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Introduction

Determining what is perceived to be ‘valuable’ in healthcare is fraught with judgement and justifications, particularly during unforeseen emergencies, disasters, epidemics, and pandemics. The accounting academy is recognising the need to re-describe accounting practices in healthcare (Firtin and Karlsson, 2020) supported by new frames of social and moral accountability (Demirag et al., 2020; Sjogren and Fernler, 2019). Further calls for the transformation of the healthcare sector are also coming from clinicians, health policy administrators and economists (Duckett, 2019; Kokshagina and Keränen, 2021; Levinson *et al.*, 2015; Ma, 2019; PC, 2021; Woolcock, 2019; Dimitropoulos *et al.*, 2019) who are currently problematising value-based healthcare (VBHC) in the Australian healthcare setting (Koff and Lyons, 2020)¹. Meanwhile, the COVID-19 mortality and hospitalisation statistics, along with reactionary expenditure, is arguably shifting attention away from financial and parliamentary accountability (Demirag *et al.*, 2020). Thus, a greater need for transparency of the budgetary and financial processes in the post COVID-19 period is required (*ibid*). To date, management accounting and control in public hospitals has largely been driven by activity-based funding (ABF), the operationalisation of economic modelling from the 1990s New Public Management (NPM) reforms (Hood, 1995; Abernethy, 1996). ABF transformed public hospital government funding from block/input to output-based funding, built around individual patient diagnosis-related group (DRG) cost weights. Activity costs are used to price treatments, manage target volumes (Abernethy and Chua, 1996; Lowe, 2000) with standard payments used to incentivise hospitals and promote efficiency, resulting in an ‘average’ hospital mindset (Llewellyn and Northcott, 2005). Lapsley (2007) noted that accounting’s operationalisation of the NPM economic funding model served to displace the power of the clinical culture. The shift from clinical to managerial control, the costing and caring debates and the hybridisation of accounting knowledge is recognised in the academic literature (Abernethy and Stoelwinder 1995; Jacobs, 1998; Kurrumaki, 1999; Abernethy *et al.*, 2007; Lapsley, 2007).

¹ An inaugural VBHC conference was recently held in Perth, Australia in May 2021, in which key global proponents (Elizabeth Teisberg, Elizabeth Koff, Daphne Khoo and others including health service managers, policy makers, clinicians and academics) contemplated how innovative practical applications of VBHC might be put into practice in Australia. Refer www.ciccancer.com/vbhconf/workshop

More recently, public hospital performance has been exacerbated with COVID-19, requiring a rethink of the technical, social and moral role accounting plays in this environment. The new and emerging definition of accounting is particularly fitting, given the multiple stakeholders concerned about the power of economic control and financial performance evaluation driving decisions in this public sector setting:

Accounting is a technical, social and moral practice concerned with the sustainable utilisation of resources and proper accountability to stakeholders to enable the flourishing of organisations, people and nature (Carnegie et al., 2020, p.69).

It is argued that current ABF systems are relatively inflexible in managing the changes in patient health profiles (Duckett and Willcox, 2015), contribute to ABF coding-related ethical dilemmas in the hospital setting (Dimitropoulos *et al.*, 2019) and do not incentivise the move to a value-based care economy (Tiesberg, 2020). From a management accounting perspective, any transformative change has budget and performance measurement and control implications. This is confirmed by the Australian Productivity Commission (PC, 2021), which concludes that ‘wellness’ is not on the DRG funding list and those that would benefit from certain digital health prescriptions, from a population health perspective, may not have access without specific diagnoses: “We get what we pay for, and we don’t pay for prevention” (PC, 2021, p.21). The value-based health care (VBHC) movement (Porter and Tiesburg, 2006; WHO, 2016; Porter, Larsson and Lee, 2016) similarly recognises the need to ‘*identify health outcomes that matter to ... individuals and families, and why understanding the actual cost of care delivery is essential strategic decision making*’². Key to integrating VBHC in Australia are enablers such as technology/digital solutions and accounting-based systems that support effective communication and multidisciplinary collaboration across the entire healthcare network (Koff and Lyons, 2020). A shift to population health and health technologies, if successful, will reduce the demand on hospitals and budgeted ABF income, which will be allocated to keeping citizens well and out of hospital.

Investing in VBHC and digital health innovations require cost-benefit modelling and performance evaluation that measures success over the long-term, including clinical outcome measures, such as Quality of Life (QoL) and other social and population health indicators

² Refer www.ciccancer.com/vbhconf/workshop

(Jansson *et al.*, 2020; Tiesberg *et al.*, 2020). Justifying investment from a financial cash-flow perspective at the institutional level, needs to be carefully considered given the potential for low value outcomes (Ma, 2019). Performance evaluation that ignores externalities and important social and moral decision metrics, can distort decision-making (Carnegie *et al.*, 2020), including the healthcare setting where patient-centred quality care (suppliers/hospitals) and volume-based payments (purchasers/funders) are arguably in conflict (Dimitropoulos *et al.*, 2019). Furthermore, with resource allocation shifts toward preventative health, and a move away from rewarding volume-based throughout, there are implications for hospital budgets and investment decisions.

To date, there is minimal accounting literature that considers this important emergent strategic role for accounting in advancing this change. In this paper, we problematise this gradual move away from throughput volumes and a focus on illness to a VBHC approach that fosters value and wellness. In highlighting the accounting problem, the aim of this paper is to consider the role of accounting in a field that is not necessarily viewed as objective and neutral (Burchell *et al.*, 1980) but heavily influenced by health economists modelling and ABF (Duckett, 2008; Palmer *et al.*, 2014; Duckett 2015). The academic healthcare accounting literature is relatively silent on accounting's connection to strategic and operational management control transformation as a result of emerging trends in VBHC (Tiesberg *et al.*, 2020). We address recent calls for broader cost-benefit appraisal and performance evaluation techniques that support digital health interventions (Jansson *et al.*, 2020) and contribute to the scant accounting literature calling for post-COVID-19 accountability strategies (Demirag *et al.*, 2020). The following research question is explored:

RQ: How does accounting need to change to meet the emerging VBHC and associated digital health investment strategies?

To address the research question on accounting change to meet emerging VBHC strategies, our fieldwork study comprises rich insights from our multidisciplinary team along with a range of field interviews with hospital administrators, clinicians, digital technology providers and policy makers on the cost-benefit challenges with investing in innovative digital health interventions. Given this research is immersed in a time of potential transformational change, a mixed inductive/deductive approach guided by the framework method (Gale *et al.*, 2013) is taken to systematically highlight the challenges and issues with implementing VBHC. Data collection

and analysis is deductively guided by the VBHC themes identified by Tiesberg *et al.* (2020) with further inductive consideration of the data through the open (unrestricted) coding which provides space for further meaning making of this emerging phenomenon and to substantiate the deductive themes (Gale *et al.*, 2013)

The outline of the paper is as follows. A review of the literature on hospital funding and pricing models is provided. This is followed by discussion on the definition and implications of VBHC on accounting and control. Given the changing notions of value, the issues surrounding strategic investment appraisal in digital health is further argued in the subsequent section of the literature review. Data collection and analysis is followed by detailed discussion and implications of the research findings for both accounting education and research. We conclude the paper with discussion on the emerging opportunities for accounting education and research as ABF and digital health investment is being refashioned in a VBHC framing.

We argue that although accounting has evolved to deal with more ambiguous valuing conditions (Carnegie *et al.*, 2020), opportunities to extend this important hybridising skillset in the public healthcare sector remain. The paper highlights the following three implications for accounting education and research. First, there is an important moral and social role that accounting can and should play in healthcare decision-making. This has implications for accounting education, calling for greater knowledge and awareness of the multiplicity of accounting values, controversies and compromises that play out in practice (Annisette *et al.*, 2017). Second, where the accounting literature largely considers the value contestations and imperfect valuations that reside in the balance sheet (Mennicken and Power, 2015), we extend this literature with consideration of valuation in the income statement and how the dysfunctional pricing of care further impacts strategic investment. The economic modelling of the 1980s, although malleable, is becoming increasingly political and contestable having implications for education, research and practice. Our findings expose the conflict between accounting and economics, whereby accounting is implicated in the practice of giving life to contested health economics models. Third, and finally, our findings contribute to the emerging valuation studies in accounting (Annisette and Richardson, 2011; Kornberger *et al.*, 2015; Mennicken and Power, 2015) and the dissonance that contested values can bring. We highlight how value is viewed as an assemblage of economising and financialisation with numbers and quantifications being made increasingly visible by the pandemic-driven healthcare crisis.

Together this reveals the relevance of the game-changing definition of accounting espoused by Carnegie *et al.*, (2020) as technical, social and moral practice and the need for proactive involvement in change, underpinned by the profession's ethical and moral duties to society. This paper addresses the calls of the *Special Issue* on COVID-19 and accounting, by highlighting the threats and opportunities for accounting in tackling wicked problems, such as healthcare resource allocation. The paper draws attention to the innovation that is occurring in and around professional practice with the potential threat that accounting will be ignored, and then blamed for the unfolding changes to the system. We call for a greater voice for accounting in addressing the threats and meeting the exciting opportunities that contribute to making the world a better place.

