

Tackling Blood Culture Contamination Rates in the Acute Setting

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1. INTRODUCTION

Blood cultures are an essential tool used to guide the physician in appropriate antibiotic administration. The department of health defines contamination as growth of organisms in a culture that were introduced at the point of sampling, and not present in the patient's blood stream¹. These are often coagulase negative staph. species. Contaminated results are problematic for several reasons:

COST

A recent study found that false positive culture results increase cost of stay by an average of £5000². Another found increased antibiotic charges of 39%³.



EXTENDED PATIENT STAY

Some studies have also reported an average increased length of stay of 5.4 days².



POTENTIAL PATIENT HARM

Any unnecessary drug treatment has inherent risk in terms of side effects and adverse events. Extended stay is associated with increased risk of hospital acquired infection.



INAPPROPRIATE ANTIBIOTIC USE

In 40-50% of cases, contributing to increased resistance.

Data collection ongoing at our trust found markedly increased rates of contamination in the Emergency Department (6.7%) and Emergency Assessment Unit compared to other adult wards (2%)
In general, reviews of blood culture contamination site an acceptable rate of around 2-3%⁴.



Causes and contributing factors of contamination

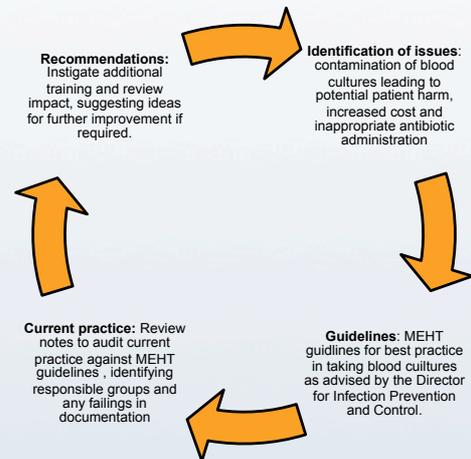
- Patient's skin flora
- Equipment
- Sampling technique
- Patient crowding
- Inadequate training
- Rapid staff turnover
- Workload
- Low sense of accountability

2. AIMS

- To identify staff groups taking falsely positive blood cultures and factors contributing to high rates of contamination.
- To implement strategies which reduce contaminants, thus promoting patient safety and reducing costs, with appropriate antibiotic use.

3. METHODS

- False positive results (are routinely recorded by laboratory staff and entered onto a spreadsheet)
- Notes of 50 patients known to have contaminated cultures were audited against local guidelines for whether sampling was performed and documented correctly.
- Groups of staff associated with contaminated samples were identified. The lead nurse in ED agreed to give extra training to her staff. New doctors starting in ED received additional training at induction.

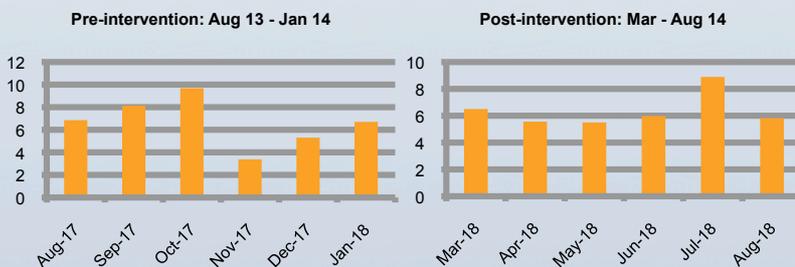


4. RESULTS

Most contaminated blood cultures could be attributed to ED Doctors, CT1-CT2 level medical doctors and ED nurses. We note that CT1 and CT2 doctors are not trained when they enter the trust, unlike F1 and F2 doctors.

Compliance with documentation was poor. We had difficulty identifying samplers in many cases or there was no documentation at all, and therefore no guarantee of compliance with sampling guidelines. (Yellow bars = contaminated BC number).

Mean pre-intervention = 6.67, Mean post-intervention = 6.37



Reducing blood culture contaminants means clearer decision making in cases of potential infection. Fewer patients will be subjected to unnecessary antibiotic treatment. The trust will save money by this and in analysing fewer contaminants.

5. CONCLUSIONS & RECOMMENDATIONS

As is seen from the results, after a reasonable start our interventions did not prove enough. It was not practicable to initiate all we wanted. The lead nurse who agreed to take on further training left the trust, and increased awareness at induction for ED doctors may not have been impactful. We have discussed the issues with senior infection control and senior acute medicine staff and have made the following recommendations, many of which will be in place with the new medical intake from August 2014:

1. All new starting doctor groups from F1-CT2 level should have thorough training as per current DIPC methods for F1 /F2 and be made aware of implications on both patient and trust.
2. Blood culture training should be treated in the same way as other practical procedures for ED nursing staff (i.e. 5x observations then sign off).
3. Culture documentation stickers (part of sepsis bundle and ED proforma) should be simplified, with more room for staff to write their name clearly.
4. Positive blood cultures should be followed up with the sampler being offered further training, to increase accountability and improve technique.
5. Consideration should be given to funding an ED phlebotomy team as specialised teams are associated with reduced contaminants⁴.

References

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4. Dawson S. Blood culture contaminants. *J Hosp Infect* 2014; **87**: 1-10

Acknowledgements

This audit was supported by Dr Alexander Heiatt, Emergency Medicine Consultant, and The Director of Infection Prevention and Control (DIPC) Dr Louise Teare, Consultant Microbiologist. The work was undertaken at Broomfield Hospital, MEHT, Chelmsford CM1 7ET.