# Contents

1 Executive Summary  
1.1 Background and objectives of the review  
1.2 Overview of the final report  
1.3 Recommendations  
1.4 Roadmap to the report  
1.5 Concluding comments  

2 Background to the review  
2.1 Project overview  
2.2 Emergency Surgery Guidelines  
2.3 Emergency Surgery definition  
2.4 Scope  
2.5 Methodology  

3 Phase 1: Assess  
3.1 Quantitative data analysis  
3.2 Key performance indicators  
3.3 Emergency Surgery Implementation toolkit  
3.4 Case studies  

4 Phase 2: Implementation  
4.1 Overview to implementation  
4.2 Emergency Surgery models  
4.3 Implementation sites  

5 Implementation action plans  

6 Recommendations  

Appendix A Hospital summary data
1 Executive Summary

“After changing the way we manage Emergency cases we would never go back to the old way – it’s better for me and better for the patients”

General Surgeon – Nepean Hospital

1.1 Background and objectives of the review

NSW Health has initiated a program of work to progress the implementation of the Emergency Surgery Guidelines in NSW hospitals. PwC was engaged by NSW Health to provide support to this program of work.

The NSW Health Emergency Surgery program has been in place since 2009. The program separates emergency surgery (unplanned surgery) from elective surgery (planned surgery). The Emergency Surgery Guidelines were released in June 2009 by the Surgical Services Taskforce (SST) in conjunction with the NSW Department of Health. The guidelines have also been endorsed by the Royal Australasian College of Surgeons (NSW) and the Royal Australasian College of Surgeons has released a position statement supporting the separation of planned and emergency surgery.

These guidelines aim to provide the people of NSW with timely access to emergency surgery, reductions in elective surgery cancellations and improved patient safety and outcomes. In addition, it is predicted that call backs and overtime for staff will be reduced as more emergency surgery is completed during daylight hours instead of after hours, also improving staff satisfaction and morale.

Project objectives

The NSW Health Emergency Surgery Implementation Project was developed to assist 39 NSW Hospitals (B2 and above) to redesign emergency surgery in accordance with the NSW Health Emergency Surgery Guidelines.

The key objective of the project was to provide assistance to NSW hospitals to better align emergency surgery practices with the guidelines through the provision of:

- Data analysis of emergency surgery activity at 39 NSW hospitals
- Assisted, funded implementation of emergency surgery management models at selected hospitals
- Examples of emergency surgery management models and supporting implementation tools and approaches for other hospitals to utilise in future reform.

Project methodology

In order to realise the objectives the project consisted of two main phases:

Phase 1 Assess: Data analysis of emergency surgery demand in 39 major hospitals and development of the implementation toolkit

Phase 2 Design and Reporting: Provision of implementation support to individual hospitals.

Further detail regarding the approach and key activities is provided in Section 2 of the report.
## 1.2 Overview of the final report

The aim of this report is to provide a summary of achievements to date and next steps in the implementation of the NSW Emergency Surgery guidelines. The Final Report describes the key activities undertaken as related to this project.

### Table 1: Project achievements and next steps

<table>
<thead>
<tr>
<th>Activity</th>
<th>Achievements and next steps</th>
</tr>
</thead>
</table>
| **Data analysis tool**  | • Quantitative data analysis conducted across 39 NSW hospitals (B2 and above).  
  • Data analysis included:  
    ▪ emergency surgery vs planned surgery loads  
    ▪ after hours surgery by specialty  
    ▪ transfers and inpatient emergency surgery loads  
    ▪ emergency surgery patient journey  
    ▪ estimation of sessions required for in hours emergency surgery  
  • Data analysis was combined in a Data Analysis Tool and packaged for distribution  
  • **Next steps:** NSW Health to follow up with LHDs regarding the Data Analysis Tool that has been distributed.                                                                                                           |
| **Implementation toolkit** | • Development of a step by step implementation toolkit to support Emergency Surgery redesign. The toolkit supports an understanding of:  
  ▪ the demand for emergency surgery  
  ▪ the appropriate Emergency Surgery model  
  ▪ the steps required for implementation, review and evaluation.  
  • The toolkit has been designed to be user friendly and include all information and tools for the assessment, design and implementation of an emergency surgery model.  
  • The toolkit is based on the Emergency Surgery Redesign Principles outlined in the Emergency Surgery Guidelines that have been endorsed by the Surgical Services Taskforce.  
  • The toolkit is currently being piloted in a number of hospital sites selected for implementation.  
  • **Next steps:** Following the pilot phase NSW Health should publish the toolkit for use by all services.                                                                                                     |
| **Key performance indicators** | • Some initial work was undertaken by the SST to develop a draft set of KPIs.  
  • Further guidance provided by the Emergency Surgery Working Group saw the development of draft KPIs for the measurement of emergency surgery performance for this project.  
  • Draft KPIs include:  
    ▪ Operational indicators: measuring the operational performance of an emergency surgical service, such as patient wait times and patient turnaround times.  
    ▪ Clinical indicators: relate to patient safety and measure the ‘clinical management’ or ‘outcome of care’ of patients, such as morbidity and mortality rates.  
  • Draft KPIs are currently being piloted in a number of sites selected for implementation.  
  • **Next Steps:** NSW Health together with the SST and Emergency Surgery Working Group should review and progress emergency surgery KPIs and agree a state-wide suite of indicators. |
Executive Summary

**Interstate and international case studies**
- A number of case study examples of innovative models of emergency surgical care have been identified.
- It is acknowledged that each hospital has a unique caseload in terms of volume and complexity, and operates within different constraints. The applicability of a particular model will be influenced by these variables and the hospital’s readiness for change.
- The case studies are presented in this report and the implementation toolkit.

**Implementation progress**
- Six hospital sites have commenced a review of their current practice in relation to emergency surgery. These sites are at various stages of progress as outlined in Section 4 of this report.
- *The next steps for progress at each site are identified in this report. Sites should continue with implementation with the support of NSW Health where required.*

### 1.3 Recommendations

Five recommendations have been provided for the continuing implementation of the Emergency Surgery Guidelines and emergency surgery models across NSW. The five recommendations discussed below have been developed in the context of the next phase of implementation building on the activities already undertaken.

**Recommendation 1** – Develop a communications strategy, between LHDs and the Department of Health, providing services with an update on progress made towards implementing the Emergency Surgery Guidelines in line with the principles of emergency surgical services.

**Recommendation 2** – Local services undertake a review of current emergency surgical services (using the quantitative data tool and Emergency Surgery toolkit) to guide the process with the purpose of identifying areas for improvement in line with the Emergency Surgery Principles.

**Recommendation 3** – Develop, pilot and agree key performance indicators including operational and clinical measures of emergency surgery.

**Recommendation 4** – Pilot the Emergency Surgery toolkit in the selected implementation sites across the state.

**Recommendation 5** – Continue to support implementation sites through to service delivery and evaluation.

### 1.4 Roadmap to the report

The report provides a summary of the project and recommendations for next steps. The following table provides an overview of the structure of the remainder of the report.

