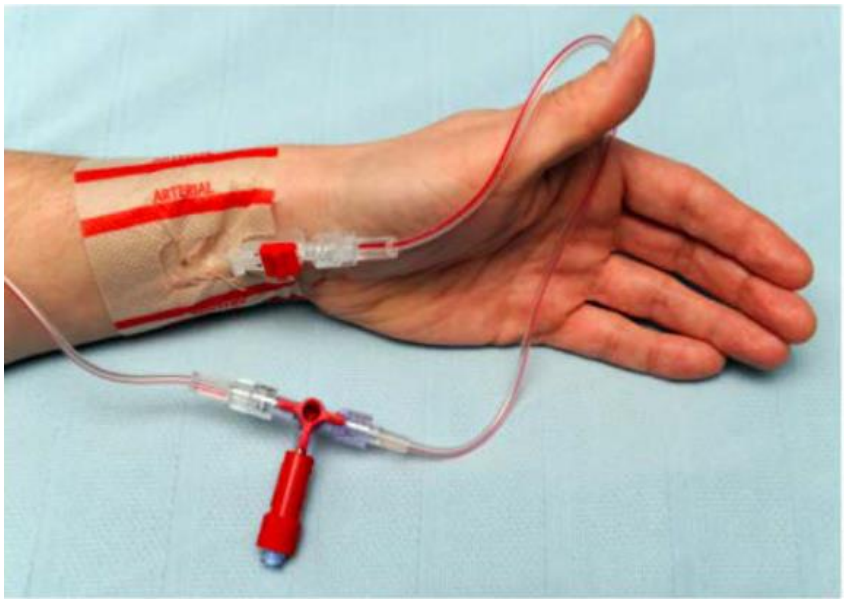
NHS Innovation Accelerator

Implementation Toolkit

Non-Injectable Arterial Connector (NIC)



UCLPartners Academic Health Science Partnership

The AHSN Network

NHS England

Introduction

NHS England's Innovation and Technology Tariff (ITT) went live on 1 April 2017. This new Tariff was introduced to incentivise the adoption and spread of transformational innovation in the NHS. The first two-year ITT runs from 2017 to 2019, with six themed product types identified as being suitable for at-scale introduction in the NHS and likely to result in great benefits for patients.

Four innovations on the NHS Innovation Accelerator (NIA) - an NHS England initiative supported by England's 15 Academic Health Science Networks (AHSNs) - meet the required theme specifications of the ITT.

These are: myCOPD, the Non-Injectable Arterial Connector (NIC), PneuX Prevention System, and Episcissors-60. Under the ITT, the first three innovations are funded under a zero cost model. Providers order the innovations directly from the supplier at no cost and NHS England reimburses the supplier directly. Episcissors-60 can be ordered via NHS Supply Chain, with providers reimbursed based on use.

In parallel, but separately from the ITT, NHS England is centrally funding the purchase of mobile ECG technology. A further NIA innovation, AliveCor's Kardia, meets the stringent specification of this technology, which will be available and managed via the AHSN Network.

The NIA has produced Implementation Toolkits for Episcissors-60, myCOPD, the Non-Injectable Arterial Connector (NIC), PneuX Prevention System, and AliveCor's Kardia. These toolkits detail how the innovations provide solutions to key challenges within our healthcare system; impact and outcomes, including cost savings, patient benefit and organisational advantage; an evidence summary and supporting testimonials; plus an overview of how to procure each innovation, including payment/price detail.

Contents

Introducing the NHS Innovation Accelerator (NIA)

The NHS Innovation Accelerator (NIA) is an NHS England Initiative delivered in partnership with the Country's 15 Academic Health Science Networks (AHSNs), hosted by UCLPartners. It supports delivery of the *Five Year Forward View* by accelerating uptake of high impact innovations for patient, population and NHS staff benefit, and providing real time practical insights on spread to inform national strategy.

Fellows supported by the NIA all share a set of values and passion for scaling evidence-based innovation to benefit a wider population, with a commitment to share their learnings. Some impressive results have been achieved by the NIA Fellows in their first 20 months since July 2015, with 469 additional NHS commissioners and providers now using NIA innovations; £28.6m in external funds secured; 14 awards won; 51 jobs created; and ten innovations selling internationally. In addition, impact data is already available at adopter sites which demonstrates earlier intervention, reductions in complications and emergency admissions, alongside cost savings.

