PAEDIATRICS

Improving Services for General Paediatric Surgery

Policy and Standards of Care for General Paediatric Surgery in the Republic of Ireland

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ROYAL COLLEGE OF PHYSICIANS OF IRELAND

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Contents

Definitions and Abbreviations

Within this document the following definitions apply:

Paediatric Patients
Children up to the eve of 16th birthday

Neonatal Patients
Infants up to 4 weeks corrected age

General Paediatric Surgery (GPS)
Non-specialist surgery that can be undertaken by paediatric surgeons or by surgeons who primarily operate on adults but have appropriate paediatric expertise.

Elective Surgery (Scheduled Care)
Surgery carried out on a planned basis, either day case or inpatient.

Acute Surgery (Unscheduled Care)
Emergency surgery, either inpatient or day case.

Tertiary Centres
Hospitals that provide specialist paediatric surgery, and GPS for catchment area, undertaken by consultant paediatric surgeons in Our Lady's Children's Hospital Crumlin, the Children's University Hospital Temple Street and the National Children's Hospital Tallaght.

Regional Paediatric Surgical Facility (RPSF)
Hospitals which have the ability to provide 24-hour anaesthetic, surgical and nursing services to children 7 days a week. It is acknowledged that at times an RPSF may not have all the necessary staff to fulfil this role (due to leave etc.) and that in those circumstances referral to the tertiary centre or another RPSF is appropriate (as per the Emergency Admission Decision Framework for Paediatric Patients: Emergency Medicine Programme, 2012).

Local Paediatric Surgical Facility (LPSF) – Model 2/3 Hospitals
Hospitals other than tertiary paediatric or regional paediatric surgical facilities that provide general paediatric surgery largely on an elective basis and who do not provide 24/7 surgical, anaesthetic and paediatric cover.

APLS	Advanced Paediatric Life Support
BMI	Body Mass Index
CPD	Continuous Professional Development
GPS	General Paediatric Surgery
HIPE	Hospital Inpatient Enquiry
HIQA	Health Information and Quality Authority
LPSF	Local Paediatric Surgical Facility
NCEPOD	National Confidential Enquiry into Patient Outcome and Death
NCPS	National Clinical Programme for Surgery
PALS	Paediatric Advanced Life Support
PICU	Paediatric Intensive Care Unit
RCSI	Royal College of Surgeons in Ireland
RPSF	Regional Paediatric Surgical Facility
SOP	Standard Operating Procedure

1.0 Introduction

This document aims to set standards for comprehensive, quality non-specialist paediatric surgery (GPS) that is accessible to children and young people in the Republic of Ireland, and to make recommendations as to how improvements in the provision of the service can be achieved.

The following informed the analysis of general paediatric surgery in this document:

- Data presented at the Royal College of Surgeons in Ireland (RCSI) Millin Symposium (November 2008)
- *Review of Paediatric and Neonatal Services and Framework for Future Development* (2013), National Clinical Programme for Paediatrics and Neonatology
- Input from the National Clinical Programme for Surgery
- Review of Hospital Inpatient Enquiry (HIPE) 2011 data - all of the HIPE analysis in this document is based on 2011 information.

1.1 Purpose of Document

The purpose of this document is to ensure that:

- All children who require acute or elective GPS are managed in an appropriate environment by staff with the requisite skills
- Assessment of acute GPS cases occurs locally as this will minimise the risks and distress associated with unnecessary transfer
- Consultant-level senior decision makers determine the need for transfer to ensure that all transfers are clinically appropriate
- Children who require transfer to the tertiary paediatric centres in Dublin are transferred in a timely and safe manner
- Acute surgery for children provided locally occurs in an appropriate environment
- Where clinically appropriate, elective procedures are performed locally with the benefits that this brings to children and their families
- An audit and peer review process is developed to assure the quality and safety of care

1.2 International Experience

The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) publication titled **'Are *we there yet?*'** (2011) gives a very detailed analysis of issues arising in surgery on children in the United Kingdom (UK) over a 5 year period with salient points including:

- The importance of clinical networks with agreed thresholds for patient transfer and the maintenance of an appropriate skill mix and competencies of health professionals within the network
- All hospitals operating on children should participate in audit
- Two thirds of all paediatric surgical deaths are in infants under 1 year of age
- Every effort should be made to separate children from adults in the scheduling of elective lists

The Report of the Children's Surgical Forum (2007) titled ***'Surgery for Children – delivering a first class service'*** also includes several recommendations such as:

- Most complex surgery in children should be centralised to provide the best outcomes
- All children must be treated by appropriately trained professionals in an environment suitable for their needs
- Day case surgery should be encouraged as much as possible
- The clinical governance structure of each hospital providing children's surgery should be multi-disciplinary and include anaesthetists, surgeons, paediatricians and paediatric nurses

'***Improving Standards for General Paediatric Surgery – Policy and Standards of Care for General Paediatric Surgery in Northern Ireland'*** (2010) sets out very clear standards of practice in line with the above points, with the addition of:

- If no paediatric team on site and if day case surgery is being performed, at least one member of the team should have Advanced Paediatric Life Support (APLS) training and there should be back up if required from the nearest paediatric facility
- Surgeons must have sufficient volumes to maintain skills and competencies
- A lead anaesthetist should undertake the equivalent of one child-only list per week (may include ENT or dental) and all other anaesthetists must undertake a sufficient volume to maintain skills and competencies (as per Paediatric Anaesthesia Model of Care, 2015).

The Association of Surgeons of Great Britain and Ireland document '***Issues in Professional Practice for General Paediatric Surgery'*** published December 2013 states that in a typical district general hospital the volume of GPS cases is rarely sufficient for a full-time surgical post, and, therefore, should be carried out in addition to a standard surgical sub-speciality.

1.3 Background

The sustainability of general paediatric surgery outside of the tertiary paediatric centres in Ireland is being impacted by a combination of factors:

1. The retirement in recent years of many consultant surgeons with paediatric surgical skills.
2. Currently there is a lack of general paediatric surgery for general surgery trainees.
3. The increase of sub-specialisation leading to the inability to recruit general surgeons with appropriate paediatric surgical skills to replace their predecessors
4. These factors have in turn led to deskilling of anaesthetic, radiology and nursing staff that previously provided the bulk of paediatric surgical care in these hospitals. This has placed many individuals in uncomfortable and unsustainable positions where public expectations are high and service delivery is compromised, resulting in increased central referral of children for general paediatric surgery
5. Inadequate support and funding for the paediatric surgical services in the tertiary centres to deal with the increase in referrals due to the above and also new techniques and treatments for complex conditions. This in turn is leading to long waiting lists for outpatient clinics and in-patient surgery which can compromise patient care.
6. The above is in the backdrop that the Republic of Ireland has the lowest number of paediatric surgeons per capita in Europe and the highest birth rate in Western Europe.

1.4 Review of Paediatric Services 2012

Visits by the Clinical Leads of the National Clinical Programme for Paediatrics and Neonatology in 2012 to hospitals with paediatric services across the country as part of a national review showed:

- Most units do not operate on children under 1 year of age
- Age cut off varies considerably, but in most units surgery takes place if over 2 years of age
- In a small number of hospitals orthopaedics, ENT, ophthalmology and dental surgery takes place without on-site paediatric back up
- The case bundle of operative procedures for most units is limited to appendicectomy, circumcision, herniotomy and orchidopexy
- There is an urgent need for national audit for all children's surgery
- It is apparent that most units have quite limited general paediatric surgery and would welcome care pathways and a 'hub and spoke model' with tertiary centres in Dublin and a small number of Regional Surgical Facilities

The programme subsequently made recommendations for non-specialist paediatric surgery:

1. Case bundles and age limits for smaller hospitals should be implemented
2. Designation of regional surgical facilities with 24 hour surgical and anaesthetic cover, paediatric radiology and medical paediatric support
3. The issue of having more than one surgeon with a special interest in paediatrics in a non-tertiary centre is important – a solitary surgeon should not carry a 24/7 workload
4. Care pathways for common surgical problems are required
5. Non-specialist paediatric surgery should be part of national surgical audit

2.0 General Paediatric Surgery

Currently 21 (47%) acute hospitals perform elective and or acute general paediatric surgery, with three (7%) providing elective day case surgery only for children over 5 years of age. Conditions that require general paediatric surgery are relatively common and do not require being undertaken in a specialist paediatric surgical unit. The most common acute procedures are laparoscopic or open appendicectomy, wound repair and abscess drainage. Most acute presentations are in older children (over 5 years of age) and are being managed by general surgeons who do not have specific general paediatric training (*Ensuring the Provision of General Paediatric Surgery in the District General Hospital,* Royal College of Surgeons of England 2010). The most common elective conditions are circumcision, resection of toenail, excision of lesion and orchidopexy. Medical circumcision has previously been a common procedure and is rarely indicated before 5 years of age. The only emergency conditions treated that are time critical are testicular torsion and trauma.

