

SIGN 157

Risk reduction and management of delirium

A national clinical guideline

March 2019

Key to evidence statements and recommendations

Levels of evidence

- 1⁺⁺ | High-quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias
- 1⁺ | Well-conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias
- 1⁻ | Meta-analyses, systematic reviews, or RCTs with a high risk of bias
- 2⁺⁺ | High-quality systematic reviews of case-control or cohort studies
High-quality case-control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
- 2⁺ | Well-conducted case-control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
- 2⁻ | Case-control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
- 3 | Non-analytic studies, eg case reports, case series
- 4 | Expert opinion

Recommendations

Some recommendations can be made with more certainty than others. The wording used in the recommendations in this guideline denotes the certainty with which the recommendation is made (the 'strength' of the recommendation).

The 'strength' of a recommendation takes into account the quality (level) of the evidence. Although higher-quality evidence is more likely to be associated with strong recommendations than lower-quality evidence, a particular level of quality does not automatically lead to a particular strength of recommendation.

Other factors that are taken into account when forming recommendations include: relevance to the NHS in Scotland; applicability of published evidence to the target population; consistency of the body of evidence, and the balance of benefits and harms of the options.

- R** | For '**strong**' recommendations on interventions that '**should**' be used, the guideline development group is confident that, for the vast majority of people, the intervention (or interventions) will do more good than harm. For '**strong**' recommendations on interventions that '**should not**' be used, the guideline development group is confident that, for the vast **majority** of people, the intervention (or interventions) will do more harm than good.
- R** | For '**conditional**' recommendations on interventions that should be '**considered**', the guideline development group is confident that the intervention will do more good than harm for most patients. The choice of intervention is therefore more likely to vary depending on a person's values and preferences, and so the healthcare professional should spend more time discussing the options with the patient.

Good-practice points

- ✓ | Recommended best practice based on the clinical experience of the guideline development group.



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SIGN guidelines are produced using a standard methodology that has been **equality impact assessed** to ensure that these equality aims are addressed in every guideline. This methodology is set out in the current version of SIGN 50, our guideline manual, which can be found at www.sign.ac.uk/sign-50.html. The EQIA assessment of the manual can be seen at www.sign.ac.uk/assets/sign50eqia.pdf. The full report in paper form and/or alternative format is available on request from the Healthcare Improvement Scotland Equality and Diversity Officer.

Every care is taken to ensure that this publication is correct in every detail at the time of publication. However, in the event of errors or omissions corrections will be published in the web version of this document, which is the definitive version at all times. This version can be found on our web site www.sign.ac.uk

Scottish Intercollegiate Guidelines Network

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March 2019

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1 Introduction

1.1 The need for a guideline

Delirium is an acute deterioration in mental functioning arising over hours or days that is triggered mainly by acute medical illness, surgery, trauma, or drugs.¹ It was previously termed 'acute confusional state'. Delirium is independently linked with poor outcomes including medical complications, falls, increased length of hospital stay, new institutionalisation, and mortality.¹ It can cause significant patient and carer distress.²

The main features of delirium are acute cognitive deficits and altered level of arousal, with up to half of patients also experiencing hallucinations or delusions.³ Delirium varies in duration, mostly resolving within days, but in some people it can last weeks or months.⁴

Delirium is among the most common of medical emergencies. A UK study found a prevalence of 20% in adult acute general medical patients.⁵ The prevalence is higher in particular clinical groups, such as patients in intensive care units (ICU). It affects up to 50% who have hip fracture and up to 75% in intensive care.¹ Several predisposing factors increase the risk of delirium, including older age, dementia, frailty, the presence of multiple comorbidities, male sex, sensory impairments, a history of depression, a history of delirium, and alcohol misuse.^{1,6}

Despite its importance, there are deficiencies in care of people with delirium in Scotland. It is underdiagnosed,⁷ and the treatment of patients with established delirium is variable. Preventative measures can reduce the incidence of delirium,¹ yet few clinical units have formal delirium risk-reduction programmes.

Experience gained from quality improvement programmes in Scotland shows that advances can be made.⁸ There is potential to improve clinical practice by reducing variation in the standards of assessment and management of people with delirium. This new national guideline on delirium provides a critical focal point for Scotland-wide improvements in delirium care. Because delirium is so common, all healthcare staff having contact with acutely unwell patients need to assume responsibility for detecting and treating it, as well as aiming to reduce the risk of delirium occurring. Those working in the long-term care environment should be able to recognise delirium, reduce risk, and monitor those in their care to resolve delirium.

1.1.1 Patient and carer perspective

Common concerns raised by patient groups and through research into patient and carer issues identified good communication with family members or carers as crucial. Family members can provide background information on patient history, changes in behaviour and early warning signs. Once diagnosed, carers need information and support to enable them to care for the patient (*see section 9*).⁹⁻¹¹

1.2 Remit of the guideline

1.2.1 Overall objectives

This guideline provides recommendations based on current evidence for best practice in the detection, assessment, treatment and follow up of adults with delirium, as well as reducing the risk of delirium. The guideline applies to all settings: home, long-term care, hospital, and hospice. It is important to note that, to date, much of the existing evidence and the focus of other guidelines, is in acute care settings. However, this does not preclude application of the recommendations to other settings, adapted according to clinician judgement. Person-centred care should be the focus of the implementation of this guideline.

The guideline excludes delirium secondary solely to alcohol and illicit substances use. It also excludes delirium in children.

1.2.2 Common comorbidities

Common comorbidities which have been considered when reviewing the evidence for this guideline are:

- critical illness
- dementia
- depression
- frailty
- head injury
- learning disability
- Parkinson's disease
- cerebrovascular disease.

1.2.3 Definitions

The International Classification of Diseases, version 10 (ICD-10) defines delirium as, "An aetiologically nonspecific organic cerebral syndrome characterized by concurrent disturbances of consciousness and attention, perception, thinking, memory, psychomotor behaviour, emotion, and the sleep-wake schedule. The duration is variable and the degree of severity ranges from mild to very severe."¹²

According to the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5), delirium is a disturbance in attention and awareness with an additional disturbance in cognition, not explained by another pre-existing, established or evolving neurocognitive disorder or coma. The disturbance develops over a short period of time and tends to fluctuate in severity during the course of the day with evidence of direct physiological consequence of another medical condition, substance intoxication or withdrawal, or exposure to a toxin, or is due to multiple aetiologies. It's specified as 'acute', lasting a few hours or days and 'persistent', lasting weeks or months.¹³

Delirium presents variably but its main characteristics are rapid onset (hours, days) of acute mental status deterioration. Patients may present with cognitive impairment, but drowsiness to the point that the patient is not speaking, severe agitation, or psychotic features such as hallucinations or delusions may be the most prominent features. Delirium is sometimes described using hyperactive, hypoactive or mixed labels depending on the level of arousal.¹³ Most delirium has a duration of a small number of days, but in around 20% of cases, it can persist for weeks or months.¹⁴

Delirium is known by several terms, some still in use in clinical practice. These terms include 'acute confusional state', 'acute confusion', 'acute on chronic confusion', and 'acute encephalopathy'. The SIGN guideline group advocates use of the term delirium rather than alternatives to promote more consistent communication among professionals, more accurate provision of information to patients and carers, and more consistent use of detection tools and management strategies.

1.2.4 Target users of the guideline

This guideline will be of interest to primary and secondary healthcare professionals, community and care home staff involved in the care of patients at risk of, or experiencing, delirium, as well as patients and carers.

1.3 Statement of intent

This guideline is not intended to be construed or to serve as a standard of care. Standards of care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns of care evolve. Adherence to guideline recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results.

The ultimate judgement must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. This judgement should only be arrived at through a process of shared decision making with the patient (or family or carers, where appropriate), covering the diagnostic and treatment choices available. It is advised, however, that significant departures from the national guideline or any local guidelines derived from it should be documented in the patient's medical records at the time the relevant decision is taken.

1.3.1 Influence of financial and other interests

It has been recognised that financial interests in, or close working relationships with, pharmaceutical companies may have an influence on the interpretation of evidence from clinical studies.

It is not possible to completely eliminate any possible bias from this source, nor even to quantify the degree of bias with any certainty. SIGN requires that all those involved in the work of guideline development should declare all financial interests, whether direct or indirect, annually for as long as they are actively working with the organisation. By being explicit about the influences to which contributors are subjected, SIGN acknowledges the risk of bias and makes it possible for guideline users or reviewers to assess for themselves how likely it is that the conclusions and guideline recommendations are based on a biased interpretation of the evidence.

While developing this guideline, one academic conflict of interest was declared. As the main author of the 4AT test, Co-Chair Professor Alasdair MacLulich did not participate in the process to form recommendations to address key question 1: tools for detecting delirium (*see Annex 1*).

Signed copies of declaration of interests forms are retained by the SIGN Executive and a register of interests is available in the supporting material section for this guideline at www.sign.ac.uk

1.3.2 Prescribing of licensed medicines outwith their marketing authorisation

Recommendations within this guideline are based on the best clinical evidence. Some recommendations may be for medicines prescribed outwith the marketing authorisation (MA) also known as product licence. This is known as 'off-label' use.

Medicines may be prescribed 'off label' in the following circumstances:

- for an indication not specified within the marketing authorisation
- for administration via a different route
- for administration of a different dose
- for a different patient population.

An unlicensed medicine is a medicine which does not have MA for medicinal use in humans.

Generally 'off-label' prescribing of medicines becomes necessary if the clinical need cannot be met by licensed medicines within the marketing authorisation. Such use should be supported by appropriate evidence and experience.¹⁵

“Prescribing medicines outside the conditions of their marketing authorisation alters (and probably increases) the prescribers’ professional responsibility and potential liability.”¹⁵

The General Medical Council (GMC) recommends that when prescribing a medicine ‘off label’, doctors should:¹⁶

- be satisfied that there is no suitably licensed medicine that will meet the patient’s need.
- be satisfied that there is sufficient evidence or experience of using the medicine to show its safety and efficacy
- take responsibility for prescribing the medicine and for overseeing the patient’s care, monitoring, and any follow-up treatment, or ensure that arrangements are made for another suitable doctor to do so.
- make a clear, accurate and legible record of all medicines prescribed and, when not following common practice, the reasons for prescribing an unlicensed medicine.

Non-medical prescribers should ensure that they are familiar with the legislative framework and their own professional prescribing standards.

Prior to any prescribing, the licensing status of a medication should be checked in the summary of product characteristics (www.medicines.org.uk). The prescriber must be competent, operate within the professional code of ethics of their statutory bodies and the prescribing practices of their employers.¹⁷

1.3.3 Health technology assessment advice for NHSScotland

Specialist teams within Healthcare Improvement Scotland issue a range of advice that focuses on the safe and effective use of medicines and technologies in NHSScotland.

