Case Study

Using governance and patient flow strategies to improve healthcare service efficiency

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Abstract.   The aim of this case study was to share lessons learned regarding strategies likely to increase healthcare service efficiency. Following quality assurance review of statewide Hospital in the Home (HITH) average length of stay (ALOS) and readmission data, Queensland's Department of Health observed that for some of the highest volume diagnoses seen in Queensland's HITH services in 2017, services that used a public–private partnership (PPP) model of care achieved a shorter ALOS than services using a traditional public model of care without demonstrably poorer patient outcomes. To understand the reasons for the differences in ALOS, ALOS and readmission data from 2017 for 10 high-volume diagnoses were retrospectively compared for five HITH services. Two of the services used a PPP and three used a public HITH model of care. Additional data were collected to determine similarities and points of difference regarding how the services operated in 2017. Hospitals that used a PPP HITH model of care achieved shorter ALOS for eight of the 10 diagnoses, with the difference ranging from 0.94 to 5.98 days. Differences between how the PPP and public HITH services operated in 2017 were identified. The findings suggest that the use of governance strategies, criteria-led discharge and financial incentives is likely to support safe shorter lengths of stay.

What is known about the topic?   Although sometimes challenging to implement and sustain, the use of governance and patient flow strategies is reported in the literature to support efficient healthcare service delivery.
What does this paper add?   An opportunity to compare the efficiency outcomes of two different models of care that were implemented for the same service type concurrently statewide, and where the trial lasted for 4 years, is rare. Review of the learnings from this study may be useful to inform the design of efficient healthcare services. In addition, this paper contains information that may be helpful to those who wish to set up or evaluate a HITH service, or, enter into a PPP.
What are the implications for practitioners?   (1) The use of patient flow strategies warrant prioritisation as using them is likely to improve service efficiency. (2) The processes employed to collect, review and use data to govern and make decisions should be carefully considered as they also are likely to affect efficiency. (3) Funding models can be used to influence efficiency.

Introduction

As part of Queensland Health's commitment to healthcare service improvement, Queensland's Department of Health routinely reviews statewide key performance indicator (KPI) data.

In 2018, following final review of a 4-year public–private partnership (PPP) trial, the authors observed that services using a PPP model of care achieved shorter average length of stay (ALOS) results for many high volume diagnoses, compared to services using a traditional public model of care in the same service type. These results appeared to have been achieved without impacting negatively on patient outcomes.

These observations raised questions regarding why this trend had occurred, and speculation about if whatever the PPP services had done to achieve their ALOS outcomes could be replicated and applied to other service types to support improved

efficiency. This retrospective case study was conducted to answer these questions.

Objectives

The aim of this case study was to share strategies suggested by the study's findings that are likely to improve the efficiency of clinical service delivery while not compromising the quality of the care provided or negatively affecting patient safety and clinical outcomes.

Methods

Five Queensland Health Hospital and Health Services supported this research by allowing senior Hospital in the Home (HITH) staff to participate in structured interviews for qualitative data to

be obtained and to complete a data collection form so quantitative data could be obtained. A condition of participating in this research was that the five Hospital and Health Services would not be identified.

Setting

In 2013, the Queensland state government commenced a 4-year HITH PPP initiative. The then government theorised that implementing PPPs in general, and the outsourcing of health care in this instance, should increase efficiency, represent good value for money and facilitate increased access to public hospital beds.

The HITH PPP initiative resulted in public system HITH services operating concurrently with private provider-delivered, but Department of Health governed (via contract), HITH services. Services using both models provided care to Queensland's public patients.

Both HITH service types routinely reported against statewide HITH KPIs for entire in-patient episodes of care that included a HITH component and where HITH was the discharging ward. The HITH KPIs included measures regarding the volume of patients seen in HITH, ALOS, readmissions within 28 days, transfer to an acute facility, patient satisfaction, clinical incidents and adverse events. Queensland's HITH KPI data were not published in the public domain, but were routinely reviewed by the Department of Health as part of their quality assurance activities. The KPI data, except for satisfaction, clinical incidents and adverse events, were automatically collected via Queensland's Hospital-Based Corporate Information System.

Methodology

The aggregated and deidentified KPI data regarding ALOS and rates of readmission within 28 days for 10 high-volume diagnosis-related groups (DRGs) were compared for all of Queensland's public health service episodes of care involving HITH services in 2017. The data were aggregated by whether the HITH services used a PPP or public HITH model of care.