The NIA hosts 25 Fellows representing 26 innovations aimed at: activating people to self-manage; earlier intervention; long term conditions management and improving safety. The next NIA call, to be launched in June 2017, will select innovations that address the population challenges prioritised within the 44 Sustainability and Transformation Partnerships (STPs).

For more information about the NIA, email NIA@uclpartners.com

An overview of the Innovation and Technology Tariff (ITT)

The Innovation and Technology Tariff (ITT) has been introduced to incentivise the adoption and spread of transformational innovation in the NHS.

Introducing new innovative products to the NHS can often be hampered by the need for multiple local price negotiations. The ITT aims to remove this need, while guaranteeing that local NHS organisations will be reimbursed for the costs of purchasing an ITT-approved product type. At the same time, the ITT allows NHS England to optimise its purchasing power and negotiate national 'bulk buy' price discounts wherever possible on behalf of the whole NHS.

The first two-year ITT runs from 2017 to 2019. This first Tariff has been developed as a pathfinder, with six themed product types identified as being suitable for at-scale introduction in the NHS, and likely to result in great benefits for patients.

The ITT themes are:

- Guided mediolateral episiotomy to minimise the risk of obstetric anal sphincter injury
- Arterial connecting systems to reduce bacterial contamination and the accidental administration of medication
- Pneumonia prevention systems which are designed to stop ventilator-associated pneumonia
- Web-based applications for the self-management of chronic obstructive pulmonary disease
- Frozen Faecal microbiota transplantation (FMT) for recurrent Clostridium difficile infection rates
- Management of Benign prostatic hyperplasia as a day case

The ITT operates under a zero cost model for four of the six themes, which allows providers to order ITT innovations without the need for multiple financial transactions. The zero cost model has been established to minimise the number of transactions and create a more efficient system to administer across the NHS. Both the 'guided mediolateral episiotomy to minimise the risk of obstetric anal sphincter injury' and 'the Management of Benign prostatic hyperplasia as a day case' operate under separate arrangements.

Mobile ECG Technology

In parallel, but separately from the tariff, NHS England is centrally funding the purchase of mobile ECG technology to improve diagnosis of atrial fibrillation (AF). Taking repeat ECG recordings continuously over a 24-hour period or recording events over several days can increase the probability of detecting an arrhythmia, but needs small, portable ECG machines to be practical. The availability of this technology will be managed through the Academic Health Science Networks (AHSNs).

The NHS England Innovation and Technology Tariff 2017-2019 Technical Notes is available to download at: www.england.nhs.uk/resources/pay-syst/development/tech-tariff-17-19-technical-notes/

Introducing the Non-Injectable Arterial Connector (NIC)

Challenge/problem identified

Arterial lines are used in patients admitted to critical care and those requiring major operations, and are used for monitoring blood pressure and taking blood samples.

There are risks associated with arterial lines, where if it is accidentally and wrongly used to administer medication into the arterial line, patients can suffer serious harm, such as damage to their hand which can lead to patient's requiring amputations. This problem was highlighted in the 2008 NPSA Arterial Rapid Response Report, which recommended that safety systems should be adopted to prevent this error.

Colour coding, re-education and re-training alone are not sufficient to prevent this error, fail-safe solutions are required. A simulation study, where junior doctors working in ICU were asked to urgently administer medication to a 'patient', showed that 66% wrongly and accidentally used the arterial line – many did not realise they had made a mistake. A national survey showed an incidence rate of around 9% for wrong route drug administration using arterial lines in ICUs, with 28.5% of participating ICUs reporting incidents in the past five years. Incidence data reported to the NHS National Reporting and Learning System suggests this error occurs on average twice a month in the NHS. This is likely to be an underestimate[2].

Infection control in Intensive Care Units (ICU) is of paramount importance, a clinical audit of standard arterial connectors showed a 6% bacterial colonisation rate of arterial lines, which correlates to the reported literature.[1]

Solution

The Non-Injectable Arterial Connector (NIC) is a low-cost, simple device that improves safety for all patients requiring arterial line in operating theatres and intensive care. It stops wrong-route drug administration, reduces arterial line-related infections, and prevents accidental blood spillage during sampling.

The NIC is a needle free arterial connector, however unlike standard connectors, it has a one-way valve safety feature built into it. This safety feature allows clinical staff to use the NIC as per normal clinical practice, however, if they attempt to wrongly give medication via the arterial line, the clinician is prevented from doing so by the safety feature.
Adoption of the NIC requires minimal staff training.

