

Title:	Guideline for the Management of Suspected Acute Abdomen in those under 16 years
Version:	1
Supersedes:	N/A
Application:	The guideline is intended for use by any hospital team caring for infants, children and young people under 16 years age across the Paediatric Critical Care Network in the North West & North Wales

Originated By:	Sarah Stibbards
Designation:	NWTS Consultant and Consultant in Paediatric Emergency Medicine, Alder Hey Children's NHS Foundation Trust
Reviewed by:	North West (England) and North Wales Paediatric Transport Service (NWTS) North West & North Wales Surgery in Children ODN North West & North Wales Paediatric Critical Care ODN North West & North Wales Children's Major Trauma ODN
Ratified by:	North West & North Wales Surgery in Children ODN
Date of Ratification:	1st September 2023
Ratified by:	RMCH (Host Trust): - Paediatric Medicines Management Committee (MMC) - Paediatric Policies & Guidelines Committee
Date of Ratification:	

Issue / Circulation Date:	
Circulated by:	
Dissemination and Implementation:	
Date placed on NWTS website:	

Planned Review Date:	3 years
Responsibility of:	Clinical lead North West (England) & North Wales Surgery in Children ODN & NWTS guideline lead consultant and nurse

Minor Amendment (If applicable) Notified To:	
Date notified:	

RMCH EqIA Registration Number:	2021-229
---------------------------------------	-----------------

1. Detail of Procedural Document

Guideline for the Management of Suspected Acute Abdomen in those 16 years and under

2. Equality Impact Assessment

EqIA registration Number for RMCH:	2021-229
------------------------------------	----------

3. Consultation, Approval and Ratification Process

This guideline was developed with input from:

- North West (England) & North Wales Surgery in Children Network
- Children's Major Trauma Network, North West & North Wales
- North West (England) and North Wales Paediatric Transport Service (NWTs).
- North West (England) and North Wales Paediatric Critical Care Operational Delivery Network
- Representatives from the District General Hospitals within networks above.

All comments received have been reviewed and appropriate amendments incorporated.

For ratification process for network guidelines see appendix 1.

