

Don't Be Dirty: Blood Culture Contamination Rates at DGRI

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Aims

- To audit blood culture contamination rates over a 12 month period
- To implement a local training programme to ensure best practice in blood culture collection using the new BD collection system
- To meet and improve on the Scottish National antimicrobial target¹: 'Use of intravenous antibiotics in secondary care will be no higher in 2022 than it was in 2018' by reducing blood culture contamination rates and subsequent inappropriate antimicrobial prescribing

Introduction

Blood culture is the gold standard for diagnosing septicaemia and is an integral part of the Sepsis 6 bundle. They provide clinicians and microbiologists with the information they need to progress to targeted antibiotic therapy.

Indications

- Abnormal core temperature <math><36^{\circ}\text{C}</math> or $>38^{\circ}\text{C}$
- Focal signs of infection
- Tachycardia (>90), blood pressure (low or raised), elevated respiratory rate (>20)
- Chills/rigors
- Abnormal white cell count (<math><4</math> or >12)
- New or worsening confusion
- Severe Inflammatory Response Syndrome (SIRS) – two or more criteria met

Only take blood cultures when there is a clinical indication to do so and not as routine.

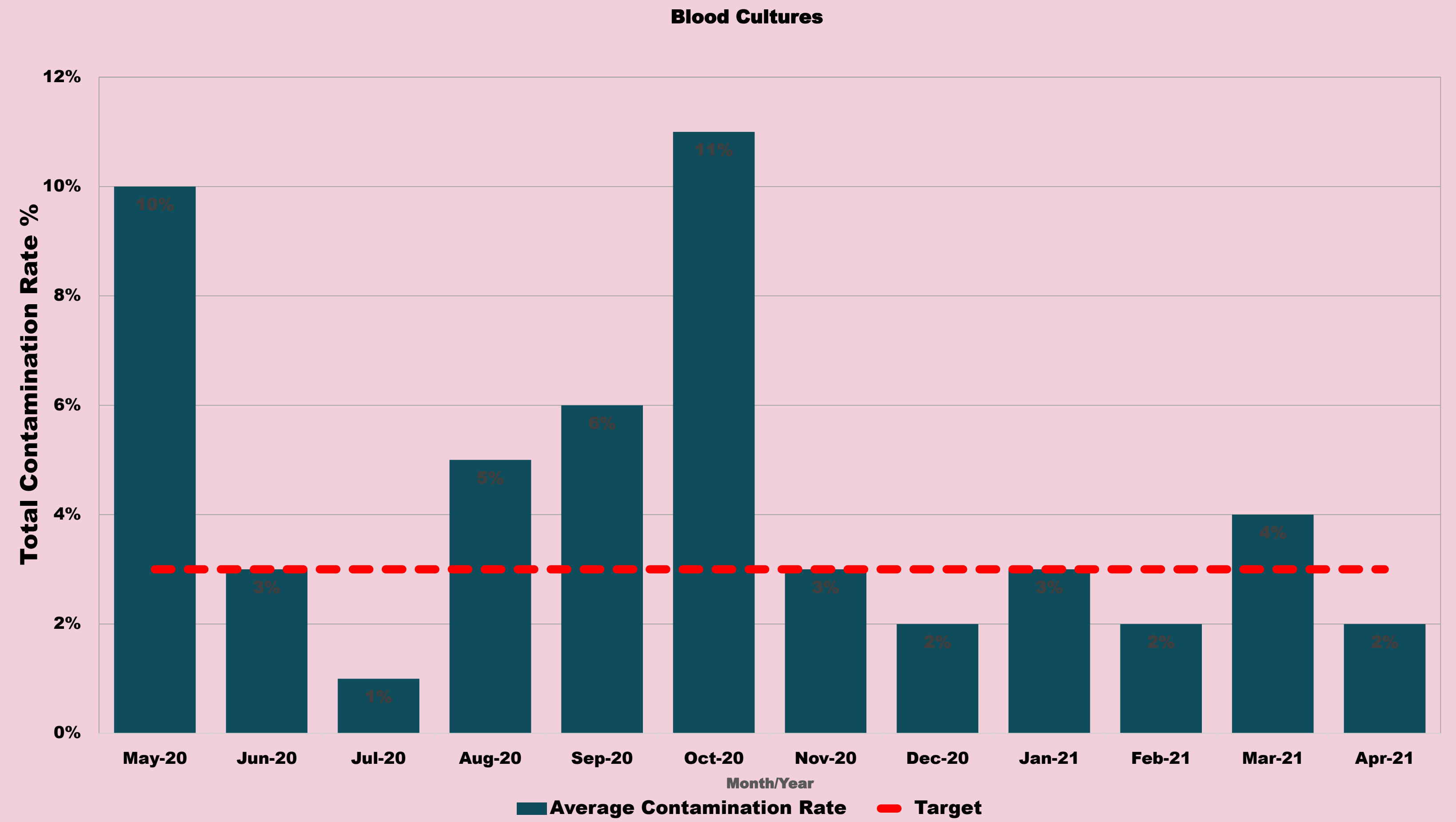
Blood cultures should be taken:

