Department of Health

health

A guide to surgical services redesign measures for improvement

Redesigning Hospital Care Program

State Government Victoria

How will this guide help you?

This guide is one of a series of documents developed by the Redesigning Hospital Care Program to assist health services select appropriate measures for their redesign work. This guide focuses on surgical services. It provides:

- detailed and high-level surgical services process maps
- a variety of recommended measures for surgical services process redesign
- measures that can be used on a day-to-day bases for managing surgical services.

This guide is not a stand alone document or a 'how-to' manual. It provides a suite of measures that health services can choose from, depending on their specific needs and priorities. It is designed to be used in the context of a comprehensive redesign and change management framework and in conjunction with advice from the health service's redesign team. It is useful to use this guide in combination with *Measurement for improvement*, which is the introductory guide in this series.

Why are measures important?

Measurement is an essential step in the redesign process. It provides an external and objective template against which to assess the impact of process improvement. Measurement issues need to be thought about at the beginning of a process improvement program, not when the program is running or complete. Measures can be used through the life of a project to:

- identify and prioritise areas for projects
- develop a base line to measure improvement against
- track the impact of redesign
- demonstrate results at the end of the project.

How do I select measures?

No two surgical services are exactly the same and a well-structured diagnostic phase is necessary to ensure the focus of an improvement program is clear and that appropriate measures are selected. There are three viewpoints from which to assess the benefits of redesign work. The viewpoints are complimentary; each contributes a perspective and ensures multiple goals are met:

- The patient view point: have the safety, quality, access, acceptability and outcomes of care improved?
- The staff viewpoint: are care processes more acceptable for the staff, is staff time being used more efficiently and effectively?
- The organisational viewpoint: does the improvement program align with institutional priorities, and has progress been made on those priorities?

The important role of surgical services

While surgical procedures for many conditions have become much less invasive, allowing shorter stays in hospital, many patients are older and have significant comorbidities. Strong growth in demand for emergency surgery creates a constant challenge for health services balancing elective and emergency surgery. Although standards of surgical care are generally very high, a small minority of patients experience problems which present considerable opportunities to build on the strength of surgical services. Both elective and emergency surgery patients share the same surgical resources and therefore very high levels of coordination and participation across an extraordinary range of staff groups is required.

Measuring surgical services performance

Surgical services measures can be grouped into four categories:

1. **Key performance measures (KPIs)**

   These are measures of overall performance and relate to the achievement of specific goals or problems to be addressed. Surgical services have reportable KPIs for elective surgical patients; however there are currently no KPIs for emergency patients reportable to the Department of Health.

2. **Demand and capacity measures**

   These measures set the scene by defining demand, capacity, and activity, and assisting in writing a problem statement for a process redesign program of work.

3. **Process measures**

   These measures capture, validate and track the impact of improvement initiatives on process performance, including times taken to perform process elements within the surgical journey.

