Paediatric Care – Core Measurement Plan

Scottish Patient Safety Programme

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The Scottish Patient Safety Programme (SPSP) is a unique national initiative that aims to improve the safety and reliability of health and social care and reduce harm, whenever care is delivered.

As part of Healthcare Improvement Scotland's ihub, SPSP is a coordinated campaign of activity to increase awareness of and support the provision of safe, high quality care, whatever the setting.

The Improvement Hub (ihub) is part of Healthcare Improvement Scotland

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SPSP-MCQIC

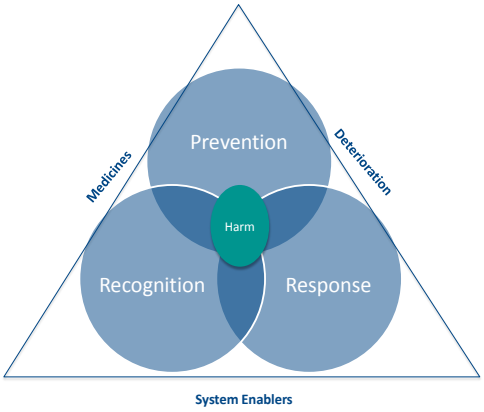
The Maternity and Children Quality Improvement Collaborative (MCQIC) aims to improve outcomes and reduce inequalities in outcomes by providing a safe, high quality care experience for all women, babies and families across maternity, neonatal and paediatric care settings in Scotland. MCQIC is part of the Scottish Patient Safety Programme (SPSP). Since the launch in 2013, the programme has demonstrated broad engagement with boards and some excellent pieces of work which show considerable promise in making Paediatric Services in Scotland safer.

With the extension of funding until 2019, the programme will now look to:

- Consolidate and support existing good practice around improvement and harm reduction.
- Continue to promote and support the use of data for improvement.
- Focus on a number of core measures supported by partnership agreements.

The MCQIC Paediatric Care programme will continue to use a data collection strategy that will allow you to identify solutions and track the impact of changes over time. The resulting data should give you confidence that you are identifying and impacting a large percentage of the harm events occurring in your board, without requiring that you spend all of your time or resources collecting data. With this in mind we are encouraging all areas to share the data with the teams involved in generating it for learning and development.

The SPSP ambition is to ensure "people using health and social care services are safe from harm in line with Scottish Government's National Health and Wellbeing Outcome 7." Prevention of harm is central to the ambition. Key to this is improving outcomes for people by preventing, recognising and responding to deterioration in any care setting. The SPSP ambition has three core themes. These themes are drivers within the MCQIC programme.



Medicines

Support of safer use of medicines across the health and social care settings in Scotland.

Deterioration

Improve outcomes for people by preventing, recognising or responding to deterioration in any care setting.

System Enablers

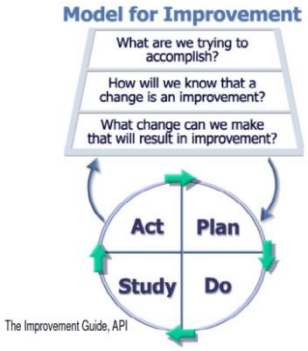
Involving people in safety involves them to make informed decisions of their safety.

The change model used by the Scottish Patient Safety Programme is the Model for Improvement. This section includes guidance in the application of this as well as references to the textbooks used to support this work. Each paediatric unit has been provided with a copy of *The Improvement Guide* which is referenced.

Guidance on Testing, Implementing and Spreading

The following is some guidance on the differences between testing, implementing and spreading.

The Model for Improvement



The three questions:
1. What are we trying to accomplish?
2. How will we know that a change is an improvement?
3. What change can we make that will result in improvement?

How?
Plan Do Study Act (PDSA) cycles

Testing (The Improvement Guide, Chapter 7, p 139)

Tests should be designed so that as little time, money and risk as possible are invested while at the same time enough is learned to move towards full scale implementation of the change.

