Gloucestershire Hospitals NHS Foundation Trust

Implementing the sepsis six pathway

Introduction

By introducing a sepsis six pathway Dr Charles Candish and his service improvement team at Gloucestershire Hospitals NHS Foundation Trust, have been able to make significant improvements to the use of the sepsis six care bundle from 16% in April 2012 to 91% September 2013 for unscheduled care, and from 5% in September 2011 to 70% in November 2012 for inpatients.

Background

In 2012 Gloucestershire Hospitals NHS Foundation Trust received a Dr Foster mortality alert relating to sepsis. Such alerts arise when an organisation sees a higher number of deaths than normal. To address the issue Dr Sean Elyan, Medical Director asked Dr Charles Candish, Consultant in Clinical Oncology to lead on a service improvement programme. Dr Candish formed a multi-disciplinary group of 30 people from across the Trust which included physicians, a microbiologist, a pharmacist, junior doctors, nurses and a member of the critical outreach team. The role of the group was to understand the problem the Trust faced in regards to sepsis, to identify solutions and to promote the solutions to their colleagues embedding improvements in the culture of the organisation.

Dr Charles Candish and some of his service improvement team.

The problem

The Trust identified through incident investigation, clinical audit and a short-term mortality alert that they had a problem with the management of patients with severe sepsis. Clinical audit revealed that only 5% of eligible patients received the full sepsis six care bundle within the recommended time. The Trust therefore set out to improve the use of the sepsis six care bundle in patients with severe sepsis.
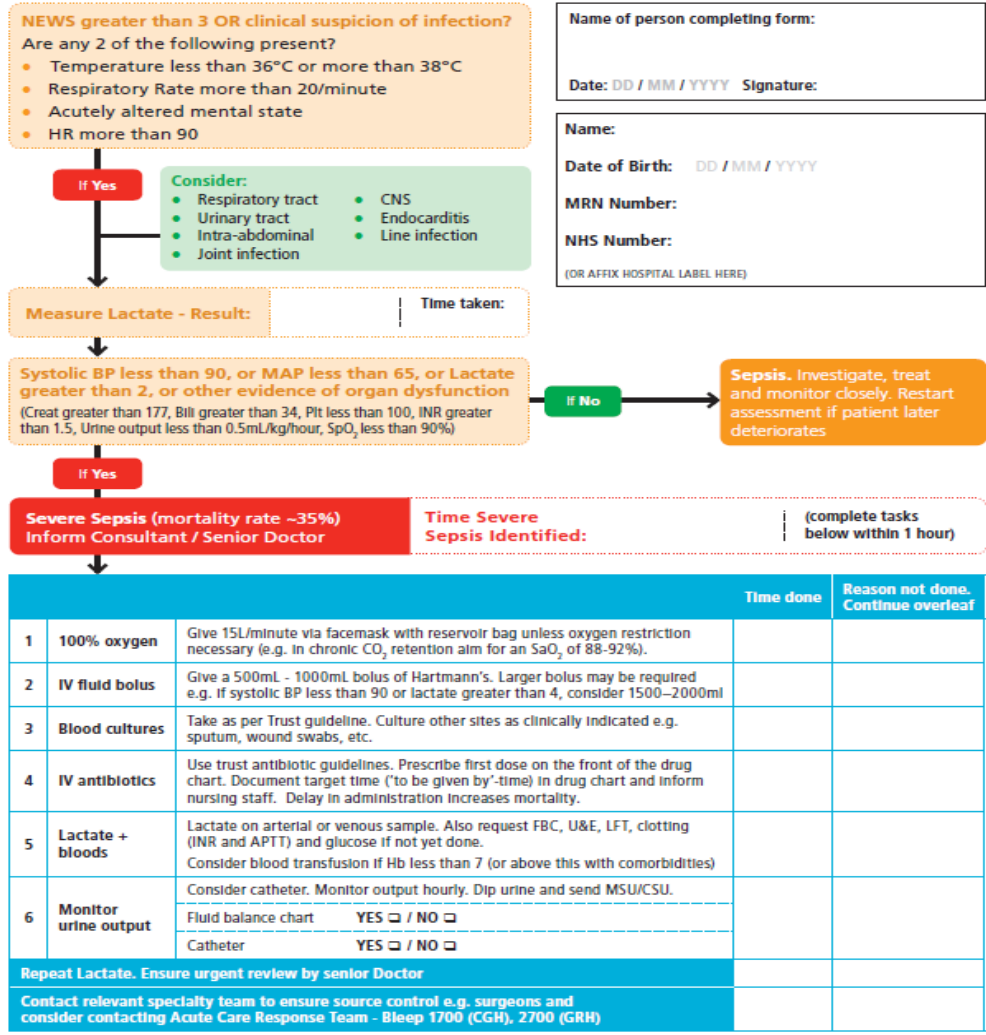
The solution

