

Reasons for Same-day Cancellation in a Dedicated Day Surgery Hospital

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Abstract

Introduction: Thousands of elective day-case procedures are cancelled in the National Health Service (NHS) annually on the day of surgery resulting in significant financial loss. The aim of this study is to determine the rate of cancellations and identify contributing factors in order to minimise and the number of cancellations

Methods: Hospital data were collated on all patients undergoing elective-day case surgery across all surgical specialties at our institution over a 2-year period from September 2015 to August 2017. Reasons for cancellation were categorised as due to patient factors, hospital, administration/organisational factors.

Results: Over this time period, a total of 1,692 cases were cancelled, giving a cancellation rate of approximately 8.0%. The majority of these were Orthopaedic (32.1%, n=543/1,692), Ophthalmology (26.4%, n=446/1,692) and General Surgery cases (14.9%, n=252/1,692).

Keywords: Day case surgery, Cancellations, Reasons.

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The median number of cancellations were 75 cases per month. Cancellations appeared to be lower in the summer months of July and August (112 and 134 respectively, p=0.03). The majority of patients were cancelled due to patient reasons (49.1%, n=831/1,692). A further 33.4% (n=565/1,692) were due to medical reasons and 17.5% (n=296/1,692) were due to hospital/ administrative reasons.

Conclusions: The majority of same-day cancellations are due to patient factors, although a substantial proportion is due to hospital and medical reasons which can and should be pre-empted. Robust measures are required to address the multi-factorial nature of the problem and although internationally there is substantial variation in healthcare systems, sharing experiences can provide insight and enhance quality improvement strategies that could be locally adapted.

Introduction

Cancellations on the day of surgery have been shown to can adversely affect the patient experience, as well as having a significant financial cost implication to hospital providers [1, 2]. A recent UK-based prospective observational cohort study by Wong et al (2018), suggests that 13.9% of planned National Health Service (NHS) cases are cancelled on the day of surgery [3]. Although a small proportion of these cancellations may be due to overrunning lists, the reality is that case cancellation can result in the under-utilization of theatres; with an average cost of £1,200 per hour to run an operating theatre [4], the financial implications cannot be ignored are significant.

A recent review of the literature reveals that same-day cancellations appears to be an issue on an international scale, with a number of recurring explanations cited for these cancellations, despite a large number of different and the variety of healthcare systems and differences in local providers [5–9]. These underlying fundamental reasons for Same Day cancellations are often sub-divided into patient versus administrative/ hospital factors or avoidable versus unavoidable factors [6]. One UK-based study by Griffin et al (2006) in 2006 found that despite a 10-year interval at the same institution, the most common reason for the cancellation of elective surgery, was the lack of an available hospital beds on the planned day of admission [10]. With the well-publicised pressures of increasing numbers of emergency admissions in NHS Trusts [10], one strategy to minimise the competition for bed availability, is to have a separate hospital/Unit site dedicated to elective procedures- so called 'ring fenced beds'.

This current study focuses on the same-day cancellation rates of operations at St Albans City Hospital (SACH). This is a dedicated elective Day Surgery Hospital with six theatres (including one procedure room for Ophthalmology), 40 beds, inpatient, outpatient and diagnostic services, and a Minor Injuries Unit. SACH forms

part of the West Hertfordshire NHS Trust and serves a population catchment area of approximately half a million people. Within the Trust, higher risk elective cases, and emergency procedures, take place at Watford General Hospital (which has an Emergency Department and Intensive Care facilities). There is an established pre-operative assessment clinic service staffed by nurses and anaesthetists.

This is one of the first studies to exclusively report the on same-day cancellation rates for a dedicated Day Surgery Hospital Unit, analysing the reasons cited for cancellation, with the aim of identifying contributing factors that could be addressed to minimise these rates in the future.

Methods

Data regarding the same-day cancellation rates for elective Day Case Surgery from a single centre (St. Albans City Hospital) was collected retrospectively over a 2-year period from 01/09/2015 to 31/08/2017. Theatre records detailing information such as operation name, speciality, date, list, patient hospital number, date and time of cancellation, cancellation reason and who by, are entered electronically into a database by members of staff in real time. An electronic search of this database was carried out to identify all same-day cancellations pan specialty at this centre during the time specified. Due to multiple similarly worded codes for identical reasons for cancellation, these were grouped together for presentation and ease of analysis. The reasons for cancellation cited were reviewed by the authors and assigned to three broad categories: patient factors, medical factors and hospital factors.