There are 3 main principles to testing:

1. If possible keep your tests on a small scale initially and increase the scale of the test on the basis of learning.
2. As the scale of the test is expanded, include differing conditions in your test (e.g. a test at 9 am on a Monday morning will differ from a test run at 2am on a Saturday night).
3. Plan the test, including the collection of data.

Small scale does not mean small change but refers to the initial extent of the test.

The concept of 'degree of belief' is used to describe one's conviction that the change will lead to an improvement in the future. The "Degree of belief" concept is related to the amount of confidence that the "team" have that the test will be successful, increased confidence in the concept of testing will consequently increase the teams confidence in the methodology.

Low "Degree of belief" within the testing team and the wider observing team can act as a barrier to progressing change – keeping the tests small will help to increase confidence in testing and the methodology.

Testing involves the team conducting a sequence of PDSA test cycles, these can be quickly accelerated to increase the rate of improvement again as confidence grows in the methodology. Multiple tests can be run on the same day.

Using rapid testing, interrogating the results from multiple tests and using the learning to guide future tests are referred to as multiple ramps. Knowledge of the subject matter is important in studying the results of tests of a change. It is essential to analyse the data from your tests – using run charts, this will provide the team with graphical display of the results of tests and can again be used to develop the degree of belief in the proposed change and the methodology.

Testing before implementing is almost always important for successful implementation.

Staff training, putting resources in place (e.g. printing thousands of information leaflets), updating guidelines are not part of the testing phase. These relate to the implementation phase when the data from the testing phase confirms that a change is an improvement.

Implementation (The Improvement Guide, Chapter 8, p 173)

Implementation is about how to make a change an integral part of the system. A common mistake is to go straight to implementation and skip testing. This is the traditional 'spray and pray' approach – update the guideline, communicate to staff and hope it is followed.

Implementation should be managed as a series of cycles.

Once improvements are implemented, practices need to be established to ensure the change becomes the normal way the business is run. Some of the practices that help make improvements permanent in an organisation are standardisation, documentation, training, measurement, and appropriate resourcing. Periodic self audits can be useful in determining whether these practices are being followed.
The increased permanence of a change associated with moving from testing to implementation is usually accompanied by increased awareness of and reaction to the change.

Many of the ways in which people are motivated to support a change begin before implementation is started.

The difference between testing and implementing

Implementation of a change often requires new forms, training, and a piece of equipment, updating a guideline or protocol or something else that requires resources to be allocated. The consideration of the resources required to implement is the difference between testing and implementing. Testing is done 'small scale', where resourcing is not an issue.

Understanding how a proposed change will be maintained should be part of the implementation plan. Consider the following:

- Will the change have a small or large effect on the system?
- Who has the authority to implement the change?
- How will the change be communicated?
- How will improvements and learning be shared with other departments?
- Is training and education required?
- What will be the process for updating guidelines, measurements, etc?
- Consider the role of information technology?
- Use the Implementation Checklist (The Improvement Guide, Figure 8.1, p. 185)

Spreading (The Improvement Guide, Chapter 9, p 195)

Spreading improvement means having people implement good ideas beyond some initial locations. Spread is supported by the improvement capabilities of testing and implementing a change, but now multiples sites are involved so execution is more complex.

For the spread of new ideas to happen in a timely fashion, the spread process needs to be managed (NB Project Plan).

Spread is founded on communication to raise awareness, attract "adopters" who colleagues who are interested in the topic and will progress the change and share the technical content with them.

For a spread plan to be effective the project lead should assign people who are recognised to be effective change agents to the work and allocate them sufficient time.

Adopters will usually progress through stages of change, from awareness to decision to act and from decision to act to action. The role of the spread team is to develop communication tactics to assist adopters to make these transitions.

People within the leadership team who are influencers or opinion leaders in the system where the change is to take place, serve as the best messengers. It is important to remember that the influencers and opinion leaders may not always be the people who have authority. Opinion leaders can have a compelling story to tell which demonstrates the benefits of adopting the change.

Making the success of early adopters visible reduces the perceived risk of the majority and makes their decision to adopt easier. Use the data obtained in early testing, indicating the challenges overcome and highlighting the successes is an effective way to begin conversations.

