understanding of their strategy and operations.

In this paper, we will explore that challenge through a field study of how a public health system adapted its costing systems in response to the COVID-19 crisis. Costing systems address a core challenge in healthcare settings of meeting growing demand for healthcare services given aging populations and advances in medical technology, whilst providing a way to both contain spending, but also direct attention to where resources might achieve the best outcomes (Chapman et al., 2022). Their importance in healthcare settings is reinforced since the outputs of costing systems feed directly into a wide range of other management control practices, including pricing and remuneration mechanisms, budgets, and key performance metrics (Chapman et al., 2016).

It has long been understood the design and technical choices that make up a given costing system must be considered as more or less appropriate to chosen purposes and areas of strategic focus (Labro, 2018). A crisis is therefore an empirically important period to examine the construction and mobilisation of cost information since it provides a context where the assumptions underpinning cost calculations become more visible as they are debated and changed in response to the crisis in the effort to regain transparency. Research suggests that during crises there is greater emphasis placed on activity-based costing (ABC) information (Pavlatos & Kostakis, 2015; Reid & Smith, 2000), managers have more latitude to revise cost standards (Colignon & Covaleski, 1988), and that pressures on managerial attention can narrow the focus to just a subset of the information used during normal operating periods, or in the case of Kenno and Free (2018), a single cost item (labour cost per hour).

Sargiacomo (2015) examines how accounting classification schemes were constructed to inform emergency aid allocations following a natural disaster. While Sargiacomo (2015) demonstrates the effort required to collect the cost information to undertake reclassification in his study, there is an often-implicit assumption that either the needed cost information is already available (Kober & Thambar, 2021) or that minimal effort is required to assemble the required cost information (Passetti et al., 2021), and that it is just a matter of how that information should be mobilised. In summary, whilst the general principle that crises increase the demand for information that is relevant, timely and reliable, the extant literature emphasises that the interactions between shifting objectives, the availability and technical specification of cost information are a complex field of enquiry that would benefit from further detailed attention.

To shed light on these interactions in this paper we draw on the concept of enabling control (Adler & Borys, 1996). The four enabling design principles provide a theorised way to bring together the various challenges of visibility and purposes discussed above. Enabling control starts from a recognition of the inherent limits of any control system to neatly and completely capture emerging contingencies, and so design concepts of *repair* and *flexibility* must be carefully incorporated into both system design, and used to create an environment in which individual creativity and understanding can contribute to the successful control of the unexpected. Enabling control also relies on two further design principles that are intended to guide and shape how such individual creativity and control in a way that aligns them with centrally set objectives and priorities and also seeks to encourage coordinated actions between different parts of an organisation and its environment. So, a control system should be designed to provide *internal* transparency

– a clear understanding of the nature of particular processes and structures to be controlled by particular individuals. The control system should also be designed to provide *global transparency*, giving individuals an understanding of how they and their activities are part of an integrated whole.

The setting of our study is the public hospital system in New South Wales Australia during the COVID-19 pandemic between 2020 and 2022. This field study extends the extant literature by providing a detailed account of how the construction and use of cost information were adapted during the crisis following the dramatic overturning of business-as-usual practice. Using Adler and Borys (1996), we explain how the enabling design principles of *internal transparency*, *global transparency*, *repair* and *flexibility* allow us to make sense of the complex interactions between new and established purposes for cost systems and the technical challenges in producing and analysing cost data in support of them.

We find that during the crisis the demand for cost information was immediate, intense and dynamic as the pandemic unfolded. Within weeks, a new cost calculation process was established to secure additional funding each month while the existing hospital costing system was modified three times, initially for new reporting requirements and then twice for future budget and pricing model requirements. Over the two-year period, the demand for cost information was driven by two-time horizons, one focusing on the immediate requirements and the second focusing on future requirements and necessitated the use of two separate cost calculation processes.

Per Adler and Borys (1996), staff across the health system (*global transparency*) were given access to costing numbers, to understand why the cost information was calculated, and for ensuring the consistency of rationales communicated for the work being undertaken. *Internal transparency* was also critical, ensuring accounting teams across the system understood the required cost information and their purposes for being deployed, engaging with local clinical teams to ensure the same. Staff were then allowed to *repair* (deviate) from established systems.

Given that the granularity and availability of cost information is influenced by numerous factors, including the cost of costing (Christensen, 2010), a crisis situation might be expected to focus attention on matters that might not receive such detailed analysis under business-as-usual practice. During the pandemic, the cost of personal protective equipment (PPE), attracted considerable attention, and required changes to accounting practices. This requirement to calculate atypical cost information was also observed by Passetti et al. (2021) who noted ad-hoc processes were implemented to calculate pandemic-related costs. Combined, these requirements for atypical cost information, new cost calculation processes and the modification of existing cost calculation processes illustrates the cost accounting contribution to the intensification of accounting information during a crisis (Cohen et al., 2015; Hopwood, 2009).

It is necessary to have granular detail available, but also necessary to establish ways to filter and focus on what is immediately important. The enabling design principles help us to move from the specifics of this situation and assess the nature of the challenge being addressed in a more theoretically generalisable fashion. In particular, we see here the complex interaction between *internal transparency* and *global transparency* in establishing such filters and focus.

Overall, in these many ways we trace the design principles of *flexibility* and *repair* as the two accounting teams modified cost accounting processes, as the pandemic unfolded. In this manner, the addition of a new costing system, amplification of information to key stakeholders within the system and within specific teams, the deviation from established practice to meet costing needs and finally a willingness to allow variation in costing activity, fundamentally allowed NSW Health to navigate the pandemic crisis.

The remainder of this paper is organised as follows. The next section provides a brief overview of the cost accounting literature, examines the management accounting crisis literature and then summarises current knowledge. The following section explains the research method. Then the study empirics section includes an overview of the COVID-19 pandemic in Australia in general and NSW in particular, and the field study findings describe how cost information was calculated and used during the COVID-19 crisis in the public hospital setting drawing on the four enabling design principles to theorise this complex and shifting set of actions. This is followed by discussion and conclusions.

## 2. Theorising cost information in times of crisis

### 2.1. Management accounting and crisis

The extant literature suggests the demand for accounting information is intensified during a crisis (Cohen et al., 2015; Hopwood, 2009) with information required to quantify the extent of the crisis, identify potential solutions and mobilise the required response (Barbera et al., 2020; Passetti et al., 2021). The demand and intensification of accounting information use is particularly heightened if the very existence of the organisation is threatened (Pearson & Clair, 1998; Weick, 1988). The accounting information that feeds into core management accounting functions, such as budgeting and management control however is predicated on calculative practices that have emerged and developed over time (Colignon & Covalleski, 1988; Miller & Napier, 1993), and the literature suggests crises may challenge existing accounting information structures, analysis and reporting routines (Ahrens & Ferry, 2021; Ezzamel & Bourn, 1990). In some instances, the crisis may require new accounting information and reporting processes to be established (Sargiacomo, 2015; Sargiacomo et al., 2021). The literature also suggests crises may result in the use of a reduced range of existing accounting numbers to explicitly direct attention and action (Kenno & Free, 2018).

