NICE National Institute for Health and Care Excellence

NICE Pathways

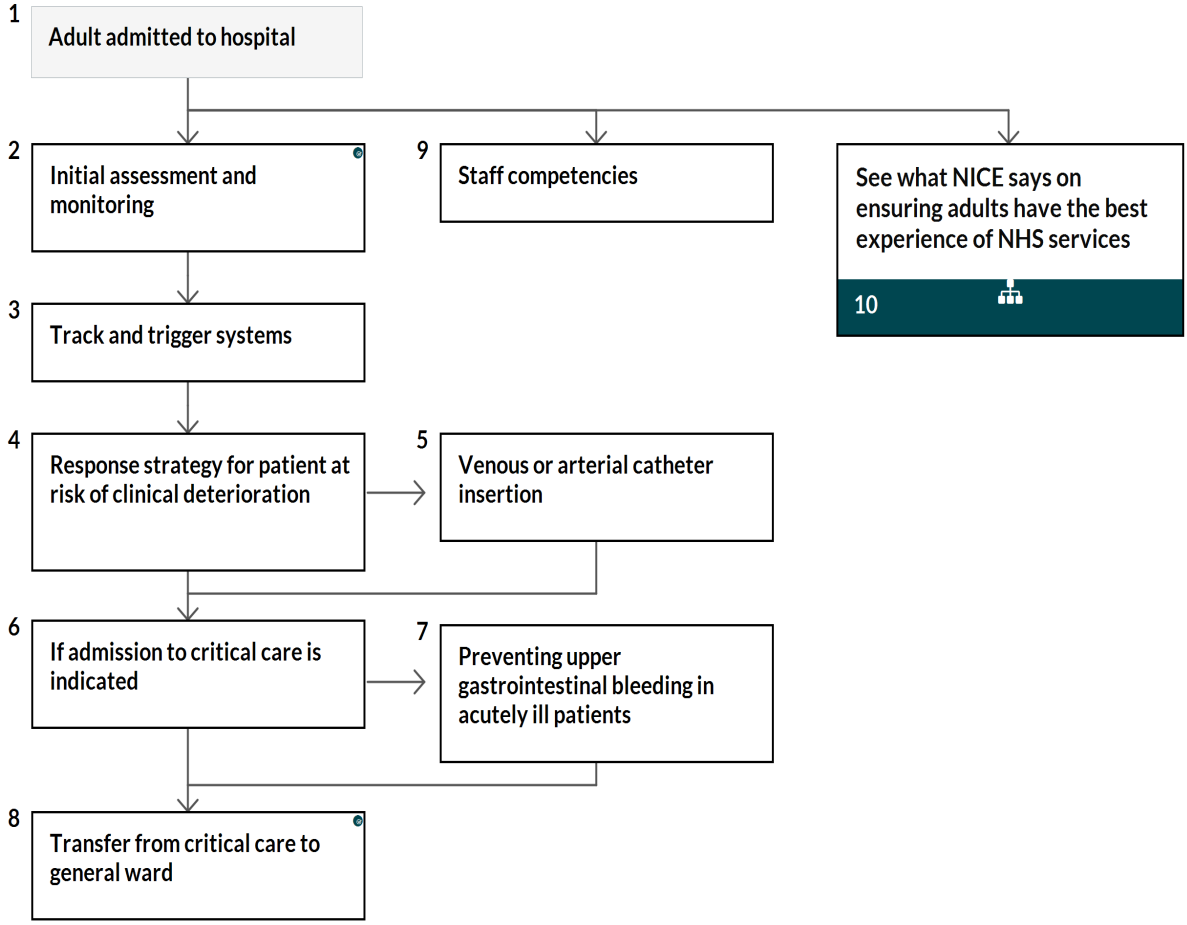
Acutely ill patients in hospital overview

NICE Pathways bring together everything NICE says on a topic in an interactive flowchart. NICE Pathways are interactive and designed to be used online.

They are updated regularly as new NICE guidance is published. To view the latest version of this NICE Pathway see:

http://pathways.nice.org.uk/pathways/acutely-ill-patients-in-hospital
NICE Pathway last updated: 30 January 2020

This document contains a single flowchart and uses numbering to link the boxes to the associated recommendations.



1 Adult admitted to hospital

No additional information

2 Initial assessment and monitoring

Adult patients in acute hospital settings, including patients in the emergency department for whom a clinical decision to admit has been made, should have:

- physiological observations recorded at the time of their admission or initial assessment
- a clear written monitoring plan that specifies which physiological observations should be recorded and how often. The plan should take account of the:
  - patient's diagnosis
  - presence of comorbidities
  - agreed treatment plan.