A subset of the same data was then obtained for five HITH services that participated in the study to provide additional data. 'Transfers back to an acute facility', 'clinical incidents' and 'adverse events' KPI data were not included in this study because the numbers were very low and no data trends were observed during routine quality assurance reviews. Satisfaction data were also not included because HITH services across Queensland reported appropriate levels of patient and carer satisfaction in 2017. No trends were observed during quality assurance reviews.

The DRG codes assigned to the episodes of care were for what the patient was classified as being admitted for (Table 1). The DRG codes do not identify comorbidities, but they do indicate level of complexity.

Ethics approval for this study was granted by the Royal Brisbane & Women's Hospital Human Research Ethics Committee. Following ethics and site-specific approval, clinical directors and nurse unit managers from five HITH services ('The Five') were approached for participation in structured interviews and collection of additional quantitative data. These five HITH services included two PPP and three public services.

During the HITH PPP initiative, some Queensland hospitals operated a PPP and a public HITH service concurrently (two

Table 1.   Diagnosis-related group list

Code	Diagnosis
J64B	Cellulitis, minor complexity
J64A	Cellulitis, major complexity
L63A	Kidney and urinary tract infections, major complexity
L63B	Kidney and urinary tract infections, minor complexity
E62A	Respiratory infections and inflammations, major complexity
E62B	Respiratory infections and inflammations, minor complexity
F62B	Heart failure and shock, minor complexity
G70A	Other digestive system disorders, major complexity
E65A	Chronic obstructive airways disease, major complexity
T60B	Septicaemia, intermediate complexity

HITH services). To be eligible for consideration as one of The Five, in 2017 the service must have discharged at least 30 patients a month and have been in a hospital that predominantly used either a PPP or a public HITH model of care. Every Queensland HITH service that met the criteria was included. The criteria were selected to ensure the service was large enough to study and to rule out, as much as possible, the issue of 'cherry picking' by excluding hospitals that could choose to send patients with specific diagnoses to either a PPP or a public HITH service.

Of the hospitals where The Five were situated, three hospitals used a public HITH model of care exclusively and one used a PPP HITH model of care exclusively. The remaining hospital that used a PPP HITH model of care operated a PPP and a public HITH service concurrently. For that hospital, of the patients admitted for the DRGs studied, 92% were treated by the PPP service and 8% were treated by the public service. Only the data from the PPP service were included in the aggregated data for The Five.

The DRGs studied were the highest volume DRGs of The Five combined; the DRGs were not chosen by the authors.

The purpose of the structured interviews was to gain information and perspective regarding:

- what explains the difference in ALOS outcomes between the PPP and public HITH services
- what factors contribute to efficient HITH services
- what the governance system was for each of The Five in 2017
- if each of The Five used data review meetings, estimated date of discharge (EDD) and criteria led discharge (CLD) among other patient flow strategies in 2017.

Other data, such as typical treatment protocols, referral processes and service location, were obtained for The Five via a purpose designed data collection form.

All data was compared to identify similarities and points of difference regarding how the services operated in 2017 and the factors senior HITH staff considered likely accounted for the differences in ALOS.

Results

The aggregated ALOS (Fig. 1) and readmission within 28 days (Fig. 2) data for the entire state and for The Five are similar.