- As soon as possible after the onset of chills; pyrexia; clinical suspicion of sepsis.
- Before the administration of antibiotics. If a patient is on antibiotics, blood cultures still be taken but the chance of detection may be decreased.

False positive (contaminated) blood cultures lead to inappropriate IV antibiotic prescribing, adverse drug reactions, increased length of hospital stay, cost implications and also drives antimicrobial resistance

Target blood culture contamination rates are below 3% of total. Rates within D&G reached 11% in 2020

Overall Contamination Rate



Method

All personnel performing blood cultures were offered a training session in the weeks prior to introduction of the new BD blood collection equipment in NHS D&G in March 2021. This included staff from all wards at DGRI, Mountainhall and Stranraer. Best practice to ensure aseptic collection of blood cultures was clearly demonstrated. Timing and volume of specimen collections were also highlighted during these sessions and practical tips provided to achieve this. An instructional video to aid those unable to attend these sessions was created and published on the intranet. A step-by-step visual aid was displayed in multiple areas, particularly clean preparation rooms. The data was also presented at the regional Grand Rounds meeting shortly after, to engage a wider audience in the implications of high rates of false positive results.

Discussion

Initial results suggest that a combination of the new collection device and refresher training on best practice has reduced the contamination rates of blood cultures within NHS D&G. The aim of the training programme as well as the introduction of the new equipment was to both reduce the number of needlestick injuries whilst simultaneously decreasing the contamination rates during specimen collection by highlighting the need for adequate skin preparation.

The long-term benefits would result in a reduction of inappropriate IV antibiotic prescribing, which in turn would lessen the potential for development of drug resistant organisms in the region. This would also enable us to meet the Scottish National antimicrobial target (Graph 2) and improve antibiotic stewardship within Dumfries and Galloway.

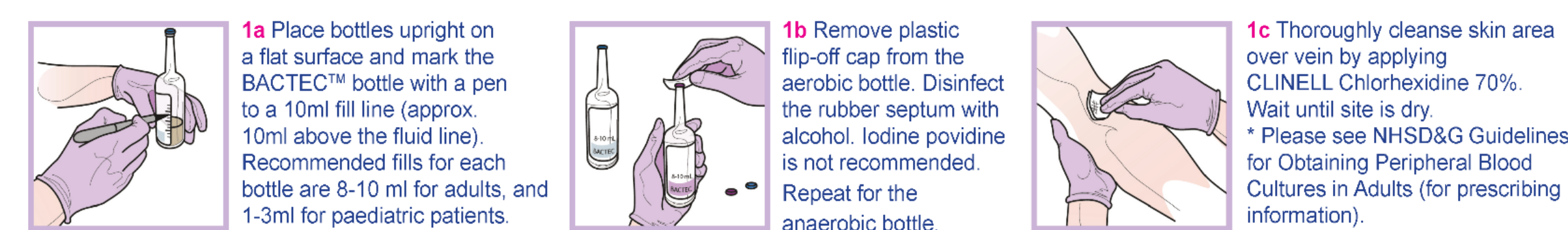
Each new group of incoming staff will receive training on best practice for blood culture collection when joining the health board to ensure this quality improvement process continues