Table 1

Provision of General Paediatric Surgery	Number of Hospitals	Percentage of Acute Hospitals
Elective and Acute GPS*	18	40%
Elective Day Case GPS only	3	7%
No Elective or Acute GPS	24	53%
TOTAL	**45**	**100%**

*excludes three Dublin children's hospitals

3.0 Paediatric General Surgery Activity

Children and young people under the age of 16 years account for 25% of the population (CSO, 2011). They require access to routine surgical and anaesthetic care at a location that is easily accessible to them and their family, and that meets the appropriate standards. The National Clinical Programme for Surgery (NCPS) undertook a detailed general paediatric surgery work load analysis of the HIPE data for 2011 with the objective of:

1. Looking at the distribution of paediatric general surgery work by hospital group (as defined by the report *The Establishment of Hospital Groups as a Transition to Independent Hospital Trusts* (2013)

2. The distribution of general paediatric surgery work independent of hospital groups but by distribution across the country providing care by local areas, whether they are:

   - **Tertiary Centres**
   - **Regional Paediatric Surgical Facilities**
   - **Local Paediatric Surgical Facilities**

The NCPS analysis has divided the country, so that all children have local access for, at least, the most straightforward procedures as defined in the basket of cases in this document (page 15-16).

3.1 Networks for General Paediatric Surgery

The use of clinical networks would ensure an integrated approach for GPS services. A network approach will ensure that children are safely treated as close to home as possible and have access to the appropriate level of care, with high quality resources delivered by the right staff with appropriate skills. The establishment of hospital groups is intended to permit greater autonomy for providers of hospital care and to allow hospitals to be more responsive to local needs. *The Establishment of Hospital Groups as a transition to Independent Hospital Trusts Report* (2013) states that "It is also acknowledged that inter-group working is as vital as the rationalisation of services within groups".

The advantages of these clinical networks are:

Common standards	○ ensure safe and high quality care, ○ pathways of care
Service Planning	○ predict trends in patient flow ○ match capacity to demand ○ resource allocation
Workforce Planning	○ maintain high-quality standards ○ care close to home if appropriate
Education	○ training to support workforce planning ○ maintain competence
Audit	○ measure agreed outcomes

Table 3 Most Commonly Performed Surgical Procedures LPSFs as defined in this document

	Inpatients						Day Cases						Total
	Acute			Elective			Acute			Elective			
Procedure /Age Range	**0 – 1**	**2 – 4**	**5 - 15**	**0 – 1**	**2 – 4**	**5– 15**	**0 – 1**	**2 – 4**	**5 - 15**	**0 – 1**	**2 – 4**	**5 - 15**	
Male Circumcision (3065300)		2	4	2	30	23		2	2	25	258	206	554
Appendicectomy (3057100)		20	377			1							398
Laparoscopic Appendicectomy(3057200)		6	332			1							339
Wedge resection ingrown toenail (4791500)						1			1		2	314	318
Lingual Frenulectomy (3027800)	1					1				109	34	9	154
Excision lesion of SSCT, other site (3120500)**					1	1			1		2	120	125
Orchidopexy for undescended testis, uni (3780300)			6	1	4	4				4	30	35	84
Excision lesion SSCT, other site of head (3123500)					1	2			1	2	5	45	56
Repair wound SSCT, oth site superficial (3002600)	1	7	15				1	9	12		2	1	48
Repair of Inguinal hernia, unilateral (30614020			2		3	5				3	10	15	38
Total	**2**	**35**	**736**	**3**	**39**	**39**	**1**	**11**	**17**	**143**	**343**	**745**	**2,114**

HIPE 2011 **SSCT is Skin and Sub-cutaneous Tissue

Table 4 10 Most Commonly Performed Surgical Procedures in RPSFs as defined in this document

	Inpatients						Day Cases						Total
	Acute			Elective			Acute			Elective			
Procedure /Age Range	**0 – 1**	**2 – 4**	**5 - 15**	**0 – 1**	**2 – 4**	**5- 15**	**0 – 1**	**2 – 4**	**5 - 15**	**0 – 1**	**2 – 4**	**5 - 15**	
Male Circumcision (3065300)	1	3	6	1	19	15			1	33	306	233	618
Appendicectomy (3057100)		37	432				1				1		471
Laparoscopic Appendicectomy(3057200)		4	451			3							458
Lingual Frenulectomy (3027800)				2						100	71	24	197
Primary Repair of Nail or nail bed (4648600)	15	21	33	1		2	39	43	64	5	15	26	264
Wedge Resection ingrown toenail (4791500)			1			2				1	2	169	175
Exc lesion of SSCT, other site (3120500)**	1				1	1			1	3	10	152	169
Orchidopexy for undescended testis, uni (3780300)		2		1	3	11				14	50	54	135
Exc debridement skin &sbc tissue (9066500)	1	14	21	1		3	8	26	37	3	5	8	127
Repair of Inguinal hernia, unilateral (30614020	6	2	1	14	3	4	1			20	20	37	108
Total	**24**	**83**	**945**	**20**	**26**	**41**	**49**	**69**	**103**	**179**	**480**	**703**	**2,722**

HIPE 2011 (exc Dublin Children's Hospitals) ** SSCT is Skin and Sub-cutaneous Tissue

4.0 Standards of Care for General Paediatric Surgery

The Paediatric Surgery Group fully subscribes to the HIQA *National Standards for Safer Better Healthcare* (2012) and its eight domains which include person centred care; leadership; governance and management; effective care; safe care; the promotion of better health and wellbeing by such methods as preventing accidents and acute surgical illnesses; a workforce that is carefully planned, managed and supported; an awareness and judicious use of resources whether they are human, financial or natural; and a service that is planned and executed based on quality information that is accurate, valid, timely, reliable, relevant, legible and complete recognising that this must be centrally supported and resourced.

4.1 Governance Structures

In hospitals that provide GPS for children there must be a commitment from the hospital group board and executive team that a high quality and resourced service is provided. Robust governance is critical with the identification of a lead / designated surgeon and anaesthetist in general paediatric surgery in any unit that accepts paediatric patients. Such units need to engage in audit /outcome multidisciplinary meetings held on a regular (monthly) basis and submit data into a national paediatric audit that includes local surgical facilities, regional surgical facilities and the tertiary paediatric hospitals. Surgeons must undertake a sufficient volume of GPS to maintain skills and competence. This is defined as the equivalent of at least one GPS list per month or ideally one per fortnight.

Children need to be protected from harm during their medical care. Children and their parents should be involved in the process and be given the opportunity to feedback their observations and experiences of the services provided.

4.2 Training Requirements and Implications

Presently only a small minority of the surgical consultants currently working in the regional centres and local hospitals in Ireland have received formal paediatric surgical experience as part of their surgical training. However, when they retire they may be replaced by surgeons with no paediatric training, as paediatric surgical experience is not a requirement for general surgical training in Ireland (Grace et al., 2010). There may be difficulty in the future in providing GPS for children due to these training and recruitment issues.