4. Disclaimer

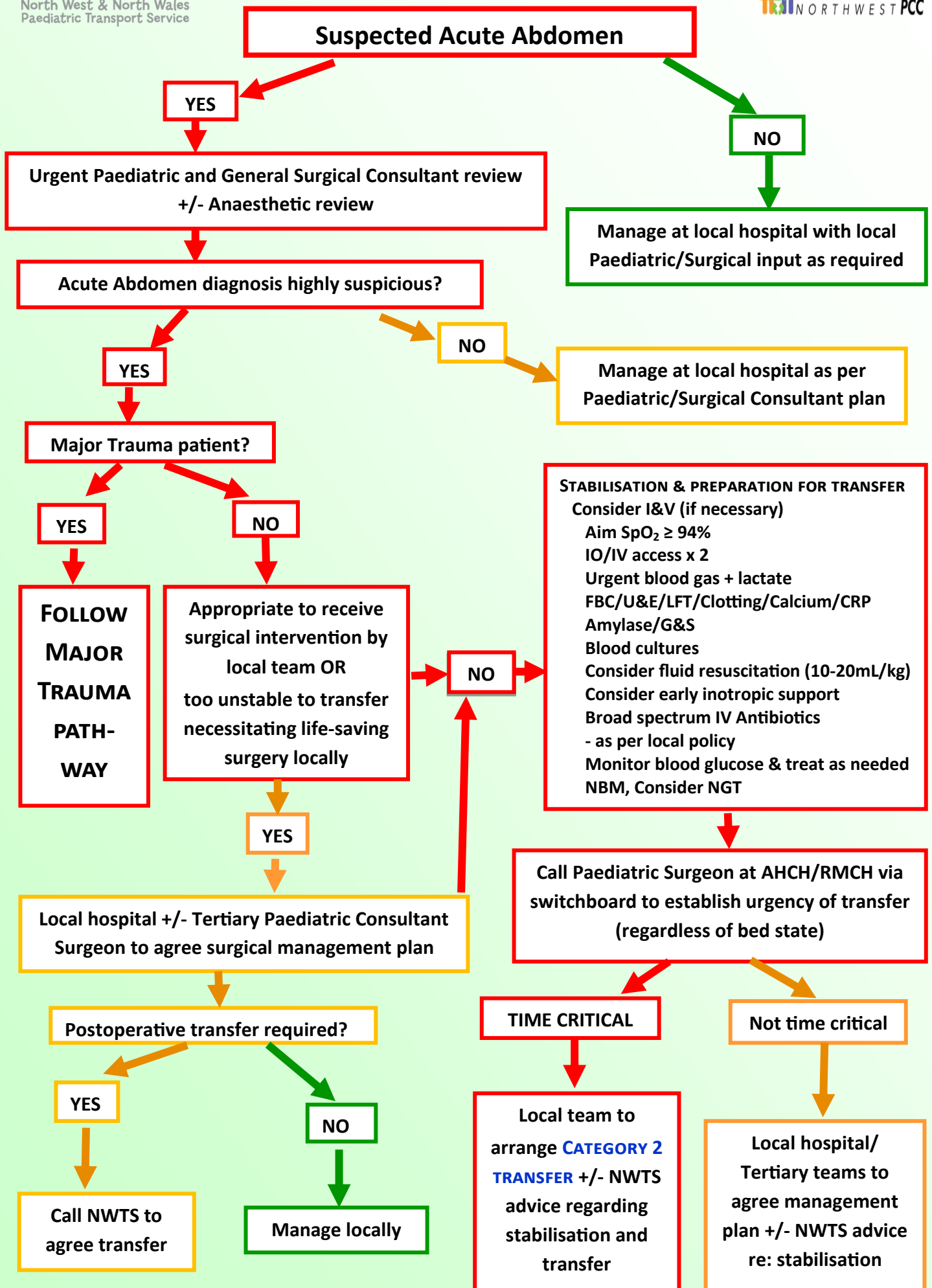
These clinical guidelines represent the views of the North West (England) and North Wales Paediatric Transport Service (NWTs) and North West (England) and North Wales Paediatric Networks mentioned above. They have been produced after careful consideration of available evidence in conjunction with clinical expertise and experience.

It is intended that trusts within the Network will adopt this guideline and educational resource after review and ratification (including equality impact assessment) through their own clinical governance structures.

The guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient.

Clinical advice is always available from NWTs on a case by case basis.

Please feel free to **contact NWTs (01925 853 550)** regarding these documents if there are any queries.



KEY POINTS

Repeated examination is useful to look for the persistence or evolution of signs and evaluate response to treatment
Analgesia should be used and will not mask potentially serious causes of pain
Investigations are guided by the most likely cause. Most children do not need investigations

True bilious vomiting is dark green and warrants urgent surgical input

BACKGROUND

The key consideration in acute abdominal pain is the differentiation between surgical and non-surgical causes
Non-specific abdominal pain is very common but is a diagnosis of exclusion once red flags are considered.
NB invasive Group A Streptococcus may present with non-specific abdominal pain & ileus (see sepsis guideline)
Symptoms in neonates may be attributed by parents as abdominal pain. A thorough examination and a broad differential should be considered in this group (see acute deterioration in neonate / infant guideline)

DIAGNOSIS THAT POTENTIALLY REQUIRES A TIME CRITICAL INTERVENTION

NEONATES	INFANTS AND CHILDREN	ADOLESCENTS
Necrotising enterocolitis	Incarcerated hernia	Testicular torsion
Congenital Anomalies	Acute Appendicitis	Acute Appendicitis
Hirschprung's enterocolitis	Volvulus	Ovarian torsion or cyst rupture
Incarcerated hernia	Intussusception	Ectopic pregnancy
Volvulus	Abdominal Trauma	Abdominal Trauma
	Ovarian torsion	Incarcerated hernia
	Perforation (including ingestion of foreign bodies eg button batteries, drawing pins, magnets)	Perforation (including ingestion of foreign bodies eg button batteries, drawing pins, magnets)
	Meckel's diverticulum	Intraabdominal sepsis
	Testicular torsion	Volvulus (neurodisability are difficult to diagnose)
	Intra-abdominal sepsis	Pancreatitis
	Pancreatitis	

RISK FACTORS FOR SEVERE DISEASE

<5 years of age
Severe co-morbidity or >2 system co-morbidity
Immunosuppression
Recent abdominal surgery

Observe child's movements, gait, position, and level of comfort.

