A prospective audit of bed utilisation and delays in care across London

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Abstract

Background A prospective bed utilisation census of acute London hospitals using an established Day of Care Survey (DoCS), which quantified adult patients not meeting criteria for in-hospital care.

Methods Twenty-three hospitals were surveyed over two weeks in October/ November 2017 using supervised trained hospital staff. Pairs of staff visited wards, reviewed all patients and identified those not meeting inpatient care criteria, recording reasons for delay. Patient demographics, length of stay (LOS), ward specialty and delay reasons were collected.

Results Overall – In total, 8,656 in-patients were studied (overall occupancy 96%, range 82-117%): 800 definite discharges were excluded, leaving 7,856 patients for analysis; seven hospitals had ≥100% occupancy; 1,919/7,856 patients (24%, range 12–43%) did not meet criteria; 56% of patients were over 70 years; five hospitals had higher number of patients <70yo. 56% patients had LOS 0≤7days. Delayed patients – Number of delayed patients increased with age, but three hospitals had more patients <70yo; 53% had LOS≤14 days and 47% LOS>14 days; 13 hospitals had greater/equal number of patients in ≤14 days LOS. For delayed patients in ≤14 days group, most were within seven days of admission (627 ≤7days, 393 8-14 days). In total 34% (range 11-54%) of delays were related to acute hospital reasons (AHR) and 61% (range 46-83%) to wider system reasons (WSR). Eight common themes accounted for 67% of recorded reasons and were equally split between AHR and WSR.

Conclusion Data showed high occupancy levels with insufficient discharges. This study suggests policies selecting age and/or LOS alone as cut offs to tackle delays in care may miss a large proportion of patients requiring more timely interventions. Adopting a proactive thematic approach to improvement using the top eight delay reasons provides an obvious opportunity to reduce delays while noting the inter site variation. All metrics analysed emphasized the need for informed local data to help support local change.

Keywords: delays in care, acute hospital, London, delayed discharges, Day of Care Survey, inpatient flow

Financial and Competing Interests: No conflict of interests declared

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Introduction

UK hospitals are often described as running at 'full' capacity, with bed occupancy in excess of the recommended 85% midnight census figure.[1,2,3] When bed utilisation is high, ensuring patient flow is challenging and usually results in delays in continuum of care for patients, reduced hospital efficiency, and negative impact on patient experience with poorer patient outcomes including mortality.[4,5,6] Bottlenecks in ED departments and patient wards result in overcrowding[7,8], longer waiting times[9,10] delayed patient transfers[11] and increased lengths of stay (LOS)[12]; all affecting patient care adversely.[13] Delayed discharges, to home or community settings has negative impact on hospital flow and is often linked to limited resources.[14,15,16,17] Identifying specific factors that contribute to delays in care in both acute[5] hospitals and the wider system, could highlight areas for improvement that are more likely to succeed if implemented at scale.

The UK four hour access standard provides a useful weather vane for the system, but solutions require a greater understanding of whole system flow as identified in National Scottish and English Collaboratives.[18,19] Individual strategies such as mapping capacity and demand, volume spike forecasting, and measuring four hour hospital performance are often used as patient flow markers.[20] Delays in care or

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transfers of care across the patient journey require more detailed information to target locally relevant improvements.[13] A mechanism to explore this is to review 'appropriateness' of inpatient bed utilisation, most frequently carried out using the Appropriateness Evaluation Protocol (AEP);[21] which measures unnecessary days of hospital care. Previous publications suggest numbers of inappropriate bed days as high as 39.5% in Italy[22] and 46% in UK.[23,24]

The Day-of-Care Survey (DoCS) criteria were developed by Reid et al,[25] building on the AEP, literature review and expert opinion to provide a snapshot audit of hospitals' inpatient status, bringing together several well researched elements of hospital flow in one tool[26], including potential in-hospital and out-of-hospital reasons for delays. They surveyed patients across nine hospitals in Scotland, Australia and England, reporting on average 23% of patients did not meet acute in-hospital care criteria.[25]

In 2017, NHS England (London) aimed to better understand how to improve capacity, by planning a pan-London census using DoCS across all (27) acute hospitals (providing both elective and emergency care and with 24-hour access emergency departments [ED]; rehabilitation, community and private hospitals were excluded). All hospitals were university affiliated. Objectives of this descriptive approach were to provide hospitals and wider system with a better understanding of:

a) numbers of patients not meeting criteria to occupy acute hospital beds, whilst exploring the age distribution, LOS from admission to survey date, ward specialty and alternative place of care
b) reasons for delays: distinguish between acute hospital reasons (AHR) and whole system reasons (WSR) to derive common themes and allow comparative metrics

with the aim of designing a system wide improvement programme to improve patient journey in acute care. This study describes the results, comparing and building on findings of previous publications.

Methods

This was an observational, cross sectional study using DoCS undertaken at each site on a single morning (between 8–10am), during one of two weeks in October (18 sites) and November 2017 (5 sites) to accommodate service needs. Four hospitals were unable to participate for site specific or logistical reasons. All adult inpatients over 16 (excluding intensive care, high dependency units and maternity and mental health wards) were surveyed. Patients were deemed inpatients if waiting more than four hours in ED and awaiting admission (irrespective of clinical diagnosis). Unfunded/surge capacity beds were also included in survey.

A central DoCS coordination team was formed, who over a six week planning period helped with:

- identification of central co-ordinator for each hospital; responsible for gathering reviewer pairs (consisting of clinical (doctor/nurse/allied health professional (AHP) and non-clinical (manager/administrator) on site staff members) to carry out survey and allocate wards
- on site co-ordinator training (both prior to, and on the day of the survey) and oversight to ensure consistency of approach, data collection and analysis on the day of survey

Reviewers were guided to watch DoCS instructional videos online[27,28] and read guidance booklet.[26] Reviewer pairs were allocated to all adult inpatient wards/units in advance, excluding their base ward/unit. Each pair surveyed maximum 30–40 beds. Central DoCS team had oversight of the entire process and validated data collection with a collaborative member on each site during the survey. Figure 1 describes DoCS process, including preparatory phase, survey day and post survey actions.

In depth data collection process is shown in appendix 1. Through discussion with the nurse in charge and review of notes/charts, reviewers decided if the patient met any of the criteria in chart 1 (appendix 2) to remain in hospital. If not, survey charts 2 and 3 (appendix 3) were used to identify the primary reason they had not been discharged and most appropriate alternative place of care. They were not questioning clinical judgment, rather identifying whether the patient could be managed elsewhere, e.g. home or another facility. A clinical override option was available to account for other reasons for stay, though rarely used in practice. Reasons for not meeting criteria were stratified into three groups with defined sub criteria in each: within control of the acute hospital reasons (AHR), those pertaining to wider system reasons (WSR) and if no reason identified option of other were permitted.

All data was checked and entered in a DoCS excel sheet pseudo anonymously. Individual hospital site co-ordinators were sent initial results within 24 hours and by three weeks, a full report including recommendations for improvement created by the central expert team using an iterative approach and available published data.

Ethical approval was deemed not required for this study, as there was no patient identifiable data and data collection sheets were not taken off site. The need for formal ethical approval was waived by Chelsea and Westminster Hospital NHS Trust secondary to this work being classed as service evaluation (Reference: EIC075).

Results

Time taken to complete data collection, with validation and data entry on site, was maximum of four hours, with most sites completing between two and three hours. Of 9,004 available acute beds on survey days, there were 8,656 inpatients reviewed giving an average occupancy of 96% (range of 82%–117% for 23 hospitals) (table 1 and appendix 4). In total, 7/23 hospitals had occupancy ≥100%

The London Acute Hospital Day-of-Care Survey Process

Preparatory Phase

1 Central DoCS team identify co-ordinators at each hospital

2 Co-ordinators create table with ward name, bed allocation & specialty

3 Co-ordinators calculate number of review teams required

4 Co-ordinators gather review pairs with minimum one clinical staff member

5 Methodology training session held several days before by central DoCS team for all co-ordinators

6 Site training held before survey by co-ordinators & central DoCS team member

7 Staff guided to watch DoCS instructional video & provided booklets

Survey Day

1 Further on-the-day training session held at 8am for any members unable to attend day before

2 Staff assemble at meeting point for training, picking up data entry forms & allocation to ward

3 Joint assessment by staff on allocated ward: review every single patient using DoCS & complete paper data entry forms by speaking to nurse in charge & reviewing notes

4 Staff return to meeting room to bring completed data entry sheets

5 Data entry sheets are checked by central DoCS team member + co-ordinator

6 Data entered anonymously into DoCS Excel template. Validation process & primary graphs generated

Post Survey

1 Preliminary results sent to co-ordinator the day after survey & he/she feeds back to all staff who participated & executive management

2 Full recommendation reports written & distributed back to site co-ordinator within several weeks

Figure 1 London Acute Hospital Day-of-Care-Survey Process

Metric	London 23 acute sites average & total no.	Median	Range
Total number of beds surveyed	9004		
Total number of patients surveyed	8656		
Total number of patients surveyed excluding discharges on day (total of 800 patients)	7856		
Bed Occupancy (%)	96%	97%	82-117%
Day-of-Care – Criteria Met (%)[1]	76% (5937)	74%	57-88%
Day-of-Care – Criteria Not Met (%)[1]	24% (1919)	26%	12-43%
Of those not met – acute hospital reasons (AHR) (%)[1]	34% (643)	34%	11-54%
Of those not met – whole system reasons (WSR) (%)[1]	61% (1176)	60%	46-83%
Of those not met – Home designated as most appropriate alternative place[1]	56% (1075)	53%	33-72%

Table 1 Table with summary results of Day-of-Care Survey across 23 hospitals

[1]Excludes patients for discharge (Individual site results can be found in Appendix 4)

representing use of unfunded/surge beds and patients over four hours in ED. Eight hundred patients were identified as definite discharges that day and excluded from subsequent analysis, leaving 7,856 adult acute in-patients for final analysis. Of 7,856 patients reviewed, 1,919 (24%, range 12-43%) did not meet criteria for acute in-hospital care (table 1).

For all results sections hereafter, the denominator for overall comparisons is 7,856 and 1,919 for patients delayed and not meeting criteria.

Age

Use of hospital beds overall increased with age; 56% (4,394/7,856) of patients reviewed being over 70 years old

(figure 2). This ascending pattern of increasing numbers of patients with age was seen in 16/23 hospitals, with 7/23 hospitals showing a bimodal distribution and 5/23 hospitals with a higher proportion of patients in younger age brackets (<70yrs). The number of patients not meeting criteria also increased with age, with 69% of all patients not meeting criteria for an acute bed in over 70 age group; 3/23 hospitals had more patients who did not meet criteria in the under 70 years rather than over 70 years category.

Length of stay (LOS)

The group 0 ≤7 days were the largest in-patient group overall (4,412/7,856, 56%) (Figure 3); those with hospital LOS between 0≤3 days represented the largest patient group

numerically (2,857/7,856, 32%;) and within this group 345 did not meet criteria for acute stay. In total 53% (1,020/1,919) of all patients not meeting criteria had LOS ≤14 days with 47% (899/1,919) with LOS > 14 days; 13/23 hospitals had a greater or equal number of patients not meeting criteria within the ≤14 days group compared to over 14 days band; within ≤14 days group, most patients not meeting criteria are within seven days of admission (627/1,919 patients ≤7days and 393/1,919 in the 8–14 days band). Furthermore, 5/13 hospitals, had majority of patients not meeting criteria within seven days overall.

Clinical Ward Group

Patients were categorised by four clinical groups: emergency services (ED, clinical decision unit (CDU), observation units), acute services (surgical/medical acute/assessment units), inpatient medicine and inpatient surgery (appendix 5). Medical inpatients comprised 60% (4,695/7,856), with 26% (2,008/7,856) surgical inpatients. Medical specialties had greatest number of patients not meeting criteria (1,349/1,919 patients, accounting for 69% of all patients not meeting criteria), with almost equal split between wards designated as elderly/stroke/rehabilitation (49%) and other medical areas (51%). Emergency and acute services made up 10% (186/1,919) of delayed patients.

Alternative place of care

Alternative place of care for delayed patients was felt to be in the patients own home for 56% (1,075/1,919; range 33–72%) and in non acute area of care for 41% of patients (787/1,919; range 24-64%).

Reasons for delay

Though majority of patients did meet criteria, 24% (1,919/7,856) did not, and reasons for their delay were identified. Overall, 61% (1,176/1,919; range 46-83%) reasons related to wider system, with 34% (643/1,919; range 11–54%) considered acute specific and only 5% labelled as not otherwise specified. Top eight reasons (out of 20) why patients were not discharged accounted for 68% of all reasons (figure 4) and a full breakdown has been shown in appendix 6. Of the top eight reasons for delays, four are acute specific (643/1,919 patients, accounting for 34% of all patients not meeting criteria) and four are system wide issues (651/1,919 patients, accounting for 34% of all patients not meeting criteria).

Discussion

This paper describes results of a census across 23 acute London hospitals using a recognised approach to studying delays in acute care (DoCS)[25], completed over short timeframe and quantifying underlying reasons. This study builds on a previous publication but is the first of its kind providing a large, near real time assessment across the largest UK health economy. Though the findings and common themes are broadly similar to Reid's paper[25] we did find important differences. In particular increasing age or/and LOS are insufficient alone to target patient pathways for improvement;

Figure 2 Age profile all patients met/not met Day-of-Care-Survey criteria (excluding patients discharged on survey day)
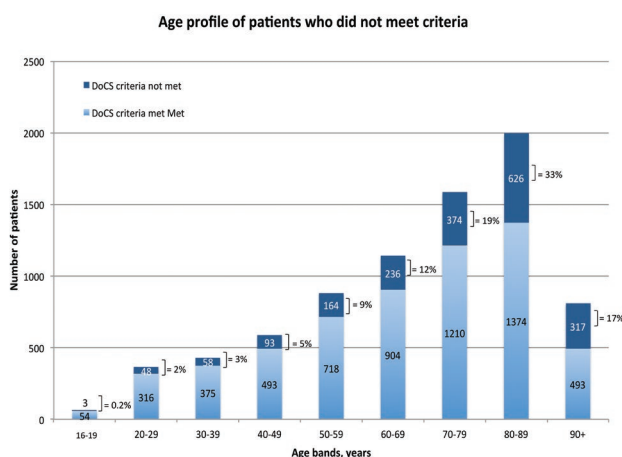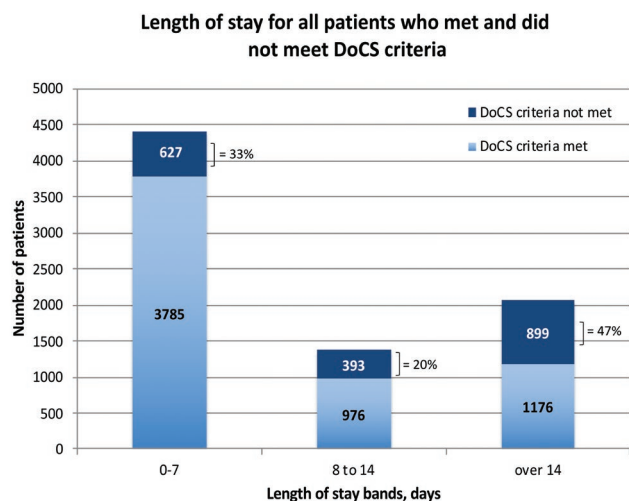

Figure 3 LOS all patients who met/not met Day-of-Care-Survey criteria (excluding patients discharged on the survey day)

equally, there is a need to understand both local data as well as system wide themes to ensure targeted improvements meet local population needs.

The data confirms high occupancy levels (average 96%) within acute hospitals, consistent with a system under stress. Only 10% of patients were identified as definite discharges, which equates to 35 patients per day per hospital, which is not sufficient to manage in day demand for elective and emergency care. Most patients met criteria for in-hospital stay, with one in four patients not meeting criteria, however range was broad (12–43%), supporting need for use of hospital level data. The upper range was greater than previous AEP country studies[17,21,22], although similar to evidence from individual UK hospitals where up to 46%[23,24] inpatient days were felt inappropriate. While there are common themes, data suggests need for improved local knowledge to identify areas for improvement including age, LOS and ward/unit setting, which will now be discussed.

Although older patients were more likely to occupy hospital beds as demonstrated by increasing bed occupancy with age
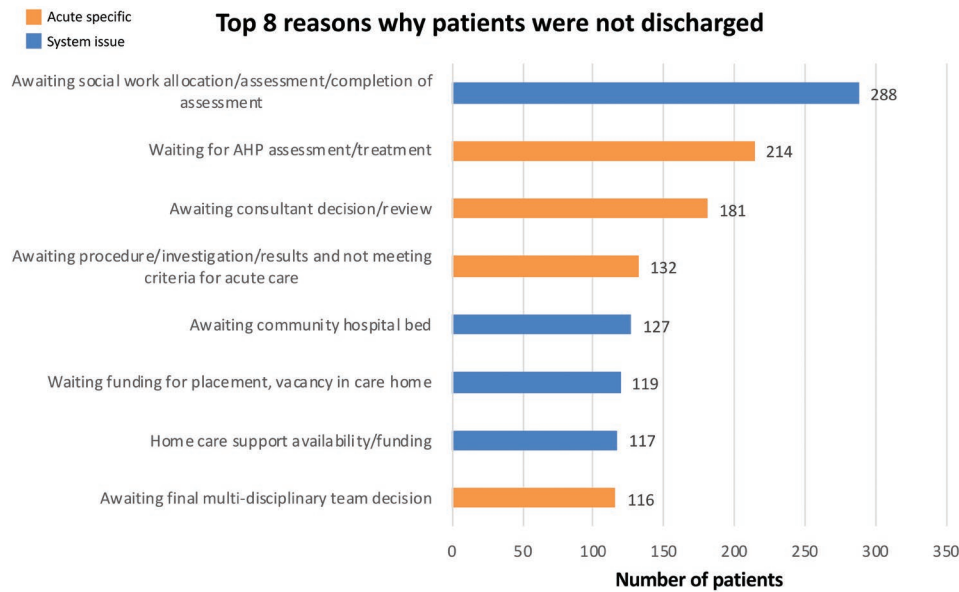
Top 8 reasons why patients were not discharged

Legend: Acute specific (orange), System issue (blue)

Reason	Number of patients
Awaiting social work allocation/assessment/completion of assessment	288
Waiting for AHP assessment/treatment	214
Awaiting consultant decision/review	181
Awaiting procedure/investigation/results and not meeting criteria for acute care	132
Awaiting community hospital bed	127
Waiting funding for placement, vacancy in care home	119
Home care support availability/funding	117
Awaiting final multi-disciplinary team decision	116

Number of patients

Figure 4 Top 8 reasons why patients were not discharged, for all patients not meeting the Day-of-Care Survey criteria, (excluding patients discharged on the survey day)

(56% of patients over 70yo), 44% of patients were less than 70 years, with five hospitals having a higher proportion of patients less <70yo, and three of the five hospitals also had a higher number of patients not meeting criteria in under 70 category. The proportion of patients not meeting criteria increases with age, however again noting that almost one third of patients are in the under 70 age group. This suggests selecting age alone as a cut off to tackle delays may not be sufficient and a needs based approach, while recognising that age is a factor, may be more beneficial.

In relation to LOS, as expected the greatest numbers of in-patients were in the 0–3 days band. Unlike age, increasing LOS was not associated directly with patients not meeting criteria. Half (53%) of patients not meeting criteria had LOS ≤14 days with 13 of 23 hospitals having a greater or equal number of patients not meeting criteria in ≤14 days, with most patients (%) being within seven days of admission. Moreover, for five hospitals the greatest numbers of patients not meeting criteria overall were within seven days. While this appears in contrast to the paper by Reid, a closer review of their data[25], suggests a similar pattern. Their method of data presentation, using non equal LOS bands gave an impression of increasing numbers of patients not meeting criteria. Furthermore our data shows that 12% of patients not meeting criteria were evident within three days of admission. This suggests using LOS cut off, e.g. after 14 days from admission, would miss more than 50% of those who may benefit from a more proactive management approach and reduce LOS. Current local/national policies focusing on longer LOS patients, often pre-defined as complex needs[29], may miss opportunities for earlier intervention/transfer of care. Early identification and management including weekends may prevent delays.