**Table 2: Report roadmap**

<table>
<thead>
<tr>
<th>Section</th>
<th>Heading</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Background Information</td>
<td>Provides the context for the project and the methodology</td>
</tr>
<tr>
<td>3</td>
<td>Phase 1 Assess</td>
<td>Details the activities undertaken in this phase including the development of the data analysis tool and the implementation toolkit</td>
</tr>
<tr>
<td>4</td>
<td>Phase 2 Design and Reporting</td>
<td>Details the activities undertaken in this phase including hospital implementation and development of KPIs</td>
</tr>
<tr>
<td>5</td>
<td>Recommendations</td>
<td>Presents the recommendations for next steps</td>
</tr>
<tr>
<td>Appendices</td>
<td></td>
<td>Hospital data summary</td>
</tr>
<tr>
<td>Appendices</td>
<td></td>
<td>Implementation Toolkit summary - clinicians</td>
</tr>
</tbody>
</table>
1.5 Concluding comments

The NSW Emergency Surgery Guidelines together with this project provide a platform and vision for change and implementation of good practice approaches for the management of emergency surgical services across NSW. Continued successful implementation will be dependent on:

- a continued focus on implementation for those sites already in progress and encouragement of other sites to review their current service
- effective communication to promote successful models and build on stakeholder engagement
- progression of the development and piloting of KPIs
- learning from and replicating other good practices and innovations in emergency surgery models.
2 Background to the review

This section of the report provides the background to the Emergency Surgery Implementation project and provides an overview of the methodology employed.

2.1 Project overview

The NSW Department of Health (NSW Health) engaged PricewaterhouseCoopers (PwC) to assist in the implementation of the Emergency Surgery Guidelines in NSW. Running from April to September 2011, the Emergency Surgery Implementation project was conducted using an overarching redesign methodology. This employed a framework for improving clinical processes in collaboration with frontline staff to identify issues across the patient journey, consider design solutions and prioritise options for implementation.

An Emergency Surgery Steering Committee was convened by NSW Health to connect with key experts within the emergency surgery field and engage them in providing advice to the project team.

In order to continue to progress the implementation of emergency surgery reform NSW Health have initiated the Emergency Surgery Implementation project. The objectives of the project were to provide assistance to NSW hospitals through:

- Data analysis of surgical supply and demand of 39 NSW hospitals (B2 and above)
- Assisted, funded implementation of emergency surgery management models at selected hospitals
- Examples of emergency surgery management models and supporting implementation tools and approaches for other hospitals to utilise in future reform.

2.2 Emergency Surgery Guidelines

The NSW Health Emergency Surgery Guidelines, developed by experienced surgical staff in 2009, define the principles underpinning the good practice management of Emergency Surgery and specify the steps required for its redesign. The intention of the guidelines is that they be used in partnership with hospital managers and clinicians when undertaking Emergency Surgery reform.

The NSW Health Emergency Surgery Guidelines have raised the profile and understanding of the benefits of emergency surgery management in patient outcomes, staff satisfaction and operational performance. The guidelines have also facilitated the development of dedicated emergency surgery management models in some NSW hospitals. These include orthopaedic trauma at Liverpool Hospital, the Acute Surgery Program at Prince of Wales Hospital and Nepean Hospital, Acute Surgical Unit at John Hunter Hospital and Surgical Acute Rapid Assessment (SARA) at Westmead.

Despite this progress the adoption of the guidelines is not yet widespread and has been somewhat limited to larger metropolitan hospitals. Recent consultation through the SST Surgery Futures project reveals there is strong motivation to continue to progress with emergency surgery service reforms in NSW. However the challenge remains in how to support the implementation of the guidelines more widely across other hospitals with vastly different demand, workforce and service characteristics.

2.3 Emergency Surgery definition

There is no one standard definition of emergency surgery. Definitions of emergency surgery are typically based either on a recommended timeframe for surgical care (e.g. surgery required in less 24 hours), on a place
Background to the review

criterion (e.g. patients that are admitted for surgery via an emergency department) or on a disease criterion (e.g. surgery for trauma).\textsuperscript{1}

The NSW Health Emergency Surgery Guidelines (2009) defines an emergency surgery patient as follows:

"An emergency procedure is one being performed on a patient whose clinical acuity is assessed by the clinician as requiring the surgery within 24 hrs or in less than 72 hours where the patient is not physiologically stable enough to be discharged from hospital prior to the required surgery."

Although a definition of emergency surgery has not been specified by the Australian Institute of Health and Welfare emergency surgery definitions will include two main components:

- An unplanned nature of identification of the need for surgery; and
- A relative urgency for surgical intervention, without which the patient’s health may deteriorate and risk poor clinical outcomes (including loss of life, limb, or function, or reduced quality of life).

For ease of data collection from NSW Health and the 39 major hospitals as part of the NSW Health Emergency Surgery Implementation project the following definition for emergency surgery was used when collecting and conducting data analysis:

"Emergency Surgery is considered as any surgical procedure performed in an operating theatre which has not been booked onto the elective surgery waiting list."

\section*{2.4 Scope}

The focus of this project was all surgical specialty patients requiring emergency surgery including paediatrics, obstetrics and gynaecology. Inpatients requiring urgent surgery were also considered to be in scope. The data analysis component of the project included 39 hospitals across NSW categorised B2 and above. Hospitals below B2 were out of scope. The implementation phase included a limited number of hospitals as nominated by NSW Health (up to eight).

\section*{2.5 Methodology}

There were two main phases undertaken during the project to assist in the implementation of the Emergency Surgery Guidelines. These were:

- Phase 1 Assess: Data analysis of emergency surgery demand in 39 major hospitals and development of the Implementation Toolkit
- Phase 2 Design and Reporting: Hospital implementation

The key activities in the above phases are discussed in sections 3 and 4 of this report.

3 Phase 1: Assess

Data specific to emergency surgery in 39 NSW Health public hospitals were collected, analysed and presented to describe the current landscape for emergency surgical services across NSW and provide a platform for redesign at individual hospitals.

3.1 Quantitative data analysis

A key step in redesigning emergency surgery in line with the NSW Health Emergency Surgery Guidelines is to understand the current level of Emergency Surgery activity. This provides an understanding of the predicted volume and variability in demand by specialty (the ‘generally predictable workload’), and informs the selection of an optimal operating model to manage for the predicted volume and spikes in demand.

A number of data sets were used in the analysis and assessment of Emergency Surgery activity:

- the centrally available NSW Health Information Exchange (HIE) data set which is derived from the admitted patient data collection for NSW public hospitals (provided by NSW Health)
- the individual hospital operating theatre data sets derived from local data collection systems (provided by individual hospitals).

These data sets were analysed to provide insight into the volume, trends and casemix of Emergency Surgery activity at individual hospitals. The data analysis was consolidated into a Data Analysis Tool as described below.

Data Analysis Tool

The following table details the analysis conducted for the 39 hospitals based on the HIE data where possible, and the individual hospital data otherwise. Trends over the 3 years to 31 December 2010 were examined, although in some cases individual hospital data were not available to cover this entire period.