EXAMINE THE ABDOMEN FOR:

Focal vs generalised tenderness
Guarding or rigidity *ie evidence of **peritonism***
Signs of trauma
Discolouration
Hernias
Abdominal masses (including faeces)
Distension

Assess for non-abdominal causes eg iGAS sepsis + ileus, Diabetic Ketoacidosis, liver capsule pain due to cardiac failure in cardiomyopathy or myocarditis etc

Rectal / vaginal examination is **rarely** indicated and is likely to require a general anaesthetic for most children or young people.

AMBULANCE REQUEST FOR TIME CRITICAL TRANSFER VIA NORTH WEST AMBULANCE SERVICE (NWAS) = CATEGORY 2

- **Category 2 response time = 18-minute** mean response time and should be used if child or young person is due to have intervention, ie surgery, on arrival at tertiary centre.
- **Category 3:** for any urgent transfers via emergency department for further surgical assessment / review

<https://www.nwas.nhs.uk/services/professionals/emergency-ambulance/>

For further information on organising inter-hospital transfers with NWAS. The code assigned is based on clinical presentation and not location of patient. All requests must be placed on the basis of clinical need.

AMBULANCE REQUEST FOR TIME CRITICAL TRANSFER VIA WELSH AMBULANCE SERVICE: follow local policy

IF ANY DELAY IS ANTICIPATED eg ambulance NOT arrived within 20 minutes: **escalate** the call to the senior clinician on duty for either NWAS or Welsh ambulance service

TIME CRITICAL TRANSFER CHECKLIST:

DO.....

Stabilise the patient
Organise transfer
Photocopy notes, blood
results, observation &
drug/fluid charts
Use STOPP form

CALL.....

Paediatric Surgical
Consultant (AHCH or RMCH)
NWS / WAS
Consider d/w: Safeguarding
+/- NWTS (transfer advice)
Both above only if needed

DON'T.....

Delay
Undertake imaging or
interventions unless advised
Perform any surgical procedures
unless advised
Wait for a critical care bed

- **AIM:** Safe but rapid transfer—**call NWTS team for stabilisation/transfer advice** if required
- **AVOID hypoxia, hypotension** or hypoglycaemia to prevent secondary injury (see normal values pg 6)
- **Do not delay transfer** to tertiary centre (Alder Hey or Royal Manchester Children’s Hospital)
- **TRANSFER** should be undertaken **by LOCAL TEAM** NOT NWTS

RESPONSIBILITIES OF LOCAL TEAM

Stabilise child
Intubate and ventilate child if required
Treat circulatory instability (discuss with NWTS for advice)
Contact Consultant Surgeon at tertiary centre (telephone numbers below)
Discuss need for Imaging with Consultant Surgeon at tertiary centre
Identify appropriate transfer team (eg experienced anaesthetist + appropriate nurse/ODP)
Contact NWS via 0345 140 0144 and ask for “**Category 2**” ambulance
<https://www.nwas.nhs.uk/services/professionals/emergency-ambulance/>
OR contact WAS via healthcare professional line (or 999) & request a time critical transfer
following local policy
Arrange transfer of all images via PACS
Refer to safeguarding team if appropriate

TEAM COMPOSITION:

- Always use **STOPP tool** (<https://nwts.nhs.uk/guidelines>) for all paediatric transfers
- Complete a risk assessment prior to any transfer; if any delay repeat just prior to transfer
- Joint decision should be made by paediatric & anaesthetic consultants on team composition
- Any potential airway concerns require an anaesthetic escort

NWTS will....

