Reducing Hospital Stay in Neonates with Suspected Sepsis

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Introduction
A patient care quality improvement project done jointly between an FY2 doctor and NHS Finance Management Trainee aimed at reducing unnecessary hospital stay on NICU for otherwise healthy neonates with suspected sepsis. The current problem being that the incubation of blood cultures was being unnecessarily delayed and is to become further delayed with microbiology services moving out of the current hospital.

Objectives
To eliminate the 3 major delays in the pathway between diagnosing suspected sepsis and discharge following negative blood cultures at 48 hours:

1. **Transportation of blood cultures to the microbiology laboratory (Delay 1 below).** This was already taking up to a number of hours, as samples were merely placed in a collection box and transported at non specific times by hospital porters. However, with microbiology services now moving to a different hospital 1–2 hours away, this delay stands to increase significantly.

2. **Blood cultures not being placed in incubators out of hours (Delay 2 below).** It is not in the job description of night staff in the microbiology department to incubate blood cultures, thus commencement of the process would only take place the next day with no urgency, often into the afternoon.

3. **Administration delays once cultures were incubated for 48 hours (Delay 3 below).** Once 48 hours had elapsed, in order to obtain results, a further 1–3 hour wait would be expected before hearing from the laboratory. Furthermore, if this elapsed time was out of hours, it would often be the next day before patients received results and were discharged.

The Goal
Graph 1 is a graphical representation of the process by which a neonate with suspected sepsis awaits blood culture results before discharge at present, with evident delays.

Graph 2 demonstrates how by correcting the delays, this process can reduce hospital stay by 24 hours.

Solutions
Following extensive discussion, the following solutions have emerged:

1. **Courier service to new microbiology department with overnight incubation.** This is likely to be a temporary solution to the problem, as ‘Delay 1’ is still incurred at around 1–2 hours, and ‘Delay 3’ likely to remain with communication between different hospitals and departments.

2. **Obtaining a blood culture analyser for the NICU department.** This will effectively reduce all delays and will mean that neonates have the greatest chance of being discharged without delay. A business case has been made for the purchase of an analyser which is pending review from the NICU, microbiology and pathology departments, as well as the panel for the ‘Innovation Fund.’

3. **Streamlining the administration process.** This included simple measures to highlight the fact that neonatal blood culture results are discharge dependent to the microbiology laboratory, as well as doctors preparing anticipatory paperwork, particularly if results were expected out of hours.

Conclusions
The most efficient way for NICU to discharge healthy babies with suspected sepsis is to possess its own blood culture analyser, for which a business case is pending.

A short term, but expensive solution to services moving out of the hospital will be to have samples couriered to the new microbiology department.

Administrative processes have been streamlined to ensure as minor delay as possible.