Patient factors were cancellations felt to be largely due to patient-specific reasons such as non-attendance or changing their mind about undergoing surgery or if the patient was suffering from an acute

illness (such as current viral upper respiratory tract, urinary tract or skin infections). Medical factors included long-term medical issues or situations where there was a need for further investigations relating to the surgery or anaesthetic pre-assessment. Hospital factors were cancellations felt largely to be resource or planning-related issues such as lack of available beds or suitable staff, non-functioning equipment, or patient being inappropriately booked for day surgery. Owing to the confidentiality of the system, data on person specific variables such as gender and age were unavailable and as the data utilised was not patient identifiable, ethical approval was not deemed necessary.

Results

The database search found that between 01/09/2015 and 31/08/2017 1,692 cases were recorded as 'on the day cancellations', giving a cancellation rate of approximately 8.0%. The median number of cancellations were 75 cases per month. Cancellations appeared to be higher in the Summer months of July and August (112 and 134 respectively, $p=0.03$). Analysis across the different specialties revealed that Orthopaedic Surgery had the highest same-day cancellation rate (32.1%), followed by Ophthalmology (26.4%) and then General Surgery (14.9%, Figure 1). Regarding the reasons for cancellation; 49.1% ($n=831/1,692$) were considered to be primarily due to patient reasons. A further 33.4% ($n=565/1,692$) were due to medical reasons and 17.5% ($n=296/1,692$) were due to hospital/administrative reasons.

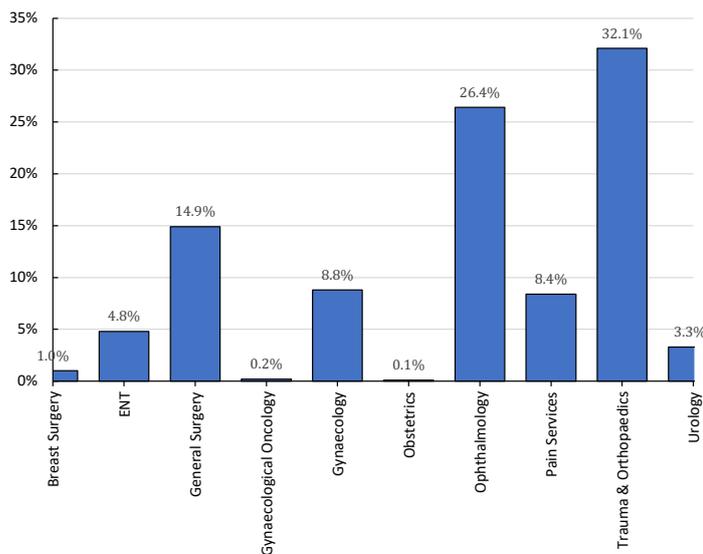


Figure 1 Proportion of day-case cancellations according to each sub-specialty.

Patient Reasons

A total of 831 cases over this 2-year period were cancelled owing to patient issues (Table 1). By far the biggest cause of this was that the patient simply did not attend on the day of surgery ($n=413/831$, 49.7%) followed by the patient cancelling on the day ($n=239/831$, 28.8%) or the patient was acutely unwell and was either hospitalised with the illness or was deemed on the day not to be well enough to undergo general anaesthetic owing to an infection of the respiratory/urinary tract or skin ($n=114/831$, 13.7%). A smaller proportion of patients did not follow the pre-operative advice they were given (such as smoking cessation, weight loss, dietary advice, wearing of certain medical devices) and were therefore deemed not suitable to undergo the planned surgery on that particular day.

Medical Reasons

The second largest cause of reasons for same-day cancellations were medical reasons, accounting for 565 cancellations (Table 2). Within

Table 1 Reasons for same day cancellation.

Patient Reasons	n	%
Patient Acutely Unwell	114	13.7%
Patient Cancelled	239	28.8%
Patient Did Not Attend	413	49.7%
Patient Did Not Follow Pre-Op Guidance	59	7.1%
Patient Pregnant Recently	6	0.7%
TOTAL	831	

Table 2 Reasons for same day cancellation.