From activity-based funding (ABF) to pandemic challenges

Clinicians and administrators have long debated the clinical-costing environments and the hybrid arrangements that exist in healthcare settings around the world (Chua and Preston, 1994; Chua, 1995; Kurunmäki, 2004). The ABF models that emerged from the NPM movement of the 1990s are underpinned by patient DRG codes (Abernethy and Chua, 1996; Lowe, 2000) influenced by Cooper and Kaplan's (1988) activity-based costing are now widely institutionalised in hospital management control. Initially criticised by Llewelyn and Northcott (2005) as driving activity toward typifying an 'average' public hospital, Kurunmäki (2004) identified the accounting hybridisation that emerged. As the managerial approach continued performance measurement, in the form of balanced scorecard metrics (Kaplan and Norton, 2001), are routinely reported to stakeholders (i.e., CEO dashboard) and measured through waiting list times and length of stay, quality and safety measures that include compliance to infection control audits, patient pain control reduction measures (Vesty and Brooks, 2017). With advances in pricing techniques, practices and technologies, the funding models have continued to evolve to meet the complexities of the different hospitals (Butler-Henderson, 2010). Like many countries around the world, the Australian-refined DRG system (AR-DRG) is now in its tenth iteration:

The AR-DRG classification consists of approximately 800 end classes, with each admitted acute episode of care being classified based on diagnoses, interventions and other routinely collected data, such as age, sex, mode of separation, length of stay, newborn admission weight and hours of mechanical ventilation. ... [is]... instrumental

to ABF ... [and]... also used for many other purposes including performance management, benchmarking, epidemiology and research (IHPA, 2019, p.5).

Public hospital efficiency is managed through government budgets and contracted service provider payment. Block funding, surpluses and a contracted mix of medical and surgical weighted activity units (including elective surgery), as well as funds from Department of Veterans Affairs, Transport Accident Commission and population health initiatives such as National Bowel Screening (DHHS, 2019) are used to support the complex, multifaceted public hospital operational activities. Public hospital productivity is impacted by the growing number of patients suffering with chronic co-morbidities, such as diabetes, obesity, heart and lung disease, adding further complexity to hospital throughput and resource consumption (Li et al., 2015; Sjogren and Fernler, 2019; PC, 2021). Issues such as bed-blocks, staffing constraints and supply chain shortfalls are key features of epidemics (e.g., Influenza A, N1H1) and now pandemics (e.g., recent COVID-19, see Appendix 1, Figures 1 and 2). Public hospitals are burdened with treating chronic illness and emergency (Category 1) patients, while those seeking important surgical care for QoL interventions (Category 3) are on long waiting lists. Chronic arthritis patients, in need of knee or hip joint replacement, are becoming less mobile with QoL impacted as they wait for surgery, which can be 12-18 months, or more (Koff and Lyons, 2020).

Emergency and surgical waiting times have been extended as hospital resources are dedicated to dealing with the pandemic (Firtin and Karlsson, 2020). Firtin and Karlsson (2020, p.173) note how accounting during the pandemic has resulted in more accounting measures as if ‘to sustain itself...[to]...loyalize physicians and economize the medical context with cost/benefit calculations for managers’ (*italics in original*). In challenging the notion of accounting being objective and neutral (Burchell *et al.*, 1980), these authors promulgated accounting’s performative role during the pandemic so it could maintain its status quo. Nevertheless, accounting was recognised for its co-existent reactionary response toward maintaining system efficiency, rather than as a strategic intervention, or used to reveal the inherent systemic problems. During the pandemic Demirag *et al* noted the mobilisation of ‘emotional accountability’ by governments to draw attention away from questions of their financial unsustainability (2020, p.891). With clinical coders noting the moral and ethical pressure to code hospital cases for optimal ABF funds (Dimitropoulos *et al.*, 2019), the malleability of the 1980s funding and policy making in the Australian healthcare is being questioned:

Current national health policy emphasises costly and unsustainable upscale of healthcare volume and perpetuates ongoing inequities in access to care. ... commitments to support flexible care models that do not rely on fee for service, as well as the development of a national preventive health strategy. Without clear policy levers to measure and fund meaningful improvements in health outcomes, national efforts to achieve a vision of “a mentally and physically healthy Australia” are likely to be hampered (Raymond, 2019, p.4).

Because resource allocation is segregated according to discrete modes of funding for hospitals and primary care, the move to integrated care (a blend of primary and hospital care), which better suits VBHC, provides challenges for hospital managers faced with investment opportunities that transgress institutional to jurisdictional boundaries. It is argued that a move toward a more blended funding model will give hospitals greater flexibility to invest in community-based services and preventative care, thus reforming for ‘value’ by keeping as many people as possible with chronic conditions, out of hospital (PC, 2021). But how will this be achieved, given the powerful players and incentives for maintaining the status quo (Duckett, 2019; Firtin and Karlsson, 2020)? While a change sounds perfectly feasible, there are always concerns on the practicalities: *How does one manage the politics of vocal losers drowning out the many who might benefit from payment reform?* (Duckett, 2019, p.20). The core thesis behind redesigning healthcare delivery is for care-incentivised delivery outcomes that flow across the entire network of service providers that involves a combination of public and private organizations, and a host of inter-organizational relationships between diverse actors, such as hospitals, health departments, public procurement, vendors and governmental agencies (Frow et al., 2016). Furthermore, high quality care is based on innovations in patient treatment and outcomes that increase value (Porter and Teisberg, 2006; Tiesberg *et al.*, 2020) requiring new investments in digital health, along with new ways of measuring performance and minimising waste (Ma, 2019; Koff and Lyons, 2020). This also requires new insights into the meaning of value (Boltanski and Thevenot, 2008) in terms of accounting values (Annisette and Richardson, 2011) and associated processes that serve to make things valuable (Kornberger et al., 2015).

The more recent health innovations that require large capital outlays by governments include integrated electronic medical record (EMR) systems or digital tools for clinical decision-making and are strategic investments by governments to enhance the digital capacity of

nations³. EMR comprise a collection of useful, disparate and increasingly complex data which through the benefits of AI, can be amplified with a wealth of data the foundation for powerful insights that help improve patient outcomes and reduce costs. Digital health, from a systems perspective can help break down silos by providing the opportunity for cross-disciplinary conversations around the results of data analytics. This results from the growth in electronic health information, robotics, telehealth and remote monitoring of patients connecting patient radiology and imaging data, their prescription data with blood tests and other procedure results for not only real-time clinical intervention but greater access to data for administrative and legal claims. Some investment-related costs are facility-level costs and not factored in the DRG-based operational cash flows, which are purely associated with patient activity costs. However, the digital health interventions that are patient- and disease-specific, can result in considerable changes to existing patient treatments, which in turn, impact accounting DRG-based activity costs, and associated hospital reimbursement funds. In Australia, ABF is federally funded and DRG-specific with funding reduced/increased over time with average total cost re-calculations. Whereas capital infrastructure investments and digital health interventions are funded by the different states and territories, and frequently rely on scarce capital funds, limited surpluses, donations, and ad hoc government grants. This is where conflict can arise as appraisal costs and benefits can be realised across multiple levels from the macro societal, healthcare sector, institution, to the micro patient level (Tsevat and Moriates, 2018) but ‘value’ might not necessarily be counted in investment decisions (Annisette et al., 2017). In this way, the emphasis on hospital funding and performance is driven by the income statement (Federal Government is the purchaser) and not the balance sheet, managed by the states and territories.

This discussion reveals how accounting is implicated in shaping and ultimately impacting lives, the health and wellbeing of society. This unfolding situation provides an essential opportunity for accounting to be involved in addressing societal *wicked problems* and answering *big questions* revealing the moral role that accounting provides decision makers. As argued by Carnegie *et al.*, 2020, p.69) professional accountants (hereafter “accountants”) are ethically bound to question: “What in the world is accounting creating, shaping and legitimising, and is this helping to create a better, more include, respectful and less-threatening world?”.

³ www.nationalstrategy.digitalhealth.gov.au

Accounting can no longer be recognised as a technically neutral practice and must be leading change, rather than being blamed for the consequences that emerge.

Towards digital health and funding reforms for value-based healthcare (VBHC)

Technological advances are essential in realising preventative health and VBHC defined as: ‘outcomes that matter to patients and the associated costs required to achieve those outcomes’ (Porter and Teisberg, 2006, p.98). VBHC offers an alternative to the volume-driven approaches that dominate the hospital activities (Tiesberg et al., 2020; Kokshagina and Keränen, 2021; Verhoeven et al., 2020). Koff and Lyons, (2020) contend that funding and management of care across the healthcare sector in Australia is not always continuous or connected, with the patient bearing the out-of-pocket costs associated with navigating between healthcare providers. It is argued for VBHC initiatives to be achieved, they should include an understanding of these out-of-pocket patient costs, holistic experiences that connect with dignity, privacy, staff interactions, cultural appropriateness, information provision and continuity of care (Duckett, 2019, p.18). Tiesberg *et al* (2020) provide a strategic framework for VBHC implementation as outlined in Figure 1.