Of The Five, all accepted referrals from emergency departments (EDs) and other wards. One PPP HITH service also
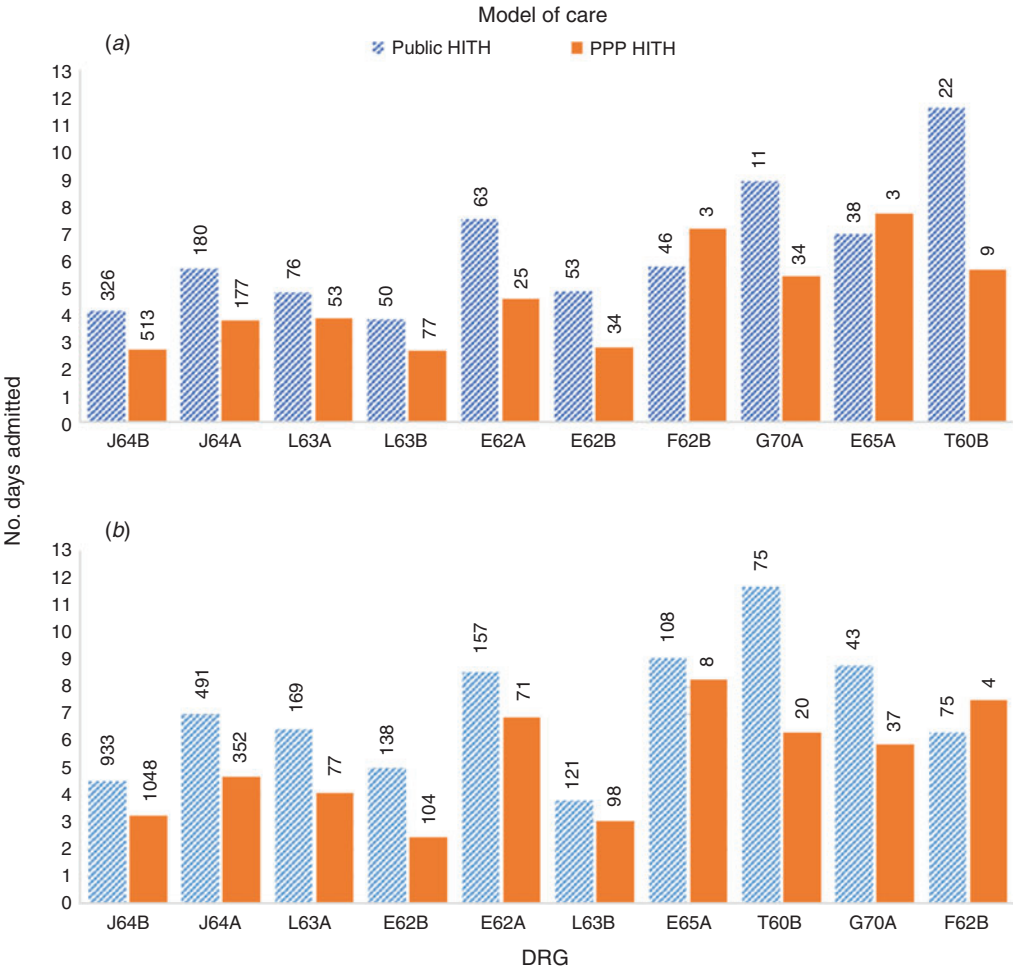
Fig. 1. Average length of stay by diagnosis-related group (DRG) in 2017 for (*a*) 'The Five' Hospital in the Home (HITH) services and (*b*) statewide HITH data for Queensland. Numbers above columns indicate the number of episodes of care. The diagnoses for each of the DRG codes are listed in Table 1.

accepted referrals from out-patient departments. All three public HITH services accepted referrals from other hospitals, and one public service also accepted referrals from residential aged care facilities.

For the 10 DRGs examined, none of the HITH services routinely involved allied health in the care of patients with these DRGs. Overall, there was no difference between the public and PPP HITH services regarding their preparedness to visit their patients more than once a day if multiple visits per day were clinically indicated.

Intake process

All five services reported similar referral and intake processes, with some points of difference. These are detailed below.

Similarities

All five services had an intake HITH clinical nurse who commenced the intake process after referral. In four services, the intake clinical nurse discussed the referrals with the HITH

doctor (registrar or consultant), who would make the final decision about whether the patient would be accepted into HITH.

Points of difference

One service did not have a dedicated HITH doctor. In this service, intake decisions were made by the HITH nurse team.

Prior to accepting any referrals to HITH, three services required at least a discussion between the referring doctor and the HITH doctor, and one service required the HITH doctor to physically see any patients referred from the ED. In either case, if a patient was referred after-hours, the patient may have had to wait in the referring ward or location until the next work-day to be admitted to the HITH service.