The Scottish Medicines Consortium (SMC) provides advice to NHS boards and their Area Drug and Therapeutics Committees about the status of all newly-licensed medicines, all new formulations of existing medicines and new indications for established products. NHSScotland should take account of this advice and ensure that medicines accepted for use are made available to meet clinical need where appropriate.

SMC advice relevant to this guideline is summarised in section 10.4.

2 Key recommendations

The following recommendations were highlighted by the guideline development group as the key clinical recommendations that should be prioritised for implementation.

2.1 Detecting delirium

R | **The 4AT tool should be used for identifying patients with probable delirium in emergency department and acute hospital settings.**

✓ | Where delirium is detected, the diagnosis of delirium should be clearly documented and coded to aid transfers of care (eg handover notes, referral and discharge letters).

2.2 Risk reduction

R | **The following components should be considered as part of a package of care for patients at risk of developing delirium:**

- orientation and ensuring patients have their glasses and hearing aids
- promoting sleep hygiene
- early mobilisation
- pain control
- prevention, early identification and treatment of postoperative complications
- maintaining optimal hydration and nutrition
- regulation of bladder and bowel function
- provision of supplementary oxygen, if appropriate.

R | **All patients at risk of delirium should have a medication review conducted by an experienced healthcare professional.**

2.3 Non-pharmacological treatment

R | **Healthcare professionals should follow established pathways of good care to manage patients with delirium.**

- **First consider acute, life-threatening causes of delirium, including low oxygen level, low blood pressure, low glucose level, and drug intoxication or withdrawal.**
- **Systematically identify and treat potential causes** (medications, acute illness, etc), **noting that multiple causes are common.**
- **Optimise physiology, management of concurrent conditions, environment** (reduce noise), medications, and natural sleep, to promote brain recovery.
- **Specifically detect, assess causes of, and treat agitation and/or distress, using non-pharmacological means only if possible** (see section 7 for pharmacological treatment).
- **Communicate the diagnosis to patients and carers, encourage involvement of carers and provide ongoing engagement and support.**
- **Aim to prevent complications of delirium such as immobility, falls, pressure sores, dehydration, malnourishment, isolation.**
- **Monitor for recovery and consider specialist referral if not recovering.**
- **Consider follow up** (see section 8).

3 Detecting delirium

3.1 Tools for detection and assessment

Delirium is frequently missed in routine clinical care and lack of detection is associated with poor outcomes.^{18,19} Delirium detection should ideally be undertaken at the earliest opportunity. Numerous assessment tools have been developed to help identify probable delirium in patients in a variety of settings, which can then prompt a more accurate diagnosis and consideration of underlying causes. For practical reasons, for implementation and acceptability to patients, assessment tools should be brief, require little or no training and be appropriate to the clinical setting.²⁰ The sensitivity of the tool is also important, as it is vital not to miss delirium.

A commonly used tool, the Confusion Assessment Method (CAM) and its variants have been reported as useful tools for detecting delirium.^{18,21,22} However, sensitivity and specificity varied broadly, possibly due to the need for users to have training and knowledge of delirium and its differential diagnoses. The CAM-ICU has particularly broad use within ICU settings but has the same limitations.^{19,23} The 4 As Test (Arousal, Attention, Abbreviated Mental Test 4, Acute change) (4AT) was developed, validated and widely implemented in Scotland in non-ICU settings. It does not require specific training, is brief and easy to use and has wide applicability in various clinical settings.^{24,25} It performed well for sensitivity and patient completion rate compared to other similar tools within the same patient group.^{20,26} The 4AT is also applicable as an assessment tool in older emergency department attendees.²⁷

2+
2++
2+

Other tools had significant disadvantages over CAM and 4AT, such as longer assessment time, poorer sensitivity and/or specificity, and/or relative lack of validation in published studies (*see Table 1*). The 13-item Delirium Observation Screening Scale (DOS) had good specificity and sensitivity but requires assessment over three shift periods and its authors have suggested it is geared more towards detection of hyperactive delirium, whereas hypoactive is more common in practice.²⁸⁻³⁰

2+
2++

The CAM-ICU and Intensive Care Delirium Screening Checklist (ICDSC) have been developed and validated in ICU settings, and may be better suited than other tests for use in intensive care.³¹

2+

In all cases, a positive assessment should be followed by additional assessment and diagnosis against ICD-10 or DSM-5 criteria by a suitably trained clinician.^{12,13} It is important to be aware that delirium may still occur in the absence of a positive test result because the condition fluctuates. Healthcare staff should not rely on the result of a single assessment during hospital admission.

Assessment of the patient’s capacity to make decisions about fundamental health and personal care must also be taken into consideration. If the person is deemed to be incapacitated appropriate documentation (eg in Scotland, Adults with Incapacity Act, Section 47 part 5 certificate with accompanying treatment plan) must be completed.

Table 1 summarises the commonly used and validated brief delirium assessment tools. There is a wide range of sensitivities and specificities with the different tools as well as in the time taken to complete assessment. Some are designed for assessment at first presentation, and others for monitoring for incident delirium. A tool with high sensitivity that requires no training or very little time to perform, and with additional advantages (for example, suitable for patients with dementia), will be important in clinical practice to ensure all cases of delirium are identified. In the case of uncertainty over whether delirium or dementia or both are present in a patient, it is best to assume it is delirium unless there is clarification from the patient’s notes or from family members that the mental state is clearly in keeping with their usual mental state.

Evidence was not identified to determine exactly which groups of patients should be routinely assessed using an assessment tool, but studies are in older people (aged 65 or over) in hospital and those in intensive care. This need not preclude their use in other settings, such as primary care.

Table 1: Overview of delirium assessment tools

Tool	Time taken (min)	Training Required	Staff	Settings	Reported Sensitivity %	Reported Specificity %	Delirium severity rating	Suitable for monitoring	Suitable for detecting DSD
4AT ^{20,24,26,27,30,32}	<2	No	Any	Multiple	86-100	65-82	No	No	Yes
AMT ^{20,26}	2	No	Any	Medical	75-87	61-64	No	No	No
CAM and variants ^{18,20,22,24,30,33}	3-10	Yes	Any	Multiple	46-94	63-100	No†	No	Yes
CAM-ICU ^{19,22,30,31}	<5	Yes	Any	ICU	28-100	53-99	No	Yes	No
DOS (13-item) ^{*28-30}	5	Minimal	Any	Multiple	89-100	87-97	Yes	Yes	No
DRS- R-98 ^{30,34,35}	20	Yes	Psychiatry	Multiple	57-93	82-98	Yes	No	Yes
ICDSC ^{19,31}	7-10	Minimal	Any	ICU	73-97	69-97	Yes	Yes	No
MMSE ³⁶	5	Minimal	Any	Multiple	76-91	51-84	Yes	No	No
Nu-DESC ³⁰	<5	No	Any	Multiple	32-96	69-92	No	No	No
RADAR ³⁷	<1	No	Any	Multiple	43-84	64-78	No	Yes	No
mRASS ^{33,38}	1	No	Any	Multiple	65-75	82-90	Yes	Yes	Yes
SQID ²⁰	<1	No	Any	Medical	77-91	56-71	No	Yes	No

Suitability for monitoring refers to the use of a tool daily or more for screening for incident delirium.

†with the exception of CAM-5

*DOS requires assessment over three shifts so time to detection is three days. It is geared towards assessment of hyperactive delirium.

Abbreviations: AMT – Abbreviated Mental Test; CAM – Confusion Assessment Method; DSD – delirium superimposed on dementia; DRS-98-R – Delirium Rating Scale; DOS – Delirium Observation Screening Scale; ICDSC – Intensive Care Delirium Screening Checklist; Nu-DESC – Nursing Delirium Screening Scale; MMSE – Mini Mental State Examination; RADAR – Recognising Acute Delirium As part of your Routine; mRASS – Modified Richmond Agitation-Sedation Scale; SQID – Single Question to Identify Delirium

- R** | **The 4AT tool should be used for identifying patients with probable delirium in emergency department and acute hospital settings.**
- R** | **Use of the 4AT tool could be considered for use in community or other settings for identifying patients with probable delirium.**
- R** | **For intensive care unit settings, CAM-ICU or ICDSC should be considered to help identify patients with probable delirium.**
- ✓ | A formal assessment and diagnosis must be made by a suitably trained clinician whenever patients with probable delirium are identified.
- ✓ | Where delirium is detected, patients and their family/carers should be informed of the diagnosis (*see section 9*).
- ✓ | Where delirium is detected, the diagnosis of delirium should be clearly documented to aid transfers of care (eg handover notes, referral and discharge letters).

3.2 Tools for measuring severity of delirium

Monitoring patients diagnosed with delirium for changes in severity or response to treatment may help predict the full clinical impact.^{39,40} Insufficient evidence was identified to recommend a particular tool for monitoring purposes. } 3

Table 1 lists tools that assess severity. Selection of a tool should take into consideration time required and ease of use. The 13-item DOS, mRASS, MMSE, DRS-R-98 and ICDSC can be considered as tools for the purpose of monitoring severity of delirium in suitable clinical areas (*see Table 1*).

3.3 Tools for detecting incident delirium in hospital

Insufficient evidence was identified to recommend a particular tool for regular monitoring purposes for detection of incident delirium after initial assessment in hospital. Selection of a tool should take into consideration time required and ease of use.

Although theoretically any tool listed in Table 1 in section 3.1 could be used, the RADAR, 13 item DOS, mRASS, CAM-ICU and SQiD are most suitable for monitoring purposes in suitable clinical areas (*see Table 1*).

3.4 Clinical investigations

Many conditions can trigger delirium. There is often more than one contributory factor in an individual person.⁴¹ A major part of treating people with delirium is treating the underlying precipitants or causes. A structured approach should be taken to identify, where possible, the issues contributing to delirium for an individual (*see Annex 2*). These include obtaining a good history from the person, a collateral or informant history, clinical examination (including a neurological examination), basic and then targeted investigations.

There is little evidence supporting the use of basic investigations because a fundamental standard of care is assumed in trials, and trials have not been conducted comparing, for example, carrying out a full blood count or not, in a person with delirium.

This section examines the available evidence for advanced investigations which are more invasive or expensive or where a condition may be identified which significantly alters the management of a person (eg identifying stroke, subdural haemorrhage or non-convulsive status epilepticus). If there is suspicion of significant illness (eg meningitis, encephalitis or sepsis) causing the delirium, these should be managed appropriately.

