

# Sepsis in Primary Care Collaborative

End of Phase Report

May 2018



The Scottish Patient Safety Programme (SPSP) is a unique national initiative that aims to improve the safety and reliability of health and social care and reduce harm, whenever care is delivered.

As part of Healthcare Improvement Scotland's ihub, SPSP is a coordinated campaign of activity to increase awareness of and support the provision of safe, high quality care, whatever the setting.

### **The Improvement Hub (ihub) is part of Healthcare Improvement Scotland**

© Healthcare Improvement Scotland 2018

Published May 2018

This document is licensed under the Creative Commons Attribution-Noncommercial-NoDerivatives 4.0 International Licence. This allows for the copy and redistribution of this document as long as Healthcare Improvement Scotland is fully acknowledged and given credit. The material must not be remixed, transformed or built upon in any way. To view a copy of this licence, visit <https://creativecommons.org/licenses/by-nc-nd/4.0/>

**[www.ihub.scot](http://www.ihub.scot)**

# Contents

Introduction	4
Background	5
Our approach	8
Local improvement journeys	13
Reflection and learning	19
Next steps	23
Appendix – Sepsis and LUCS	24
References	29

# Introduction

The Scottish Patient Safety Programme (SPSP) in Primary Care was launched in March 2013. Primary care is healthcare provided in the community. It is estimated that 90% of all healthcare is provided in the community by a wide range of professionals, such as general practitioners (GPs), pharmacists, dentists and nurses, with medicines the most common healthcare intervention.

The Primary Care programme has been delivered through a staged approach. With the initial focus on general medical services, the programme was then spread into pharmacy in primary care, dentistry in primary care and community and district nursing, with a focus on reducing pressure ulcers in care homes. More recently, the programme has focused on improving early recognition of sepsis in primary care.

The SPSP Sepsis in Primary Care Collaborative was launched in November 2016 and concluded in March 2018. Four NHS boards were part of this pilot work. The aim of this end of phase report is to give an overview of the collaborative's work and discuss its results and the learning.

This report, together with the measurement plan, will also help others embarking on work to improve recognition of sepsis in primary care to consider the approach to take and the challenges they might encounter.

# Background

Sepsis has a significant associated mortality resulting in the deaths of approximately 4,000 people in Scotland every year – more than lung, bowel and breast cancer combined.<sup>1</sup> It is the most common cause of death related to infection and is the number one cause of maternal death in the UK. The incidence of sepsis is rising each year.<sup>1</sup>

Evidence suggests that each hour of delay in administering antibiotics to people with severe sepsis increases the risk of dying by 7.6%.<sup>2</sup>

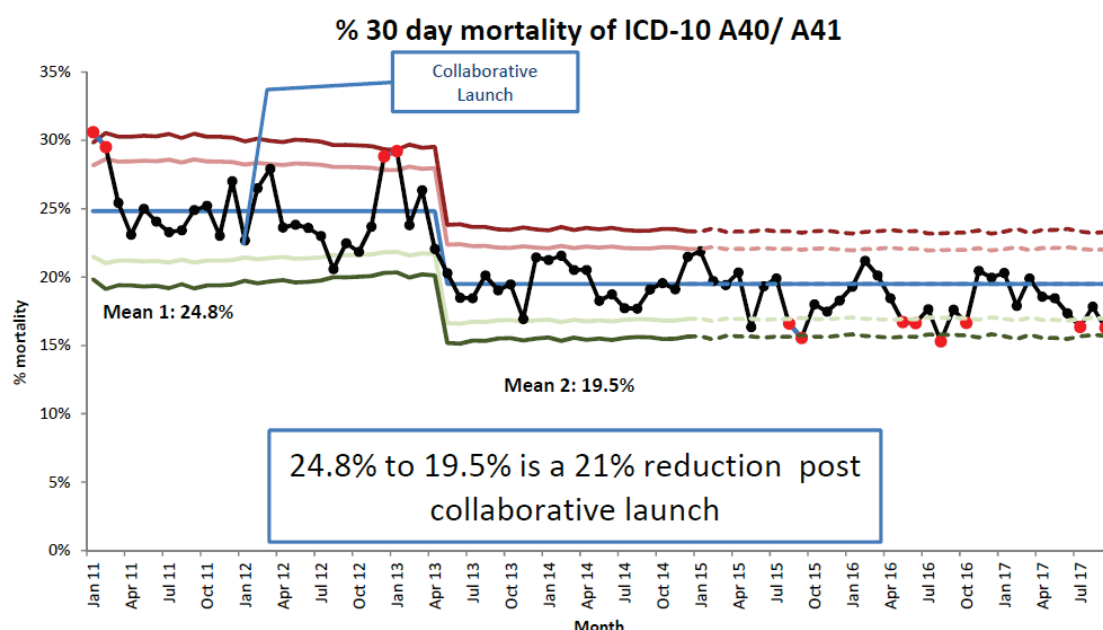
*“In Scotland, one person dies every four hours as a result of sepsis.”*

**Shona Robison, Cabinet Secretary for Health and Sport**

Mortality and harm can be reduced by early recognition and treatment of deteriorating patients. This has been one of the focuses of SPSP since 2008. As a result, acute hospitals now have an improved approach to identifying and treating patients with sepsis quickly and effectively. To achieve this, the SPSP Acute Adult programme focuses on:

- early recognition of deteriorating patients through the National Early Warning Score (NEWS)
- the implementation of a process for structured response and treatment for sepsis, and
- person-centred care planning and early referral where required.

Delivery of these interventions has improved to around 75% of sampled patients and has helped to reduce mortality from sepsis by 21% in NHS Scotland (see Figure 1).



Note: ICD-10 codes A40 & A41 are the most commonly used codes to identify a person with sepsis

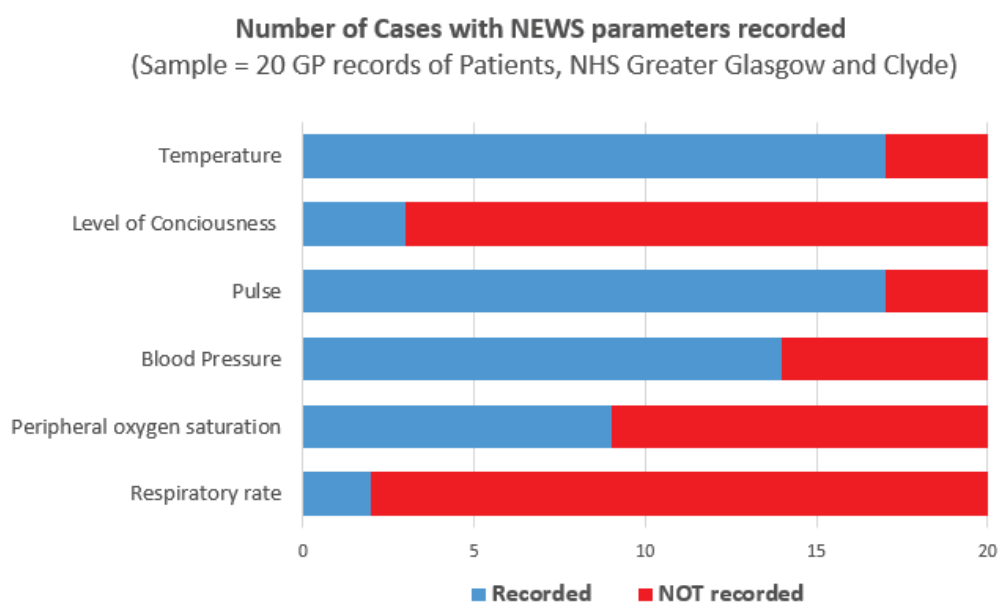
**Figure 1: Sepsis Mortality NHS Scotland**

