

NHS Innovation Accelerator
Critical Care innovations

Oxford 
Academic Health
Science Network

Non-Injectable Arterial Connector

Implementation Support Pack
for Provider Organisations



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Introduction

This document has been compiled by Drs Peter Young and Maryanne Mariyaselvam (Consultant Intensivist and Clinical Fellow, Queen Elizabeth Hospital, King's Lynn) and the Oxford Academic Health Science Network (AHSN), to assist provider organisations in implementing the Needle-Free Non-Injectable Arterial Connector (NIC).

The device is part of the NHS Innovation Accelerator (NIA), having been recognised as providing an evidence-based solution to a key healthcare challenge. In addition, the NIC attracts NHS England's Innovation and Technology Tariff (ITT) from April 2017, providing an opportunity for Trusts to implement these devices without the financial barriers to adoption.

The Oxford AHSN sees the NIC as an important innovation that reduces patient harm and improves patient safety. This **Oxford AHSN Implementation Support Pack** aims to provide Trusts with all the necessary information to implement this device, providing clinicians and project leads with a step by step guide of how to implement the NIC. The pack includes a number of resources to help simplify the process of implementation including a summary document, outline business case, guidance for procurement, tariff reimbursement procedures, PowerPoint presentations, and advice on how to handle challenges to adoption and overcome potential barriers to implementation.

The guidance in this document is based on the experiences in the east of England. Differences in practice, protocols and systems at different Trusts may mean that processes vary slightly. If this is the case, please do share these differences with the contacts at the Oxford AHSN for future learning and to help other partner organisations.

Overview of Implementation Process

Below is an outline process for implementing the Non-Injectable Arterial Connector that has been developed based on the experience of other Trusts. The process is made up of 3 core elements: engagement and building the case for adoption, securing reimbursement and implementing on the unit.

