"Knowing the Risk:" implications for Critical Care

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Background:

- In the UK 170,000 patients undergo higher-risk non-cardiac surgery each year.
- Of these patients, 100,000 will develop significant complications.
- Resulting in over 25,000 deaths.
- General surgical emergency admissions are the largest group.
- And account for a large percentage of all surgical deaths.

- Emergency cases alone presently account for 14,000 admissions to intensive care in England and Wales annually.
- The mortality of these cases is over 25%.
- ICU cost alone is at least £88 million.
- Mortality for over 80s can reach 50% for GIT surgery.
- Access to dedicated emergency theatres suboptimal.

"Who operates when" 1997,2003 "Caring to the end "2009:daytime available dedicated theatre team 51% to 87%

Day of admission :Friday/sat# NOF and time to surgery

Week-end Admission and outcome

Week-end operating sub-optimal in some sites

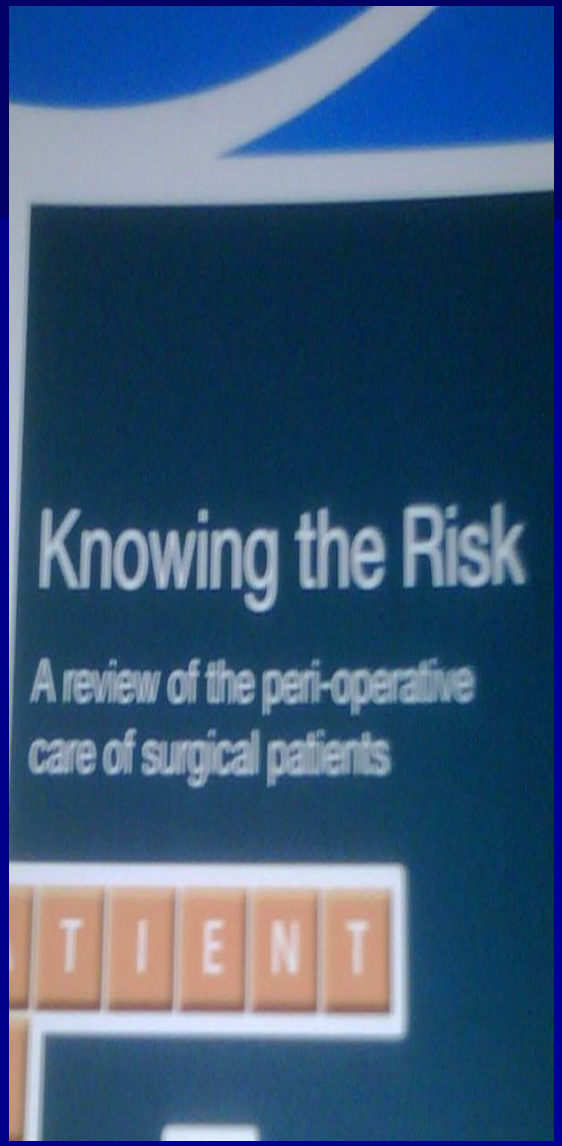
High volume operating for AAA (≥35cases/yr))(mortality 13%v 8%)

- Prospective audit
- Retrospective review by assessors
- 19,097 pts in week (march 2010)
- Non-cardiac, neurological , transplant
- Adults only (>16yrs)
- Analysis:

- Classification of patients
- Infrastructure
- Process measures
- Outcomes;

a. Critical Care usage

b. mortality (30days, 6 mths)



Overview:

- Surgical pathways ill defined.
- Poor recognition of individual patient risk.
- No agreement on definition of “High” risk.
- Poor intra-operative use of evidence based practice for “High” risk patients.
- Recognition of value of Critical Care poorly understood.
- Optimising ward based care to detect patient deterioration.

Infrastructure: pre-surgery

- 12% hospitals (27 sites) with no policy for recognition and management of acutely ill patients.
- 10% hospitals (20) with no critical care unit and not compliant with NICE 50.
- Identification of "High" risk appeared to apply more weight to cardiovascular risk (static as opposed to dynamic function).
- 60% no CPET service.
- Anaesthesia classification of risk.