Table 3: Data analysis summary

<table>
<thead>
<tr>
<th>Current emergency and planned surgery load by specialty</th>
<th>Emergency surgery patient journey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned and emergency surgery load</td>
<td>ED arrival to operation start time by specialty</td>
</tr>
<tr>
<td>Surgery load by admitted specialty</td>
<td>Emergency surgery patient journey</td>
</tr>
<tr>
<td>Surgery load and proportion emergency by admitted specialty</td>
<td>Loads and lengths of stay for specific conditions</td>
</tr>
</tbody>
</table>
Phase 1: Assess

<table>
<thead>
<tr>
<th>Amount of emergency surgery performed after hours by surgical specialty</th>
<th>Transfers and inpatient load requiring emergency surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>After hours emergency surgery loads</td>
<td>Emergency surgery patients transferred in</td>
</tr>
<tr>
<td>Twilight and overnight emergency surgery loads by specialty</td>
<td>Emergency patients transferred in by specialty and facility</td>
</tr>
<tr>
<td>After hours emergency surgery loads by specialty</td>
<td>Medical waiting list patients requiring emergency surgery</td>
</tr>
<tr>
<td>Estimation of sessions required for emergency surgery in standard hours scheduling by specialty</td>
<td></td>
</tr>
<tr>
<td>Average operating time by specialty</td>
<td></td>
</tr>
<tr>
<td>Emergency surgery requirements in standard hours scheduling</td>
<td></td>
</tr>
</tbody>
</table>

Data Summary tables

Data summary tables (including data from all 39 hospitals) were developed to provide a snapshot overview of hospital performance relevant to emergency surgery and to assist in the selection of the hospitals for implementation.

The summary data tables focused on presenting a profile of emergency surgery at each of the 39 hospitals and included baseline activity as follows:

- Number of sessions needed for emergency surgery (1 session = 4 hrs)
- Total volume of Emergency Surgery (2010)
- Proportion of surgery classified as emergency (2010)
- 2 year growth Emergency Surgery episodes (%)
- Proportion of emergency surgery activity in daylight hours 2010 (0700 - 1600)
- Proportion of emergency surgery activity in Twilight 2010 (1600 - 2200)
- Proportion of emergency surgery activity overnight 2010 (2200 - 0700)
- 2 year growth in after hours activity 1800 - 0700 hours (%)
- 2 year growth Twilight 1800 - 2200 hours (%)
- 2 year growth Overnight 2200 - 0700 hours (%)
- Increasing/high specialty volumes (for orthopaedic and Obstetrics &Gynaecology)

The data summary tables are attached in Appendix A.

Data limitations

Accurate measurement provides a platform for informed decision making. For surgery, the fundamental unit of measurement is the surgical procedure. As such, operating theatre data reported at a procedure level must be collected for accurate analysis of surgical activity.
Phase 1: Assess

There are a number of data limitations to be mindful of when undertaking this analysis.

**HIE** - The HIE data extract supplied by NSW Health consists of data submitted by hospitals accordance with the standards for State reporting via the Health Information Exchange, however it should be noted that this information was not independently verified by PwC. The following limitations were observed:

- Procedure dates for primary procedures were largely intact and accurate. However, for almost all subsequent procedures, procedure dates were missing or unreliable. Hence the primary procedure date needed to be used as an approximation for all procedures within an episode. NSW Health further informed PwC that primary procedure dates are mandatory in a patient’s record. However they are entered manually hence the possibility of some errors. It is also noted that subsequent procedure dates are not mandatory and hence cannot be relied upon.

- The data extract provided included three years’ of admitted episodes up to 31 December 2010. Therefore the numbers of procedures in latter months (in particular December 2010) are slightly under-counted since admitted episodes with discharge dates in 2011 but procedures in 2010 are not captured.

- Only admitted specialty (ie SRG) is provided at an episodic level, rather than surgical specialty at a procedural level. Hence there is a heavy reliance on SRG classifications.

- Date inconsistencies: Admission <= episode start <= primary procedure <= episode end <= discharge NOT TRUE for 723 episodes (or 0.10% of all episodes provided).

- Length of stay = 0 for 162 episodes (or 0.02% of all episodes provided). NSW Health data dictionaries state that the minimum length of stay is 1, even if the episode is less than 24 hours. Hence a length of stay = 0 is an error.

- The admitted patient data collection allows a maximum of 50 procedures to be entered per episode. 93 episodes (or 0.01%) in the data extract provided had this maximum number of procedures and hence were potentially truncated; i.e. if a patient had more than 50 procedures within an episode, procedures 51+ would be missing.

- Different coding practices among hospitals, e.g. method for assigning procedure dates (pdate1 – pdate49) may vary between hospitals.

**Additional hospital data/analysis** - With regard to the operating theatre data supplied directly by the hospitals, submissions from hospitals will only be as good as the understanding and application of the data submission requirements by the hospital. Potential errors could be found in differing definitions between hospitals about what is considered emergency surgery. However PwC provided clarity around definitions for the hospitals to minimise this.

In addition, the following limitations are noted:

- There are a number of different reporting systems used in operating theatres across NSW, e.g. OTIS, Surginet, Legacy, HOSPAS, IPM

- Some requested timestamps in the patient journey for an Emergency Department presentation were unavailable, e.g. Time decision made for surgery, Surgery booking time. Hence this information was either not submitted or estimated by the person inputting the data.

- Some hospitals provided incomplete data due to system difficulties or recent changes in data systems.

**Conclusion**

The data tool and summary data tables developed have proven useful for hospital sites, the Emergency Surgery Working Group and NSW Health in understanding emergency surgery performance.

Accurate data on emergency surgery activity will inform management decisions and allow strategic improvement at the state, health service and hospital levels. As such NSW Health together with the SST and
Emergency Surgery Working Group should consider practical options for the development of a state-wide surgical procedure data set to provide consistent and comparable data for repeatable analysis of surgical activity.

3.2 Key performance indicators

A state-wide emergency surgery data set would provide useful insights into trends in emergency surgical activity and demand. This information would serve to be a valuable foundation for predicting, planning, managing and evaluating emergency surgery in NSW.

Currently, the existing state-wide reporting system is not designed to identify patients receiving emergency surgery. In order to understand the performance of emergency surgery management a number of data sets may be useful. These data sets include:

- Emergency department (ED)
- Operating theatre
- Inpatient
- Incident reporting
- Surgical cancellations.

Robust performance monitoring and evaluation processes are informed by data collection, analysis, and tracking over time. Data collection contributes to the development of an evidence-based understanding of the quality of an emergency surgical service by measuring it against common standards of care.

Current progress in NSW

Currently in NSW, there is no consistent framework for measuring the performance of emergency surgery care at a state-wide level. Although performance data is reported to NSW Health, it is generally not disaggregated enough to distinguish between in emergency and planned surgery.

At a local level, performance measurement systems vary depending on the site. There has been some work undertaken by the Surgical Services Taskforce to develop KPIs and a draft list developed. The establishment of the Emergency Surgery Working Group and the current Emergency Surgery Implementation project emphasise NSW Health’s commitment to the management of emergency surgery. There are opportunities within this project and in particular the selected sites to pilot a suite of KPIs and assist hospitals to collect and report these data.

Key performance indicators

Guidance provided by the Emergency Surgery Working Group indicated draft KPIs for the measurement of emergency surgery performance.

Two types of KPIs should be considered in relation to emergency surgery:

- Operational indicators: measuring the operational performance of an emergency surgical service, such as patient wait times and patient turnaround times
- Clinical indicators: relating to patient safety and measuring the ‘clinical management’ or ‘outcome of care’ of patients, such as morbidity and mortality rates.