Contact the Consultant Surgeon at tertiary centre if not already done so by the local team
Advise local team on stabilisation & transfer if required

NWTS: 08000 84 83 82

AHCH Consultant Surgeon (via Switchboard)

0151 228 4811

RMCH Consultant Surgeon (via Switchboard)

0161 276 1234

RESOURCES

Oxygenation targets: SpO₂ ≥ 94%

Glucose targets: ≥ 3 mmol/L

RESP RATE ¹⁹	NORMAL	MODERATE	SEVERE	HEART RATE ¹⁹	NORMAL	MODERATE	SEVERE
Neonate 37– 44 weeks	30-59	60-79	≥ 80	Neonate	91-149	150-179	≤ 70 or ≥ 180
<1yr	30-39	40-54	> 54	<1yr	110-149	150-159	<80 or >160
1-2	25-34	35-49	> 50	1-2	100-139	140-149	<80 or >150
3-4	25-29	30-39	> 40	3-4	95-129	130-139	<60 or >140
5-7	20-23	24-28	> 29	5-7	80-109	110-119	<60 or >120
8-11	15-21	22-24	> 25	8-11	60-104	105-114	<60 or >115
> 12 yr	15-21	22-24	> 25	> 12 yr	65-90	91-130	<55 or >130

SYSTOLIC BP ¹⁸	NORMAL	MODERATE	SEVERE	DIASTOLIC BP	TARGET mean BP
37—44 weeks (neonate)	60-80	50-59	< 50	35-53	40-45
< 4 months	60-80	50-59	< 50	37-56	45-50
4 m—2 yr	70-90	60-69	< 60	42-63	50-55
2—5 yr	90-129	80-89	< 80	46-72	55-60
5-12 yr	90-129	80-89	< 80	57-76	60
> 12 yr	110-130	91-100	≤ 90	64-83	65

GUIDELINES FOR < 16 YEARS: www.nwts.nhs.uk/clinicalguidelines

Crashcall link via NWTS website home page - for intubation drugs / sedation regime / inotropes etc

Safe Transfer of Paediatric Patients (STOPP) tool which includes risk assessment prior to transfer, and checklists

NWTS LocSIPPS / Checklists includes sizes of ETT, suction, NGT, CVL & arterial lines

Guidelines include: intubation and difficult airway, sepsis, insertion of intraosseous line, collapsed neonate or infant, management of under 16 years outside PCC level 3 unit, and transfer

EDUCATION: www.nwts.nhs.uk/education-website

Includes recordings of NWTS education eg time critical transfers, surgical abdomen etc

Login details for education site is available from your nursing and medical paediatric critical care (PCC) operational delivery network (ODN) links

FOR DRUG DOSES:

British National Formulary for Children

CRASHCALL = regional drug calculator link: <https://www.nwts.nhs.uk/documentation/crashcall>

RECEIVING TERTIARY CENTRE FOR TIME CRITICAL ACUTE ABDOMEN PATIENTS

REFERRING HOSPITAL	General Surgery	Neonatal Surgery	Major Trauma	Preferred PICU
Aintree	AHCH	AHCH	AHCH	AHCH
Bangor	AHCH	AHCH	AHCH	AHCH
Barrow in Furness	RMCH	RMCH	AHCH	RMCH
Blackpool Victoria	RMCH	RMCH	AHCH	RMCH
Royal Blackburn	RMCH	RMCH	RMCH	RMCH
Royal Bolton	RMCH	RMCH	RMCH	RMCH
Burnley General	RMCH	RMCH	RMCH	RMCH
Countess of Chester	AHCH	AHCH	AHCH	AHCH
Chorley	RMCH	RMCH	RMCH	RMCH
Fairfield General (Bury)	RMCH	RMCH	RMCH	RMCH
Glan Clwyd	AHCH	AHCH	AHCH	AHCH
Lancaster General	RMCH	RMCH	AHCH	RMCH
Royal Liverpool	AHCH	AHCH	AHCH	AHCH
Leighton (Crewe)	AHCH	AHCH	AHCH	AHCH
Macclesfield General	RMCH	AHCH	RMCH	RMCH
Nobles, Isle of Man	AHCH	AHCH	AHCH	AHCH
North Manchester General	RMCH	RMCH	RMCH	RMCH
Royal Oldham	RMCH	RMCH	RMCH	RMCH
Royal Preston	RMCH	RMCH	RMCH	RMCH
Southport and Ormskirk	AHCH	AHCH	AHCH	AHCH
Salford	RMCH	RMCH	RMCH	RMCH
Stepping Hill	RMCH	RMCH	RMCH	RMCH
Tameside	RMCH	RMCH	RMCH	RMCH
Trafford General	RMCH	RMCH	RMCH	RMCH
Warrington	AHCH	AHCH	AHCH	AHCH
Whiston	AHCH	AHCH	AHCH	AHCH
Wigan	RMCH	RMCH	RMCH	RMCH
Wrexham Maelor	AHCH	AHCH	AHCH	AHCH
Wythenshawe	RMCH	RMCH	RMCH	RMCH