According to the National Confidential Enquiry into Patient Outcomes and Death (NCEPOD),<sup>3</sup> 70% of cases of sepsis develop in the community but early recognition of deteriorating patients is not systematically recorded and therefore not communicated to the ambulance service or acute receiving unit when patients require acute care.

There are guidelines to aid sepsis identification and management in primary care.<sup>1</sup> It is recommended that a structured set of clinical observations is used to assess the risk of sepsis. These observations include pulse, temperature, blood pressure, respiratory rate, peripheral oxygen saturation and consciousness level and are components of the National Early Warning Score (NEWS2 see new guidance for changes from NEWS to NEWS2 in January 2018).

In the NCEPOD report which reviewed 54 GP records of patients that developed sepsis,<sup>3</sup> they concluded that there was poor recording of baseline parameters: 25 out of 54 had temperature recorded, and 23 out of 54 had no blood pressure recorded. There was no use of an early warning score (EWS) in any of the GP records reviewed.

Similar results were found in an audit of 20 GP records in patients in NHS Greater Glasgow and Clyde in 2014.<sup>4</sup> The audit showed 17 out of 20 (85%) had temperature and pulse recorded but consciousness level (Alert, Voice, Pain, Unresponsive [AVPU]) and respiratory rate were recorded in 3 out of 20 (15%) and 2 out of 20 (10%) cases respectively (see Figure 2).



**Figure 2: Number of Cases with NEWS parameters recorded from NHS Greater Glasgow and Clyde**

Evidence would suggest there is an opportunity to improve the recognition, referral and treatment of deteriorating patients who first present to a primary care health professional and may have sepsis.

In November 2016, building on the SPSP Acute Adult programme's work, the Sepsis in Primary Care Collaborative was initiated with the purpose of promoting the assessment and recording of the six NEWS parameters and overall NEWS value within referral documentation when escalating patients with suspected sepsis to secondary care.

# Our approach

The SPSP Sepsis in Primary Care Collaborative was launched in November 2016, following a competitive recruitment process. The participating pilot NHS boards were:

- NHS Greater Glasgow and Clyde
- NHS Highland
- NHS Lothian, and
- the Scottish Ambulance Service.

Originally, NHS Greater Glasgow and Clyde and the Scottish Ambulance Service made a joint application to be part of the collaborative. However, as the work progressed, it was acknowledged that the Scottish Ambulance Service was integral to the overall NEWS communication data collection process for all of the NHS boards so it was agreed they should be a separate NHS board in this pilot work.

The purpose of the collaborative was to promote the assessment and recording of the six NEWS parameters and overall NEWS within referral documentation when escalating patients with suspected sepsis to secondary care. The pilot also aimed to encourage the verbal communication of the NEWS value by the referring clinician to the acute receiving unit/Scottish Ambulance Service (and hence secondary care colleagues).

## Aim

Initially, each NHS board developed their own aims. However, since March 2017, all participating NHS boards worked together to improve on an agreed national aim that:

By 31 March 2018, 95% patients (>16 years of age) who are being escalated from primary care due to a high index of suspected sepsis will have their NEWS communicated to the “receiving unit”/Scottish Ambulance Service.

## Driver diagram

In order to achieve the aim, the participating NHS boards developed driver diagrams which illustrate the theory of change used to achieve this aim. The local driver diagrams were combined to develop the collaborative driver diagram, shown in Table 1.