One PPP service used a 'HITH first' approach that included a HITH referral speed telephone to rapidly admit patients with certain diagnoses from the ED. This streamlined the intake process from the ED and promoted the use of the HITH service. The public services reported the use of push-and-pull strategies to promote the use of HITH services, but none reported the use of a streamlined admission process from the ED.
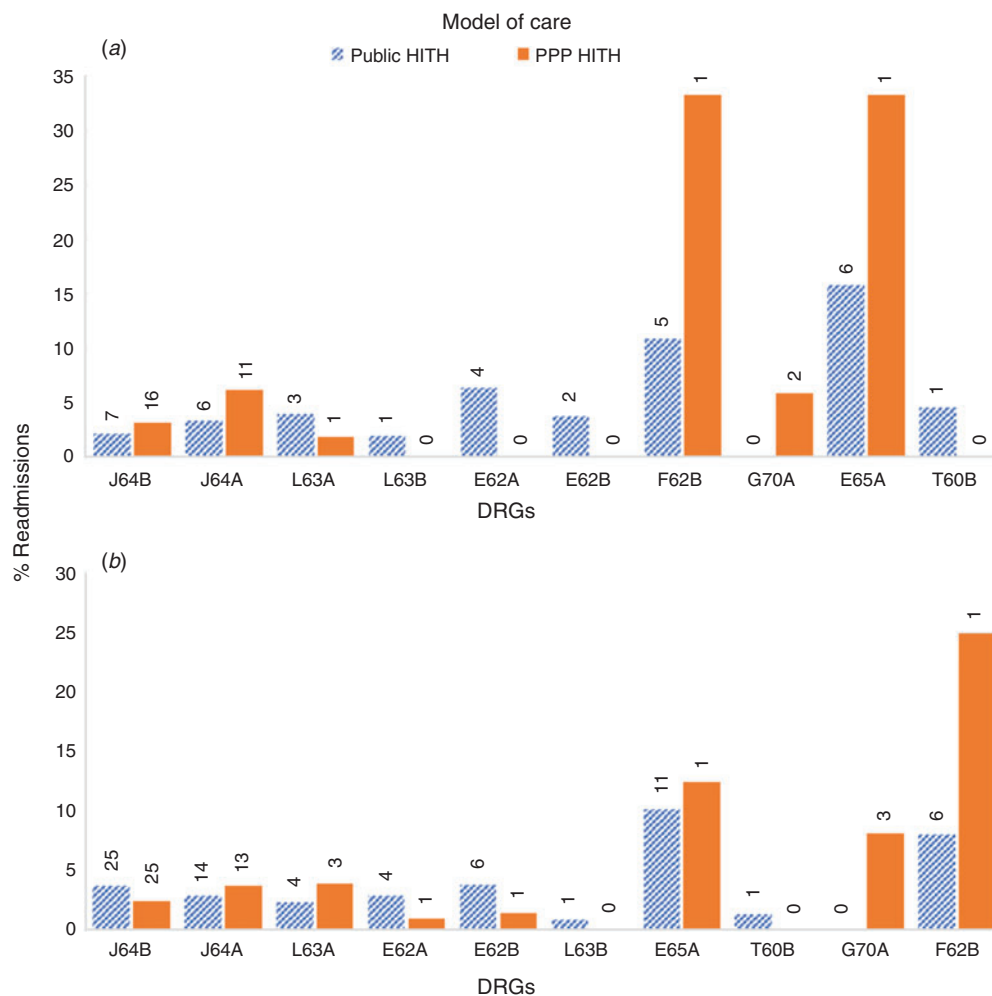
Fig. 2. Readmission rates within 28 days by diagnosis-related group (DRG) in 2017 for (*a*) 'The Five' Hospital in the Home (HITH) services and (*b*) statewide HITH data for Queensland. Numbers above columns indicate the number of episodes of care. The diagnoses for each of the DRG codes are listed in Table 1.

Criteria-led discharge

HITH clinical leaders from three of The Five cited CLD as a likely contributing factor to shorter ALOS. The implication was that the PPP services may have used CLD more extensively than the services that used a public HITH model of care.

In 2017, CLD was used in all five HITH services with the following points of difference: (1) in one PPP service, CLD was the mandatory default discharge strategy; and (2) one public service reported that in 2017 there was no formal CLD process in their hospital.

Use of data

All five services reported routine review and analysis of the following data:

- patient volume (admission and discharge data)
- ALOS
- readmission rates (this included readmission within 28 days for the same diagnosis, and, patients readmitted to a traditional inpatient bed from HITH during the episode of care)
- patient satisfaction and complaints.

Although the services reviewed and analysed similar datasets, they differed in how often the data were reviewed, who reviewed the data, the processes used to review and analyse the data (or parts of the data) and how or where the data were used to support decision making.

A point of difference between the PPP and public HITH services was that the PPP data were reviewed in a routine monthly or quarterly joint governance committee meeting that was attended by the Department of Health, which maintained contract governance of the initiative across the state, the private HITH provider and public hospital staff. Statewide HITH KPIs and emerging issues were discussed at these meetings. Issues would be resolved as much as possible at the meetings and, if necessary, escalated to executive officers from each stakeholder group. These meetings put in place an additional level of governance that the public services were not subject to.

Factors contributing to efficiency and effectiveness

HITH clinical leaders were asked to nominate the factors they considered contributed to efficiency and effectiveness. Clinical

leaders from all five services stated that medical governance and leadership is necessary. Furthermore, marketing, education and clear inclusion and exclusion criteria supported the service being known, respected and trusted by referral sources. Finally, all five services stated that active patient recruitment strategies are necessary. Although pull-and-push models were cited, pull models were viewed by three of the services as being superior to push models. All services recorded the use of HITH staff as advocates for HITH.