A training video is available at: www.KLIPSuk.com

Impact and outcomes

Key statistics

A six-month study saw the NIC adopted by 11 trusts and used in 79% (2,881) of all cases requiring arterial lines. A follow-up survey of >250 NHS ICU and anaesthetic staff showed that:

- 28% had seen adverse events where standard arterial connectors were used and 93% believed these events would have been avoided with the NIC
- 98% believe it is important to have a device like the NIC
  81% wished to use the NIC once the study was complete

This study also showed that:

- The NIC is easier and quicker to use than standard connectors
- The NIC stays on the arterial line for the lifetime of the line (and does not have be changed with each blood sample). In equipment costs alone, using the NIC saves **£285 per trust per year**

The cost of adverse incidents from wrong-route drug administration incidents ranges from £57 for a near miss to over £10,000 when incidents occur. With an average incidence of 2 times per month in the NHS, using the NIC could eradicate this error from the NHS.

Testimonials

"Use of the NIC can be considered dominant in health economics terms, as it delivers improved patient outcomes at reduced cost."

Anna Crispe, Independent Health Economist

"Excellent idea (NIC), feel confident this would benefit my family, myself and the NHS"

Patient feedback, East of England Citizens' Senate, 2015

Awards

- 2012 National Patient Safety and Care Award
- 2015 Association of Anaesthetists of Great Britain and Ireland, Innovation in Anaesthesia, Critical Care and Pain Award

How to procure the Non-Injectable Arterial Connector (NIC)

The below is detailed within The NHS England Innovation and Technology Tariff 2017-2019 Technical Notes, available to download at:

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

Payment/price detail

The ITT agreed price for this innovation is £2 per unit. This is available to providers under the zero cost model. Refer to page 14 of the ITT Technical Notes for reporting instructions.

Availability

From 1 April, the Non-Injectable Arterial Connector (NIC) can be ordered direct from Amdel Medical (www.amdelmedical.com) under the zero cost model. NHS England is working to include this product on the NHS Supply Chain by the end of summer 2017.

Evidence summary

Colour coding the arterial line is not sufficient

- Colour coding, re-education and re-training alone are not enough to prevent this error, fail-safe solutions are required.
- A simulation study, where junior doctors working in ICU were asked to urgently administer medication to a 'patient', showed that 66% wrongly and accidentally used the arterial line – many did not realise they had made a mistake.[4]

The NIC prevents bacterial contamination

- A clinical audit of standard arterial connectors showed a 6% bacterial colonisation rate of arterial lines, which correlates to the reported literature.[5] The one-way valve safety feature of the NIC, prevents bacterial contamination of the arterial line.
- Laboratory studies replicating arterial blood gas sampling, compared the NIC to a standard arterial connector, and determined the effectiveness of both connectors in preventing bacterial contamination. When using the NIC there was 0% colonisation of the connector and 0% transmission of bacteria to the patient. Compared with a standard arterial connector where 100% of the connectors were contaminated and 85% transmission of bacteria to the patient.[4]

NIC Implementation data

- The Eastern AHSN Patient Safety Implementation study included a health economic evaluation which showed that the NIC is easier and quicker to use than standard connectors. The NIC stays on the arterial line for the lifetime of the line (and does not have be changed with each blood sample). In equipment costs alone, using the NIC saves a trust on average £285 per trust per year.[6]

References

1. Problems with infusions and sampling from arterial lines. Rapid Response Report. National Patient Safety Agency. July 2008. Available at: NPSA/2008/RRR006 http://www.nrls.npsa.nhs.uk/resources/?entryid45=59891
2. Personal communication of adverse events data from NHS England
3. Accidental intra-arterial injection: an under-reported preventable never event. Critical Care 2015; Supplement A441. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4472680/
4. Description of a new non-injectable connector to reduce the complications of arterial blood sampling. Anaesthesia 2015; 70(1): 51-55. Available at: http://onlinelibrary.wiley.com/doi/10.1111/anae.12884/full
5. Infectious risk associated with arterial catheters compared to central venous catheters. Critical Care Medicine 2010 Vol. 38, No. 4
6. Non-injectable arterial connector. A cost effectiveness assessment to improve arterial line safety. Eastern Academic Health Science Network. 2015. Available at: http://www.eahsn.org/our-work/casestudies/

Useful links

- Full information: http://klipsuk.com/portfolio-items/nic-the-non-injectable-arterial-connector/
- NIC Instructional Video: http://klipsuk.com/portfolio-items/nic-the-non-injectable-arterial-connector/#training

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