

How widely has ANTT been adopted in NHS hospitals and community care organisations in England and Scotland?

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ABSTRACT

Background: To the detriment of patient safety, the important clinical competency of aseptic technique has been notoriously variable in practice, and described ambiguously in the literature, internationally. From a UK perspective, attempts have been made to improve patient safety by reducing variability and improving education and practice through standardisation. The Welsh Government mandated Aseptic Non Touch Technique (ANTT®) as a specific national standard in 2015. All healthcare organisations in England are required by the Health and Social Care Act 2008 to have a single standard aseptic technique, demonstrable by the clinical governance indicators of education, training, competency assessment and compliance audit. In Scotland, an education-based initiative was launched by NHS Education for Scotland in 2012. To review the impact of these and other initiatives on the current status of aseptic technique, all NHS trusts in England and NHS health boards in Scotland were assessed under the Freedom of Information procedure. **Findings:** 93% of NHS trusts in England use a single standard for aseptic technique. In 88% of these trusts the single standard was stipulated as being ANTT. In Scotland, 62% of NHS acute and community care hospitals within health boards use a single standard. In 56% of these, the single standard was ANTT. When including those that use ANTT in combination with other techniques ANTT usage is 73%. **Conclusion:** These data demonstrate significant progress in standardising aseptic technique education, assessment and governance, and confirms ANTT as the de facto aseptic technique used in NHS trusts in England and health boards in Scotland.

Key Words: Aseptic Non Touch Technique ■ ANTT ■ Standardisation ■ Patient safety ■ Clinical governance

Aseptic Non Touch Technique (ANTT®) was the first, and is still the only, complete clinical practice framework for aseptic technique shared widely in the UK and internationally (Association for Safe Aseptic Practice (ASAP), 2019) (Box 1). Its use provides healthcare organisations and

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patients with the advantages afforded by a single practice standard for aseptic technique. Such advantages include less practice variability, a common practice language and shared understanding for improved education and research. Developed in the late 1990s (Rowley, 2001), ANTT is now referenced, endorsed and used extensively in many healthcare sectors around the world (Rowley and Clare, 2019). For example, it is used in Ireland (Health Service Executive, 2011), Wales (Welsh Government, 2015), and Australia (National Health and Medical Research Council (NHMRC), 2019). It is also recommended in the USA by the Association for Vascular Access (AVA) (2019).

The widespread adoption of ANTT can be explained by the previous dearth of evidence, and the confusion and myths surrounding aseptic technique. Simply, ANTT filled a void in an area of practice critical to patient safety. Concern about ambiguity of description and practice of aseptic techniques began to be documented during the 1980s (Thomlinson, 1987; Johnson, 1988). Every decade since, multiple authors internationally have researched and reiterated this ambiguity, and there has been variability in the definition of the term 'aseptic technique' (Bree-Williams and Waterman, 1996; Gilmour, 2000; Preston, 2005; Rowley et al, 2010). In fact, there are still authors today reporting confusion about this generic term as new findings (Gould et al, 2020).

A review of the literature of the 2000s identified that, because various terminologies for aseptic technique had been used, the term had become ambiguous. Therefore different terms had begun to be used interchangeably. Hybrid techniques evolved ad hoc, creating another layer of ambiguity, particularly in the community setting (Hallett, 2000; Unsworth and Collins, 2011). Authors such as Flores (2008) and Aziz (2009) began to express concern at the impact of this ambiguity on practice standards. The Department of Health (DH) in England demonstrated its concern by setting out standards of aseptic technique across the NHS, within the 'Saving Lives' initiative (DH, 2005) and, more explicitly, in the subsequent passing of the Health and Social Care Act 2008 (DH, 2015).

More specialist stakeholder organisations began to recognise these problems, but generally limited improvement to settling upon, and then simply prescribing, the generic term 'aseptic technique' in clinical guidance. However, such 'prescription without description' often provided no exact details of how

Box 1. The Aseptic Non Touch Technique (ANTT)

ANTT is a clinical practice framework for the education, practice and research of the critical clinical competency of aseptic technique. Based on a novel concept of Key-Part and Key-Site Protection, it provides a comprehensive, yet simple set of principles, actions and rules to ensure safe and efficient clinical practice. Determined by ANTT risk assessment, Standard-ANTT is used for technically straightforward procedures such as intravenous therapy and simple wound care, and Surgical-ANTT for technically complex procedures such as surgery and central venous access

aseptic technique should be applied to ensure patient safety, for example, the Healthcare Infection Control Practices Advisory Committee/Centers for Disease Control and Prevention guidelines (O'Grady et al, 2011). This lack of meaningful guidance, together with the decline of traditional aseptic assessments in healthcare training, meant that, up until around 2010, healthcare workers were arguably receiving very little support for this essential competency.

Establishing significant evidence-based change in healthcare is said to take approximately 17 years (Morris et al, 2011) and would appear to reflect the timeline of the ANTT initiative to date. Designed to address the ambiguity and in particular the confused and unhelpful terminology used, such as 'clean', 'aseptic' and 'sterile' techniques, the first author (Rowley, 2001), originated the ANTT Clinical Practice Framework in the late 1990s. ANTT is designed to be used for all clinical procedures from complex surgery to simple clinical procedures and maintenance of invasive medical devices. An updated version of the framework was published in 2010 (Rowley et al, 2010) and a new non-profit clinical organisation, the ASAP, was formed to help support organisations in the adoption and practice of ANTT internationally (http://anntt.org/ANTT_Site/about.html). When updating a national clinical guideline for the National Institute for Health and Care Excellence (NICE) in 2012, the National Clinical Guideline Centre defined ANTT as, 'A specific type of aseptic technique with a unique theory and practice framework'. This definition refers to the original practice concept of 'Key-Part' and 'Key-Site' protection, that more effectively defines and describes aseptic technique and has laid important foundations for improvement. Key-Parts are the critical parts of the procedure equipment that, if contaminated, are most likely to cause infection. Key-Sites are any portal of entry for micro-organisms into the body such as open wounds and medical device access sites.

The ASAP's clinical and unbureaucratic structure has facilitated responsive and transparent working with clinical professionals. For the past 12 years, on-site support, including peer-review assessment, national conferences and numerous publications, have helped disseminate ANTT to many different countries. The association developed the ANTT Implementation Programme based upon numerous lessons learned from introducing ANTT into every kind of healthcare provider environment. It was quickly realised that the organisational dynamics of healthcare settings can make or break successful implementation of any new initiative.

ANTT is now being used, translated into many different languages, in more than 25 countries. Different models of

adoption have ensued, from voluntary ground-up processes by individual organisations and clinicians, as seen in England and Scotland, to countries that have explicitly mandated or promoted ANTT at government level as a national standard, including Wales and Australia (Welsh Government, 2015; NHMRC, 2019). In addition, large specialist stakeholder organisations have often helped accelerate ANTT adoption in different countries, such as current national initiatives in the USA by organisations with international reach. For example, the Association for Vascular Access (AVA) has issued a position statement explicitly recommending ANTT (AVA, 2019) and the Infusion Nurses Society is integrating ANTT into the forthcoming edition of its *Infusion Therapy Standards of Practice*.

As would be expected, ANTT is most frequently used in hospital and community care settings. However, it is also widely used in many other care environments such as by emergency services, by military medical personnel, in dentistry and podiatry and, increasingly, by organisations conducting humanitarian work such as Médecins Sans Frontières (MSF). In 2018, the ASAP collaborated with MSF on site visits in South Sudan and Sierra Leone, demonstrating the use of ANTT in even the most challenging of care settings and with limited medical supplies (Treacy-Wong and Davies, 2018).

The ASAP also recognised the important role industry plays in promoting safer aseptic technique through improved product design and supply, and subsequently collaborates, without financial interest, with numerous industry partners to help ensure medical products and devices are effectively integrated with best clinical practice using ANTT.

The critical link between standardised clinical practice and patient safety

In healthcare and other high-volume client-based industries, such as aviation, that are safety critical, educational and practice standardisation is paramount. Quite simply, standardisation reduces variability in understanding and practice, thus increasing quality and safety (Sidiropoulos et al, 2009; Lavelle et al, 2015). Notably, the World Health Organization (WHO) has been committed to improving standardisation in healthcare since 2007, with the ongoing 'High 5s project' (WHO, 2013). Perhaps the most well-known example of the advantages of a single standard for a critical clinical competency is cardiopulmonary resuscitation (CPR). Globally, CPR theory, process and practice are essentially the same, based on a shared practice language and a defined set of guidelines and evidence-based recommendations (Perkins et al, 2017; Olasveengen et al, 2017). Related to aseptic technique, was the work by Pronovost et al (2006), who demonstrated that widespread standardisation of intravenous access and maintenance in intensive care settings led to highly significant reductions in healthcare-associated infections.

Standardisation and improvement require a continuous quality assurance framework to both establish and maintain high levels of patient safety. To this end, ASAP produces and freely supplies all the necessary components to support high standards of ANTT practice, including educational competency assessment, audit and evaluation tools. As one part of this multi-modal approach, many NHS organisations have used ANTT Procedure Guidelines (A4

picture-based posters) to help inform and direct best practice for the most common clinical procedures, and many have developed local ANTT Procedure Guidelines for more niche procedures.

Standardising variable aseptic technique with ANTT has been an important milestone in reducing variability and improving practice standards and patient safety. However, it is important to note that, educationally, the ANTT Clinical Practice Framework provides a robust set of principles, practice rules and a simple risk-assessment method that supports practitioners to apply critical thinking to different clinical challenges, including to emergency care scenarios (ASAP, 2020).

Study rationale

In the UK, the Welsh Government mandated ANTT as a national standard in 2015. In England, widespread adoption has been from the ground up on the specific request of practising health professionals, infection prevention leads, chief nurses and chief executive officers. Although an excellent endorsement, this voluntary, rather than mandatory, approach made it difficult to accurately quantify ANTT use. The ASAP wished to gain a complete picture of aseptic technique utilisation, including alternatives to ANTT. Therefore a survey of all NHS trusts in England and NHS boards in Scotland was undertaken in 2019. A Northern Ireland survey is at the planning stage.

Objectives of the study

- To assess requirements for standardisation and clinical governance of aseptic technique in England as set out in the Health and Social Care Act 2008
- To do a similar assessment in Scotland, noting that, although not covered by the Health and Social Care Act 2008, NHS Scotland has pursued improvement in aseptic technique (NHS Education for Scotland (NES), 2018).
- To benchmark levels of ANTT use and any other models
- To consider the findings in the context of patient safety.

Methodology

The Freedom of Information (FOI) Act 2000 provides public access to information held by public authorities in England, Wales and Northern Ireland; Scotland is covered by Scotland's own Freedom of Information (Scotland) Act 2002. Public authorities are obliged to publish certain information about their operations and members of the public are entitled to request this information, within certain parameters established by the Act(s).

The FOI survey questions were framed around compliance with the legal requirements for aseptic technique, expected of every NHS trust in England:

- Aseptic technique should be standardised across the organisation
- Staff should be educated, trained and assessed for proficiency in aseptic technique
- Audit should be undertaken to monitor compliance with aseptic technique.

The survey also enquired about generally accepted indicators of best practice in clinical governance.

The survey tool aimed to elicit whether NHS trusts in

England and NHS boards in Scotland had a single standard aseptic technique and what it was termed; whether staff education, training and competency assessment were provided, whether competency assessment was periodic and whether their standard aseptic technique was stipulated in policy. Finally, trusts and health boards were asked if they used ANTT Clinical Procedure Guidelines.

The survey was sent to FOI officers for recommended completion by the chief nurse or director of infection prevention and control. It was sent to an exhaustive list of NHS trusts in England identified from the NHS Confederation (2017) (N=228), consisting of:

- 130 acute non-specialist trusts (including 84 foundation trusts)
- 17 acute specialist trusts (including 16 foundation trusts)
- 54 mental health trusts (including 42 foundation trusts)
- 17 community providers (11 NHS trusts, 6 foundation trusts)
- 10 ambulance trusts (including 5 foundation trusts).

In Scotland, the survey was sent to FOI officers in each of the 16 Scottish NHS health boards responsible for 175 NHS acute and community care hospitals in Scotland.

Results

The main findings are presented in *Figures 1–4*.

England

A standard technique

Of the 228 eligible NHS trusts in England, 210 (92%) responded to the survey. Of these, 195/210 responders (93%) stated that they had adopted a single-standard approach to aseptic technique, and of those trusts, 171/195 (88%) identified their single standard to be ANTT. The remaining 24 trusts (12%) stated they had an alternative single standard to ANTT. However, of these trusts, 10/24 (42%) stated they used ANTT Clinical Procedure Guidelines and 15/24 (62%) used combinations of different aseptic techniques, including 9/15 (60%) citing ANTT, rather than their stipulated 'single standard'. The remaining 9/24 (37%) defined their standard generically, as either 'the aseptic technique', 'aseptic technique' or 'aseptic procedure(s)'. In total, 158/171 (92%) of English trusts using ANTT as their single standard aseptic technique used ANTT Clinical Practice Guidelines as part of their approach.

Some 15/210 (7%) of trusts said they had no standard aseptic technique at all. These trusts had various combinations of aseptic technique: 4/15 (27%) cited a combination of all the aseptic technique descriptors from the FOI tool (ie aseptic technique, ANTT, sterile technique, clean technique, non-touch technique), 2/15 (13%) described using aseptic technique and clean technique, 2/15 (13%) identified a clean technique only, 3/15 (20%) said they used a combination of aseptic technique and ANTT and 3/15 (20%) said that ANTT was in development in the trust.

Clinical governance of aseptic technique in England

Indicators for effective clinical governance of aseptic technique were more prevalent in trusts that used ANTT as their single standard aseptic technique (*Figure 2*).

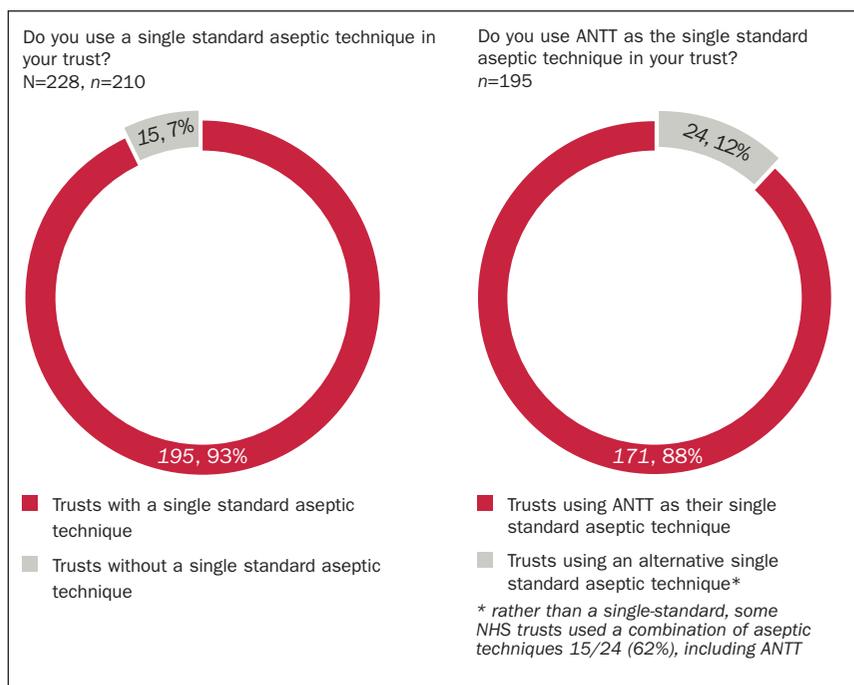


Figure 1. English NHS trusts with a single standard aseptic technique and those trusts using ANTT as their single standard aseptic technique

Scotland

A standard technique

In Scotland 16/16 (100%) health boards responded to the FOI survey, representing 175 NHS acute and community care hospitals. Some 109/175 (62%) Scottish NHS acute and community care hospitals reported having a single standard approach to aseptic technique, with 61/109 (56%) of these organisations citing ANTT as that single standard. A further 66 stated that they used ANTT in combination with other techniques, resulting in 127/175 (73%) of NHS acute and

community care hospitals in Scotland using ANTT as their single standard or in combination.

Some 48/109 (44%) Scottish organisations said they had an alternative single standard to ANTT. However, similar to English trusts, for 24/48 (50%) this was not a single standard, but a combination of approaches. Some 42/61 (69%) organisations using ANTT as their single standard also used the ANTT Procedure Guidelines.

It seems noteworthy that, in England, where there exists a legal requirement to have a single standard aseptic technique, there is high compliance, with only 7% of trusts outlying. In Scotland where there is no such legal requirement 38% of NHS acute and community care hospitals did not have a single standard.

Clinical governance of aseptic technique in Scotland

Similar to England, but even more evident in Scotland, the indicators for effective clinical governance for aseptic technique were more prevalent in hospitals that used ANTT as their single standard aseptic technique (Figure 4).

Discussion

This study provided the first detailed account of the prevalence of aseptic technique type, and indicators for effective clinical governance of aseptic technique in the English trusts and Scottish NHS boards that responded to the survey.

Recognising the clinical risks inherent in the use of variable aseptic techniques, the Health and Social Care Act 2008 legislated for a single standard aseptic technique within all individual healthcare organisations in all sectors.

This study found that in the English NHS trusts that responded, this ambition has been realised, and in fact, surpassed. Rather than using multiple different standards in individual NHS trusts, one single shared standard—ANTT—exists in a large majority of trusts. Similarly, ANTT is used in more than half

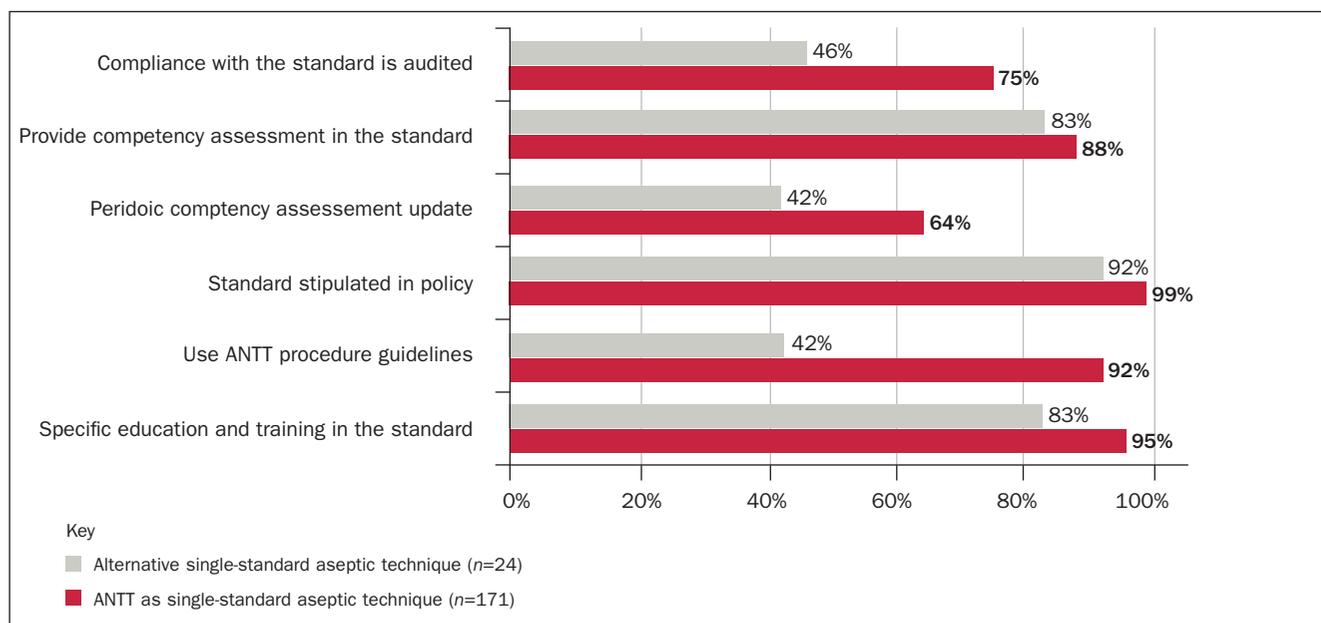


Figure 2. Clinical governance of aseptic technique vs ANTT in England

of NHS acute and community care hospitals in Scotland as a single standard aseptic technique and is used in combination with other standards in nearly three-quarters of all Scottish hospitals.

With ANTT already mandated by the Welsh Government as a single standard in Wales, and recognising widespread ANTT adoption in Northern Ireland (Public Health Agency, 2019), ANTT can be said to be the de facto standard in the UK.

Using ANTT provides a shared practice language, and the clinical governance of education and monitoring of practice standards. NHS trusts that do not use ANTT as a single standard, reported variable combinations of techniques, based upon ambiguous generic terms for aseptic technique that have been well documented as problematic educationally and in practice for decades (Bree-Williams and Waterman, 1996; Gilmour, 2000; Hallett, 2000; Preston, 2005; Flores, 2008; Aziz, 2009; Rowley et al, 2010; Unsworth and Collins, 2011).

Clinical governance

These results show that this is not simply a cosmetic change from the use of generic, ambiguous terms for ‘aseptic technique’ to a specifically defined term of ‘ANTT’. This survey demonstrated the first ever widespread adoption of a single standard for aseptic technique in trusts in England and health boards in Scotland. Most importantly, ANTT is a robustly defined and comprehensive Clinical Practice Framework for education and practice. It not only explains aseptic technique with the novel and now well-tried method of Key-Part and Key-Site protection, it also supports organisations to improve and maintain practice standards through robust clinical governance tools and methods.

To this end, the survey found that the presence of clinical governance indicators for safe aseptic technique, education, training, competency assessment and compliance audit, was appreciably higher in English trusts and Scottish NHS acute and community care hospitals that used ANTT as their single standard technique.

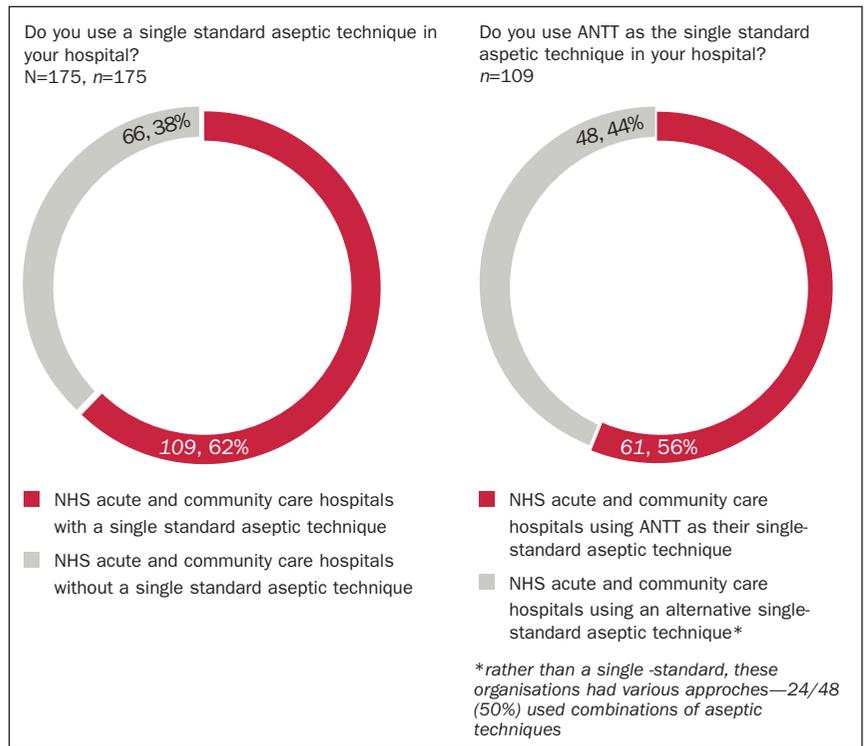


Figure 3. Scottish NHS acute and community care hospitals with a single standard aseptic technique and those using ANTT as their single standard aseptic technique

The potential benefits of this was identified in a previous ANTT implementation study of two large NHS hospitals, which identified that the framework, and associated clinical governance components, helped improve health professionals’ understanding of aseptic technique, coupled with notable improvements in healthcare-associated infection rates (Clare and Rowley, 2018).

ANTT has helped NHS organisations to improve patient

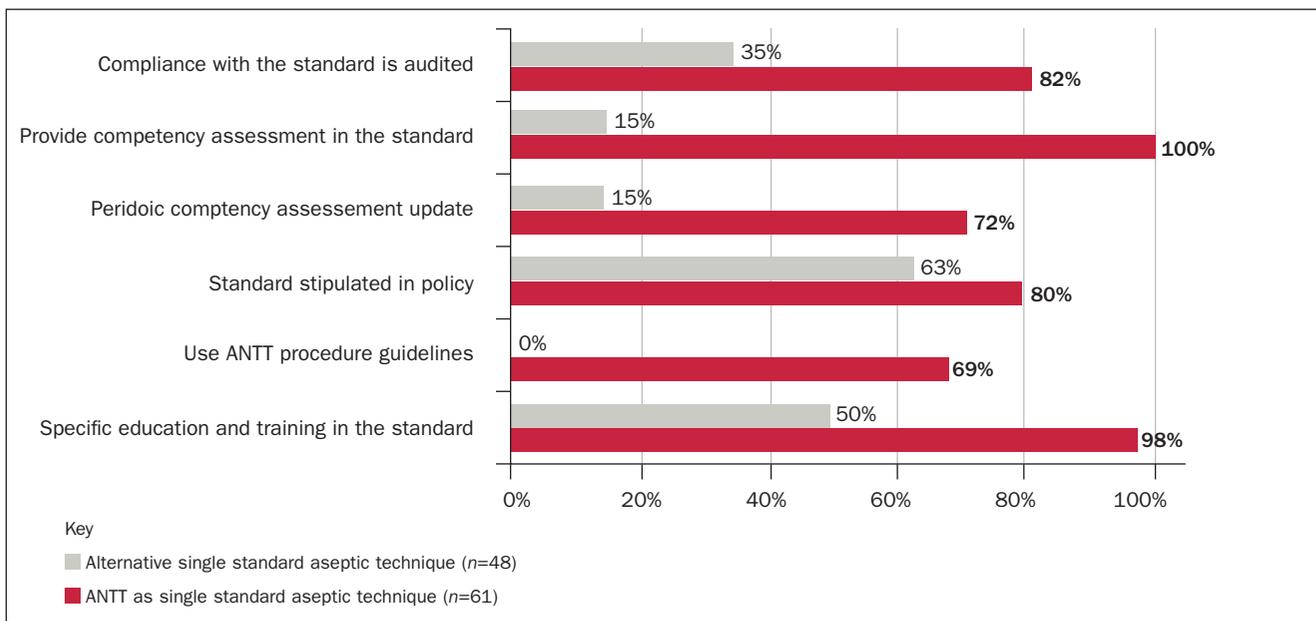


Figure 4. Clinical governance of aseptic technique vs ANTT in Scottish NHS acute and community care hospitals

KEY POINTS

- Historically, aseptic technique has caused concern around ambiguous definitions, variable practice, compromised standards and a lack of effective clinical governance; in contrast, ANTT is based upon a comprehensive ANTT Clinical Practice Framework that teaches the principles and process of aseptic technique
- In relation to requirements in the 2008 Health and Social Care Act, this study aimed to determine whether NHS trusts/boards used a standard aseptic technique and if this was supported by education, assessment and audit
- Findings demonstrate ANTT to be the national single standard aseptic technique in England and Wales, and a de facto standard aseptic technique in Scotland; moreover, NHS acute and community care hospitals that used ANTT had higher levels of clinical governance in place to support safe practice, such as education, assessment and audit

safety, by delivering the clinical governance requirements for aseptic technique required of them in the Health and Social Care Act 2008 in England and more generally in Scotland. In comparison, Scotland's specifically educational and non-mandatory aseptic technique initiative (NES, 2018), has had less impact on promoting associated clinical governance components required to support standards of aseptic technique.

A planned study for Northern Ireland will complete this detailed review of aseptic technique in NHS trusts in the UK. Private healthcare providers were excluded from the survey and take-up of ANTT in this sector is currently being assessed by the ASAP. Similar results are anticipated given collaboration of the ASAP with many of the major private care providers who have undertaken national approaches to ANTT implementation. ANTT is also used in the private community care sector, with Healthcare at Home (HAH), one of the largest independent community care providers in the UK, being the first organisation to achieve Gold level ANTT accreditation status—a peer-review process that evaluates every aspect of ANTT implementation and clinical governance. Head of Clinical Services at HAH, Dawn Genders (2017) said, 'Using ANTT enabled us to effectively standardise practice nationally and, importantly, monitor our standards effectively.'

CPD reflective questions

- Why do you think clinical practice based on aseptic, sterile, and clean techniques was so variable before ANTT was originated?
- What are the advantages of a single standard for aseptic technique with ANTT?
- NHS organisations that implemented ANTT have better levels of clinical governance for aseptic technique, such as education and audit. Why do you think this might be?
- Why do you think NHS hospitals not using ANTT have variable methods of practice?

Future challenges

The challenge now is to build on this success. Although this survey demonstrated the adoption of ANTT in the majority of English and Scottish hospitals, there is no room for complacency with patient safety at stake. Of course, there will still be instances of practice confusion surrounding generic aseptic technique and no doubt ANTT also. However, the progress afforded by ANTT in providing overdue clarity for education and practice of aseptic technique, is a significant improvement over the previous state of confusion and ambiguity. At the very least, future research enquiry could stop pondering what is meant by the generic term 'aseptic technique'.

The now clear challenge for healthcare organisations in the UK, and internationally, is to build on this solid foundation for patient safety that widespread use of ANTT has afforded, and pursue the even greater challenge of firmly embedding and sustaining practice understanding and improving ANTT compliance. However, it is important that healthcare organisations fully understand the scale of the challenge and properly invest in it. For perspective, one only needs to consider the historical and ongoing difficulties in establishing compliance with effective hand hygiene. Whereas hand cleaning involves just one, well defined and relatively simple task that has had millions invested globally, compliance is still problematic and considered to be around 50% (Fuller et al, 2011; Kingston et al, 2016; Brühwasser et al, 2016).

In contrast, aseptic technique or ANTT, involves 6–10 steps that require correct integration into every different clinical situation. Therefore, although it is pleasing to see indicators for clinical governance of ANTT in place in so many organisations, it is important that such educational, assessment and monitoring components are not 'tick-box' exercises and are robust enough to be effective and maximise patient safety.

ANTT's standard Clinical Practice Framework and common practice language has also allowed more meaningful and generalisable research (Mutalib et al, 2015; Taylor et al, 2017; Simarmatar and Indriani, 2017; Khurana et al, 2018). This foundation can now be built on with larger scale enquiries. For example, the two well defined approaches to practice in ANTT, Standard-ANTT and Surgical-ANTT, facilitate comparative research for specific clinical procedures. ANTT was never intended to be the final solution, but a prerequisite foundation for practice improvement.

Strengths and limitations

The survey was sent to the whole population the authors wanted to investigate, with a near 100% response rate. In England the FOI requests were handled individually by trusts and in Scotland collectively by health boards. There was no response bias, excepting the few centres that chose non-compliance with the legislative instruction of an FOI request. Governance indicators were not collated for the small minority of trusts that declared they had no standard approach.

Conclusion

This study has confirmed ANTT is the single standard aseptic technique in the large majority of NHS trusts in England and a

de facto standard in Scotland. Unlike NHS Wales, where ANTT is mandated, NHS adoption in England and Scotland has been notable for its voluntary adoption and user involvement. This is testimony to the void ANTT has filled in this critical area of clinical practice and the commitment and engagement of health professionals to improve patient safety.

ANTT is being used widely internationally and is now established as the first and only global standard for aseptic technique that is commonly shared daily across the boundaries of different hospitals and countries. It provides a standardised approach to aseptic practices and a more meaningful shared practice language across all health sectors, including industry.

In research, it is evident from the literature that authors are using the shared understanding and common practice language of ANTT seen in this study, as a foundation for research enquiry across a range of clinical practices (Mutalib, et al, 2015; Taylor et al, 2017; Khurana et al, 2018; Simarmatar, and Indriani 2017). This survey identified that having a single standard ANTT policy in place has facilitated improvement in the clinical governance of this critical clinical competency and therefore in patient safety.

Recommendations

- Healthcare organisations should ensure effective levels of clinical governance (including education, competency assessment and audit) to assure compliance to high standards of ANTT practice
- All healthcare organisations should use the standard ANTT Competency Assessment Tool available from the ASAP
- ANTT periodic updating and re-assessment of staff should be based upon annual audit findings and take place at least every 3 years. **BJN**

Declaration of interest: the authors work in the NHS and are also non-salaried board members of The Association for Safe Aseptic Practice (ASAP) a non-profit non-governmental organisation

Association for Safe Aseptic Practice. Aseptic non-touch technique (ANTT): a practice framework for clinical practice. 2019. http://www.antt.org/ANTT_Site/theory.html (accessed 24 August 2020)

Association for Safe Aseptic Practice Emergency ANTT. 2020. http://www.antt.org/ANTT_Site/emergency-ANTT.html (accessed 24 August 2020)

Association for Vascular Access. Guidance document. Standardizing the critical clinical competency of aseptic, sterile, and clean techniques with a single international standard: Aseptic Non Touch Technique (ANTT®). 2019. <https://tinyurl.com/y5estadd> (accessed 11 August 2020)

Aziz MA. Variations in aseptic technique and implications for infection control. *Br J Nurs*. 2009;18(1):26–31. <https://doi.org/10.12968/bjon.2009.18.1.32073>

Bree-Williams FJ, Waterman H. An examination of nurses' practices when performing aseptic technique for wound dressings. *J Adv Nurs*. 1996;23(1):48–54. <https://doi.org/10.1111/j.1365-2648.1996.tb03134.x>

Brühwasser C, Hinterberger G, Mutschlechner W, Kaltseis J, Lass-Flörl C, Mayr A. A point prevalence survey on hand hygiene, with a special focus on *Candida* species. *Am J Infect Control*. 2016;44(1):71–73. <https://doi.org/10.1016/j.ajic.2015.07.033>

Clare S, Rowley S. Implementing the aseptic non touch technique (ANTT®) clinical practice framework for aseptic technique: a pragmatic evaluation using a mixed methods approach in two London hospitals. *J Infect Prev*. 2018;19(1):6–15. <https://doi.org/10.1177/1757177417720996>

Department of Health. Saving lives: a delivery programme to reduce

healthcare associated infection including MRSA. 2005. <https://tinyurl.com/yy545y6q> (accessed 11 August 2020)

Department of Health. Guidance for compliance with criterion 9, section 9.3.b: aseptic technique. In: the Health and Social Care Act 2008: code of practice on the prevention and control of infections and related guidance. 2015. <https://tinyurl.com/y4mt3zt7> (accessed 11 August 2020)

Flores A. Sterile versus non-sterile glove use and aseptic technique. *Nursing Standard*. 2008;23(6):35–39. <http://doi.org/10.7748/ns2008.10.23.6.35.c6707>

Fuller C, Savage J, Besser S et al. 'The dirty hand in the latex glove': a study of hand hygiene compliance when gloves are worn. *Infect Control Hosp Epidemiol*. 2011;32(12):1194–1199. <https://doi.org/10.1086/662619>

Genders D. ANTT accreditation. 2017. http://antt.org/ANTT_Site/accreditation.html (accessed 11 August 2020)

Gilmour D. Is an aseptic technique always necessary? *Journal of Community Nursing*. 2000;14:32–35

Gould D, Gallagher R, Chudleigh J, Purssell E, Hawker C for the Royal College of Nursing. Understanding aseptic technique: an RCN investigation into clinician views to guide the practice of aseptic technique. 2020. <https://tinyurl.com/y684oqew> (accessed 11 August 2020)

Hallett CE. Infection control in wound care: a study of fatalism in community nursing. *J Clin Nurs*. 2000;9(1):103–109. <http://doi.org/10.1046/j.1365-2702.2000.00316.x>

Health Service Executive Health Protection Surveillance Centre. Guidelines for the prevention of catheter-associated urinary tract infection. 2011. <https://tinyurl.com/y6qu79v3> (accessed 11 August 2020)

Johnson A. Wound management: are you getting it right? *Prof Nurse*. 1988;3(8):306–309

Khurana S, Saini SS, Sundaram V, Dutta S, Kumar P. Reducing healthcare-associated infections in neonates by standardizing and improving compliance to aseptic non-touch techniques: a quality improvement approach. *Indian Pediatr*. 2018;55(9):748–752. <https://doi.org/10.1007/s13312-018-1373-6>

Kingston L, O'Connell NH, Dunne CP. Hand hygiene-related clinical trials reported since 2010: a systematic review. *J Hosp Infect*. 2016;92(4):309–320. <https://doi.org/10.1016/j.jhin.2015.11.012>

Lavelle J, Schast A, Keren R. Standardizing care processes and improving quality using pathways and continuous quality improvement. *Current Treatment Options in Pediatrics*. 2015;1(4):347–358. <https://doi.org/10.1007/s40746-015-0026-4>

Morris ZS, Wooding S, Grant J. The answer is 17 years, what is the question: understanding time lags in translational research. *J R Soc Med*. 2011;104(12):510–520. <https://doi.org/10.1258/jrsm.2011.110180>

Mutalib M, Evans V, Hughes A, Hill S. Aseptic non-touch technique and catheter-related bloodstream infection in children receiving parenteral nutrition at home. *United European Gastroenterol J*. 2015;3(4):393–398. <https://doi.org/10.1177/2050640615576444>

National Clinical Guideline Centre. Partial update of NICE clinical guideline 2. Infection: prevention and control of healthcare-associated infections in primary and community care. 2012. <https://tinyurl.com/yaqhz0mu> (accessed 11 August 2020)

National Health and Medical Research Council. Australian guidelines for the prevention and control of infection in healthcare. 2019. <https://tinyurl.com/yxe5oc4a> (accessed 11 August 2020)

NHS Confederation. NHS statistics, facts and figures. 2017. <https://tinyurl.com/y56lssdk> (accessed 11 August 2020)

NHS Education for Scotland. Healthcare associated infections: aseptic technique. 2018. <https://tinyurl.com/y4ovw966> (accessed 11 August 2020)

O'Grady NP, Alexander M, Burns LA et al for the Healthcare Infection Control Practices Advisory Committee (HICPAC), Centers for Disease Control and Prevention. Guidelines for the prevention of intravascular catheter-related infections. *Clin Infect Dis*. 2011;52(9):e162–e193. <https://doi.org/10.1093/cid/cir257>

Olasveengen TM, de Caen AR, Mancini ME et al. ILCOR collaborators. 2017 international consensus on cardiopulmonary resuscitation and emergency cardiovascular care science with treatment recommendations summary. *Circulation*. 2017;136(23):e424–e440. <https://doi.org/10.1161/CIR.0000000000000541>

Perkins GD, Neumar R, Monsieurs KG et al International Liaison Committee on Resuscitation. The International Liaison Committee on Resuscitation—review of the last 25 years and vision for the future. *Resuscitation*. 2017;121:104–116. <https://doi.org/10.1016/j.resuscitation.2017.09.029>

Preston RM. Aseptic technique: evidence-based approach for patient safety. *Br J Nurs*. 2005;14(10):540–546. <https://doi.org/10.12968/bjon.2005.14.10.18102>

Pronovost P, Needham D, Berenholtz S et al. An intervention to decrease catheter-related bloodstream infections in the ICU. *N Engl J Med*. 2006;355(26):2725–2732. <https://doi.org/10.1056/NEJMoa061115>

Public Health Agency. IPC procedures: aseptic non-touch technique (ANTT). In: The Northern Ireland regional infection prevention and control manual. 2019. <https://www.niinfectioncontrolmanual.net/antt> (accessed 11 August 2020)

Rowley S. Theory to practice. Aseptic non-touch technique. *Nurs Times*. 2001;97(7):VI–VIII

Rowley S, Clare S, Macqueen S, Molyneux R. ANTT v2: an updated practice framework for aseptic technique. *Br J Nurs*. 2010;19(Suppl 1):S5–S11. <https://doi.org/10.12968/bjon.2010.19.Sup1.47079>

Rowley S, Clare S. Standardizing the critical clinical competency of aseptic, sterile, and clean techniques with a single international standard: aseptic non touch technique (ANTT®). *Journal of the Association for Vascular Access*. 2019;24 (4): 12–17. <https://doi.org/10.2309/j.java.2019.004.003>

Sidiropoulos N, Dumont LJ, Golding AC, Quinlisk FL, Gonzalez JL, Padmanabhan V. Quality improvement by standardization of procurement and processing of thyroid fine-needle aspirates in the absence of on-site cytological evaluation. *Thyroid*. 2009;19(10):1049–52. <https://doi.org/10.1089/thy.2009.0161>

Simaratar R, Indriani S. Implementation of aseptic non touch technique (ANTT®) for procedure IV preparation and administration, IV cannulation and blood sampling to reduce HAIs rate at Premier Jatinegara Hospital [poster]. 4th International Conference on Prevention & Infection Control, Switzerland, 20–23 June 2017. *Antimicrobial Resistance and Infection Control* 2017;6(Suppl 3):52 <https://tinyurl.com/y6n3wyxf> (accessed 11 August 2020)

Taylor JE, McDonald SJ, Earnest A et al. A quality improvement initiative to reduce central line infection in neonates using checklists. *Eur J Pediatr*. 2017;176(5):639–646. <https://doi.org/10.1007/s00431-017-2888-x>

Thomlinson D. To clean or not to clean. Cleaning discharging surgical wounds. *Nurs Times*. 1987;83(9):71–75

Treacy-Wong V, Davies J. Pilot of ANTT® by Médecins Sans Frontières (MSF). 2018. http://antt.org/ANTT_Site/evaluation_files/MSF.pdf (accessed 11 August 2020)

Unsworth J, Collins J. Performing an aseptic technique in a community setting: fact or fiction? *Prim Health Care Res Dev*. 2011;12(01):42–51. <https://doi.org/10.1017/S1463423610000198>

Welsh Government. Welsh Health Circular. WHC/2015/026. Aseptic non touch technique (ANTT): implementation of a national standardised approach. 2015. <https://tinyurl.com/yyt3ett7> (accessed 11 August 2020)

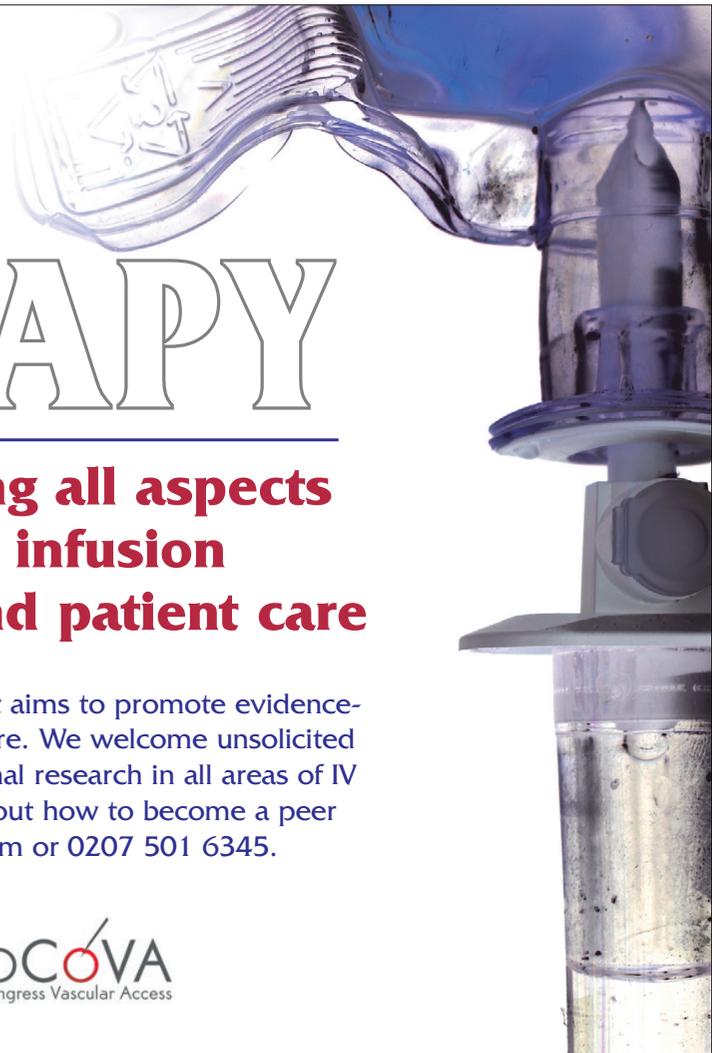
World Health Organization. The high 5s project: interim report. 2013. <https://tinyurl.com/y3qmkne4> accessed 11 August 2020)

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