Strategies for such an approach and systems of care are outlined in the Royal College of Physicians' 'Acute Care Toolkit 3: Acute medical care for frail older people' and in the Healthcare Improvement Scotland TIME Bundle (*see Annex 3*).⁴²

3.4.1 Brain imaging

The aim of brain imaging is to identify stroke, haemorrhage, trauma or structural abnormality, such as a tumour, as causes of delirium. The diagnostic yield of computed tomography (CT) in determining the cause of delirium is low, but may be indicated in some high-risk patients.⁴³ For patients with pre-existing cognitive impairment who have other identified conditions that can precipitate delirium, such as dehydration or infection, brain imaging is unlikely to change management.⁴⁴

Observational, mostly retrospective, studies identified abnormal brain imaging with CT in people aged over 70 years presenting with acute confusion and:

- new focal neurological signs⁴⁴⁻⁴⁸ (defined as acute onset dysphasia, visual field defect, pyramidal or cerebellar signs).⁴⁶ There should be awareness that dysphasia (a focal sign) may be mistaken for confusion (a global brain dysfunction)⁴⁹
- presenting after a fall^{46,48}
- a reduced level of consciousness^{46,47}
- a head injury (in patients of any age)⁵⁰
- taking anticoagulant therapy.⁴⁸

Cerebral atrophy is more likely in patients presenting with delirium than without.⁵¹ This in itself, however, is not a useful finding in making a diagnosis of delirium or changing medical management.

R | **CT brain scan should not be used routinely but should be considered in patients presenting to hospital with delirium in the presence of:**

- **new focal neurological signs**
- **a reduced level of consciousness** (not adequately explained by another cause)
- **a history of recent falls**
- **a head injury** (patients of any age)
- **anticoagulation therapy.**

✓ | Consideration should be given to imaging patients with non-resolving delirium where no clear cause is identified or there are features to suggest primary central nervous system pathology.

3.4.2 Electroencephalogram

Currently electroencephalogram (EEG) is not performed routinely in patients with delirium, however, three retrospective studies from an epilepsy research group suggest that the incidence of epileptic activity and non-convulsive status epilepticus (NCSE) are higher than recognised in patients with delirium. One study found that 80% of patients with NCSE had delirium attributed initially to another cause.⁵²] 3

In one prospective study EEG was carried out in 44 patients aged 60 years or older with “confusion of unknown origin” (defined as unexplained confusion following screening investigations, including CT scan and blood sample screening, carried out in an emergency unit). Patients with a known history of epilepsy or in whom seizure-related confusion was highly suspected were excluded. Seven (15.9%) patients had EEG changes consistent with NCSE. Clinical indications of NCSE, with statistical significance, were rapid onset (<24 hours), lack of response towards simple commands and female gender.⁵³] 3

Continuous EEG monitoring is more sensitive than single EEG assessment at identifying epileptic activities and NCSE (28% v 6%).⁵²] 3

Further evidence is needed to determine the efficacy of routine use of EEG in patients presenting with confusion.] 3

R | **Electroencephalogram should be considered when there is a suspicion of epileptic activity or non-convulsive status epilepticus as a cause of a patient’s delirium.**

3.4.3 Lumbar puncture

Only one small study from the 1980s was identified on the use of lumbar puncture in the assessment of patients with delirium. It concluded that most patients with fever and delirium have a cause other than infection in the central nervous system (80 of 81 samples were negative for bacterial growth). Given the age of the trial, viral polymerase chain reaction (PCR) testing is unlikely to have been performed.⁵⁴] 3

Lumbar puncture is not a straightforward procedure and such an invasive investigation may cause further distress to someone who may be confused or agitated. There is also a risk of adverse events, such as infection, causing spinal haematoma, cerebrospinal fluid (CSF) leak or low pressure CSF headache.⁵⁵

✓ | Lumbar puncture should not be performed routinely on patients presenting with delirium.

4 Non-pharmacological risk reduction

4.1 Introduction

Delirium is often multifactorial. Prevention may merge with treatment when non-pharmacological practices are used. Risk reduction should therefore be considered throughout the patient's care. Many of the acute factors triggering delirium or lowering the threshold of risk are modifiable. Targeting these modifiable factors forms the basis of reducing the risk of delirium. Up to 50% of delirium in hospitalised patients arises after hospital admission.^{1,56} Categories of risk reduction include preventing physiological derangements such as dehydration and hypoxia, maintaining sleep, reducing psychological stress through communication and managing the environment, and correcting sensory impairments when possible. These non-pharmacological strategies have often been delivered in multicomponent packages, and trials of such packages form the majority of the evidence. Because of limited resources, targeting higher-risk patients (eg older people, or those with cognitive impairments) for specific delirium risk-reduction strategies is commonly advocated.^{57,58} To date, these strategies are considered distinct from the use of medication to reduce the risk of delirium (*see section 5*), and are advocated in pathways and guidelines based on expert opinion.⁵⁸⁻⁶⁰

Non-pharmacological practices should be tried before pharmacological interventions are considered.

4.2 Inpatient care

Studies in a variety of patients and settings (acute and perioperative) have found multicomponent interventions to be effective in reducing incidence of delirium.⁶¹⁻⁶⁴ Meta-analysis of seven studies found that compared to usual care there was a significant reduction in incidence of delirium with multicomponent interventions, with a relative risk (RR) of 0.73, 95% confidence interval (CI) 0.63 to 0.85.⁶² Pooled analysis in a Cochrane review also reported a reduction in incidence of delirium, (RR) 0.69, 95% CI 0.59 to 0.81 compared to usual care.⁶³ Interventions included in multicomponent care varied, but consisted of some of the following; physiotherapy, reorientation, early mobilisation, identification and treatment of underlying causes or postoperative complications, pain control, regulation of bowel and bladder function, hydration and nutrition, and oxygen delivery.⁶¹⁻⁶³ Such interventions are considered to be good fundamental care.⁶³ Comprehensive geriatric care, defined as a specialist geriatric orthopaedics team providing comprehensive medical assessment, management and initiation of rehabilitation, was also associated with lower incidence of delirium during the hospital stay and at one month.⁶⁵ Most of the studies identified in the systematic reviews were medium or low quality.

Use of a checklist may help to embed good fundamental care and reduce incidence of delirium in patients after an operation.^{62,63,66} Educating relatives or carers to deliver non-pharmacological multicomponent interventions, such as reorientation, can also reduce the incidence of delirium.⁹ A systematic review identified one randomised controlled trial (RCT) that reported an 8% reduction in the incidence of delirium in those patients cared for by relatives who were educated in delivering a reorientating intervention versus care as usual, RR 0.42, 95% CI 0.19 to 0.92.⁶¹ Advice on information to provide to family and carers, and suggestions of ways to help are in section 9.

Expert consensus recommends the use of multicomponent interventions as fundamental good practice.^{58,67,68} Pathways for good practice for risk reduction and management are in Annexes 3 and 4.

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- R** | **The following components should be considered as part of a package of care for patients at risk of developing delirium:**
- orientation and ensuring patients have their glasses and hearing aids
 - promoting sleep hygiene
 - early mobilisation
 - pain control
 - prevention, early identification and treatment of postoperative complications
 - maintaining optimal hydration and nutrition
 - regulation of bladder and bowel function
 - provision of supplementary oxygen, if appropriate.
- ✓ | Ward moves should be avoided wherever possible for patients at risk of delirium.
- ✓ | Prior to surgery patients and carers should be advised of the risk of developing delirium, to alleviate distress and help with management if it does occur.
- ✓ | Where possible, assistance should be sought from a patient’s relatives and carers to deliver care to reduce the risk of delirium developing.

4.2.1 Anaesthetic management

Using monitoring to avoid episodes of deep anaesthesia in patients aged over 60 under general anaesthesia for surgery lasting more than one hour can significantly reduce the risk of developing postoperative delirium. Two RCTs have shown a reduction in incidence of 16.7% in the monitoring group versus 21.4% in the control group and 15.6%, intervention, versus 24.1%, control.^{69,70} A substudy from a large RCT showed a risk reduction that did not reach statistical significance (18.8% in the intervention group and 28% in the control group), however, meta-analysis of the three trials and one further study of bispectral index-guided sedation reported an odds ratio (OR) of 0.56, 95% CI 0.42 to 0.73.⁷¹ None of the studies included patients with dementia, emergency anaesthesia or surgery for hip fracture in older patients.

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- R** | **Depth of anaesthesia should be monitored in all patients aged over 60 years under general anaesthesia for surgery expected to last for more than one hour, with the aim of avoiding excessively deep anaesthesia.**

4.3 Intensive care

A number of studies of non-pharmacological interventions in ICU settings were identified.⁷²⁻⁷⁷ Interventions included acupuncture, mirror therapies, and range of motion exercises. Most of the studies were underpowered. The largest trial addressed the use of dynamic light therapy to reduce the incidence and duration of delirium in patients in ICU.⁷⁷ It did not find the therapy to be more effective than placebo. Due to the heterogeneity of interventions and populations no single intervention for patients in ICU can be recommended.

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A systematic review of eight studies of a multicomponent care approach reported benefit in five of the studies.⁷⁸ The other three studies showed no difference between the treatment and control groups. However, the multicomponent care approach is considered as standard good practice (see section 4.2), and the effect of multimodal therapy may not be as evident as in other patient groups, given that critically ill patients exhibit ongoing risk factors for much of their critical care admission.

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The use of earplugs, either alone or along with eye shades and other noise-reducing strategies to promote sleep in ICUs, was associated with a reduction in the incidence of delirium, RR 0.59, 95% CI 0.44 to 0.78, in a systematic review of five low-quality studies (832 patients).⁷⁹ Suitability for earplugs should be considered on an individual basis as there may be a risk of exacerbating confusion in some patients. } 2⁺⁺

R | **The use of earplugs should be considered as part of a sleep-promotion strategy in intensive care.**

5 Pharmacological risk reduction

5.1 Medicines optimisation

Delirium has numerous causes that interact in any one person to cause delirium. Several classes of medication can increase the likelihood of delirium occurring, and the probability that a drug will precipitate delirium should be considered when prescribing, particularly in those at increased risk of delirium.^{61,80,81} Observational evidence suggests that exposure to certain medicines increases the odds of delirium developing and that medication review can decrease rates of delirium.⁸⁰⁻⁸³ The following is an approach to medication review and prescribing in people who are experiencing, or are at increased risk of, delirium, and covers three broad areas.

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- Any changes in medications, including over-the-counter and herbal medications. Commencement of new medications, changes in dosage of medication or abrupt withdrawal of medication could result in delirium.^{84,85}
- Changes in how the body handles and is affected by medication. The natural physiology of ageing can result in medication, which has been beneficial without side effects for years, now causing or contributing to delirium. The same can also be said for acute derangements in physiology seen with illness.⁸⁴
- Delirium risk should be considered when assessing the risks and benefits of commencing a new medication.^{81,84}

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It is impossible to cover all medication that may cause or contribute to delirium but some medication particularly associated with delirium merits discussion.