INSERT FIGURE 1 HERE

This framework offers challenges for health economists and accounts across the five main strategies. For example, the first strategy is to *understand shared health needs of patients*. The authors argue healthcare needs to be organised and funded around segments, such as “people with knee pain” or “elderly people with multiple chronic conditions” (Tiesberg *et al* (2020, p.683). This may occur organically as noted recently by Firtin and Karlsson (2020) in the rapid structural changes with clinical response teams being set up in the emergency department to deal with COVID-19 patients. Accounting was involved in this performative response, which generated a shared vision between accounting and the clinical teams. Although reactionary, this more recent research indicates the potential for reconfiguring cost structures to focus on immediate health needs of patients, while simultaneously understanding and managing costs. This also has ramifications for the hybridisation of accounting skills by clinicians (Kurunmäki, 2004; Miller et al., 2008) and potential for effecting revolutionary change. In the second strategy *design solutions to improve health outcomes*, Tiesberg *et al* (2020, p.684) argue that the “goal of care shifts from treating to solving patients’ needs”, which might include addressing their nonclinical needs. This is where digital health investments can also play an

important role in remote patient care ensuring greater continuous monitoring and communication with practitioners. In this way, patients do not have the out-of-pocket costs of seeking care-related health activities and digital health provides an important intermediary, or connecting tool perceived as maximising patient value. In the third strategy *integrate learning teams*, technology is vital in enabling world class care, remote monitoring and delivery as well as sharing expertise. This strategy aims for seamless integrated care between primary care and local hospitals to benefit population health over funding models that incentivise the volume throughput associated with treating illness. The following strategy *Measure health outcomes and costs*, like the prior two strategies, is where accounting can play a significant role through digital health investment appraisal and performance measurement that aligns with VBHC objectives. Tiesberg *et al* (2020, p.684) claim ‘the current dearth of accurate health outcomes and cost data impedes innovation’. VBHC proponents suggest the significantly important metrics from the clinical and societal perspective, include Patient Reported Outcome and/or Experience Measures (PROMs and PREMs) can help “*to understand what matters most to patients and to find out if the care we deliver supports the outcomes and experiences that patients expect*” (NSW Health, 2021b). Many health jurisdictions in Australia are now seeking digital solutions to help collect and monitor PROMs and PREMs data. Digitisation of these functions enables health service managers to monitor in real time patient outcomes and experiences, to be able to rapidly divert resources as and where required and address issues as they arise. For example, the real time monitoring of emergency department attendances across several sites allows a regional manager to redirect ambulances to less busy emergency departments, and to bring in staff expertise to the departments that require need the additional support. The ability to target in real time where resources are required will provide obvious benefits, including the saving of lives.

While the healthcare sector is built on a proliferation of metrics to meet the demand for greater transparency and accountability, Tiesberg *et al* (2020, p.684) draw attention to cost applications including ‘time-driven activity-based costing’ (Kaplan and Anderson, 2007) to better match costs with associated VBHC activities. Sjogren and Fernler’s, (2019) empirical accounting study similarly identified the importance of *time* in costing clinical activity, as the key activity determinant that links to the financial bottom line and NPMs understanding of management control. Similarly, Jansson *et al.* (2020) identified key time measures that would be useful in digital health appraisal. This repertoire of time and activity measures are now part of a suite of standardised tests which alongside scorecard measures have been noted to drive clinician and

administrator choices. Nevertheless, there are missing measures (Jansson *et al.*, 2020) and claims of ‘harmful, unintended consequences ... [when] professionals lose discretion and ... focusing on indicators rather than the on the qualities that the measures are designed to evaluate’ (Espeland and Sauder, 2007, p.2). Callon and Muniesa (2005) warn that calculative practices privileged with scales and measurement, can be transformed from different qualities to a common metric, that sometimes lead to the detriment and discredit of others. The valuation studies in accounting further highlight the dissonance that contested values can bring (Annisette and Richardson, 2011; Kornberger *et al.*, 2015; Mennicken and Power, 2015).

Hence the importance of the final fifth strategy, *expand partnerships*, as identified in Figure 1 to control the dominance of powerful players in a single point of value delivery. For performance evaluation and investment appraisal it is essential ‘value’ is clearly defined and understood by the partnership. This includes recognising that value can be at the societal level or at individual patient-level. Costs may be borne by the hospital, whereas benefits may be downstream and beyond the boundaries of the organisation. This has implications for managers incentivised by alternative performance metrics. Similarly, the nature of NHMRC and other government grants that call for digital health interventions might not benefit long term collaborative partnerships. The available grants might be ad hoc, or in times of crisis such as during the COVID-19 pandemic⁴, which suggests that technology isn’t necessarily strategically planned for, or potentially long lasting, after the grant funds are expended. In this way, investment tends to be treated as a limited project, evaluated as part of a clinical trial, with little attention to the capital outlay and cash flows (and benefits) that extend beyond a single service provider (WHO, 2016). Mennicken and Power (2015) reveal the implications for performance reporting in terms of imperfect valuations that reside in the balance sheet, which include the public sector. Annisette *et al* (2017) reveal the value-laden controversy associated with using net present value (NPV) accounting in social investment decisions. The Australian peak body for healthcare providers agree that important governance structures need to be in place to avoid value-based controversy:

Shifting away from volume to value-based healthcare will require robust data measurement and timely public reporting of patient outcomes. Performance indicators

⁴ Examples of digital health investment at: <https://www.communityservices.act.gov.au/home/grants/successful-applications-covid-19-stimulus-rapid-response-grants-program>. Multiple grants of \$500,000 to \$2million are offered: <https://business.gov.au/Grants-and-Programs/Rapid-Response-Digital-Health-Infrastructure>

must be evidence-based and suitably chosen to ensure incentives or disincentives are linked to desired outcomes to prevent unintended consequences. (AHHA, 2019, p.1).

The framework, identified in Figure 1, reveals the multiplicity behind individual value perception which adds complexity to performance evaluation, associated resource allocation and investment (Tseng and Hicks, 2016). Currently there is no single agreed view of what value means in the health context (EXPH, 2019) as VBHC takes on different meanings in different jurisdictions, depending on the priorities of government. While digital health solutions are essential to VBHC initiatives and reduce overall health systems costs by preventing unnecessary hospitalisations (van Velthoven, 2019), they can similarly represent different rankings of perceived value for individual stakeholders (Annisette *et al.*, 2017). Thus, achieving the actions identified in Figure 1, is therefore not so straight forward when relying on ABF models for management control. Accounting is already being blamed for deficiencies in the existing system, but with a long history of alternative modes of valuing in other settings (Gray *et al.*, 1996), why can't the profession similarly lead in healthcare change?

With the key theme reinforced in the VBHC literature and emerging discussion is that fundamental policy changes and incentivisation is required to move away from a hospital funding system that rewards standardised patient throughput volumes. However, the accounting academic literature is relatively silent on the performance measurement and appraisal techniques that support the changing market demands. This is where this research paper provides an important contribution. Tiesberg *et al.*'s (2020) framework (Figure 1) is used to frame data collection and analysis as indicated in the sections that follow.

Field Study: Exploring ABF, VBHC and investing in digital interventions

Our data sources are primarily based on field interviews conducted with senior managers (accounting and clinical administrators) from 7 large teaching hospitals in Australia, as well as administrators and policy makers that manage the healthcare system more broadly. Qualitative field research was undertaken and informed by the framework method whereby combined inductive and deductive analysis is used to capture the interplay of activity and meaning (Gale *et al.*, 2013). We draw on our collective research group experiences to problematise the emerging trend towards VBHC in the Australian hospital setting.

Our multidisciplinary team comprise experts from accounting, information systems, clinical science, VBHC and digital health. Our past experiences and research collaborations, both local and international, provides rich group discussion for sense-making purposes. This background is particularly important for data collection and analysis purposes. This accounting-focused study helped the team to problematise the accounting role in healthcare change and to better understand the type of information required for budgeting activities, links between the ABF costing elements (see Appendix 1, Figure 1) and investment in digital health. The team were able to discuss their individual and group collaborations to focus on the changing stakeholder perceptions of value (given COVID-19 impacts and increased need for digital health interventions), making the nature of our work more relevant, urgent and with a renewed priority.

Overall, we conducted 18 interviews with key hospital clinicians (4), accountants (4), administrators (2) policy makers (4) and digital health experts (4). The nature of their expertise resulted in data saturation with a smaller number of interviews (Guest et al., 2006). Most interviews lasted 45 minutes to 1 hour. They were open ended and examined the value-based controls and factors that underlie ABF-related patient-mix choices in public hospitals. The five broad themes developed from the VBHC literature (Figure 1) were used to develop the interview questions and deductively applied in data analysis. Engaging in more open-ended questions around the themes, also permitted '*a more inductive approach that allows for the unexpected and permits more socially-located responses... which cannot be predicted by the researcher in advance*' (Gale et al., 2013, p.3). Due to the sensitive nature of the healthcare context, special care was taken to protect the identity of participants. University ethics protocols were followed in each of the cases and participants consented to be recorded via a participant information and consent form.