These KPIs and some examples are listed below in Table 4.
Table 4: Emergency surgery KPIs

<table>
<thead>
<tr>
<th>Measures</th>
<th>Comments and examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operational indicators</strong> - measuring the operational performance of an emergency surgical service, such as patient wait times and patient turnaround times. Operational indicators encompass both cost and process related indicators.</td>
<td></td>
</tr>
</tbody>
</table>
| Volume of emergency surgery | Volume of procedures and/or surgical time and associated descriptive variables such as session type, specialty, surgeon, day of week etc.  
- proportion of emergency surgery by specialty  
- growth of emergency surgery by specialty |
| Time of day surgery conducted | Providing information on management strategies for in-hours versus out-of-hours surgical activity  
- duration of operations  
- % twilight operating  
- % overnight operating |
| Other |  
- use of Imaging e.g. CT scanning for positive appendix  
- first case on-time start on weekends |
| **Clinical indicators**: relating to patient safety and measuring the ‘clinical management or outcome of care’ of patients, such as morbidity and mortality rates. Clinical indicators are quality and outcome related indicators. |
| Index procedure/ condition | Clinical outcomes for high volume cases (e.g. acute cholecystitis, fractured neck of femur, acute appendicitis)  
- unplanned return to theatres  
- 30 Day mortality – Fractured Neck of Femur  
- 30 Day mortality – Laparoscopic Cholecystectomy |
| Overall emergency surgery outcomes |  
- infection rates  
- antibiotic prophylaxis – including timeliness  
- deep vein thrombosis prophylaxis – including timeliness |
| Length of stay for patient (pre-operative and post-operative split) | To provide information on LOS and potential analysis of pre-op / post-op correlations  
- length of stay (pre and post project implementation)  
- length of stay in Intensive Care Unit  
- pre operative length of stay  
- use of imaging e.g. CT scanning for positive appendix |
| Supervision |  
- registrar (Anaesthetic and Surgical) supervision  
- duration of operating theatre time (supervised vs unsupervised - registrar time) |

**Conclusion**

The draft KPIs have been used as discussion points with the pilot implementation sites. As part of the redesign the pilot sites are to select the appropriate KPIs as part of their business case to assist in demonstrating changes and improvements in overall patient care. The KPIs will also provide consistent and comparable outcome data for analysis of emergency surgery models across hospitals in NSW.

NSW Health together with the SST and Emergency Surgery Working Group should pursue discussions to develop, pilot and agree KPIs, including operational and clinical measures, of emergency surgery.
3.3 Emergency Surgery Implementation toolkit

The Emergency Surgery Implementation toolkit was developed to facilitate local implementation of the Emergency Surgery Guidelines. The purpose of the toolkit is to lead the project team, step by step, through the phases and core tasks required for Emergency Surgery redesign. At the completion of the toolkit project managers will have an understanding of:

- the demand for Emergency Surgery at their facility
- the appropriate Emergency Surgery model for their facility
- the steps required for implementation, review and evaluation.

The toolkit has been designed to be user friendly and include all the information and tools for the assessment, design and implementation of emergency surgery models.

The toolkit is based on the Emergency Surgery Redesign Principles outlined in the Emergency Surgery Guidelines that have been endorsed by the SST. There are 4 phases in the toolkit, each phase is completed sequentially followed by continuous quality monitoring after implementation. Ongoing evaluation enables a feedback loop to promote modifications as required.

Figure 1 below illustrates the Emergency Surgery Principles and the four phases of implementation.

**Figure 1: Emergency Surgery Principles and implementation phases**

The four phases include:

**Project management** - The purpose of this phase is to lay the foundations for a successful redesign and implementation. Successful implementation of changes will depend on effective project management throughout the period of the project.

**Define and assess** – The purpose of this phase is to establish the arrangements for directing, managing and controlling the intended Emergency Surgery redesign and implementation in a way that maintains a focus on and delivers the intended benefits.
Phase 1: Assess

Design the Emergency Surgery model – The purpose of this phase is to assist in the preparation for the redesign; analysing the qualitative and quantitative data and emergency surgery activity, setting objectives for the redesign and creating a business case to present to the senior executive supporting the case for change.

Implement and evaluate – The purpose of this phase is to implement the model, monitor the change management and to collect, analyse and report on performance indicators.

The activities involved in each phase are outlined below.

Figure 2: Activities by implementation phase

### 3.4 Case studies

As hospitals around the world confront the range of challenges associated with the provision of emergency surgical care, new approaches are tested in an attempt to improve the quality of care being delivered to the public. A number of case study examples of innovative models of emergency surgical care that have been identified are presented in Table 5. The case studies presented have been selected because sufficient evidence exists linking these operational models to positive outcomes in emergency surgical care.

It should be remembered that some of the models are interrelated and thus should not be viewed in isolation. For example, the dedicated emergency consultant-surgeon model, which involves the appointment of a dedicated emergency surgical consultant with no elective surgery commitments, is an approach that is incorporated into other models of care such as the Acute Surgery Unit (ASU).

In addition, it is important to keep in mind that each hospital has a unique caseload in terms of volume and complexity, and operates within different resourcing, policy and infrastructure constraints. The applicability of a particular model to any given hospital will be influenced by these variables and the hospitals readiness for change.

Table 5: Emergency Surgery models

<table>
<thead>
<tr>
<th>Model</th>
<th>Key features</th>
</tr>
</thead>
</table>
| The dedicated emergency surgeon model | - This model involves designating a consultant surgeon with no fixed elective commitments to emergency surgical care. He/she is responsible for ensuring that patients are assessed within an appropriate timeframe of their arrival.  
  - The dedicated emergency surgical consultant model does not necessarily stand alone, and has been incorporated into some of the other models of care identified. |
## Phase 1: Assess

### Model | Key features
---|---
**Charing Cross Hospital, United Kingdom**<sup>2</sup> | • Dedicated emergency surgery consultant provided a week-day emergency surgery service between 8am – 5pm with other surgical consultants rostered to provide cover outside those hours.
• Day-time registrar cover was from a registrar solely committed to emergency surgery work or a registrar of the admitting team, free from other fixed commitments.
• A dedicated emergency surgery theatre was available and all minor operations were performed within 12 hours, allowing for same-day discharge.
• The implementation of this model resulted in more day-time Consultant-supervised operations, improved training, shorter hospital stays and financial savings.

**Medway Maritime Hospital, United Kingdom**<sup>3</sup> | • A Surgical Assessment Unit (SAU) was established in a bay next to the general surgery ward to provide fast-track assessments of acute surgical and urological referrals. The unit is staffed all day by at least one registered nurse.
• A consultant surgeon is rostered on-call to the SAU with no elective commitments during this period. An operating theatre was available during work hours exclusively for SAU patients.
• The SAU had the potential to divert over 2,000 patients away from the A&E annually.
• Nearly 65% of patients arriving at the SAU came from sources other than the A&E. Without the SAU, these patients would have had to be seen in the A&E department, which was already struggling to meet demands.
• The SAU streamlined the emergency surgery patient journey and provided patients with rapid assessment and management by senior surgical staff.

**Helsinki University Central Hospital, Finland**<sup>4</sup> | • The Orthopaedic and Trauma Operating Unit of the Helsinki University Central Hospital implemented parallel processing in which an induction team of an anaesthetist, an anaesthesia nurse and a circulating nurse performed parallel anaesthesia induction in the induction room of the operating theatre, concurrently with the preceding procedure. By the end of the first case, the induction team will call for the next patient and perform anaesthesia induction.
• Parallel processing showed to reduced non-operative time and generated a faster turnaround time for orthopaedic trauma cases, enabling an extra case per day to be performed.