As a minimum, the following physiological observations should be recorded at the initial assessment and as part of routine monitoring:

- heart rate
- respiratory rate
- systolic blood pressure
- level of consciousness
- oxygen saturation
- temperature.

In specific clinical circumstances, additional monitoring should be considered; for example:

- hourly urine output
- biochemical analysis, such as lactate, blood glucose, base deficit, arterial pH
- pain assessment.

NICE has published medtech innovation briefings on:

- EarlySense for heart and respiratory monitoring and predicting patient deterioration
- i STAT CG4+ and CHEM8+ cartridges for point-of-care testing in the emergency department
- Visensia for early detection of deteriorating vital signs in adults in hospital.

See what NICE says on:

- assessment on and within 24 hours of admission and whenever clinical situation changes in relation to venous thromboembolism and bleeding risk
- risk factors for pressure ulcers
- screening for malnutrition and risk of malnutrition in hospitals
- sepsis.

Quality standards

The following quality statement is relevant to this part of the interactive flowchart.

Acute kidney injury

3. Monitoring in hospital for people at risk

3 Track and trigger systems

Physiological track and trigger systems should be used to monitor all adult patients in acute hospital settings.

- Physiological observations should be monitored at least every 12 hours, unless a decision has been made at a senior level to increase or decrease this frequency for an individual patient.
- The frequency of monitoring should increase if abnormal physiology is detected, as outlined in the recommendation on graded response strategy.

Track and trigger systems (NEWS2 has been endorsed by NHS England) should use multiple-parameter or aggregate weighted scoring systems, which allow a graded response. These scoring systems should:

- define the parameters to be measured and the frequency of observations
- include a clear and explicit statement of the parameters, cut-off points or scores that should trigger a response.

Multiple-parameter or aggregate weighted scoring systems used for track and trigger systems should measure:

- heart rate
- respiratory rate
- systolic blood pressure

- level of consciousness
- oxygen saturation
- temperature.

Trigger thresholds for track and trigger systems should be set locally. The threshold should be reviewed regularly to optimise sensitivity and specificity.

When adults are at risk of acute kidney injury, ensure that systems are in place to recognise and respond to oliguria (urine output less than 0.5 ml/kg/hour) if the track and trigger system (early warning score) does not monitor urine output. See what NICE says on acute kidney injury.

NICE has published medtech innovation briefings on:

- PulmoVista 500 for monitoring ventilation in critical care
- the MR-proADM test for use with clinical deterioration scores in cases of suspected infection
- VitalPAC for assessing vital signs of patients in hospital.

4 Response strategy for patient at risk of clinical deterioration

The response strategy for patients identified as being at risk of clinical deterioration should be triggered by either physiological track and trigger score or clinical concern.

A graded response strategy for patients identified as being at risk of clinical deterioration should be agreed and delivered locally. It should consist of the following three levels.

- Low-score group:
  - Increased frequency of observations and the nurse in charge alerted.
- Medium-score group:
  - Urgent call to team with primary medical responsibility for the patient.
  - Simultaneous call to personnel with core competencies for acute illness. These competencies can be delivered by a variety of models at a local level, such as a critical care outreach team, a hospital-at-night team or a specialist trainee in an acute medical or surgical specialty.
- High-score group:
  - Emergency call to team with critical care competencies and diagnostic skills. The team should include a medical practitioner skilled in the assessment of the critically ill patient, who possesses advanced airway management and resuscitation skills. There should be an immediate response.

Patients identified as 'clinical emergency' should bypass the graded response system. With the exception of those with a cardiac arrest, they should be treated in the same way as the high-score group.

For patients in the high- and medium-score groups, healthcare professionals should:

- initiate appropriate interventions
- assess response
- formulate a management plan, including location and level of care.

5 Venous or arterial catheter insertion

Ultrasound locating devices for placing central venous catheters

The following recommendations are from NICE technology appraisal guidance on ultrasound locating devices for placing central venous catheters.

Two-dimensional imaging ultrasound guidance is recommended as the preferred method for insertion of central venous catheters into the internal jugular vein in adults and children in elective situations.

The use of two-dimensional imaging ultrasound guidance should be considered in most clinical circumstances where central venous catheter insertion is necessary either electively or in an emergency situation.

It is recommended that all those involved in placing central venous catheters using two-dimensional imaging ultrasound guidance should undertake appropriate training to achieve competence.