The subsequent coding helped to substantiate the five broad themes, with open ended coding also used to capture values and elicit knowledge about the value-laden concerns with current accounting systems and practices. Gale et al's (2013, p.4-5) analytic procedure comprising seven (7) stages was followed: Stage 1: Transcription; Stage 2: Familiarisation with the interview (recording and transcript); Stage 3: Coding; Stage 4: Developing a working analytic framework; Stage 5: Applying the analytical framework; Stage 6: Charting data into the framework matrix; Stage 7: Interpreting the data. Following transcription and checking transcripts against recordings, each of the researchers independently coded the transcripts and

compared notes in relation to the labels applied. To thoroughly consider potential bias in our data interpretation, we continuously engaged in a critical reflection on our role as researchers in relation to the data, discussing how our research may have been shaped by our own assumptions (Hammersley & Atkinson, 2019, p. 15; Schön, 1983, pp. 131–132). By means of this ongoing reflexivity, we believe we interpreted our observations in ways that reflected the realities expressed and enacted by our interviewees. We continually returned to the literature and Tiesberg et al (2020) framework and used these ideas to fine tune the working analytic framework as part of our data analysis, collectively developing the working analytic framework to clarify our contributions to the accounting academy. Themes were grouped together to support an overarching accounting research narrative. The coding process to the development of a working framework is provided in Table 1, eventuating in three final accounting-derived themes to address the research question: *hybridised accounting; ABF malleability; digital health investment*.

Table 1: Coding and development of a working analytic framework

VBHC Strategies (Figure 1) Broad Themes for Coding	Examples of Accounting Sub-Themes Identified
Theme 1 Understand shared health needs of patients	Hybridised accounting skills ABF's ability to be organised around segments with reconfigured cost structures
Theme 2 Design solution to improve health outcomes	Digital health investment to shift the focus from treating illness to managing wellness
Theme 3 Integrate learning teams	Hybridised accounting skills Digital health investment to foster shared expertise
Theme 4 Measure health outcomes and costs	Performance metrics including PREMS, PROMS and consideration of time.
Theme 5 Expand partnerships	Blurred organisational boundaries – care beyond the hospital
Developing an Analytic Framework from the Accounting Sub-Themes Identified	Final Three Accounting Themes
Hybridised accounting skills	Hybridised accounting ABF Malleability

ABF's ability to be organised around segments with reconfigured cost structures	
Digital health investment to shift the focus from treating illness to managing wellness	Digital health investment
Digital health investment to foster shared expertise	Hybridised accounting Digital health investment
Performance metrics including PREMS, PROMS and consideration of time.	Hybridised accounting ABF Malleability
Blurred organisational boundaries – care beyond the hospital	ABF Malleability

The framework method helped to frame our VBHC research journey to explore the healthcare system and management control of hospitals from both inside to outside policy makers focusing on: the current accounting skillset required to address strategic change (hybridised accounting); whether the accounting tools can be adapted to meet VBHC strategies (ABF malleability); and, the extent to which accounting can support digital health investment (digital health investment). We juxtaposed views of interviewees and our collective understanding to explore how healthcare administrators are moving toward VBHC and digital health investment under an ABF model.

Hybridised accounting in the hospital setting – where is the accountant?

Although ABF is the dominant income for public hospitals, from a *hybridised expertise* perspective it was a black box for most, somewhat hidden, siloed and not readily understood. One hospital director claimed it is hard to recruit management accountants with ABF healthcare expertise and had previously recruited international graduates with public health qualifications. Another suggested “*it is easier to teach a clinician about hospital accounting, than it is to train accountants to understand the clinical complexities*”. Most accountants we spoke with suggested they learnt the DRG-based ABF system on the job. This was a similar case for clinicians. A lead management accountant explained how newly appointed medical doctors (residents) would spend a day in the accounting department as part of their orientation to understanding the varying support functions within the hospital. She said that the time allocated was not enough for details of ABF, so instead would highlight the importance of lean accounting, elimination of waste and care with the use of scarce resources.

The junior medical residents gradually learn about the funding models through the treatment details they were required to provide on the patient reports, but some admitted they hadn't really grasped the nuances of the system. This was confirmed in further interviews at different public hospitals, where AI is used in clinical coding by scanning clinician clinical treatment notes for key words to determine the appropriate DRG-group code. A senior medical director commented that junior doctors begin to realise that certain 'key' words in their clinical notes might impact hospital DRG-coded payment. For example, if the AI picks up notions of perceived 'complexity' through the specific words used by the doctor and, as a result, this will increase ABF for the hospital. It was discussed that the ABF system is not one that can be gamed for too long, as the Independent Hospital Pricing Authority (IHPA) usually catches up and tightens any loopholes. Overtime the funding body has removed many 'complexity' payments from the DRG list, resulting in reduced payments for certain procedures. This evidence of malleability of the ABF by the regulatory body has served to address concerns raised by Dimitropoulos *et al* (2019) and is further evidenced in the following section. Nevertheless, it also indicates that purchasers (Government funder) rely on standard payments which might not necessarily equate with activity performed. While clinicians may code to maximise income for the hospital, the accountant requires hybridised expertise in understanding the nuances of the activities performed for variance analysis.

From a social perspective the value around reporting and working with non-financial measures such as patient reported outcome measures (PROMS) and patient reported experience measures (PREMS) was discussed in terms of new VBHC evaluation methodologies. While these measures are touted by VBHC proponents, and identified as key to clinical work, and associated research around investment appraisal, the argument for inclusion in accounting and ABF was not so encouraging: *"incredibly useful for clinicians and hospital managers to understand sources of variation in outcomes, outcomes that matter to patients... I am, however, not sure how, or if we should incorporate those into funding models"*. This view was from a leading authority in ABF. He indicated there were deficiencies in the hybridisation of accounting skills in this sector.

Further, at the clinician end of the spectrum and not part of the accounting activity, there were clinical costing experts, who used ABFs DRG systems forensically to determine *value-based performance* in terms of the medical reasons behind poor quality care. With the same consideration as that espoused by lean accounting, one hospital interviewee explained how he

uses the Choosing Wisely initiative to promote the minimisation of unnecessary and costly treatments: *“there’s still so much waste and poor outcomes from not focusing enough on prevention and coordination that could actually keep people out of hospital”*. His medical training is applied forensically to uncover evidence (i.e., records from emergency department, pharmacy, radiology, operating theatre, surgical/medical wards etc.) to ensure clinicians follow the appropriate pathways of care (as outlined in Appendix 1, Figure 1). Using the accounting model as a clinical audit tool, this interviewee’s role was to examine patient outliers, unexpected deaths and hospital reported incidents and escalate this information. He described the system as if it were akin to a panopticon that monitors and controls clinician practices, ensuring they follow prescribed care pathways and best practice. This section highlighted that the administrator-clinician divide remained, indicating the need to further foster integrated leaning teams (Tiesberg *et al.*, 2020).

ABF Malleability - Incentives, reconfigured cost structures

In discussions with an ABF policy maker, he clarified the accounting hybridisation issue we witnessed inside the hospitals and confirmed that they (government agency) understand the need to adjust the systems further. He highlighted some of the changes to move the focus from volume throughput to targeted care. This included incentives in the ABF modelling that pay to keep patients out of hospital: *“we’re interested in building incentives into funding models, so as to not admit someone [patients]... with capitation models, where you give the hospital the expected expenditure for that patient group for the year, and then say, “spend it how you wish” and “if you want to purchase general practice interventions, and community health interventions and digital interventions, you’re free to go and do that, and you won’t lose money”*. Whereas right now, *if I spend money to not admit someone, I lose money.... So that’s where we’re putting all of our effort [to deal with] fragmented care in Australia, with your two distinct funding streams, both state and federal, primary and secondary. So, it’s not easy, but we think we think this will make a difference.”* From the technical point of view, he explained that the system can continue to work with the current ABF model, but it needs further modifications to in terms of adding incentives in the model to better tackle the discontinuity between primary and secondary and hospital care, allowing for better social outcomes. It is assumed, that the changes to economic modelling and incentivisation should then flow to the operationalisation of the model in budgeting, performance evaluation and management control.

However, in furthering the conversation with two different policy makers, they challenged the malleability of the ABF model and the capacity of the accounting function in hospitals to flex and respond. First, a policy maker involved with the jurisdictional system-wide investment in EMR, argued accounting and control in hospitals is not aligned with the emerging economic modelling and new incentives in ABF pointing out that “... *by having a siloed repository of information simply around that disease, you're actually providing an obscured view of that consumer. ...we have a consumer centred approach - one patient, one record, and actively discourage siloed disease centred collections of information.*” According to this second policy maker, the ABF incentivisation is aligning with VBHCs view of grouping patients in segments or “*bundling up episodes [of care] and understanding the cost of care, which we [already] do really well in Australia*”. However, he further explained some of the issues associated with the bundling activity that is underway in one of the leading jurisdictions of Australia. He highlighted the need to place multidisciplinary teams around a single patient, the costly patients with co-morbidity issues that routinely require hospitalisation for acute on chronic episodes. For improved holistic care to keep this type of patient out of hospital, this requires: “*up to 15 different disciplines at any one time depending on the patient. [however] ...The ABF only funds three of those people. ... it's difficult to work with and it's been difficult to convince chief executives to fund these models, because they, they feel that they are losing funding by moving from an inpatient to an outpatient model, even though we have incentivised the system But it's a message that doesn't cut through, and some of your colleagues [accountants] in the health system, do not understand the nuances of the ABF model and reinforce the fact “no we can't move from inpatient to outpatient because we're going to lose money. That is not the case, we've demonstrated that over and over again.”*”