List of Measures

Paediatric Serious Harm Key Indicators		
PSHKI2	**Ventilator associated pneumonia**	Outcome
PSHKI3	**Central venous catheter related bloodstream infections**	Outcome
PSHKI4	**Unplanned admission to Paediatric Intensive Care Unit (PICU)**	Outcome

Safe, Effective and Reliable Care		
DPO1	**% of at-risk observations identified that are acted upon and have appropriate interventions undertaken in terms of their management as identified by Paediatric Early Warning System (PEWS)**	Outcome
DPP1	% compliance with PEWS bundle	Process
SO1	**% of children and young people who receive the Sepsis 6 bundle within 1 hour**	Outcome
SP1	% compliance with Sepsis 6 bundle	Process
DPO2	Number of **R**apid **A**dmission to **P**aediatric **I**ntensive **C**are for **I**n-patient **D**eterioration (RAPID) per month	Outcome
DPP2	% compliance with "Watchers" bundle	Process
CCO1a	**Monthly ventilator associated pneumonia (VAP) rate / 1000 ventilation days**	Outcome
CCO1b	**Days between ventilator associated pneumonia (VAP) incidents**	Days between
CCP1	% compliance with the paediatric VAP prevention care bundle	Process
ILO1a	**Monthly central venous catheter related blood stream infections (CRBSI) / 1000 central line days**	Outcome
ILO1b	**Days between CRBSI**	Days between
ILP1i	% compliance with paediatric central venous catheter (CVC) insertion bundle	Process
ILP1m	% compliance with paediatric central venous catheter (CVC) maintenance bundle	Process

Paediatric Serious Harm Key Indicators

Measure name	**Ventilator associated pneumonia**
Identifier	**PSHKI2**
Primary driver	Programme outcome measure and critical care outcome measure
Type	Outcome
Why is this measure needed in our project?	In order that the activity across Scotland can demonstrate improvement the Clinical Reference Group determined that measuring the number of Serious Safety Events over time would contribute to this understanding and demonstrate improvement. There is growing evidence that VAP is avoidable when consistent practice is provided to patients receiving ventilatory support. This outcome measure is directly linked to CCP1
Measurement definition	Number per month
Operational definition	Ventilator associated pneumonia is a hospital acquired pneumonia that occurs 48 hours or more after tracheal intubation[1]. Evidence suggests that by using the VAP prevention bundle the incidence of VAP can be reduced or eradicated
Exclusions	Non-invasively ventilated children and young people
Stratifiers	None
Data collection and sampling method	No sampling. All ventilator associated pneumonias should be recorded
Display	Number, reported on a run chart – monthly reporting
Baseline data available?	No
Goal or target	Reduction over time

[1] http://www.bmj.com/highwire/filestream/587087/field_highwire_article_pdf/0/bmj.e3325

Measure name	**Central venous catheter related bloodstream infections**
Identifier	**PSHKI3**
Primary driver	Programme outcome measure
Type	Outcome
Why is this measure needed in our project?	In order that the activity across Scotland can demonstrate improvement the Clinical Reference Group determined that measuring the number of Serious Safety Events over time would contribute to this understanding and demonstrate improvement. There is growing evidence that most CRBSI are avoidable when consistent practice is provided to patients requiring therapy using central venous catheters. This outcome measure is directly linked to ILP1i and ILP1m
Measurement definition	Number per month
Operational definition	A central venous catheter related bloodstream infection (CRBSI) is a septicaemia which occurs in patients who are also receiving therapy via a central venous catheter. Recognised diagnosis definitions are provided by Centers for Disease Control (CDC)[2] and European Centre for Disease Control (ECDC)[3]
Exclusions	None
Stratifiers	None
Data collection and sampling method	No sampling. All central venous catheter related bloodstream infections should be included
Display	Number, reported on a run chart – monthly reporting
Baseline data available?	No
Goal or target	Reduction over time

[2] http://www.tsicp.org/web_documents/tsicp_clabsi_and_ssi_criteria_slides_handouthoran.pdf
[3] http://www.sicsag.scot.nhs.uk/HAI/helics_protocol.pdf (pp. 9–10).