Other factors, such as teamwork, access to resources, and flexibility, were noted to varying degrees.

Factors explaining difference in ALOS

HITH clinical leaders were asked to nominate factors that could explain the differences in ALOS. Various factors were suggested to decrease ALOS, including:

- Financial incentives to discharge. (The details of the HITH PPP contracts are commercial in confidence and cannot be published. However, the authors confirm that the contracts included financial incentives to promote the discharge of patients as soon as it was clinically and otherwise appropriate to do so.)
- The importance placed on ALOS. (The contracts linked KPI performance (or lack thereof) to payment and mandated routine review of KPI data by all stakeholders, with corrective action (if required) documented and tracked.)
- CLD.
- Dedicated HITH medical governance.
- Access to human and non-human resources. (For example: clinical equipment such as infusers; more nursing staff and doctors on call to provide extended hours of care; senior doctors; nurses with specialty skills.)
- EDD. (The use of EDD was mandated in the contracts.)
- Models that encourage discharge directly to a General Practitioner.
- Valuing patient feedback.
- Standardised pathways.

Factors that clinical leaders suspected led to increases in ALOS included a lack of trust and communication between the referral sources and private providers, treating patients holistically, socioeconomically disadvantaged patients, the tyranny of distance and models that required the HITH doctor to personally see the patient before the patient was admitted to the HITH service.

Discussion

The purpose of this study was to try to answer the following questions: (1) why did HITH services that used a PPP model of care achieve shorter ALOS (without compromising patient safety or clinical outcomes) for several of the highest volume DRGs treated in HITH compared with services that used a traditional public HITH model of care; (2) what did services that used a PPP model of care do differently to services that used a public HITH model of care; and (3) could the strategies used by the PPP services be transferrable to other health care settings?

Treating the patient holistically, socioeconomic factors and the tyranny of distance were not found to be factors that explained the difference in ALOS outcomes. One of The Five with the shortest ALOS required its staff to travel up to 50 km each way to see their HITH patients, all of The Five serviced socioeconomically disadvantaged populations and the PPP contract obliged the private providers to offer holistic care (e.g. access to allied health services), whereas not all the public services offered access to allied health services.

Based on the following points of difference between how The Five operated in 2017, the findings suggest that beyond increasing access to more or better-quality resources, healthcare services can reduce their ALOS performance via the use of: governance strategies, CLD and financial incentives.

- Only PPP services were subject to joint governance committee meetings and Department of Health participation in governance; this forced governance to be transparent and may have resulted in a Hawthorne effect.
- Both PPP services used CLD routinely, with one service making it a mandatory default discharge strategy. None of the public services reported using CLD as a mandatory discharge strategy, and one reported that, in 2017, there was no formal CLD process in their hospital.
- Both PPP services were subject to financial incentives written into the contracts that promoted the discharge of patients as soon as it was appropriate to do so. Linking payment to KPI performance was another financial incentive. These provisions facilitated corrective action when required on the one hand and incentives to perform on the other.

The subjects for this study were Queensland's HITH services as they operated in 2017. However, the authors propose that the use of governance strategies, CLD and financial incentives may be applied to a broad range of healthcare services, including inpatient, out-patient and community-based services.

The authors do not suggest that the use of PPP models of care will necessarily reduce ALOS. In this case, it was the conditions written into the PPP contracts plus individual hospital initiatives that are likely to have facilitated desirable KPI outcomes.

The authors conclude that should the strategies noted above be applied to other healthcare services, they are likely to support safe, shorter ALOS compared with services that are not using these measures.

Limitations

The outcomes of this study should be considered taking the following design limitations into account: (1) small sample size, particularly for some DRGs; (2) limited prompting of interview participants to maintain study consistency (it is likely that, if prompted, some services would have provided more in-depth information); and (3) the time lag between the period under study and when the structured interviews were conducted. The interviewees needed to rely on their memories regarding what happened in 2017 because they were not interviewed until the first quarter of 2019. Some of what was reported may have been confounded with current HITH practices, which may be different to how the HITH services functioned in 2017.

Competing interests

The authors of this research are both Department of Health, Queensland Health Officers. However, there are no known competing interests regarding this research. The decision to submit this case study for publication was that of the authors alone, and was supported by the Department of Health, Queensland Health.