Severe Sepsis, Social Media and the #Sepsis 6: 'Tweeting' National Innovations

L McMenamin, N Murch & R Daniels

Abstract

The Surviving Sepsis Campaign (SSC) was launched in 2002 with guidelines created to help manage severe sepsis and septic shock. In response to poor compliance with the SSC guidelines in the UK, the 'Sepsis 6' model of delivery was created. We report some of the innovative methods hospitals from around the UK are using to help deliver the 'Sepsis 6' care bundle. The use of social media, such as Twitter, for disseminating these innovations is also explored.

Keywords

Early Goal Directed Therapy, Innovation, Sepsis, Septic Shock, Social Media.

Key Points

- Severe sepsis is an increasing global problem.
- The prompt recognition, and appropriate treatment, of severe sepsis increases survival rates.
- Institutions throughout the UK have created innovative methods of delivering the 'Sepsis 6' care bundle.
- Social media, such as Twitter, is one novel way of sharing innovations between institutions.

Background

Early recognition and treatment of sepsis is critical to ensure the best outcomes for patients[1] and is a key component of the work of an acute physician. Since the launch of the Surviving Sepsis Campaign (SSC) in 2002,[2] guidelines for its management have been revised and are now distilled into two distinct care bundles, the 'Severe Sepsis Bundle' and the 'Septic Shock Bundle'.[3] The 'Sepsis 6' care bundle[4] (see Figure 1) is closely reflected in the 2012 SSC guidelines, and is designed to facilitate early response to sepsis. The bundle consist of three diagnostic and three therapeutic steps to be delivered by staff as soon as severe sepsis is recognised, and ideally well within the first hour.[4]

In recognition of the importance of adherence to sepsis care bundles, many hospitals will undoubtedly have conducted local audits of their practice. An audit of the management of severe sepsis published in the last edition of this journal[5] illustrated significant deficiencies in delivering the necessary treatment in the recommended timeframe. We hypothesised that many hospitals who have adopted the 'sepsis 6' care bundle will have identified local solutions to enable its delivery. However a literature search of PubMed, Embase, Web of Science and Google Scholar revealed no relevant publications describing how institutions had achieved this.

We decided, therefore, to use the social medium of *Twitter* to identity and enable sharing of innovations designed to improve delivery of the *Sepsis 6* care bundle. Twitter is an online micro-blogging community; it is considered by many to be a new way of information sharing throughout the world. Users of Twitter post up to 140 characters worth of text at any single time, which can be combined with a photograph or link to another website. Each post is known as a 'tweet'. Users can 'follow' individuals or organisations, providing them with a regular 'timeline' of tweets from that source; for example 'The UK Sepsis Trust' (which can be found under the connection: @SepsisUK). Alternatively, the use of a '#' symbol (known as a 'hashtag') prior to a word within a tweet will enable other twitter users to read the tweet by searching specifically for the term (for example #sepsis). A user of twitter can share a tweet that they have read and found interesting with their own followers by 'retweeting'. In this way,

Sepsis 6 Bundle
1. Deliver high flow Oxygen
2. Take blood cultures
3. Administer empiric intravenous antibiotics
4. Measure serum lactate and send full blood count
5. Start intravenous fluid resuscitation
6. Commence accurate urine output measurement

Figure 1. 'The Sepsis 6'.

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information can be rapidly disseminated amongst large numbers of individuals in a short space of time. Figure 2 is an example of the conversation that was 'tweeted' during a discussion on Twitter following the inception of the idea for this search.

Method

Tweets denoted by the hash tag #sepsis or #sepsis6 were searched along with searching the tweets of @SepsisUK. Tweets about #sepsis6 highlighted other websites such as BBC News and YouTube displaying Sepsis 6 innovations. The following list of Sepsis 6 innovations were found using twitter. Tweets highlighting Sepsis 6 innovations, either directly or via tweeting a link have been followed up and all have been mentioned in this report. At the time of the original visible online discussion (December 8th to December 9th 2012) amongst @AcuteMedEd (approximately 177 followers) and @SepsisUK (approximately 3215 followers), a maximum of 3392 Twitter accounts could have seen the original Tweets. One of the followers of @SepsisUK was @medicluke (approximately 476 followers) who joined in the discussion explaining that he had seen Sepsis 6 bags used in his local Hospital. As a result of this discussion the maximum possible number of Twitter accounts who could have seen part of the conversation was 3868. The initial tweets were not, to our knowledge, retweeted.