Benzodiazepines markedly increase the odds of delirium developing in a variety of settings (OR 3.0 95% CI 1.3 to 6.8) and should not be used unless in specific circumstances such as management of alcohol withdrawal or acute seizure management.⁸¹

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Opiates can also cause delirium but they remain a vital class of drug for treating pain. It is important to remember that pain in itself can precipitate delirium. A systematic review cited an OR of delirium associated with treatment with opioids of 2.5 (95% CI 1.2 to 5.2).⁸¹ However, the main opioid in the review, which carries the highest risk, is pethidine (OR 2.7, 95% CI 1.3 to 5.5), which is anticholinergic and is rarely used in the UK. More commonly used opioids such as morphine (OR of delirium 1.2, 95% CI 0.6 to 2.4) and fentanyl (OR of delirium 1.5, 95% CI 0.6 to 4.2) were not significantly associated with delirium.⁸¹ The opioid with the lowest odds of causing delirium was oxycodone but this still had a confidence interval that crossed 1 (OR 0.7, 95% CI 0.3 to 1.6).⁸¹

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Probably the most important factor when using opiate analgesia is titrating to the minimal effective dose to achieve pain control and minimise side effects. If opiates are used it is also important to be holistic and prescribe laxatives to prevent constipation which can contribute to delirium.

Optimising the dose of analgesic and sedative drugs in a critical care setting is advocated.⁸⁶ Daily sedative interruption or nurse-protocolised sedation to facilitate spontaneous breathing trials and daily mobilisation have been associated with improved outcomes, although not directly delirium.⁸⁶

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Although delirium is not specifically covered in the NHSScotland polypharmacy guideline, the guideline contains information on medication to avoid or reduce in older people, some of which is aimed at reducing falls by reducing medications that can cause delirium. Medications recommended to avoid, stop or reduce the dose if possible include tricyclic antidepressants, anticholinergic medications, benzodiazepines, antihistamines and tramadol. The guideline also contains practical information on how to safely reduce chronic medication with potential for withdrawal such as benzodiazepines.⁸⁷

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R | **All patients at risk of delirium should have a medication review conducted by an experienced healthcare professional.**

- ✓ | Areas with patients at high risk of delirium, such as trauma orthopaedic wards, should have protocols for commonly required medication (eg analgesia and anti-emesis) that contain choices for first-line treatments which minimise the risk of causing delirium.

5.2 Antipsychotics

Some, low-quality, studies suggest that prophylactic antipsychotic medication may be beneficial for the prevention of postoperative delirium in patients undergoing cardiac, general, elective joint replacement and hip fracture surgery.⁸⁸⁻⁹¹ One systematic review did not support its use.⁹² Results in this review may have been skewed by the inclusion of a controlled trial in which an imbalance in the age of participants could have been a confounding factor. A Cochrane review concluded that there was no evidence of benefit for the use of haloperidol, but olanzapine compared to placebo, reduced the incidence of delirium (RR 0.36, 95% CI 0.24 to 0.52).⁶³

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A systematic review of several small studies evaluated the use of haloperidol prophylaxis in ICU or surgical patients compared to placebo and found that haloperidol prophylaxis did not decrease the incidence of delirium overall or in subgroup analysis of the patient groups (ICU or surgery).⁹³

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A systematic review of six RCTs concluded that there appears to be a greater benefit from antipsychotic prophylaxis in patients at higher risk of delirium.⁸⁸ If delirium did occur, prophylaxis did not reduce the severity or duration, length of hospital stay or mortality.⁸⁸ Two systematic reviews cited one RCT which found that although prophylactic haloperidol did not reduce incidence of delirium it was associated with a reduction in delirium duration and severity.^{88,94}

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Two small RCTs concluded that daily doses of ≥ 5 mg haloperidol may reduce the incidence of delirium in surgical patients.⁹³

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Overall no optimal regime for perioperative antipsychotic use was determined from the studies.

A large RCT, designed primarily to investigate the effect of prophylactic haloperidol on survival of critically ill patients, also measured delirium incidence as a secondary outcome. No difference was found between the haloperidol and placebo groups: delirium incidence (mean difference 1.5%, 95% CI -3.6% to 6.7%).⁹⁵

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There is insufficient evidence to determine whether antipsychotic prophylaxis is effective in other hospital inpatients.^{92,94,96,97} One Dutch multicentre RCT (n=242) examined the efficacy of prophylactic oral haloperidol in patients ≥ 70 years of age at risk of delirium, acutely admitted to hospital for both medical and surgical emergencies. It concluded that haloperidol prophylaxis did not lower delirium incidence during the first seven days of admission in this patient group.⁹⁸

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Common side effects of antipsychotics include constipation, movement disorders, QTc prolongation, reduced seizure threshold, urinary retention and neuroleptic malignant syndrome.¹⁵ One of the secondary outcomes of the Dutch RCT was to examine haloperidol safety. No significant differences were found between oral haloperidol and placebo for changes to QTc interval.⁹⁸ Similarly, three other RCTs, in a systematic review, reported no difference in QTc prolongation or extrapyramidal side effects with haloperidol prophylaxis compared to placebo.⁹³ Otherwise, adverse effects were rarely noted, but this could be due to lack of reporting in the studies included in the systematic reviews.

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No antipsychotics are licensed for the prophylaxis of delirium. There is insufficient evidence of benefit to recommend the use of antipsychotic prophylaxis in patients at risk of developing delirium.

5.3 Dexmedetomidine

Dexmedetomidine has been utilised in a perioperative and critical care setting. A meta-analysis identified 14 trials of medium to low quality, incorporating 3,029 patients in ICU (general and postoperative).⁹⁹ Dexmedetomidine was compared to other therapies (propofol, midazolam or morphine) or placebo to assess reduction of the incidence of delirium, agitation and confusion. Overall, analysis was associated with a significant reduction in the incidence of delirium with dexmedetomidine versus controls, RR 0.68, 95% CI 0.49 to 0.96.⁹⁹ However, not all studies showed a statistically significant benefit, and the greatest effect was evident when midazolam was used as the comparator.

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An RCT of 90 patients undergoing non-invasive ventilation in ICU found dexmedetomidine to be superior to haloperidol or placebo (3/30 patients given dexmedetomidine developed delirium compared to 10/30 given haloperidol and 13/30 in the placebo group; $p=0.014$).¹⁰⁰ However, patients in both the haloperidol and particularly the placebo group received significantly larger amounts of supplementary sedatives and analgesics including midazolam.

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A two-centre RCT allocated 100 critically ill patients without a diagnosis of delirium to receive either a nocturnal dexmedetomidine infusion or placebo. Sedatives were halved during the drug infusion period and opiates were unchanged. Nocturnal dexmedetomidine was associated with a greater proportion of patients who remained delirium free during their ICU stay (80% *v* 54%); RR 0.44, 95% CI 0.23 to 0.82.¹⁰¹

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Results of a trial on the use of dexmedetomidine in patients who are mechanically ventilated in a general ICU setting (Early Goal Directed Sedation Compared with Standard Care in Mechanically Ventilated Patients in Intensive Care (SPICE III)) are awaited.

A systematic review and meta-analysis of 18 RCTs with 3,309 patients, assessed the efficacy of perioperative dexmedetomidine on delirium incidence in both adult cardiac and non-cardiac surgical patients.¹⁰² Findings indicated dexmedetomidine reduced postoperative delirium for the entire surgical population (OR 0.35; 95% CI 0.24 to 0.51). Subgroup analyses of the nine cardiac surgery studies and nine other surgical studies showed a benefit in both patient groups (OR 0.41; 95% CI 0.26 to 0.63) and (OR 0.33; CI 0.18 to 0.59) respectively. Studies were heterogeneous in their size, dose and timing of dexmedetomidine administration and in particular the control drug given. Propofol, midazolam and different opiates were used as comparators, in addition to placebo. Trials comparing dexmedetomidine directly with placebo were not analysed separately. The largest study included in the review was in a Chinese population, involving 700 patients given either dexmedetomidine or placebo postoperatively on arrival in ICU. Delirium was significantly lower in the group receiving dexmedetomidine (OR 0.35, 95% CI 0.22 to 0.54). However, patients who were mechanically ventilated were sedated with propofol or midazolam to achieve a set RASS. Patients in the placebo group received more supplemental sedatives and analgesics compared to the dexmedetomidine group, which may have increased their delirium risk.¹⁰²

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Two randomised placebo-controlled trials, one each in patients undergoing cardiac and non-cardiac surgery, showed no reduction in delirium when comparing dexmedetomidine with normal saline.^{103,104}

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Bradycardia and hypotension are known side effects of dexmedetomidine, secondary to its intrinsic effects as an alpha2-receptor agonist. Dexmedetomidine has been associated with an increased incidence of bradycardia in patients undergoing cardiac surgery (OR 1.89; 95% CI 1.11 to 3.2) but this did not appear to be an issue in other surgical groups.¹⁰² Neither was there consistent evidence linking hypotension to dexmedetomidine. Caution should be taken when considering the use of dexmedetomidine, particularly in patients with low cardiac output states and consideration given to either omitting or using a lower loading dose prior to starting a continuous infusion.¹⁰⁵

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There remains controversy over whether dexmedetomidine can reduce the incidence of delirium in both critically ill patients and those in the perioperative setting. Many of the trials which indicate a benefit have used other sedative agents, including benzodiazepines in the control group. It remains unclear if dexmedetomidine can inherently reduce delirium or merely reduce the need for delirogenic drugs. Since there are potential physiological concerns relating to the widespread adoption of dexmedetomidine for prophylaxis, in addition to cost implications, dexmedetomidine cannot be recommended for the prevention of delirium. Large randomised placebo-controlled trials and cost-effectiveness studies are warranted.

5.4 Other pharmacological therapies

One systematic review included four RCTs which reported the incidence of postoperative delirium when comparing ketamine to placebo. Overall, the incidence of postoperative delirium did not differ between the control and intervention groups. The quality of each RCT was low, so the review concluded that the effect of ketamine on postoperative delirium is unclear. The largest RCT reported an increase in postoperative hallucinations and nightmares with ketamine use.¹⁰⁶

Systematic reviews identified four RCTs on the use of melatonin to prevent delirium in medical and surgical settings.^{63,107,108} Results were inconclusive. One small RCT in 88 patients found a melatonin receptor agonist reduced the incidence (24.4% *v* 46.5%) and duration (0.78 *v* 1.4 days) of delirium in critically ill patients.¹⁰⁹

Results from two large RCT are awaited.

