



**Improving outcomes for
patients with sepsis**
A cross-system action plan

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Improving outcomes for patients with sepsis

A cross-system action plan

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The National Health Service Commissioning Board was established on 1 October 2012 as an executive non-departmental public body. Since 1 April 2013, the National Health Service Commissioning Board has used the name NHS England for operational purposes.

This document has been prepared in collaboration with:

- The UK Sepsis Trust
- Department of Health
- Public Health England
- National Institute for Health and Care Excellence (NICE)
- Monitor
- Health Education England (HEE)
- Health and Social Care Information Centre (HSCIC)
- Care Quality Commission (CQC)
- NHS Improving Quality (NHSIQ)
- Academy of Medical Royal Colleges (AoMRC)
- Royal College of General Practitioners
- Royal College of Emergency Medicine
- Royal College of Surgeons of England
- Royal College of Paediatrics and Child Health
- Royal College of Pathologists
- Royal College of Nursing
- Royal Pharmaceutical Society
- College of Paramedics
- Patient representative
- North West Coast Academic Health Science Network (AHSN)

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1 Foreword

Sepsis is the body's systemic inflammatory response to microbial infection which can cause organ damage, shock, and eventual death. It has been referred to before as a 'silent killer', and it is easy to understand why. Silent, because it can be extremely difficult to identify for both professionals and the public alike, with symptoms often suggesting less serious illnesses such as influenza. And we know that it affects a huge number of people – we believe that last year over 123,000 people in England suffered from sepsis, and estimates suggest that there are around 37,000 deaths per year associated with it. To put this into context, sepsis now claims more lives than lung cancer, the second biggest cause of death after cardiovascular disease. Whilst some of these deaths are inevitable, others are not. We can, and we must, do better for this group of patients.

There is no single solution or magic bullet that can unlock the improvements we want to see – it will require changes in a number of areas, and across the whole patient pathway. We do know from our colleagues in Scotland that sepsis can be tackled and improvements can be seen, and that is why earlier this year I convened a group of experts, involving the UK Sepsis Trust, Royal Colleges, national organisations and clinicians, to advise on what actions can be taken now to help to drive these improvements. I am extremely grateful for their input and support in delivering this action plan.

We have a good idea of the steps we need to take to improve chances of survival and reduce complications from sepsis. This will become even clearer when NICE publish a Clinical Guideline on sepsis in 2016, and a Quality Standard in 2017. Treating sepsis early improves outcomes and reduces complications in the long-term. I was therefore disappointed to learn that the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) has recently found that in many cases, diagnosis of sepsis was delayed because clinicians did not record basic vital signs, and even when the condition was suspected, many patients still did not receive simple interventions that will save lives in many cases. This report echoed many points that the Parliamentary and Health Service Ombudsman (PHSO) has made previously.

However, this does mean that our critical task now is focussing on how to make changes happen, rather than considering what needs to be done. This isn't about demanding more money, new services or employing more staff. First and foremost, it is about ensuring that professionals are supported and equipped to be aware of sepsis, ensuring that they have access to evidence based guidelines, and that they are trained in identifying and treating sepsis promptly. Similarly, we need the public to be more aware of sepsis and to seek medical help when they need it. Never has it been more important to get this right: resistance to antibiotics continues to increase,

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posing a very real threat to treatment options. We need to ensure that treatment remains effective into the future, in part, by ensuring that we treat sepsis properly now. Forthcoming NICE guidance and new definitions of the term 'sepsis' will help in this regard.

This report is intended to be practically focussed; it does not repeat arguments and observations at length that have been made elsewhere; rather, it outlines how we will get on with the task in hand. I hope it will be of use to health and care professionals, national organisations and the public alike.

A handwritten signature in black ink, reading "Bruce Keogh". The signature is written in a cursive style and is underlined with a single horizontal line.

Professor Sir Bruce Keogh KBE, MD, DSc, FRCS, FRCP
National Medical Director, NHS England

2 Executive Summary

Sepsis is a common and potentially life-threatening condition triggered by an infection. It can arise as a consequence of a variety of infections, though the most common sources are the lung, the urinary tract and the abdominal organs. Though it can affect people of any age, it is most common in the elderly and the very young.

When people suffer from sepsis, the body's immune system goes into overdrive, setting off a series of reactions including widespread inflammation, swelling and blood clotting. This can lead to a significant decrease in blood pressure, which can reduce the blood supply to vital organs, starving them of oxygen. If not treated quickly, sepsis can lead to multiple organ failure and death.

But in many cases, sepsis is avoidable, and it is treatable.

Earlier this year, NHS England convened a group of experts from across the health and care landscape, the UK Sepsis Trust, Royal Colleges, patients and expert clinicians to advise on those actions needed to drive improvement in the identification and treatment of sepsis. Through their deliberations, the group agreed on the need to:

1. Prevent avoidable cases of sepsis.

Key to improving patient outcomes from sepsis is early identification and prompt treatment. However, some cases of sepsis are likely to be preventable, particularly in at-risk groups including older people, the immunosuppressed, pregnant women and children.

2. Increase awareness of sepsis amongst professionals and the public.

Over 70% of cases of sepsis arise in the community¹ and yet a large proportion of the public do not recognise the symptoms, which can lead to a delay in treatment.

The range of health and care professionals who will come into contact with patients with suspected sepsis is huge. Though many are aware of and trained in responding to sepsis, some are not, and there is significant variation in the training provided to different professional groups.