4. **Check measures**

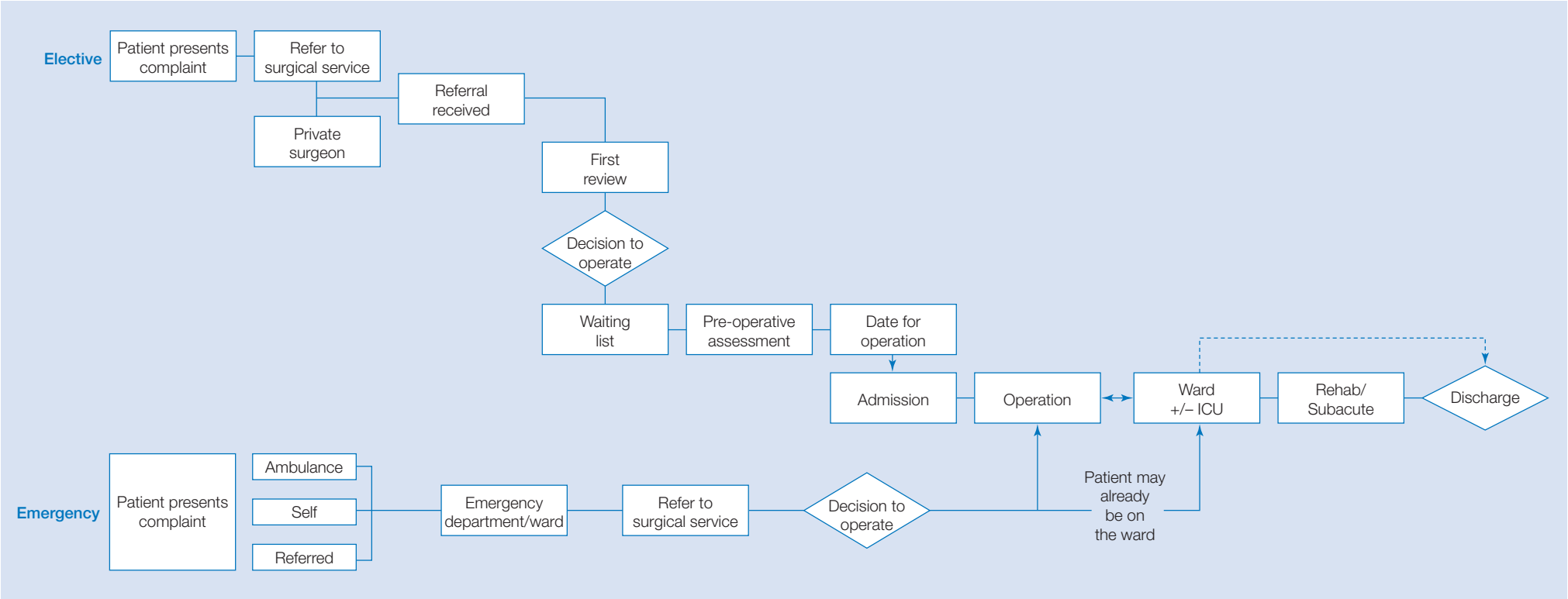
   These measures capture the quality and safety outcomes, as well as, unintended effects elsewhere in the patient journey or hospital system. The choice of measures to monitor and evaluate quality and safety will relate to the focus of the program of redesign.

The feasibility of the measures described in this guide, detailed on pages six and seven, will depend on the availability of reliable data, and/or the capacity of health services to collect the data.

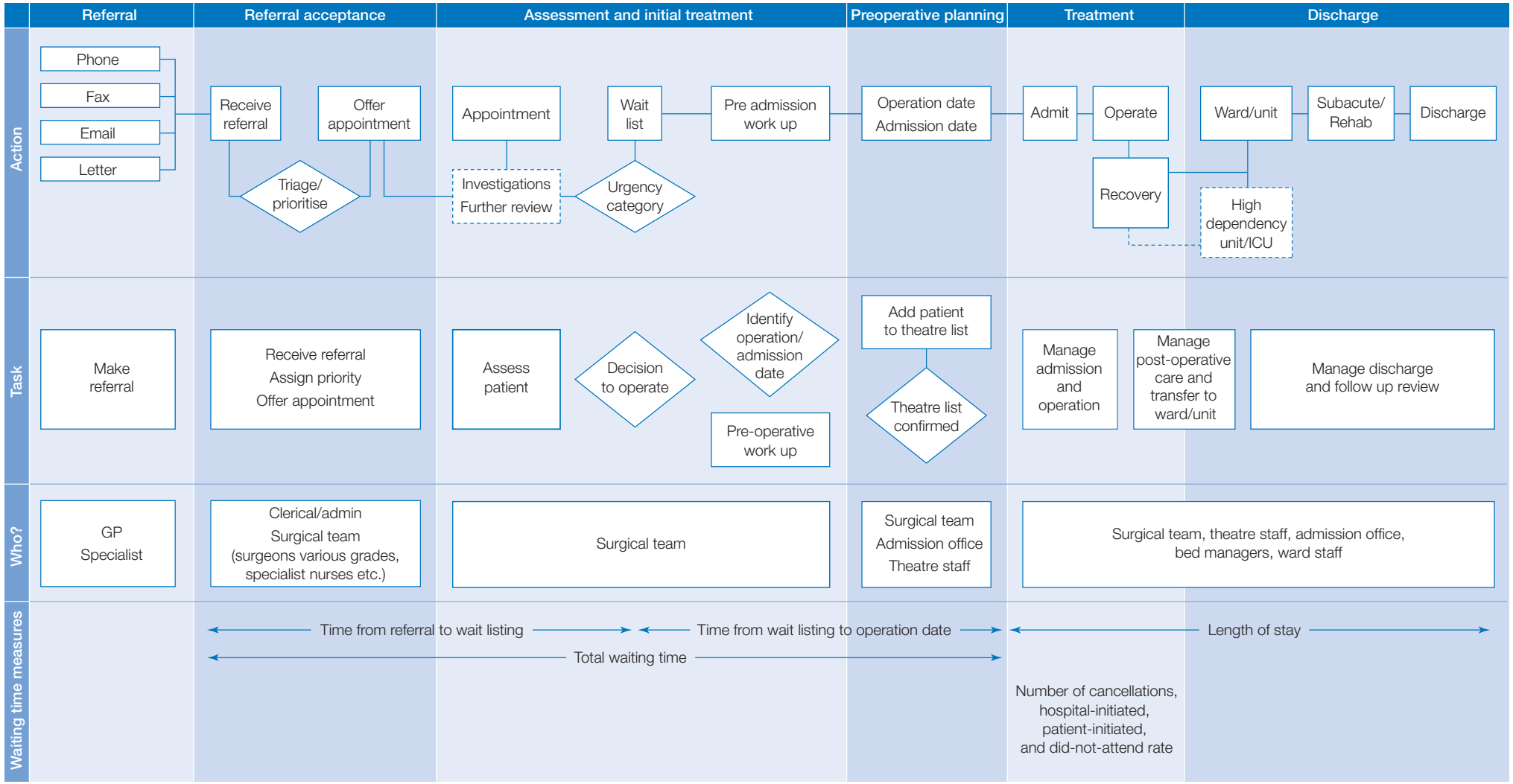
Inter-relationships between surgical services and the hospital and community services