Dr Candish recognised from the outset that he would need to engage with staff from across the trust to ensure that teams took ownership of the problem and were willing to implement change to improve the treatment of sepsis. When building his service improvement team he ensured all areas of the Trust were represented.

The service improvement team introduced a sepsis six pathway proforma (see below), which was adapted from the resources available from the National Sepsis Trust.

Sepsis Six Pathway

Gloucestershire Hospitals NHS Foundation Trust

(i) Start/complete this form if NEWS equal to/greater than 3 OR clinical suspicion of infection

(i) If neutropenic sepsis is suspected then do not use this form but start the Suspected Neutropenic Sepsis Pathway

NEWS greater than 3 OR clinical suspicion of infection?
Are any 2 of the following present?
- Temperature less than 36°C or more than 38°C
- Respiratory Rate more than 20/minute
- Acutely altered mental state
- HR more than 90

Name of person completing form:

Date: DD / MM / YYYY **Signature:**

Name:

Date of Birth: DD / MM / YYYY

MRN Number:

NHS Number:

(OR AFFIX HOSPITAL LABEL HERE)

If Yes

Consider:
- Respiratory tract
- Urinary tract
- Intra-abdominal
- Joint infection
- CNS
- Endocarditis
- Line infection

Measure Lactate - Result: | **Time taken:**

Systolic BP less than 90, or MAP less than 65, or Lactate greater than 2, or other evidence of organ dysfunction
(Creat greater than 177, Bili greater than 34, Plt less than 100, INR greater than 1.5, Urine output less than 0.5mL/kg/hour, SpO$_2$ less than 90%)

If No → **Sepsis.** Investigate, treat and monitor closely. Restart assessment if patient later deteriorates

If Yes

Severe Sepsis (mortality rate ~35%)
Inform Consultant / Senior Doctor | **Time Severe Sepsis Identified:** | (complete tasks below within 1 hour)

			Time done	Reason not done. Continue overleaf
1	100% oxygen	Give 15L/minute via facemask with reservoir bag unless oxygen restriction necessary (e.g. in chronic CO$_2$ retention aim for an SaO$_2$ of 88-92%).		
2	IV fluid bolus	Give a 500mL - 1000mL bolus of Hartmann's. Larger bolus may be required e.g. if systolic BP less than 90 or lactate greater than 4, consider 1500–2000ml		
3	Blood cultures	Take as per Trust guideline. Culture other sites as clinically indicated e.g. sputum, wound swabs, etc.		
4	IV antibiotics	Use trust antibiotic guidelines. Prescribe first dose on the front of the drug chart. Document target time ('to be given by'-time) in drug chart and inform nursing staff. Delay in administration increases mortality.		
5	Lactate + bloods	Lactate on arterial or venous sample. Also request FBC, U&E, LFT, clotting (INR and APTT) and glucose if not yet done. Consider blood transfusion if Hb less than 7 (or above this with comorbidities)		
6	Monitor urine output	Consider catheter. Monitor output hourly. Dip urine and send MSU/CSU.		
		Fluid balance chart YES ☐ / NO ☐		
		Catheter YES ☐ / NO ☐		
Repeat Lactate. Ensure urgent review by senior Doctor				
Contact relevant specialty team to ensure source control e.g. surgeons and consider contacting Acute Care Response Team - Bleep 1700 (CGH), 2700 (GRH)				

Sepsis six pathway proforma

The service improvement team felt that to convey messages across their teams then more than one approach was required as different people engage in different forums. A number of initiatives were therefore decided on.