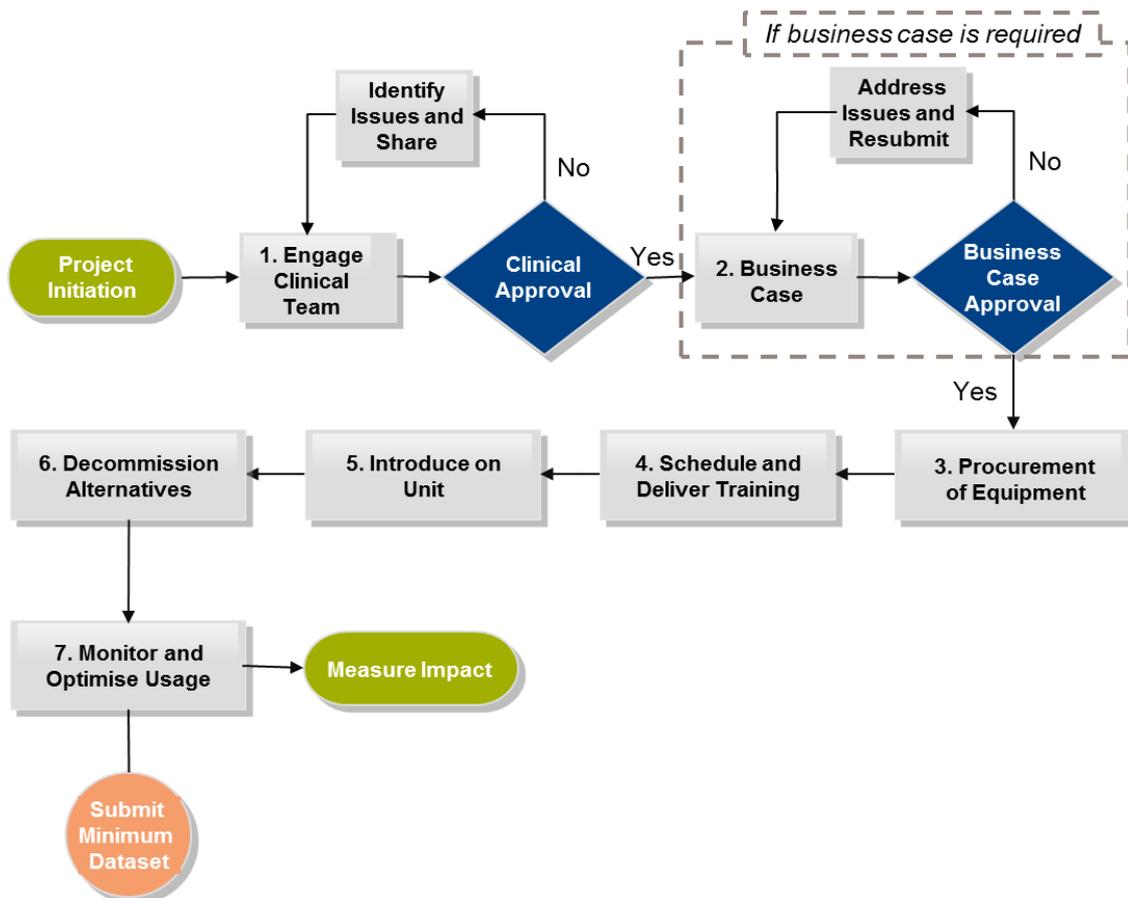


Figure 1 Outline Implementation Process

Step 1: Engage Clinical Team

Key Points

- Clinical engagement is a crucial first step in ensuring there is a willingness to adopt the NIC
- The Summary Document in this section provides a good starting point for discussion with both clinical and managerial teams
- Summary PowerPoint presentations are also provided in the Implementation Support Pack for leads to present back to teams
- Common clinical concerns or queries have been captured in the “Potential Barriers to Implementation and Mitigating Action” section of the pack. Any other queries can be directed to your regional AHSN who will support in addressing these issues.

Summary Document

Non-Injectable Arterial Connector (NIC) Summary Document	
Summary of Device	<ul style="list-style-type: none"> • Needle-free non-injectable arterial connector (NIC) is a standard arterial connector with a safety valve built into the device • The NIC is connected to the sampling port of an arterial line and through which blood gas samples can be collected • NIC would replace arterial connectors currently used in adults with arterial lines (it is not currently licensed for use in children) • Promotes patient safety by eliminating inadvertent injection into the arterial line and by reducing potential for infection • NIC is part of the National Innovation Accelerator and will attract the NHS England Innovation and Technology Tariff from April 2017.
Patient safety / experience	<p>Potential problems with arterial lines that could lead to patient harm were highlighted in the 2008 National Patient Safety Agency Rapid Response Report. This included confusion of arterial and venous lines leading to medication errors, errors with sampling such as excess blood spillage, and bacterial contamination of the arterial line.</p> <p>The NIC addresses these concerns and improves patient safety through the use of a one-way valve in its internal chamber which:</p> <ul style="list-style-type: none"> • Acts as a physical barrier preventing staff from accidentally administering medication via the arterial line (the valve closes completely and prevents injection if a member of staff attempts to inject through it) • Prevents excess blood spillage during sampling or if the access port is accidentally left open • Prevents bacterial contamination of the arterial line <p>Incidents related to arterial line medication errors are rare but consequences are often very severe, causing serious damage to the arterial blood vessels and surrounding tissue in the hand, and it can lead to amputation. Widespread use of the NIC however, would eliminate the possibility of such an event occurring.</p>
Clinical effectiveness	<p>Lab studies found the NIC does not become colonised with bacteria, reducing arterial line infections compared with standard arterial connectors:</p> <ul style="list-style-type: none"> • 0% NIC became contaminated with bacteria, compared to 100% standard connectors • 0% NIC transmitted bacteria to arterial line, compared to 85% standard connectors