All staff have a stake in a well-functioning surgical service as this is where a significant proportion of inpatients may first commence their journey and impacts on the whole hospital. The following figure outlines the basic relationships between elective and emergency surgical services. In practice there are many different ways of organising the flow of patients through the hospital. This map details the two main processes of elective and emergency surgery.

High-level surgical service process map



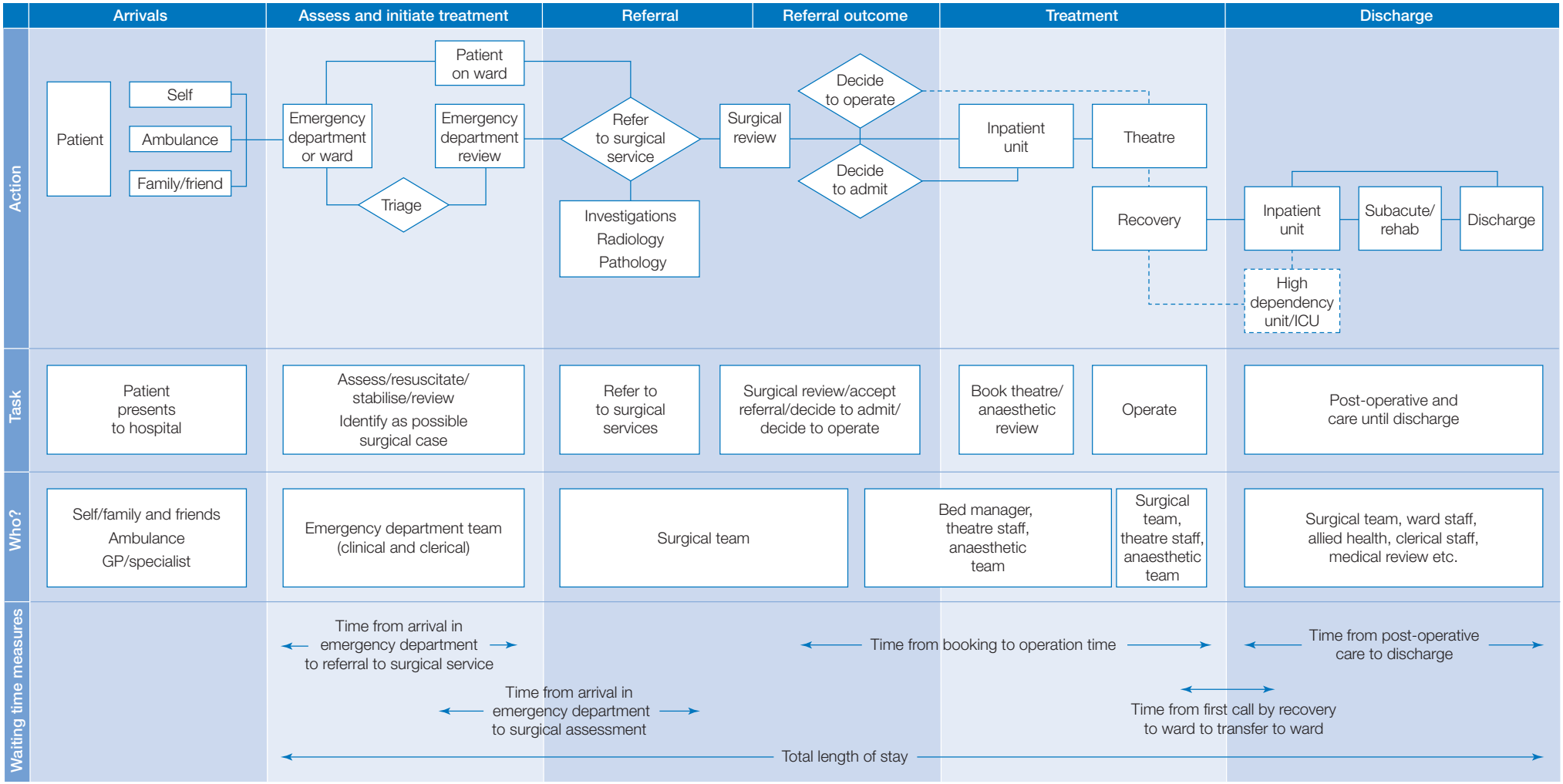
Generic representation of processes for the elective surgery patient detailed-level process map



Elective surgery measures for improvement

	Demand and capacity measures	Key performance indicator aligned to statement of priorities	Process measures	Check measures
Purpose	To define demand, capacity, and activity, and assist in writing a problem statement	A direct measure of the goal that you are trying to achieve or problem that you are trying to address	To capture, validate and track the impact of improvement initiatives on process performance	To demonstrate the improvement did not have unintended effects elsewhere in the patient journey or the hospital system
Examples	**Demand: all patients referred to surgical service** • Number of referrals • Number of additions to list • Number and % of patients requiring ICU • Number and % of patients for preadmission by category • Number of patients not appropriate to add to the waiting list **Capacity: resource available to provide a service to the patient, and includes staff** • Number of theatres • Number of recovery beds • Number of 23-hour beds • Surgeon staff hours, by category, by session • Anaesthetic staff hours by category, by session • Nursing staff hours by category, by hour of day and day of week • Staffing profile (for example, number of trainee staff) • Imaging/diagnostic availability by hours • Theatre overruns hours per list, unit, day, and month • Percentage of allocated theatre list time utilised • Percentage of available theatre time utilised • Patients removed from wait list • Percentage of patients cleared form the waiting list	• Number of patients registered to wait list • Patient treated and waiting within time: – Cat 1 (30 days) – Cat 2 (90 days) – Cat 3 (365 days) • Percentage of patients treated within urgency category guidelines • Percentage of patients per 100 scheduled admissions experiencing hospital-initiated postponements by reason for cancellation • Percentage of patients waiting within urgency category	**Process time:** • Surgical start time (for example, incision time) • Anaesthetic start time • Time from referral to waiting list • Time from waiting list to treatment • Percentage of consent forms complete before day of surgery • Percentage on-time list starts • Registration within three days of referral • Time it takes to confirm a list • Number of patients cancelled on day of surgery admission • Theatre list early finishes • Theatre list overruns • Number of times recovery closes **Process quality:** • Number of patients that fail day surgery • Average % of admitted patients treated out of turn • Number and rate of patient-initiated postponements • Surgical turnaround time • Operation time allocated vs. operation time required • Rate of adherence to time-out • Imaging/pathology turn around time • Percentage of theatre list with day of surgery admission (DOSA) patients vs. day surgery patients • Percentage of patients waiting who are not ready for care (NRFC) • Number of times a list order is changed • Number of patients waiting greater than 365 days • Number of interruptions • Time taken to reschedule cancelled patients • Time out	**Key measures:** • Unplanned return to theatre rates • Wound infection rates • Rate of adherence to patient pathways • Readmission to hospital • Mortality • Adverse events • Wrong side surgery **Patient satisfaction:** • Targeted surveys • Net promoter scores (recommending the service to others) • Qualitative patient feedback **Staff satisfaction:** • Targeted surveys • Turnover • Sick leave **Other measures:** • Agency use • OH&S incidents **Cost measures:** • Theatre cost per hour based on contact hours (range $40–$45 per minute) in hours and out of hours • Performance against budget • Lost income per contact hours (Contact hours is the number of session hours used per working day. One contact hour = one WIES) • Consumables and consignment stock • Stock take • Prosthetic expenditure • Radiology expenditure • Overtime expenditure