Measure name	**Unplanned admission to Paediatric Intensive Care Unit (PICU)**
Identifier	**PSHKI4**
Primary driver	Programme outcome measure
Type	Outcome
Why is this measure needed in our project?	In order that the activity across Scotland can demonstrate improvement the Clinical Reference Group determined that measuring the number of Serious Safety Events overtime would contribute to this understanding and demonstrate improvement. The measure is linked to the activity associated with identification of deteriorating patients, effective use of PEWS and Sepsis 6 bundle as well as effective communication practices
Measurement definition	Number per month
Operational definition	An unplanned admission to PICU is defined as any admission which is not considered to be part of the natural in-patient journey, i.e. 24 hour observation post appendicectomy
Exclusions	Children or young people admitted to the Emergency Department who, because of their condition, require PICU admission. Children or young people admitted to the ward for stabilisation prior to retrieval to PICU
Stratifiers	May wish to stratify between medical and surgical patients
Data collection and sampling method	No sampling. All unplanned transfers should be included
Display	Number, reported on a run chart – monthly reporting
Baseline data available?	Nil
Goal or target	Reduction over time

Deterioration and Harm

Safe, Effective and Reliable Care

Measure name	**Percentage of at-risk observations identified that are acted upon and have appropriate interventions undertaken in terms of their management as identified by Paediatric Early Warning System (PEWS)**
Identifier	**DPO1**
Primary driver	Safe, effective and reliable care
Type	Outcome
Why is this measure needed in our project?	This outcome measure is linked to the reliability of the PEWS bundle as well as the appropriate use of the Sepsis 6 bundle. Reliable application of the bundles should result in the reduction of cases where observations are not appropriately acted on and/or inappropriate interventions undertaken
Measurement definition	**Numerator:** number of children and young people where "at risk" observations are acted on and appropriate interventions are carried out **Denominator:** number of children and young people with "at risk" observations **Percentage:** numerator / denominator x 100
Operational definition	Each board is expected to have a clearly defined escalation process to support the appropriate and timely referral and treatment of deteriorating and deteriorated children and young people
Exclusions	Children and young people who do not have "at risk" observations
Stratifiers	May wish to differentiate between medical and surgical patients
Data collection and sampling method	Sampling: Select 5 children and young people identified as having had "at risk" observation per week or 20 per month to review. If less than 5 per week please include all. If electronic systems are used, all patients may be included each month
Display	Percentage, reported on a run chart – monthly reporting
Baseline data available?	No

Goal or target	Improvement over time

Measure name	**Percentage compliance with PEWS bundle**
Identifier	**DPP1**
Primary driver	Safe, effective and reliable care
Type	Process
Why is this measure needed in our project?	The reliable use of the correct age related PEWS chart, taking the correct physiological observations for the child or young person's condition and determining the correct score on those observations is fundamental in supporting the clinical decision making process as well as directing the correct interventions for the child or young person
Measurement definition	**Numerator**:the total number of PEWS charts reviewed which met the three components of the PEWS bundle **Denominator**: Total number of PEWS charts reviewed **Percentage**:numerator x 100 denominator
Operational definition	The PEWS bundle consists of three components which should be reliably provided for every child or young person • **Reliable completion of the PEWS bundle** ○ Correct age-related chart ○ Correct observations completed ○ Correct scoring of chart
Exclusions	Children or young people without PEWS charts
Stratifiers	You may wish to differentiate between children and young people receiving medical and surgical care
Data collection and sampling method	Sampling: Select 5 PEWS charts per week or 20 per month to review. If less than 5 per week please include all. If electronic systems are used, all charts may be included each month
Display	Percentage, reported on a run chart – monthly reporting
Baseline data available?	No
Goal or target	95% compliance with measure