Non-Injectable Arterial Connector (NIC) Summary Document																																					
Operational performance / efficiency	<p>A single implementation study with 11 Trusts in the east of England surveyed more than 250 clinicians who used the NIC and found that:</p> <ul style="list-style-type: none"> • 97% said the NIC allowed increased identification of arterial line • over 80% said the NIC was easy to learn and use • 81% wanted to continue use of NIC after study was completed due to both the ease of use and promotion of patient safety <p>Studies have also demonstrated the NIC delivers an easier sampling method, by reducing process steps and is quicker to use.</p>																																				
Financial Analysis	<p><u>Cost of Device</u></p> <table border="1"> <thead> <tr> <th>Device</th> <th>Cost per Unit (£)</th> <th>Comments</th> </tr> </thead> <tbody> <tr> <td>NIC</td> <td>2.00 + VAT</td> <td>- Single use - Changed when giving set replaced, usually every 48-72 hours</td> </tr> <tr> <td>Current connectors</td> <td>Range: 0.18 – 1.50 + VAT</td> <td>- Single use - Changed after blood sample taken, can be up to 4 times a day</td> </tr> </tbody> </table> <p><u>Savings identified with NIC</u></p> <table border="1"> <thead> <tr> <th>Description</th> <th>Cost saving</th> <th>Comment</th> </tr> </thead> <tbody> <tr> <td>Staff time</td> <td>£1091 p.a.</td> <td>Opportunity cost potential</td> </tr> <tr> <td>Consumables</td> <td>£285 p.a.</td> <td>Includes reduced number of connector changes</td> </tr> <tr> <td colspan="3"><i>Savings associated with eliminating medication errors</i></td> </tr> <tr> <td>1. Near miss</td> <td>£57 per incident</td> <td>Cost of time taken to report and document incident</td> </tr> <tr> <td>2. Incident with no lasting harm</td> <td>£2230 per incident</td> <td>Cost of additional time needed in critical care, medications, surgery, radiology, staff time</td> </tr> <tr> <td>3. Incident with lasting harm</td> <td>> £4000 per incident (> £10,000 with amputation)</td> <td>Cost of additional time need in critical care, medications, surgery, radiology, staff time</td> </tr> <tr> <td colspan="3"><i>Savings associated with eliminating infection</i></td> </tr> <tr> <td>Reduced arterial line associated infections</td> <td>Unknown</td> <td>NIC shown to reduce intraluminal contamination associated with sampling</td> </tr> </tbody> </table> <p><u>NHS England Innovation and Technology Tariff</u> The Innovation and Technology Tariff will enable Trusts to use the NIC for free, thereby allowing Trusts to adopt a safety innovation without the financial barriers to adoption.</p>	Device	Cost per Unit (£)	Comments	NIC	2.00 + VAT	- Single use - Changed when giving set replaced, usually every 48-72 hours	Current connectors	Range: 0.18 – 1.50 + VAT	- Single use - Changed after blood sample taken, can be up to 4 times a day	Description	Cost saving	Comment	Staff time	£1091 p.a.	Opportunity cost potential	Consumables	£285 p.a.	Includes reduced number of connector changes	<i>Savings associated with eliminating medication errors</i>			1. Near miss	£57 per incident	Cost of time taken to report and document incident	2. Incident with no lasting harm	£2230 per incident	Cost of additional time needed in critical care, medications, surgery, radiology, staff time	3. Incident with lasting harm	> £4000 per incident (> £10,000 with amputation)	Cost of additional time need in critical care, medications, surgery, radiology, staff time	<i>Savings associated with eliminating infection</i>			Reduced arterial line associated infections	Unknown	NIC shown to reduce intraluminal contamination associated with sampling
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Non-Injectable Arterial Connector (NIC) Summary Document	
Workforce implications	<ul style="list-style-type: none"> • No changes to the way current services are organised or delivered are needed • All arterial lines have injection ports (sampling or transducer ports); the NIC has a standard luer lock connection and is compatible with all arterial lines • The implementation study demonstrated the NIC is easy to use and requires minimal training
Trusts currently using device	<ul style="list-style-type: none"> • The implementation study was carried out in the east of England with 11 Trusts • The NIC is currently used in 13 hospitals in England and 1 in Northern Ireland
Devices available from	Devices can be ordered from AmDel Medical: www.amdelmedical.com Contact: james.lyon@amdelmedical.com
Relevant links	Full clinical information and training videos available at www.KLIPSuk.com https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4472680/ http://www.eahsn.org/wp-content/uploads/The-Non-injectable-Arterial-Connector-EAHSN-Final-Report-Mariyaselvam-Blunt-Young-smaller-size.pdf

PowerPoint Presentation

To support clinical leads in making the case to clinical and managerial teams, a slide deck has been put together to demonstrate the benefits of the device, how the device can be implemented and what stakeholders can expect during implementation. The slide deck is available as an embedded file in the online file, or alternatively by emailing james.rose@oxfordahsn.org or alison.gowdy@oxfordahsn.org

Step 2: Business Case

The case for adoption of the NIC has been made extremely compelling through the inclusion of the device on the NHS England Innovation and Technology Tariff (ITT). **NHS England has confirmed the NIC will be free to provider organisations from April 2017 for 2 years.**

A summary of the ITT and how it will operate has been included below, and in addition the full ITT guidance is available as an electronic resource from the link below

<https://www.england.nhs.uk/resources/pay-syst/development/tech-tariff-17-19-technical-notes/>

Due to the Innovation and Technology Tariff, a formal business case may not be required. However, a semi-populated business case template has been included should this be required either for initial implementation or at a later date.

An electronic version is available as a word document which can be adapted to meet local requirements.

Innovation and Technology Tariff – NIC

The Innovation and Technology Tariff (ITT) was introduced to incentivise the adoption and spread of transformational innovation in the NHS. It aims to remove the need for multiple local price negotiations and guarantees automatic reimbursement when an approved innovation is used.

NHS England has made the NIC available to provider organisations at zero cost from April 2017 for 2 years.

The ITT for the NIC operates under a zero cost model, which has been established to minimise the number of financial transactions and create a more efficient system to administer across the NHS (see Figure 2).