REFERENCES

STOPP transfer document www.nwts.nhs.uk/clinicalguidelines

Green R, Bulloch B, Kabani A, Hancock BJ, Tenenbein M. Early analgesia for children with acute abdominal pain. *Pediatrics*. 2005;116(4):978-83.

Nance ML, Adamson WT, Hedrick HL. Appendicitis in the young child: a continuing diagnostic challenge. *Pediatr Emerg Care*. 2000;16(3):160-2.

Nelson DS, Bateman B, Bolte RG. Appendiceal perforation in children diagnosed in a pediatric emergency department. *Pediatr Emerg Care*. 2000;16(4):233-7.

RCEM. Ingestion of Super Strong Magnets in Children 2021 [Available from: https://rcem.ac.uk/wp-content/uploads/2021/10/RCEM_BPC_Ingestion_of_Super_Strong_Magnets_in_Children_170521.pdf].

HealthierTogether. Acute Abdominal Pain Pathway 2021 [Available from: https://what0-18.nhs.uk/application/files/1816/2920/1568/CS52646_NHS_Abdo_Pain_Pathway_Management_-_Primary_Care_April_21v3.pdf].

SepsisTrust. Clinical Tools - The UK Sepsis Trust: The UK Sepsis Trust; 2021 [Available from: <https://sepsistrust.org/professional-resources/clinical-tools/>].

NICE. Sepsis: recognition, diagnosis and early management 2017. Available from: <https://www.nice.org.uk/guidance/ng51>.

NICE. Algorithms for IV fluid therapy in children and young people in hospital [Available from: <https://www.nice.org.uk/guidance/ng29/resources/algorithms-for-iv-fluid-therapy-in-children-and-young-people-in-hospital-set-of-6-pdf-2190274957>].

BMJ Best Practice: Assessment of acute abdominal pain in children 2021

Managing acute abdominal pain in children: current perspectives *Ped Health, Med & Therap* 2017