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2 Ibid.
4 TORKKI, P., MARJAMAA, R., TORKKI, M., KALLIO, P. & KIRVELA, O. 2005. Use of anesthesia induction rooms can increase the number of urgent orthopedic cases completed within 7 hours. Anesthesiology, 103, 401-405.
Phase 1: Assess

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**Model**

Guidelines for surgical procedures (excluding obstetrics) to be performed at night at the London Teaching Centre

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**Key features**

- The London Teaching Centre has developed a list of night-time procedures using the revised NCEPOD classification system.

<table>
<thead>
<tr>
<th>Category</th>
<th>Specialty</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Immediate</strong></td>
<td>Vascular</td>
<td>• Ruptured AAA</td>
</tr>
<tr>
<td></td>
<td>Trauma</td>
<td>• Major trauma to thorax/abdomen with haemodynamic compromise</td>
</tr>
<tr>
<td></td>
<td>Urology</td>
<td>• Suspected testicular torsion</td>
</tr>
<tr>
<td><strong>Urgent</strong></td>
<td>Abdomen</td>
<td>• Perforated viscus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Penetrating abdominal injuries</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Peritonitis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Gastrointestinal haemorrhage with haemodynamic compromise</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Intestinal obstruction with possible bowel infarction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Strangulated hernia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Acute appendicitis (especially in children and elderly)</td>
</tr>
<tr>
<td></td>
<td>Vascular</td>
<td>• Critical limb ischaemia</td>
</tr>
<tr>
<td></td>
<td>Orthopaedics</td>
<td>• Fracture with major neurovascular deficit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Compartment syndrome</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Compound fracture</td>
</tr>
</tbody>
</table>

- This list was created as out-of-hours emergency surgery is usually more costly to the hospital; less satisfactory in terms of staff working conditions; and working in unsafe hours has potential to degrade the quality of patient care provided.

- The list provides a guide to some procedures that may require night-time surgery if patients present with these conditions out-of-hours. It is one of the few examples that exist in the literature, suggesting that further investigation into this topic may be useful to gain a better understanding of how to manage emergency surgery out-of-hours.

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4 Phase 2: Implementation

The objective of the implementation phase of the Emergency Surgery Implementation project was to provide support to project teams initiating redesign of emergency surgery management at selected hospitals. This included support in understanding the funding and resources available to assist (such as the Implementation Toolkit) and where possible supporting the progress of a business case for emergency surgery management.

4.1 Overview to implementation

Measurement is the first step in the effective and efficient organisation of emergency surgery. Prediction of emergency surgery demand and subsequent management of this demand is not possible without measurement and the data to support these. The type of data required to identify meaningful trends in emergency surgery demand will include volume by caseload and specialty. Measurement of broader trends in population growth and the ageing population are also useful indicators that can help plan for future shifts in emergency surgery demand based on demographic trends.

Prediction of emergency surgery is possible given measurement of the right data. Although emergency surgery, is generally unplanned in nature the variability is in the main predictable. This does not mean that it is possible to accurately predict the exact volume or complexity of cases that will present at any given hospital by time of day. Instead, it recognises the growing acceptance that the volume and variability in emergency surgery demand can be measured and predicted.

Management is the final step in achieving the effective and efficient organisation of emergency surgery. Once an understanding of the predicted volume and variability in demand is established, strategies and systems for the management of emergency surgery can be implemented. Changes in emergency surgery demand must be met by a corresponding increase in the capacity of emergency surgical services. Furthermore once capacity has been defined and established appropriate plans for the allocation of resources and workforce need to be considered.

Phase 1 of the project, including the development of the Data Analysis Tool and the Implementation Toolkit, provided a foundation for the implementation (Phase 2) of new emergency surgery models across NSW.

4.2 Emergency Surgery models

Strategies for management or redesign of emergency surgical services have been discussed widely. Internationally and locally, a range of emergency surgery initiatives have been explored and introduced. Discussion during the project highlighted various initiatives across NSW but stressed the importance of the consideration of the local context in the exploration of any new initiatives. Consultant-led models, theatre scheduling within daylight hours and focus on at risk patient cohorts are all areas that can be considered to improve access to and the quality of emergency surgical services.

There are numerous models of emergency surgery that have been implemented in NSW Hospitals. In confirming a appropriate model, implementation sites were asked to consider the following:

- Quantitative data: the volume and growth in Emergency Surgery case load overall and by specialty
- Qualitative data: hospital profile, challenges and barriers, intended benefits and facilitators
- Degree of clinical engagement and support from local staff
- Availability of workforce to staff the new model
Anticipated patient activity volumes and their sustainability

Availability of support services such as pathology, radiology, CSSD

Alignment with agreed objectives and intended benefits of the Emergency Surgery model.

Guidance from the Emergency Surgery Steering Committee suggested that high volume was considered to be an emergency surgery load of greater than 35%. In addition the individual volumes of each specialty should also be considered to determine the model. Most models will be designed with one particular specialty in mind, for example an ASU model for General Surgery or a dedicated daily emergency session for Orthopaedics. Similarly a low load was considered to be that less than 35%.

A matrix based on the quantitative data analysis was provided to assist hospitals in determining the most appropriate model.

**Figure 3: Emergency Surgery model matrix**

*A After hours data includes ‘Twilight’ (1800 – 2200) and ‘Overnight’ (2200 – 0700) data

** Suitable for lower volume emergency surgery specialities eg plastics, ENT, urology*
4.3 Implementation sites

During the 'Design and Reporting' phase of the project, a number of hospitals were selected for participation in the project. Hospitals were selected by NSW Health in consultation with the Emergency Surgery Working Group. The selected hospitals represented a cross-section of services from metropolitan and regional locations. The selected participating hospitals are listed in the figure below.

Figure 4: Emergency Surgery Implementation Pilot hospitals

Quantitative data analysis

As discussed previously, a key step in redesigning emergency surgery in line with the NSW Health Emergency Surgery Guidelines is to understand the current level of emergency surgery activity. This will provide an understanding of the predicted volume and variability in demand by speciality (the ‘generally predictable workload’), and inform the selection of an optimal operating model to manage for the predicted volume and spikes in demand.

The data table below presents the proportion of emergency surgery as a percentage of all surgery for 2010 for the implementation hospitals and the breakdown of emergency surgery conducted during daylight hours, twilight (1800 – 2200) and overnight (2200 – 0700). In addition the two year growth in emergency surgery episodes is presented.
The data presented above, together with the more detailed data analysis including the emergency surgery loads by specialty, provided hospitals with an understanding of their demand for emergency surgery.

**Qualitative data and hospital readiness**

To complement the data analysis and build a more complete picture of emergency surgery, additional qualitative information was collected. The purpose of the qualitative data collection was to assist hospitals to further determine the ‘as is’ state of emergency surgery and provide additional detail to interpret the quantitative data analysis. Furthermore the qualitative data provided a summary of influences on any potential new model of emergency surgery including local challenges, capacity and readiness for change.