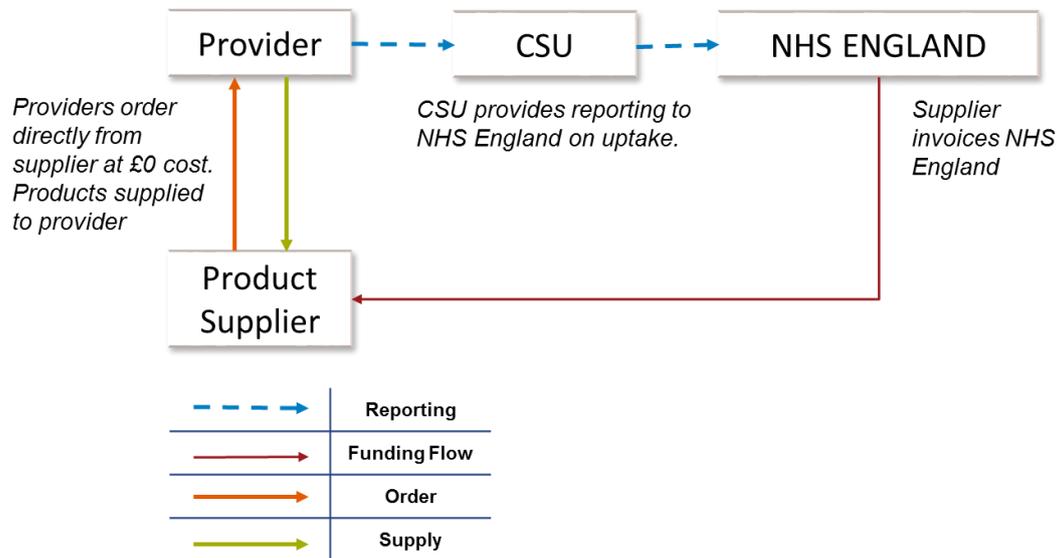


Figure 2 ITT Zero Cost Model

Key Points

1. Provider organisations will order the NIC direct from the Supplier (AmDel Medical)
2. Supplier will invoice NHS England for the devices, who will pay for the devices
3. NHS England will undertake follow-up research with providers who implement this device, and will contact a sample of Trusts to seek answers to the following questions:
 - a. Number of patient incidents of bacterial contamination and accidental intraarterial injection prior to the introduction of this innovation
 - b. Number of patient incidents of bacterial contamination and accidental intraarterial injection after the implementation of this innovation
 - c. Number of Non-Injectable Connectors or other approved devices directly used in patient care and a breakdown of usage levels against clinical intervention

Business Case Template

Improving Patient Safety - Implementation of the Non-Injectable Arterial Connector (NIC)	
Executive Sponsor	{insert}
Author	{insert}
Date	{insert}
Summary of service development	<p>To implement the NIC within the Intensive Care Unit and operating theatres, thereby improving the patient safety for approximately {insert approx. annual number of patients who will have the NIC} patients per annum.</p> <p>The NIC is a patient safety device, designed to:</p> <ul style="list-style-type: none"> - prevent wrong route medication administration via the arterial line - prevent errors with sampling - prevent bacterial contamination of the arterial line <p>The NIC attracts the Innovation and Technology Tariff (ITT), and as such is free to provider Trusts to implement. The tariff operates under a zero cost model. This means the Trust orders direct from the supplier, who in turn invoices NHS England.</p> <p>As well as improving patient safety for patients in critical care and operating theatres, the implementation of this innovation will provide a cost saving over the next 2 years by:</p> <ul style="list-style-type: none"> - free provision of arterial connectors - no requirement to purchase currently used needle-free arterial connectors for 2 years
Link to Trust’s strategic aims	{insert}
Link to department’s annual plan	{insert}
Change in activity (IP / DC / OP)	Not applicable
Change in staffing	Not applicable
Change in income	Not applicable
Change in costs	{insert cost saving per annum against reduced level of current needle-free arterial connectors}

1. Strategic Overview

Arterial lines are used in ICU and operating theatres to accurately measure a patient's blood pressure and to take numerous and repetitive blood samples. In order to prevent bacterial contamination and blood spillage from the arterial line, red arterial connectors (needle-free arterial connectors or closed cap coverings) are placed on the sampling port of the arterial line. It is estimated that approximately 1 million arterial connectors are used each year in the UK.

The 2008 National Patient Safety Agency Rapid Response Report (NPSA) highlighted problems with arterial lines that lead to patient harm, including:

- Errors with sampling, including excess blood spillage during sampling
- Bacterial contamination of the arterial line from not adhering to strict cleaning prior to sampling
- Confusion of the arterial and venous lines leading to medication administration error (which can have devastating implications for the patient, causing serious damage to the arterial blood vessel and surrounding tissues; the severest implication being amputation of the fingers or hand)

Within **{insert Trust name}** approximately **{insert annual number of ICU patients}** patients are admitted to the Intensive Care Unit each year. Approximately **{insert annual number of patients}** major operations are performed in the Trust each year, which require an arterial line. This equates to approximately **{insert number of arterial connectors ordered per annum}** arterial connectors used per annum.