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6 Non-pharmacological treatment

Other guidelines, narrative reviews and expert opinion on the treatment of patients with established delirium focus mainly on treating the presumed causes of the delirium, and other aspects of care such as treating distress and agitation.^{1,58,60,110} Few trials have been conducted testing such approaches. There is insufficient high-quality evidence to determine the efficacy of formal packages of non-pharmacological interventions in reducing the severity or duration of delirium when it does occur.^{58,61} Meta-analyses did not find a significant difference in the reduction of duration of delirium with multicomponent care or comprehensive geriatric care, compared to usual care.^{62,65} One RCT did not find benefit from the use of cognitive-stimulating interventions in patients with delirium superimposed on dementia.¹¹¹

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Therefore, guidance on treatment of people with delirium relies on expert consensus, which advocates multicomponent interventions as fundamental good practice.^{58,67,68} In Scotland a comprehensive pathway, incorporating the Triggers, Investigate, Manage, Engage (TIME) bundle, which covers the first two hours of care, and the Scottish Delirium Association (SDA) delirium management pathway provide protocols for good care (see Annexes 3 and 4). NICE recommends treating the causes, effectively communicating with the patient, providing a suitable care environment, and specifically addressing distress.⁵⁸

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R Healthcare professionals should follow established pathways of good care to manage patients with delirium.

- **First consider acute, life-threatening causes of delirium, including low oxygen level, low blood pressure, low glucose level, and drug intoxication or withdrawal.**
- **Systematically identify and treat potential causes** (medications, acute illness, etc), **noting that multiple causes are common.**
- **Optimise physiology, management of concurrent conditions, environment** (reduce noise), **medications, and natural sleep, to promote brain recovery.**
- **Specifically detect, assess causes of, and treat agitation and/or distress, using non-pharmacological means only if possible** (see section 7 for pharmacological treatment).
- **Communicate the diagnosis to patients and carers, encourage involvement of carers, and provide ongoing engagement and support.**
- **Aim to prevent complications of delirium such as immobility, falls, pressure sores, dehydration, malnourishment, isolation.**
- **Monitor for recovery and consider specialist referral if not recovering.**
- **Consider follow up** (see section 8).

✓ Promote cognitive engagement, mobilisation, and other rehabilitation strategies.

Advice on information to provide to family and carers, and suggestions of ways to help are in section 9.

7 Pharmacological treatment

7.1 Antipsychotics

Studies of the efficacy of antipsychotics are heterogenous and inconclusive. Most are small and rated as low or very low quality.^{92,96,112,113} One meta-analysis concluded that antipsychotics should not be used in non-ICU settings for the treatment of patients with delirium, while another concluded that antipsychotics were superior to placebo or usual care in reducing delirium severity scale scores.^{92,112} A Cochrane review concluded that antipsychotics did not reduce delirium severity, resolve symptoms or alter mortality in the acute care setting.¹¹³ The Cochrane review also identified a large RCT of patients receiving palliative cancer care, which found that patients treated with either risperidone or haloperidol had worse delirium symptom scores than those receiving placebo.¹¹³

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Comparisons of haloperidol and other antipsychotics did not find any antipsychotic to be more effective than another.^{96,112,114} Two RCTs comparing the efficacy of haloperidol and quetiapine reported conflicting results.^{112,115}

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No serious side effects were reported in the studies of haloperidol and overall adverse effects were poorly or rarely reported.^{94,96} Haloperidol was associated with a higher incidence of extrapyramidal side effects and dystonias than second generation antipsychotics, although this may be due to the high dose of haloperidol used in the trials.^{112,114} The Cochrane review concluded that extrapyramidal symptoms were not more frequent with antipsychotics compared to non-antipsychotics and there was no difference between typical and atypical antipsychotics.⁹⁴ Haloperidol is contraindicated in combination with any drug that is associated with QTc prolongation.¹¹⁶ If it is used with other QT prolonging drugs, treatment is rendered unlicensed. Advise on prescribing unlicensed medicines can be found in section 1.3.2.

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If commenced, antipsychotics prescribed for delirium should be reviewed on a daily basis and stopped as soon as the clinical situation allows, typically within 1-2 days. In situations where it is deemed safer to continue antipsychotic therapy for delirium beyond discharge or transfer from hospital, a clear plan for early medication review and follow up in the community should be agreed.

Pooled subgroup analysis of two small trials of patients in ICU with delirium found use of antipsychotics to be marginally superior to placebo in response rate at the studies' endpoint (risk ratio 0.25, 95% CI 0.06 to 1.02). Second generation antipsychotics were superior to haloperidol in reducing delirium severity scores in patients in ICU (standardised mean difference (SMD) -0.52, 95% CI -0.85 to -0.19). There was no difference in discontinuation rates or adverse events.¹¹²

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A systematic review identified five studies, one of which reported that quetiapine reduced the duration of delirium (1 day *v* 4.5 days) compared to placebo in 36 patients.⁹⁷ None of the studies reported a reduction in length of stay, or mortality.

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Because the studies identified are underpowered, further, larger trials are needed before recommendations can be made on the use of antipsychotics for the treatment of patients in ICU with delirium.

7.2 Dexmedetomidine

A small RCT on the use of dexmedetomidine in patients with agitated delirium receiving mechanical ventilation in ICU reported secondary outcomes of a reduction in delirium (23.3 hours *v* 40 hours with placebo) and reduced the length of ICU stay.¹¹⁷

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7.3 Acetylcholinesterase inhibitors

One systematic review included six small RCTs, comparing either donepezil or rivastigmine to placebo in patients older than 60 years. Five of the trials were in surgical settings. Four of the seven studies found no benefit from acetylcholinesterase inhibitors and overall the studies were not sufficiently powered to detect a difference between the intervention medication and placebo. Four of the seven studies found acetylcholinesterase inhibitors to have similar tolerability to placebo.¹¹⁸ 1*

A systematic review identified one RCT (104 participants) which reported longer duration of delirium and longer length of hospital stay in patients with delirium in ICU given a combination of haloperidol and rivastigmine compared to those given haloperidol and placebo.¹¹⁸ There were three times as many deaths among patients receiving the haloperidol and rivastigmine combination.¹¹⁸ There is insufficient evidence to draw conclusions on the efficacy and safety of the use of acetylcholinesterase inhibitors for the treatment of patients with delirium. 1*

7.4 Benzodiazepines

In a systematic review only one small trial (n=30) was identified on the use of lorazepam in the treatment of patients with delirium. The trial, in patients with acquired immune deficiency syndrome (AIDS) in a hospital setting, found no benefit from lorazepam and treatment was stopped early due to intolerable side effects.¹¹⁴ 2*

7.5 Urgent pharmacological intervention

While the evidence for pharmacological treatment is insufficient to support a recommendation, expert opinion supports a role for medication in specific situations such as in patients in intractable distress, and where the safety of the patient and others is compromised (*see Annex 4*).

8 Follow up

Older patients who develop delirium may have undiagnosed underlying dementia or mild cognitive impairment.^{119,120} Delirium is also associated with an increased rate of cognitive decline after the episode of delirium.^{119,120} The majority of studies identified found that delirium is a risk factor for future cognitive decline.¹²¹⁻¹²⁴ Longer duration of delirium has been linked to worse global cognition at three and 12 months' follow up.¹²²

A systematic review of non-comparative prospective studies concluded that people may develop depression after experiencing delirium.¹²⁵ The length of time before people experience depression post-delirium in ICU varied between studies, with some reporting no association between delirium and depression at three months, but higher rates of depression and worse mental health status at 12 months, and others reporting depression at three, four, six and 12 months.^{125,126} Other studies did not find a significant association between delirium, post-traumatic stress disorder (PTSD), anxiety or depression.¹²⁷⁻¹²⁹ In these studies the patient groups were younger (mean ages 42, 61 and 62 compared to mean age >80 years in the majority of studies in the systematic review).^{125,127-129}

The studies addressed a variety of population groups, in acute and ICU settings, and used different measures for delirium, mental and cognitive impairment and depression.

R | **Healthcare professionals should be aware that older people may have pre-existing cognitive impairment which may have been undetected, or exacerbated in the context of delirium. Appropriate cognitive and functional assessment should be considered. Timing of this assessment must take into account persistent delirium.**

R | **In patients who have experienced delirium in ICU consideration should be given to follow up for psychological sequelae including cognitive impairment.**

- ✓ | Patient records should be coded to highlight a previous episode of delirium so that hospital staff are aware of the increased risk on readmission.
- ✓ | Ensure that delirium is noted in the discharge letter for the primary care team.
- ✓ | All patients who have had delirium should be reviewed by the primary care team.

9 Provision of information

This section reflects the issues likely to be of most concern to patients and their carers. These points are provided for use by health professionals when discussing delirium with patients and carers and in guiding the development of locally-produced information materials.

9.1 Checklist for provision of information

This section gives examples of the information patients/carers may find helpful at the key stages of the patient journey. The checklist was designed by members of the guideline development group based on their experience and their understanding of the evidence base. The checklist is neither exhaustive nor exclusive.

If a patient is at risk of delirium

Identify the family and/or main carer of the patient.

- Ensure that the patient's contact details are on file. If the patient lacks capacity, ascertain whether a family member or carer has Power of Attorney/Guardianship over welfare.

Explain to the patient and the family/carers about delirium:

- Delirium is common amongst hospitalised patients especially following an operation.
- Acute triggers of delirium include:
 - infection, dehydration, severe constipation, urinary retention, and pain
 - critical illness
 - surgery especially heart and hip operations
 - side effects of new medicines or medicines withdrawal.
- Those most at risk are:
 - older people
 - older people on multiple medicines
 - people with dementia, Parkinson's disease, stroke or pre-existing cognitive impairment
 - people who are hearing or visually impaired.

Ask family/carers to alert medical staff if they notice any change to their relative's normal behaviour.

Ask the patient and family/carers to complete a 'Getting to know me' form (*see section 9.3.2*), or similar, to help healthcare staff to take care of the person's specific needs.

Ask family/carers to help, if they feel able to do so, to reduce the risk of delirium developing by doing the following:

- ensure hearing aids, glasses and dentures are available at all times
- talk to and keep the patient informed in short, simple sentences
- check that the patient has understood you and be prepared to repeat if necessary
- keep a calendar and/or clock within view
- bring in some familiar objects from home to the hospital to keep next to the bed side
- if required, encourage the patient to eat and drink.

If a patient develops delirium

Explain to the patient and family/carers that delirium is a change in mental state that often starts suddenly but usually improves when the physical condition improves and the underlying cause gets better.

Discuss treatment options and possible side effects with the patient and/or carer.

Provide the family/carer with appropriate information leaflets.

It is important for carers and relatives to participate and work together with the clinical team in hospital or home to clear delirium and give the affected person the best chance of getting back to good health.

Explain that the person affected with delirium may show many different types of change.

The patient may:

- be less aware of their surroundings
- be unable to speak clearly or follow conversations
- have dreams which can sometimes be frightening and can carry on when they wake up
- hear voices or noises which may not be present (auditory hallucinations)
- see objects or people that are not present or in different context (visual hallucinations)
- get upset that other people are trying to harm them
- be agitated or restless, unable to sit still, and have an increased risk of having a fall
- be sleepy and slow to move and respond
- be reluctant to eat or drink
- have a temporary change in personality
- have all or some of the above and that could quickly change
- have worse symptoms in the evenings or overnight.