**Table 7: Qualitative data collection**

**Sydney Children’s Hospital**

<table>
<thead>
<tr>
<th>Site overview</th>
<th>Challenges</th>
<th>Potential solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• In March 2011 SCH was given access to an emergency surgery theatre for 8 hours (10 sessions/ week) – currently not fully utilised (approx 45%)</td>
<td>• Staffing arrangements: high proportion of VMOs. On-call staff are reporting difficulty running planned lists and the emergency theatre concurrently</td>
<td></td>
</tr>
<tr>
<td>• At present there is no formalised leadership for emergency surgery oversight – 3 – 4 General Surgeons (staff specialists) share the prioritisation of emergency surgery theatre time</td>
<td>• Shared theatres with POWH</td>
<td></td>
</tr>
<tr>
<td>• Staffing arrangements: monthly roster. General Surgery (3 staff specialists, 3 VMOs), orthopaedic, plastic and ENT surgeons are all VMOs. Anaesthetists mix of</td>
<td>• Emergency theatre allocation changes daily: this presents issues for collating data. Emergency theatre time for paediatrics is not ‘protected’ as within the POWH theatre block – (adult emergency surgery may bump paediatric emergency surgery).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Limited theatres with laparoscopic equipment</td>
<td>• Designated emergency lists by specialities (eg general surgery 5 AM sessions, orthopaedics 3 PM sessions, plastics 2 PM sessions)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Paediatric Anaesthetic Director position is currently being scoped. Planned role is to run and coordinate the Emergency Theatre to increase communication and utilisation of the theatre. In addition the role will be responsible for scheduling emergency lists as per patient prioritisation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• A General surgical Fellow will commence in Jan 2012 (50% clinical), key role will be to assist with emergency lists</td>
</tr>
</tbody>
</table>
Phase 2: Implementation

Staff specialists and VMOs
- Previously trialled a Paediatric Nurse Manager (3 mths) – coordinator role worked well – Paediatric Anaesthetic Director position could potentially fill this role

Prince of Wales Hospital

<table>
<thead>
<tr>
<th>Site overview</th>
<th>Challenges</th>
<th>Potential solutions</th>
</tr>
</thead>
</table>
| The success of the General Surgery Acute Surgical Unit program and the identified need for improved care in acute orthopaedic surgery has led to the Orthopaedic Surgeons and team at POWH to look at a similar model for acute orthopaedic surgery. | Recent experience and data collection at POWH showed that the care of hip fractures in the elderly is a current and ongoing risk, with the following issues: - Delays/ cancellation of surgery - Failure to provide standardised DVT/ PE prophylaxis - No agreed process for combined acute admission of elderly hip fracture patients | Orthopaedic emergency surgery lists aim to: - Establishing a predictable operating time for patients and therefore a reduction in delays/ cancellations of surgery leading to better patients outcomes and potentially a decreased length of stay - Combined orthopaedic and geriatric medicine admission and share cared for the high risk population (elderly patient with fractures NOFs) - Increased supervision for orthopaedic registrars
A new operating table, imaging machine and other equipment is required. |

Maitland Hospital

<table>
<thead>
<tr>
<th>Site overview</th>
<th>Challenges</th>
<th>Potential solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theatre complex: 4 theatres (note: 1 theatre is small and utilisation is limited, currently being used for scopes, and other miscellaneous lists)</td>
<td>High volume of emergency surgery - Endoscopes and ECTs currently undertaken in theatres - Delays in getting patients to theatre - Several cancellations for surgery leading to patients fasting and deconditioning on the ward (potential increase length of stay) - Emergency caesareans often delay/bump planned and emergency surgery start times</td>
<td>Recruit Orthopaedic Fellow to assist with emergency caseloads during daylight hours and increase supervision of junior registrars - Offload planned surgery to Cessnock/ Kurri Hospitals and increase availability at Maitland Hospital (eg move scopes from Maitland to Cessnock, move some gynaecology to Singleton (ablation equipment)). - Purchase of additional instruments for orthopaedic surgery to improve turnaround time efficiencies - Extend CSSD hours to accommodate emergency surgery – afternoon/evening shifts and additional weekend shifts - Review obstetrics model</td>
</tr>
</tbody>
</table>
### Gosford Hospital

<table>
<thead>
<tr>
<th>Site overview</th>
<th>Challenges</th>
<th>Potential solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currently have an Orthopaedic Trauma model which works similar to ASU principals. This model was implemented in 2005.</td>
<td>Limited theatre space – require capital funding for theatre suite extension.</td>
<td>General Surgery ASU plan: 3 surgery sessions per week, 8 bed ASU model, consultant-led, use existing resources (consultant, registrar, CNC). Weekend cover will be provided by existing on call VMO roster.</td>
</tr>
<tr>
<td>8 Operating Theatres, 2 Procedural rooms</td>
<td>Limited funded sessions available – require funding for three extra theatre sessions and eight beds for General surgery ASU</td>
<td>Identify 3x2 hour sessions at Wyong Hospital for the provision of in hours emergency surgery (currently no emergency surgery time in hours) to increase the Theatre capacity at Gosford Hospital</td>
</tr>
<tr>
<td>Increase in volume of acute general surgical patients across LHD eg gall bladder disease</td>
<td>General Surgery ASU plan: 3 surgery sessions per week, 8 bed ASU model, consultant-led, use existing resources (consultant, registrar, CNC). Weekend cover will be provided by existing on call VMO roster</td>
<td></td>
</tr>
</tbody>
</table>

### Orange Hospital

<table>
<thead>
<tr>
<th>Site overview</th>
<th>Challenges</th>
<th>Potential solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current have 0.7 Orthopaedic staff specialist, otherwise all VMOs – shared with Bathurst</td>
<td>Share VMO’s with Bathurst</td>
<td>Designated orthopaedic emergency lists at Orange and Bathurst</td>
</tr>
<tr>
<td>3 morning emergency surgery session at Orange</td>
<td>On-call rosters between Bathurst and Orange</td>
<td>CNC position and Orthopaedic Fellow for Orange</td>
</tr>
<tr>
<td>5 theatres at Orange and 4 theatres at Bathurst</td>
<td>Orange theatre utilisation – almost at capacity</td>
<td></td>
</tr>
</tbody>
</table>

### The Tweed Hospital

<table>
<thead>
<tr>
<th>Site overview</th>
<th>Challenges</th>
<th>Potential solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currently have designated emergency surgery lists - 4 x sessions/ week with some specialty emergency surgery lists (General Surgery Friday pm 1x session)</td>
<td>Currently no capacity in theatres to allocate additional emergency surgery sessions (procedures are currently performed in theatre)</td>
<td>Commissioning and 'fit-out' of procedure room to accommodate for endoscopies and ECTs that are currently performed in theatre</td>
</tr>
<tr>
<td>In addition 2 hours is allocated for emergency surgery 5 days/week after an elective orthopaedic &amp; general surgery list.</td>
<td>Elective surgery lists delayed or cancelled 2 – 3 times a week to accommodate emergency surgery</td>
<td>Off-load of surgery to Murwillumbah District Hospital to free some theatre capacity and review theatre schedule</td>
</tr>
<tr>
<td>4 operational theatres</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
- Identified 3x2 hour sessions at Wyong Hospital for the provision of in hours emergency surgery (currently no emergency surgery time in hours) to increase the Theatre capacity at Gosford Hospital.
### Wagga Wagga Hospital