From **{insert financial year}** to **{insert financial year}**, there have been **{insert number}** reported incidents of wrong route medication errors via the arterial line and **{insert number}** reported near misses.

{If zero, use this}. While there have been no reported incidents or near misses of wrong route medication errors via the arterial line over the last three years, there could be an under-reporting of this, possibly as the resulting complications may be delayed for several hours.

The NPSA arterial line alert and the published literature recognise that there are cases of bacterial contamination of the arterial line and other sampling errors. However, this is currently difficult to quantify clinically as such cases are often under reported. The use of the NIC will prevent these errors.

All such incidents have a significant impact not only on critically ill patients, but lead to increased expenditure for the hospital in terms of additional procedures and / or medications required and increased length of stay.

2. Summary of Proposed Option

This business case seeks to implement the NIC device in order to improve patient safety within the ICU.

The NIC is an engineered patient safety solution which has been designed to address the three issues highlighted by the National Patient Safety Agency. The device has a one-way valve in its internal chamber which:

- Acts as a physical barrier preventing staff from accidentally administering medication via the arterial line, as the valve closes completely when pushed downwards
- Prevents excess blood spillage during sampling
- Prevents bacterial contamination of the arterial line, with laboratory studies showing the NIC does not become colonised with bacteria and therefore bacteria cannot be transmitted to the arterial line and patient (compared to a clinical audit of standard arterial connectors in ICU showing a 6% bacterial colonisation rate).

Implementation of the NIC will provide ICU staff, the Trust and patients with the assurance that incidents such as wrong route medication errors will be prevented.

Furthermore, the Trust will attract the National Innovation and Technology Tariff which will cover the cost of the device.

3. Option Appraisal

Option 1 – Do Nothing

This option maintains the status quo and would not see the NIC implemented within ICU. The current arterial connectors would remain in place and the potential for the incidents highlighted above would also remain. The Trust would not be able to attract the Innovation and Technology Tariff and savings from the reduction in the current connectors would not be realised.

Option 2 – Implement the Non-Injectable Arterial Connector on ICU (preferred option)

This option would see the NIC device implemented within ICU, and in doing so the potential for wrong route medication errors, sampling errors and bacterial contamination of the arterial line would be reduced. Staff and patients would have assurance that such errors would not occur, and the Trust would have assurance that increased expenditure and increase length of stay as a result of such incidents would not occur.

Furthermore, as the NIC attracts the Innovation and Technology Tariff there is no cost-implication of introducing this device.

4. Activity Implications for Preferred Option

- The NIC will not impact on the volume of patients coming through ICU
- There will be minimal impact on the staff using the NIC
- Minimal training is required; a training video is available to ensure staff can conveniently access training
- Data collection for the Innovation and Technology Tariff may be required for NHS England to assess uptake of the innovation. For the NIC, NHS England will undertake follow-up research with providers who implement this device, and will contact a sample of Trusts to request the following:
 - Number of patient incidents of bacterial contamination and accidental intraarterial injection prior to the introduction of this innovation
 - Number of patient incidents of bacterial contamination and accidental intraarterial injection after the implementation of this innovation
 - Number of Non-Injectable Arterial Connectors or other approved devices directly used in patient care and a breakdown of usage levels against clinical intervention

5. Financial Analysis for Preferred Option

Currently {insert number} arterial connectors are ordered per annum, at a cost of {insert cost}.

The NIC will replace the arterial connectors currently used, and is used on both the sampling port and transducer port of the arterial line.

{If the Trust currently uses needle-free arterial connectors insert this}. There will be no requirement to purchase the currently used needle-free arterial connectors for 2 years, with a cost saving per annum of {insert annual cost of currently used needle-free arterial connectors}.

{Note that if Trusts wish to continue to purchase arterial bungs / caps, this needs to be off set against the cost saving}.

{If Trust has cases of wrong route medication errors, insert cost of additional treatment and increased length of stay to demonstrate potential cost savings}

The cost of the NIC is currently £2 per connector. The cost of the arterial connectors currently used is {insert cost}. Health economic analysis has shown the NIC is cost saving directly on consumables alone, meaning that using the NIC represents a cost savings for the Trusts despite the Innovation and Technology Tariff (this is because the NIC is used for the life of the arterial line, reducing the number of connectors used on the arterial line).