An **e-learning** package was created and rolled out across the trust for all clinical and nursing staff. The package is not mandatory but all new doctors are expected to complete the learning during their induction period.

Safety Cafes have been implemented across the trust were members of the service improvement team go along to key social points of the Trust and provide information and advice about using the sepsis six pathway.

The **Doctors inductions** provide the ideal opportunity to target a large number of people in one go, it also ensures the new doctors are aware of the sepsis six pathway as soon as they commence their employment with the organisation.

So that people can see the impact of the changes that were being implemented the data is recorded on the **Quality dashboard.** This enables people to see the results of their hard work and also brings an element of competitiveness access the organisation with areas striving to do better than their colleagues in other teams.

The team recognised that it is often difficult for staff to leave the ward to attend training or awareness sessions, they therefore included **Ward visits** to inform people of the sepsis six pathway and how they can implement it within their areas.

Additionally the trust put in place a CQUIN to drive the change, this created additional pressure on them but they found that it did keep the group motivated and focused.

The results

The improvements are clear to see!
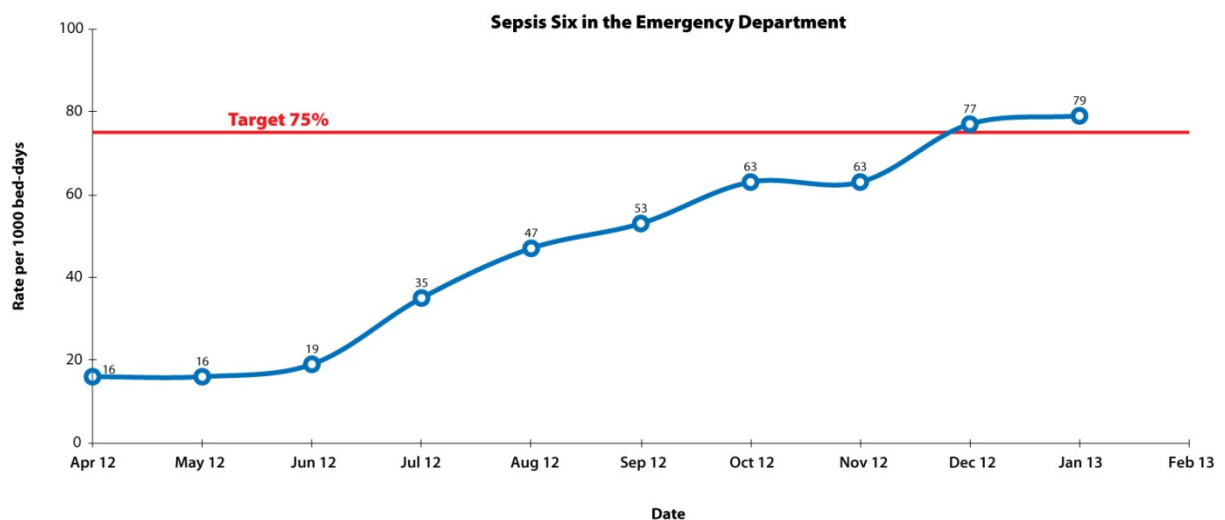
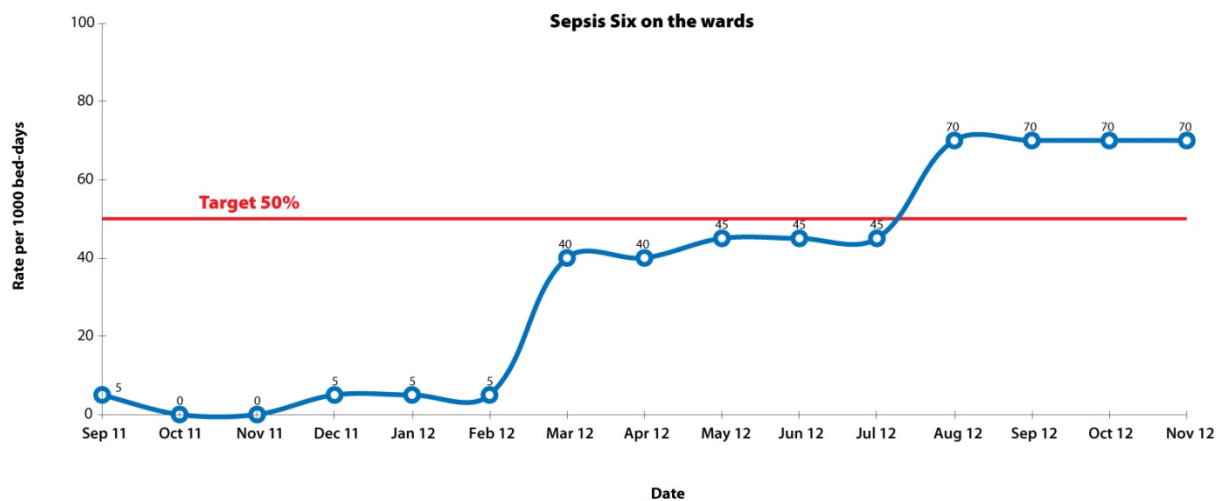**Figure 1.** Rate of Sepsis Six implementation in the Emergency Department