Suggest completing a diary so that if the person with delirium cannot remember what has happened the carer can fill in the blanks and help make sense of the experience once the person is starting to feel better.

Let the family/carer know how to help someone with delirium:

They can help by reassuring and reorienting the patient, eg:

- ensure hearing aids, glasses and dentures are available at all times
- have a gentle and friendly approach, smiling and providing reassurance
- talk and keep the patient informed in short, simple sentences
- check that the patient has understood you and be prepared to repeat if necessary
- familiarity helps, so try to make sure that someone the patient knows well is with them
- try not to agree with any incorrect ideas but disagree with tact and change the subject
- keep a calendar and/or clock within view and give reminders of the surroundings.
- bring in some familiar objects from home to the hospital to keep next to the bed side
- remind the patient to eat and drink and assist if required.

The key is to remain calm and help the affected person feel calm and in control.

At discharge following an acute episode of delirium

Liaise with the family/carers regarding discharge arrangements. Discuss with family/carers whether they need extra support. Some patients may still be recovering, not be entirely themselves or be less able than usual to carry out their daily activities.

Inform carers of their right to have a new or updated adult carer support plan.

Ensure that support is in place before the patient is discharged to their home.

If there are concerns about cognitive impairment in the following months, advise the patient/carers to see their general practitioner (GP).

9.2 Publications from SIGN

SIGN patient versions of guidelines are documents that 'translate' guideline recommendations and their rationales, originally developed for healthcare professionals, into a form that is more easily understood and used by patients and the public. They are intended to:

- help patients and carers understand what the latest evidence supports around diagnosis, treatment and self care
- empower patients to participate fully in decisions around management of their condition in discussion with healthcare professionals
- highlight for patients where there are areas of uncertainty.

A copy of the patient version of this guideline is available from www.sign.ac.uk/assets/patient-publications

9.3 Sources of further information

9.3.1 Websites

Scottish Delirium Association

www.scottishdeliriumassociation.com

The Scottish Delirium Association consists of healthcare professionals working to share best practice in delirium by providing education, promoting research and raising awareness of the condition.

Critical Care Recovery

www.criticalcarerecovery.com

This is a website developed by the NHS to offer information, advice and support on recovery after intensive care.

Minded for Families

www.mindedforfamilies.org.uk

This is a website with videos and information to raise awareness of what delirium is and help older people and those around them with how to deal with it.

9.3.2 Information leaflets

THINK Delirium

[www.knowledge.scot.nhs.uk/media/CLT/ResourceUploads/4052742/20141007%20Delirium%20leaflet%20\(web\).pdf](http://www.knowledge.scot.nhs.uk/media/CLT/ResourceUploads/4052742/20141007%20Delirium%20leaflet%20(web).pdf)

This is patient information leaflet developed by Healthcare Improvement Scotland in collaboration with NHS boards.

Alzheimers Scotland

www.alzheimers.org.uk/info/20029/daily_living/370/delirium

This is a patient information leaflet on the effects of delirium, treatment and what happens afterwards. It also includes patient experiences.

www.alzscot.org/information_and_resources/information_sheet/3472_getting_to_know_me

The 'Getting to Know Me' form was designed for patients with dementia. It is completed with information about the person's likes and dislikes and needs and is held with the patient notes to allow staff to provide the best care possible.

Dementia UK

www.dementiauk.org/delirium

This web-based leaflet describes the symptoms of delirium and gives suggestions of what carers can do to help a person with delirium.

Marie Curie

www.mariecurie.org.uk/professionals/palliative-care-knowledge-zone/symptom-control/delirium

This web-based leaflet focuses on delirium occurring towards the end of life. It describes causes, and offers advice on what carers can do and when to seek expert help.

NHS website

www.nhs.uk/conditions/confusion

This leaflet provides advice on when to contact a GP or phone an ambulance if someone is showing signs of delirium.

Royal College of Psychiatrists

www.rcpsych.ac.uk/mental-health/problems-disorders/delirium

This leaflet provides information on signs and symptoms, treatment and what may happen after a person has had delirium.

9.3.3 Telephone helplines**Alzheimers Scotland**

0808 808 3000

helpline@alzscot.org

This helpline provides information and emotional support to people with dementia, their families, friends and professionals.

Dementia UK

0800 888 6678

This helpline is available to support to carers or anyone with dementia.

10 Implementing the guideline

This section provides advice on the resource implications associated with implementing the key clinical recommendations, and advice on audit as a tool to aid implementation.

10.1 Implementation strategy

Implementation of national clinical guidelines is the responsibility of each NHS board and care provider and is an essential part of clinical governance. Mechanisms should be in place to educate staff and review care provided against the guideline recommendations. The reasons for any differences should be assessed and addressed where appropriate. Local arrangements should then be made to implement the national guideline in individual hospitals, units and practices.

Implementation of this guideline will be encouraged and supported by SIGN.

10.2 Resource implications of key recommendations

No recommendations are considered likely to reach the £5 million threshold which warrants resource impact analysis.

10.3 Auditing current practice

A first step in implementing a clinical practice guideline is to gain an understanding of current clinical practice. Audit tools designed around guideline recommendations can assist in this process. Audit tools should be comprehensive but not time consuming to use. Successful implementation and audit of guideline recommendations requires good communication between staff and multidisciplinary team working.

To assist with the implementation of this guideline the guideline development group has identified the following as key points to audit:

The percentage of:

- at-risk patients assessed using the 4AT tool
- patients in a critical care environment assessed using CAM-ICU or ICDSC (taking account of appropriate sedation level)
- patients with confirmed delirium who are recorded and coded with delirium, and the diagnosis is included in discharge summaries to the GP
- patients who have medication review and medications stopped as a result
- patients followed up by the primary care team after experiencing delirium
- operations compliant with depth of anaesthesia monitoring.

The quality of care for older patients with delirium can be measured against the Healthcare Improvement Scotland Care of Older People in Hospital standards.¹³⁰

10.4 Health technology assessment advice for NHSScotland

In May 2012 the SMC accepted dexmedetomidine hydrochloride for sedation in adult patients in intensive care unit requiring a sedation level not deeper than arousal in response to verbal stimulation (corresponding to RASS 0 to -3).

11 The evidence base

11.1 Systematic literature review

The evidence base for this guideline was synthesised in accordance with SIGN methodology. A systematic review of the literature was carried out using an explicit search strategy devised by a SIGN Evidence and Information Scientist. Databases searched include Medline, Embase, Cinahl, PsycINFO and the Cochrane Library. The year range covered was 2012–2017. Internet searches were carried out on various websites including the US National Guidelines Clearinghouse. The main searches were supplemented by material identified by individual members of the development group. Each of the selected papers was evaluated by two Evidence and Information Scientists using standard SIGN methodological checklists before conclusions were considered as evidence by the guideline development group.

The search strategies are available on the SIGN website, www.sign.ac.uk

11.1.1 Literature search for patient and carer issues or concerns

At the start of the guideline development process, a SIGN Evidence and Information Scientist conducted a literature search for qualitative and quantitative studies that addressed patient and carer issues of relevance to patients with delirium and their carers. Databases searched include Medline, Embase, Cinahl and PsycINFO, and the results were summarised by the SIGN Patient and Public Involvement Advisor and presented to the guideline development group.

11.1.2 Literature search for cost-effectiveness evidence

The guideline development group identified key questions with potential cost-effectiveness implications, based on the following criteria, where it was judged particularly important to gain an understanding of the additional costs and benefits of different treatment strategies:

- treatments which may have a significant resource impact
- opportunities for significant disinvestment or resource release
- the potential need for significant service redesign
- cost-effectiveness evidence could aid implementation of a recommendation.

A systematic literature search for economic evidence for these questions was carried out by a SIGN Evidence and Information Scientist covering the years 2012–2017. Databases searched include Medline, Embase and NHS Economic Evaluation Database (NHS EED). Each of the selected papers was evaluated by a Health Economist, and considered for clinical relevance by guideline group members.

Interventions are considered to be cost effective if they fall below the commonly-accepted UK threshold of £20,000 per Quality-Adjusted Life Year (QALY).

11.2 Recommendations for research

The guideline development group was not able to identify sufficient evidence to answer all of the key questions asked in this guideline (*see Annex 1*). The following areas for further research have been identified.

- Research into detection and management of people with delirium in primary care, community and long-term care settings.
- Validation of tools for routine monitoring of patients with delirium with clarification of the frequency of using these tools and their impact on outcomes and cost effectiveness.
- Studies of the practicalities and diagnostic yield of performing EEG in adults presenting with delirium.
- RCTs on the efficacy of depth of anaesthesia monitoring in reducing postoperative delirium in patients with dementia undergoing surgery and patients undergoing emergency surgery or trauma orthopaedic surgery.
- Trials of multicomponent interventions for the treatment of patients with delirium in general hospital settings.
- Large multicentre trials detailing a package of non-pharmacological interventions in the ICU with evidence of implementation.
- RCTs on the efficacy and safety of antipsychotics in reducing the risk of delirium in patients in ICU or other hospital settings.
- RCTs on the efficacy and safety of haloperidol in the reduction of the severity and duration of delirium in non-ICU settings.
- RCTs on the efficacy and safety of antipsychotics, benzodiazepines or dexmedetomidine in the reduction of the severity and duration of delirium in patients in ICU.
- Studies on the impact of follow-up clinics and community mental health support for people who have experienced delirium, in improving first-year mortality.

11.3 Review and updating

This guideline was issued in 2019 and will be considered for review in three years. The review history, and any updates to the guideline in the interim period, will be noted in the review report, which is available in the supporting material section for this guideline on the SIGN website: www.sign.ac.uk

Comments on new evidence that would update this guideline are welcome and should be sent to the SIGN Executive, Gyle Square, 1 South Gyle Crescent, Edinburgh, EH12 9EB (email: sign@sign.ac.uk).

12 Development of the guideline

12.1 Introduction

SIGN is a collaborative network of clinicians, other healthcare professionals and patient organisations and is part of Healthcare Improvement Scotland. SIGN guidelines are developed by multidisciplinary groups of practising healthcare professionals using a standard methodology based on a systematic review of the evidence. Further details about SIGN and the guideline development methodology are contained in 'SIGN 50: A Guideline Developer's Handbook', available at www.sign.ac.uk

This guideline was developed according to the 2015 edition of SIGN 50.