Management accounting practices provide the mechanisms through which to mobilise the required response, and depending on the nature of the crisis, different accounting practices may be mobilised across different levels of an organisation to link divisional operations with corporate requirements (Colignon & Covalleski, 1988). The mobilisation of management accounting practices however is not without tension as institutionalised practices may be challenged (Anesa et al., 2019), policy choices may be politically motivated (Bracci et al., 2015; Puxty, 1997), and difficult choices may need to be made between immediate requirements and long-term interests (Barbera et al., 2020; Nikidehaghani & Cortese, 2021). Studies have found that organisations with effective management

accounting practices prior to the crisis event may be better equipped to manage during a crisis (Barbera et al., 2020; Kober & Thambar, 2021).

Similarly, studies examining accounting systems during a crisis suggest the quality of the accounting system in place before the onset of the crisis also impacts an organisation's ability to manage during a crisis. Ezzamel and Bourn (1990) show how crises can expose the deficiencies of a system that were not apparent before the crisis. Historically orientated systems can be "caught off-guard by the speed of events" as the crisis unfolds (Ezzamel & Bourn, 1990, p. 411). While the literature suggests systems do adapt and evolve during a crisis, it is not always clear whether system changes were in response to the crisis or identified the existence of the crisis (Janke et al., 2014; Reid & Smith, 2000). Arguably though, management accounting systems provide the mechanism through which individuals are able to (un)learn and adapt accounting practices during a crisis (Busco et al., 2006).

A key area of interest for management accounting scholarship has been in relation to budgeting. Collins et al. (1997) reveal how strategy and budgeting behaviours change during crises, with prospector firms making greater use of budgets, while Becker et al. (2016) report that two key budgeting functions, planning and resource allocation became more important during a crisis whilst a third budgeting function, performance evaluation, became less important. Makrygiannakis and Jack (2016) found senior management initially demanded a consistent application of the existing budgeting practices, and as the crisis evolved, requested incremental modifications. Additionally, more time was spent on budgeting and proactive variance control, with budget revisions incorporating variance action plans. These changes resulted in a more intense budgeting practice that was pervasive throughout the organisation, shifted time horizons, and triggered a heightened awareness and reflection.

While many management accounting practices, including budgeting, are reliant on cost information, the specific role of costing information and how costing processes are adapted during a crisis has not received much detailed attention. The study by Colignon and Covalesski (1988) identified cost accounting as an area of contention as various levels of the organisation expressed different views about the required granularity of cost information. Later studies by Pavlatos and Kostakis (2015) and Reid and Smith (2000) found an increased use of cost accounting, but with limited insight as to how, when and why cost information emerged as important information. Further, contrary to the increased demand for accounting information during a crisis, Kenno and Free (2018) found that over an extended crisis period, the cost information used to guide decision making was reduced to only one cost measure. In other studies, references to the calculation and use of cost information are noted in passing as illustrated by Passetti et al. (2021, p. 1436) who stated that *ad-hoc* calculation of pandemic-related costs such as "sanitation costs, protective masks and additional shop entrance security, to a specific accounting item" involved the whole organisation or Kober and Thambar (2021, p. 1425) who noted that "[c]osting and performance information was available to answer questions".

Given the extant literature suggests crises usually result in an increased demand for accounting information and adaptations to existing management accounting systems, an in-depth examination of cost information is pertinent. This is particularly so in a public hospital setting where cost information underpins funding arrangements and health system management.

## 2.2. Cost information in hospital settings

Prior literature examining cost information in the hospital setting has studied the way in which costs are allocated (Arnaboldi & Lapsley, 2004; Cardinaels et al., 2004; Pizzini, 2006), the importance of costing standards (Chapman et al., 2014; Tan et al., 2011) and the impact healthcare system complexity has on the production of cost information (Cardinaels & Soderstrom, 2013; Labro, 2015).

In relation to cost allocation, studies have examined variations in the design of different allocation processes, such as volume-based costing (VBC), ABC and time-driven activity-based costing (TDABC) (Arnaboldi & Lapsley, 2004; Cardinaels et al., 2004; Keel et al., 2017; Krug et al., 2009; Labro, 2006). While the difficulty and cost of implementing ABC has resulted in a decreased interest in such techniques (Lawson, 2005), studies have found time-driven ABC approaches effective in allocating costs to particular patient cohorts (Balakrishnan et al., 2017; Donovan et al., 2014; Ippolito et al., 2016). The literature has identified that allocation of joint costs as particularly challenging in the hospital setting where clinical staff, especially nursing staff, care for multiple patients simultaneously (Maher & Marais, 1998), with Chapko et al. (2009) and Tan et al. (2009) indicating that clarity regarding the intended use of cost information is important for the effectiveness of cost system design choices.

Research suggests hospital costing standards and guidelines are usually developed by central authorities and typically reflect hospital funding or tariff pricing requirements (Chapman et al., 2014; Tan et al., 2011). Variation in costing standards across jurisdictions (Chapman et al., 2013; 2022; Vogl, 2013) however makes the comparison of cost results across hospitals for price setting and benchmarking activities difficult (Banker et al., 1998; Northcott & Llewellyn, 2003). The literature also highlights the complexity of the health ecosystem, with multiple reimbursement arrangements (Hsu, 2011), complex market structures (Krishnan & Yetman, 2011; Smet, 2002) and multiple institutional actors (Cardinaels & Soderstrom, 2013; Chua, 1995; Lehtonen, 2007). Variations in costing practices and the inherent complexity of the operational processes that costing represents are likely to make it difficult to adapt to rapidly changing circumstances.

## 2.3. Enabling design principles

Adler and Borys (1996) outline four principles that underpin an enabling logic of organisational system and procedural design. The first principle, *repair*, considers the ability of workers to deal with unexpected events and identify opportunities for improvement. Repairable systems encourage workers to discuss problems associated with systems or procedures and develop rules and standards that are relevant for real-world operations (Ahrens & Chapman, 2004). Further, mistakes or deviations are viewed as opportunities for further improvement or training (Brown et al., 2020). *Internal transparency* considers whether the key elements of a system or procedure, best-practice examples, and the underlying rationale of the system or procedure are visible to workers (Adler & Borys, 1996). Ahrens and Chapman (2004) suggest providing layered and easily accessible information is key to creating internal transparency.

The third principle, *global transparency*, considers whether workers have an understanding of the broader systems and procedures within which they operate (Adler &



Borys, 1996). Brown et al. (2020) suggest an understanding of the broader picture enables workers to identify improvement opportunities within their processes that may contribute to the overall system. The final principle, *flexibility*, considers how much discretion is available to workers to exercise their own judgement in relation to the system or procedure (Adler & Borys, 1996).