Infrastructure and process: pre-surgery

- 80% all patients classified as ASA 1 or 2
- Overall 20% pts classified at time of surgery as "high" risk.
- Urgency of need for surgery poorly understood.
- Only 54% of patients in the immediate group and 29% urgent group classified as "high "risk.

Assessors opinion:

- Clarity on definition of "high" risk required
- Estimated "high" risk group only 16% of cohort ie 20% incorrect.

Assessors opinion:

- Delay in investigations in 8.5% pts
- Pre-operative assessment poor in 10%
- ASA classification :

  23.5% ASA 1 or 2

  65.6% ASA 3

  10% ASA 4
- Only 80% non-elective surgery timely
- Fluid management

Infrastructure: peri-operative phase

- Emergency theatre: 27.5% still without appropriate infrastructure
- 22.5% recovery areas unable to offer post-operative ventilatory support
- Use of invasive monitoring:

- 9% arterial line (27% high risk)
- 4.3% CVC (14% high risk)
-2.2% Cardiac output (5% high risk)

Infrastructure: peri-operative phase

- *Assessors opinion:*
- Correct grade of surgeon 99%.
- Correct grade of anaesthetist 95%.
- Intra-operative complication in 10%.
- Inadequate Intra-operative monitoring in 11%of pts.
- Inadequate monitoring associated with increased mortality.
- Anticipated use of Cardiac output 12% (v 1.2%).
- Intra-operative care good in <50% high risk patients.
- "High" Risk patients more likely to have worse care if require un-planned surgery (~60% v ~40%).

Infrastructure: post-operative phase

- Overall 8.1% of patients had a pathway to critical care
- 7.1% primary event, 1% secondary event
- 2/3rds elective; 1/3rd emergency
- ~20% "High" risk patients undergoing elective surgery admitted to critical care (primary event)
- ~26% "High" risk patients undergoing emergency surgery admitted to critical care

NB:64% pts having immediate surgery to critical care

Unplanned subsequent admission

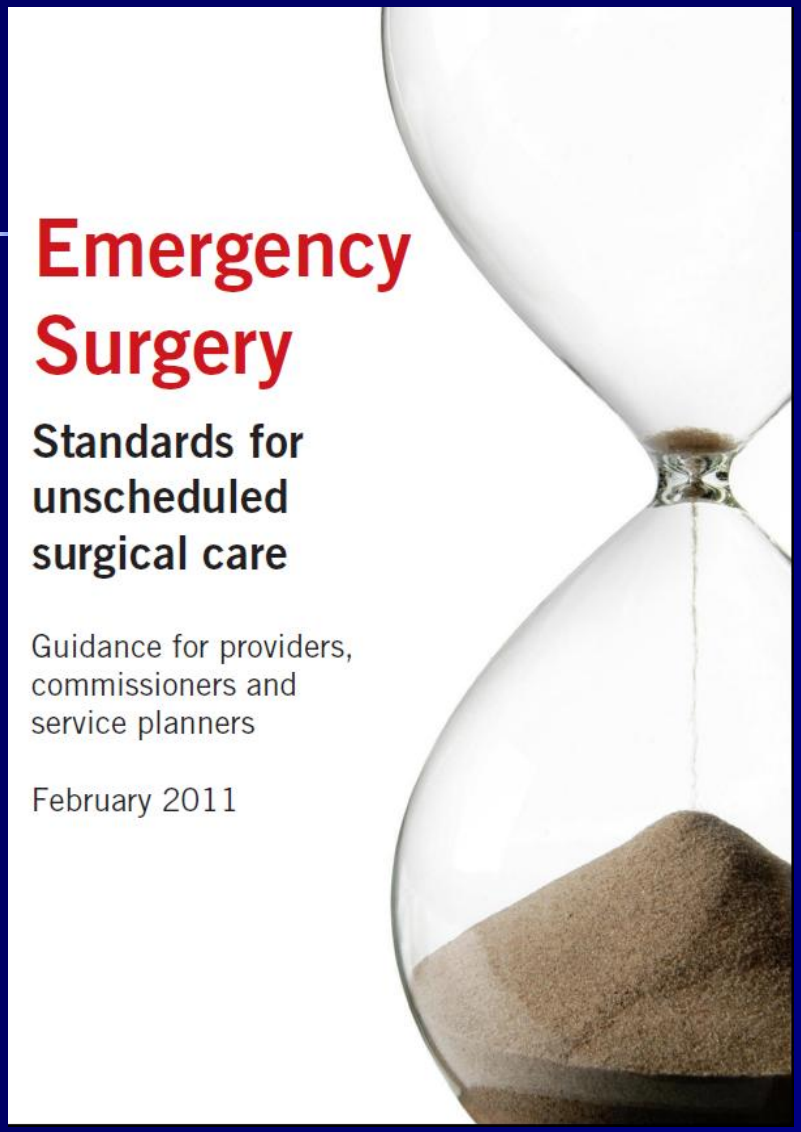
- Unplanned subsequent admission from the ward associated with poor outcome:
- Elective patients 4.6%v 0.2% (2% primary admission)
- Emergency patients 8.9%v 2.7%