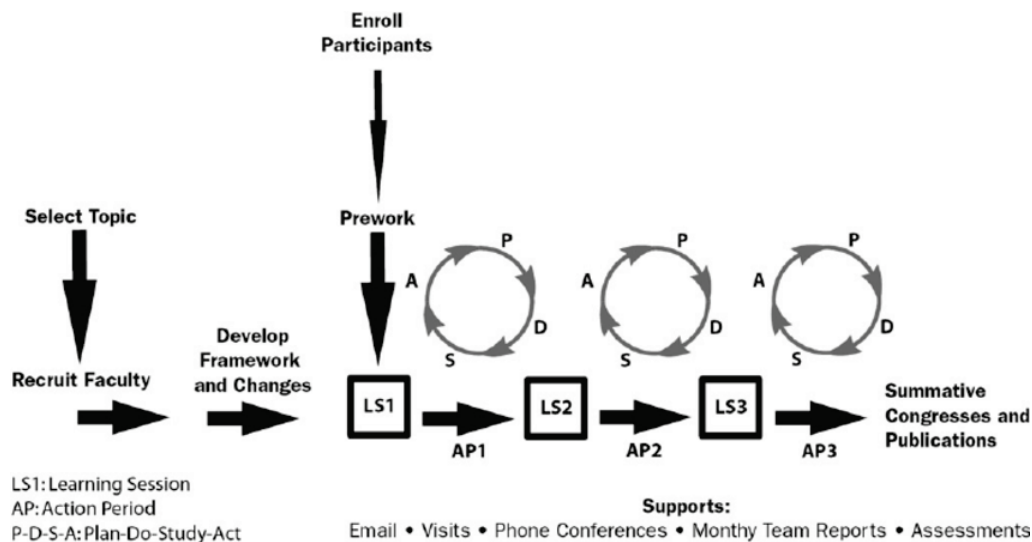


Aim	Primary driver	Secondary driver
95% patients (>16years of age) who are being escalated <u>from</u> primary care with a high index of suspected sepsis will have their NEWS communicated to the 'receiving unit'/Scottish Ambulance Service.	Education	<ul style="list-style-type: none"> <li>• Increase awareness of NEWS.</li> <li>• Increase knowledge of what sepsis is and importance of rapid referral.</li> <li>• Increase correct diagnosis, recognition, referral and response of sepsis.</li> <li>• Encourage provision and completion of appropriate learning resources.</li> <li>• Improve knowledge of/increase use of quality improvement methodology.</li> <li>• Facilitate roll-out of a relevant protocol/tool that will reduce variance in approach.</li> <li>• Provide real-life scenarios and encourage adverse event reporting.</li> </ul>
	Recording and escalation	<ul style="list-style-type: none"> <li>• Increase the number of NEWS recorded in primary care.</li> <li>• Facilitate improvements in the recording of NEWS using EMIS/AdastraePR/Vision.</li> <li>• Increase number of recorded cases of sepsis pre-admission.</li> <li>• Ensure reliable use and communication of escalation plan.</li> <li>• Promote early access to Sepsis 6 in secondary care.</li> <li>• Early and appropriate antibiotic management.</li> <li>• Facilitate improvement in communication and recording of NEWS in the Scottish Ambulance Service control centre.</li> </ul>
	Person and family-centred care	<ul style="list-style-type: none"> <li>• Involve patients and carers in anticipatory care planning.</li> <li>• Increased evidence of 'What matters to you'/shared decision making.</li> <li>• Facilitate the reliable use of escalation plans.</li> <li>• Encourage the use of patient stories to learn and highlight the impact of sepsis screening.</li> <li>• Increase patient and carer awareness of early sepsis recognition.</li> </ul>
	Leadership and communication	<ul style="list-style-type: none"> <li>• Reliable communication of NEWS and suspected sepsis with other agencies.</li> <li>• Improved engagement with clinical leaders and stakeholders.</li> <li>• Share and learn from case stories, for example 'Save of the week'.</li> <li>• Facilitate relationships between Scottish Ambulance Service and NHS board.</li> <li>• Increased use of social media.</li> <li>• Share outcomes of collaborative work.</li> <li>• Encourage multidisciplinary adverse event reporting for appraisal and peer review purposes.</li> <li>• Reduced variation in NHS boards' approach to evaluation of sepsis cases.</li> </ul>

Table 1: Driver diagram

## Breakthrough Series Collaborative Model approach

The collaborative adopted an approach based on the Institute for Healthcare Improvement (IHI) Breakthrough Series Collaborative Model (see Figure 3).



**Figure 3: IHI Breakthrough Series Collaborative Model<sup>3</sup>**

This collaborative model provides the structure of a learning system to facilitate collaboration and learning from all teams involved in seeking improvement in a specific topic area.<sup>5</sup>

The collaborative adapted the IHI Breakthrough Series Collaborative Model. Teams came together at learning sessions to learn about improvement methodology and to share and discuss their learning so far. In between learning sessions, the teams carried out tests of change. Steering group meetings or WebEx's were held every 2 months. These were key for the teams to come together to share the data from the tests and discuss their learning, challenges and successes.

## Data collection

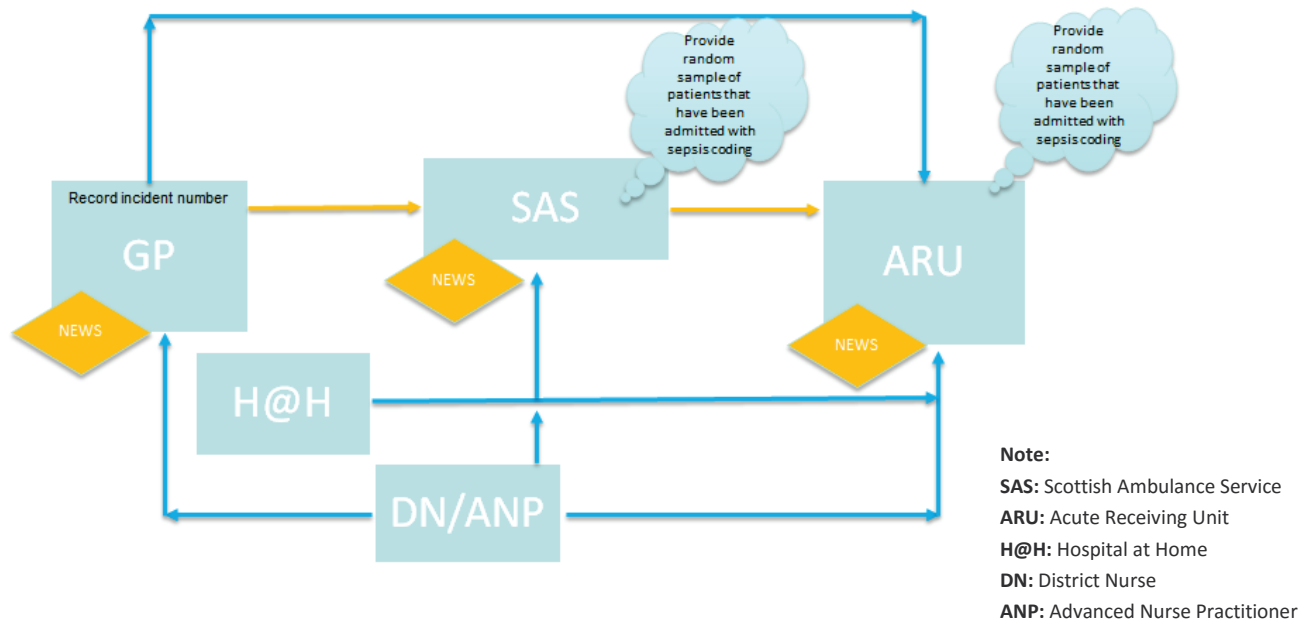
Measurement and data collection plans were developed and agreed with all the teams to ensure a uniform approach (see Table 2). The measurement plan focused on the recording of NEWS and the communication to the SAS or the acute receiving unit. Figure 4 illustrates where NEWS should be recorded and/or communicated across the pathway. An Excel data collection tool was developed to assist participating NHS boards with the data collation and analysis.

Id	Measures	Operational definition	Data collection and sampling method
1	% NEWS recorded in referral documentation	A complete NEWS has to have been entered in the handover/referral letter/home visit summary or electronic out of hours (OOH) equivalent software that would allow the communication of the NEWS from the referring clinician to SAS/acute receiving unit.	Within an agreed location [NHS board or acute setting], 20 random adult patients referred to SAS with suspected sepsis should be sampled each fortnight. Patients may be identified as escalated with suspected sepsis due to identifiers held with SAS or from the acute receiving unit. NHS boards can choose themselves how to highlight these patients. Referral documentation should be reviewed and it should be noted whether NEWS was recorded in the handover documentation.
2	% NEWS communicated per individuals reviewed	The NEWS must be communicated to the SAS call handler/acute receiving unit at the time of referral/escalation.	Within an agreed location [NHS board or acute setting], 20 random adult patients referred to SAS with suspected sepsis should be sampled each fortnight. Patients may be identified as escalated with suspected sepsis due to identifiers held with SAS or from the acute receiving unit. NHS boards can choose themselves how to highlight these patients. Referral documentation should be reviewed and it should be noted whether NEWS was recorded in the handover documentation.

**Table 2: Extract of the measurement plan**

Data for Measure 2 proved to be challenging to collect. The existing systems within the Scottish Ambulance Service did not allow for easy extraction of the data required. For a short period of time, a manual process of reviewing the calls retrospectively was adopted but discarded as this was not sustainable.

As a result, Measure 2 was later removed from the measurement plan until less time-consuming alternatives were available.



**Figure 4: NEWS recording across the pathway**

It was also anticipated and encouraged that NHS boards highlighted additional measurements on their improvement journey that they considered appropriate to be recorded and shared with their collaborative members.

# Local improvement journeys

The participating NHS boards had significant variations in their improvement journey. Each of them took a different approach and focused on different aspects as summarised in Table 3 below.

NHS board	Focus
NHS Greater Glasgow and Clyde	<ul style="list-style-type: none"><li>• Education on NEWS recording</li><li>• Improving IT for NEWS recording</li></ul>
NHS Highland	<ul style="list-style-type: none"><li>• Improving IT for NEWS recording</li></ul>
NHS Lothian	<ul style="list-style-type: none"><li>• Education on NEWS recording</li><li>• Standardisation of NEWS communication</li></ul>
Scottish Ambulance Service	<ul style="list-style-type: none"><li>• Education on NEWS communication and escalation</li></ul>

**Table 3: Focus taken by participating NHS boards**

## NHS Greater Glasgow and Clyde

NHS Greater Glasgow and Clyde began their improvement journey in 2015 with a group of six out-of-hours GPs using a bundle of four measures:

- calculation of NEWS for all admissions
- consideration of antibiotic treatment prior to admission
- effective communication of NEWS to the hospital team, and
- appropriate transfer arranged according to NEWS severity.

In 2016, NHS Greater Glasgow and Clyde submitted a joint bid with the Scottish Ambulance Service to participate in the SPSP in Primary Care Sepsis Collaborative, with the aim to improve the detection and management of sepsis in both primary care and in the transition between primary care and the Scottish Ambulance Service.

Being part of the collaborative, NHS Greater Glasgow and Clyde then refocused their improvement work on the use of NEWS by a cohort of 15 GPs, both in-hours and out of hours, for patients identified with suspected sepsis and the communication of the NEWS by primary care to the Scottish Ambulance Service and/or acute receiving unit.

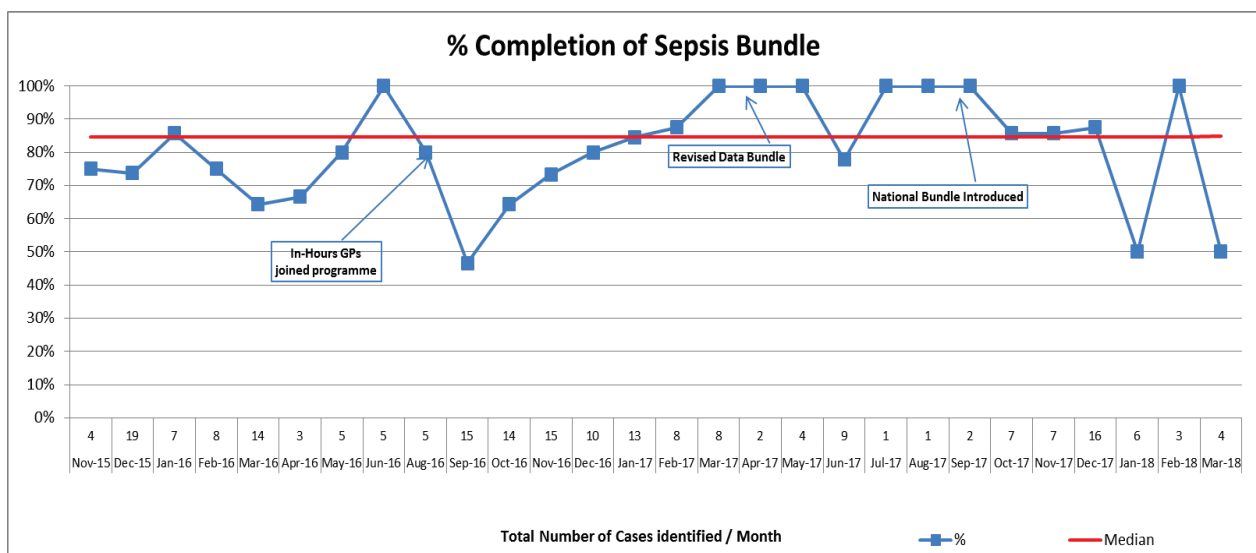
These GPs provided monthly retrospective data via their practices using a data collection tool detailing NEWS calculation and communication to the acute receiving unit.

Data was analysed (Figure 5) and feedback was provided to participants using a variety of methods: monthly meetings, learning events and by email or flash reports. The disparate nature of the group precluded easy access to data sharing by other means.

Awareness on sepsis was raised by signposting participating GPs to resources such as the Royal College of Physician's online NEWS guidance and learning module and NICE guidance.<sup>6,7</sup>

Although not part of the original participating GPs, during the collaborative period an innovative GP cluster in Inverclyde started recording observations prior to prescribing specific antibiotics. They developed a form on EMIS (one of the electronic patient record systems and software used in primary care) to record the six observations. However, EMIS does not calculate the cumulative score.

Building on the learning from the collaborative, NHS Greater Glasgow and Clyde continues to consider how to use NEWS to detect sepsis in the community setting. Options include developing further sepsis pathways from the community into acute settings, working with a GP cluster to build momentum on the use of NEWS and promoting the use of NEWS for the early detection of deterioration to avoid hospital admissions.



**Figure 5: NHS Greater Glasgow and Clyde Completion of Sepsis Bundle**

## NHS Highland

In Highland, a GP cluster was approached to be part of the SPSP Sepsis in Primary Care Collaborative. Practices from Nairn, Badenoch and Strathspey worked on increasing the recording and communication of NEWS in patients who present to their GP with common infective conditions.

The list of infective conditions considered were upper respiratory tract infection, meningitis, wound infection, lower respiratory tract infection, urinary tract infection, abdominal pain, cellulitis, device related infection (for example catheter), confusion and pyrexia of unknown origin.

Vision, the electronic patient record systems and software used in primary care in NHS Highland, did not have the capability for recording NEWS parameters. The Nairn Practice, with support from NHS Highland and a software company, developed a new template to enable this.

The template underwent several tests of change to reach the version illustrated below in Figure 6. Initial testing was undertaken in the Nairn Practice before roll-out to the Badenoch and Strathspey practices.

**Figure 6: Screenshot of NEWS report in Vision**

Each entry in the template was recorded and coded within Vision to allow data extraction and analysis. Data was sent weekly to the associated software company for sharing with the quality improvement practitioner supporting the Highland cluster pilot area.

By the end of the collaborative, data on Measure 1 (% NEWS recorded in referral documentation) started to be available.

Learning has been shared through visits by the quality improvement practitioner to individual practices and cluster meetings. A well-attended learning event was held in Inverness in November 2017 and a further event is planned for June 2018.

NHS Highland plans a roll-out of the Vision template beyond the participating GP cluster. However, further work is first required in terms of governance issues between the software

company and NHS Highland (such as clarification on the intellectual property of the template and the extraction of the data collected).

## NHS Lothian

NHS Lothian focused on improving NEWS recording and communication by their out-of-hours practitioners. There are approximately 280 salaried and ad hoc GPs and 25 nurse practitioners in the Lothian Unscheduled Care Service (LUCS). Although these practitioners can potentially work across the whole service, individual practitioners will tend to have regular working patterns in the same bases or groups of bases.

Practitioners were encouraged to use NEWS by using different means. Both GPs and nurse practitioners were directed to LearnPro resources for sepsis and NEWS.<sup>7</sup> Learning materials were developed and sent to all LUCS staff by the associate clinical director (see Appendix 1). NEWS lanyard cards (see Figure 7) were also distributed to practitioners. Staff were also encouraged to use the NHS Scotland NEWS and Sepsis app.<sup>8</sup>

As part of this work, a transfer sheet was developed by a GP and a paramedic in response to addressing the issue of LUCS GPs typing their notes on the consultation and having these faxed to the Emergency Department or Acute Receiving Unit directly and then not leaving anything handwritten at the patient's house.

The transfer sheet is now carried in all the LUCS cars' paperwork files, are widely (but not completely uniformly) used by home visiting GPs and they are liked by the Scottish Ambulance Service.

Together with NHS Highland, LUCS is developing a video to illustrate a patient journey and raise awareness of sepsis in primary care. The video will be available by the end of 2018.

Physiological Parameters		3	2	1	0	1	2	3
A	Respiratory rate (bpm)	≤8		9-11	12-20		21-24	≥25
	O <sub>2</sub> Saturations (%)	≤91	92-93	94-95	≥96			
B	Any supplemental Oxygen		Yes		None			
C	Systolic BP (mmHg)	≤90	91-100	101-110	111-219			≥220
	Pulse (bpm)	≤40		41-50	51-90	91-110	111-130	≥131
D	AVPU score				Alert			VPU
E	Temperature (°C)	≤35.0		35.1-36.0	36.1-38.0	38.1-39.0	≥39.1	
Concern about a patient should lead to escalation, regardless of the score.								

**Figure 7: NEWS lanyard card**

Information on learning resources, tests of change and data was shared by email and through the LUCS website as well as the Midlothian base whiteboard. A staff survey gathered feedback on how staff were adapting to and using NEWS.



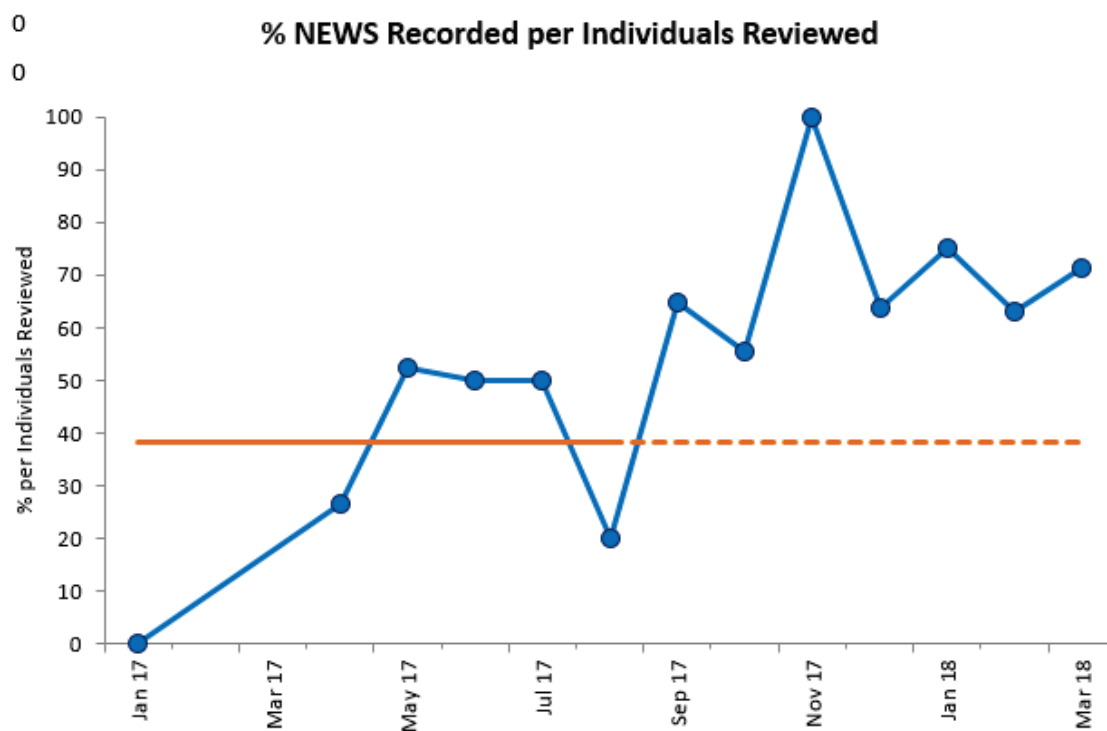
A dedicated GP research fellow reviewed admissions from the Midlothian postcode area. For each month, a search was done using five filters:

1. Case Type (such as primary care centre attendance or home visit)
2. Final Location (for example which centre or laptop used in OOH visits)
3. Informational Outcomes added (for example referral to ambulance or hospital)
4. Age (over 16), and
5. Postcode – only those patients with a Midlothian postcode.

Thereafter, the GP research fellow reviewed each case and selected those with a code that could suggest secondary care referral with infection (such as sepsis, lower respiratory tract infection, urinary tract infection, skin infection, cystitis, pyelonephritis and abdominal pain).

Learning from the case studies reviews was shared as described previously and by email, through the LUCS website and the Midlothian base whiteboard.

Data showed early signs of improvement in the recording of NEWS (see Figure 8).



**Figure 8: Lothian Unscheduled Care Service Data**

Tests of change also included the introduction of a transfer document.

LUCS continues to work on improving the recording of NEWS by providing education and learning from the data.

## The Scottish Ambulance Service

All three territorial NHS boards were supported by the Scottish Ambulance Service with NEWS data collection. A senior officer from the Scottish Ambulance Service listened to call recordings in specific cases to produce a spreadsheet of data.

The need to train non-clinical staff on the importance of recognising and managing sepsis promptly was recognised. The senior officer provided training to call handler staff and advisors on focusing on key buzz words that would help escalate the level of response when logging suspected sepsis calls.

The learning from the collaborative is informing the review of the ambulance booking guide.

Overall, communication between the Scottish Ambulance Service and participating NHS boards was reported to have been improved.