This paper builds on Reid's work by analysing data by ward group and alternative place of care. A small but important proportion of delayed patients (10%, 186 patients) were in the short stay areas; 19/23 hospitals had delayed patients here. Short stay units must operate efficiently to maintain flow[6], reduce LOS[30] and inpatient mortality[31], improve direct discharge rates[30] and satisfaction of staff and patients[31]. LOS and ward group data suggest some short stay units were not operating effectively, emphasising need for proactive model of care close to front door.[32,5,6] Hospitals with more delayed patients in short stay wards are advised to examine processes and protocols to maximise efficiency and improve patient outcomes.[32,29,10,33]

Of delayed patients on medical wards, only half were on elderly/frailty/rehab wards (usually with additional resources), the remainder being distributed among other wards. This is important as majority of delayed patients were awaiting care at home, so hospitals need better local understanding of care requirements using a thematic not individualised approach.

The top eight delay reasons were equally split between acute hospital reasons (AHR) and wider system reasons (WSR), in terms of number of reasons (4/4) and patient numbers (50%/50%). Focussing on reduction in delays (both within hospital and wider system) is imperative, rather than on longer LOS or community needs alone. Inter site variation in AHR (range 11–54%) suggests for hospitals with higher percentages, more capacity could be gained by focusing on AHR. Given UK occupancy pressures, firstly reducing delays within acute control seems sensible, while continuing to work closely with social and community services (these are more complex to address and have major impact on costs[34] and LOS[16,17]. While undertaking a DoCS program, it is necessary to understand the healthcare system being surveyed, for example here in the UK[35].

Examination of reasons for the delay showed that all of Reid's top six reasons remained in the most common reasons in our study. Newly emerged reasons were 'waiting for funding for placement/vacancy in a care home' and 'awaiting final multidisciplinary team decision' suggesting these have become more common problems[25]. This may reflect pressures

on social care with reduced community funding[1] and may link to social work involvement being the most common reason (15% of all delays).

The area which may have improved but remains in top themes is consultant decision/review, perhaps reflecting success of initiatives like increased senior review[36], daily ward/board rounds[37] and Acute Medicine Task Force Guidance[6], but requires further study and monitoring. Early consultant decisions are critical[22] for continuity of care[6], are associated with reduced mortality and decrease re-admission rates. [37,33]

Involvement/assessment by AHP's is the most common reason for delay within hospital control. The general view is that AHP services are often underfunded and undervalued as an investment and development area, despite literature recommending a seven day AHP model of care to avoid delays and improve health outcomes.[6,31,38,39] On a system level, shifting from focussing on individual patient delays to thematic approaches would allow much greater gain. Using targeted improvement, focused on top eight reasons identified in this survey, 1,294 extra beds could have been achieved.

Based on individual reports (example in appendix 7), a series of improvement Plan-Do-Study-Act cycles, whilst using iterative DoCS as an improvement and monitoring tool in addition to performance data are advised.[40]

Limitations of the present study includes that for logistic reasons there were two survey waves and surveys were operator dependent, which meant that despite training, some staff would have more experience in the DoCS approach. To mitigate this, DoCS experts checked completed surveys on the day at each hospital. The survey results do not provide a complete London picture; due to unavoidable reasons, we were unable to survey four hospitals (3,124 bed complement). However, very similar results of our study to Reid and other published studies, suggest limitations did not significantly affect results. This was predominantly a qualitative study and individual data was not collected, which limits a more quantitative analysis. Given the complexity, much larger study numbers would be required. In future, comparing midweek with weekends my provide further insights and inter country comparisons would also be valuable, recognising the specific aspects of different healthcare systems.[35]

In conclusion, our study suggests that opportunities remain to improve patient journey and shorten LOS, increase bed capacity and reduce system stress. This study reveals important considerations for both policy makers and individual hospitals. Examination of population age suggests selecting age alone as cut off to tackle delays is insufficient and instead a needs based approach may be beneficial. Moreover, data strongly suggests using LOS cut off such as 14 days from admission would miss more than 50% of patients who require proactive intervention earlier in journey.

Inter site variation in all metrics examined suggest importance of an individual hospital approach to understand the local system and develop local solutions as well as recognising need to tackle the identified common causes for delays in patient care both locally and collectively. Adopting a proactive thematic approach to improvement rather than solving individual problems reactively, should provide greater opportunity for sustainable change and greater capacity release to maximise benefits for patients and support staff engagement.[31] Focusing on top eight delay reasons identified could release significant system capacity; concentrating firstly on reasons within acute hospital control may provide gains quicker. While there are common themes, this study also highlights need for local ownership, knowledge and improvements with ongoing patient outcomes monitoring. ◑

Disclaimer

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