Blood Culture Collection

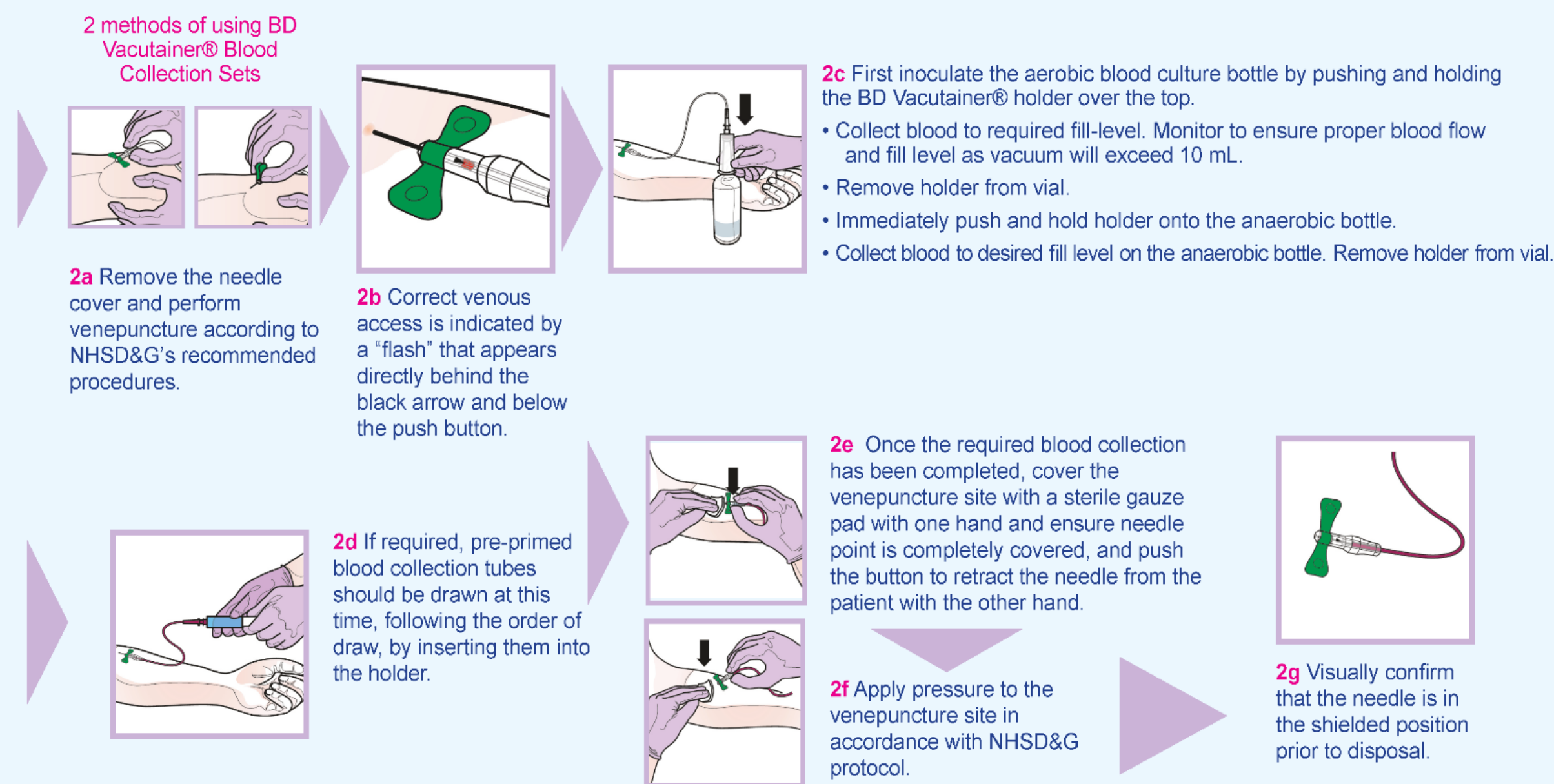
Quick Reference Guide



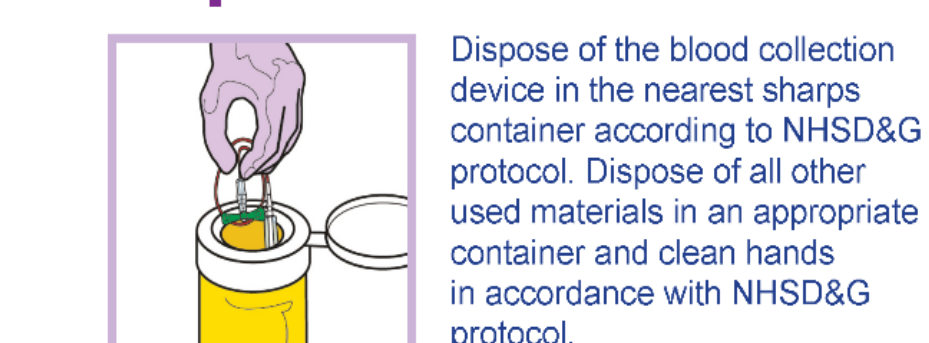
1. BD BACTEC™ bottle and skin preparation



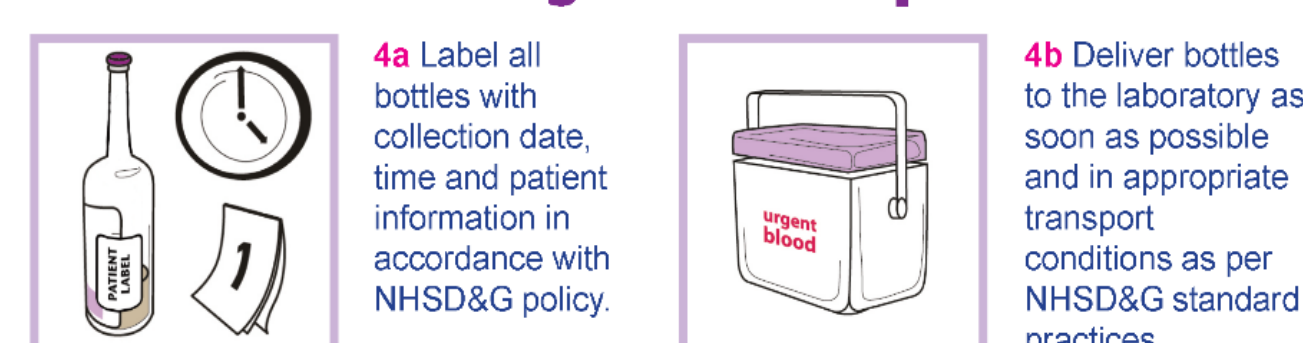
2. Collecting blood cultures using BD Vacutainer® Push Button™ Blood Collection Set with Pre-Attached Holder



3. Disposal

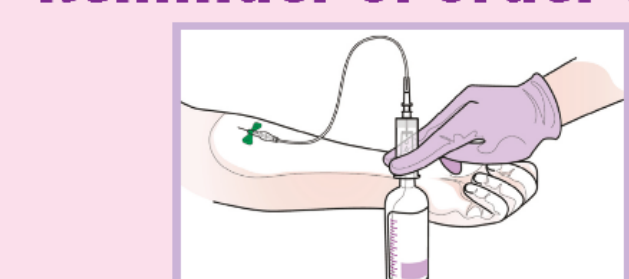


4. Bottle labelling and transport

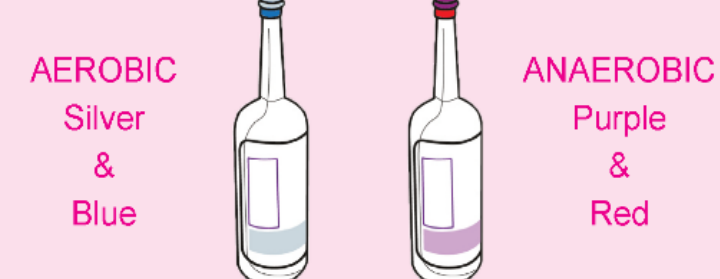


Labels are best wrapped round the neck of the bottle, with the loose ends stuck together like a tag. DO NOT write or place any labels over the BD BACTEC™ bottle barcode or bottom of bottle, and do not obstruct the clear window of the bottle.

Reminder of order of draw



When collecting blood cultures using BD Vacutainer® push button blood collection sets: For each set, first inoculate the aerobic bottle, then the anaerobic bottle.

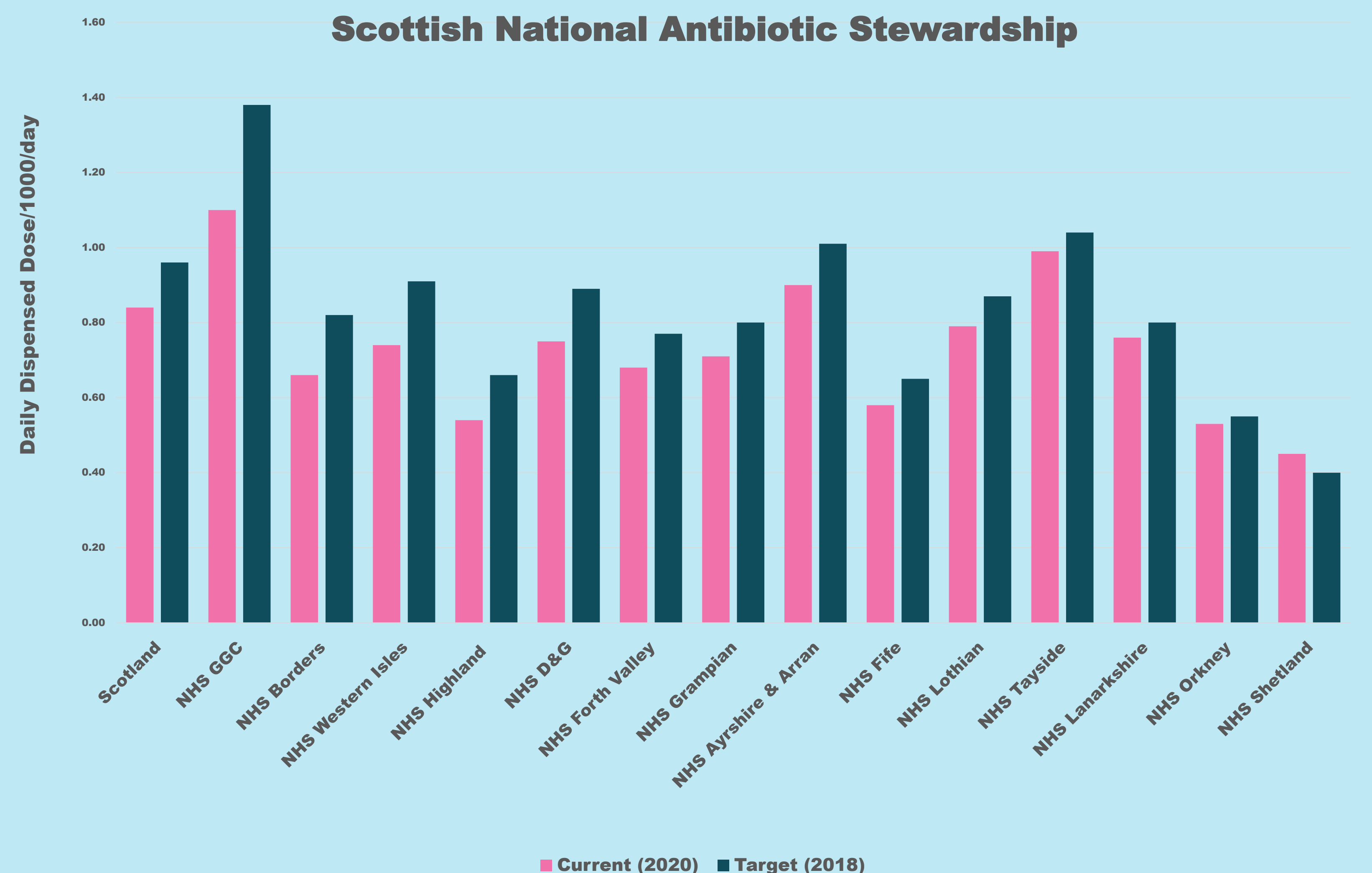


Procurement order code

23G BD Vacutainer® Push Button Blood Collection Set Pre-Attached Holder 12" tube: NDC SKU243402

HC20-00019

Scottish National Antibiotic Stewardship



References

- Prescribing Information System, NHS National Services Scotland and Public Health Scotland. Hospital Medicines Utilisation Database, NHS National Services Scotland and Public Health Scotland Scotland 2020
- Lamy, B., Dargère, S., Arendrup, M. C., Parienti, J.-J., & Tattévin, P. (2016). How to Optimize the Use of Blood Cultures for the Diagnosis of Bloodstream Infections? A State-of-the Art. *Frontiers in Microbiology*, 7, 697.