Measure name	**Percentage of children and young people who receive the Sepsis 6 bundle within 1 hour**
Identifier	**SO1**
Primary driver	Safe, effective and reliable care
Type	Outcome
Why is this measure needed in our project?	This outcome measure is linked to the reliability of the Sepsis 6 bundles. Reliable application of the bundles should result an increase in the number of children and young people receiving the complete Sepsis 6 bundle within 1 hour. Reducing the time to receiving the Sepsis 6 reduces the risk of mortality and potential morbidity to children and young people who have developed sepsis
Measurement definition	**Numerator:** the total number of casenotes reviewed which demonstrated that the child or young person received all of the Sepsis 6 components within one hour **Denominator:** Total number of case notes reviewed **Percentage:** $\frac{\text{numerator}}{\text{denominator}} \times 100$
Operational definition	A septic child or young person is described as having been identified using the Sepsis 6 flowchart as having suspected sepsis and requiring the administration of antimicrobials as part of their therapy
Exclusions	Children or young people who have not received the Sepsis 6
Stratifiers	You may wish to differentiate between children or young people receiving medical and surgical care
Data collection and sampling method	Sampling: Select 5 children or young people who have received the Sepsis 6 per week and review their case notes or 20 per month to review. If less than 5 per week please include all
Display	Percentage, reported on a run chart – monthly data
Baseline data available?	No
Goal or target	95% reliability with measure

Measure name	**Percentage compliance with Sepsis 6 bundle**
Identifier	**SP1**
Primary driver	Safe, effective and reliable care
Type	Process
Why is this measure needed in our project?	The timely provision of appropriate care for specific clinical conditions is recognised to reduce morbidity and mortality of patients. Evidence shows that the provision of specific activity following the suspicion of sepsis within one hour reduces the risk of morbidity and mortality of patients
Measurement definition	**Numerator**: number of children and young people with suspected sepsis who received all 6 components of the Sepsis bundle **Denominator**: number of children and young people with suspected sepsis **Percentage**: numerator / denominator x 100
Operational definition	Sepsis 6 bundle[4] • Give high flow oxygen • Obtain intravenous (IV) or intra-osseous (IO) access and take appropriate blood tests • Give IV or IO antibiotics: as per local empiric prescribing policy • Consider fluid resuscitation – (20ml/kg isotonic fluids) and document • Involve senior clinicians/specialists early and document • Consider inotropic support early and document
Exclusions	Children or young people who are not suspected of having developed sepsis
Stratifiers	May wish to stratify for medical and surgical patients
Data collection and sampling method	Sampling: Select 5 children or young people who have received the Sepsis 6 per week and review their case notes or 20 per month to review. If less than 5 per week please include all
Display	Percentage, reported on a run chart – monthly reporting
Baseline data available?	No
Goal or target	95% compliance with the Sepsis 6 bundle

[4]Provision of each bundle component should be appropriate to the child or young person's clinical condition. If during the treatment of sepsis it is not clinically appropriate to provide some/any of the bundle components this does not constitute non-compliance as long as the reason for not complying is clearly documented in the notes.

Measure name	Number of **R**apid **A**dmission to **P**aediatric **I**ntensive **C**are for **I**n-patient **D**eterioration (RAPID) per month
Identifier	**DPO2**
Primary driver	Safe, effective and reliable care
Type	Outcome
Why is this measure needed in our project?	Ensuring that all children and young people who deteriorate are treated appropriately and in a timely manner is a fundamental part of the Paediatric Safety work. Could children who meet the RAPID criteria have benefited from earlier review and intervention?
Measurement definition	Count: number of RAPID admissions per month
Operational definition	A Rapid Admission to Paediatric Intensive Care for In-patient Deterioration (RAPID) is defined as any transfer from an acute care floor to an ICU where the patient received intubation, inotropes, or 3 fluid boluses in first hour after arrival or before transfer. These can be in isolation or in combination.
Exclusions	Children or young people requiring resuscitation in Emergency Department and admitted to the ward/unit within 1 hour
Stratifiers	You may wish to stratify between medical and surgical patients
Data collection and sampling method	No sampling. All RAPID admissions should be included
Display	Count, reported on a run chart – monthly reporting
Baseline data available?	No
Goal or target	Reduction over time