Prior to COVID-19, interviews with accountants from two large hospitals reinforced the challenges revealed by these two policy makers. The issue they experienced with hospital budgeting related was argued to be inflation in the system. The DRG-based payments were often less than the cost to serve (in both private and public hospitals). Chronically ill, hospitalised patients created bed blocks (and reduced funding from higher margin DRGs). The interviewees mentioned the impact of the influenza epidemic on the system, the need to provide isolation beds, personal protective equipment (PPE), greater use of resources including casual nursing staff cost increases to support or replace permanent staff who became unwell or needed a break. Hospital accountants complained about the issue of cost overruns. Some administrators blamed the internal costing systems, while others blamed the funding structure. Most suggested

that they have no choice in the type of patients they admit (they cannot turn away public or private patients who present to their emergency department). However, none mentioned the potential for adopting an outpatient model, to better manage the patients that put demand on their resources. Two accounting interviewees, one from a large private hospital (in a wealthier suburb) and one from a large public hospital (in a less affluent suburb) suggested the funding models did not adequately support or fund remote home-based care interventions. One clinician reinforced the notion that a DRG code is required for payment, which takes the emphasis away from health promotion and ‘wellness’ and places the emphasis back on ‘illness’ and payment for volume throughput. It was argued that there were a lot of bottom-up digital health solutions being proposed and tested in clinical trials. But making decisions on budget allocation to meet targets and demands of the different clinical directorates, lacked strategic planning. In considering the moral issue that arises when taking a volume-driven approach to funding and budget allocation, one administrator stated, *“I have hypothetically asked this of others. Do we treat one person for \$100,000 or 100 patients for the same price?”*. These were contemplated hypothetical questions, prior to COVID-19, but soon to become a reality. While the malleability of the model was evident in the changes underway, it appeared that the system is still in ethical and moral conflict over the nuances of delivering VBHC.

Digital health investment – Income statements versus balance sheets

One of the aims of the interviews within the hospital setting was to tease out the technical role of accounting and help reveal the social and moral role that accounting can play in valuing for digital health interventions, it was interesting to note that digital health investment appraisal did not dominate our conversations. The valuing discussions tended to revolve around funding models, capacity issues, DRG-costs and waste minimisation. Whereas investment in digital health technologies appeared to be treated more as a short-term project, or a government gift. This potentially emphasised the reduced autonomy that public hospital management have when treated as government ‘cost centres’ without ‘investment-centre’ autonomy. The focus for accounting was on managing activity performance and ABF through the income statement, rather than emphasising the balance sheet. One interviewee, a digital health company executive working within a hospital on a successful digital health grant, confirmed that *“grant funding is useful to a point, but it also has its own issues. ...there's a time period to it. It also means that the institution doesn't necessarily value it as much as they should or would. And I think it doesn't necessarily always instil the right behaviours. ... realistically hospitals should be paying for the digital health systems because it improves efficiency. But, at the moment the*

funding models don't necessarily allow that". Agreeing with this comment another administrator said: *"we have activity-based funding. There's nothing else. There are other models, but no one's brave enough yet!"*

Nevertheless, state funded investment was occurring and where possible, clinical work was supported by AI-driven health care services, scanning technology and asset trackers to further refine direct, and indirect costs and equipment use for each DRG. In addition, large strategic infrastructure assets, such as EMRs are providing more information, transparency and surveillance. This was evidenced by the Medical Director who showed us a mobile app that provides up-to-date information on his patients, which is entered directly by pathology, radiology, nursing staff and machines at the patient bedside. He laughed as he showed us his ID badge, which also has an asset tracker attached, explaining even staff are tracked, as well as the equipment. "Nothing can go missing, not even me!" Nevertheless, the ad hoc nature to investment was apparent in our interview process.

With COVID-19 providing the opportunity for essential digital health interventions, hospitals were responding to NHMRC and other similar Rapid Response Grants that would provide necessary support to deal with anticipated hospital demands. One policy maker reflected on this during a later interview, when asked whether COVID-19 in some way helped the digital health investment agenda. He explained *"that's a tough question to answer, only because my first response is no! Which is quite shocking right? We've seen investments in technologies that have got us over the line to deliver essential services, but there's been no strategy around it"* He later indicated that there was some very important work done to lobby for new COVID-19 digital health capabilities in their jurisdiction, such as remote monitoring of patient observations while in hotel quarantine, which will be something they aim to expand to the community and will *"go into battle for with the finance people"* to guarantee long-term funding support for this. Where Mennicken and Power (2015) find value contestations largely residing in the balance sheet, it was the largely income statement and ABF funding agenda that drove the valuing challenges in this setting.

The federal government funded ABF and the state funded capital investment mean that jurisdictional infrastructure investments are both large and political. From a VBHC and digital health investment perspective, attention is given to the ERM infrastructure and connected care through patient-centric data collection and real-time dissemination to clinical decision-makers.

While these are state-funded, many of the condition-specific digital health interventions emerge from clinical insights and patient-centric needs. These might rely on ad hoc grants and short-term clinical trials to justify worthiness. Investments by individual hospitals reveal the accounting-related problematic confirmed by the field conversations. Ad hoc or targeted government and industry grants would pay for the prototype development and clinical trial, and the hospital eventually would be required to pay for the use of the technology, which would be owned and managed by health technology companies. Many of the clinically identified VBHC investments became projects ‘won’ and owned by the different clinical directorates and use would continue until funding expired.

Reflecting on our interview discussion and our own involvement in a clinical trial of a digital health intervention, and those presented at the inaugural 2021 VBHC conference, we note the project-oriented innovations emerging as bottom-up innovations. Championed by a surgical director, the investment we were involved in was largely borne by the digital health technology company. The original prototype developed by clinicians as part of a large business-funded grant and further funds made the clinical trial possible. With the randomised control trial now concluded, there is no indication that further investment will be made, regardless of the clinical benefits (PREMS and PROMS) and the technical capacity. In this situation, financial cost-benefit analysis was stymied by the ABF systems, which did not routinely capture the time-driven activity data we required. Because of the disconnect with AFB and the challenges with long-term investment, Australian digital health technology companies are moving offshore to maximise investment potential and in jurisdictions that funded digital health interventions. In other offshore locations, digital health interventions can be prescribed, and funded, like a drug intervention. Data laws and the ability to link to ERMs are also major factors to considered in digital health interventions.

Discussion: Positioning for change

Our discussions with leading experts in the Australian healthcare sector ensured we had a rich and diverse narrative on which to interpret our findings. Because of our open-ended questions, we also had the opportunity to clarify comments and confirm our understanding and assumptions with others. One of our last interviews was with a leading healthcare policy maker, an expert in ABF, which was extremely valuable in consolidating our narrative.

In considering the *hybridisation of accounting* in the hospital setting, we find siloed skillsets and lack of a cohesive narrative. We also find there is a lack of accounting knowledge by clinicians and many of the policy makers. Accountants are also struggling to meet the activity-based budgeting requirements and make sense of the revenue/cost variances. With the heavy emphasis on the ABF model, a health economics model introduced with NPM in the late 1980's, accounting is implicated in bringing to life the model requirements. In reflecting on our inductive analytics, we agreed that in some interviews we, as interviewers, actually felt uncomfortable talking about "accounting" or being accounting researchers. Accounting was blamed for the problems or blamed for not understanding the new value-based approaches. In two interviews accounting was derided as being inferior to health economics. In these interviews, we had "I don't understand" responses and had to rephrase our questions and move to the bigger picture, rather than how VBHC would unfold in detailed accounting practices within the hospitals. For example, when discussing investments in digital health, one of our interviewees scoffed at the operational investments as being small and inconsequential, compared with the large digital health infrastructure assets. Assumptions were made that digital health intervention just get adopted into practice when deemed fit for purpose. But how these decisions are made and linked to the funding models were little understood. This further highlighted the lack of hybridised accounting knowledge in this setting and minimal attention to how the big picture becomes operationalised in practice.

From an *ABF malleability* perspective, we noted that incremental change was occurring to address the VBHC movement. However, this was in the form of incentivisation, rather than directly changing the ABF model or approach to funding healthcare. The funding model is income statement focused, which drives agendas, thus creating a different mindset in terms of perceived value. We spoke with hospital managers and policy makers from different state different jurisdictions throughout Australia who are now experimenting with the ABF changes that bundle funds for remote hospital care by multidiscipline teams beyond the walls of the hospital. While these funding efforts aim to keep comorbid vulnerable patients out of hospital, the knowledge of the emerging VBHC-associated cost structures and incentivisation in the ABF has not yet filtered down to management control in many organisations. Unlike Mennicken and Power (2015) who highlight that imperfect valuations largely reside in the balance sheet; this study demonstrates the power of the income statement in public health policy and decisions made by hospitals. As a result of COVID-19 the ABF funding is also

skewed away from payments for elective treatment (i.e., total hip or total knee replacements), as elective surgery is cancelled or postponed while dealing with the pandemic patients, requiring costly intensive care and ventilation. The patients missing out on surgery are in chronic pain, have poor quality of life, requiring medication and other medical support and frequently present to hospital with acute illness that sits on top of their existing, sometimes multiple chronic conditions. The hospital manager, of a hospital in a COVID-19 hot zone recognised that these patients are also their COVID-19 vulnerable patients, best suited for remote monitoring interventions that would keep them out of hospital while they wait for surgery. Again, there are significant moral and ethical dilemmas that result from accounting for patient mix choices in public hospital care. The pandemic has increased the visibility of dysfunctional decisions, which can no longer be ignored by health economists and accountants that bring these contested models to life. Accountants are currently being blamed for their technical practices, with little voice in operational change. This highlights how accounting is far from neutral, implicated in a wicked problem but not given a strategic voice.

