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Systemic Issues of the Information System in the Healthcare Industry: Lessons Learned from the Field in Australia

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Abstract

This paper examines the systemic issues involved in attempting to meet the needs and requirements of this stakeholder group: health care provider, information system vendor of the health care provider and the government funding department in the reporting data for the funding model for the health care provider. In this paper we consider the upgrade process of the information system to meet the data requirement with a change in policy by the government funding body in their funding model.

Keywords: eHealth, health information systems, health funding models, health systems.

1 Introduction

Health care providers in western society now command and require increasingly large budgets to provide health care for their patients (or clients) and their communities. Moreover, in western societies there is a growing problem of an aging community and this has seen an increasing drain and burden on the resources on health care systems (Cooper & Hagan 1999; Coory 2004). Indeed, government funding to health care has been steadily growing during the last ten years and will grow into the future. This has required health care providers to clearly define their resource usage and provide information (e.g., patient level data) on their organisational and operational processes in the provision of these services (AIHW 2008). In both the public and private health care systems this has seen the development of funding models that are based on the development of “best practices in health care.” To assess the performance of health care provides in attaining best practices information and data should be reported on the performance from within the health care system and from the diversity of health care providers to develop a fair and equitable funding model. The central business relationships between primary health care providers and the government funding body is the ability to provide accurate and timely reporting of the operational performance of the health care providers. Central to this flow of information is the development of information systems to capture, process and output reports that can be used within the

government bodies funding model. Moreover, the development of information systems that are able to capture this information need to have clear and detailed understand of what information is required and how it should be presented for use by the funding model. This requires the development of sophisticated health care information systems. The information system vendors provide an important role that facilitates between the development of systems for the capture of information for the health care providers to enable them to report to the government, as well as provide for the health services operational needs.

This paper will investigate the relationships, impact and effect on the three major stake holders of a government mandated information system for health care provider funding: health care provider, information system vendor of the health care provider and the government funding department. The varied key stakeholder organisations involved have different objectives and outcomes from the information system development. Moreover they perceive the necessity of change differently and develop systemic behaviour that may be different for the proposed outcome of the funding model that is being implemented.

2 Funding Model Approach in Health Care

While funding models vary between the states across Australia, we will examine the model where a government body directly funds the health care provider for the clinical work they perform, as is the case in Victoria, Australia. The funding for components of patient care for health services comes in the form of a preset annual budget. This is allocated on a patient-by-patient basis relating to the coded diagnosis and procedures attributed to their episode of care. The overall patient level funding to the health service may be supplemented with bonus funding where government preset performance targets have been met (Department of Health 2012).

Bonus targets are set differently for health organisations depending on demand and specificity of the core patient care they undertake. This bonus funding is divided across the state so cannot be predicted with any accuracy by individual health services. Though the amount of bonus funding is unknown till the end of the financial year health services rely on and allocate this resource well in advance of knowing the actual figure.

This requires that the data incorporated into the hospital information system meets the information compiled by the health services so that the health services are accurately informed of how their own organisation stands for the current financial year compared to the previous year.

3 Funding Model – Implications for the health care providers

The Department of Human Services, DHS, is the government funding department for the health sector and is the largest state government body within in Victoria, Australia. The DHS comprises a budget of over nine billion Australian dollars and directly employs twelve thousand staff with a further eighty thousand staff indirectly in health care facilities across Victoria (Department of Health 2012). These health care facilities are legislated to report patient or client episodes of service to the government funding department at preset intervals.

The government funding department, DHS, has numerous divisions dealing with different pathways of clinical reference units (e.g., Funding, Health and Information Policy Branch, etc) and these groups are then further divided into functional health care groups such as clinical data reporting (e.g emergency presentations, elective surgery, etc). The DHS executive develop the funding model that attempts to provide funding that meets the health needs of community and meets the responsibilities of government. The DHS clinical units are responsible for interpreting the funding model and develop the data requirements that can be used to understand if a health care provider has been achieving their targets and the level of funding that they should be provided. This allows the DHS clinical units to provided information system specification documents to health care providers and their software vendors. From this specification both the health care provider and software vendors develop information systems that are capable of capturing information and data from the operational processes of the health care providers that will allow them to report on the performance of the organisation. Moreover, this data is received from the health service providers and is interpreted by the DHS clinical units and the information gained is used to evaluate performance and therefore the level of funding allocated to each health service.