*“The addition of a NEWS score allows us as a service not only to prioritise the call accordingly, but to send the correct clinical resource to continue that patient’s care journey. The NEWS has allowed us to recognise unwell sepsis patients booked as urgent transfer and escalate them appropriately to an emergency. These patients have continued through the chain and received timely intervention from Emergency Departments and Critical Care teams in hospital.”*

**National Patient Safety Manager at Scottish Ambulance Service**

Joint working between the Scottish Ambulance Service, SPSP Acute Adult and SPSP Primary Care gave the opportunity to promote the possibility of a consensus on the appropriate use of antibiotics pre-hospital, particularly where sepsis was suspected and deterioration likely from NEWS and clinical concern.

Although not part of the aim of the collaborative, it was suggested that cefotaxime, an antibiotic used to treat infections such as meningitis, should be available to paramedics in the same way that out-of-hours GPs have it in their medication bags.

There was an initial presentation to the Scottish Antibiotics Prescribing Group (SAPG) in December 2017, where the Scottish Ambulance Service’s *Patient Group Direction for Cefotaxime* was presented and accepted. A consensus SBAR from SPSP Acute Adult, SPSP Primary Care and the Scottish Ambulance Service will be presented to the next SAPG meeting in 2018, suggesting cefotaxime as the drug of choice for parenteral use pre-hospital.

To assess antibiotic use and appropriate stewardship, the Scottish Ambulance Service records use of antibiotics in their service. This will help prevent unnecessary usage and fulfil SAPG requirements for balancing measures where antibiotic use is being promoted.

# Reflection and learning

This section describes the enablers that contributed to the improvement of sepsis recognition and communication in primary care and the barriers encountered in this improvement work.

## Enablers

- **Group of willing and enthusiastic people working and collaborating towards one aim**  
The enthusiasm for participation and sharing within the collaborative by members was particularly evident in both the steering group sessions and the learning events. The local teams were formed by very keen individuals genuinely motivated to improve patient outcomes. Sometimes labour intensive tasks were required to test different ideas but they were willing to try them. The Breakthrough Series Collaborative structure allowed them to learn together and collaborate.

- **Use of data and patient stories to discover opportunities for improvement**  
Data is crucial to improvement, however the patient's journey from primary to secondary care, usually by ambulance, often revealed opportunities for learning and improvement that could be shared with professionals and the public alike, to promote better, safer care. For example, during the Scottish Ambulance Service's data collection process, it became evident that there was the potential for much greater communication between the service and GPs on issues such as the best use of the service's booking guide, sharing of patient stories and pre-hospital antibiotic use.

- **Collaboration with other teams and organisations**  
The work went beyond working with the participating NHS boards in the collaborative. For example, there were meetings with colleagues from the SPSP Acute Adult team to consider the pathway of patient deterioration and joint initiatives such as the development of national online resources on NEWS2 in collaboration with NHS Education for Scotland.

Joint working also led to the Scottish Ambulance Service's *Patient Group Direction for Cefotaxime* to be approved by SAPG. A consensus SBAR for pre-hospital antibiotics will be presented to SAPG in June 2018.

There were links with other NHS board areas out with the collaborative to learn from their work. For example, NHS Tayside continues to progress its work on deterioration and promote use of NEWS in conjunction with appropriate escalation plans for community hospitals and practitioners (such as Angus area of Tayside).

- **Standardisation of communication**  
Using a common language around sepsis is essential to raise awareness with both clinical and non-clinical staff and enable efficient communication. In the collaborative, there

were examples of different approaches to standardise communication (for example buzz words, standard transfer document).

- **Publication of NEWS2 guidance in December 2017**

The Royal College of Physicians published the NEWS2 guidance in December 2017.<sup>9</sup> The guidance clarified previous use of NEWS and reinvigorated the use of NEWS. This comprehensive document continues to promote the use and development of NEWS and particularly re-emphasises the need for ongoing standardisation of practice, learning and use of a common language.

- **Development of training resources**

The need for a Scottish learning resource across primary and secondary care was recognised and, as mentioned before, a LearnPro module was developed by NHS Education for Scotland in collaboration with Healthcare Improvement Scotland.<sup>7</sup> Other materials were developed and/or are beginning to be developed as part of the Sepsis in Primary Care Collaborative (such as training information for out-of-hours GPs - see Appendix 1).

- **Use of technology**

Being able to adapt EMIS and Vision was considered an enabler to record NEWS in primary care systematically.

## **Barriers**

- **Complex identification of the population**

For the aim relating to 'Patients with Suspected Sepsis', the population of interest was clear but identifying those patients retrospectively was more complex and was the biggest barrier to this work.

Each NHS board had widely varying potential population numbers due to the different sizes of area, clinician numbers and methods used. Table 4 describes the different approaches taken by the participating NHS boards. Further limitations occurred when the reliability of coding was considered and the use of IT systems not specifically designed to record sepsis or NEWS. In some cases, NHS boards reviewed case notes manually when resources and numbers allowed but this approach may not be feasible in everyday use.

Participating NHS board	Method	Population of intervention	Population identified	Pros	Cons
<b>NHS Greater Glasgow and Clyde: Out-of-Hours GPs and In-Hours GPs</b>	Self-identifying paper audit system, GPs would record on an audit sheet information about any patients that they suspected had Sepsis	All patients that had suspected sepsis that were being admitted to hospital	All patients that had suspected sepsis that were included on audit sheet	Simple paper based system. Not relying on coding completeness or pulling records. Very easy to identify those patients who had suspected sepsis	Reliant on GPs remembering or being able to complete audit sheet. No additional prompts to use NEWS which might increase suspicion of sepsis
<b>NHS Greater Glasgow and Clyde: In-Hours GPs</b>	Identify patients prescribed antibiotic	All patients prescribed antibiotic	All patients prescribed antibiotic	Easy to identify patients, population identified is exactly the same as population of intervention so all patients identified are expected to have NEWS completed, has potential to increase recognition of sepsis, does not go as far as requiring all patients seen by GP to have NEWS completed	Population of interest will not specifically be patients suspected with sepsis (may not be a con) – requires case note review
<b>NHS Highland</b>	Identifying patents admitted to hospital with a coding of sepsis	All patients that had suspected sepsis	Patients admitted to hospital with a coding of sepsis	Identifies all patients that were admitted to hospital and coded with sepsis, so no need for GPs to self-identify so potentially more complete data set	Reliant on correct use of coding in hospital, may include patients admitted where there was no reason for GP to suspect sepsis at that time and so perhaps no reason to complete NEWS - requires case note review
<b>NHS Lothian</b>	Identify patients on ADAQRA that were admitted to hospital and coded with one of 27 conditions associated with presumed sepsis	Patients on ADAQRA that were admitted to hospital and coded with one of 27 conditions associated with presumed sepsis	Patients on ADAQRA that were admitted to hospital and coded with one of 27 conditions associated with presumed sepsis	Population identified is exactly the same as population of intervention so all patients identified are expected to have NEWS completed, has potential to increase recognition of sepsis, does not go as far as requiring all patients seen by GP to have NEWS completed	Relies on coding used appropriately to identify patients, population identified may not specifically be patients with suspected sepsis (again not really a con) – requires case note review

**Table 4: Data collection methods adopted by different NHS boards**

- **Technological barriers**

Adapting Adastra, the software system used by out-of-hours services across Scotland, to enable NEWS recording was not possible. There was no flexibility to adapt Adastra. Any changes to the system to amend the data entry and data extraction requires the work of the software company and it is not always possible.