Measure name	**Percentage compliance with "Watchers" bundle**
Identifier	**DPP2**
Primary driver	Safe, effective and reliable care
Type	Process
Why is this measure needed in our project?	A local mechanism within a hospital, directorate or ward requires a clearly defined process to identify and communicate the children and young people who are considered to be "watchers" i.e. patients who have clinical indicators which may suggest they are a potential deterioration risk or children and young people for whom there are other clinical concerns, parental concerns, abscond risk, safeguard risk, etc. There also needs to be a robust mechanism to share the fact that the child or young person has been identified as a "Watcher" within the local care team and care service
Measurement definition	**Numerator**: number of children or young people where full compliance with the "Watcher" bundle is demonstrated **Denominator**: number of children and young people identified as "Watcher" **Percentage**: numerator / denominator x 100
Operational definition	Watcher bundle • The local mechanism to designate "Watcher" status has been followed and documented • The local mechanism to communicate patients designated as "Watcher" to the team has been followed and documented • Appropriate local mitigation plan has been developed and clearly documented • There is a locally appropriate escalation as per the child or young person's condition
Exclusions	Children and young people not identified as "Watcher"
Stratifiers	You may wish to stratify for medical and surgical patients
Data collection and sampling method	Sampling: Select 5 children and young people who have been designated Watcher status per week and review their case notes or 20 per month to review. If less than 5 per week please include all
Display	Percentage, reported on a run chart – monthly reporting
Baseline data available?	No
Goal or target	95% compliance with Watcher bundle

Measure name	**Monthly ventilator associated pneumonia (VAP) rate / 1000 ventilation days**
Identifier	**CCO1a**
Primary driver	Safe, effective and reliable care
Type	Outcome
Why is this measure needed in our project?	The use of mechanical ventilation is an essential part of the care of some critically ill children and young people. This outcome measure is linked to the reliable use of the Ventilator Associated Pneumonia Prevention bundle
Measurement definition	**Numerator:** Total number of VAP in the month **Denominator:** Total number of ventilator days in the month **Rate (per 1,000):** $\frac{\text{numerator}}{\text{denominator}} \times 1000$
Operational definition	• A VAP is diagnosed using locally defined diagnosis definitions • A ventilation day is defined as any calendar day or part there of where the child or young person is documented to have had an endotracheal tube or tracheostomy tube in situ and is connected to invasive ventilation including CPAP via tracheostomy
Exclusions	Children and young people not receiving invasive mechanical ventilation
Stratifiers	None
Data collection and sampling method	No sampling. All VAP incidents should be included per month
Display	Rate, reported on a run chart – monthly reporting
Baseline data available?	No
Goal or target	30% reduction

Measure name	**Calendar days between ventilator associated pneumonia (VAP) incidents**
Identifier	**CCO1b**
Primary driver	Safe, effective and reliable care
Type	Outcome
Why is this measure needed in our project?	The use of mechanical ventilation is an essential part of the care of some critically ill children and young people. This outcome measure is linked to the reliable use of the Ventilator Associated Pneumonia Prevention bundle
Measurement definition	**Count:** number of days between diagnosis of VAP
Operational definition	• A VAP is diagnosed using locally defined diagnosis definitions • A ventilation day is defined as any calendar day or part there of where the child or young person is documented to have had an endotracheal tube or tracheostomy tube in situ and is connected to invasive ventilation including CPAP via tracheostomy
Exclusions	Children and young people not receiving invasive mechanical ventilation
Stratifiers	None
Data collection and sampling method	No sampling. All children and young people receiving invasive mechanical ventilation should be included
Display	Rate, reported on a run chart – monthly reporting
Baseline data available?	No
Goal or target	300 days between or no VAP