Audio-guided Doppler ultrasound guidance **is not recommended** for central venous catheter insertion.

NICE has written information for the public on ultrasound locating devices.

SecurAcath for securing percutaneous catheters

The following recommendations are from NICE medical technologies guidance on SecurAcath for securing percutaneous catheters.

The case for adopting SecurAcath for securing peripherally inserted central catheters (PICCs) is

supported by the evidence. SecurAcath is easy to insert, well tolerated, associated with a low incidence of catheter-related complications and does not usually need removing while the catheter is in place.

SecurAcath should be considered for any PICC with an anticipated medium- to long-term dwell time (15 days or more).

Cost modelling shows that SecurAcath is cost saving compared with adhesive securement devices if the PICC remains in place for 15 days or longer. Estimated cost savings range from £9 to £95 per patient for dwell times of 25 days and 120 days, respectively. Cost savings result from shorter maintenance times and less need for device replacement with SecurAcath. Annual savings across the NHS from using SecurAcath are estimated to be around £1 million.

The 3M Tegaderm CHG IV securement dressing for central venous and arterial catheter insertion sites

The following recommendations are from NICE medical technologies guidance on the 3M Tegaderm CHG IV securement dressing for central venous and arterial catheter insertion sites.

The case for adopting the 3M Tegaderm CHG IV securement dressing for central venous and arterial catheter insertion sites is supported by the evidence. This technology allows observation, and provides antiseptic coverage, of the catheter insertion site. It reduces catheter-related bloodstream infections and local site infections compared with semipermeable transparent (standard) dressings. It can be used with existing care bundles.

The 3M Tegaderm CHG IV securement dressing should be considered for use in critically ill adults who need a central venous or arterial catheter in intensive care or high dependency units.

The estimated cost saving from using a 3M Tegaderm CHG IV securement dressing (Tegaderm CHG) instead of a standard transparent semipermeable dressing is £93 per patient. This estimate is based on a baseline catheter-related bloodstream infection rate of 1.48 per 1,000 catheter days. Tegaderm CHG is estimated to be cost neutral when the baseline catheter-related bloodstream infection rate is 0.18 per 1,000 catheter days, and cost incurring when the baseline rate falls below that figure.

Sherlock 3CG Tip Confirmation System for placing peripherally inserted central catheters

The following recommendations are from NICE medical technologies guidance on the Sherlock 3CG Tip Confirmation System for placement of peripherally inserted central catheters.

The case for adopting the Sherlock 3CG TCS for placement of peripherally inserted central catheters is supported by the evidence. The technology usually avoids the need for a confirmatory chest X-ray in patients who would otherwise have blind insertion, minimising the delay before the catheter can be used for infusion. Using the technology increases staff confidence during catheter insertion.

The Sherlock 3CG TCS should be considered as an option for placement of peripherally inserted central catheters in adults. For patients whose electrocardiogram does not show a P wave (for example, patients with atrial fibrillation), a chest X-ray will still be needed to confirm tip location of the peripherally inserted central catheter.

The cost of using the Sherlock 3CG TCS is similar to that of blind insertion and subsequent chest X-ray in adults who need a peripherally inserted central catheter in a non-intensive care setting. When the Sherlock 3CG TCS is used instead of fluoroscopy, the estimated cost saving is £109 per patient. In an intensive care setting, where the rate of misplacement with blind insertion is generally higher, there is an estimated cost saving of £54 per patient per use of the Sherlock 3CG TCS and a confirmatory chest X-ray compared with using blind insertion and chest X-ray. All these cost savings are subject to some uncertainty and need to be considered in the context of the clinical benefits.

Medtech innovation briefings

NICE has published medtech innovation briefings on:

- Biopatch for venous or arterial catheter sites
- AccuVein AV400 for vein visualisation.

6 If admission to critical care is indicated

If the team caring for the patient considers that admission to a critical care area is clinically indicated, then the decision to admit should involve both the consultant caring for the patient on the ward and the consultant in critical care.

NICE has published medtech innovation briefings on:

- needle-free arterial non-injectable connector
- Space GlucoseControl system for managing blood-glucose in critically ill patients in intensive care.

7 Preventing upper gastrointestinal bleeding in acutely ill patients

Offer acid-suppression therapy (H_2-receptor antagonists or proton pump inhibitors) for primary prevention of upper gastrointestinal bleeding in acutely ill patients admitted to critical care. If possible, use the oral form of the drug[1].

Review the ongoing need for acid-suppression drugs for primary prevention of upper gastrointestinal bleeding in acutely ill patients when they recover or are discharged from critical care.