These ABF challenges and focus on the income statement have strategic implications for *digital health investment*. For example, in trying to align cost-benefit appraisal with VBHC goals many readily calculable cash-flows were not altered from a revenue perspective, as the DRG funding model uses average activity costs from prior total costs determination, across the network of hospitals. Our investigations demonstrate that taken holistically, the cash-flows generated from operational digital health interventions remain outside the hospital funding models. For example, remote monitoring that minimises patient-incurred costs or savings from not having to travel to appointments is not measured. Savings from technology that integrates learning teams and breaks down siloed clinical expertise is similarly not included in the ABF model or hospital accounting system. Likewise, future added costs incurred when a patient's condition moves from a minor elective to a major complexity because of the long and delayed waiting lists, are similarly not considered in traditional ABF. For most hospitals in this field study, digital health interventions were largely a 'wish list' item for their hospital to address concerns with the large number of older patients with chronic comorbidities, such as diabetes and obesity that are embroiled in a cycle of not being well enough to be placed on the surgical waiting list for QoL interventions. Our collaborative discussions remain open to government grant opportunities, further supporting our evidence on the cycle of sporadic investment in digital health and the need for strategic accounting intervention.

Conclusion

With recognised resource constraints, there are continued calls for increased government expenditure in health for improved hospital capacity to manage growing demand. The counter argument by proponents of the VBHC movement is the need for preventative health to reduce hospital demand. They recognise the need to improve outdated funding models and misaligned decision-making (Raymond, 2019; Koff and Lyons, 2020). Our findings concur that the system is volume-driven, with an ABF model that funds illness over wellness and preventative care. Nevertheless, we find that incentivisation and changes in the ABF model are bringing about emergent change, encouraging hospital managers to be more strategic about the way they manage throughput. In rewarding the shift from inpatient to outpatient care, the difficult comorbidity high cost, high volume patients should reduce, alleviating some of the pressure that hospitals are currently faced with. The pandemic has exacerbated these concerns. In terms of Tiesberg *et al.* (2020) strategic framework for VBHC, the ABF model change is beginning to ensure the first strategy to *understand shared health needs of patients*, can be achieved. The emerging change to ABF funding incentivising multidisciplinary teams and ‘bundling’ care to deal with elderly people with multiple chronic conditions is the first step. The challenge is for accounting to support this move and provide insights into the resource trade-offs and benefits this outpatient will provide. Rather than occur as a reactive response to deal with COVID-19 patients (Firtin and Karlsson, 2020), accounting is well-positioned to support a strategic response. However, this requires education, not only of accountants, but clinicians and policy makers, so they better understand how the ideals of the emergent health economic solutions are operationalised by accounting. Further education on the implications of the funding is also required to emphasise the moral and ethical dilemmas that are faced by those working in the hospital setting. Particularly, given the social health implications that arise from dysfunctional decision models. Taking a patient-centred approach requires broader notions of value (Annisette and Richardson, 2011). Further research is required to contribute to valuation studies in accounting.

The second strategy *design solutions to improve health outcomes*, is an area for accounting to play a much larger role, especially guiding clinician innovators with enhanced cost-benefit modelling of their time-limited digital health interventions that sit outside the ABF. Further work in this area in the healthcare setting would be a valuable and meaningful contribution to enhance multidiscipline expertise. In this way, accounting is essential to ensure digital health

interventions are an important part of a strategic planning process, rather than rely on sporadic grant opportunities that possibly benefit individual career paths, rather than society. This is essential as these digital health interventions generally meet the strategic investment definition (Simons, 2000), but lack adequate appraisal. Vesty *et al.* (2015) draw on an integrated thinking mindset to show how cost-benefit modelling has evolved in the public sector, with potential avenues to extend research to cost-benefit modelling and digital health investment in VBHC. This change in focus from income statement to balance sheet provides the opportunity for further accounting research in valuation methodologies and shifting power influences (Mennicken and Power, 2015).

Being part of an organisation's long-term strategic plan, included in the strategic and annual budget, and costed to allow for ongoing monitoring and evaluation over the lifecycle of the investment, will encourage Tiesberg *et al.* (2020) third strategy *integrate learning teams*. Findings reveal that the cost-centre mindset and siloed decision-making removes the capacity for accounting to support with suitable appraisal techniques. Nevertheless, with the new incentivised ABF and attention to digital health interventions by VBHC proponents, it will be inevitable that systems and practices will emerge to better deal with patient value delivery. In terms of staffing impacts, digital health investments encourage knowledge sharing and enhance workforce technological capacity (Butler-Henderson, 2010). Accounting needs to be part of this journey and understand the underlying strategic importance as well as social, ethical and moral role that accounting plays in this sector. The field study findings revealed reservations that accounting has the capacity to embrace this change. As such, further insights into training requirements would be useful, particularly for graduates and new healthcare accounting practitioners.

Multiple value(s) need to be captured over time which include both direct and indirect benefits including those that relate to technical, social and moral accountability (Carnegie *et al.*, 2020). This is essential to meet Tiesberg *et al.* (2020) fourth strategy *measure health outcomes and costs*. From a technical perspective the acknowledgement of *time* in activity analysis remains important in capturing ABF activities (Kaplan and Anderson, 2007) and confirmed in more recent research (Sjogren and Fernler's, 2019; Jansson *et al.*, 2020). However, the ways in which PREMS and PROMS can cohabit with ABF is something that needs further work and problematisation. This is essential to meet the new definition of accounting (Carnegie *et al.*, 2020) and give a voice to accounting, alongside the dominant economic modelling. From a

social and moral perspective, adequate consideration should be given to the impact accounting has on patient care along with operational costs and population health impacts. The accounting academy have the tools to take a larger role in supporting this valuing challenge to motivate solutions for managers wanting to make socially impactful operational and strategic decisions. This is particularly important when dealing with the pandemic and the potential for dysfunctional decision when financial and other operational capacity resources are stretched. Patient mix choices and ABF can continually be enhanced by taking a VBHC lens.

Finally, to be part of the VBHC movement, accountants need to embrace transdisciplinary literacy and collaboration, addressing the fifth strategy *expand partnerships*. Further digital health and accounting education will help develop communication channels between clinicians and accountants. Of vital importance is the relationship between health economics and accounting. Particularly, if accounting continues to be implicated, and even blamed for operationalising contested models. In answering Duckett's (2019) calls, accounting has the means to build new accounting networks with systems that extend ABF to VBHC measures and further incentivise the 'system', so the population benefits from distributed arrangements. It is time to exploit the uncertainty of COVID-19 with new values and measurement so digital health initiatives can be included in strategic choices by hospital managers who are willing to embrace the strategic framework for VBHC. Without this appetite for change, the digital health initiatives will continue to remain outside the ABF and investments will remain reactionary and time limiting. Policy contributions that incentivise population health and wellbeing while freeing up the hospital infrastructure, is essential for the new normal that COVID-19 brings to this setting.

Together these five strategies have important implications for accounting education and accounting research. This setting and emerging real world case study is the epitome of accounting as a social and moral practice. An important outcome of the paper is to highlight the moral duty of accountants to innovate outdated techniques as well as recognise that the accounting techniques are far from neutral (Carnegie *et al.*, 2020). They communicate a social and political reality. If innovation is left unchecked, the accounting code of ethics is compromised, and the profession is failing to service their clients – and stakeholders - with the best tools possible for societal health and wellbeing. Accountants must be up to date with the emerging practices and be able to identify the barriers as well as the disruptive nature of this emerging landscape.

The risks associated with dysfunctional resource allocations can directly impact patient lives and society more broadly. Therefore, it is important for accountants to be aware of the behavioural implications and biases associated with the accounting models through this change. Biases in the models can reduce access of care to certain cohorts, or minorities. With prior research acknowledging the cultural politics and powerful actors in this setting (Duckett, 2019), it is essential that accountants are educated on professional behaviour and leadership in committing to professional promises and duties to IESBAs (2021) *International Code of Ethics for Professional Accountants*.

The Code directs accountants to act in the best interest of society, which means they must be educated to identify, evaluate and address threats. This includes widespread consultation across the network, being able to identify pressures and self-interest along with power imbalances that can undermine the intentions of the VBHC movement, and the conditions that direct human life. Accounting education can help develop the critical ethical capabilities of individuals so they can better manage the consequences of the emerging systemic changes and understand what their accounting systems are *creating, shaping and legitimising* (Carnegie *et al.*, 2020, p.69). Accounting research is essential in auditing and assuring the unfolding practices and drawing attention to unintended consequences.