Government bodies require the supply of data extracts from health care providers to monitor clinical performance and patient outcomes (VHA 2010). When the government body changes the data they require a change in data captured by the health services, or merely it would seem a change in data extracted for the submission will be required. Health services have limited resources for day-to-day systems support, maintenance and data analysis. Extending these resources for the testing and implementation of information system upgrades reduces their ability to maintain ongoing duty of care within the organisation. With a government mandated upgrade the timing is determined by outside forces preventing the organisation from choosing timing to suit other competing information system demands on the time of the staff. In addition as the benefit to the Health Service is not perceived to be the motivation for the upgrade, the Health Service is reluctant to commit resources to the upgrade and pressure is placed on staff to incorporate testing and implementation into their normal roles. To add to the difficulty across the region business relationships are varied and diverse in the Australian Health Care funding model adding complexity to the system upgrade process particularly when issues or errors are uncovered. Over time the data needs of the government funding department change and a schedule for the changes in submitted data has to be confirmed. Information system software changes at both the health care provider and the government funding department then need to be modelled and developed from the functional specification documents the DHS produces.

3.1 Business Relationships between the stakeholder groups

The DHS, government funding body, perceives that both the health service and the software vendor are their clients. While the software vendor is paid direct by the health care provider, the health care provider in turn is funded on a case by case basis by the DHS as well as (hopefully) receiving bonus funding for achieving preset performance targets (Barwon Health 2012).The software vendor perceives the government as the client, leaving the health service between two controlling powers. If the health services lacks sufficient internal technical resource they are left at the mercy of believing what

they are told both theoretically and in respect to the data by the other key stakeholders, which can lead to inaccurate figures determining performance targets and ultimately funding.

The government deals with each health service individually. The health services in turn deal with the information system vendors who may have multiple health services to support. The government body also has dealings with the information system vendors who may support the business processes of one or many health care providers, as in figure 1. While it may seem simpler for the larger vendors with multiple clients to support change, the business of health is so diverse that individual health services may have conflicting needs. This can indeed make it more difficult for the multiply represented software vendors as they may feel that a generic extract component that they plug in to any health service is not possible and a specific extract must be written and upgraded if problems are identified for each health care site.