Sepsis 6 Innovations

A variety of innovative ideas for the delivery of sepsis 6 care bundles were identified and have been listed below. The list is divided into 'Low Tech', 'Equipment Based' and 'Higher Tech' innovations.



@AcuteMedEd @SepsisUK we are also looking at a piece of work seeing why doctors can't do the 6 interventions in time. Know better? Not important?
@SepsisUK @AcuteMedEd I believe they can, our 'record' was 6 mins. Just need to make it default action & the easiest thing to do. Boxes/carts/bags help
@AcuteMedEd @Sepsis6 I agree, we have a sepsis trolley with 6 drawers, what do you mean by boxes and bags? Pre made sets for wards?
@SepsisUK @AcuteMedEd yes indeed. We have boxes, one of the Welsh hospitals uses bags
@medicluke @SepsisUK @AcuteMedEd #leeds also uses a bag! #sepsis6
@AcuteMedEd @medicluke @SepsisUK if not a piece of research and a publication perhaps? Sharing good practice?
@AcuteMedEd @medicluke @SepsisUK we could organize a web based study to assess the innovations out there - need to disseminate any good ideas!
@medicluke @AcuteMedEd @SepsisUK great idea. Very keen to help out! #sepsis

Figure 2.

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Low Tech innovations

Sepsis 6 Screening Cards

Wrexham Maelor Hospital, Betsi Cadwaladr, University Health Board, Wales

As part of the '1000 Lives Plus Campaign', a credit card sized 'Severe Sepsis Screening Tool' was created[6]. The laminated card (Figure 3) contains the SIRS criteria, the Sepsis 6 guidelines along with the six and 24 hour care bundles. This small transportable aide-memoire was distributed amongst the staff so that, they could be repeatedly reminded of recognising and responding to the medical emergency of severe sepsis.

Severe sepsis 6 protocol

The Royal Free London NHS Foundation Trust, England

Pathways such as these offer a clear and concise way to document and record, not only the recognition of severe sepsis, but also the implementation and documentation of the Sepsis 6. As seen in Figure 4, its format may help facilitate the rapid diagnosis and management steps required by all members of the health care team. Its bold design may allow rapid identification of the Sepsis pathway in the patients' notes as well as critical information for clinical improvement including audit. There are multiple different examples being developed by, and in use by different Trusts. For example, The Royal Free London NHS Foundation Trust's pathway has already passed Version 30. *(users may adapt this protocol to your local needs; however the Royal Free London NHS Trust will require official recognition on adapted forms and any publication that are related to the use of the forms in their current or adapted formats)*

Equipment based innovations

Sepsis 6 Trolley

Acute Medicine Unit, Western General Hospital, Scotland

A variety of Hospitals have created Sepsis 6 trolleys.[7] They are designed to contain all the necessary equipment needed to deliver the Sepsis 6 bundle, sometimes with a separate drawer for each intervention (Figure 5). Having all the equipment mobile and at hand all at once, may make the delivery of the bundle to a patient more simple and efficient. These trolleys may be particularly useful in high turnover acute areas such as the Emergency Department.

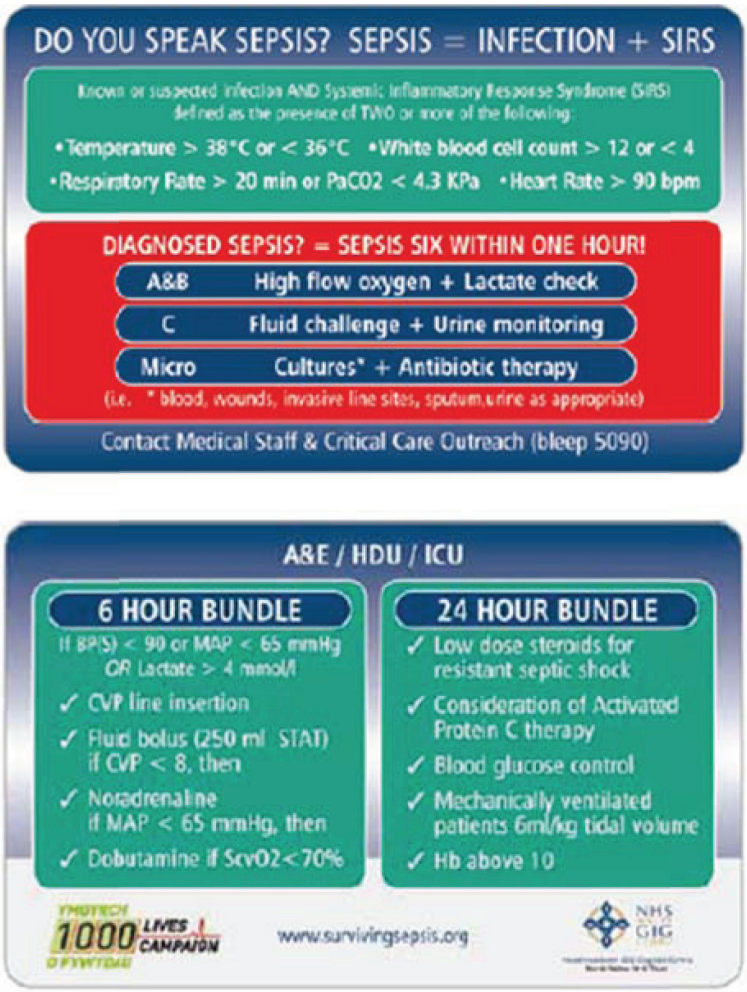

Figure 3. Sepsis 6 screening cards

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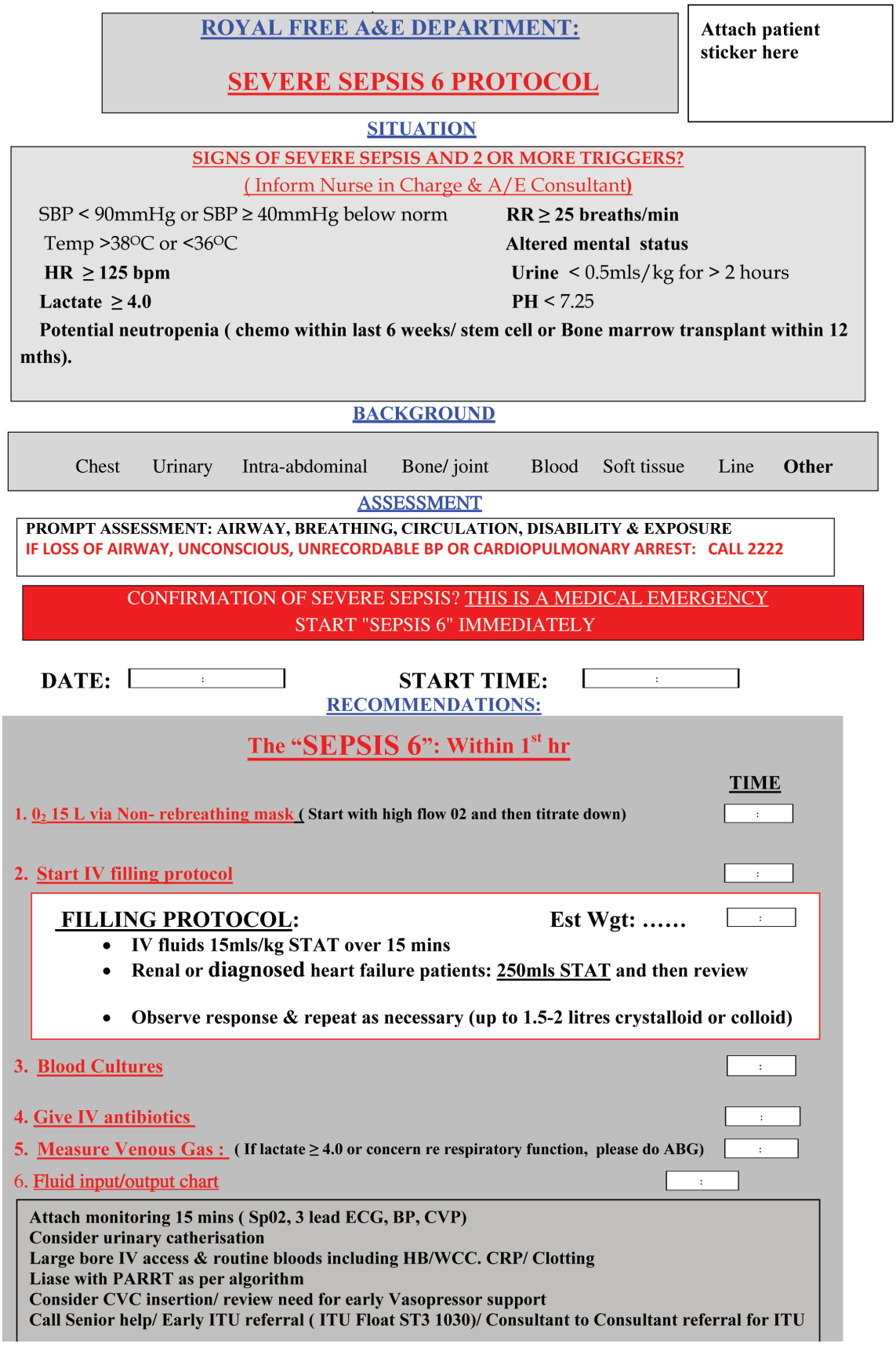

ROYAL FREE A&E DEPARTMENT:

SEVERE SEPSIS 6 PROTOCOL

Attach patient sticker here

SITUATION

SIGNS OF SEVERE SEPSIS AND 2 OR MORE TRIGGERS?

(Inform Nurse in Charge & A/E Consultant)

SBP < 90mmHg or SBP ≥ 40mmHg below norm

Temp >38°C or <36°C

HR ≥ 125 bpm

Lactate ≥ 4.0

RR ≥ 25 breaths/min

Altered mental status

Urine < 0.5mls/kg for > 2 hours

PH < 7.25

Potential neutropenia (chemo within last 6 weeks/ stem cell or Bone marrow transplant within 12 mths).

BACKGROUND

Chest Urinary Intra-abdominal Bone/ joint Blood Soft tissue Line **Other**

ASSESSMENT

PROMPT ASSESSMENT: AIRWAY, BREATHING, CIRCULATION, DISABILITY & EXPOSURE

IF LOSS OF AIRWAY, UNCONSCIOUS, UNRECORDABLE BP OR CARDIOPULMONARY ARREST: CALL 2222

CONFIRMATION OF SEVERE SEPSIS? THIS IS A MEDICAL EMERGENCY

START "SEPSIS 6" IMMEDIATELY

DATE: : **START TIME:** :

RECOMMENDATIONS:

The "SEPSIS 6": Within 1st hr

TIME

1. 0_2 15 L via Non- rebreathing mask (Start with high flow 02 and then titrate down) :

2. Start IV filling protocol :

FILLING PROTOCOL: **Est Wgt: ……** :

- **IV fluids 15mls/kg STAT over 15 mins**
- **Renal or diagnosed heart failure patients: 250mls STAT and then review**
- **Observe response & repeat as necessary (up to 1.5-2 litres crystalloid or colloid)**

3. Blood Cultures :

4. Give IV antibiotics :

5. Measure Venous Gas : (If lactate ≥ 4.0 or concern re respiratory function, please do ABG) :

6. Fluid input/output chart :

Attach monitoring 15 mins (Sp02, 3 lead ECG, BP, CVP)
Consider urinary catherisation
Large bore IV access & routine bloods including HB/WCC. CRP/ Clotting
Liase with PARRT as per algorithm
Consider CVC insertion/ review need for early Vasopressor support
Call Senior help/ Early ITU referral (ITU Float ST3 1030)/ Consultant to Consultant referral for ITU

Figure 4. Severe sepsis 6 protocol

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The sepsis 6 bag
Royal Glamorgan Hospital, Cwm Taf Health Board, Wales

The Sepsis 6 bag contains the equipment to treat the patient with oxygen, fluids and antibiotics within an hour of being diagnosed.[8] The bags also contain the equipment to aseptically obtain peripheral blood cultures.