See what NICE says on managing acute upper gastrointestinal bleeding.

8 Transfer from critical care to general ward

After the decision to transfer a patient from a critical care area to the general ward has been made, he or she should be transferred as early as possible during the day. Transfer from critical care areas to the general ward between 22.00 and 07.00 should be avoided whenever possible, and should be documented as an adverse incident if it occurs.

The critical care area transferring team and the receiving ward team should take shared responsibility for the care of the patient being transferred. They should jointly ensure:

- there is continuity of care through a formal structured handover of care from critical care area staff to ward staff (including both medical and nursing staff), supported by a written plan
- that the receiving ward, with support from critical care if required, can deliver the agreed plan.

The formal structured handover of care should include:

- a summary of critical care stay, including diagnosis and treatment
- a monitoring and investigation plan
- a plan for ongoing treatment, including drugs and therapies, nutrition plan, infection status and any agreed limitations of treatment
- physical and rehabilitation needs
- psychological and emotional needs
- specific communication or language needs.

[1] As of August 2016, only the H2-receptor antagonists ranitidine and cimetidine are licensed for prophylaxis of

gastrointestinal bleeding in acutely ill patients. The proton pump inhibitors omeprazole, esomeprazole, lansoprazole, pantoprazole and rabeprazole are not licensed for prophylaxis of gastrointestinal bleeding in acutely ill patients. The use of proton pump inhibitors or H2-receptor antagonists other than ranitidine and cimetidine for this indication would be off label.

When patients are transferred to the general ward from a critical care area, they should be offered information about their condition and encouraged to actively participate in decisions that relate to their recovery. The information should be tailored to individual circumstances. If they agree, their family and carers should be involved.

See what NICE says on rehabilitation after critical illness.

Quality standards

The following quality statements are relevant to this part of the interactive flowchart.

Rehabilitation after critical illness in adults

2. Transfer from critical care to a general ward

Emergency and acute medical care in over 16s

4. Structured patient handovers

9 Staff competencies

Physiological observations should be recorded and acted upon by staff who have been trained to undertake these procedures and understand their clinical relevance.

Staff caring for patients in acute hospital settings should have competencies in monitoring, measurement, interpretation and prompt response to the acutely ill patient appropriate to the level of care they are providing. Education and training should be provided to ensure staff have these competencies, and they should be assessed to ensure they can demonstrate them.

Staff working with acutely ill patients on general wards should be provided with education and training to recognise and understand the physical, psychological and emotional needs of patients who have been transferred from critical care areas.

Preventing hospital-associated infections on secondary care

See what NICE says on local strategy for preventing and controlling hospital-associated infections in secondary care.

10 See what NICE says on ensuring adults have the best experience of NHS services

See Patient experience in adult NHS services

Glossary

TCS

Tip Confirmation System

Sources

Acute kidney injury: prevention, detection and management (2019) NICE guideline NG148

Acute upper gastrointestinal bleeding in over 16s: management (2012) NICE guideline CG141

Acutely ill adults in hospital: recognising and responding to deterioration (2007) NICE guideline CG50

Guidance on the use of ultrasound locating devices for placing central venous catheters (2002) NICE technology appraisal guidance 49

SecurAcath for securing percutaneous catheters (2017) NICE medical technologies guidance 34

The 3M Tegaderm CHG IV securement dressing for central venous and arterial catheter insertion sites (2015, updated 2019) NICE medical technologies guidance 25

The Sherlock 3CG Tip Confirmation System for placement of peripherally inserted central catheters (2015, updated 2019) NICE medical technologies guidance 24

Your responsibility

Guidelines

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility

to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Technology appraisals

The recommendations in this interactive flowchart represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, health professionals are expected to take these recommendations fully into account, alongside the individual needs, preferences and values of their patients. The application of the recommendations in this interactive flowchart is at the discretion of health professionals and their individual patients and do not override the responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or their carer or guardian.

Commissioners and/or providers have a responsibility to provide the funding required to enable the recommendations to be applied when individual health professionals and their patients wish to use it, in accordance with the NHS Constitution. They should do so in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Medical technologies guidance, diagnostics guidance and interventional procedures

guidance

The recommendations in this interactive flowchart represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, healthcare professionals are expected to take these recommendations fully into account. However, the interactive flowchart does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

Commissioners and/or providers have a responsibility to implement the recommendations, in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity, and foster good relations. Nothing in this interactive flowchart should be interpreted in a way that would be inconsistent with compliance with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.