Mortality:

- Overall mortality 1.6%, 6.2%" High" risk group.
- 79% of all deaths in "High" risk group.
- Link between urgency of surgery and mortality.
- 1:4 "High" risk patients requiring immediate surgery will die.
- 1:8 "High" risk patients requiring urgent surgery will die.

Infrastructure: post-operative phase

- *Assessors opinion:*
- Review of critical care requirements.
- 8.3 % patients discharged to wrong location.
- Post-operative care good in only 47% pts.
- Monitoring, timely investigations, use of inappropriate NSAIDs all relevant to pathway.
- Post-operative complications: 10% respiratory;8.4% CVS;HAI 6.4%;Renal 5.4%).

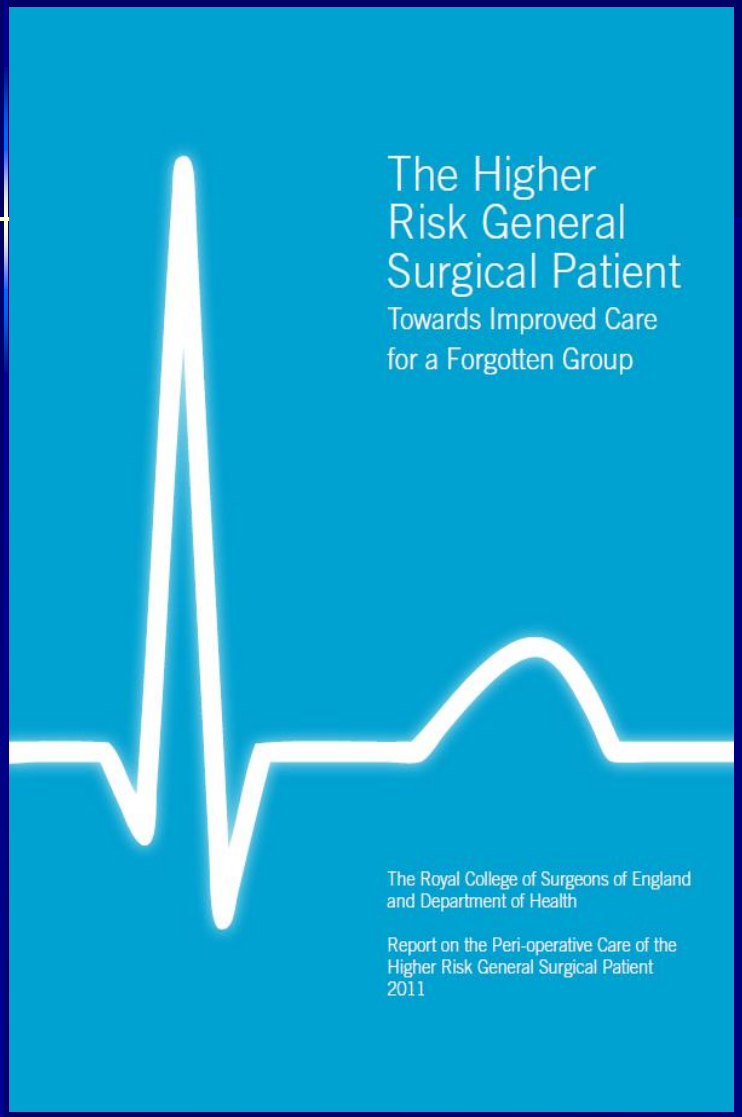


Senior decision making

Pathway design

Matching resources to needs of population

Prioritisation of Acutely ill patients



Definition of "High Risk": predicted hospital mortality ≥ 5%

Consultant input if predicted mortality ≥ 10%

All "High" risk patients to be considered for post-surgery critical care

All patients with predicted mortality ≥ 10% admitted to critical care

Implications:

- Proposed a definition for "High" risk.
- Recommended more explicit communication of risk.
- Identified need to define surgical pathways (elective, un-planned).
- Identify roles and responsibilities within the pathway including diagnostic and Peri-operative care strategy.
- Identify when Critical Care will be required.

Implications:

- Proposed tools to enhance reliability of the pathway with the purpose of:

  -Minimising clinical handoffs

  - Reducing omissions in care

  - Maximising patient outcomes with the added benefit of reducing the overall cost of the pathway

The pathway:


Clinical Assesment
Diagnostics
Intraoperative Phase
Post-Op Care

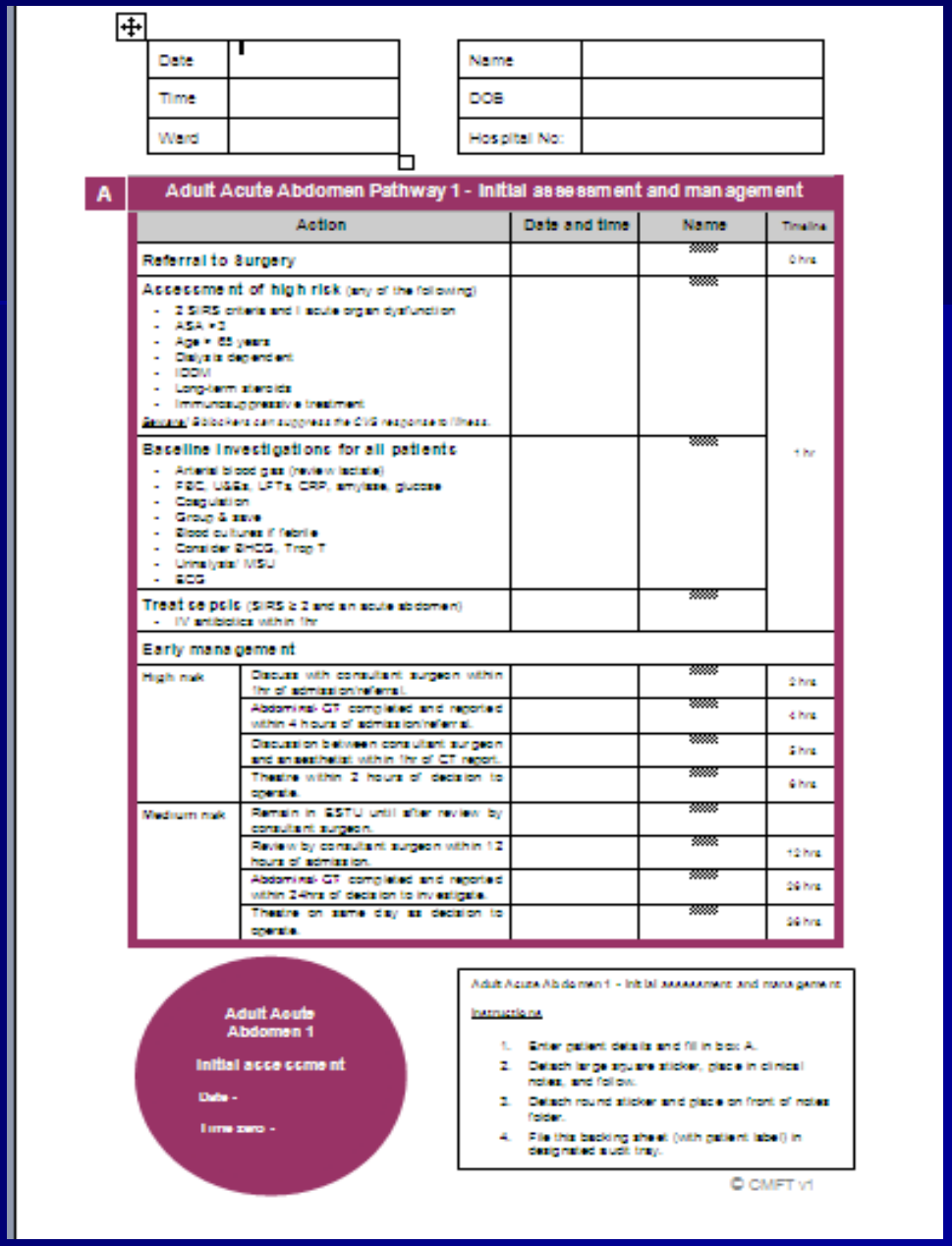
Appendix 3: Unscheduled Adult General Surgical Pathway

This pathway has four identifiable components: Clinical Assessment, Diagnostics, Intra-Operative, and Post-Operative phases. It was developed by clinical staff from Surgery, Anaesthesia, Intensive Care Medicine, Radiology and Emergency Medicine in Central Manchester University Hospitals NHS Foundation Trust. The Pathway will assist colleagues in matching an individual patient's risk of death to seniority of staff in decision making and identifying the timing of key interventions. These include the timing and choice of diagnostic tests and location of post-operative care. The pathway describes measurable standards based on the report.

	Clinical assessment	Diagnostics	Intraoperative phase	Postoperative care
FEATURES	Decision based on: clinical history, clinical examination, bedside observations, EWS and laboratory tests.	Laboratory: assessment of organ function; microbiology assessment. Radiology: choice determined by clinical examination and history. Minimise secondary renal morbidity.	Assessment of risk associated with anaesthesia and surgery calculated and documented in notes. The surgical risk will be calculated using P-Possum. The risk associated with anaesthesia will be undertaken using the ASA grade. Antibiotics within 30mins prior to skin incision. Optimisation of perioperative fluid administration, cardiovascular and respiratory function Monitoring of other organ function	Patients will be located in a clinical area dependent on end of surgery bundle assessment. Principles of care: • Post-operative plan determined by diagnosis/surgery/ clinical condition. • Early detection of new onset acute organ dysfunction • Mobilisation at the earliest opportunity.
DECISION MAKING	MRCS and Senior help as indicated by condition.	MRCS.	MRCS and FRCAnaes.	MRCS for low and medium risk populations.

	Clinical assessment	Diagnostics	Intraoperative phase	Postoperative care
INTERVENTIONS	Monitoring EWS plan set. Minimum of 4 hrly observations. Graded response based on EWS and clinical progress. Diagnostic plan identified. Senior review within 12hrs (Consultant or MRCS trainee should not be moved from ESTU or nor should they be handed off to another team until review has occurred). If referred to another surgical team senior review within 12hrs. Organ dysfunction quantified. Antibiotics as per Trust Surviving Sepsis guidelines.	USS CT; selection of contrast determined by renal function. CT with angiography. Discussion about need for interventional / other procedures before leaving the Radiology Dept.	Intraoperative: • Invasive monitoring to optimise intravascular fluid therapy and organ perfusion. • Measurement of arterial blood gases and lactate. • Minimise risk of secondary organ dysfunction eg atrial fibrillation, basal atelectasis, renal dysfunction. End of Suraerv: • Assessment of postsurgery organ support needs, based on operative findings, clinical state and risk of further deterioration. • Development of Bundle to identify low, medium and High Risk Groups and determine postsurgery pathways	Maintain minimum of 1hrly observations following surgery until senior review. Antibiotic regime dependent on surgical diagnosis. Chest physiotherapy and Mobilisation regime. Nutritional regime. DVT prophylaxis. Use of continuous fluid balance monitoring. Daily biochemistry and Haematology until stepped down in frequency by senior review. Post-operative pain relief regime according to protocolised care.

Admission Bundle:



Date	
Time	
Ward	

Name	
DOB	
Hospital No:	

A **Adult Acute Abdomen Pathway 1 - Initial assessment and management**

Action		Date and time	Name	Timeline
Referral to Surgery				0 hrs
Assessment of high risk (any of the following) - 2 SIRS criteria and 1 acute organ dysfunction - ASA >2 - Age > 65 years - Dialysis dependent - ICD/VI - Long-term steroids - Immunosuppressive treatment Remember: Bloodtests can suppress the CVS response to illness.				1 hr
Baseline investigations for all patients - Arterial blood gas (review lactate) - FBC, U&Es, LFTs, CRP, amylase, glucose - Coagulation - Group & save - Blood cultures if febrile - Consider BHCG, Trop T - Urinalysis/ MSU - ECG				
Treat sepsis (SIRS ≥ 2 and an acute abdomen) - IV antibiotics within 1hr				
Early management				
High risk	Discuss with consultant surgeon within 1hr of admission/referral.			2 hrs
	Abdominal CT completed and reported within 4 hours of admission/referral.			4 hrs
	Discussion between consultant surgeon and anaesthetist within 1hr of CT report.			5 hrs
	Theatre within 2 hours of decision to operate.			9 hrs
Medium risk	Remain in SSTU until after review by consultant surgeon.			
	Review by consultant surgeon within 12 hours of admission.			12 hrs
	Abdominal CT completed and reported within 24hrs of decision to investigate.			36 hrs
	Theatre on same day as decision to operate.			36 hrs

Adult Acute Abdomen 1

Initial assessment

Date -

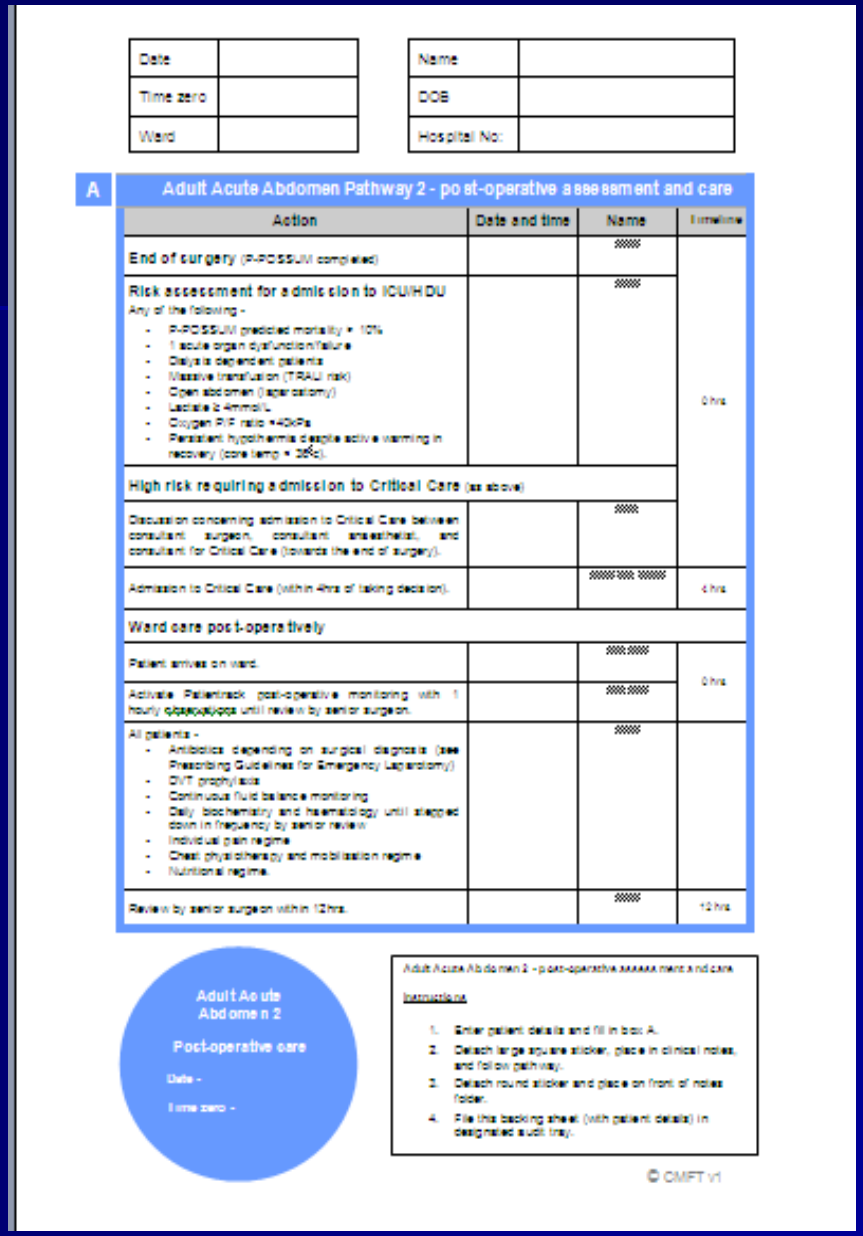
Time zero -

Adult Acute Abdomen 1 - Initial assessment and management

Instructions

1. Enter patient details and fill in box A.
2. Detach large square sticker, place in clinical notes, and follow.
3. Detach round sticker and place on front of notes folder.
4. File this backing sheet (with patient label) in designated audit tray.

Post-Surgery Bundle:



Date		Name	
Time zero		DOB	
Ward		Hospital No:	

A Adult Acute Abdomen Pathway 2 - post-operative assessment and care

Action	Date and time	Name	Timeline
End of surgery (P-POSSUM completed)		[redacted]	0 hrs
Risk assessment for admission to ICU/HDU Any of the following - • P-POSSUM predicted mortality > 10% • 1 acute organ dysfunction/failure • Dialysis dependent patients • Massive transfusion (TRALI risk) • Open abdomen (laparostomy) • Lactate ≥ 4mmol/L • Oxygen P/F ratio <40kPa • Persistent hypothermia despite active warming in recovery (core temp < 36°C).		[redacted]	
High risk requiring admission to Critical Care (as above)			
Discussion concerning admission to Critical Care between consultant surgeon, consultant anaesthetist, and consultant for Critical Care (towards the end of surgery).		[redacted]	
Admission to Critical Care (within 4hrs of taking decision).		[redacted]	4 hrs
Ward care post-operatively			
Patient arrives on ward.		[redacted]	0 hrs
Activate Patientrack post-operative monitoring with 1 hourly observations until review by senior surgeon.		[redacted]	
All patients - • Antibiotics depending on surgical diagnosis (see Prescribing Guidelines for Emergency Laparotomy) • DVT prophylaxis • Continuous fluid balance monitoring • Daily biochemistry and haematology until stepped down in frequency by senior review • Individual pain regime • Chest physiotherapy and mobilisation regime • Nutritional regime.		[redacted]	
Review by senior surgeon within 12hrs.		[redacted]	12 hrs

Adult Acute Abdomen 2

Post-operative care

Date -

Time zero -

Adult Acute Abdomen 2 - post-operative [redacted] and care

Instructions

1. Enter patient details and fill in box A.
2. Detach large square sticker, place in clinical notes, and follow pathway.
3. Detach round sticker and place on front of notes folder.
4. File this backing sheet (with patient details) in designated audit tray.

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To Conclude:

- Audit findings reflective of current practice.
- Clarifies risk associated with surgery.
- Identifies poorly defined surgical pathways.
- Emergency patients at higher risk.
- Current pathway not designed to match needs of patients: pre-operatively, peri-operatively or post-operatively.
- "High" risk patients need to be defined at each stage of the pathway.
- Professional bodies have a role in defining "High" risk.

To Conclude:

- Collaborative working essential: local, Network and National level.
- Surgical pathways need to be defined.
- National Auditable Standards need to be set to reflect effectiveness of the pathway.
- Comparative Audit essential.
- Urgent requirement for Trusts to assess effectiveness of their pathway, particularly the "High" risk unplanned population.
- Gap analysis : manpower; diagnostics; critical care; commissioning.