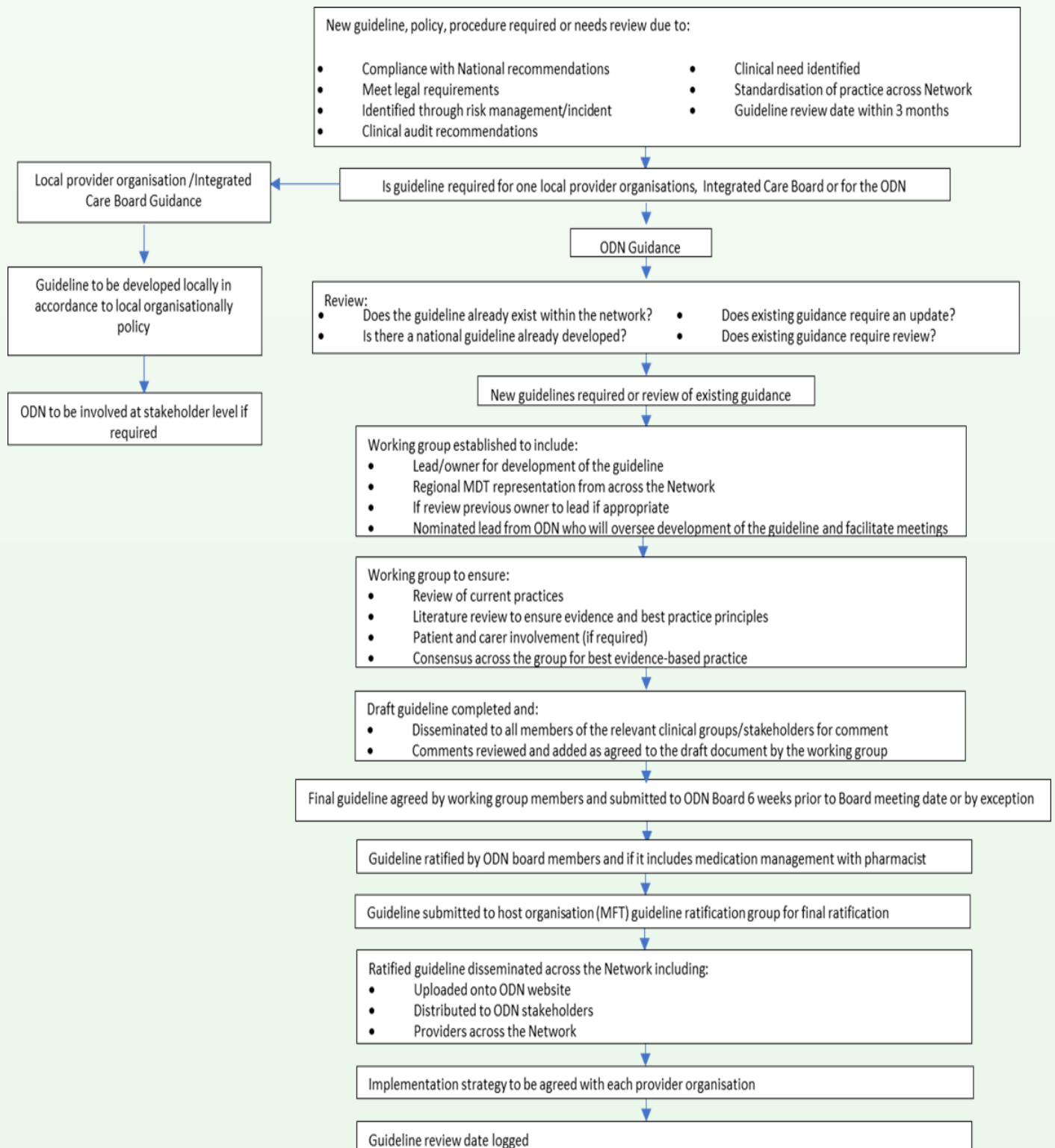
GUIDELINES REFERENCED

RCEM Guideline: Acute abdominal pain in children

Royal Melbourne Children's Hospital: Acute Abdominal Pain

https://www.rch.org.au/clinicalguide/guideline_index/Abdominal_pain_-_acute/

RATIFICATION PROCESS



CONTACT NUMBERS:

Switchboard Alder Hey Children's Hospital 0151 228 4811

Switchboard Royal Manchester Children's Hospital 0161 276 1234

NWTS (North West & North Wales Paediatric Transport Service) 01925 853 550

Regional Paediatric Intensive Care Unit Alder Hey Children's Hospital 0151 252 5241

Regional Paediatric Intensive Care Unit Royal Manchester Children's Hospital 0161 701 8000

Guideline author:

Sarah Stibbards NWTS Consultant & Consultant in Paediatric Emergency Medicine,
Alder Hey Children's Hospital

Consulted parties:

North West (England) & North Wales Paediatric Transport Service (NWTS)

North West (England) & North Wales Surgery in Children ODN

Children's Major Trauma Network, North West (England) & North Wales

North West (England) and North Wales Paediatric Critical Care ODN

General Surgical and Anaesthetic teams, Royal Manchester Children's Hospital

General Surgical and Anaesthetic teams, Alder Hey Children's Hospital

NWTS Guideline contact point: Kate.parkins@nwts.nhs.uk & Nicola.longden@mft.nhs.uk

Please visit NWTS website for the most up to date version of this guideline: www.nwts.nhs.uk

Date of approval by SiC ODN: 1st September 2023

Date of Approval by Host Trust:

Date of Review: