NICE National Institute for Health and Care Excellence

Adoption support resource – insights from the NHS

Implementation support

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Contents

1 Introduction

This resource has been developed to provide practical information and advice relating to NICE medical technologies guidance on the Sherlock 3CG Tip Confirmation System for placement of peripherally inserted catheters.

It is intended for use by both clinical and non-clinical staff planning to implement this NICE guidance and start using this technology.

NICE's Health Technologies Adoption Programme worked with NHS organisations to share their learning and experiences of using the Sherlock 3CG Tip Confirmation System (TCS). The information presented in this resource is intended for the sole purpose of supporting the NHS in adopting or further researching this technology.

The information presented was neither assessed by the External Assessment Centre nor presented to the Medical Technologies Advisory Committee when it developed provisional recommendations on the Sherlock 3CG TCS. However, an advanced draft of the pack was available to the Committee, for information, when it considered the consultation comments and developed its final recommendations on the technology.

The Sherlock 3CG TCS is designed to confirm the correct placement of a peripherally inserted central catheter (PICC). It integrates tip location and confirmation by enabling the magnetic and electrocardiographic real-time tracking of the PICC tip during insertion. This technology is intended to allow the person placing the PICC to immediately detect and correct any tip malposition.

The benefits of using the Sherlock 3CG TCS reported by the NHS staff involved in the production of this resource include:

- Reduced PICC tip malposition rates.
- Reduced delay in commencement of infusion therapy.
- Potential cost savings due to fewer PICC re-insertions and repositions and less need for chest X-rays.
- More convenient and reduced radiation exposure for patients by avoiding the need for X-ray confirmation.

The learning gained from existing users is presented as series of examples of current practice. They are not presented as best practice but as real-life examples of how NHS sites have adopted and used this technology.

2 Current practice

There are a variety of reasons why someone may need a PICC for long- or short-term care. These include:

- delivery of chemotherapy drugs, antibiotics or total parenteral nutrition
- repeated administration of blood products
- poor peripheral venous access
- monitoring central venous pressure
- power injection of contrast media for CT scans
- infusion of vesicant, irritant or hyperosmolar solutions
- people with needle phobia, to prevent repeated cannulation.

PICCs may be single, double or triple lumen in design (depending on the indication) and are available in a number of sizes. They may be open-ended or valved and made of silicone rubber or polyurethane. Device selection will be made following clinical assessment of the individual.

Using a PICC for central venous access, rather than a skin-tunnelled catheter or implanted port, presents a number of advantages: it can be inserted at the bedside or in a clinic setting, it does not require a surgical procedure for insertion or removal, and it does not leave a scar.

PICC insertion

In current NHS clinical practice, PICCs are inserted by clinicians including nurse specialists, intensive care consultants, anaesthetists, general physicians, radiologists and radiographers. The clinical settings where PICCs are inserted include operating theatres, emergency rooms, oncology departments, orthopaedic and other wards, radiology departments, intensive care, high dependency units and outpatient clinics.

Although there are no national guidelines for catheter insertion, a modified Seldinger

micro-introducer technique under local anaesthesia with ultrasound guidance is most commonly used for PICC insertion in the UK.

PICC tip placement

Opinions vary about the ideal catheter tip position (Tizard et al. 2012). However, the following positions are generally considered acceptable

- mid-lower superior vena cava
- atrio-caval junction
- high right atrium.

NHS local practice guidelines and policies determine that a chest X-ray, to confirm the PICC tip location, must be performed before the PICC can be used and that this must be documented in the patient's medical records.

3 Summary of NICE recommendations

NICE medical technologies guidance on the Sherlock 3CG TCS assessed the device to help the NHS decide whether to use this technology for placement of PICCs.

The case for adoption is supported by the evidence. The Sherlock 3CG TCS usually avoids the need for a confirmatory chest X-ray in people who would otherwise have blind insertion, minimizing patient discomfort and delays. Using the device also increases staff confidence during catheter insertion.

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

4 Tips for adopting the Sherlock 3CG TCS

- Before implementation, collect baseline data on current PICC placements, malpositions and adjustments. See measuring success for more details.
- Ensure that all stakeholders are consulted and ensure any relevant groups and committees are informed. See insights from the NHS for more details.
- Oversee a trial period for training before independent placing to increase clinical confidence. See insights from the NHS for more details.
- Build robust protocols for the correct insertions of PICCs. See PICC placement policies for more details.
- Once independent placing with the Sherlock 3CG TCS has been established, continue to perform chest X-rays for a locally agreed pilot period. Identify a lead clinical sponsor to act as an external assessor of these X-rays. Once this has been agreed, the protocol for PICC placements can amended so that routine X-rays are no longer needed. See insights from the NHS for more details.
- Develop data collection mechanisms to monitor PICC placements using the Sherlock 3CG TCS. See measuring success for more details.

5 Insights from the NHS

During the development of this resource, NICE worked with a number of NHS trusts using the Sherlock 3CG TCS. These organisations agreed to provide structured feedback on their experiences of using the technology as detailed in this section.

Bristol Haematology and Oncology Centre

The Bristol Haematology and Oncology Centre is 1 of the 8 hospitals run by University Hospitals Bristol NHS Foundation Trust. The centre provides specialist non-surgical treatments for people with cancer and for people who do not have cancer but need specialist radiotherapy or haematology services. There are 2 wards, 2 day units, a combined outpatients department, 5 linac machines, a brachytherapy theatre and an isotopes unit. The centre provides cancer treatment to people from Bristol, South Gloucestershire and North Somerset, and provides specialist services to people from across the South West.

Since 2007, a PICC placement service has been delivered by a vascular access team consisting of 4 part-time nurses, or 1.8 whole time equivalent (wte). The team has a designated PICC placement clinic room. During the procedure, either a health care assistant or another PICC placer attends in accordance with trust policy. PICC clinics are held all day Monday to Thursday and people can be referred urgently on Fridays. Bedside placements are provided for any acutely ill people who are unable to attend the clinic. Initially, the traditional method of PICC placement was used with anatomical measurement, ultrasound and X-ray confirmation. Because the centre has a dedicated radiology suite located directly opposite the PICC placement room, there has never been a delay for X-ray.

The team manager was interested in trialling the use of the Sherlock 3CG TCS to see if it would improve the team's PICC tip malposition rate, which was estimated to be 40%. In August 2013 an application was submitted to the trust Techniques and Medical Devices sub-group of the Clinical Governance Committee for permission and funding for a 3-month pilot to trial the Sherlock 3CG TCS. The funding element was to cover the cost of the consumables as the equipment was on loan from the company.

The team commenced the pilot in September 2013, with the company providing training

and supervision. During the 3-month period, the team kept a record of the first 88 Sherlock 3CG TCS PICC insertions and confirmed placement with X-rays. As a proxy for misplacements avoided, the team measured the line length it would have placed without the Sherlock 3CG TCS and compared it with the line length actually inserted with the technology. The team estimated that a difference of more than 2 cm would have needed to be adjusted following X-ray, and that a difference of more than 5 cm would have required a second chest X-ray following adjustment. These measurements are recorded in the PICC placement documentation which is kept in the patient notes.

The data collected showed that of the 88 procedures completed:

- 47 (53%) were within 2 cm of the placer's predicted measurement
- 20 (23%) were outside the 2 cm margin and would have needed further manipulation, a dressing change and extra clinic time
- 21 (24%) were potential misplacements during the insertion
    - 18 started to go into the internal jugular vein (1 went in 6 times and would have previously been a failed placement)
    - 1 went contralateral
    - 2 curled in the subclavian.

All 21 of the potential misplacements were corrected successfully using the Sherlock 3CG TCS. It is difficult to identify which of these the team may have suspected were going into the incorrect position without the Sherlock 3CG TCS, but the team reported that some people would certainly have needed several chest X-rays. The placer would have previously tried to adjust those in the incorrect position after the procedure, which would have meant a higher risk of infection during dressing changes and line manipulation. From the team's experience, some of the lines would have been removed completely and the procedure repeated on the opposite arm.

As a result of the successful trial period the team presented a case for funding to 2 local charities: Bosom Buddies and It's in the Bag (part of the trust's Above & Beyond charity). Many people with breast cancer and testicular cancer need PICCs and the case presented was well received and funding agreed. The use of the Sherlock 3CG TCS is now fully implemented in the service, and between January and September 2014 a further 493 PICCs had been placed with no reported misplacements.

The team is now planning to stop routine X-rays for uncomplicated placements using the Sherlock 3CG TCS and are submitting a new protocol for approval.

Cambridge University Hospitals NHS Foundation Trust

Addenbrooke's Hospital is a university teaching hospital and part of the Cambridge University Hospitals NHS Foundation Trust. It provides emergency, surgical and medical services for people living in the Cambridge area. It also provides regional specialist services including organ transplantation, cancer, neurosciences, paediatrics and genetics. The trust has 1000 beds and 7000 staff.

The vascular access team at Addenbrooke's was established in January 2006. A dedicated venous access unit was opened in June 2008 and consists of 2 theatre suites and a 4-bed recovery unit, a treatment room, mobile chest X-ray, scrub and shower rooms for main lines, and a full day-case facility. The team provides both an inpatient and outpatient service for people who need central venous access lines to be inserted (PICCs, ports, tunnels). The team consists of 1.0 wte specialist nurse manager, 2.6 wte band 7 and 0.8 wte band 5 nurses, 1 health care assistant, reception staff, and 2 porters allocated on a daily basis (Monday to Friday). Medical leadership is provided by a consultant in intensive care medicine and anaesthetics. The team also provides hands-on PICC line insertion training for nurses from other trusts.

The team inserts PICCs into the upper arm veins using a Seldinger micropuncture and spilt sheath technique, under ultrasound control and followed by X-ray confirmation. PICC placements are done by a single nurse with confirmation from a second person that both guide wires have been removed. People who are able (or who can be porter-assisted) attend the venous access unit for PICC insertions and X-ray. Those too ill to attend, in the intensive care unit or neurosciences critical care unit, have a bedside insertion followed by a mobile chest X-ray. The vascular access nurses have competencies signed off for requesting and interpreting chest X-rays. Once the nurse has checked the X-ray, it will be approved as a correct placement or adjusted as necessary before therapy can be administered. A radiology consultant gives final sign-off, and this is also recorded in the notes.

The team had done a retrospective analysis of 479 PICC insertions over a 6-month period (November 2011 to April 2012), and found a high (definition-dependent) malposition rate of

42–76%. Malposition rates were significantly higher in ICU patients. The team identified that there were emerging technologies that may assist in reducing these high rates, and was specifically looking for a solution for critically ill patients where double-lumen PICCs would be needed. In April 2013 they agreed to become a pilot site for the Sherlock 3CG TCS as it offered both the ECG and 'Sherlock' visualisation element.

The nurses were trained by the company in how to operate the equipment and understand the Sherlock 3CG TCS screen. They also all attended an in-house 2-day training course, provided by the trust Cardiology department, in interpreting and reading ECG results to improve their understanding of P-wave optimisation.

In the first 3 months of using the Sherlock 3CG TCS the team collected data for 239 critically ill patients in ICU, the results of which were published in July 2014 (Sherlock 3CG evaluation). When compared with the malposition rates in the team's previously published retrospective analysis, the Sherlock 3CG TCS resulted in an improved PICC position rate and almost eradicated gross malpositions outside the central venous circulation. The results are shown in table 1.

Table 1 PICC tip positions in ICU patients

	ICU patients (n)	Correct PICC tip position defined as mid/low SVC, CAJ or high right atrium	Gross malposition above central venous circulation (SVC, CAJ, right atrium)
Traditional 'blind' technique	246	121 (49.2%)	51 (20.7%)
Using then Sherlock 3CG TCS	239	190 (79.5%)	1 (0.4%)
Abbreviations: CAJ, cavoatrial junction; ICU, intensive care; PICC, peripherally inserted central catheter; SVC, superior vena cava; TCS, tip confirmation system.			

The team believe that using the Sherlock 3CG TCS has benefits for people who specifically need double lumen PowerPICCs (including all those in intensive care and the neurosciences critical care unit). In the first 6 months of 2014, 2316 central lines were placed, 1960 of which were PICCs (84%). Of these, 535 (27%) were PowerPICCs. It is

estimated that over a full year more than 1000 PICC placements would be done with the Sherlock 3CG TCS.

Currently, 2 members of staff contribute to a single PICC placement with the Sherlock 3CG TCS because it is more time-intensive in terms of setting up the equipment; a second person makes operating the machine more manageable. The team reported that the Sherlock 3CG TCS can be operated by a single placer but that this can be difficult. Chest X-rays are still taken after PICC placement because the team considers there is not enough published evidence or agreement within the vascular community on what is an acceptable final PICC tip position.

Frimley Health NHS Foundation Trust

Frimley Park Hospital, part of Frimley Health NHS Foundation Trust, is a district general hospital located in Surrey which serves a population of more than 400,000 across north-east Hampshire, west Surrey and east Berkshire. It also offers tertiary services to a wider population including primary percutaneous coronary intervention, vascular surgery, cystic fibrosis, spinal surgery and stroke services. It has 750 beds and 4200 staff.

A nurse-led vascular access service started in 2010 to address rising demand for central lines, PICCs and implantable ports, and in particular to reduce pressure on the radiology-based chest X-ray and fluoroscopy PICC placement service. The full-time vascular access nurse provides a bedside and outpatient PICC placement service across the whole hospital, with the majority of referrals coming from haematology, oncology and ITU.

PICCs were placed using ultrasound and anatomical measurement followed by a chest X-ray. The X-ray would then be reviewed by the vascular access nurse who would confirm correct placement and give clearance for drug administration. The delay between PICC insertion and sign off for a correctly placed tip ranged from 2 hours to 2 days depending on the time and day of insertion, portering requirements and radiology waiting times.

Using this technique, approximately 10% of PICCs needed complete repositioning (thus requiring a repeat chest X-ray). About 80% of the others would need to be withdrawn by 1–2 cm following X-ray.

In May 2013, Frimley Park became 1 of 4 pilot sites trialling the Sherlock 3CG TCS in the NHS in England. Following initial training from the company, the Sherlock 3CG TCS was

used for a pilot period of 3 months. All chest X-rays and ECGs for the 65 placements done during this time were then independently reviewed by a consultant chest physician and the lead interventional radiologist. They agreed that all the PICCs placed with the Sherlock 3CG TCS were acceptable. The trust Vascular Access Policy was then updated to reflect its decision to stop routine X-ray confirmation for PICC tip placement when using the Sherlock 3CG TCS with ECG. As part of the adoption resource review in 2019, the trust shared their most up to date Vascular Access Policy.

All PICC placements are recorded on an Excel spreadsheet for audit purposes and a PICC insertion record is kept in the patient notes.

Although it was agreed that all PICCs in the trial period had been correctly placed, X-rays continued to be taken while the policy was being developed to ensure wider clinical confidence was established. The updated policy was approved by the trust's Clinical Practice Documentation Group in December 2013, at which point 225 PICCs had been successfully placed with the Sherlock 3CG TCS.

The new care pathway was implemented in January 2014 and is reported as being more efficient, less time consuming and having an improved patient experience. PICCs can now be placed later in the day and therapies administered immediately after placement. It has also been reported that there have been no central line infections during the 18 months that PICC insertions have been done with the Sherlock 3CG TCS. Due to the rising number of requests for bedside PICC placements, a business case is being developed for an additional vascular access nurse and an oncology nurse is being trained to insert PICCs and to use the Sherlock 3CG TCS.

The procurement team in the trust led on the development of a project report during the pilot period detailing projected savings in the first year of £17,810 (exc. VAT). This compared traditional placement with PowerPICCs. As a result of their recommendations, funding was secured for purchase of a new Sherlock 3CG TCS to replace the one on loan.

Medway NHS Foundation Trust

Medway Maritime Hospital provides services for around 400,000 patients each year mainly in Medway and Swale. Specialist services including a cardiac catheter suite, West Kent Vascular Centre, West Kent Centre for Urology, a dedicated stroke unit and the Macmillan Cancer Care Unit are also provided to a wider population across other parts of North and West Kent.

A matron in trauma and orthopaedics had training in ultrasound-guided PICC insertions in 1999 to address the waits of up to 1 week for lines in interventional radiology for orthopaedic patients who needed antibiotics. Following the successful introduction of this nurse-led initiative, other nurses in the trust (oncology and intensive care) also had PICC placement training. In March 2014, the company offered the nurses the opportunity to trial the Sherlock 3CG TCS to assess if it could provide any additional benefits to the nurses already placing PICCs.

The original protocol for ultrasound-guided PICC insertions had clinical governance arrangements in place which stated that the procedure must be done in a room in interventional radiology, followed by a chest X-ray with placement confirmed by an interventional radiologist. Some insertions were carried out at the bedside for very ill people but they still had to have a chest X-ray, so treatment could be delayed for up to 24 hours.

Nurses were trained by the company over an initial 3-month pilot period and during this time the clinical governance arrangements for confirmation by chest X-ray stayed the same. The ECG printouts and chest X-rays of the first 40 PICC placements were then reviewed by an interventional radiology consultant and consultant cardiologist. They agreed that all had been placed in an acceptable location. The Divisional Director for Medicine, A&E and Critical Care (an anaesthetist) then observed a PICC placement session using the Sherlock 3CG TCS in the intensive care unit and also reviewed the X-rays. Following this it was agreed that the policy for adult-valved PICC placement and management could be re-written to include using the Sherlock 3CG TCS as an alternative method to chest X-ray and fluoroscopy for PICC tip placement confirmation in adults where a P wave is present.

The trust now has a rolling programme of training in PICC placements using the Sherlock 3CG TCS for nurses in the oncology, intensive care and surgery teams.

Northampton General Hospital NHS Trust

Northampton General Hospital NHS Trust provides general acute services for a population of 380,000. The trust's cancer centre provides haematology and oncology tertiary services to a wider population of 880,000 who live in Northamptonshire and parts of Buckinghamshire.

Since 2010, 2 junior sisters (band 6) in the centre have been providing PICC placements

using ultrasound in a dedicated clinic room in the oncology outpatient department. Clinics are held 3 days per week (Monday, Wednesday and Thursday) and urgent referrals are accommodated on other days if at all possible.

In December 2013 the matron in oncology proposed that a 3-month trial of the Sherlock 3CG TCS should be done. The drivers for adoption were to reduce the number of misplaced lines, stop the need for X-ray and reduce the associated time delay to commencement of treatment.

Currently, people who are able need to walk for 10 minutes to get to the radiology department. For those people who need assistance there is a longer delay because a porter has to be called. The X-ray is then sent electronically to the PICC placer, who contacts the registrar on call to assess that the PICC tip is correctly placed. This doctor then signs the PICC form in the notes to authorise drug administration.

During the pilot period, the number of line adjustments needed after PICC placement decreased by two thirds and there were no malpositions. The results are shown in table 2.

Table 2 PICC placements pre- and post-implementation of the Sherlock 3CG TCS

PICC placement	Time period	No of PICCs	Pulled back (1–7 cm)	Gross malpositions (such as internal jugular)
Traditional ultrasound-guided	13 months (October 2012 to November 2013)	256	61 (23.8%)	11 (4.3%)
Using the Sherlock 3CG TCS	7 months (December 2013 to June 2014)	183	14 (7.7%)*	0
* At the request of the referring physician. Abbreviations: PICC, peripherally inserted central catheter; TCS, tip confirmation system.				

In order to realize the benefits of stopping routine chest X-rays and the associated delays to starting treatment, the PICC placers are now working with their line managers to refine

the care pathway after PICC placement. Governance arrangements will need to be agreed to enable the nurses to sign their PICCs as being correctly placed with the Sherlock 3CG TCS.

University Hospitals Birmingham NHS Foundation Trust

Queen Elizabeth Hospital Birmingham (QEHB) provides direct clinical services to nearly 800,000 patients every year, serving a regional, national and international population. It is a regional centre for cancer, trauma, renal dialysis and burns and plastics. QEHB employs more than 8500 members of staff and is the UK's largest single site hospital. It has 1400 inpatient beds, 40 operating theatres and a 100-bed critical care unit.

A nurse-led IV team was established in 2008 in response to the initiatives Saving Lives and Epic 2 (Pratt et al. 2007). The purpose of the team was to oversee the education of both medical and nursing staff, with the aim of reducing health care-related infections caused by vascular access issues.

In March 2013, the consultant nurse manager of the team started an internal review of all PICC insertions across the trust. The objective was to standardise practice and increase capacity by creating a more efficient PICC service and improving delays in antibiotics therapy.

Stage 1 of the service review involved identifying staff who were placing PICCs, where they were doing this and the lines they were using. This found that PICCs were routinely inserted in the renal unit, interventional radiology, oncology and haematology.

The procedure for PICC placement was the same in each area, using the traditional method of ultrasound measurement and chest X-ray for confirmation.

Stage 2 of the review was to identify all PICC placement methods and systems available and to consult on these both internally and externally.

Following this 6-month review, the areas in the trust identified for improvement were interventional radiology, where the staff were keen to release capacity, and oncology, where additional support and training was needed.

The consultant nurse recommended refreshing and rebranding the existing IV team and separating the infection control and vascular access functions. It was also decided to trial the Sherlock 3CG TCS in the new vascular access team. These recommendations were agreed by the Chief Operating Officer and Executive Chief Nurse.

A Senior Charge Nurse with appropriate experience was appointed in January 2014 to lead and develop a team of 4 band 6 nurses and provide additional support to the 3 existing oncology nurse PICC placers. The vascular access and oncology nurses had the training provided by the company for the Sherlock 3CG TCS and within 3 months were trained to competency. Placements are now done either in a clean room or at the bedside with full sterile procedure. A health care assistant maintains asepsis and operates the machinery.

A validation audit was done in May 2014 by a consultant radiologist who reviewed the X-rays and ECGs of 38 oncology and haematology patients with a Sherlock 3CG TCS-inserted PICC in April 2014. Of the 38 lines, 36 (95%) were categorised as acceptable and 2 as being out of position. Of the 2 out of position, 1 was deemed to be just inside the right atrium and the other had been accidentally pulled out by 3 cm between insertion and the time of X-ray. However, all PICCs were deemed as safe for use. Using the magnetic real- time tracking system also identified that 10 of the lines had migrated out of position during the insertion (internal jugular, brachio cephalic, contralateral). The inserter was able to re-manipulate all of the misdirected lines into a correct position. This avoided re-insertions, inconvenience to patients and added cost.

The consultant concluded that the system was safe for use but highlighted that it was not possible to accurately validate an ECG confirmation system using this method, and that an X-ray would need to be taken at the exact time of insertion to verify the line's tip position with the ECG read out. He advised that all clinicians using the Sherlock 3CG TCS should be properly trained in its use and if there is any doubt when confirming a PICC tip position when using the system, a chest X-ray should be requested and reviewed by a medic.

An expanded practice protocol for registered nurses to insert peripherally inserted central catheters (PICC) and confirm position of PICC was agreed and signed off by the Executive Chief Nurse and Medical Director in July 2014.

An Excel spreadsheet recording all PICC placements referred to the team is kept for audit purposes. A 3-month review of 131 people referred to the vascular access team for PICC insertions between May and August 2014 showed that:

- 126 of 131 were able to be inserted using the Sherlock 3CG TCS (5 were referred to interventional radiology; anatomical abnormalities or trauma, meaning the navigation plate could not be seated on the person's chest)
- 110 of 126 ECG confirmations (87%) of the Sherlock 3CG TCS PICC tip positions were completed (16 people needed chest X-ray to confirm tip position due to atrial fibrillation or contra-indication to ECG but all were able to use the navigation system).

The team has done cost-benefit analyses and shown that there is a cost saving in delivering a nurse-led service using the Sherlock 3CG TCS. The team plans to submit a business case for additional band 6 nurses (and Sherlock 3CG TCS devices) to expand the service to cover the whole trust and all PICC placements.

The waiting time from referral to PICC insertion during this 12-week period was compared with the 12 weeks prior to the service starting. PICCs placed within 24 hours increased from 19% to 75%. Full results are shown in table 3.

Table 3 Waiting times pre- and post-implementation of the Sherlock 3CG TCS

PICC placements	12-week period	Lines	<24 hours	<48 hours	<7 days	<14 days
Traditional technique (interventional radiology)	February to May 2014	204	19%	31%	90%	100%
Sherlock 3CG TCS (vascular access team)	May to August 2014	131	75%	84%	99%	100%
Abbreviations: PICC, peripherally inserted central catheter.						

There is the potential in the future to identify other nurses in the trust who could be trained as PICC placers, instead of them referring to the vascular access service (such as nutrition nurses and critical care nurses). The long-term plan is to 'up skill' the workforce where numbers of PICCs placed in their areas would enable competency to be maintained.

6 How to implement NICE's guidance on Sherlock 3CG TCS

The experiences of NHS trusts have been used to develop practical suggestions for how to implement NICE guidance on the Sherlock 3CG TCS.

Project management

It is the experience of the Health Technologies Adoption Programme that in order to gain maximum benefit, this technology should be adopted using a project management approach.

NICE has produced the into practice guide which includes a section on what organisations need to have in place to support the implementation of NICE guidance.

Project team

The first step in this approach is to form a local project team who will work together to implement the technology and manage any changes in practice.

Individual NHS organisations will determine the membership of this team and how long the project will last. In order to implement this guidance in an effective and sustainable way, consider the following membership of the team:

- Clinical champion(s): could be a radiologist or physician with an interest in PICC placements. They should have the relevant knowledge and understanding to be able to drive the project, answer any clinical queries and champion the project at a senior level.
- Project manager: could be someone in a clinical or managerial role and will have responsibility for the day-to-day running of the project, coordinating the project team and ensuring the project is running as planned.
- Management sponsor: will be able to help assess the financial viability of the project, drive the formulation of a business case and help to demonstrate the cost savings achieved.

- Vascular access nurse(s): will be valuable members of the project team because they will be providing the service.
- Clinical audit facilitator: to help set up mechanisms to collect and analyse local data related to the project metrics and audit requirements.

Early questions that the team may wish to consider are:

- How will the project be funded?
- How will local metrics be identified and measured?
- Who will be responsible for collecting clinical data?
- How will the necessary education be provided?
- How can effective communication be ensured?
- Are there any obvious challenges and how can these be overcome?

Measuring success

In order to demonstrate the benefits of adopting the Sherlock 3CG TCS it is important to take measurements before, during and after implementation.

A number of NHS sites have developed Excel spreadsheets to record all PICC insertions to enable local audit.

- Frimley Park Hospital NHS Foundation Trust – example data sheet
- Medway NHS Foundation Trust – example data sheet
- University Hospitals Birmingham NHS Foundation Trust – example data sheet

Overcoming implementation challenges

The implementation challenges reported by NHS sites using the Sherlock 3CG TCS are set out in table 4.

Table 4 Reported implementation challenges when using the

Sherlock 3CG TCS

Implementation challenge	Solution
Capital and ongoing revenue costs.	Prepare a business case including full cost considerations for PICC placements compared with the current service model. Select appropriate metrics to demonstrate cost and clinical benefits, safety and demand.
Clinical confidence in stopping routine chest X-rays for PICC tip confirmation.	Include interventional radiology and senior medical staff who refer for PICCs in the adoption of the technology. Ask consultant physician or interventional radiologist to independently review all chest X-rays and ECGs for the placements undertaken during the pilot period. See insights from the NHS for more information.

Business case development

Resource impact

Some NHS trusts reported that using the Sherlock 3CG TCS reduced their use of chest X-rays and the number of PICC re-insertions, therefore saving money. Further details of these examples can be found in the insights from the NHS section.

Business case

The implementation team should treat the development of a robust business case as an early priority in the life of the implementation project.

Local arrangements for developing and approving business plans will vary from trust to trust and each organisation is likely to have its own template and process in place.

The following are examples of procurement proposals developed by trusts using the Sherlock 3CG TCS which can be used to inform the development of local business plans.

- The Bristol Haematology and Oncology Centre developed an implementation application for funding the Sherlock 3CG TCS and consumables.
- Frimley Park Hospital NHS Foundation Trust developed a project report appraising three options for the purchase and placement of PICCs.