Training options required to meet service needs are:

a. Proleptic training of 6 months attached to a Consultant Paediatric Surgeon

Or

b. Six months training in tertiary paediatric surgery at registrar level

Or

c. Equivalent training abroad

Or

d. 12 months training in a RPSF

In the consultants appointments process, due consideration must be given to the appointment of a

surgeon with paediatric skills whenever an appointment is made of a consultant general surgeon in a hospital offering regional paediatric surgical services.

4.3 Surgeons

The Association of Surgeons of Great Britain and Ireland in their document *Issues in Professional Practice, General Paediatric Surgery* (2013) recommend that GPS should be provided by a surgeon competent in the required tissue handling techniques and who has competence in communication with, and management of, children and their families. It further states that it matters little whether that surgeon's main speciality lies within General Surgery, Urology or Paediatric Surgery, so long as the individual has the required competencies. A surgeon who performs elective GPS should be either a specialist paediatric surgeon (tertiary hospitals), or a surgeon trained in GPS to carry out paediatric surgery in a RPSF, or a general surgeon who is competent to perform the defined bundle of cases described for LPSFs. Day case surgery may be undertaken by senior experienced trainees but only under appropriate consultant supervision.

The surgeon must:

- Audit their practice on key outcomes including but not limited to:
  - Mortality
  - Unexpected readmission rate
  - Complication rate
  - Unexpected referral to tertiary centres
- Participate in audits involving surgeons in other local, regional and tertiary hospitals
- Implement the WHO *Safe Surgery Saves Lives* checklist in their practice
- Have their audits signed off by their clinical director
- Maintain their skills by participating in continuous professional development (CPD) events with other paediatric surgeons and designated lead surgeons for GPS including advanced resuscitation
- Have regular multidisciplinary meetings with anaesthetists and nursing staff analysing outcomes and identifying issues as they arise

Paediatric surgeons in the three children's hospitals will provide general paediatric surgery for their catchment area.

4.4 Features of Regional Paediatric Surgical Facilities (RPSF)

Designated RPSFs should be established based on the following standards:

- 24-hour anaesthetic, surgical and nursing services for children available 7 days a week. At times an RPSF may not have all the necessary staff to fulfil this role (e.g. due to leave etc.), and in those circumstances referral to the tertiary centre or another RPSF is appropriate.
- Appropriate paediatric radiology and consultant paediatrician support.
- Sufficient volume to generate at least one elective paediatric list per week.
- Child and adult lists should be separated with children prioritised to the morning.
- Close links with the tertiary paediatric surgeons.
- The ability to operate on a child under 12 months of age.
- On site in patient paediatric medical units.
- Paediatric trained nursing staff.
- Anaesthetists assisted by dedicated staff (assistants and anaesthetic nurses) with specific competencies.

- A child and youth -friendly environment.
- Peer review of practice and outcomes.
- Child protection and appropriate staff training for same.
- Managed care plans should be in place in order to refer complex cases to tertiary paediatric centres.
- All acute surgery for children under two years of age should be admitted under the combined care of a designated surgeon and paediatrician.

The Acute Case Bundle in a **Regional Paediatric Surgical Facility** includes:

- Appendicectomy
- Acute scrotal pathology
- Emergency endoscopy (if local expertise available)
- Intussusception (if air enema fails)
- Pyloromyotomy (if sufficient throughput, e.g. minimum 5 cases per year)
- Incision and drainage of abscesses
- Suturing of simple lacerations
- Laparatomy for abdominal trauma
- Management of acute surgical abdomen (in consultation with colleagues in tertiary cente where feasible)

The Acute Case Bundle in a **Local Paediatric Surgical Facility** includes:

- Appendicectomy
- Acute scrotal pathology
- Incision and drainage of subcutaneous abscesses
- Suturing of simple lacerations

The **Elective Case Bundle** in a **Regional Paediatric Surgical Facility (RPSF)** includes:

- Conditions of the foreskin
- Herniotomy / ligation of patent processus vaginalis
- Maldescent of the testis
- Umbilical hernia repair
- GI endoscopy (where there is expertise)
- PEG re-insertion
- Lymph node and muscle biopsies (where appropriate expertise and laboratory support available)
- Excision of skin and subcutaneous lesions
- Wedge resection of ingrown toenail

The Elective Case Bundle in a Local Paediatric Surgical Facility includes:

- Conditions of the foreskin
- Herniotomy / ligation of patent processus vaginalis
- Umbilical hernia
- Lymph node biopsies
- Excision of skin and subcutaneous lesions
- Wedge resection of ingrown toenail or repair of nail or nail bed
- Maldescent of the testis if over 24 months of age and the testis is palpable

Ideally, most elective procedures should be performed as day cases with inpatient stay only if clinically indicated. Preterm or ex-preterm infants should not be considered for day case surgery unless they are medically fit and have reached at least 60 weeks post conceptual age. Infants with chronic lung disease or a history of apnoea should only be managed in tertiary units with facilities equipped for post-operative ventilation.

Children, who require observation, should be admitted to the local inpatient paediatric unit. While local arrangements may vary between hospitals, all units must ensure that paediatricians in such hospitals are available for consultation in the management of children with surgical emergencies. Each unit should have agreed written protocols for management of children with possible surgical emergencies, ensuring clarity of responsibility if a child is transferring between the care of a surgeon and paediatrician.

If it is determined that a child needs surgery, or is likely to need surgery, the following should apply:

All children who require acute general paediatric surgery who have **not reached their second birthday** should be transferred for surgery to a RPSF or tertiary paediatric hospital **unless**:

- The child's condition is time critical e.g. testicular torsion, trauma

OR

- The designated Consultant General Surgeon for GPS is competent to perform the operation within a time period appropriate to the child's clinical condition. Staff with the appropriate anaesthetic and nursing competencies is also required.

4.5 Day Case Surgery

Hospitals (RPSFs, LPSFs and designated model 2 hospitals) should meet the following standards in order to provide day case surgery for children:

- The surgery should be undertaken by a surgeon experienced in the condition
- A member of the surgical team must remain in the hospital until arrangements have been made for the discharge of all patients or, if necessary, a patient has been transferred to another unit for whatever reason
- At least one member of the team involved in the treatment of day cases should hold the APLS/PALS certificate and the other team members must have up-to-date basic skills in paediatric resuscitation
- While the child is in the unit at least one member of staff with up-to-date skills in basic paediatric life support should be present
- Agreed and robust arrangements should be in place for paediatric assistance and transfer if necessary
- Parents and carers should receive clear instructions on follow-up with written information on arrangements to deal with a post-operative emergency, including out of hours telephone numbers
- Surgical day units must be staffed by nurses with competencies in the care of children
- Units must develop and implement a pain management policy including advice on pain assessment and management at home and the provision of 'take-home' analgesia with clear instructions for its use
- Play specialists should be available and the environment should be child and family friendly
- Day case activity should be audited and regularly reviewed
- Peer review of practice and outcomes should be undertaken
- There is a clear protocol for contact with Paediatric Intensive Care Units (PICUs) and paediatric surgeons in the tertiary children's hospitals to arrange transfer of patients should complications arise (PICU contact: 1890 213213 for advice and or referral www.picu.ie)
- Anaesthesia services for children require specially trained clinical staff together with equipment, facilities and an environment appropriate to the needs of children

4.6 Inpatient Surgery

Inpatient elective general paediatric surgery in children should be undertaken in hospital sites which have:

- Either an on-site inpatient paediatric medical unit or access to paediatric consultant opinion
- Nurses with skills and competencies in the management of children
- Anaesthetists assisted by dedicated staff (assistants and anaesthetic nurses) with specific paediatric skills and competencies
- A child-friendly environment
- Child-only theatre lists, or priority given to children on a paediatric/adult list
- Peer review of practice and outcomes

4.7 Co-Morbid Conditions Requiring Mandatory Referral to Tertiary Centre

- Anatomical or functional abnormalities of the airway or history of severe acute upper airway obstruction in the last 3 months
- Cardiac disease which is unstable/symptomatic or not yet investigated
- History of bleeding disorder
- Patient on anticoagulants
- Obesity (> 91st centile / BMI > 35)
- Previous anaesthetic complication or un-investigated family history of same
- Impaired renal/hepatic/endocrine disorders
- Congenital syndromes associated with significant anaesthetic risk (advice to be sought from tertiary centre)

Relative Indications for Referral or Discussion with RPSF/Tertiary Centre

- Patient on cardiac medication e.g. sildenefill
- History of learning or behavioural abnormalities
- Haemoglobinopathies (SOP in place).
- Previous serious surgical complication
- Parental anxiety not allayed by standard discussion
- Severe neurological, skeletal or neuromuscular disorder.

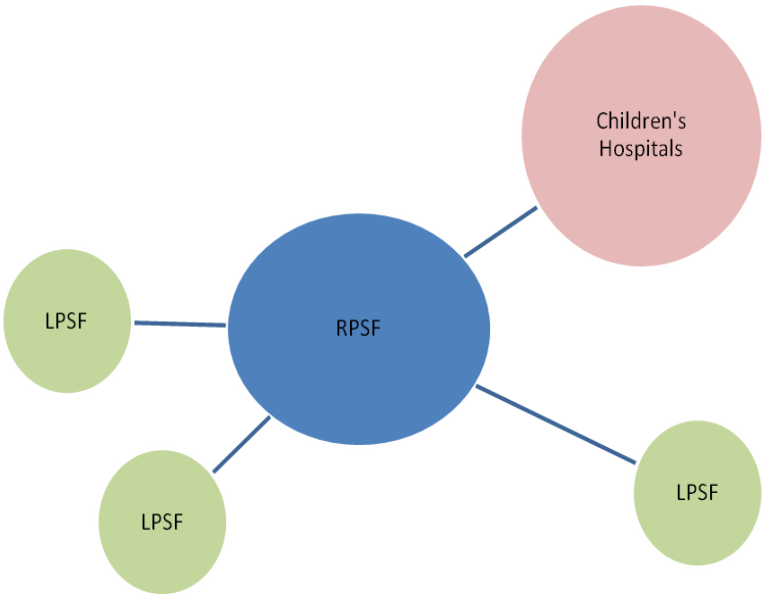
4.8 Arrangements for Transfer

The final decision on the need to transfer should be taken by a consultant in the local unit in consultation with the consultant anaesthetist. Typically this will be a consultant in general surgery or emergency medicine and depending on the circumstances, with input from a paediatrician

- The consultant in the local unit should contact the on-call consultant paediatric surgeon in the RPSF or tertiary unit to discuss the case and arrange transfer
- The child's parents must be involved in the decision and be given a clear explanation of the reasons for transfer
- The ambulance service should be alerted to the possibility of transfer at as early a stage as possible
- Each hospital should have a protocol for transfer of children which should be consistent with the recommended pathways for emergency GPS outlined in this policy and the Emergency Admission Decision Framework for paediatric patients

4.9 Outreach

As with other paediatric tertiary specialties (e.g. cardiology, cleft, neurosurgery) it is expected that the paediatric surgeons in tertiary centres will undertake outreach clinics and theatre lists to RPSF hospitals. They will provide training/support to staff in these hospitals. The service would be undertaken by paediatric surgeons travelling for a full day once a month or once every 2-3 months to the outreach RPSF hospitals. The provision of an effective hub and spoke model for general paediatric surgery will require additional paediatric surgeons in the tertiary paediatric centres to undertake outreach. Surgeons undertaking GPS in the RPSF can also provide an outreach service to LPSF within their hospital group or network. Opportunities should also be available for surgeons and anaesthetists to upskill in the children's hospitals.



Outreach Model for General Paediatric Surgery

4.10 Anaesthetic Services

Paediatric anaesthesia services in Ireland should be provided by competent, trained staff in a safe working environment with adequate and appropriate facilities, drugs and equipment to safely anaesthetise and manage elective and acute paediatric surgery (see *Paediatric Anaesthesia Model of Care,* 2015).

The principal requirements for the safe provision of anaesthesia to children in Ireland are:

- Compliance with minimal standards of monitoring (as recommended by AAGBI 2007 guidelines)
- Child and parent-friendly facilities with children managed ideally in a separate environment from adults
- Guidelines, equipment and facilities to manage pre-operative assessment, equipment checking, drug and syringe labelling, difficult /failed intubations, peri-operative upper airway obstruction emergencies, malignant hyperpyrexia, anaphylaxis, local anaesthetic toxicity, unexpected massive haemorrhage, infection control, postoperative care, child protection and the care and transport of the critically ill child.
- The WHO *Safe Surgery Saves Lives* checklist should be in operation
- Analysis of adverse events and regular audit should take place at a local, regional and national level
- Children should be anaesthetized by consultants, or senior anaesthetic trainees under supervision, who have regular and relevant paediatric practice sufficient to maintain core competencies
- Anaesthesia assistants and nursing staff providing care in the perioperative period must be trained and/ or be sufficiently competent in the care of children
- A full range of monitoring and anaesthetic equipment, disposable items for general and regional anaesthesia should be available
- Resuscitation drugs and equipment including an appropriate defibrillator should be available at sites where children are routinely anaesthetised
- Equipment needs to be in place to maintain the body temperature of small children and infants in the peri-operative period
- Precise and accurate delivery of intravenous fluids is essential
- It is recommended that there should be an area where parents can be spoken to confidentially near the operating theatres
- It is recommended that there should be a staffed pre-operative assessment and acute pain service where pain scoring is routinely performed and documented
- Arrangements, equipment and facilities for the immediate care, stabilisation and safe transfer of critically ill children should be in place in both RPSF and LPSF facilities, facilitated by www.picu.ie
- Each regional hospital undertaking GPS must have one designated lead anaesthetist who has subspecialty interest in paediatric anaesthesia. The lead anaesthetist(s) should undertake sufficient volume to maintain competencies in the peri-operative care of children and adolescents
- All other anaesthetists involved in GPS must undertake a sufficient volume of paediatric anaesthesia (which may include ENT, Dental, Orthopaedics or other speciality cases) to maintain skills and competencies, as determined in the guidelines elaborated below.
- All anaesthetists who provide anaesthetic services for elective GPS:
  1. Must have sufficient training and maintain their skills in paediatric resuscitation to the level of PALS/APLS or equivalent

2. Must audit their practice on key outcomes including but not limited to:
    i. Complication rate
    ii. Unexpected readmission rate
    iii. Unexpected referral to tertiary centres
    iv. Quality of service indicators e.g. post operative nausea and/ or vomiting rates, regional anaesthesia success rates
3. These audits should include anaesthetists and other GPS healthcare professionals in local, regional and tertiary hospitals, in a network framework

5.0 Core Recommendations

1. Hospitals that provide GPS services should adopt the policies and standards as set out in this document.

2. All major neonatal and complex paediatric surgery should be performed in the tertiary paediatric surgery units.

3. Specific transfer guidelines must be in place to facilitate safe transfer in the event of an unexpected complication. Stabilisation prior to transfer is critical. Senior clinicians should be closely involved in pre transfer stabilisation.

4. GPS can be performed in tertiary, regional and local paediatric surgical facilities or within designated model 2 hospitals.

5. To achieve RPSF status, hospitals must have the capacity to provide 24-hour anaesthetic, surgical and nursing services to children 7 days a week.

6. At times an RPSF may not have all the necessary staff to fulfil this role (e.g. due to leave, etc.) and in those circumstances referral to the tertiary centre or another RPSF is appropriate.