<table>
<thead>
<tr>
<th>Site overview</th>
<th>Challenges</th>
<th>Potential solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 5 operating theatres (including an upgraded procedure room - limited to minor surgery only)</td>
<td>• High emergency surgery load</td>
<td>• Implementation of an Acute Surgical Unit (ASU) with a Clinical Nurse Consultant to be appointed to the ASU to coordinate patient care. ASU (commencing 31 October 2011)</td>
</tr>
<tr>
<td>• Designated operating time for Emergency Surgery each day</td>
<td>• Emergency surgery performed in elective lists.</td>
<td></td>
</tr>
<tr>
<td>• In April 2010: allocated emergency sessions for General surgery each weekday PM and an increase in number of separate allocated Trauma sessions for Orthopaedics</td>
<td>• Elective list over run incurring overtime and occasional cancellation of elective cases</td>
<td>• Recruitment of a Surgical Fellow to undertake elective surgery to maintain elective surgery waiting list targets for surgeon who is on call.</td>
</tr>
<tr>
<td>• In February 2010 a Surgical Patient Flow Nurse Manager position was established to effectively manage the waiting list</td>
<td>• Aligning surgeon availability with emergency theatre availability.</td>
<td>• Booking Office scheduling to be reviewed and monitoring additions to lists on day of elective list.</td>
</tr>
<tr>
<td></td>
<td>• Limited theatre availability (Limited sessions available because of theatre allocation specifically to trauma)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Separating emergency cases into emergency lists rather than elective lists.</td>
<td></td>
</tr>
</tbody>
</table>

Taken together the quantitative and qualitative data provide hospitals with the foundations required to assist in determining an appropriate model of Emergency Surgery. In summary, the model selected for individual hospitals will depend on the emergency surgery load, volume and range of specialities, number of operating theatres, number of surgical consultants participating on the Emergency Surgery roster, collegiality of consultants on the roster, geographical location and the hospital designation.

### Conclusion

NSW Health will continue to support the implementation hospitals through design, implementation and evaluation. The Emergency Surgery Implementation Toolkit should be piloted in the selected implementation sites across the state and published for wider use on the NSW Health website.
## 5 Implementation action plans

Progress towards implementation across the selected hospital sites is at varying points. Most sites are working through the Assess and Design phase (of the toolkit) and developing a business case for an emergency surgery model. Sites will then progress to developing the detailed model of emergency surgery to facilitate the implementation of a successful and sustainable future model of emergency surgery.

Site visits and/or teleconferences have been held with all implementation hospitals. Additional support activities to date have included review of documentation, analysis of theatre templates, further detailed data analysis and preparation of business cases. In addition, the Implementation Toolkit has been discussed and copies provided to a number of pilot sites.

The culmination of the project for the selected hospitals is to implement the model, monitor and manage the change to collect, analyse and report on performance indicators.

The table below provides a generic Implementation Plan for the selected hospitals, a sequence of activities intended to take the Emergency Surgery model designed for each hospital through to implementation and delivery of emergency surgical services and finally evaluation of the new model.

### Table 8: Hospital implementation plans

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Next steps</th>
</tr>
</thead>
</table>
| **Gosford Hospital**      | 1. Appoint project manager  
2. Develop local communications plan  
3. Undertake Project Management activities as required (refer toolkit chapter 1)  
4. Develop business case and options (refer toolkit chapter 2)  
   - Application for capital funding: theatre fit out and additional beds  
   - Application for recurrent funding: CNC  
5. Business case and funding approval from NSW Health  
6. Continue Design and Implement phases (refer toolkit chapters 3 and 4): recruit required staff, purchase equipment and fit out theatre, update theatre schedule  
7. Collect, analyse and present relevant data and KPIs to NSW Health  
8. Develop case study for publishing and sharing with other services |
| **Prince of Wales Hospital** | 1. Appointed project manager  
2. Develop local communications plan: meeting with Orthopaedic surgeons held to communicate support for ASU  
3. Undertake Project Management activities as required (refer toolkit chapter 1)  
4. Develop business case and options (refer toolkit chapter 2)  
   - Application for capital funding: additional instrumentation and theatre fit out for orthopaedic emergency surgery  
   - Application for recurrent funding: Data manager, CNC to oversee orthopaedic emergency surgery  
5. Business case and funding approval from NSW Health  
6. Continue Design and Implement phases (refer toolkit chapters 3 and 4): purchase equipment and fit out theatre, recruit required nursing staff and anaesthetist, update theatre schedule, confirm governance of orthopaedic surgery model (working alongside general surgery ASU surgeon)  
7. Collect, analyse and present relevant data and KPIs to NSW Health |
## Implementation action plans

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Next steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney Children’s Hospital</td>
<td>8. Develop case study for publishing and sharing with other services</td>
</tr>
<tr>
<td></td>
<td>1. Appointed project manager</td>
</tr>
<tr>
<td></td>
<td>2. Develop local communications plan: meet with specialty groups (orthopaedics, plastics and general surgery) to discuss emergency list scheduling options: designated specialty lists, discuss option of daily designated emergency theatre for paediatrics (within POWH theatre complex) to assist with ease of data collection</td>
</tr>
<tr>
<td></td>
<td>3. Undertake Project Management activities as required (refer toolkit chapter 1)</td>
</tr>
<tr>
<td></td>
<td>4. Develop business case and options (refer toolkit chapter 2): Progress options for ES model and seek surgeon/anaesthetist feedback, incorporate new Paediatric Anaesthetic Director roles and responsibilities, incorporate general surgery Fellow role (Jan 2012, 0.5FTE)</td>
</tr>
<tr>
<td></td>
<td>5. Business case approval from NSW Health</td>
</tr>
<tr>
<td></td>
<td>6. Continue Design and Implement phases (refer toolkit chapters 3 and 4): update and review theatre schedule: look at scheduling designated specialty emergency lists (eg general surgery 5 AM sessions, plastics/orthopaedics PM alternate lists), review oncall rosters and options</td>
</tr>
<tr>
<td></td>
<td>7. Collect, analyse and present relevant data and KPIs to NSW Health</td>
</tr>
<tr>
<td></td>
<td>8. Develop case study for publishing and sharing with other services</td>
</tr>
<tr>
<td>The Tweed Hospital</td>
<td>1. Appoint project manager</td>
</tr>
<tr>
<td></td>
<td>2. Develop local communications plan</td>
</tr>
<tr>
<td></td>
<td>3. Undertake Project Management activities as required (refer toolkit chapter 1)</td>
</tr>
<tr>
<td></td>
<td>4. Develop business case and options (refer toolkit chapter 2)</td>
</tr>
<tr>
<td></td>
<td>- Application for capital funding: fit out and commissioning of additional theatre</td>
</tr>
<tr>
<td></td>
<td>- Application for recurrent funding</td>
</tr>
<tr>
<td></td>
<td>5. Business case and funding approval from NSW Health</td>
</tr>
<tr>
<td></td>
<td>6. Continue Design and Implement phases (refer toolkit chapters 3 and 4)</td>
</tr>
<tr>
<td></td>
<td>7. Collect, analyse and present relevant data and KPIs to NSW Health</td>
</tr>
<tr>
<td></td>
<td>8. Develop case study for publishing and sharing with other services</td>
</tr>
<tr>
<td>Maitland Hospital</td>
<td>1. Appointed project manager</td>
</tr>
<tr>
<td></td>
<td>2. Develop local communications plan</td>
</tr>
<tr>
<td></td>
<td>3. Undertake Project Management activities as required (refer toolkit chapter 1)</td>
</tr>
<tr>
<td></td>
<td>4. Develop business case and options (refer toolkit chapter 2): review of VMO and staff commitments and on-call rosters for all specialties (commencing with general surgery), progress extension of CSSD hours, consider role and responsibilities of Anaesthetic Day Director</td>
</tr>
<tr>
<td></td>
<td>- Application for capital funding: instrumentation for Maitland (orthopaedic), Singleton (gynae ablation) and Cessnock (scopes)</td>
</tr>
<tr>
<td></td>
<td>- Application for recurrent funding: Orthopaedic Fellow</td>
</tr>
<tr>
<td></td>
<td>5. Business case and funding approval from NSW Health</td>
</tr>
<tr>
<td></td>
<td>6. Continue Design and Implement phases (refer toolkit chapters 3 and 4): update and review theatre schedule: look at scheduling designated specialty emergency lists, consider mixed planned / emergency lists</td>
</tr>
<tr>
<td></td>
<td>7. Collect, analyse and present relevant data and KPIs to NSW Health</td>
</tr>
<tr>
<td></td>
<td>8. Develop case study for publishing and sharing with other services</td>
</tr>
<tr>
<td>Hospital</td>
<td>Next steps</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Orange Hospital        | 1. Appoint project manager  
2. Develop local communications plan: Joint meeting between Orange and Bathurst held 13.9.11 – all agreed to progress options for orthopaedic emergency surgery joint model  
3. Undertake Project Management activities as required (refer toolkit chapter 1)  
4. Develop business case and options (refer toolkit chapter 2)  
   - Application for capital funding: instruments  
   - Application for recurrent funding: Orthopaedic Fellow and CNC  
5. Business case and funding approval from NSW Health  
6. Continue Design and Implement phases (refer toolkit chapters 3 and 4): review and update theatre schedules for Orange and Bathurst in line with on call rosters  
7. Collect, analyse and present relevant data and KPIs to NSW Health  
8. Develop case study for publishing and sharing with other services                                                                                                                                         |
| Wagga Wagga Hospital   | 1. Appoint project manager  
2. Develop local communications plan  
3. Undertake Project Management activities as required (refer toolkit chapter 1)  
4. Develop business case and options (refer toolkit chapter 2)  
5. Business case and funding approval from NSW Health  
6. Continue Design and Implement phases (refer toolkit chapters 3 and 4)  
7. Collect, analyse and present relevant data and KPIs to NSW Health  
8. Develop case study for publishing and sharing with other services                                                                                                                                         |
6 Recommendations