There has been discussion of how this conceptualisation relates to other prominent theorisations of control (e.g. Tessier & Otley, 2012). Perhaps a part of the reason for this interest in theoretical triangulation with other prominent frameworks, such as Simons (1994), arises from the ideological call to allow more space for individual creativity and emancipation that supports Adler and Borys (1996) original theorisation. However, since Ahrens and Chapman (2004) a growing empirical literature (Chapman & Kihn, 2009; Coyte, 2019; Jordan & Messner, 2012; Van der Hauwaert et al., 2022) has emerged that demonstrates the capacity of the enabling design principles to inform studies of control in situations where these ideals of emancipation are not present, with enabling control replacing the concept of enabling formalisation.

Taken together then, we argue that the four enabling design principles offer a coherently theorised way to address the challenges of suspending business-as-usual practice that confront costing systems in a crisis. The concept of enabling design is relevant at both the design and implementation of systems, and it captures both the necessity and intention to allow different actors in a situation to make sense of their positions and the available scope of action both individually and collectively. We will draw upon this theorisation in the analysis and presentation of field material that follows.

### 3. Research method

A field study was considered the most appropriate empirical method to examine how cost information was calculated and used during COVID-19 in the public hospital setting. Given the uniqueness of a pandemic and the complexity of the health system in general (Labro, 2015), a field study was determined to be a superior approach to gain an in-depth understanding of the phenomena of interest (Merchant & Van der Stede, 2006; Yin, 2018).

#### 3.1. Research site

Australia has a universal health insurance scheme with states and territories (states) responsible for managing public hospital services. The NSW Health entity includes the NSW Ministry of Health, Local Health Districts which are geographically organised public hospitals, Specialty Health Networks, Statewide Health Services, Shared Services and Pillar agencies (Document 23). In 2019–2020, the Health Cluster had an initial budget allocation of \$26.7b, of which \$24b was recurrent expenditure and \$2.7b capital expenditure (Document 37). Utilising a NSW Health standard chart of accounts, each entity maintains separate general ledgers, with consolidated financial statements comprising of the financial statements of the Ministry of Health (the Parent entity) and all other controlled entities after elimination of all inter-entity transactions and balances (Document 23).

As the Australian Government (also referred to as the federal or Commonwealth government) is responsible for income taxation (Duckett & Swerissen, 1996), states are



reliant on agreements with the Commonwealth to provide a significant portion of funds required for public hospitals (Biggs, 2018). Under the National Health Reform Agreement public hospitals are jointly funded using activity-based funding and block funding models<sup>1</sup> based on the National Weighted Activity Unit,<sup>2</sup> a volume measure applied to all casemix classifications, and the National Efficient Price<sup>3</sup> (Document 21). The National Hospital Cost Data Collection, which is coordinated by the Independent Health and Aged Care Pricing Authority, is the source data for National Weighted Activity Unit and National Efficient Price calculations.

A unit within NSW Health is responsible for coordinating the hospitals' clinical costing submissions (Guideline 22). This clinical costing information is the source data for the NSW submission to the National Hospital Cost Data Collection and the NSW State Efficient Price calculation for activity-based funding budgets each year. The Independent Health and Aged Care Pricing Authority in collaboration with the state health departments is responsible for developing and maintaining national hospital costing standards. The unit within NSW Health, in consultation with the Local Health Districts/Specialty Health Networks, adapts the standards and provides practical guidance for the NSW operating environment.

Activity-based funding payments from the Commonwealth and the State governments to Local Health District/Specialty Health Networks are processed by the Administrator through the National Health Funding Pool accounts each month. At the end of each financial year, the Administrator completes a full reconciliation with wash ups processed the following year (Document 20).

### 3.2. Data sources

Following ethics and governance approvals, archival and interview data was collected between July 2021 and April 2022. A total of 52 semi-structured interviews were conducted with 46 participants who were either directly involved in producing, reporting, or using cost information, or who were able to provide additional contextual operational information. Interview participants included officers, middle managers and senior executives drawn from NSW Health entities, NSW Treasury, Independent Health and Aged Care Pricing Authority, the National Health Funding Body and an external consultant. While the arms-length recruitment process minimised pressure on individuals to participate in the study, the approach to individual staff members may have resulted in some selection bias. This limitation was mitigated by asking participants whether there were other staff that might have interesting insights that would contribute different perspectives. This invitation resulted in five interviews.

The interviews coincided with the emergence of the Delta variant outbreak, the ramping up of the vaccination program and then the emergence of the Omicron variant outbreak.

<sup>1</sup>Further details regarding the National Health Reform Agreement, activity-based funding and block funding models is available at <https://www.ihacpa.gov.au/>

<sup>2</sup>National Weighted Activity Unit (NWAU) is the unit of count for health service activity and is based on the clinical complexity of patients and legitimate variations in cost. The "average" hospital service is equivalent to one NWAU (Document 22).

<sup>3</sup>The National Efficient Price is the price set by the Independent Health and Aged Care Pricing Authority, and determines the Commonwealth share of funding to the states for public hospital services funding on an activity-based funding basis (Document 22).

To address concerns regarding interviewee recall bias (particularly relating to the early period of the crisis), archival documents, emails, calendar appointments and mobile phone text messages to confirm events, dates and actors were accessed during interviews.

This study may have also been limited by confirmation bias, as the researcher undertaking the interviews, is a NSW Health employee with more than twenty years' experience in clinical costing, and may have consciously or unconsciously drawn on information that is consistent with personal thoughts and views. Further, participants, many of whom are well-known colleagues, may have assumed this researcher knew all the relevant information. During the interviews, a conscious effort was made to ask participants to explain events or issues for the record, especially when they had made statements to the effect that "well you know what happened".

The semi-structured interview questions explored participants professional background and work experience, their use of cost information prior to the pandemic, when and how COVID-19 impacted the information they used, changes they needed to implement, reflections on what could have been done differently, and what lessons should be remembered for post-COVID-19 operations.

All interviews were conducted virtually, lasted an hour on average and were recorded. Interviews were initially transcribed using an audio transcription service and then checked against the audio recording with corrections made as required. Transcripts were sent to participants for review. A summary of the interviews conducted and the archival data is shown in [Tables 1](#) and [2](#) below.

Archival documents and interview transcripts were analysed and coded using Nvivo 11. The initial analysis employed an expansive open coding and identified four preliminary themes: the use of cost information early in the pandemic, the National Partnership on COVID-19 Response and the calculation of additional cost, how clinical costing processes were adapted during COVID-19, and the impact of COVID-19 on cost structures in the post-pandemic environment. Each of these preliminary themes was further analysed to identify key issues and sub-issues raised by participants. The final coding framework, primarily inductively derived from the transcripts and archival documents, was also informed by cost accounting literature with the inclusion of codes such as "Detail" and "Timeliness" (Pizzini, 2006). Code definitions, including inclusions and exclusions, were developed to ensure they were consistently applied, and coding reviews were undertaken to check text coding was consistent with definitions.

## **4. Developing enabling cost information during the COVID-19 crisis**

This section presents details from our field study of how cost information was calculated and used during the COVID-19 pandemic. A brief synopsis of the COVID-19 pandemic in NSW is first outlined to provide contextual background.