After the 2-year period, the Innovation and Technology Tariff will be evaluated by NHS England to determine whether it should be continued. The clinical team recommend the use of the NIC for the lifespan of the tariff, with further discussions regarding the continuation at a later date.

6. Project Implementation

Action / Milestone	Responsible Person	Timescale
Agreement of business case		
Training sessions for staff to ensure all staff aware of NIC and how it works; training will be provided by AmDel Medical along with training literature	Practice Development Nurse	
NIC to be set up on procurement ordering system		
Order agreed volume of NIC from AmDel Medical / reduce order volume for current connectors		
Transition from old connectors to NIC: remove currently used arterial connectors from the bedside and ward stock; replace with NIC On patients, remove standard arterial connector and replace with NIC; this will be used as a teaching opportunity for nursing staff at the bedside	Practice Development Nurse	
Inform theatre staff of the new safety device with the potential to train ODPs and introduce NIC in theatres		
Completion and submission of NHS England minimum data set requirement. If selected by NHS England, data required: <ul style="list-style-type: none"> - Number of patient incidents of bacterial contamination and accidental intraarterial injection prior to the introduction of this innovation - Number of patient incidents of bacterial contamination and accidental intraarterial injection after the implementation of this innovation - Number of Non-Injectable Connectors or other approved devices directly used in patient care and a breakdown of usage levels against clinical intervention 		NHS England will contact a sample number of Trusts following implementation

7. Risk Management / Service Development Sensitivities

Risks	Mitigation
Wastage of current arterial connectors	Current connectors can be used in theatres for major operating cases until the NIC can be introduced in operating theatres, and as such there should not be any wastage of current stock.
Significant number of staff to receive training before device can be implemented	Training plan has been confirmed which will ensure clinical staff will receive timely training on the using the NIC. Implementation plan for the NIC has also been agreed, at which point there will be further opportunities for training at the bedside.

Step 3: Procurement of Devices

Once there is agreement from clinical and managerial teams to proceed, leads will need to work with procurement and finance. An overview of the procurement process has been provided to help leads at each Trust understand the steps needed to make the NIC available for ordering (Figure 3)

In addition, the key information for procurement has been collated into a simple one page document for leads at each Trust to share with procurement at the appropriate time