Five recommendations have been provided for consideration by NSW Health in continuing the implementation of the Emergency Surgery Guidelines and emergency surgery models across NSW. The five recommendations discussed below have been developed in the context of the next phase of implementation building on the activities already undertaken as described in the previous sections of this report.

**Recommendation 1** – Develop a communications strategy, providing services with an update on progress made towards implementing the Emergency Surgery Guidelines in line with the Emergency Surgery Principles.

The development and implementation of a communication plan will assist to promote a shared understanding of the work undertaken to date regarding implementation of the Emergency Surgery Guidelines.

Effective change management and communication are imperative to achieving ongoing and successful implementation of the guidelines and sharing achievements between services.

Regular communication will assist to enhance clarity and consistency of information, and build on the momentum harnessed through the project. Components of a communication strategy could include:

- The provision of regular communication updates (e.g. meetings, emails, conference presentations) to all key stakeholders, particularly administration and surgical/theatre staff who will be most interested and impacted by any potential redesign. Communication should occur on a regular basis and be tailored to meet the specific requirements of individual stakeholder groups.

- Dissemination of the four page flyer to emergency surgery staff (see Appendix B) along with dissemination of the toolkit to all hospitals (specifically targeting management and project managers).

- The provision of education and training for project management staff covering both project management and redesign methodology.

- Development and sharing of site specific case studies describing the hospital profile, the model of emergency surgery and key outcomes (supported by data where possible).

**Recommendation 2** – Local services undertake a review of current emergency surgical services (using the quantitative Data Analysis Tool and Emergency Surgery Implementation Toolkit) to guide the process with the purpose of identifying areas for improvement in line with the Emergency Surgery Principles.

The Emergency Surgery Guidelines support the move towards consultant-led, in-hours emergency surgery where possible. While it is acknowledged that emergency surgical services are provided in a variety of environments, there are several models that may be considered to enable hospitals to implement practices that support the emergency surgery principles. The Emergency Surgery Implementation Toolkit together with the Data Analysis Tool provides services and project managers with a framework to analyse the current data and emergency surgery activity and identify the future model for emergency surgery as required. It is acknowledged that the model selected for individual hospitals will depend on the emergency surgery load, volume and range of specialities, number of operating theatres, number of surgical consultants participating on the emergency surgery roster, collegiality of consultants on the roster, geographical location and the hospital designation.

Services may continue to use the Implementation Toolkit to focus on the detailed development of the future model of emergency surgery and the steps required to implement the model, monitor and manage the change and collect, analyse and report on performance indicators.

**Recommendation 3** – Develop, pilot and agree key performance indicators including operational and clinical measures of emergency surgery.

The development of an agreed set of consistent and comparable KPIs will provide a platform for performance improvement and management. Informed decision making requires robust performance information. Accurate reporting on emergency surgery performance will inform management decisions and allow strategic improvement at the state, health service and hospital levels.
Currently there is no recognised measurement framework for emergency surgery. Guidance provided by the Emergency Surgery Working Group indicated a number of desirable KPIs for the measurement of emergency surgery performance. These measures are described in Table 4: Emergency surgery KPIs.

Sites selected for the implementation phase should pilot these indicators where possible and provide feedback to NSW Health on the ease of collection and the relevance of the measure to their service. Similarly NSW Health together with the Emergency Surgery Working Group and the SST should review the data collected and determine the indicators of interest for a state-wide collection.

In identifying an agreed set of state-wide KPIs for emergency surgery, it is important to consider the following:

- data collections already in place, and how the data will be used internally or externally
- the method by which data will be collected, where the data will be reported and the frequency of data collection
- the type of data required to identify meaningful trends in emergency surgical services classified as operational (process and cost) indicators and clinical (quality and outcome) indicators.

**Recommendation 4** – Pilot the Emergency Surgery Implementation Toolkit in the selected implementation sites across the state.

The Implementation Toolkit should continue to be piloted in the implementation sites to identify any areas that may required further explanation or review.

Following completion of the pilot, any necessary changes to the Implementation Toolkit should be made and the toolkit published for state-wide use.

**Recommendation 5** – Continue to support implementation sites through to service delivery and evaluation.

NSW Health should continue to provide guidance and assistance to the hospitals that have commenced the redesign process for emergency surgery.

The monitoring and evaluation cycle should be a continuous process. Evaluation and initial data results should be reported and discussed with the leaders at each site, NSW Health, the Emergency Surgery Working Group and the SST.

The development of site specific case studies should be published and other sites encouraged to review their practice and implement models of emergency surgery consistent with the emergency surgery principles.
Appendices

Appendix A  Hospital summary data  30
Appendix B: Emergency Surgery Toolkit 4-page summary  31
## Appendix A  Hospital summary data

<table>
<thead>
<tr>
<th>Hospital Name</th>
<th>Category</th>
<th>No. of seasons needed for 65% (1 season = 6 months)</th>
<th>Increasing volumes overall</th>
<th>Total volume of emergency surgery (2019)</th>
<th>Proportion of surgery classified as emergency (%)</th>
<th>3 year growth emergency surgery volumes (%)</th>
<th>Proportion of ED done in day/night hours (2019)</th>
<th>Proportion of ED done in overnight (2019)</th>
<th>Proportion of ED done in overnight (2019)</th>
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NSW Health
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Appendix B: Emergency Surgery Toolkit

4-page summary