### **4.1. The COVID-19 pandemic**

Following the first Australian COVID-19 cases in mid-January 2020, the Australian government progressively introduced travel bans and quarantine requirements, culminating in the closure of borders to all foreign nationals in late March 2020 (Stobart & Duckett, 2022). Public health orders at first limited then banned public gatherings and restricted

**Table 1.** Interview details.

Interview No	Organisation	Interviewee Title*	Interview Duration (mins)
01	Ministry of Health	Director	64
02	Ministry of Health	Director	55
03	Ministry of Health	Director	50
04	Ministry of Health	Executive	47
05	Ministry of Health	Executive	52
06	Local Health District	Manager	59
07	National Body	Director	58
08	National Body	Director	58
09	Ministry of Health	Executive	57
10	National Body	Director	53
11	National Body	Director	55
12	Ministry of Health	Executive	58
13	Local Health District	Director	56
14	Statewide Health Services	Director	66
15	Statewide Health Services	Executive	49
16	Other NSW Agency	Director	59
17	Shared Services	Executive	56
18	National Body	Director	52
19	Ministry of Health	Officer	51
20	Ministry of Health	Director	56
21	Ministry of Health	Executive	52
22	Ministry of Health	Executive	57
23	Ministry of Health	Executive	57
24	Ministry of Health	Manager	93
25	Ministry of Health	Director	49
26	Statewide Health Services	Manager	60
27	Shared Services	Executive	58
28	Shared Services	Director	55
29	Ministry of Health	Manager	59
30	Ministry of Health	Executive	56
31	Pillar Agency	Director	56
32	Ministry of Health	Director	52
33	Local Health District	Director	58
34	Local Health District	Manager	64
35	Consultant	Director	54
36	Ministry of Health	Officer	56
37	Ministry of Health	Manager	68
38	Ministry of Health	Manager	74
39	Local Health District	Director	54
40	Ministry of Health	Manager	73
41	Pillar Agency	Director	29
42	Local Health District	Manager	59
43	Local Health District	Officer	73
44	Ministry of Health	Director	42
45	Ministry of Health	Director	48
46	Local Health District	Manager	28
47	Ministry of Health	Officer	59
48	Local Health District	Manager	49
49	Local Health District	Director	38
50	Local Health District	Manager	45
51	Local Health District	Officer	58
52	National Body	Executive	58

\* Interviewee Titles are generic to protect participant anonymity.

non-essential activities and business (Media Release 3). Non-urgent elective surgery was suspended on 26 March 2020 to free up hospital beds for the expected influx of COVID-19 patients and to preserve PPE supplies (Interviews 22 and 31).

A Public Health Emergency Operations Centre was established by NSW Health to lead the public health response, while the State Health Emergency Operations Centre oversaw

**Table 2.** Archival documents.

Year	Author	Document	Type
2020	Australian Government	Document 1	Public
2020	Australian Government	Document 2	Public
2021	Australian Government	Document 3	Public
2020	National Body	Document 4	Controlled
2020	NSW Health	Document 5	Controlled
2020	NSW Health	Document 6	Controlled
2020	NSW Health	Document 7	Controlled
2020	NSW Health	Document 8	Controlled
2020	NSW Health	Document 9	Controlled
2020	NSW Health	Document 10	Controlled
2020	NSW Health	Document 11	Controlled
2021	National Body	Document 12	Public
2021	National Body	Document 13	Public
2021	NSW Health	Document 14	Controlled
2022	National Body	Document 15	Public
2021	National Body	Document 16	Public
2022	NSW Health	Document 17	Public
2020	Parliament of New South Wales	Document 18	Public
2020	NSW Health	Document 19	Public
2020	Australian Government	Document 20	Public
2019	National Body	Document 21	Public
2019	Ministry of Health	Document 22	Controlled
2020	NSW Health	Document 23	Public
2019	NSW Health	Document 24	Public
2021	NSW Health	Document 25	Public
2022	NSW Health	Document 26	Public
2021	NSW Health	Document 27	Public
2022	NSW Health	Document 28	Public
2022	NSW Health	Document 29	Public
2022	NSW Government	Document 30	Public
2019	Australian Government	Document 31	Public
2021	National Body	Document 32	Public
2021	National Body	Document 33	Public
2023	NSW Health	Document 34	Controlled
2021	National Body	Document 35	Public
2023	NSW Health	Document 36	Controlled
2019	NSW Treasury	Document 37	Public
2021	NSW Health	Document 38	Public
2023	NSW Health	Document 39	Public
2020	National Body	Document 40	Public
2016	NSW Health	Document 41	Public
2020	Australian Government	Document 42	Public
2019	National Body	Document 43	Public
2020	National Body	Document 44	Public
2021	National Body	Document 45	Public
2020	NSW Health	Guideline 1	Public
2020	NSW Health	Guideline 2	Public
2020	NSW Health	Guideline 3	Public
2020	National Body	Guideline 4	Public
2020	National Body	Guideline 5	Controlled
2020	National Body	Guideline 6	Public
2020	NSW Health	Guideline 7	Controlled
2021	National Body	Guideline 8	Controlled
2020	NSW Health	Guideline 9	Controlled
2020	NSW Health	Guideline 10	Controlled
2021	NSW Health	Guideline 11	Controlled
2020	National Body	Guideline 12	Public
2021	NSW Health	Guideline 13	Public
2020	NSW Health	Guideline 14	Public
2020	NSW Health	Guideline 15	Public
2020	NSW Health	Guideline 16	Public

*(Continued)*

**Table 2.** Continued.

Year	Author	Document	Type
2004	NSW Health	Guideline 17	Public
2021	NSW Health	Guideline 18	Controlled
2021	National Body	Guideline 19	Public
2020	NSW Health	Guideline 20	Controlled
2020	NSW Health	Guideline 21	Controlled
2013	NSW Health	Guideline 22	Controlled
2021	National Body	Guideline 23	Controlled
2020	NSW Government	Media Release 1	Public
2020	NSW Government	Media Release 2	Public
2020	NSW Government	Media Release 3	Public
2022	Australian Government	Media Release 4	Public
2020	NSW Government	Media Release 5	Public
2020	Australian Government	Media Release 6	Public
2021	Australian Government	Media Release 7	Public
2021	Australian Broadcasting Corporation	Media Article 1	Public
2020	NSW Health	Spreadsheet 1	Controlled
2020	NSW Health	Spreadsheet 2	Controlled
2020	NSW Health	Spreadsheet 3	Controlled
2020	NSW Health	Spreadsheet 4	Controlled
2020	NSW Health	Spreadsheet 5	Controlled
2020	NSW Health	Spreadsheet 6	Controlled
2020	NSW Health	Spreadsheet 7	Controlled
2021	NSW Health	Spreadsheet 8	Controlled
2022	NSW Health	Spreadsheet 9	Controlled
2020	NSW Health	Spreadsheet 10	Controlled

hospital clinical operations, workforce and procurement strategies (Document 38). Emergency Operation Centres were established in Local Health District/Specialty Health Networks to guide local implementation of statewide directives and initiatives, coordinate communication with staff and the local community and manage procurement (Interviews 13, 49).