Although EMIS allowed the creation of a NEWS template, the calculation of the NEWS required further work.

Governance issues were raised and had to be dealt with as a result of adapting information systems used by GPs, such as Vision.

Promoting and adopting a new template within an existing software system may not result in significant improvements in use or recognition of deterioration. Factors such as training, education and workload also have to be addressed.

- **No standardisation of referral pathways and documentation**

Referral pathways are complex in areas of large population and multiple receiving units, for example in our major cities. The changing nature of the workforce, particularly when new ways of working are increasingly being introduced, can impact on standardisation of the documentation and referral route.

- **Engagement with specific groups of GPs**

Rural GPs are under even more significant pressure than other areas of general practice in terms of resources and staffing which may impact on their ability to engage with the recommendations from national and regional sources.

Communication with out-of-hours GPs is also challenging due to their geographical dispersion and regular communication mainly relies on emails that need to somehow stand out in their inboxes.

The changing nature of the workforce, such as locums, makes it more challenging to introduce new ways of working.

- **Lack of resources in community nursing**

Pressures on community nurses are similar to other primary care areas with increased workload and less resource, not only in terms of staffing but also equipment. For example, the provision of basic equipment required to record the NEWS parameters is often lacking (particularly Pulse oximeters and tympanic thermometers) even when adequate training has been put in place.

# Next steps

The SPSP Sepsis in Primary Care Collaborative has been a pilot piece of work that will help inform the national agenda on deteriorating patients. The work was carried out in different settings: individual practices, GP clusters, out-of-hours GPs, Scottish Ambulance Service and in different areas of Scotland (rural versus cities). This provided a good understanding of the enablers and challenges faced when working to improve sepsis in primary care.

## Next steps - nationally

The resources and learning from the SPSP Sepsis in Primary Care Collaborative will be shared on the SPSP Sepsis in Primary Care webpage: <https://ihub.scot/spsp/primary-care/sepsis-collaborative>. The following resources will be available:

- end of phase report
- driver diagram
- measurement plan
- link to NHS Education for Scotland's NEWS2 LearnPro module, and
- a video to raise awareness of sepsis in primary care.

The learning from the SPSP Sepsis in Primary Care Collaborative pilot work will be considered in conjunction with other pieces of work carried out in secondary care and community nursing around sepsis and will be aligned under the deteriorating patient across the pathway theme. The priorities for the next phase of the deteriorating patient across the pathway will be defined with key stakeholders over the coming months.

## Next steps - locally

The participating NHS boards are keen to continue work to improve the recording and communication of NEWS locally, building on the learning from this work and considering a pathway approach.

New NHS boards, GP clusters and/or individual GP practices should consider the learning from this work before embarking on their own improvement journeys.

In line with the Royal College of Physician's NEWS Guidance, Recommendation 42: *'Education, training and demonstrable competency in the use of NEWS should be a mandatory requirement and form part of mandatory training for all healthcare staff engaged in the assessment and monitoring of acutely ill patients'*, NHS boards should promote the use of sepsis learning resources across relevant staff in NHS Scotland, as raising awareness on NEWS is key to improving the identification and response to sepsis.

# Appendix 1 – LUCS sepsis learning material

## Sepsis and LUCS

### What is sepsis?

Sepsis is a condition where the body's abnormal (or 'dysregulated') response to infection starts to damage the body and cause organ failure.<sup>1</sup>

### Who does it affect?

Anybody – and causes more than 44,000 deaths per year UK wide.<sup>2</sup>

### Why is sepsis tricky?

It is a clinical diagnosis, and there is no specific lab test with reliably either confirms or excludes its diagnosis. Many patients are seen in Primary Care with infection, and only a very small fraction will have sepsis.<sup>3</sup>

### Have I got NEWS for you?

NEWS stands for National Early Warning Score and is a risk stratification tool, developed in secondary care, for identifying acutely unwell patients, including those with sepsis. In LUCS we are testing NEWS as a communication tool between both SAS and secondary care clinicians in patients aged over 16, with presumed sepsis, that we have decided warrant an emergent transfer to hospital. This test is currently occurring in patients who attend the Midlothian base, and those who are visited at home with a Midlothian postcode.

### NEWS card

Physiological Parameters		3	2	1	0	1	2	3
A	Respiratory rate (bpm)	≤8		9-11	12-20		21-24	≥25
	O <sub>2</sub> Saturation (%)	≤91	92-93	94-95	≥96			
B	Any supplemental Oxygen		Yes		No/nc			
	Systolic BP (mmHg)	≤90	91-100	101-110	111-219			≥230
C	Pulse (bpm)	≤40		41-50	51-90	91-110	111-130	≥131
	WPU score				Alert			UPE
E	Temperature (°C)	≤35.0		35.1-36.0	36.1-38.0	38.1-39.0	≥39.1	
Concern about a patient should lead to escalation, regardless of the score.								

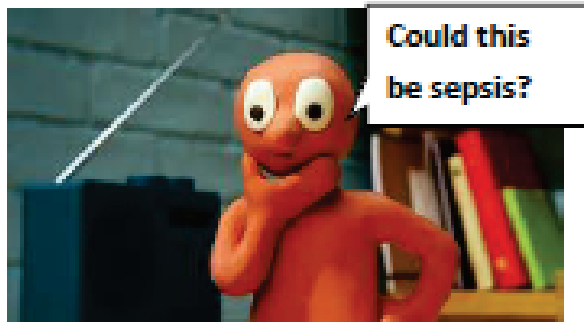
### NEW scores

Low risk aggregate score 1-4

Medium risk aggregate score 5-6

High risk aggregate score 7 or more, or any RED score (individual parameter scoring 3). Also be concerned with non blanching rash/mottled/ashen/cyanotic skin, and the patient who has not passed urine for 18 hours.





is the key question.