Measure name	**Percentage compliance with the paediatric VAP prevention care bundle**
Identifier	**CCP1**
Primary driver	Safe, effective and reliable care
Type	Process
Why is this measure needed in our project?	The use of invasive mechanical ventilation is an unavoidable part of therapy for some critically ill patients but is associated with increased risk of mortality and morbidity. To reduce these risks for the patient reliable application of the VAP prevention bundle is known to reduce the risk of acquiring ventilator associated pneumonia
Measurement definition	**Numerator:** number of children and young people requiring invasive mechanical ventilation where the VAP prevention bundle has been demonstrated **Denominator:** number of children and young people requiring invasive mechanical ventilation **Percentage:** numerator / denominator x 100
Operational definition	VAP prevention bundle – components • Head of bed 30 degrees for paediatric and 15 for neonates • Daily review of ability to wean sedation – but not a sedation vacation • Daily review of ability to wean ventilation • Oral hygiene – teeth brushing and chlorhexidine gel x 2 daily (gel for patients > 1 year of age)
Exclusions	Children and young people not requiring invasive mechanical ventilation
Stratifiers	None
Data collection and sampling method	Sampling: Select 5 patients receiving invasive mechanical ventilation per week. If less than 5 per week please include all cases
Display	Rate, reported on a run chart – monthly reporting
Baseline data available?	No
Goal or target	95% compliance with the VAP prevention bundle

Measure name	**Monthly central venous catheter related bloodstream infections (CRBSI) / 1000 central line days**
Identifier	**ILO1a**
Primary driver	Safe, effective and reliable care
Type	Outcome
Why is this measure needed in our project?	This outcome measure is linked to the reliability of the CVC insertion and maintenance bundles. Reliable application of the bundles should result in the reduction of CRBSI
Measurement definition	**Numerator:** Total number of CRBSI in the month **Denominator:** Total number of central venous catheter days in the month **Rate (per 1,000):** $\frac{\text{numerator}}{\text{denominator}} \times 1000$
Operational definition	**A CRBSI is locally defined – each ward/unit will have an explicitly defined diagnosis definition which is applied consistently.** • This measure is applicable in any care setting where CVC are used, i.e. not just the critical care/HDU setting and includes patients receiving community-based therapy who are admitted for acute care/hospital based interventions • A CVC is defined as any central venous access device which provides vascular access to the central vascular system including PICC and surgically inserted central lines • Septicaemias are associated with any micro-organism and not restricted to *Staphylococcus aureus* only • A CVC day is defined as any calendar day or part thereof where the child or young person is documented to have had central venous access in situ
Exclusions	Children and young people without CVC
Stratifiers	You may wish to differentiate between specific line types or anatomical placement of the lines as well as care service, i.e. community-based care or inpatient
Data collection and sampling method	No sampling. All children and young people with CVC in situ should be included. Different collection methods will be required depending on the service location, i.e. community based or inpatient based
Display	Rate (per 1000 CVC days), reported on a run chart – monthly reporting

Baseline data available?	No
Goal or target	30% reduction

Measure name	**Calendar days between central venous catheter related bloodstream infections (CRBSI)**
Identifier	**ILO1b**
Primary driver	Safe, effective and reliable care
Type	Outcome
Why is this measure needed in our project?	This outcome measure is linked to the reliability of the CVC insertion and maintenance bundles. Reliable application of the bundles should result in the reduction of CRBSI
Measurement definition	Count: number of days between CRBSI diagnosis
Operational definition	**A CRBSI is locally defined – each ward/unit will have an explicitly defined diagnosis definition which is applied consistently.** • This measure is applicable in any care setting where CVC are used, i.e. not just the critical care/HDU setting and includes patients receiving community-based therapy who were admitted for acute care/hospital based interventions • A CVC is defined as any central venous access device which provides vascular access to the central vascular system including PICC and surgically inserted central lines • Septicaemias are associated with any micro-organism and not restricted to *Staphylococcus aureus* only • A CVC day is defined as any calendar day or part thereof where the child or young person is documented to have had central venous access in situ
Exclusions	Children and young people without CVC
Stratifiers	You may wish to differentiate between specific line types or anatomical placement of the lines as well as care service, i.e. community-based care or inpatient
Data collection and sampling method	No sampling. All children and young people with CVC in situ should be included. Different collection methods will be required depending on the service location, i.e. community based or inpatient based
Display	Days between or run chart
Baseline data available?	No
Goal or target	300 days or no CRBSI