12.2 The Guideline Development Group

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Professor Alasdair MacLulich (Co-Chair)	Professor of Geriatric Medicine, University of Edinburgh, Honorary Consultant in Geriatric Medicine, Royal Infirmary of Edinburgh
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Dr Michael Götz	Consultant Psychiatrist, Forth Valley Royal Hospital, Larbert
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Mr Brian O'Toole	Health Economist, Healthcare Improvement Scotland
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Dr Roy Soiza	Consultant Physician, Aberdeen Royal Infirmary
Ms Christine Steel	AHP Consultant (Dementia), West Glasgow Ambulatory Care Hospital
Ms Ailsa Stein	Programme Manager, SIGN
Ms Alyson Warren	Lead Pharmacist, Care of the Elderly, Raigmore Hospital, Inverness
Dr Elizabeth Wilson	Consultant in Critical Care Medicine and Anaesthesia, Royal Infirmary of Edinburgh
Dr Maria Wybrew	General Practitioner, Thurso and Halkirk Medical Practice

The membership of the guideline development group was confirmed following consultation with the member organisations of SIGN. All members of the guideline development group made declarations of interest. A register of interests is available in the supporting material section for this guideline at www.sign.ac.uk

Guideline development and literature review expertise, support and facilitation were provided by SIGN Executive and Healthcare Improvement Scotland staff. All members of the SIGN Executive make yearly declarations of interest. A register of interests is available on the contacts page of the SIGN website www.sign.ac.uk

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Aimie Little	Administration Officer, SIGN Executive
Domenico Romano	Publications Designer, SIGN Executive
Gaynor Rattray	Guideline Co-ordinator, SIGN Executive
Dr Carolyn Sleith	Evidence and Information Scientist, Healthcare Improvement Scotland

12.3 Acknowledgements

SIGN is grateful to the following former members of the guideline development group and others who have contributed to the development of the guideline.

Ms Karen Martin	Mental Health Development Co-ordinator, Carers Trust, Glasgow
Mr James McKillop	Patient representative, Glasgow
Ms Rachael Wybrew	Medical student, Birmingham

12.4 Consultation and peer review

12.4.1 National open meeting

A national open meeting is the main consultative phase of SIGN guideline development, at which the guideline development group presents its draft recommendations for the first time. The national open meeting for this guideline was held on 21 June 2018 and was attended by 123 representatives of all the key specialties relevant to the guideline. The draft guideline was also available on the SIGN website for a limited period at this stage to allow those unable to attend the meeting to contribute to the development of the guideline.

12.4.2 Specialist review

This guideline was reviewed in draft form by the following independent expert referees, who were asked to comment primarily on the comprehensiveness and accuracy of interpretation of the evidence base supporting the recommendations in the guideline. The guideline group addresses every comment made by an external reviewer, and must justify any disagreement with the reviewers' comments. A report of the peer review comments and responses is available in the supporting material section for this guideline on the SIGN website. All expert referees made declarations of interest and further details of these are available on request from the SIGN Executive.

SIGN is very grateful to all of these experts for their contribution to the guideline.

Dr Nikhil Agrawal	General Practitioner, Southside Road Surgery, Inverness
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Ms Helen Skinner	Alzheimer Scotland Dementia Nurse Consultant, NHS Fife

12.4.3 SIGN editorial group

As a final quality control check, the guideline is reviewed by an editorial group comprising the relevant specialty representatives on SIGN Council to ensure that the specialist reviewers' comments have been addressed adequately and that any risk of bias in the guideline development process as a whole has been minimised. The editorial group for this guideline was as follows. All members of SIGN Council make yearly declarations of interest. A register of interests is available on the SIGN Council Membership page of the SIGN website www.sign.ac.uk

Dr Jenny Bennison	Royal College of General Practitioners
Dr Roberta James	SIGN Programme Lead; Co-Editor
Professor John Kinsella	Chair of SIGN; Co-Editor
Dr Jane Morris	Royal College of Psychiatrists
Ms Jacqueline Thompson	Royal College of Nursing

Abbreviations

4AT	4 As Test (Arousal, Attention, Abbreviated Mental Test 4, Acute change Test)
AIDS	acquired immune deficiency syndrome
AMT	Abbreviated Mental Test
CAM	Confusion Assessment Method
CI	confidence interval
CRP	C-reactive protein
CSF	cerebrospinal fluid
CT	computed tomography
CXR	chest X-ray
DOS	Delirium Observation Screening Scale
DRS-98-R	Delirium Rating Scale
DSD	delirium superimposed on dementia
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, fifth edition
ECG	electrocardiogram
EEG	electroencephalogram
FBC	full blood count
GMC	General Medical Council
GP	general practitioner
ICD-10	International Classification of Diseases, version 10
ICU	intensive care unit
ICDSC	Intensive Care Delirium Screening Checklist
LFT	liver function test
MA	marketing authorisation
MMSE	Mini Mental State Examination
mRASS	Modified Richmond Agitation-Sedation Scale
NCSE	non-convulsive status epilepticus
NICE	National Institute for Health and Care Excellence
Nu-DESC	Nursing Delirium Screening Scale
OR	odds ratio
PCR	polymerase chain reaction
PTSD	post-traumatic stress disorder

QALY	quality-adjusted life year
RADAR	Recognising Acute Delirium As part of your Routine
RASS	Richmond Agitation – Sedation Scale
RCT	randomised controlled trial
RR	relative risk
SDA	Scottish Delirium Association
SIGN	Scottish Intercollegiate Guidelines Network
SMC	Scottish Medicines Consortium
SMD	standardised mean difference
SPICE III	early goal directed sedation compared with standard care in mechanically ventilated patients in intensive care
SQID	Single Question to Identify Delirium
TCD	transcranial doppler
TIME	Triggers, Investigate, Manage, Engage
US	Ultrasound
UTI	urinary tract infection

Annex 1

Key questions used to develop the guideline

This guideline is based on a series of structured key questions that define the target population, the intervention, diagnostic test, or exposure under investigation, the comparison(s) used and the outcomes used to measure efficacy, effectiveness, or risk. These questions form the basis of the systematic literature search.

Section(s)	Key question
3.1	<p>1. What tool(s) should be used to detect delirium and when?</p> <p>Population: Adults at risk of delirium</p> <p>Assessment tools:</p> <ul style="list-style-type: none"> a. 4 As Test (Arousal, Attention, Abbreviated Mental Test 4, Acute change Test) (4AT) b. Confusion Assessment Method Instrument (CAM) c. 3D Confusion Assessment Method Instrument (3D-CAM) d. Delirium Observation Screening Scale (DOS) e. Single Question to Identify Delirium (SQID) f. Memorial Delirium Assessment Scale (MDAS) g. Recognizing Acute Delirium As part of your Routine (RADAR) h. Delirium Rating Scale - 98 - Revised (DRS-98-R) i. Intensive Care Delirium Screening Checklist (ICD-SC) j. CAM for the intensive care unit (CAM-ICU) k. Richmond agitation sedation score (RASS); Modified RASS l. Family Confusion Assessment Method Instrument (FAM-CAM) m. Brief Confusion Assessment Method Instrument (B-CAM) n. Nursing Delirium Screening Scale (Nu-DESC) o. Organic Brain Syndrome scale (OBS) p. Mini Mental State Examination <p>Comparison: Diagnostic and Statistical Manual (DSM-5) or International Classification of Diseases (ICD-10) defined diagnosis; between tools</p> <p>Outcomes: Sensitivity, specificity, evidence of adherence in clinical practical</p>
3.2, 3.3	<p>2. What tool(s) should be used for monitoring purposes and when should they be used?</p> <p>Population: Adults at risk of delirium</p> <p>Assessment tools:</p> <ul style="list-style-type: none"> a. 4 As Test (Arousal, Attention, Abbreviated Mental Test 4, Acute change Test) (4AT) b. Confusion Assessment Method Instrument (CAM) c. 3D Confusion Assessment Method Instrument (3D-CAM) d. Delirium Observation Screening Scale (DOS) e. Single Question to Identify Delirium (SQID) f. Memorial Delirium Assessment Scale (MDAS) g. Recognizing Acute Delirium As part of your Routine (RADAR)

	<ul style="list-style-type: none"> h. Delirium Rating Scale – 98 – Revised (DRS-98-R) i. Intensive Care Delirium Screening Checklist (ICDSC) j. Confusion Assessment Method Instrument for the intensive care unit (CAM-ICU) k. Family Confusion Assessment Method Instrument (FAM-CAM) l. Confusion Assessment Method Instrument (B-CAM) m. Nursing Delirium Screening Scale (Nu-DESC) n. Organic Brain Syndrome (OBS) scale <p>Comparison: Diagnostic and Statistical Manual (DSM-5) or International Classification of Diseases (ICD-10) defined diagnosis; between tools</p> <p>Outcomes: Sensitivity, specificity, evidence of adherence in clinical practical</p>
3.4	<p>3. What (other) investigations are useful when assessing a patient for delirium?</p> <p>Population: Adults with suspected delirium</p> <p>Intervention:</p> <ul style="list-style-type: none"> a. imaging (CT or MRI scans) b. lumbar puncture c. electroencephalogram (EEG) d. testing for antibodies for autoimmune encephalitis e. toxicology screening <p>Comparison: Usual care</p> <p>Outcomes: Sensitivity, specificity, cost effectiveness</p>
4, 5	<p>4. What risk reduction strategies for patients at risk of delirium are effective?</p> <p>Population: Patients at risk of developing delirium</p> <p>Interventions:</p> <p>Multicomponent interventions – non-pharmacological and pharmacological</p> <p>Non-pharmacological:</p> <ul style="list-style-type: none"> a. proactive screening of delirium and pre-existing cognitive impairment including dementia b. hydration c. catheterisation avoidance d. sensory impairment e. constipation f. sleep hygiene and promotion g. falls prevention and mobility h. providing means of communication i. impact of ward moves (incl 'boarding') j. environmental factors <p>Pharmacological:</p> <ul style="list-style-type: none"> a. medication reconciliation b. pain relief c. antipsychotics and benzodiazepines (medical and surgical patients) d. sedation for night-time sleep <p>Comparison: usual care</p> <p>Outcomes: Incidence of delirium (hospital acquired), prevalence of delirium (community acquired), duration of delirium, severity of delirium</p>