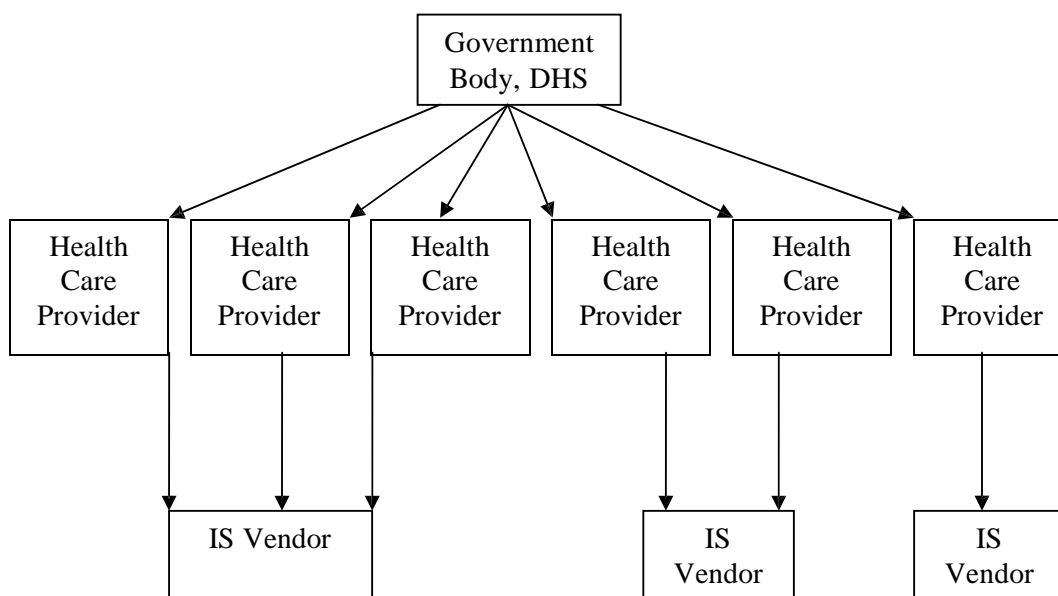


Figure 1: Business Relationship between Funding Bodies, Health Care Providers and Information System Vendors

3.2 Motivation for upgrade – Government funding department

Information Technology (IT) are relatively new business branches within health care settings (Magruder et al. 2005). They are not core business and the resource is traditionally under utilised by clinicians. In this scenario the staffing level is maintained at a minimal operating level and is hard pressed to take on further roles, such as software testing and development. While funding is at the highest priority level for the executive of the health care institution, the workers in IS / IT are often in a “bush fire fighting” scenario and struggle to maintain routine tasks. Upgrades for government data extracts are fully supported by management but are often un-resourced at the coal face placing pressure on the other roles the staff involved must undertake.

The government department requires data in predetermined format to be sent at regular reporting intervals. Previous systems required a text file for each calendar month to be sent and cleared of data errors as determined by the government information system, before being resubmitted until free of detected errors. The file contained a single line of data for each patient episode to be reported to the government funding department. A secondary file containing a check data number for the number of episodes and confirmation of the last day of the month was also sent.

An area of considerable concern is these text file data could simply be edited by a health care provider before submission to the government funding department in order to meet designated targets and/or to receive bonus funding. The systemic issue can lead to health care providers developing processes that alter or modify the actual data to accord to some advantage from the funding model. While data extract editing is not approved by the government funding body for many health services providers the only way to complete their submission was to edit the data files. This is often caused by the software vendor extracts not fully complying with the data model mandated by the government. Similarly, this is the case for a health care provider who has developed their own system. Moreover, the government funding bodies does not make available an information system that allows health care providers to test run their submissions. Nor do they ensure that the software vendors are provided with a typical set of data to ensure the correct operation of their software and processes.

Changes to submitted data fields allow the government funding department to fine tune their data model and receive the data they currently believe is relevant to their decision making processes. The supplied data is used to monitor patient care standards and to set standard funding amounts for each health organization and allocate bonus funding for the reaching of targets. Change of file structure provided the impetus for the government department to change the review process of submitted data. This supported the increase in evaluation of data quality in line with the increase in data complexity. In addition the increase in number of submitted fields that had occurred gradually during the decade since the original submission process was set up, had created complexity in the original extract.

Internal systems required major changes to accept the new file structure. In addition the existing system provided control data reports to the health care providers to verify the analysis of data that would be used for funding and analysis within the whole Government organization for benchmarking like health care organizations.

3.3 Motivation for upgrade - Health Care Provider

The primary motivation for the health care provider to upgrade their system is to continue to gain funding, if they don't change their process to match the new data model then funding is likely to be withheld by the government funding department. While this is supported at the highest level of management, the staff resource required to achieve the desired outcome is often under estimated. A disguised motivation for upgrade is that utilising this period of enforced change can provide the opportunity for the health system to change internal processes to work more efficiently. With the tightening of government check processes the data returned is of a higher quality. This can be used by the Health Care Provider to cross check their internal reports and ensure that the correct

data is sent to the government funding body and accurate bonuses and funding targets set.