7. A LPSF is a hospital that provides general paediatric surgery (case bundle as defined) largely on an elective basis.

8. Clear transfer pathways should exist between local, regional and tertiary facilities.

9. RPSF Hospitals must identify paediatric surgical needs when appointing general surgeons and such appointments must always be linked and highlighted by the Consultant Appointments Committee. Designated lead surgeons and anaesthetists in GPS should be identified locally within hospital groups and must conduct regular multidisciplinary meetings with analysis and review of surgical outcomes.

10. General paediatric surgical training can be undertaken in a tertiary paediatric hospital, an RPSF, or as an appropriate proleptic appointment or an equivalent training abroad.

11. The provision of an effective hub and spoke model for general paediatric surgery will require additional paediatric surgeons in the tertiary paediatric centres to undertake outreach and in-reach sessions.

Appendix 1

Paediatric General Surgery Committee Members:

Mr. Emmet Andrews, Consultant General Surgeon, Cork University Hospital (co-chair since June 2012)

Mr. Brian Sweeney, Consultant Paediatric Surgeon, Our Lady's Children's Hospital, Crumlin and Tallaght (co-chair since June 2012)

Mr. Feargal Quinn, Consultant Paediatric Surgeon/Urologist, Our Lady's Children's Hospital, Crumlin

Prof. Martin Corbally, Consultant Paediatric Surgeon, Chairman of Department of Surgery RCSI, Medical University of Bahrain (chair August 2011-April 2012)

Prof. Alf Nicholson, Professor of Paediatrics RCSI, Clinical Lead National Clinical Programme for Paediatrics and Neonatology

Dr. Bill Casey, Consultant Anaesthetist, representative of Irish Paediatric Anaesthesia Network and Council of Association of Pediatric Anaesthesia of Great Britain and Ireland

Ms. Helen Byrne, Paediatric Lead, Quality and Patient Safety Division, HSE

Dr. Jeanne Moriarity, Consultant Anaesthetist, Past- President of the College of Anaesthetists

Dr. Ellen O Sullivan, President of the College of Anaesthetists

Dr. Tom Stack, Consultant Paediatrician, Limerick Regional Hospital

Dr. Brendan O'Hare, Consultant Paediatric Anaesthetist/ Intensivist, Our Lady's Children's Hospital

Mr. Martin Caldwell, Consultant General Surgeon, Sligo General Hospital

Prof. Tony Ryan, Consultant Neonatologist, Cork University Hospital

Dr. Rory Page, Consultant Anaesthetist, Cavan General Hospital, representative of the Association of Anaesthetists of Great Britain & Ireland

Dr. Alan Woolhead, Consultant Anaesthetist, Our Lady of Lourdes Hospital, Drogheda and representative of the Association of Anaesthetists of Great Britain & Ireland

The committee would also like to acknowledge the participation in the drafting of the guidelines:
Prof. Frank Keane, Clinical Lead, National Clinical Programme for Surgery
Mr. Ken Mealy, Clinical Lead, National Clinical Programme for Surgery
Mr. Gerry Kelliher, RCSI, National Clinical Programme for Surgery
Prof. Paddy Broe, Past President RCSI
Mr. Declan Magee, Current President RCSI
Ms. Claire Browne and Ms. Grace Turner, Programme Managers National Clinical Programme for Paediatrics and Neonatology

Appendix 2

Sample Care Pathways

These sample care pathways have been reproduced from the Royal College of Surgeons of England document *Example Care Pathways* available at www.rcseng.ac.uk

Introduction

The following care pathways have been adapted from those developed to sustain provision of general surgery for children in Scotland.

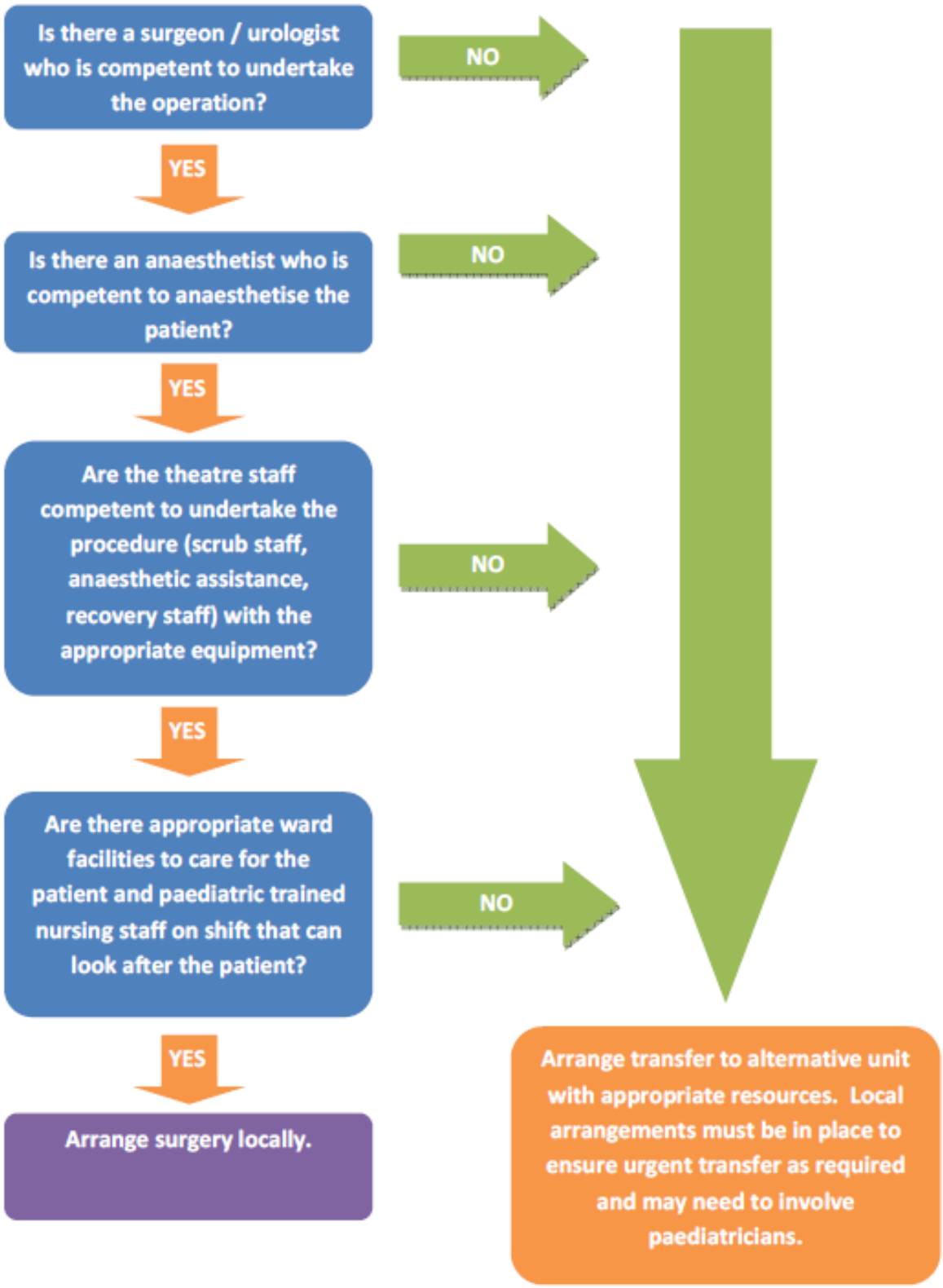
We have tried to avoid being too prescriptive. These pathways are provided to aid discussion between commissioners, providers, service planners and patients. Each locality will have a different solution and this must be understood and agreed by all stakeholders.

Child Presents with Suspected Testicular Torsion (all ages except neonates)

NOTE:

There is an imperative here to ensure surgery within 6 hours of symptoms.
Any delay will result in testicular loss. Local surgery or immediate transfer is essential.

Ensure adequate analgesia (you may need to involve local paediatricians in this step).

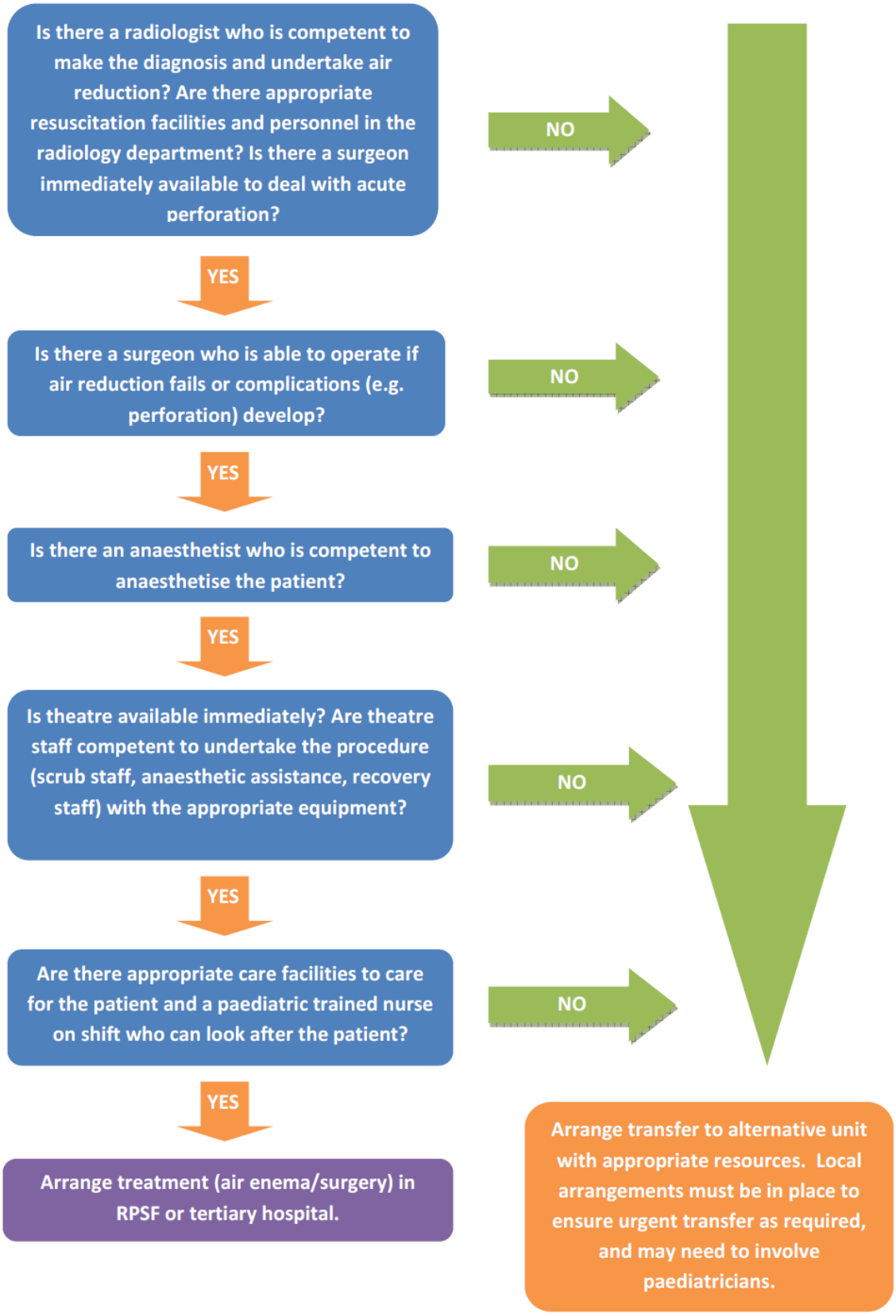


Child Presents with Suspected Intussusception

Establish IV access and ensure adequate and appropriate IV fluid resuscitation and analgesia (you will need to involve local paediatricians in this step)

NOTE:

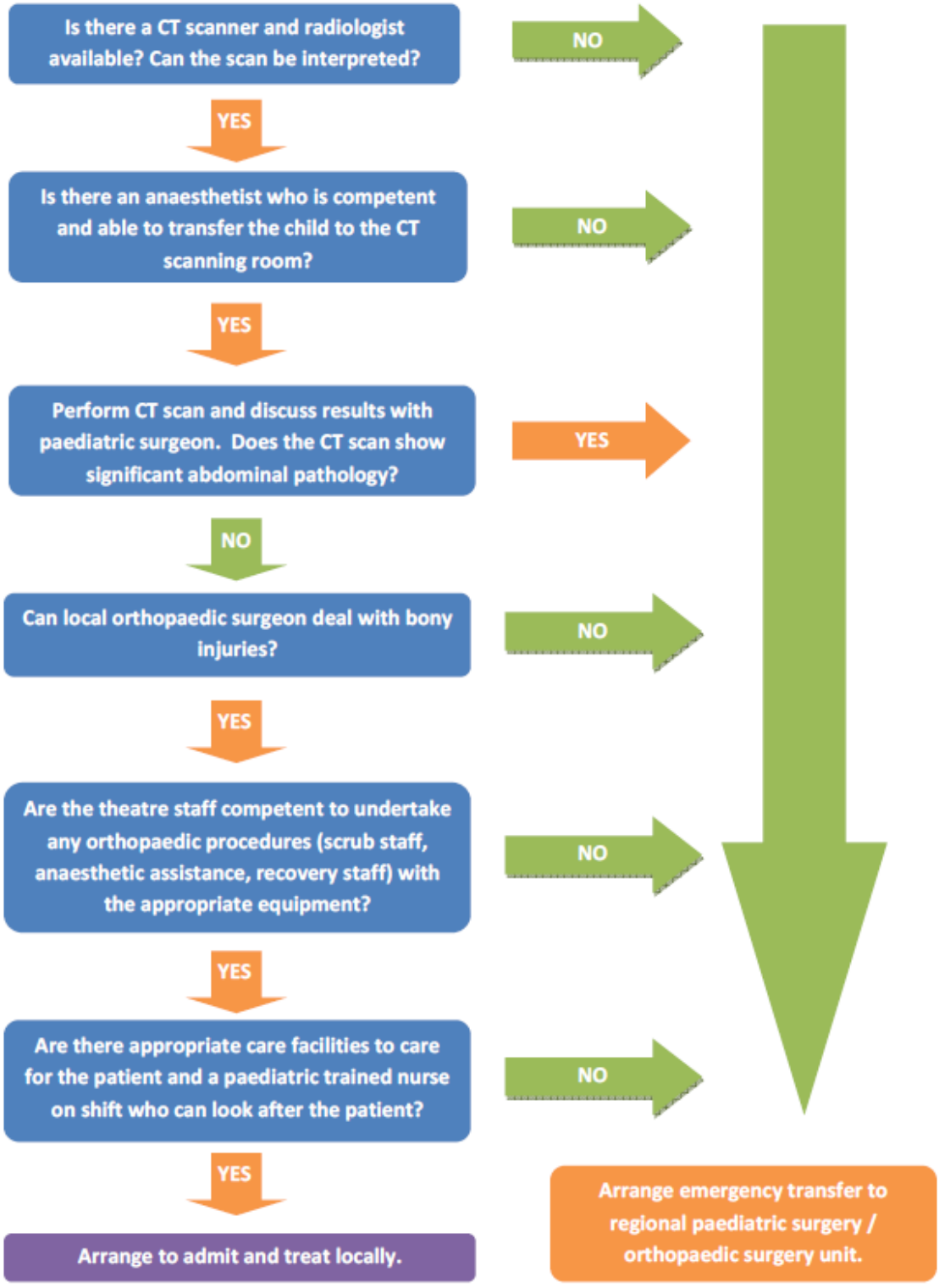
Fluid resuscitation in this condition needs to be vigorous and may require 40-60mls/kg body weight of crystalloid fluid. Careful monitoring during the resuscitation is essential.