6	<p>5. What are the most effective non-pharmacological strategies for managing patients with delirium?</p> <p>Population: people with delirium</p> <p>Interventions:</p> <p>Multicomponent non-pharmacological interventions</p> <p>(Staff) behavioural adaptations:</p> <ul style="list-style-type: none"> • calm non-confrontational manner • reassurance • reorientation • distraction/de-escalation techniques • one-to-one nursing • cognitive stimulation <p>Environmental adaptations:</p> <ul style="list-style-type: none"> • single room • well-lit area • clear signs re: day, time, season, place • familiar objects • family input • minimise bed moves • activities and occupational therapy • address sensory impairment • sleep promotion • facilitate mobility <p>Address specific causes of stress:</p> <ul style="list-style-type: none"> • pain • hunger • feeling too hot/too cold • thirst/dry mouth • urinary retention • specific fears • not understanding what is happening • hallucinations, delusions, aggression, agitation, and wandering/searching <p>Comparison: Usual care, pharmacological therapies</p> <p>Outcomes: Mortality, complete response, duration of delirium, severity of delirium, distress in delirium, length of hospital stay, loss of independent living/new institutionalisation, reduction in depression and anxiety, reduced dementia risk, worsening of dementia, reduction in long-term effects, reduction in falls, cost effectiveness</p>
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7	<p>6. What are the most effective pharmacological strategies for managing patients with delirium?</p> <p>Population: Patients with delirium Consider hyperactive versus hypoactive delirium. Consider subpopulations:</p> <ol style="list-style-type: none"> 1. Parkinson's disease 2. delirium superimposed on dementia 3. patients already taking long-term medication <p>Interventions:</p> <ol style="list-style-type: none"> a. antipsychotics b. benzodiazepines c. acetylcholinesterase inhibitors d. melatonin e. antidepressants f. dexmedetomidine g. clonidine h. propranolol i. withdrawal of medicines which may be causing the delirium <p>Comparison: Usual care, between therapies</p> <p>Outcomes: Mortality, complete response, duration of delirium, severity of delirium, length of hospital stay, loss of independent living/new institutionalisation, increased dementia risk, worsening of dementia, adverse events, reduction in long-term effects, cost effectiveness</p>
8	<p>7. What follow-up care should patients receive after experiencing delirium?</p> <p>Population: patients who have had delirium</p> <p>Interventions:</p> <p>Screening for:</p> <ol style="list-style-type: none"> a. dementia b. functional psychiatry disorders – post-traumatic stress disorder, depression <p>Comparison: usual care</p> <p>Outcomes: incidence of dementia after delirium, incidence of psychiatric disorders</p>

Annex 2

Investigations for underlying causes of delirium

The majority of people with delirium are older adults, often with a vulnerability to delirium due to underlying neurological disease (eg dementia, cerebrovascular disease, Parkinson's Disease). In each there is commonly more than one precipitating factor. Identifying these factors and addressing those that are modifiable underpin the treatment of a person with delirium.

A good clinical history taking into account premorbid illness, cognition and level of function gives key information. However, the person at risk of delirium may not be able to provide reliable information themselves due to confusion or diminished attentiveness. A collateral history from the person's family or carers should be obtained to confirm and supplement information provided by the person. This collateral history should be sought at the earliest opportunity. Relatives will often accompany the unwell person when initially assessed in hospital or at home. Some additional time obtaining this information at an early stage can assist rapid identification and treatment of precipitants.

A full clinical examination should be undertaken including neurological examination to identify focal signs and musculoskeletal examination to look for evidence of injury. Confusion and agitation resulting in poor co-operation or understanding of instructions may make examination difficult.

Severe illness should be identified and rapidly treated as an urgent priority (*see Annex 3*). This should include assessment of basic observations, blood oxygen saturations, and blood glucose with near-patient testing to exclude hypoglycaemia. Intoxication due to medication should be considered in every case.

The information obtained from history and investigation will guide further investigation. Some investigations would be considered general and applicable to most patients, while others are targeted to specific clues from history and examination. Investigations will also depend on the setting, whether the person is in hospital or at home.

These tests are commonly done but this list is not entirely comprehensive.

Blood tests:

- Renal function (urea and electrolytes) – to identify dehydration, acute kidney injury, chronic kidney disease, hyponatraemia.
- Full blood count (FBC) – to identify anaemia, macrocytosis, elevated white cell count
- C-reactive protein (CRP) – to identify inflammation/infection
- Liver function tests (LFT) – can identify liver dysfunction which could identify biliary infection, malignant disease, encephalopathy
- Calcium – hypercalcaemia can cause confusion, and requires further investigation
- Blood cultures – where there is evidence of infection (eg fever or sepsis)
- Thyroid function – thyroid dysfunction can cause confusion
- Vitamin B₁₂ and folate – consider if there are concerns about nutrition or macrocytosis on full blood count.

Electrocardiogram (ECG)

- this may identify clinically silent myocardial ischaemia or arrhythmia which may be significant (such as atrial fibrillation).

Radiological imaging

- Chest X-ray (CXR) – should be done if there are symptoms or signs of chest pathology such as infection. It should be remembered that clinical examination may not reveal all pathology, such as a tumour, and should be considered.
- Musculoskeletal X-rays – target where there is evidence of injury or suspicion of fracture.
- Other imaging should be guided by history, examination and initial investigations.

Other tests

- Identify hypoxia using pulse oximetry
- Urine dipstick and culture – a negative urine dipstick can be useful, in that urinary tract infection (UTI) would be less likely, but a positive dipstick does not necessarily mean infection. Asymptomatic bacteruria can also exist in the elderly and delirium may mean that the person is unable to give a history of symptoms of UTI. This may cloud the situation and treatment of suspected urinary tract infection should be based on clinical grounds and probability.
- Bedside ultrasound (US) bladder scan – to identify urinary retention
- Pain assessment tools.

This is not a comprehensive list of tests which could be done and investigation should be targeted from information obtained initially and built on as the clinical situation evolves. Section 3 recommends investigations which are evidence based.

Where there is consideration of central nervous system pathology as a cause of confusion or delirium, targeted investigations may be appropriate including brain imaging, lumbar puncture, EEG, auto-antibody testing (such as for autoimmune encephalitis – antivoltage-gated potassium channel antibodies, anti-NMDA antibodies).

Annex 3

TIME bundle delirium management protocol⁶⁸

Name: _____ Date of birth: _____ CHI number: _____	Date: / / Zero time: :
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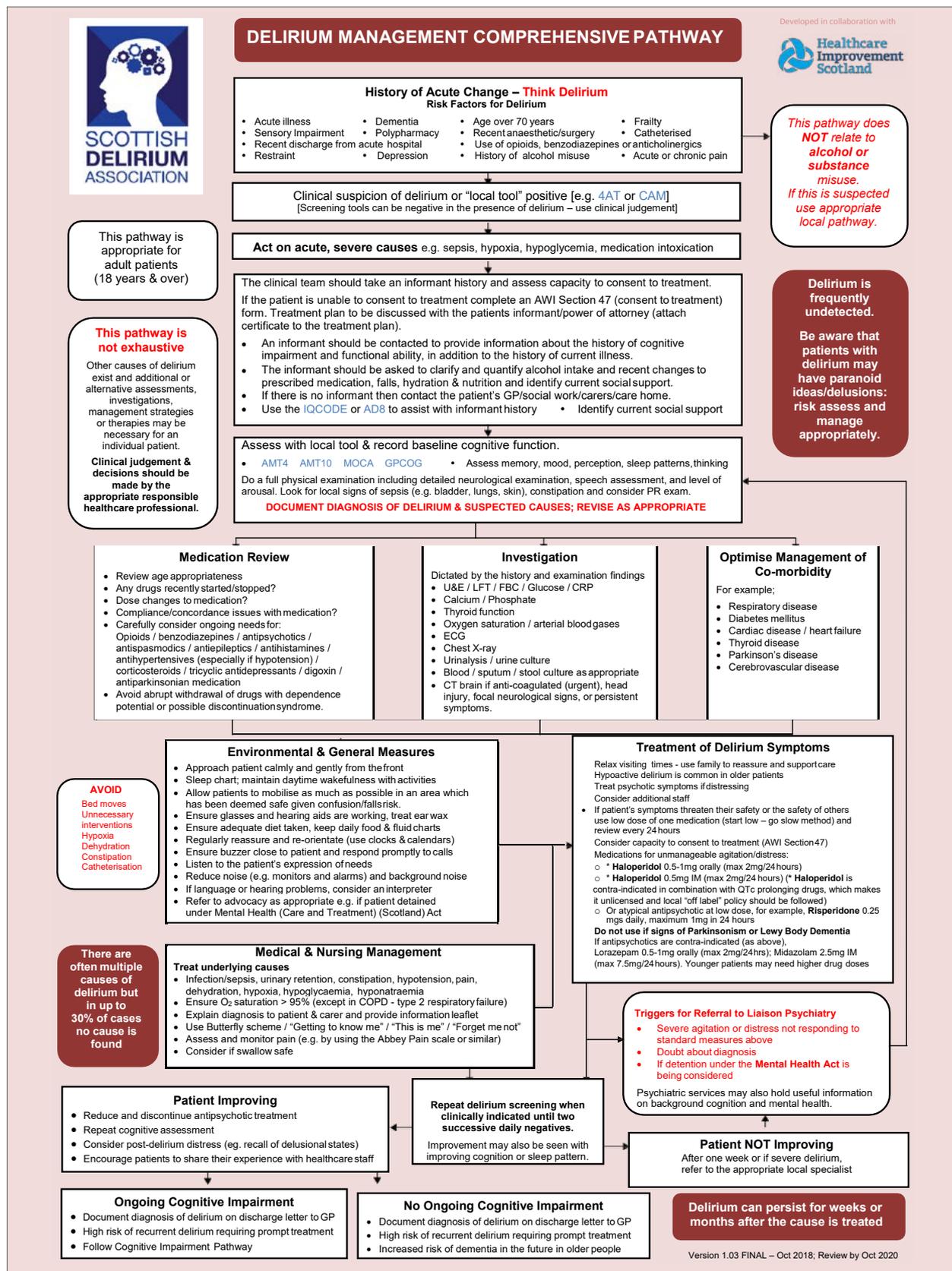
Practitioner name: _____ Practitioner signature: _____

Designation: _____

Initiate TIME within 2 hours (initial and write time of completion)	Assessed/ sent	Results seen	Abnormality found
Think exclude and treat possible triggers			
T NEWS (think sepsis six)			
Blood glucose			
Medication history (identify new medications/change of dose/medication recently stopped)			
Pain review (Abbey Pain Scale)			
Assess for urinary retention			
Assess for constipation			
Investigate and intervene to correct underlying causes			
Assess Hydration and start fluid balance chart			
Bloods (FBC, U&E, Ca, LFTs, CRP, Mg, Glucose)			
I Look for symptoms/signs of infection (skin, chest, urine, CNS) and perform appropriate cultures/imaging depending on clinical assessment (see sepsis six)			
ECG (ACS)			
Management Plan			Completed
M Initiate treatment of ALL underlying causes found above			
Engage and Explore (complete within 2 hours or if family/carer not present within 24 hours)			
E Engage with patient/family/carer – explore if this is usual behaviour. Ask: How would you like to be involved?			
Explain diagnosis of delirium to patient and family/carers (use delirium leaflet)			
Document diagnosis of delirium			

Annex 4

Scottish Delirium Association delirium management pathway⁶⁸



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