3.4 Motivation for upgrade - Software Vendor

The ability for health care providers to edit reporting submissions was a benefit for the software vendor. In the event an error was discovered with their software the timeliness for software correction was reduced as the client hospital could edit the file before submission, rather than the vendor correct data errors or their extract. The new five file format (four data and one check data) disadvantaged the software vendors as the increase in file complexity exponentially increased the difficulty for health care providers to edit files, forcing the vendors to create extracts that fully met specification. As well as the increased number of files, the Patient Administration System (PAS) must now record the state of data in the previous submission data. This reduced the amount of data in each submission by only sending data to the Government funding department if the record has changed since last submission, but the complexity of the extract requires greater database resource to create.

4 Systemic issues in the development of the health information system

Major changes to a government model of information they require from health services require changes to both the government information system and the health services information system. The new government system had to entertain new data fields and a new file format requiring development of a new system to match the new data model that was quite different to the system they were currently employing. This new system accepted data from health care providers who also had extract files completely revised. Their software vendors each developed a model and produced software they believed would match the government department's software model.

Unfortunately the scenario had issues, as the government department software did not in fact match the model it had produced. In addition the software vendors were inclined to model their new software based on the incorrect assumption that their previous system met the previous model and the baseline of data at the government department had multiple inaccuracies due to limitations in the error checking of the previous system. Initially data analysis reports were not available from the government body leaving health sites knowing that their data had been accepted but not which data had been accepted or how accurate it was. Once feedback was available the health care providers were able to request raw data files from the government body and compare the episodes contained with their own internal reports.

Gradually issues were uncovered by many different health care providers with both the health care provider vendor extracts and the government body information system. The discrepancy between the government model and their software increased the time to match models because each health service struggled to adjust to the new system and submit both the existing model while testing the new model that pre implementation testing was limited to extracts could be sent and data accepted by the government body. Post implementation the number of health care providers contacting the government

body with both real and perceived issues was also time consuming for both the DHS and health care providers as many duplications of error location were found.

5 Discussion and Outcomes

Government bodies should carefully consider major changes to data required and the method of its delivery before mandating a change. The traditional timing for change is the end of the financial year, when pressure on staff to complete budgetary data is at its greatest, placing additional pressure on the resources of the health care provider. Multiple health care providers and their multiple information system vendors all trying to match their data to the government system is an inefficient process for the DHS as effectively they are paying multiple health service providers to complete the same system evaluation work simultaneously. A potentially better future scenario is to have one health care provider move to the new system and thoroughly match data sent to the government body, to ensure that the government system is in fact a match for the model that they initially proposed, and that it is possible for a software vendor could match the data requirement.

6 Lessons Learned

In the development of a suitable funding model the funding must understand that the health care providers are faced with the dilemma of “does data validate the model or does the model validate the data.” This extremely is important for all the stakeholders to understand the difference and focus on the model being developed and implemented and what it is attempting to be achieved by its development.

Simultaneous rollout to multiple health services with different software vendors increases the complexity of bedding in a new system and ironing out the inevitable problems. The perception that a system is fully functional when two different systems can send and receive extracted data is erroneous. Acceptance of upgraded software should only be finalized when independent data verifies system reports.

Process change increase of data for processing required Submission officers to reorganise the timing of tasks and processes outside reporting. The earlier system supported multiple extract runs and submissions on a daily basis. The new system requires that the extract be run out of hours to prevent effecting users of the health care system. In addition the government funding bodies system is only able to accept one submission per day from the health care providers. This has created the requirement to change a pre-existing business rule whereby health care providers had to have the previous month’s submission complete and error free before the 21st day of the subsequent month.

Change of data fields and quantity of data added an unnecessary degree of difficulty to the upgrade. While two step upgrade processes tend to be unpopular with users they allow for technical aspects and issues surrounding the upgrade to be analysed. Government mandated information system upgrades are more prone to failure than organization sponsored upgrades if the government does not directly resource them. With IT/IS perceived as a non core business of health care, upgrades are in danger of

being under resourced with this likelihood increasing when health care facilities are forced to upgrade at a time not of their own choosing.

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