Medical Reasons	n	%
Operation Not Necessary	97	17.2%
Postponed on Clinical Grounds	13	2.3%
Requires Additional Investigations	64	11.3%
Requires Another Clinic Appointment Prior to Surgery	3	0.5%
Unfit for Surgery/Anaesthetic	388	68.7%
TOTAL	565	

this group, over 2/3 of cancellations were due to the patient being medically unfit for either the type of anaesthetic or surgery they were listed for ($n=388/565$, 68.7%) followed by an operation being deemed unnecessary ($n=97/565$, 17.2%) or the patient requiring additional investigations prior to undergoing surgery ($n=64/565$, 11.3%).

Hospital Reasons

Table 3 shows that a total of 296 cancellations were due to hospital related issues ($n=296/1,692$, 17.5%). Amongst these reasons for cancellations, the most commonly occurring were medical/nursing staffing issues ($n=82/296$, 11.8%) and unavailability of or failure of medical equipment ($n=40/296$, 13.5%). A smaller proportion of patients were cancelled due to over-running lists or disruptions to the list due to unforeseen emergencies ($n=35/296$, 11.8%). Booking and administration error was responsible for 10.8% of cancellations ($n=32/296$).

Table 3 Hospital reasons leading to same day cancellations.

Hospital Reasons	n	%
Bed Issues	1	0.3%
Booking/Admin Error	32	10.8%
Cancelled/Postponed	20	6.8%
Equipment Unavailable/Failure	40	13.5%
Estates Issue	27	9.1%
Medical Notes Unavailable	15	5.1%
Over-running Lists/Emergency Case Disruption	35	11.8%
Patient Unsuitable or Unfit for Day-Case	22	7.4%
Staffing Issue	82	27.7%
Unavailable/Inadequate Investigations	22	7.4%
TOTAL	296	

Seasonal Variation

Month by analyses were also carried out and revealed that the lowest rates of on the day cancellation occurred in the summer month of July (6.6%) whilst they were considerably higher in October (9.2%, $p=0.030$). Further analyses were carried out by grouping the months into their respect seasons to assess potential seasonal variation (spring: March-June, summer: July – August, autumn: September – November, winter: December – February). The season with the lowest cancellations were the spring (7.7%) and summer seasons (7.9%) compared with the autumn (9.2%) and winter (9.0%, $p=0.007$). The greatest number Patient Reason cancellations occurred in the winter (27.6%) and autumn seasons (27.1%) compared to the summer (22.5%) and spring seasons (22.9%, Table 4, $p=0.046$).

Discussion

In our study, 1692 cases were cancelled on the day of surgery- giving a cancellation rate of 8% over the 2-year period of data collection. This is one of the first studies to report day of surgery cancellation rates at a dedicated day surgery hospital in the UK. The majority of last-minute cancellations were found to be within Orthopaedic Surgery; followed by Ophthalmology and General Surgery. Analysis of the reasons for inter-specialty variation in cancellation rates is beyond the scope of this study. The most common reason for day of surgery cancellation was patient non-attendance (24.4%), followed by lack of fitness for surgery/ anaesthesia (22.9%), and patient self-cancellation (14.1%). Cancellation due to acute illness was considered separately. When divided into patient-factors, medical-factors and hospital/ administrative factors, the cancellation rates were 49.1%, 33.4% and 17.5% respectively. Cancellation due to 'bed issues' was 0.06%.

According to the literature, day of surgery cancellations can vary between <2% and >30% [1,2]. Typically, higher cancellation rates are reported in developing countries, however there is overlap in the ranges reported[2]. With a cancellation rate of 8%, our centre appears to perform better than the average NHS figure of 13.9% suggested by Wong et al [3], however there is room for improvement- a cancellation rate of 5.19% was reported across two NHS hospitals by Dimitriadis et al [4]. Internationally, cancellation rates < 2% have been reported in the USA[1], 4.7% in Finland [5]. and 14.3% [6] have been reported by units in Australia,

However, due to the significant differences in healthcare systems and populations on an international level, not to mention the differences in local characteristics of the centres included, and study design, there are limitations to the conclusions which can be made by drawing direct comparisons. None-the-less, there remains a number of common reasons for same-day cancellation such as patient non-attendance (patient-related factor), unfitness for anaesthesia (medical-related factor), or overrunning lists (hospital-related factor). A number of studies have used similar means of categorising cancellation reasons into broader groups, and then dividing these further into avoidable and unavoidable reasons for cancellation. In our study, the hospital-related and medical related reasons for cancellation, were judged as potentially avoidable, whereas the patient-related reasons, were felt to be unavoidable. This results in a rate of 51% avoidable, and 49% unavoidable reasons for day of surgery cancellation. This is similar to the rates found in the US single centre study by Trenteman et al, which found a 47% rate of avoidable cancellation [1]. However, in this study, the 'avoidable' reasons for cancellation included 'patient related' reasons, and they found no cancellations due to patient non-appearance (contrary to our findings).