Generic representation of processes for the emergency surgery patient detailed-level process map



Emergency surgery measures for improvement

	Demand and capacity measure	Key performance measure	Process measure	Check measure
Purpose	To define demand, capacity, and activity, and assist in writing a problem statement.	A direct measure of the goal that you are trying to achieve or problem that you are trying to address.	To capture, validate and track the impact of improvement initiatives on process performance. High volume patient groups can be used to capture the process steps.	To demonstrate the improvement did not have unintended effects elsewhere in the patient journey or hospital system.
Examples	**Demand: all patients referred to surgical service** • Emergency surgery requests • Volume of emergency surgery admission by day of week and month of year **Capacity: resource available to provide a service to the patient, and includes staff and equipment** • Percentage emergency surgery in hours/ out-of-hours • Percentage of sessions or operating time dedicated to emergency surgery • Utilisation of dedicated emergency surgery lists • Number of theatres • Number of recovery beds • Surgeon staff hours, by category, by session • Anaesthetic staff hours by category, by session • Nursing staff hours by category, by hour of day and day of week • Staffing profile (for example number of trainee staff) • Surgical turnaround time • Imaging/diagnostic availability • Theatre overruns hours per list, unit, day and month • Bed occupancy • Number of patients transferred from/to another hospital	Please note that emergency surgery unlike elective does not have reportable KPIs. This table reflects suggested process performance measures only. • Total length of stay for emergency surgery patients • Waiting times between ED admission and booking time for high volume procedures (for example, appendectomy, cholecystectomy fracture NOF, fracture radius, emergency caesarean section) • Waiting time between booking time and operation time • Percentage of emergency surgery patients that are waiting more than four hours	**Process time:** • Time of arrival to referral to surgical services • Time of arrival to surgical review • Time from booking to operating theatre • Time from recovery to ward **Process quality:** • Percentage emergency cases with consultant present in theatre • Percentage of patients requiring an ICU bed • Percentage of patients operated in hours and out of hours • Cancellations of emergency surgery • Number of interruptions • Time taken to reschedule cancelled patients • Time out	**Key measures:** • Unplanned return to theatre rates • Wound infection rates • Total in-hospital mortality emergency surgery • In-hospital mortality for high volume indicator conditions • Readmission rates • 28-day mortality • Adverse events • Wrong side surgery **Patient satisfaction:** • Targeted surveys • Net promoter scores (recommending the service to others) • Qualitative patient feedback **Staff satisfaction:** • Targeted surveys • Turnover • Sick leave **Other measures:** • Agency use • OH&S incidents **Cost measures:** • Theatre cost per hour based on contact hours (range $40–$45 per minute) in hours and out of hours • Performance against budget • Lost income per contact hours (contact hours is the number of session hours used per working day. One contact hour = one WIES) Consumable and consignment stock • Stock take • Prosthetic expenditure • Radiology expenditure • Overtime expenditure

Operating theatre time-stamps

Listed below are a number of operating theatre time-stamps that health services should consider collecting to enable health services to monitor performance and improvement to benchmark with other services. Health services are encouraged to review current time-stamps and definitions being used, and to consider incorporation of the suggested time-stamps into local systems.