The expected surge in COVID-19 cases did not materialise, resulting in significantly reduced hospital activity in April and May 2020, and a staged resumption of elective surgery commenced in late April (Document 25). By the end of calendar year 2020, NSW had reported 4,782 COVID-19 cases (Document 26).

The COVID-19 vaccination program commenced in February 2021. In mid-June 2021 the Delta variant emerged and resulted in over 75,000 COVID-19 cases (Document 27), this time placing significant demands on admitted, emergency department and non-admitted hospital services (Interview 30). NSW Health launched a rapid escalation of the vaccination program to mitigate the spread of the Delta variant, and by December 2021, 94 per cent of the NSW population aged over 16 years had received at least two doses (Document 26). The Omicron variant emerged in early December 2021, resulting in more than a million cases in three months, and significant demand for non-admitted services into early 2022 (Documents 28 and 29). By 30 June 2022, NSW had reported a total of 2.6 m COVID-19 cases (Document 30).

#### **4.2. Using cost information to manage during COVID-19**

Australian governments rapidly realised in early March that state health systems would require additional funding quickly to respond to the emerging crisis, and on 13 March 2020 the National Partnership on COVID-19 Response (hereafter the

Funding Agreement) was signed. The Funding Agreement provided set the general terms for providing funding to diagnose, treat and prevent the spread of COVID-19 (Document 1).

The initial Funding Agreement identified two payment types to fund additional costs. A *Hospital Services Payment* for the diagnosis and treatment of activity-based funding eligible patients with or suspected of having COVID-19, and a *State Public Health Payment* for the diagnosis and treatment of activity-based funding ineligible patients with or suspected of having COVID-19, and for other activities related to managing the outbreak. The Funding Agreement was amended in April 2020 to include Private Hospital Viability Payments<sup>4</sup> and again in February 2021 to include COVID-19 vaccination payments (Documents 2 and 3).

Leveraging National Health Reform Agreement governance arrangements to expedite the distribution of funds, the Funding Agreement established the Administrator, National Health Funding Pool, as the authority responsible for determining what constituted COVID-19 response activities. Each month, states were required to submit estimates for the following month of Hospital Services Payment costs (expressed as National Weighted Activity Units), State Public Health Payment related costs, and after February 2021, the number of vaccination doses to be delivered. Based on these monthly estimates, the Administrator advised the Commonwealth Treasurer of the additional funding required and processed payments through the National Health Funding Pool accounts. Ninety days after the end of each financial quarter, states were required to submit Hospital Services Payment actual activity and estimated actual cost data, State Public Health Payment activity and cost data and vaccination activity data to enable the Administrator to reconcile monthly estimates with actuals. Adjustments for over or underpayments for the quarter were then applied to subsequent monthly estimate payments as required.

The Funding Agreement provided the overall context in which cost information would form the basis of funding distributions. But as it was hastily written, given the urgency of the situation (Interview 32), it presented significant accounting operationalisation challenges. Careful and strategic parsing of the terms “additional cost”, “responding to”, “patients with COVID-19” and “efforts to minimise the spread” was collaboratively undertaken by national and state authorities to develop the required rules and standards necessary for activity and cost reporting processes to inform the newly introduced Funding Agreement. The teams responsible for patient data collection and reporting led the work to rapidly expand existing datasets to include variables for the diagnosis and treatment of patients with or suspected of having COVID-19 and ensured these requirements were widely distributed across NSW Health staff (Guidelines 1, 2, 3; Interviews 3, 47). This data provided the required information for the monthly Hospital Services Payment National Weighted Activity Unit estimates and quarterly actual activity submissions.

As quickly as these changes took place, there was a disconnect between the requirements imposed by the Administrator and the ability of local authorities to submit cost information necessary to make the Funding Agreement operational. Most state costing

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<sup>4</sup>The Private Hospital Viability Payment enabled states to purchase private hospital services or capacity as required and ensured private hospitals would remain financially viable and able to resume normal operations after the pandemic. State health authorities acted as intermediaries for the Private Hospital Viability Payment (Document 2).

systems were constructed to provide annual or, at best, semi-annual cost submissions. As one executive noted:

I don't think that any state in the country was set up to do quarterly costing or had the capacity at that time to do quarterly costing, so some of the rules and requirements were contrary to the system's ability to respond and [...] comply with it. (Interview 9)

While the existing costing system could not be quickly adapted to meet the new reporting demands, there was sufficient flexibility for costing teams to try and modify established costing practices on the run, in response to the new reporting requirement. In the previous year, a working group had been developing cost models to support monthly cost reporting. While the development work had not yet been finalised, the team responsible for clinical costing submissions organically repurposed this work to construct monthly estimated actual costs for the quarterly reconciliations, and to assess the adequacy of the National Efficient Price for pricing COVID-19 episodes. While the cost model did not produce cost results at a patient level, it could estimate aggregate costs and identify material cost movements between patient types and between cost pools (Document 5 and Guideline 20). When the expected influx of COVID-19 patients did not materialise and early concerns regarding the adequacy of the National Efficient Price for COVID-19 patients receded, and, as it became apparent other states would not be submitting estimated actual cost data each quarter, the requirement for monthly cost modelling became less urgent, and ceased in August 2020. To this end, NSW Health exhibited a level of flexible responsiveness that was out of the ordinary.

At the same time, Health Entity accountants were actively involved in their local Emergency Operation Centre discussions. This involvement enabled accountants to understand emerging COVID-19 initiatives so relevant inputs could be identified and rules and procedures for classifying clinical activities into cost accounts and models could be developed. Having such a close involvement facilitated greater operational transparency to generate valid and reliable cost information, especially for services that had never previously been provided such as hotel quarantine, mass swabbing clinics and vaccination centres (Interviews 13, 15, 22, 39 and 49). Accounting teams also needed to be nimble and make efforts to be aware of changes to existing operational models in determining whether additional costs would be incurred. For example, the creation of hot and cold zones in emergency departments, to separate suspected from non-COVID-19 patients required additional staff, as transferring COVID-19 patients from the emergency department to a ward required two ward assistants, with one to push the bed and the other to make sure bystanders were kept at a safe distance (Interview 34).

Drawing on advice from Health Entity accountants and discussions with the Administrator, senior Ministry of Health accountants iteratively developed reporting guidelines that defined additional cost, COVID-19 response activities and mechanisms for capturing costs in general ledgers. A standard reporting template was developed for Health Entities to submit their additional costs each month to the Ministry of Health. These templates provided greater clarity and visibility as to what costs needed to be collected and how they should be reported. They also demonstrated the connection between the need for more frequent, updated and flexible reporting and alternate cost calculations to secure additional funding when deviations from normal practice occurred. Monthly reporting of COVID-19 costs commenced for the month of April 2020.