In the literature, there are a number of strategies that have been considered to reduce the rates of same day cancellations- some of

which will be more or less applicable, depending upon the local centre characteristics. For many hospitals, the pre-operative pathway includes the decision for operation; booking the patient for surgery; pre-operative investigations and optimisation; communication of the date of surgery and relevant preparatory information with the patient; and planning an appropriate selection of cases, which will use the available theatre time to its full potential. Issues can occur at any of these steps and have been reported in the literature as reasons for same-day cancellations. Despite no change in the cancellation rates of patients for reasons of unfitness for anaesthesia over a 10-year period (during which Pre-operative assessment clinics were introduced) in a UK centre study by Griffith et al, on balance, pre-operative assessment clinics are one such intervention which can be used to reduce the risk of day of surgery cancellations by focusing on ensuring appropriate pre-operative tests and optimisation, starving instructions and medication instructions [7]. Patients undergoing a GA at our centre will attend a nurse-led pre-operative assessment clinic, with anaesthetic support available as required. There is no fixed model for the delivery of pre-operative assessment clinics, which varies across the UK [8].

Although in our study we have classified patient non-attendance as 'unavoidable', it could be argued that with better communication, the rates of cancellation due to this reason could be reduced. This includes initiatives such as calling patients to remind them of their surgery date a couple of days before- and also provides the opportunity for any acute illness (again considered unavoidable), to be flagged up, and providing the possibility of cancelling prior to the day of surgery and scheduling in cases at the last minute to avoid wastage of theatre [6,7,9]. Within our trust, a text message alert system has been developed to remind patients of their surgery date. Other strategies to target non-attendance include penalties, which are used by some US centres, but are unlikely to be adopted in the NHS [10].

The 'overbooking' of theatre lists can result in cancellations (overrunning) or wasted resources through lack of theatre utilisation. However, there are a number of factors at play, and sometimes cases can be more or less difficult than anticipated, requiring deviation from the 'average' time taken for that procedure by that particular surgeon. Some centres employ mathematical tools to evaluate surgeon's lists and to try and make the planning of lists more efficient. However, it is suggested that some centres deliberately 'overbook lists' to minimise the impacts of non-attendees on theatre utilization [11]. Another way to tackle the unpredictability of lists is to use expandable block systems (such as those in the US) rather than fixing theatre times and cancelling any cases that fall outside the fixed session time [1]. Analysis of an individual centre's non-operative time is another way hospitals can scrutinise their efficiency and see if there are ways to reduce non-operative time and therefore reduce the risk of overrunning and cancelling for this reason [6].

Post-operative planning (i.e. availability of appropriate beds- ward or higher level of care) is another common reason for cancellation. We found our rate of cancellation due to the lack of beds was only 0.06%, which is much lower than other studies- for example Griffin et al (2006) report that 70% of same day cancellations in 2003 were due to a lack of ward beds, and Dimitriadis et al report a rate of 21.7% [4,12]. However, both studies by Griffin et al and Dimitriadis et al were carried out in a District General Hospital with an emergency department. Therefore, it is expected that the proportion of cancellations due to bed availability would be much lower in our study- a dedicated Day Surgery Hospital for low risk operations, without an Emergency Department. Interestingly the reason for cancellations due to lack of beds is not eliminated in our study. This is likely to be due to a number of factors including the late start and subsequent finishing of GA operations necessitating an overnight stay

due to the time required for safe recovery from anaesthesia, and the closure of the Day Surgery Unit in the evening; planned admission for social reasons (i.e. lack of available responsible adult to collect the patient after GA) and the unpredicted need for inpatient stay after routine surgery. Strategies that other centres discuss to minimise the impact of bed availability is to 'ring-fence' surgical ward or ICU beds.

This study found a same-day cancellation rate of elective day surgery cases at a dedicated Day Surgery Unit to be approximately 8%. Although there are likely to be significant financial implications (waste of resources) where this results in underutilised theatre capacity, a more detailed cost analysis was beyond the scope of this study. Studies, such as the Australian-based paper by Keller et al (2014) which focus on theatre utilization and analyse the use of time during the theatre list, are a useful adjunct when considering strategies to improve efficiency and reduce day of surgery cancellations where due to overrunning lists [6].