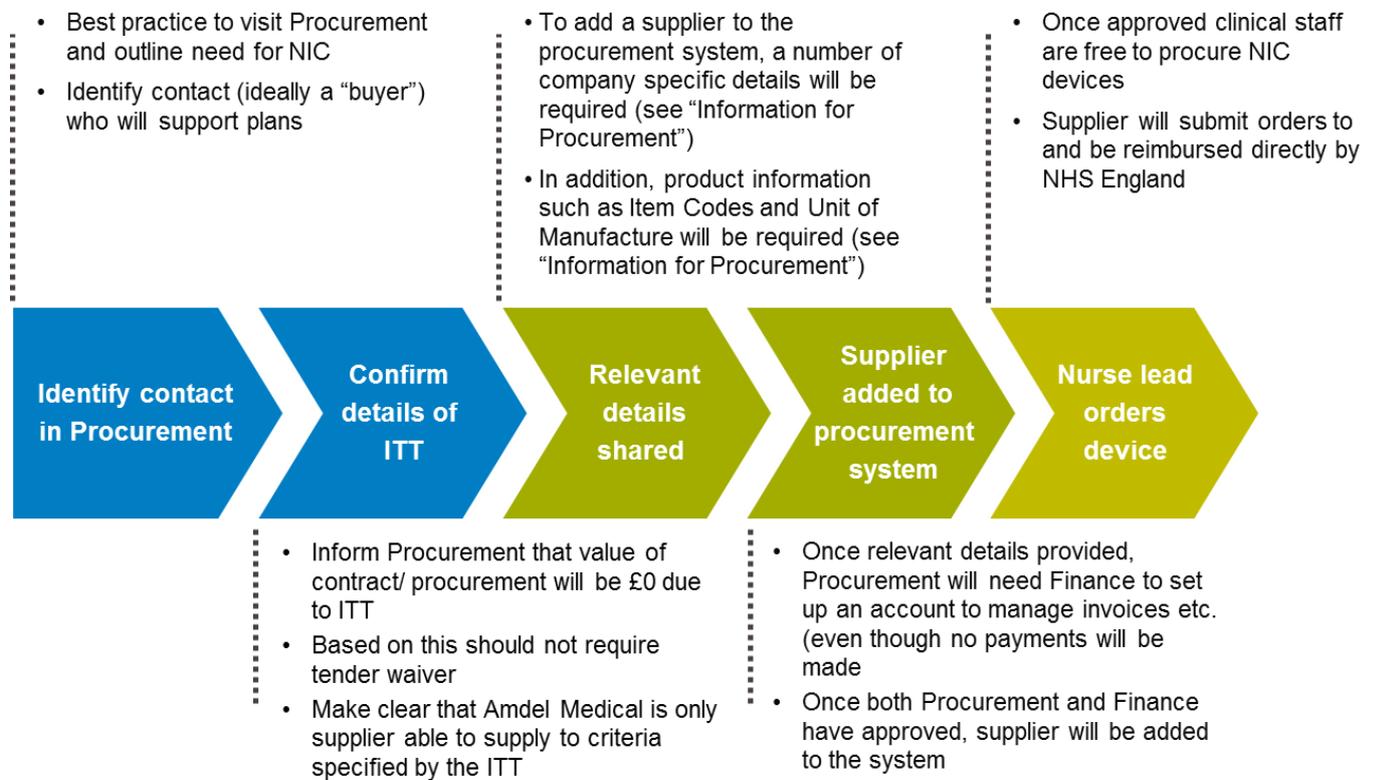


Figure 3 Overview of Process for Procuring NIC

Information for Procurement

Leads at each Trust can use the text and details below to share relevant information with Procurement department.

After approval from clinical leads and management to proceed, ICU would like to procure and implement a novel product – “Non-injectable arterial connector” from AmDel Medical Ltd. As part of the new NHS England Innovation and Technology Tariff (ITT) the device is available at zero cost to Trusts (see Theme 2 <https://www.england.nhs.uk/resources/pay-syst/development/tech-tariff-17-19-technical-notes/>). AmDel Medical is a small supplier that will need to be added to our procurement system. We have gathered the relevant information below which we hope is enough for you to proceed. Please let us know if further information is required.

Total value of contract per annum: £0 (due to ITT reimbursement) - assume no waiver needed

Suppliers able to provide goods to specification: Currently Single Source - only AmDel Medical can provide the product according to the specifications outlined in the ITT

Supplier Details:

AmDel Medical Limited
123a Allerton Road,
Mossley Hill,
Liverpool
L18 2DD
Tel: +44 (0)151 733 1900
Fax: +44 (0)151 733 9899

enquiries@amdelmedical.com

www.amdelmedical.com

VAT Number: *to be provided*

GHX Number: *to be provided*

Supply Classification as per Sid4gov guidance: Small to Medium Enterprise (SM/E)

Products to be added to procurement System: *to be provided*

Step 4: Schedule and Deliver Training

The NIC is a simple arterial connector, that does not require a large amount of training. However, as with any change of practice, local practice development nurses should be involved in understanding how the NIC is used and how the unit is likely to get the most from its use.

Once an order for the NIC has been submitted, responsible project leads and practice development nurses should may wish to contact the supplier to schedule a meeting with a sales representative. A rep from AmDel Medical will be happy to run a short train the trainer session on the device. The similarity of the NIC to standard connectors may mean that leads decide that rep contact is not necessary. An excellent training resource has been developed by staff at Queen Elizabeth Hospital, King Lynn which can be accessed using the following link <https://www.youtube.com/watch?v=R-9Ue4qTU5A>

Practice development nurses will want to make sure all nursing and medical staff are aware of the change to the NIC, and ensure all ICU staff are comfortable using the device.

Contact details for rep visit

AmDel Medical Ltd

Telephone: 0151 733 1900

Email: enquiries@amdmedical.com

Step 5: Introduce NIC to the ICU

Once training has been delivered, and stock has been received leads should look to introduce the NIC into practice. Specifying a date at which the other needle free connectors will no longer be available would provide a defined timeframe for staff to become accustomed to the new device whilst allowing old stock to be run down to minimise wastage. Practice development nurses may wish to audit usage over this time and continue to drive usage through reinforcing the benefits of usage of the NIC.

Step 6: Decommission Alternatives

The incumbent needle free connectors can be used in theatres for major operating cases until the NIC is introduced in operating theatres, and as such there should be no wastage of current stock.

After introducing the NIC, the Trust should stop ordering the incumbent needle-free arterial connectors leading to a cost saving for the Trust. If they wish, Trusts can continue to order the arterial caps / bungs, but this cost should be off set against the cost saving.

The level of stock required will depend on size of the ICU.

Step 7: Monitor and Optimise Usage

Once implemented on the ICU, continual monitoring and reinforcement to ensure use of the NIC becomes standard of care. There may be a strong case for expanding adoption to theatres in addition to ICU.