The sepsis 6 box
Northampton General Hospital NHS Trust, England

Another simple method of storing all the equipment required to deliver the Sepsis 6 bundle within the first hour of the diagnosis is by having all the required equipment within a box. The box can contain all the equipment required to collect blood cultures and take blood samples along with the latest version of the Trust's antibiotics guidelines.[9]



Figure 5. Sepsis trolley

Higher Tech Innovations
Survive Sepsis App
UK Surviving Sepsis Trust, UK

The survive sepsis app (Figure 6), which is free to download from the iTunes app store, provides a simple and effective reminder of the SIRS criteria and signs of new infection checklist. It clearly lays out steps required in the Sepsis 6 Bundle. The app also has the ability to store information for more than one patient. The app is currently being developed for multiple platforms such as Android.

Discussion

The use of Twitter as a medium to survey current practice is novel but clearly open for debate. The advantages of using Social Media (and Twitter in particular) for this purpose include its international reach meaning that large numbers can see Tweets simultaneously. It is relatively quick, free and simple to use. Twitter can be highly interactive, provoking discussion, and interesting or relevant tweets can be retweeted by interested parties. Users may also be happy to interact with people they don't know socially (as in this case) and can break down traditional hierarchical barriers with all seen as peers, allowing direct communication between different professions and grades.

The disadvantages of having used Twitter as a medium to survey current practice include the necessity to be brief, being limited to 140 characters, as well as clear selection bias. Many people following an individual may share their interests. Tweets are a moment in time, which may then be lost in a user's Twitter feed, perhaps necessitating repeatedly



Figure 6. Survive sepsis app

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sending the same message, especially as individuals may be on different times zones or even working patterns (such as on call or night shifts). Searching for appropriate hash tags could be an inaccurate method of searching due to the frequency of spelling mistakes when typing a brief message online. Without the advantage of selectively specifying a target audience, a message is also in danger of being diluted.

Twitter is an example of a Global platform upon which interested individuals or institutions can disseminate innovations, guidelines and clinical expertise including those mentioned above.

Competing Interests

Dr Daniels is also Chief Executive of the Global Sepsis Alliance, a registered charity which has received unrestricted grants from Thermofisher Scientific, who produce assays for procalcitonin which is a biomarker indicative of infection, in the sum of £50,000; and from Roche Diagnostics, who produce biomarker panels in infection, in the sum of £10,000.

Dr Daniels is Chair of the registered charity, the UK Sepsis Trust. This charity has received an unrestricted grant of £25,000 from Becton Dickinson, manufacturers of syringes, blood culture containers and other medical consumables, and an anonymous private donation of £38,000 which funded a sepsis nurse at his base hospital.

Conflict of Interest

All authors have no conflict of interest to declare. No extraneous funding was obtained.

References

1. Raghavan M, Marik PE. Management of sepsis during the early "golden hours". *J Emerg Med.* 2006; **31(2):** 185-199.
2. Robson WP, Daniels R. The Sepsis Six: helping patients to survive sepsis. *Br J Nurs.* 2008; **17(1):** 16-21.
3. Dellinger RP, Levy M, Rhodes A, *et al.* Surviving Sepsis Campaign: International Guidelines for Management of Severe Sepsis and Septic Shock: 2012. *Critical Care Med.* 2013; **41(2):** 580-637.
4. Daniels R, Nutbeam T, McNamara G, *et al.* The sepsis six and the severe sepsis resuscitation bundle: a prospective observational cohort study. *Emerg Med J.* 2011; **28(6):** 507-512.
5. Meyer J, Fritz Z, Burton H, *et al.* Towards 'Sepsis with Optimal Treatment': Evaluating the sepsis care pathway in Acute Medicein and identifying scope for system improvements, *Acute Medicine* 2013; **12(1):** 5-12.
6. NHS Wales. 1000 Lives Plus Campaign. http://www.1000livesplus.wales.nhs.uk/home Accessed 3 January 2013.
7. NHS Scotalnd. 2012; http://www.knowledge.scot.nhs.uk/sepsisvte/blogs/sepsis-calls-and-webex---top-tips/19th-july-2012.aspx. Accessed 3 January 2013.
8. BBC. Royal Glamorgan Hospital, Llantrisant, bid to fight sepsis. 2012; http://www.bbc.co.uk/news/uk-wales-south-east-wales-19545474. Accessed 3 January 2013.
9. Northampton General Hospital NHS Trust 2011; http://www.youtube.com/watch?v=PSS1K4D3X8s 3 January 2013.

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