Whilst it is difficult to extrapolate figures across different healthcare systems, countries, and currencies; these studies highlight the complexity of calculating such costs to individual units, and the number of interacting factors at play. Similar to the study by Turunen et al, it is unclear in our study as to whether or not costs of same-day cancellations were offset by recruiting patients at short notice to replace them [5]. Also, costs from cancellations due to overrunning lists (a small percentage) have not been separated from other reasons for cancellations as the former may not result in under-utilisation of theatre time. Therefore this, coupled with the fact that, on average, different procedures can vary significantly in the duration of time, it can be somewhat misleading to assume the exact extent of the financial costs of same day cancellations purely based on the number of cancellations. However, as a crude estimate of financial cost at our unit, we have calculated the average time for each case to be 1 hour across the different specialties. With an average cost of running a theatre for an hour in the UK being £1,200, the estimated cost of these cancelled 1,692 cases may potentially be upwards of £2 million pounds, or £1 million a year. A substantive sum for any hospital in any system. Whilst some cancellations will inevitably occur regardless of the robustness of the system, it is clear that mitigating measures which are effective in reducing the number of cancellations, however small, is likely to be beneficial and worthwhile both from a systems point of view as well as financially.

An interesting, yet difficult to explain finding of this study was the seasonal variations in cancellation rates and reasons. In our study, we found that the largest proportions of cancellations occurred in the winter and autumn months. This has been previously reported although (not fully explained) by the Nuffield Trust in 2017 where they also found a higher proportion of cancellations in the winter months [13]. It is unlikely that this higher rate of cancellation is solely due to adverse weather conditions, higher rates of staff shortage or equipment failure during the winter months as in our study, the data demonstrated no significant difference amongst the seasons in terms of hospital and administrative causes of cancellations. In fact, in the present study, the highest proportion of hospital and administrative reasons contributing to cancellation were in the spring months.

One of the limitations of this study is the retrospective collection of data from electronic coding databases- here a number of the pre-coded reasons for cancellation appear ambiguous when it comes to ascertaining the reasons for cancellation, and so prospective data collection with clear definitions and pre-allocation to 'hospital/administrative factors' versus 'patient factors' from the outset, may prove more reliable. Ultimately deciding as to whether reasons for cancellation are primarily 'patient'- related or 'hospital/administrative' related is subjective, which one should bear in mind when attempting to make direct comparisons between other units.

Also relying on coding for the reason for cancellation- in the raw electronic data, there were multiple similarly worded codes, for the same reason. Some codes appear ambiguous, and you have to rely on people assigning the most appropriate code (when some reasons could potentially fit in to more than one code). Relying on a code could give a simplistic overview and not necessarily provide the root cause analysis (i.e. hypothetically a patient may have not attended, because they did not receive a letter from the hospital confirming the date of surgery. this would therefore need to be reassigned as a 'hospital related' reason for cancellation, not patient related. Another limitation is the subjectivity of assigning the reasons to patient related, hospital and medical. A consensus between the three authors was used (similar methods have been used in other papers), however this process could be improved to be more reliable [7,14]. Other factors to consider would be a more in-depth financial analysis or to consider cancellation rates in terms of minutes rather than absolute numbers (which can be skewed by high numbers of shorter cases) [7].

This is the first UK-based study reporting day of surgery cancellation rates at a dedicated day surgery hospital. It incorporated two-years of data collection, resulting in large numbers, and accounting for seasonal variability. It provides an insight into the reasons for same day cancellation, many of which are shared by other centres both within the UK and internationally, which may cater for different services and healthcare systems. It would be interesting to compare our data with other dedicated day surgery units. Analysis of local system processes, and communication between clinicians, patients and administrative staff, may help to reduce day of surgery cancellation rates in the future. Reducing the number of coded reasons for same day cancellation, and detailed prospective data collection may help improve the reliability of data for future studies.

Conclusion

Rates as low as 2% for day of surgery cancellation have been reported in the literature (although this particular study includes both elective and emergency, inpatient and outpatient operations at US-based institution). However, despite the variation in the local set up of single-centre reported same-day cancellation rates, it is clear that there are common issues on an international scale, particularly when it comes to avoidable reasons largely due to poor communication between parties. Although some of these studies are based in different healthcare systems, or include emergency and inpatient operations, sharing experiences can provide insight and enhance quality improvement strategies that could be locally adapted.

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