As part of the ITT, NHS England will undertake follow-up research with providers who implement this device, and will contact a sample of Trusts to seek answers to the following questions:

1. Number of patient incidents of bacterial contamination and accidental intraarterial injection prior to the introduction of this innovation
2. Number of patient incidents of bacterial contamination and accidental intraarterial injection after the implementation of this innovation
3. Number of Non-Injectable Connectors or other approved devices directly used in patient care and a breakdown of usage levels against clinical intervention

Baseline Data Requirements

The table below outlines the data required both to inform the business case and to provide the baseline against which the impact of the device can be measured (Table 1). The system by which the data can be collated is given, although it is recognised that this may vary by Trust.

Table 1 Baseline Data Requirements - NIC

Data requirement	System/department to provide data	Time period for which data is required
1. Current type of arterial connector and / or bung used	Procurement	N/A
2. Annual volume of arterial connectors and / or bungs ordered	Procurement	Last 3 years (to understand increasing numbers)
3. Reported incidents of wrong route medication errors via arterial line	Incident Reporting System / NHS England	Last 3 years
4. Reported near misses of wrong route medication errors via arterial line	Incident Reporting System	Last 3 years
5. Reported incidents of bacterial contamination of the arterial line	Incident Reporting System	Last 3 years

Potential Barriers to Implementation and Mitigating Action

Implementation of innovation is rarely straightforward and in many cases barriers and challenges faced at one Trust will be similar to those experienced at other Trusts. In the table below, some of the most common issues arising from implementation have been captured along with how best to circumvent or overcome this hurdle (Table 2).

Table 2 Barriers to implementation captured from previous site implementations of the NIC device and how they have been overcome

Potential Barriers to Implementation	Mitigating Action
1. Additional cost required to implement the innovation	The Innovation and Technology Tariff covers the cost the device, meaning it is free for Trusts to implement
2. Training programme required before the device can be implemented	A minimal amount of training is required to ensure staff are accustomed to the device. Training videos are provided and the training requirement is not cumbersome; training can be delivered at the bedside and can be undertaken during hand over of shifts. Training on the NIC will be included in the induction of new members of staff
3. The NIC will require changes in clinical practice	The NIC is very similar to the current arterial connectors used and as such does not require changes to clinical practice
4. The unit still has a large number of the current connectors in stock	The current connectors can be used in theatres if required, to prevent wastage

Potential Barriers to Implementation	Mitigating Action
<p>5. Our Trust uses a proprietary closed arterial sampling system and the NIC is not compatible with this system</p>	<p>The NIC works with all open and closed arterial systems.</p> <p>All these systems have luer injection ports on their arterial lines. The WHO and Joint Commission recommend that arterial lines should not have injection ports. By using the NIC on these systems they comply with the WHO and Joint Commission guidance.</p> <p>Using the NIC, standard transducer sets and standard ABG syringes is much more cost-effective than using a proprietary closed arterial sampling system. The Association of Anaesthetists of Great Britain and Ireland state the best method of taking blood gas samples is via the blood conserving method:</p> <ol style="list-style-type: none"> 1. Place a syringe on the transducer port of the arterial line, withdraw the syringe until patient's blood passes the sampling port 2. Do not remove the syringe from the transducer port 3. Take the blood sample from the injection port 4. Return the blood back to the patient by pinching the transducer and flushing the arterial line and the NIC 5. For additional safety place a NIC on the transducer port of the arterial line
<p>6. If using a standard arterial line with a 3-way tap, the NIC would only be effective if staff remembered to affix the NIC to the 3-way tap</p>	<p>This is not correct. The NIC is attached to the sampling port when the line is set up and is never removed. There will always be a connector covering the sampling port of the arterial line; this will now be the NIC and as such there is no change to normal clinical practice</p>
<p>7. What is the dead space volume in the NIC?</p>	<p>The outer case of the NIC is of a haptic design to differentiate it visually from other connectors. The dead space in a NIC is the same as the dead space in a 3-way tap – 0.2ml</p>

Potential Barriers to Implementation	Mitigating Action
8. How is the NIC flushed?	After taking the ABG sample, replace the waste syringe onto the NIC. Pinch at the transducer, this will flush both the arterial line and the NIC
9. The Innovation and Technology Tariff is only in place for 2 years, meaning there could be a potential cost pressure	<p>The tariff is in place to incentivise the use of evidence-based innovations that are known to improve patient safety.</p> <p>Health economic analysis has shown that the NIC is cost saving directly on consumable alone, meaning that using the NIC is cost saving for the Trust despite the ITT tariff. However, in order to support the introduction of a safety innovation into the NHS, the cost of the NIC will be free for 2 years.</p> <p>The NIC also eliminates the potential for wrong route medication errors, bacterial contamination of the arterial line and excess blood spillage. Such incidents have a detrimental impact on patients, plus incur additional expenditure for the Trust. Thereby preventing the potential for these errors not only improves patient safety but prevents the potential for increased expenditure</p>

Contacts

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