Education

The successful adoption of this technology relies on the knowledge and skills of those staff doing the placements and interpreting the results.

The company offers 2 PICC training programmes: 1 for experienced placers and 1 for novice PICC placers[1]. The appropriate programme must be completed before the operator can be signed-off as being competent with the Sherlock 3CG TCS by a company nurse specialist. Following training all documentation is made available to the practitioner and their line manager for clinical governance purposes.

Competent PICC Placers (2-week training programme)

- Experienced PICC placer (as determined by local NHS trust policy).
- 1-hour online Sherlock 3CG TCS course and examination including the theory and evidence supporting the technology must be successfully completed prior to hands-on training.
- Half day workshop covering anatomy physiology, theory and evidence with hands-on skills training for equipment and hardware.
- Successful placement of at least 6 PICCs with the Sherlock 3CG TCS (observed by a nurse specialist from the company and signed-off using an observational Standard Operating Procedure).

Novice PICC Placers (4-week training programme)

- 1-hour ultrasound for peripheral access online course and examination.
- 1-hour vascular access device selection, insertion and management online course and examination.

- 1-hour online Sherlock 3CG TCS course (as above).
- 1-day on-site advanced PICC placement workshop:
  - anatomy and physiology related to vascular access, catheter device choice, complication management and ultrasound techniques
  - practical training on mannequins, sterile PICC procedure and ultrasound upper arm anatomy scanning.
- Successful placement of at least 15 PICCs with the Sherlock 3CG TCS observed and signed-off as above. The number of PICCs placed to reach competency will be assessed on an individual basis.

Ongoing clinical support

- Annual peer review by nurse specialists from the company for PICC placers whose competency must be formally assessed as part of their organisation's clinical governance remit.
- PICC Precepting Programme Education and Clinical Supervision Day held 3 times a year by invitation.

Development of local documentation

The following are examples developed by NHS trusts using the Sherlock 3CG TCS which can be used to inform the development of local documentation.

PICC insertion records:

- Frimley Park Hospital NHS Foundation Trust: PICC insertion record
- University Hospitals Bristol NHS Foundation Trust: PICC placement documentation for patient notes

PICC placement policies:

- Frimley Park Hospital NHS Foundation Trust: Example vascular access policy section on long term CVC access

- Medway NHS Foundation Trust: Adult valved PICC placement and management policy
- University Hospitals Birmingham NHS Foundation Trust: Expanded practice protocol for registered nurses to insert peripherally inserted central catheters (PICC) and confirm position of PICC

[1] Details of how the company support training and education for staff was correct at the time the adoption resource was written (March 2015).

7 The technology

The Sherlock 3CG Tip Confirmation System (BD) is described in detail in NICE medical technologies guidance on the Sherlock 3CG Tip Confirmation System for placement of peripherally inserted central catheters. A review of the guidance in 2019 identified that Sherlock 3CG is now also available within the Site Rite ultrasound device (version 8).

8 Acknowledgements

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Update information

Minor changes since publication

May 2019: This adoption resource was reviewed and amended to fix broken weblinks and update resources and information sources.

About this resource

The NICE Health Technologies Adoption Programme produces practical advice on adopting health technologies in the NHS in England.

NICE's Health Technologies Adoption Programme worked with NHS organisations to collect and share their experiences of using Sherlock 3CG TCS with organisations that may want to use it in the future. The information gained from these NHS organisations and included in this resource is intended for the sole purpose of supporting the NHS in adopting Sherlock 3CG TCS.

The information presented was neither assessed by the External Assessment Centre nor presented to the Medical Technologies Advisory Committee when it developed provisional recommendations on the Sherlock 3CG TLS. However, an advanced draft of the pack was available to the Committee, for information, when it considered the consultation comments and developed its final recommendations on the technology.

This resource accompanies the medical technologies guidance on the Sherlock 3CG Tip Confirmation System for placement of peripherally inserted central catheters. It was developed using the NICE Health Technologies Adoption Programme process. It is an implementation tool and discusses and summarises the experiences reported by NHS sites who have previously adopted this technology and shares the learning that took place.

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

More information about the adoption team.

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