Child Presents with Abdominal/ Multi-System Trauma

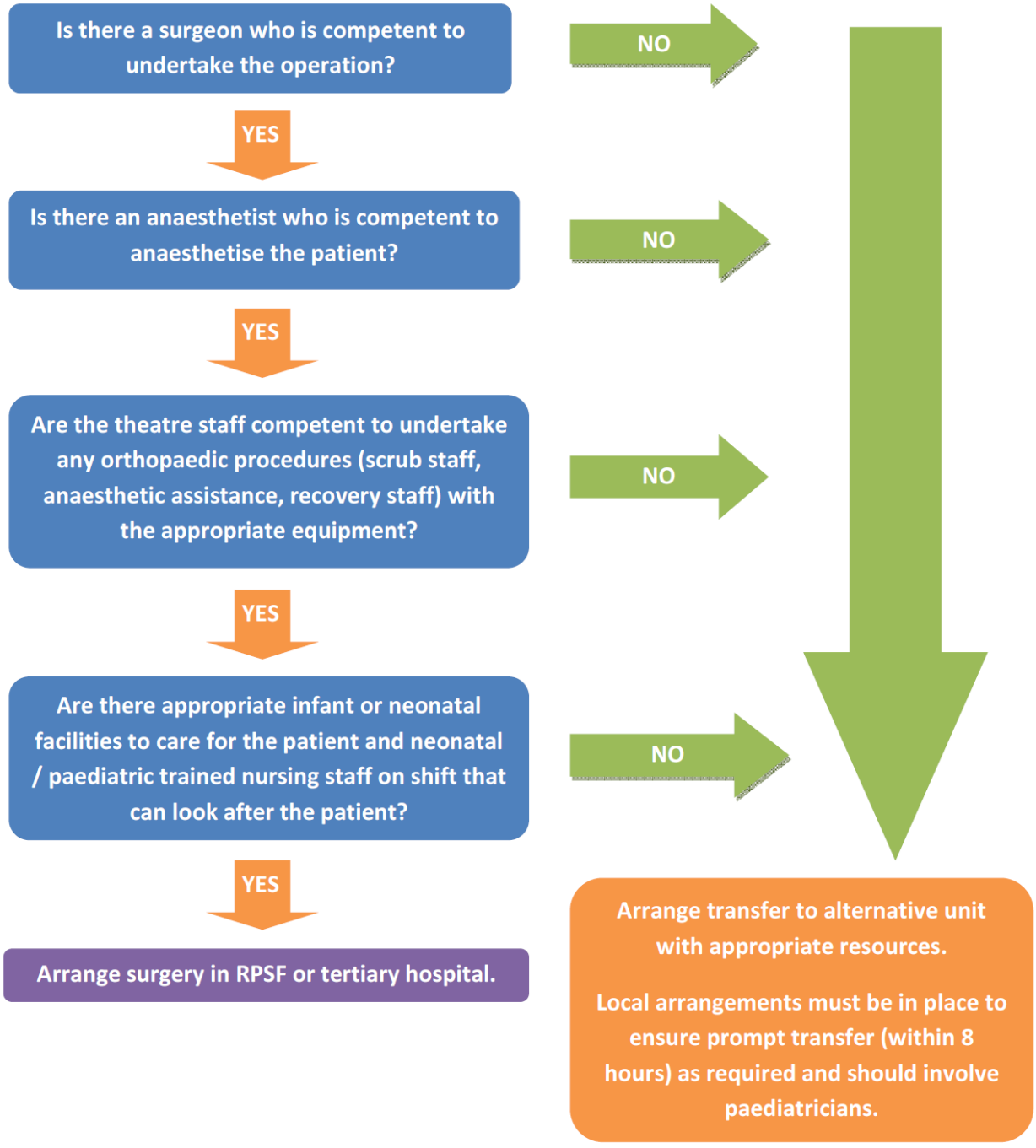
NOTE:
Use APLS/ATLS guidelines to assess and manage the child. Early consultation with the on-call Paediatric Surgical Team in the Regional Surgical Centre is essential.

(If trauma involves a head injury, look at head injury care pathway for assistance. In the event of conflict between general trauma or neurotrauma, discuss best plan of action with colleagues in the regional centre. Do not perform a diagnostic peritoneal lavage without prior discussion with the Regional Paediatric SURGICAL Team.)



Child presents with Suspected Pyloric Stenosis

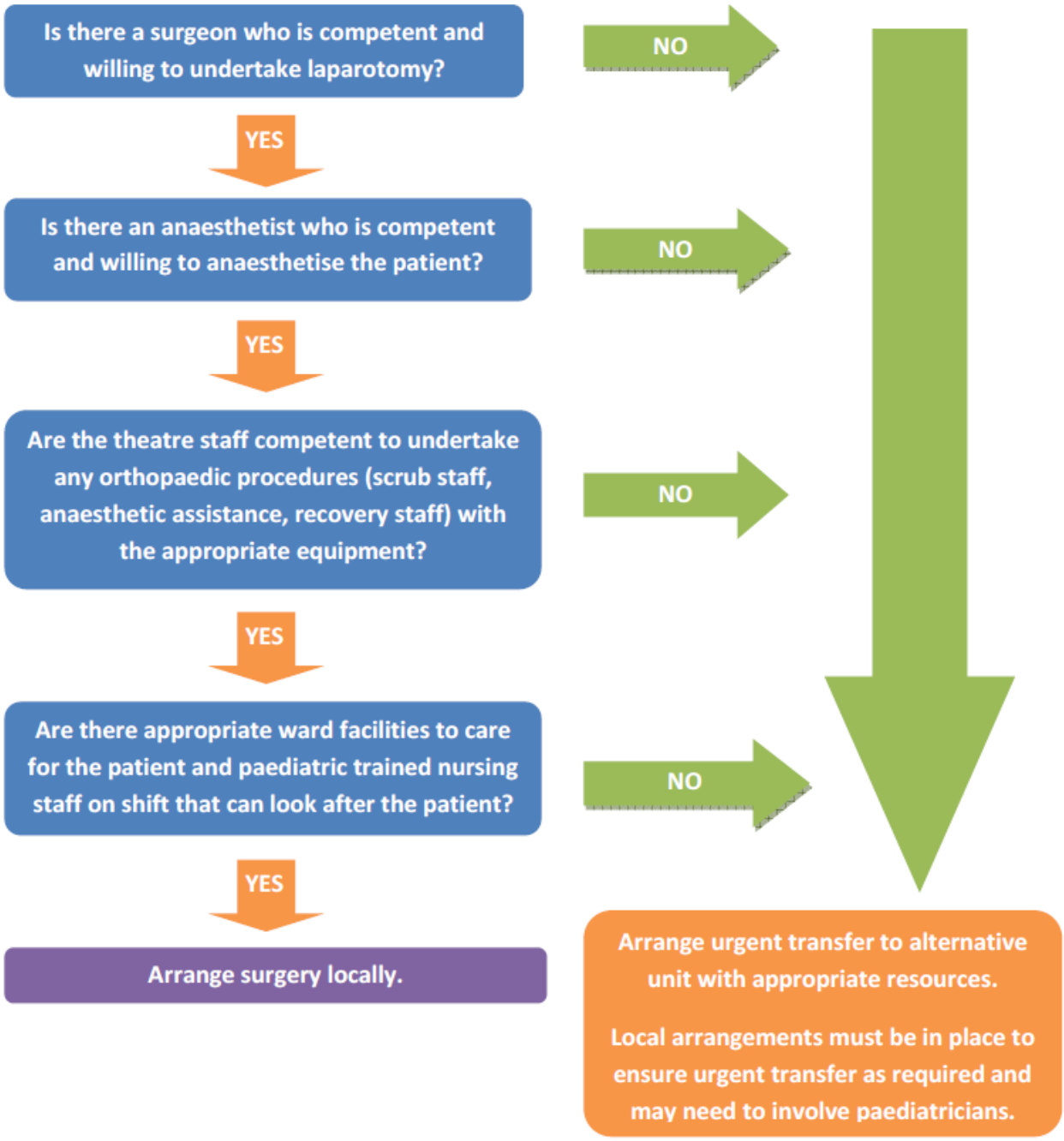
Make a diagnosis based on history, physical examination (including test feed} and. II necessary, abdominal ultrasound scan. Chock U&E's and blood gases. Establish IV access and ensure adequate and appropriate IV fluid resuscitation (you will need to involve local paediatricians in this step.) IV fluid replacement should be 0.45% saline with 5% dextrose and 10-20 mmol KCI in every 500ml bag. Fluid replacement should commence at 125% maintenance. Involve the paediatric team on call.



Child presents with an Acute Abdomen but no diagnosis

NOTE:
Establish IV access and ensure adequate and appropriate IV fluid resuscitation and analgesia (you must involve local paediatrician in this step.) Pass a nasogastric tube and arrange plain abdominal x-rays.

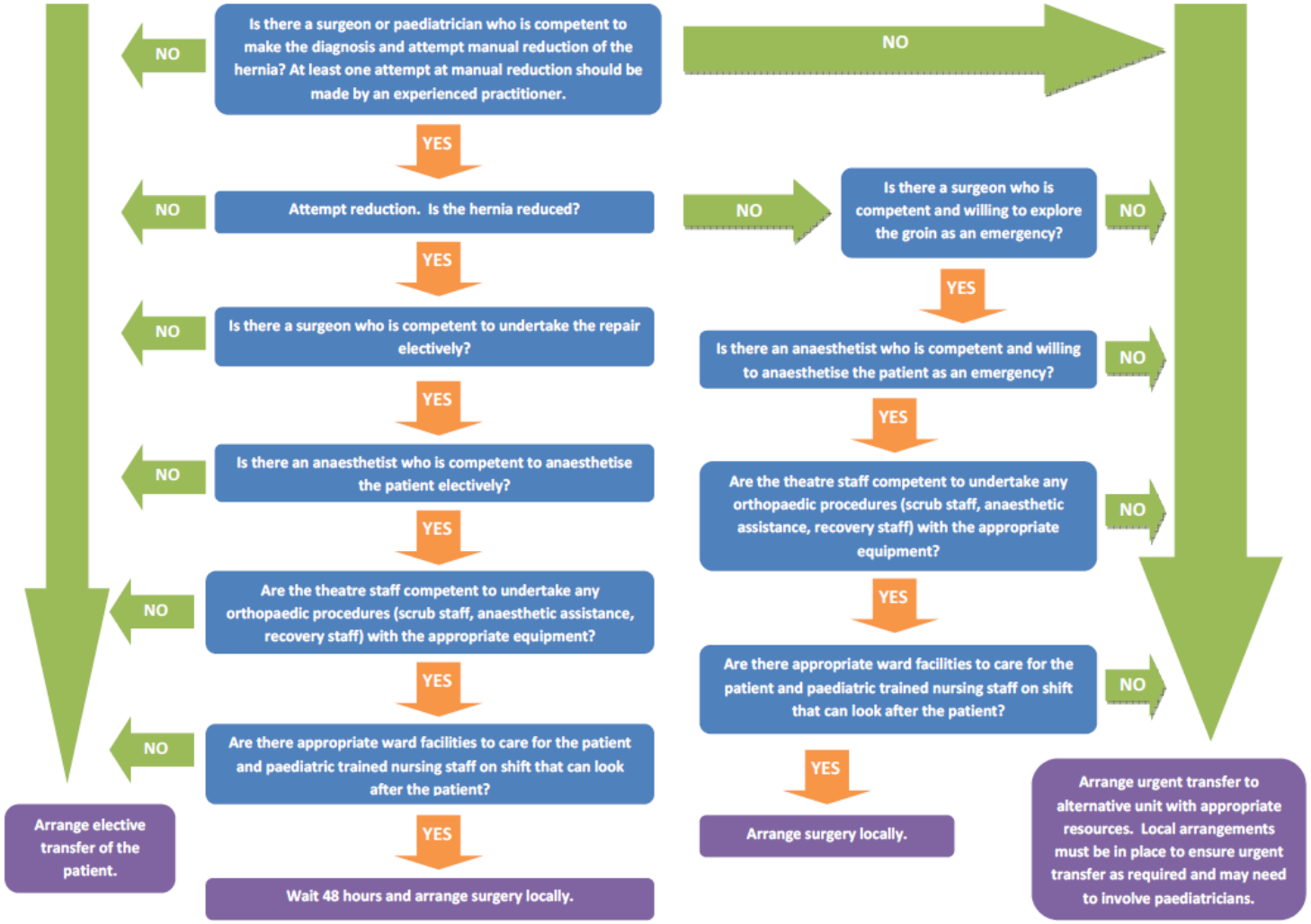
For children under the age of 5 years, consider early consultation with the Regional Paediatric Surgery Team and arrange urgent transfer. For children over the age of 5 years, consider local care.



Child presents with an Irreducible Inguinal Hernia

Establish IV access and ensure adequate and appropriate IV fluid resuscitation and analgesia (you may need to involve local paediatricians in this step).

A small dose of analgesia/sedation (if the child is well resuscitated with appropriate personnel and monitoring) may facilitate manual reduction of the hernia. If the child is < 12 months or no local expertise available refer to RPSF or tertiary paediatric hospital.



Appendix 3 Clinical Governance Checklist

Recommendations	Is it met? Y/N/ Partially/Planned	Comments (Examples of good practice or deficits	Action Required	Person Responsible
Surgical Workload				
All hospitals that undertake surgery in children must have the necessary information systems in place to determine the number of patients that are treated within their hospital for monitoring, clinical governance and financial purposes. (Hospital Chief Executives)				
Transfer of children				
All hospitals that admit children should have a comprehensive transfer policy and should include; elective and emergency transfers, staffing levels for the transfer, communication procedures, family support, equipment provision and transport arrangements.				
Team working				
All hospitals that provide surgery for children should have clear operational policies regarding who can operate on and anaesthetise children for elective and Acute surgery, taking into account on-going clinical experience, the age of the child, the complexity of surgery and any co-morbidities. These policies may differ between surgical specialities. (Directors)				
Clinical governance and audit				
All hospitals that undertake surgery in children must hold regular multidisciplinary audit and morbidity and mortality meetings that include children and should collect information on clinical outcomes related to the surgical care of children. (Directors)				
Pre-operative assessment of elective paediatric surgical patients				
Hospitals in which surgery in children is undertaken should provide written information for children and parents about anaesthesia. Good examples are available from the Royal College of Anaesthetists website. (Clinical Directors in Anaesthesia)				

Theatre scheduling for children				
Hospitals that have a large case load for children's surgery should consider using dedicated children's operating theatres. (Clinical Directors in Surgery and Anaesthesia and Medical Directors)				
Specialised staff for the care of children				
Children admitted for surgery whether as an inpatient or an outpatient must have timely access to paediatric medical support and be cared for on a ward staffed by appropriate numbers of children trained nurses. (Clinical Directors)				
Management of the sick child				
All hospitals that admit children as an inpatient must have a policy for the identification and management of the seriously ill child. This should include a process for escalating care to senior clinicians. (Paediatric Intensive Care Referral/Advice 1890 213213 www.picu.ie) (Medical Directors,)				
All hospitals that admit children must have a resuscitation policy that includes children. This should include the presence of onsite paediatric resuscitation teams that includes health care professionals who have advanced training in paediatric resuscitation. (Medical Directors and Resuscitation Leads)				
Paediatric acute pain management				
Guidelines on the provision of acute pain management for children should be in place by all hospitals that undertake surgery in children. (Medical Directors)				

Adapted from National Confidential Enquiry into Patient Outcome and Death Report 'Are We There yet?' 2011

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