### Red flags

Person may just feel very unwell or exhibit changes from usual behaviour

### Groups at higher risk of developing sepsis:<sup>16</sup>

- Age - the very young (under 1 year) and older people (over 75 years) or people who are very frail
- Impaired immune systems because of illness or drugs, (chemotherapy, diabetes, splenectomy patients, sickle cell disease, long term steroids, immunosuppressant drugs eg for RA, IBD):
- Surgery, or other invasive procedures, in the past 6 weeks
- Breach of skin integrity (for example, cuts, burns, blisters or skin infections)
- Intravenous drug users
- Indwelling lines or catheters.
- Women who are pregnant, have given birth or had a termination of pregnancy or miscarriage in the past 6 weeks

### Cautions

Take care if person can't give a good history eg English as a second language or difficulty in communication

### Pitfalls with NEWS in identifying sepsis

#### **Respiratory Rate**

- Person with a chronic lung condition eg COPD might always have a higher than normal baseline respiratory rate

#### **Oxygen saturations**

- Person with a chronic lung condition eg COPD might always have lower than normal baseline oxygen saturations
- Oxygen saturations as measured by an oxygen saturation monitor are unreliable in a cold, shocked person, and person who is wearing nail varnish/has a co-existent arrhythmia/ is moving/has an automatic BP cuff on the same arm/is moving/has co-existent CO poisoning

#### **Blood pressure**

- Normal blood pressure does not mean the absence of sepsis, particularly in fit people and young adults

#### **Heart Rate**

- Baseline is lower than predicted by age in fit adults
- Pregnancy pulse rate is 10-15 beats per minute higher than in non-pregnant women
- Older people may get an arrhythmia rather than a large increase in heart rate with sepsis
- B Blockers can mask sepsis induced increase in heart rate

#### **Mental state**

- In children and people with dementia, change in mental state might mean irritability or agitation

#### **Temperature**

Don't rely on fever to rule sepsis in or out (AND – temperature rise might be normal post operative or post trauma physiology)

These groups may not mount a temperature:

- Old, frail, or very young
- People receiving cancer treatments
- Severely ill

### Sepsis and Telephone Triage

If identifying sepsis face to face is tricky, identifying it via telephone triage is much more so. Think about questions which identify abnormalities in terms of the NEWS parameters:

#### **Respiratory Rate**

- Is person able to speak?
- Is person able to speak in sentences?
- Does he/she sound breathless on the phone?
- Is he/she making any additional respiratory noises?

#### **Oxygen saturations**

- Is the person the same colour as usual?
- If not, what colour are they?
- Does the person have a device eg sats monitor?

#### **Blood pressure**

- Is the person dizzy on standing?
- Is the person able to walk as they would normally to the bathroom?
- Can the person climb stairs as they normally would?
- What is the person doing at the moment?
- Does the person have a device eg blood pressure monitor?

#### **Pulse**

- Is the person aware of his/her heartbeat?
- Anyone present who knows how to check a pulse?
- Does the person have a device eg fitbit tracker?

#### **AVPU**

- Is the person's behaviour normal for them or not?
- Are they making sense when they speak?

#### **Temperature**

- Is there a thermometer to measure temperature at home?
- Is the person hot to touch but complaining of feeling cold?
- Has the person been visibly shivering?

**AND.....Skin** Is the skin mottled, ashen, blue, is there a non-blanching rash? **Urine** When did the person last pass urine? How much did they pass? What colour was it?

### Safety netting

For both telephone triage and face to face consultation, it is really helpful for people when you are specific about what they need to seek further urgent medical advice for, rather than saying 'contact us again if you or your son/mother/partner get any worse'. It is also good practice to document this specific guidance in the medical notes.

LUCS work on NEWS communication is part of a Scotland wide collaborative which aims that 95% of patients escalated from primary to secondary care with a presumed diagnosis of sepsis, have their NEWS communicated to SAS and admitting hospital.<sup>v</sup>

Please find enclosed with this document a NEWS lanyard card. If you have any comments, or want any further information please contact [lisa.carter@nhslothian.scot.nhs.uk](mailto:lisa.carter@nhslothian.scot.nhs.uk).

Thank you!

Lisa Carter 28<sup>th</sup> December 2017

---

<sup>i</sup> <https://sepsistrust.org/education/>

<sup>ii</sup> <https://sepsistrust.org/education/>

<sup>iii</sup> <https://sepsistrust.org/education/>

<sup>iv</sup> <https://www.nice.org.uk/guidance/ng51/chapter/Recommendations>

<sup>v</sup> <http://ihub.scot/spsp/primary-care/sepsis-collaborative/>

# References

1. The Sepsis Manual, 4th Edition, 2017-2018, [https://sepsistrust.org/wp-content/uploads/2018/02/Sepsis\\_Manual\\_2017\\_final\\_v7-red.pdf](https://sepsistrust.org/wp-content/uploads/2018/02/Sepsis_Manual_2017_final_v7-red.pdf)
2. Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock, Kumar et al ; Crit. Care Med. 2006 Jun;34(6):1589-96
3. National Confidential Enquiry into Patient Outcome and Death. Sepsis: Just Say Sepsis! (2015) <http://www.ncepod.org.uk/2015sepsis.html>
4. Sepsis in Primary Care: Recognition , Response and Referral using NEWS, McLaughlin, S., Houston, N, Winter, J  
[http://www.qihub.scot.nhs.uk/media/969883/stephen%20mclaughlin\\_25.pdf](http://www.qihub.scot.nhs.uk/media/969883/stephen%20mclaughlin_25.pdf)
5. The Breakthrough Series: IHI's Collaborative Model for Achieving Breakthrough Improvement. IHI Innovation Series white paper. Boston: Institute for Healthcare Improvement; 2003 –  
<http://www.ihl.org/resources/Pages/IHIWhitePapers/TheBreakthroughSeriesIHIsCollaborativeModelforAchievingBreakthroughImprovement.aspx>
6. National Early Warning Score (NEWS) 2, Royal College of Physicians, December 2017, <https://www.rcplondon.ac.uk/projects/outputs/national-early-warning-score-news-2>
7. Nice Guidance 51. Sepsis: recognition, diagnosis and early management. July 2016, updated September 2017. <https://www.nice.org.uk/guidance/ng51/resources>
8. LearnPro Module: National Early Warning Score (NEWS) 2, NHS Education for Scotland, <https://learn.nes.nhs.scot/2983/elearning-medical/national-early-warning-score-news-in-nhs-Scotland>
9. National Early Warning Score & Sepsis Screening Tool, NHS Education for Scotland, <http://www.knowledge.scot.nhs.uk/home/portals-and-topics/sepsis-app.aspx>
10. National Early Warning Score 2, the Royal College of Physicians, December 2017, <https://www.rcplondon.ac.uk/projects/outputs/national-early-warning-score-news-2>

Published May 2018

You can read and download this document from our website.

We are happy to consider requests for other languages or formats.

Please contact our Equality and Diversity Advisor on 0141 225 6999

or email [contactpublicinvolvement.his@nhs.net](mailto:contactpublicinvolvement.his@nhs.net)

Improvement Hub  
Healthcare Improvement Scotland

Edinburgh Office  
Gyle Square  
1 South Gyle Crescent  
Edinburgh  
EH12 9EB

0131 623 4300

[www.ihub.scot](http://www.ihub.scot)

Glasgow Office  
Delta House  
50 West Nile Street  
Glasgow  
G1 2NP

0141 225 6999