These time-stamps allow measurement of a range of time spans for the purpose of benchmarking within or across specialties and health services. An example is 'turnaround time', which can be measured as the time span from *Surgery stop* (time-stamp 4) of one procedure to *Position/prep start* (time-stamp 2) of the next procedure. 'Timeliness of access to emergency surgery' can be measured from *Time of booking* (time-stamp 9) to *Procedure/surgery start* (time-stamp 3).

The table below defines six time-stamps in the perioperative process necessary that will enable health services to measure theatre utilisation when aggregated with the fixed points such as designated session start and finish times. Three other time-stamps are recommended but not necessary. These time stamps have been based on surveys of Victorian health services and similar work conducted interstate and overseas.

It is important to note that these measures should be considered as base measures only, and health services may wish to include additional measures if they have a specific problem they want to measure. Health services should refer to the measures guide to help identify additional measures that could be used.

Minimum necessary time-stamps

	Time-stamp	Agreed definition
1.	**Anaesthetic start**	Time when anaesthetist begins preparing the patient for an anaesthetic.
2.	**Position/prep start**	Time when the nursing or surgical team begins positioning or prepping the patient for the procedure.
3.	**Procedure/surgery start**	Time when the procedure is begun (for example, incision for a surgical procedure, insertion of scope for a diagnostic procedure, beginning of examination).
4.	**Procedure/surgery stop**	Time when all the instruments and sponge counts are completed and verified as correct; all postoperative radiological studies to be done in the operating or procedure room are completed; all dressings and drains are secured and the surgeons/physicians have completed all procedure related activities on the patient.
5.	**Anaesthetic stop** (anaesthetic handover)	Time when anaesthetist hands over care of the patient to a post anaesthesia care team.
6.	**Patient leaves recovery**	Time patient leaves recovery.

Highly recommended time-stamps

	Time-stamp	Agreed definition
7.	**Patient arrives in room**	Time when anaesthetist hands over care of the patient to a post anaesthesia care team.
8.	**Patient leaves room**	Time when the patient leaves the operating room or the procedure room.
9.	**Time of booking**	This is a proxy measure for the time that the decision for surgery was made.

Measures of surgical services department processes and outcomes

Important information:

- The particular focus of the redesign work will determine which measures should be chosen and they will differ according to the situation.
- Measures that capture the 'system view' of the redesign work should also be included, for example, ward measures.
- Consider the units that will be used to capture measures, for example, time, dollars, number of patients.

Key tips to remember when collecting and presenting data

- All measures should be collected prior to the implementation of improvement initiatives to establish baseline performance. Measures should then be collected post implementation of improvement initiatives (PDSA cycles) to determine the impact on process performance and achievement of the overall goal.
- It is important that measures collected after an improvement is implemented are comparable to the baseline data, for example, the same questions are repeated in a follow-up staff survey, or staff tracking is repeated at approximately the same time of day or day of week.
- Processes will vary depending on time of day, day of the week, and time of year. During the diagnostic stage it is necessary to collect a representative sample of data (in other words, different time of day, day of week) in order to analyse and understand existing variations.
- Due to the variations in surgical services, it is recommended that a minimum of two years' worth of historical data (for example, patient presentations) is used as a point of comparison.
- Measures should be described by their range, median, and percentage within the goal or target.
- When tracking patients and staff it is important to collect enough data so that it is a representative sample of all patients and staff. It is difficult to make hard and fast rules about when this point is reached, but it will be clear that enough patients have been tracked when patterns start to repeat. Tracking can be hard work, so if the basic issues are not clear after 20 patients, then it might be time to reassess the objectives of the tracking exercise.
- When presenting measures:
  - data related to time should be presented and analysed using run charts, which will reveal seasonal, weekly, daily or hourly variation
  - data related to categories (for example, type of error, admitting department) should be presented and analysed using bar charts.

Acknowledgements

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www.health.vic.gov.au/redesigningcare

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