This case study highlights the wicked problems in public healthcare administration and the important changes that are taking place to bring a values-based focused to a system that was traditionally volume and efficiency-focused. With a broader notion of value that encapsulates the quality of life, we argue accountants should be equipped with the ethical and moral skills to drive this social change and effect a fully functioning and inclusive society.

References

- Abernethy, M.A. (1996), "Physicians and resource management: the role of accounting and nonaccounting controls", *Financial Accountability & Management*, Vol. 12 No. 2, pp. 141-156.
- Abernethy, M., and Chua, W.F. (1996), "A field study of control system "redesign": the impact of institutional processes on strategic choice", *Contemporary Accounting Research*, Vol.13 No. 2, pp. 569-606.
- Abernethy, M. A. and Stoelwinder, J. U. (1995), "The role of professional control in the management of complex organizations", *Accounting, organizations and society*, Vol. 20 No. 1, pp. 1-17.
- Australian Healthcare and Hospitals Association (AHHA) (2019), Aiming for Value in Health, available at: https://ahha.asn.au/sites/default/files/docs/policy-issue/ahha_position_statement_-_aiming_for_value_in_health.pdf (accessed online 14 May 2020).
- Aidemark, L.G. (2001), "The meaning of balanced scorecards in the health care organisation", *Financial accountability & management*, Vol. 17 No. 1, pp. 23-40.
- Annisette, M. and Richardson, A.J., 2011. Justification and accounting: applying sociology of worth to accounting research. *Accounting, Auditing & Accountability Journal*, Vol. 24 No. 2, pp. 229-249.
- Annisette, M., Vesty, G. and Amslem, T., 2017. Accounting values, controversies, and compromises in tests of worth. In *Justification, evaluation and critique in the study of organizations*. Emerald Publishing Limited. Bingley, pp. 209-239. <https://doi.org/10.1108/S0733-558X20170000052007>
- Boltanski, L. and Thévenot, L. (2006), "On Justification: Economies of Worth", Princeton University Press, Princeton, NJ.
- Burchell, S., Clubb, C., Hopwood, A., Hughes, J. and Nahapiet, J. (1980), "The roles of accounting in organizations and society", *Accounting, organizations and society*, Vol. 5 No. 1, pp. 5-27.
- Butler-Henderson, K. (2010), "Health reform, health data and the Health Information Manager." (Guest Editorial), *Health Information Management Journal*, Vol. 39 No. 2, pp. 7-8.
- Callon, M. and Muniesa, F. (2005), "Peripheral vision: Economic markets as calculative collective devices", *Organization studies*, Vol. 26 No. 8, pp.1229-1250.
- Carnegie, G., Parker., L and Tsaharidu, E. (2020), "It's 2020. What is Accounting Today", *Australian Accounting Review*, Vol. 98 No. 31, pp 69-73.

- Chua, W. F. (1996), "Experts, networks and inscriptions in the fabrication of accounting images: A story of the representation of three public hospitals", *Accounting, Organizations and Society*, Vol. 20 No. 2-3, pp. 111-145.
- Chua, W.F. (1995), "Experts, networks and inscriptions in the fabrication of accounting images: a story of the representation of three public hospitals", *Accounting, organizations and Society*, Vol. 20 No. 2-3, pp. 111-145.
- Chua, W.F. and Preston, A. (1994) "Worrying about accounting in health care", *Accounting, Auditing & Accountability Journal*.
- Cooper, R. and Kaplan, R.S. (1988), "Measure costs right: make the right decisions.", *Harvard Business Review*, Vol. 66 No. 5, pp. 96-103.
- Demirag, I., Firtın, C.E. and Bilbil, E.T. (2020), "Managing expectations with emotional accountability: making City Hospitals accountable during the COVID-19 pandemic in Turkey.", *Journal of Public Budgeting, Accounting & Financial Management*, Vol. 32 No. 5, doi: 10.1108/JPBAFM-07-2020-0097.
- Department of Health and Human Services (DHHS) (2019), "Policy and funding guidelines 2019-20: Policy guide", ISSN 2207-8347, available at:
<https://www.dhhs.vic.gov.au/sites/default/files/documents/201908/Policy%20and%20Funding%20Guidelines%202019-20.pdf>.
- Dimitropoulos, V., Lean, N., Butler-Henderson, K. and Shephard, J., 2019. Supporting Clinical Coders: future proofing the integrity of our clinically coded data. *HIM-Interchange*, Vol 9 No. 1, pp.17-24.
- Duckett, S. and Willcox, S. (2015), "*The Australian health care system* (No. Ed. 5)", Oxford University Press.
- Duckett, S., Beaumont, M., Bell, G., Gun, J., Murphy, A., Wilson, R. and Crowley, T. (2015), "Leading change in primary care: boards of primary health networks can help improve the Australian health care system", available at: <https://ahha.asn.au/leading-change-primary-care> (accessed 5 May 2021)
- Duckett, S. (2019), "Value-Based Healthcare: Fad or Fabulous?", *HealthcarePapers*, Vol. 18 No. 3, pp.15-21.

- Duckett, S.J. (2008), "The Australian health care system: reform, repair or replace?", *Australian Health Review*, Vol. 32 No. 2, pp. 322-329.
- Espeland, W.N. and Sauder, M. (2007), "Rankings and reactivity: How public measures recreate social worlds". *American journal of sociology*, Vol. 113 No.1, pp. 1-40. Expert Panel on effective ways of investing in Health (EXPH) (2019), "Defining value in "value-based" healthcare.", available at: https://ec.europa.eu/health/sites/default/files/expert_panel/docs/024_defining-value-vbhc_en.pdf (accessed online 11 May 2021).
- Firtin, C.E. and Karlsson, T.S., (2020), "(Re) descriptions of medical professional work: exploring accounting as a performative device within an emergency unit health-care context.", *Journal of Public Budgeting, Accounting & Financial Management*.
- Frow, P., McColl-Kennedy, J.R. and Payne, A. (2016), "Cocreation practices: their role in shaping a health care ecosystem", *Industrial Marketing Management*, Vol. 56, pp. 24-39.
- Gale, N.K., Heath, G., Cameron, E., Rashid, S. and Redwood, S., 2013. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC medical research methodology*, Vol. 13 No. 1, pp.1-8.
- Grocott, P.W., Plumb, J.O.M., Edwards, M., Fecher-Jones, I. and Levett, D.Z.H. (2017), "Re-designing the pathway to surgery: better care and added value", *Perioperative Medicine*, Vol. 6 No. 9, DOI 10.1186/s13741-017-0065-4.
- Guest, G., Bunce, A. and Johnson, L., 2006. How many interviews are enough? An experiment with data saturation and variability. *Field methods*, Vol.18 No.1, pp.59-82.
- Gray, R., Owen, D., and Adams, C. (1996), *Accounting and Accountability: Changes and Challenges in Corporate Social and Environmental Reporting*, Prentice Hall, London.
- HealthShare Vic (2021), "Medical Equipment Sourcing Stream", available at: <https://healthsharevic.org.au/tenders-and-contracts/info-for-health-services/ess/> (accessed 9 June 2021).
- Hirji, N., and Geddes, G. (2016), "What's your digital ROI? Realizing the value of digital investments." Price Waterhouse Cooper, available at: <https://www.strategyand.pwc.com/ca/en/media/whats-your-digital-roi.pdf> (accessed 11 May 2021)
- Hood, C. (1995), "The New Public Management in the 1980s: Variations on a theme", *Accounting, Organizations and Society*, Vol. 20 No. 2-3, pp. 93-109.

- International Ethics Standards Board for Accountants (IESBA), (2021), 2020 Handbook of the International Code of Ethics for Professional Accountants (including Independence Standards), Retrieved from <https://www.ethicsboard.org/publications/2020-handbook-international-code-ethics-professional-accountants>, accessed 18 Jan, 2022.
- Jain, A., Nair-Hartman, A., Fraser, H., Saravanakumar, S. and Daniel, D. (2019), "The emergence of value-based health", *IBM Institute for Business Value*, available at: <https://www.ibm.com/downloads/cas/N2NNWYXG> (accessed 9 June 2021).
- Jansson, M., Vuorinen, A.L., Harjumaa, M., Similä, H., Koivisto, J., Puhto, A.P., Vesty, G. and Pikkarainen, M. (2020), "The digital patient journey solution for patients undergoing elective hip and knee arthroplasty: Protocol for a pragmatic randomized controlled trial", *Journal of Advanced Nursing*, Vol. 76 No. 6, pp. 1436-1448.
- Jones, M.J. and Solomon, J.F. (2013), "Problematising accounting for biodiversity", *Accounting, Auditing & Accountability Journal*, Vol. 26 No. 5, pp. 668-687. <https://doi.org/10.1108/AAAJ-03-2013-1255>.
- Kaplan, R.S. and Anderson, S.R. (2007), *Time-driven activity-based costing: a simpler and more powerful path to higher profits*. Harvard Business Press.
- Kaplan, R.S. and Norton, D.P. (2001). "Transforming the balanced scorecard from performance measurement to strategic management: Part 1.", *Accounting Horizons*, Vol. 15 No. 1, pp. 87-104.
- Koff, E., & Lyons, N. (2020), "Implementing value-based health care at scale: the NSW experience", *The Medical Journal of Australia*, Vol. 212 No. 3, pp. 104-106.
- Kokshagina, O. and Keränen, J. (2021), "Institutionalizing value-based healthcare in a service system: a policy and document analysis over three decades", *Journal of Business & Industrial Marketing*, Vol. ahead-of-print No. ahead-of-print, available at: <https://doi.org/10.1108/JBIM-08-2020-0380> (accessed 7 June 2021).
- Kornberger, M., Justesen, L., Madsen, A.K. and Mouritsen, J. eds., 2015. *Making things valuable*. Oxford University Press, USA.
- Kurunmäki, L. (2004), "A hybrid profession – the acquisition of management accounting expertise by medical professionals", *Accounting, Organizations and Society*, Vol. 29 No. 3-4, pp. 327-347.
- Levinson, W., Kallewaard, M., Bhatia, R.S., Wolfson, D., Shortt, S. and Kerr, E.A. (2015), "Choosing Wisely': a growing international campaign", *BMJ Qual Saf*, Vol. 24 No. 2, pp. 167-174.