Measure name	**Percentage compliance with paediatric central venous catheter (CVC) insertion bundle**
Identifier	**ILP1i**
Primary driver	Safe, effective and reliable care
Type	Process
Why is this measure needed in our project?	It is recognised that the clinical condition of some children and young people requires the insertion of central venous access – using the central venous catheter insertion bundle mitigates for the main risks associated with these inserting devices, such as development of septicaemia.
Measurement definition	**Numerator:** number of children or young people where full compliance with the CVC insertion bundle is demonstrated **Denominator:** total number of children or young people with CVC inserted **Percentage:** numerator / denominator x 100
Operational definition	**CVC insertion bundle**[5] • Compliance with local hand hygiene policy • Maximum barrier protection/aseptic non-touch technique • Skin preparation – chlorhexidine (unless contra-indicated) as per local policy • Appropriate fixation of the line • Transparent semi-permeable dressing as appropriate (use gauze only if the site is bleeding/oozing) • Dressing applied and insertion documented • Documentation of the correct line tip position by appropriate imaging • A CVC is defined as any central venous access device which provides vascular access to the central vascular system including PICC and surgically inserted central lines • A CVC day is defined as any calendar day or part there of where the child or young person is documented to have had central venous access in situ
Exclusions	Children or young people who do not have CVC sited

[5]Provision of each bundle component should be appropriate to the child or young person's clinical condition. If during the care of the child or young person it is not clinically appropriate to provide any of the CVC insertion bundle components this does not constitute non-compliance as long as the reason for not complying is clearly documented in the case notes.

Stratifiers	You may wish to differentiate between specific line types or anatomical placement of the lines as well as service provision type, i.e. community based or inpatient
Data collection and sampling method	Sampling: Select 5 children or young people with CVC inserted per week or 20 per month to review If less than 5 lines inserted per week please include all If electronic systems are used, all patients may be included each month
Display	Percentage, reported on a run chart – monthly reporting
Baseline data available?	No
Goal or target	95% compliance with CVC insertion bundle

Measure name	**Percentage compliance with paediatric central venous catheter (CVC) maintenance bundle**
Identifier	**ILP1m**
Primary driver	Safe, effective and reliable care
Type	Process
Why is this measure needed in our project?	It is recognised that the clinical condition of some children and young people requires the insertion of central venous access – using the central venous catheter maintenance bundle to ensure reliable review and care of the central line while in situ helps mitigates for the main risks associated with these devices, such as septicaemia and delayed removal
Measurement definition	**Numerator:** number of children and young people where full compliance with the CVC maintenance bundle is demonstrated **Denominator:** children or young people with CVC inserted **Percentage:** numerator x 100 denominator
Operational definition	CVC maintenance bundle[6] • Daily assessment and documentation of line necessity • Hand hygiene (as per local policy) prior to line maintenance and access • Date and time of dressing application – changed every 7 days • Replace dressing if damp/loose/visibly soiled • Chlorhexidine (unless contra-indicated) for cleaning site during dressing change (as per local policy) • Catheter/hub/cap/tubing care – as per local policy • A CVC is defined as any central venous access device which provides vascular access to the central vascular system including PICC and Hickmann lines • A CVC day is defined as any calendar day or part thereof where the child or young person is documented to have had central venous access in situ
Exclusions	Children or young people who do not have CVC sited

[6]Provision of each bundle component should be appropriate to the child or young person's clinical condition. If during the care of the child or young person it is not clinically appropriate to provide any of the CVC maintenance bundle components this does not constitute non-compliance as long as the reason for not complying is clearly documented in the case notes.

Stratifiers	You may wish to differentiate between specific line types or anatomical placement of the lines as well as service provision are, i.e. community services or inpatient
Data collection and sampling method	Sampling: Select 5 children or young people with CVC per week or 20 per month to review If less than 5 lines inserted per week please include all If electronic systems are used, all patients may be included each month
Display	Percentage, reported on a run chart – monthly reporting
Baseline data available?	No
Goal or target	95% compliance with CVC maintenance bundle