Figure 2. Rate of Sepsis Six implementation on the inpatient wards

It is felt that the significant improvement in August reflects the new large intake of doctors and the intense promotion of the Sepsis Six to this group of staff. Recent audit results show that although the rate of implementation of Sepsis Six on inpatient wards has improved they have again plateaued. To address this and to continue to improve the rates the team are increasing the promotion of Sepsis Six to the senior nursing staff and ward managers.

It is recognised that senior nursing staff and ward manager tend to be a stable group of employees with low turnover rates, by engaging with this group of staff and empowering them, it is felt that although it is difficult to implement change, once the change has been accepted it will be embedded in the culture and promoted easily to new staff on the wards.

The setback

Despite the success of the introduction of the sepsis six pathway in December 2013 the Trust received a further alert regarding mortality rates from deaths associated with patients admitted with septicaemia (except in labour), specifically with a diagnosis coded as 'unspecified septicaemia' (A41.9). In view of the alert, the Sepsis group at Gloucestershire Hospitals NHS Foundation Trust decided to undertake a review of patients who had died from 'unspecified septicaemia' during the timeframe raised by the alert.

Patients were identified and 50 patients were randomly selected for inclusion in the review, six sets of notes were unavailable so 39 sets were independently reviewed by five clinicians using a standard Mortality Review Audit proforma.

The results of the audit showed the patient demographics to be a largely elderly frail cohort of patients admitted via the acute medical take with approximately a third of patients coming from a nursing or residential home and a quarter of patients dying within a day of admission.

On review of the clinical records, approximately half of the patients were felt to be coded incorrectly and whilst they may well of had an element of sepsis in their complex medical condition, the definition of 'septicaemia, unspecified' was not met and an alternative diagnosis and subsequent coding could have been used.

Nine of these patients should have had a more accurate 'sub-code' for sepsis such as bronchopneumonia, urinary tract infection or abdominal sepsis. It was felt that this alternative coding could have been given by the admitting team in the first consultant episode.

In addition ten patients had diagnoses as the first consultant episode which were felt to be very different from 'septicaemia, unspecified' e.g. small bowel obstruction, advanced malignancy, dementia etc. This highlights how difficult making an initial diagnosis and coding can be in complex, frail elderly patients.

Out of those reviewed only seven of the 39 patients had a positive blood culture result, only five of which were felt to be clinically significant.

Intravenous antibiotics were administered to all patients but clear documentation as to the timing (for example, less than one hour) was not clear and not consistently recorded.

In all patients a clarification of the ceiling of care with resuscitation statue and documentation of family involvement in decision making was present.

In summary therefore the management of these patents seemed appropriate and in half of patients an alternative diagnosis and coding could have been made.

Main learning points
- Empower key staff to make changes. If people own the problem and are empowered to make changes they are more likely to make workable changes which create improvements.
- Don't stop, keep going - the change needs to be embedded in the culture of the Trust.
- Coding is complex and difficult to get accurate, and is something most Trusts need to work on. The regular use of audit and reflection can aid learning and better coding.
- Have an agreed plan for educating new staff and updating all staff regularly.