- Li, Q., Blume, S.W., Huang, J.C., Hammer, M. and Ganz, M.L. (2015), “Prevalence and healthcare costs of obesity-related comorbidities: evidence from an electronic medical records system in the United States”, *Journal of medical economics*, Vol. 18 No. 12, pp. 1020-1028.
- Llewelyn, S. and Northcott, D. (2005), “The Average Hospital”, *Accounting, Organizations and Society*, Vol. 30 No. 6, pp. 555-583.
- Lowe, A. (2000), “Accounting in health care: some evidence on the impact of casemix systems”, *The British Accounting Review*, Vol. 32 No. 2, pp. 189-211.
- Ma, R. (2019), “Clinical Costing Standards”, *Clinical Costing Techniques and Analysis in Modern Healthcare Systems*, IGI Global, pp. 1-30.
- Mennicken, A. and Power, M., 2015. Accounting and the plasticity of valuation. *Moments of valuation: Exploring sites of dissonance*, Oxford, UK, pp.205-228.
- Miller, P., Kurunmäki, L. and O’Leary, T., 2008. Accounting, hybrids and the management of risk. *Accounting, organizations and society*, Vol. 33 No.7-8, pp.942-967.
- Mrak, M. K. and Sokolic, D. (2019), “Evolution Paths of Business Models in Personalized Medicine”, *Personalized Medicine in Healthcare Systems*. Springer, Cham. pp. 149-158.
- NSW Health (2021a), "About value-based healthcare.", available at <https://www.health.nsw.gov.au/Value/Pages/about.aspx> (accessed 11 May 2021).
- NSW Health (2021b), "Patient reported measures.", available at <https://www.health.nsw.gov.au/Value/Pages/patient-reported-measures.aspx> (accessed 11 May 2021).
- Raymond, K. (2019), “Reforming for value: Opportunities for outcome-focused national health policy”, Deeble Institute for Health Policy Research, Number 33, available at at: https://ahha.asn.au/system/files/docs/publications/deeble_issues_brief_no._33_reforming_for_value_opportunities_for_outcome-focused_national_health_policy_0.pdf.
- Palmer, K.S., Agoritsas, T., Martin, D., Scott, T., Mulla, S.M., Miller, A.P., Agarwal, A., Bresnahan, A., Hazzan, A.A., Jeffery, R.A. and Merglen, A. (2014), “Activity-based funding of hospitals and its impact on mortality, readmission, discharge destination, severity of illness, and volume of care: a systematic review and meta-analysis”, *PLoS One*, Vol. 9 No. 10, p.e109975.
- Porter, M. E., and Teisberg, E. O. (2006), “Redefining Health Care: Creating Value-Based Competition on Results”, *Harvard Business School Press*, Boston.

- Porter, M. E., Larsson, S. and Lee, T. H. (2016), "Standardizing patient outcomes measurement", *N Engl J Med*, Vol. 374 No. 6, pp. 504-506.
- Prising, J., Sorenson, A. and Weinelt, B. (2018), "Digital Transformation Initiative Maximizing the Return on Digital Investments", World Economic Forum.
- Productivity Commission (PC) (2021), *Innovations in Care for Chronic Health Conditions*, available at: <https://www.pc.gov.au/research/completed/chronic-care-innovations/chronic-care-innovations.pdf> (accessed 5 June 2021).
- Raich, W., Baxter, J. Robinson, L.A. and Hammitt, J.K. (2018). "Valuing Reductions in Fatal Risks to Children", available at: https://www.cpsc.gov/s3fs-public/VSL_Children_Report_FINAL_20180103.pdf?crqdQGttjTalnQbCPf3.7freqXkMrEbu (accessed 9 June 2021).
- Simons, R. (2000), "Performance measurement and control systems for implementing strategy", Prentice Hall, USA.
- Sjögren, E. and Fernler, K., (2019), "Accounting and professional work in established NPM settings.", *Accounting, Auditing & Accountability Journal*, Vol. 32 No. 3, pp. 897-922.
- Stark, D. (2009), "The Sense of Dissonance: Accounts of Worth in Economic Life", Princeton University Press, Princeton, NJ.
- Teisberg, E., Wallace, S. and O'Hara S. (2020), "Defining and Implementing Value-Based Health Care: A Strategic Framework.", *Academic Medicine: Journal of the Association of American Medical Colleges*, Vol. 95 No. 5, pp 682-685, <https://doi.org/10.1097/ACM.0000000000003122>.
- Tseng, E.K. and Hicks, L.K. (2016), "Value based care and patient-centered care: divergent or complementary?", *Current hematologic malignancy reports*, Vol. 11 No. 4, pp. 303-310.
- Tsevat, J. and Moriates, C. (2018), "Value-based health care meets cost-effectiveness analysis", *Annals of internal medicine*, Vol. 169 No. 5, pp. 329-332.
- van Velthoven, M. H., Cordon, C. and Challagalla, G. (2019), "Digitization of healthcare organizations: the digital health landscape and information theory", *International journal of medical informatics*, Vol. 124, pp. 49-57.
- Verhoeven, V., Tsakitzidis, G., Philips, H. and Van Royen, P. (2020), "Impact of the COVID-19 pandemic on the core functions of primary care: will the cure be worse than the disease? A

qualitative interview study in Flemish GPs”, *BMJ open*, Vol. 10:e039674, doi: 10.1136/bmjopen-2020-039674.

Vesty, G. and Brooks, A. (2017), “St George Hospital: Flexible Budgeting, Volume Variance, and Balanced Scorecard Performance Measurement”, *Issues in Accounting Education*, Vol. 32 No. 3, pp.103-116.

Vesty, G., Brooks, A. and Oliver, J. (2015), “Contemporary capital investment appraisal from a management accounting and integrated thinking perspective: case study evidence”, CPA Australia.

Woolcock, K. (2019), “Value based health care: setting the scene for Australia. Value in Health”, *Deeble Institute for Health Policy Research*, pp. 323-25.

World Health Organization (WHO) (2016), “Monitoring and evaluating digital health interventions: a practical guide to conducting research and assessment”, available at: <https://apps.who.int/iris/bitstream/handle/10665/252183/9789241511766-eng.pdf> (accessed 5 June 2021)

Appendix 1: The Technical, Social and Moral issues with ABF and COVID-19 Payment

Hospitals allocate budgets to the different medical and surgical directorates based on activity units (NWAUs), calculated as follows:

$$\text{National Weighted Activity Unit (NWAU)}^5 = \frac{\text{Average cost of a patient in a DRG}}{\text{Average cost of all patients across all DRGs}}$$

An example of Activity Units currently determined in ABF, relating to: DRG Code E40A Respiratory Systems Disorders W Ventilator Support Major Complexity (Figure 1). Every DRG Code has a similar breakdown of activity cost items, categorised as direct or overhead.

INSERT FIGURE 1 APPENDIX HERE

COVID-19 has been given its own DRG category with different weighting depending on demographic data and severity (Figure 2).

INSERT FIGURE 2 APPENDIX HERE

In this example, a hospital treating a 78-year old male patient with respiratory complications, is paid \$49,554 (8.2587 PW x \$5,320 NEP, where PW is Price Weight and NEP is National Efficient Price), adjusted for resource consumption and length of stay. In comparison, a standard hip joint replacement in an average hospital is weighted in the same way, paying approximately \$22,207 (4.1742 PW x \$5,000 NEP). A patient's medical record is used to generate the DRG payment code.

Some hospitalised Influenza A (H1N1) and COVID-19 patients receive very expensive Extracorporeal Membrane Oxygenation (ECMO)⁶, heart-lung bypass in intensive care (ICU) for potentially reversible acute respiratory failure (Sukhal et al., 2017; <https://www.elseo.org/covid19>). In some countries, COVID-19 patients over the age of 60 are denied access to ventilators and intensive care beds (Mrak and Sokolic, 2019).

⁵ As an example, the Victorian hospital budget (2019-2020) is \$14,667.2 million, allocated to each hospital in the form of WAUs. Two metropolitan hospitals are allocated funds according to a budgeted patient mix (Casemix) - Monash Health (166,882 WAUs) and Alfred Health (110,546 WAUs). Pricing is around \$5,000 x 1 WAU, depending on hospital jurisdiction.

⁶ Note that ECMO is used in cardiac as well as respiratory failure conditions.