There were, of course, challenges. The conceptualisation of additional costs was particularly difficult to understand and capture. Additional cost was explained using “Incremental” and “Base” cost constructs. Incremental expenses were additional expenditures incurred because of the pandemic and included cost categories not previously incurred or incremental to what would have likely been incurred absent COVID-19. Base costs referred to expenditures that would otherwise be recorded in the general ledger and existed as the “base” from prior year even though the nature of the expense was redirected to accommodate or respond to COVID-19 (Guideline 10).

To capture the COVID-19 expense, general ledger processes were modified to incorporate a combination of Project Codes (PCodes), and expenditure categories referred to as sub-packages were established. Four PCodes were created to tag COVID-19 expense in the general ledger, and some sub-ledgers at the account level, for incremental operating expenditure, base costs, capital expenditure and vaccinations. The guideline required cost centres to be established exclusively for booking COVID-19 expenditure to follow a standard COVID-19 naming convention to enable assignment of an appropriate default PCode to all accounts. There was significant flexibility in the creation of sub-packages to capture COVID-19 response initiatives as the pandemic evolved, with the number of sub-packages expanded from an initial list of 24 to 77 in 2020–2021, with a reduction to 57 by the end of 2021–2022.

Following month end, each Health Entity would extract the general ledger data based on the PCodes, map the expense to the relevant sub-package based on the guidance document definitions, and upload the data to COVID-19 reporting template (Interviews 16, 20, 23 and 36). The template also included the ability to adjust each entity’s revenue, which was important for facilitating internal budget forecasts and cash management practices. Based on the monthly submissions, and following appropriate checks, Health Entities would receive additional budget allocations the following month (Interview 21). The consolidated expense results were used as the basis of the monthly Funding Agreement cost estimate submissions to the Administrator (Interviews 16 and 36).

Limits to the flexibility of existing systems to account for incremental and base costs posed several challenges. First, while purchase orders could be processed with the PCodes, staff roster and payroll systems were unable to incorporate PCodes. This meant that unless staff were paid directly from a COVID-19 cost centre with the default PCode enabled, manual journals were required to PCode salary and wage expense to the COVID-19 incremental or base PCode. The rapid changes in clinical operations, particularly in late March and April 2020 as elective surgery and outpatient clinics were cancelled and hospital wards were reconfigured for the expected influx of COVID-19 patients, meant many staff were redeployed from their usual role. Correctly identifying which staff were backfilled (incremental), as opposed to just redeployed without being backfilled (base), and the speed with which these changes occurred, made the identification of incremental and base costs problematic (Interviews 14, 21, 23 and 33). Further, the number of staff involved in correctly capturing this information across such a large system (Interview 25) meant it took time for staff to identify and correctly code costs as base or incremental (Interview 28). Significant formal and informal communication (e.g. meetings, phone calls, emails, documentation) was required to make as transparent as possible the rules and processes, ensuring all staff understood the requirements.

Second, what constituted additional cost was subjective and open to interpretation. For example, additional costs relating to information technology (IT) generated considerable debate early in the pandemic as services pivoted to a virtual environment. Eventually, IT costs associated with changes for intensive care units were classified as additional costs for example, while the additional cost of laptops for staff to work from home was excluded as it was argued providing staff with the resources to work is a part of normal operating costs (Document 4). In other instances, the calculation of additional cost adopted a rudimentary approach (Interview 9) with 2018–2019 expense providing a baseline from which to calculate additional cost (Document 1 and Guideline 8).

Finally, the accounting standards sometimes made the calculation of additional cost contentious. When the mass vaccination centres were established in mid-2022, several building leases were entered into which, based on accounting standards, should be classified as capital. Under the national hospital costing standards however, this classification would exclude this cost from cost per dose calculations. One executive stated:

I'm [...] fighting with accounting standards around what's capital, what's not capital [...]. But all I want to do is gather all of those costs because they're a cost, regardless of how you define them [...] that's incurred as a result of having to establish these centres, and [...] they are short-term in nature, and we need to get reimbursed for them. (Interview 9)

The requirement to report the PCode incremental expense by sub-package highlighted the importance of cost centres. While the financial guidance document detailed a standard naming convention, there was no guidance regarding when to open a COVID-19 cost centre. Depending on local accounting practices, some Local Health District/Specialty Health Networks created only a few COVID-19 cost centres whilst others created numerous cost centres (Interviews 23, 33, 34 and 43). The structure of the cost centres however was important for transforming the extracted general ledger PCode data into the required sub-packages in the monthly reporting template. Accounting staff observed that it was particularly challenging when cost centres needed to be split into more than one sub-package (Interview 20) and that the reporting quality was greater for those Local Health Districts that had more cost centres (Interview 23). This divergence in how local accounting practices were adapted demonstrates the problems of ensuring global transparency when there are significant and complex variations in internal accounting processes between entities.

Some Health Entities refined cost centres as sub-packages evolved, when for example, in 2021 COVID-19 clinic costs had to separately report drive through and pop-up clinics from clinics operating on hospital campuses. In other instances, the refinement of cost centres was driven by internal Local Health District/Specialty Health Network needs when the sheer scale of the initiative, such as the vaccination clinics, made the use of only one cost centre untenable for managers (Interview 33).

The system of PCodes, accounts, cost centres and sub-packages established to calculate monthly additional cost was critical for securing additional funding for NSW Health. The monthly reporting of additional cost, as well as changes in revenue, was key for maintaining the NSW Treasury mandated cash buffer given the usual yearly cashflow patterns were disrupted with large, atypical expenses (such as PPE), Funding Agreement revenue, and spikes in expenditure during outbreaks (Interview 44). The focus on

additional cost however came to mean additional funding, and with no funding incentive, the identification of base cost was limited (Interview 4). This along with the focus on sub-package expense, made the calculation of the total cost of resources deployed to respond to COVID-19 difficult to quantify and presented challenges for the clinical costing process.

#### ***4.3. Adapting clinical costing processes during COVID-19***

While the modelled estimated actual cost information was ultimately not required by the Administrator for quarterly reconciliation, it unequivocally demonstrated the significant effect decreases in activity in March and April 2020 were having on average cost results. Noting the potential ramifications for future State Efficient Price and National Efficient Price calculations, the NSW Health clinical costing team's focus had to quickly shift to adapting the clinical costing process a second time to mitigate the limitations of the existing two stage reciprocal VBC method. To this end, various options were canvassed and internally "sense-checked". A first approach contemplated separately costing unutilised and utilised capacity in hospital areas most effected by activity decreases. Leveraging TDABC utilised and unutilised resource concepts (Kaplan & Anderson, 2004), a pre-COVID-19 and COVID-19 capacity utilisation rate was calculated using actual output divided by potential output. The difference between these two rates was applied to relevant cost pools to create two cost pools that could be separately allocated (Document 9). While this approach was conceptually superior, and successfully tested in a small hospital, it was not pursued as it was agreed it was too difficult to implement in the larger and more complex hospitals. The pragmatic applicability of the costing system had to be considered prior to pursuing a workable option.

A second approach explored better measuring the impact of reduced activity by splitting the financial year into two separate costing periods: the pre COVID-19 and the COVID-19 months. Concerns regarding the impact of reduced activity on average cost results were also raised by other states during national consultations to develop National Hospital Cost Data Collection COVID-19 costing guidelines (Document 10). While the Guideline required COVID-19 standby/unutilised costs to be separately identified, there was no guidance provided as to how this could be practically or technically implemented. The Guideline also recommended

[T]wo distinct costing periods in the 2019-20 financial year – business as usual and COVID-19 response. The commencement of the COVID-19 response costing period should be determined at a local level depending upon when hospital operations were impacted. (Guideline 6, p. 6)

Based on the activity profile, the NSW clinical costing unit determined July 2019 to March 2020 as the business-as-usual (BAU) period and April to June 2020 as the COVID-19 period (Document 13), to calculate separate average cost per National Weighted Activity Unit for the BAU period, the COVID-19 period and for the full financial year.

These were innovative approaches constructed quickly and nimbly. Creating costing periods within a financial year had never been contemplated before and required significant adaptation of clinical costing tools, costing system setups, and reporting processes.

The application used to extract general ledger data was enhanced to produce a separate extract for each costing period, and a general ledger analytical tool was developed to assess the consistency of monthly average balances at a cost centre and account code level to determine if there were expenses that needed to be prorated across the two periods, with year-end adjustments booked in June of particular interest (Guideline 7). However, it was not just the year-end adjustments that required examination. Many COVID-19 clinics were established in the last week of March 2020, and due to the fortnightly payroll routine, there were no salary and wage accruals for staff working in clinics with new cost centres as the accrual calculation process does not include new cost centres (Document 11).

The general ledger analysis indicated that monthly balances in the nine-month costing period were quite stable however there were some material adjustments in the three-month costing period (Interview 43). Some of these adjustments were due to the definitional changes by the Administrator which required accounting teams to reverse initial incremental and base cost PCode postings (Interviews 6 and 46). The detailed general ledger knowledge developed by the costing staff during the monthly cost modelling submissions proved invaluable in this general ledger analysis.

Overhead allocation statistics that had long been accepted and assumed, needed to be reviewed and adjusted for the two costing periods. Full time equivalent (FTE) statistics used in overhead allocation processes required particular attention as FTE calculations were derived from a sub-ledger that did not incorporate the PCodes. Allocation rules were also updated to ensure State Public Health Payment related sub-packages were not allocated to patient activity or allocated overhead costs in line with the Administrator determinations (Guideline 7).

Changes to the usual cross charging of pathology tests by NSW Health Pathology, initially implemented to facilitate Funding Agreement reporting, also complicated the clinical costing process. Initially there was only one laboratory accredited to process all COVID-19 nasal swab tests, with other laboratories progressively coming online as they were accredited (Interview 14). In a significant departure from usual pathology cross-charging processes, charges for the COVID-19 tests were billed to the Local Health District/Specialty Health Network with the laboratory(ies) that processed the test as opposed to the Local Health District/Specialty Health Network that ordered the test. This meant considerable expense for COVID-19 tests was sitting in eight general ledgers, with some general ledgers having little COVID-19 test expense. This required adjustments to “add” the missing COVID-19 test expense to the costing ledgers of the Local Health District/Specialty Health Networks where the patient had the test done and “eliminate” the additional COVID-19 test expense from the Local Health District costing ledgers that had processed the test (Guideline 7).

The two costing periods dramatically demonstrated the difference in cost per National Weighted Activity Unit for the BAU period and the COVID-19 period (Interviews 1 and 51). The BAU period average cost per National Weighted Activity Unit increase of 3 per cent on 2018–2019 was in line with expected year on year movements. The average cost per National Weighted Activity Unit in the COVID-19 period however demonstrated a 19 per cent increase on 2018–2019 while the average cost per National Weighted Activity Unit for the full year with the two periods combined indicated an 8 per cent increase on 2018–2019 (Document 14).

Within the Local Health District/Specialty Health Networks, there were mixed responses to the hospital costing results for 2019–2020. Costing managers expressed less confidence in the overall cost results in comparison with previous years due to the changes in the general ledger and the disruption in usual activity patterns (Interviews 42 and 50). One costing manager noted that clinicians and hospital managers appeared less interested in the cost information as there was perceived to be limited value in benchmarking results from a year so profoundly disrupted by COVID-19 (Interview 6). The treatment of incremental and base costs also impacted how costs for the COVID-19 period could be interpreted. While there were considerable efforts expended capturing incremental costs, there was comparatively limited reporting of base costs. Further, base cost was typically left in the home cost centre of the employee (Interview 39), and with no requirement to report the base cost by sub-package, there was limited information regarding what COVID-19 activities base cost staff were redeployed to undertake.

A further complication was the structure of certain sub-packages and COVID-19 cost centres that siloed some expense accounts to facilitate reporting in the monthly reporting template. For example, while the IT sub-package reflected total incremental IT related expense, it was not always easy to identify whether the incremental expense related to ward reconfigurations or the establishment of the new COVID-19 clinics.

The team responsible for developing the State Efficient Price for the 2021–2022 activity-based funding budget however thought the costing periods was an excellent innovation as it provided them with more information and greater flexibility. The manager recalled that:

[W]e had three possible things we could use. We could use, an average cost as a basis, for [July] to March, we could use [April] to June, or we could use a full 12 months and all three were giving us different results and [...] that's the first time we've ever used something other than a full 12 months. So we used the nine months [...] on the basis that, after considering many, many options, that that was [...] the best representation [...] of the cost going forward. (Interview 29)

Even though few COVID-19 cases were reported in 2020–2021, significant COVID-19 expense continued to be funded through the Funding Agreement. When COVID-19 vaccinations commenced in early 2021, it was thought the end of the pandemic was in sight and discussions amongst accounting teams turned to whether COVID-19 might have lasting impacts on hospital cost structures and operations, and if so, whether the State Efficient Price and National Efficient Price would cover the increased cost base (Guideline 18) when the Funding Agreement was terminated. These discussions heralded a third adaptation to the clinical costing process.

The 76 sub-packages used for monthly reporting during 2020–2021 were reviewed to assess if they were for expenses that were directly attributable to patient care, and if so, whether the expense was likely to persist in a post COVID-19 environment. This review identified 15 sub-packages of interest.

The booking of many sub-package expenses into centralised cost centres in the general ledger to facilitate the Funding Agreement reporting disrupted clinical costing cost allocation rules. This was especially the case for PPE, as large PPE expense amounts were booked in cost centres and there was limited information available as to which hospital department used the PPE. These costs, however, needed to be allocated in a novel way

that enabled costs to be included or excluded in subsequent cost analysis or pricing calculations. This was managed by classifying the 15 sub-package expenses as direct costs, despite the fact that these costs were not directly traceable to individual patients (Labro & Vanhoucke, 2007). Customised allocation rules were developed by the clinical costing unit, utilising bedday or episodic constructs to allocate the sub-package expense to relevant patient cohorts. For example, Enhanced Security was allocated to all patients attending the hospital, while Emergency Department Concierge was only allocated to emergency department patients. Where appropriate, costing managers in Local Health Districts/Specialty Health Networks modified allocation rules to enable local circumstances to be better reflected (Interview 51). This approach facilitated more effective discussions between accounting teams as it provided a clear reconciliation with the monthly expense reporting, used the same language, and resulted in greater confidence in the clinical costing results (Interview 46).

## 5. Discussion

An issue that has been identified as of being particular importance in the crisis literature is how organisations adapt from business-as-usual practice under the pressure of a crisis situation (Leoni et al., 2022). Our empirical findings show how the creation of a new cost calculation method, intensified communication of cost information to key stakeholders, adaptation of existing costing practices, and a willingness to allow for variation in costing activity, were central to efforts by NSW Health to respond to challenges imposed by the COVID-19 pandemic. In this section, we consider how the principles of enabling system design (flexibility, repair, internal and global transparency) provide an understanding of these changes that allows us to move from the specifics of our particular case to an assessment of how the challenges imposed by the crisis were addressed in a more theoretically generalisable fashion.

As a key element of the emergency COVID-19 Funding Agreement was the calculation of COVID-19-related cost, the flexibility provided to staff to use their discretion allowed a separate costing process to emerge. The creation of a separate costing process provided a “work-around” that allowed decision-makers to meet the new Funding Agreement requirements without jeopardising the integrity of existing clinical costing practices. Nevertheless, in tandem with this new cost calculation process, the existing clinical costing processes were modified three times, first in an attempt to satisfy the COVID-19 Funding Agreement reporting requirements and then to better reflect changes in cost structures due to the pandemic.

The ability to repair existing practices allowed actors to remedy limitations and avoid “breakdowns” of the clinical costing systems in a rapidly changing environment (Brown et al., 2020). We can see how the repair principle was operationalised in practice as the two accounting teams were able to customise and modify respective accounting processes as the cost information requirements evolved over the course of the pandemic. We also observed that there were impediments to adapting costing processes to environmental changes, suggesting that limits to flexibility and repair are likely for any complex control system. Such limits can inhibit more significant changes, for example the implementation of time-driven activity-based costing that could have provided decision-makers with greater insight into shifting resource requirements. But restrictions



to flexibility and repair, either unintended or purposefully built into the system, can be necessary to maintain continuity and integrity of core processes, which in our case meant ensuring that cost information from the periods before, during and after the crisis were reconcilable.

Key to ensuring the calculation of the required cost information was the global transparency attribute that enabled individual staff across the health system to understand the purpose of the cost information that was being calculated. Numerous formal and informal channels of communications with accounting teams at different levels of the health system enabled them to understand that their calculation of relevant COVID-19 costs was key to securing additional funding. Global transparency was also essential for ensuring a consistently understood rationale for the additional work associated with creating two costing periods within a financial year and for treating selected indirect costs as direct costs. Understanding the bigger picture provided context for the unusual and additional workload that was asked of the accounting staff (Brown et al., 2020).

Equally important was the internal transparency that enabled accounting teams to understand how to calculate the required cost information from a technical perspective. For the accounting team responsible for the calculation of cost for the COVID-19 Funding Agreement however, they had to first understand their local COVID-19 response activities before they could appropriately reflect that expense in the general ledger. This required accountants to regularly engage with local clinical operations teams. Similarly, the clinical costing teams needed clear and simple instructions explaining how to create separate costing periods or create new cost allocation logics.

This analysis contributes to prior literature on the role of accounting in responding to challenges imposed by a crisis as well as our understanding of enabling design principles in relation to costing and other control systems. First, in contrast to most prior literature that, at least implicitly, assumes that cost information is available in a form suitable for decision-makers in times of crisis (Kober & Thambar, 2021), we show that fundamental changes to costing processes can be necessary for effective organisational responses. In this respect, we extend Sargiacomo (2015) by explicating the design attributes that can allow actors to rapidly adapt accounting structures and processes to reflect changing conditions. Second, prior literature examines the enabling design of costing and control systems under normal or business-as-usual conditions, showing how enabling systems are designed to help actors adjust to local changes whilst ensuring that their actions are consistent with the overall organisational objectives (e.g. Ahrens & Chapman, 2004; Englund & Gerdin, 2015; Free, 2007; Jordan & Messner, 2012). Moreover, these studies suggest that the four design principles operate together in a relatively unproblematic manner. Our study, situated in a period of crisis, shows that while each design principle has an important role in facilitating adaptation, there are also complex interactions that give rise to tensions and trade-offs between the design principles. For instance, we observe how flexibility of costing systems that allow accounting processes to be tailored to the unique conditions of Local Health Districts/Specialty Health Networks can create problems for global transparency and coordination. We also see that limits to flexibility and repair, while partly constraining, are also necessary, for instance, to ensure that increased transparency to respond to immediate disruptions does not jeopardise organisational transparency across time.



Third, we add to the recent studies by Kenno and Free (2018) and Passetti et al. (2021) by demonstrating the need for flexibility in costing systems to provide decision-makers with ad-hoc and atypical cost information that focuses organisational attention towards implementing effective responses to immediate demands. Our study sheds light on the processes through which such information is constructed and why focus on cost information becomes intensified during periods of crisis (Cohen et al., 2015; Hopwood, 2009). Finally, and perhaps most obviously, our findings illustrate how and why the design of costing systems matter in times of crisis. This is particularly pertinent given that climate change is likely to increase the frequency of emergency events that will have significant ramifications for health system activity.

Our case demonstrates that effective and continuous communication across all stakeholders in a broader system is critical to navigate a crisis (global transparency). Staff that have appropriate technical knowledge within specific local teams are needed to effectively respond to the information needs of a crisis, often occurring in high flux (internal transparency). We also show that even established, long-held costing systems require modification in times of crises (repair) and without the requisite technical accounting knowledge, staff are likely to find it difficult to devise novel solutions to address the unique operational needs brought on by a crisis (flexibility).

## 6. Conclusion

In this study we explored the role of cost information in responding to the unique challenges imposed by the COVID-19 pandemic in a public health system. We detailed how the construction of a new cost calculation process and the adaptation of existing costing systems allowed actors to navigate shifting priorities during the pandemic. To gain an understanding of how and why cost information was able to be mobilised and adapted in such a dynamic and complex environment, we drew on the concept of enabling control and the four design principles of flexibility, repair, internal and global transparency (Adler & Borys, 1996).

Future studies could examine the transition back to business-as-usual processes after a crisis event and investigate whether any learnings acquired during the crisis are retained or whether cost accounting assumed an increased importance in decision making more broadly.

## Acknowledgements

The researchers would like to thank NSW Health for access to staff during a time of crisis and staff who generously participated in interviews and academics at Business School UTS for feedback on earlier versions of this research. We would also like to thank the editors of the special issue and the two anonymous reviewers for their constructive feedback and support. The review process and your comments have improved the paper.

## Disclosure statement

The lead author is a long time employee of NSW Health. The research was conducted in line with NSW Health and UTS research ethics and governance policies and procedures.

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