3. Improve the identification and treatment of sepsis across the whole patient pathway.

Though there are pockets of good practice and protocols in distinct settings and localities, improvements are needed across the whole patient pathway, and at interfaces between different settings, to ensure that at-risk patients and those presenting with early sepsis are recognised and treated promptly.

4. Improve consistency of standards and reporting.

The data we currently have on sepsis are limited, due to a lack of consistency of definitions used to describe sepsis and due to differences in coding practice

between professionals and organisations. Better information is needed on the true prevalence and associated burden of sepsis to inform future quality improvement initiatives.

5. Underpin all actions with the principles of appropriate antibiotic use and antimicrobial stewardship.

Antimicrobial resistance (AMR) now poses a significant threat to the delivery of healthcare. It is imperative to ensure that principles of good antimicrobial stewardship and appropriate use of antibiotics are built into all activities, communication, training and actions that this report promotes.

These areas for action are explored in more detail in the following chapters, which highlight some of the key challenges and issues identified, along with a summary of the actions that health and care organisations across the country will take to address them.

This document is intended for those working across the health and social care landscape – including provider organisations, commissioners, and healthcare professionals. We hope that it will also be helpful to the public in understanding what the health system is doing to address a major cause of death and lasting ill health.

3 Introduction

Sepsis develops when the body's response to infection starts to cause organ dysfunction. Without prompt, effective treatment it can cause death or long-term disability. Treatment includes controlling the source of the infection and giving appropriate supportive treatment, including antibiotics and fluids, and achieving acid-base balance.

3.1 Prevalence of sepsis is increasing

With approximately 123,000 cases of sepsis per year in England² and around 36,800 associated deaths^{3,4}, sepsis now claims more lives than lung cancer – the second biggest killer after cardiovascular disease. For those who do survive sepsis, many people may suffer long term physical and mental effects such as post-traumatic stress disorder (PTSD), chronic pain and fatigue, organ dysfunction, and/or amputations.

The incidence of sepsis is increasing; in the USA hospital admissions for a recorded diagnosis of sepsis have more than doubled over the last ten years.⁵ This trend is likely to continue as people are living longer and more medical and surgical interventions are being performed. People with serious co-morbidities are also more likely to survive their illness, and for a longer period of time than in previous decades, which leads to much of the hospital-acquired sepsis that now occurs.

For some people – such as older people with advanced frailty or dementia – severe sepsis is a common and sometimes unpreventable cause of death. However, for other patient groups sepsis is more responsive to treatment and in many cases deaths are avoidable. Better treatment could reduce the mortality and morbidity currently associated with sepsis with some estimates suggesting that 10,000 deaths per year from sepsis could be avoided.⁶

3.2 We know what to do

We also have a good idea of *what* needs to be done to improve survival. Though we await definitive guidance from the National Institute for Health and Care Excellence (NICE) due in 2016, the Sepsis Six care bundle as a whole has been shown to reduce the relative risk of death by 46.6 percent⁷ when delivered to patients with severe sepsis within one hour. Close monitoring and regular review can identify patients who do not improve with the Sepsis Six, prompting urgent referral to critical care.

The Sepsis Six care bundle comprises:

- Give oxygen to maintain saturations >94%.
- Take blood cultures and consider source control.
- Administer empiric intravenous antibiotics.
- Measure serum lactate and send full blood count.
- Start intravenous fluid resuscitation.
- Commence accurate urine output measurement.

Underpinning every element of this approach, the principles of sound antibiotic prescribing must prevail, as outlined in the NICE Guideline on Antimicrobial Stewardship.⁸ Adhering to principles of good antimicrobial stewardship will ensure that antibiotics remain effective in treating severe sepsis, and we must ensure that actions and messages are targeted to guard against the risk of increasing broad spectrum antibiotic use where this is not clinically indicated.

3.3 We can save money and lives

At a national level, the spotlight on sepsis as a key source of avoidable mortality and morbidity has been intensifying. It has been highlighted by the recent NCEPOD report⁹ which found that there was room for improvement in the management of 2 in every 3 patients with sepsis, and that only a third of the patients they reviewed received good quality care.

In addition to the significant opportunities to deliver better outcomes for patients, there is the potential to make financial savings - the reliable delivery of basic care has been shown to save between £2000 and £5000 per case in reduced bed days alone¹⁰. The UK Sepsis Trust has estimated that a typical medium-sized general hospital could save £1.25 million annually through improved management of sepsis, and that achieving 80% delivery of the basic standards of care is likely to save 10,000 lives per year and around £170 million annually for the National Health Service.¹¹ The longer term fiscal cost – contributed to by reduced productivity in survivors and victims – has not yet been estimated, but is likely to be even greater.

3.4 We are united in taking action

National organisations, the Government and the NHS have all united in their commitment to take action to improve outcomes for patients with sepsis. There are already many local and regional initiatives underway across the NHS, including 15 Patient Safety Collaboratives (PSCs) which are bringing together professionals working in the community, acute and hospital settings to design, implement and evaluate solutions to local safety priorities, including sepsis. With the combination of national support and local innovation, we have an opportunity to take forward some of the key recommendations from the NCEPOD report and, crucially, to drive real improvement in outcomes for patients.

3.5 How did we produce this action plan?

In January 2015, NHS England convened a cross-system programme board bringing together a wide range of experts from the UK Sepsis Trust, Royal Colleges, statutory organisations, clinicians and patients to advise on how best to drive improvement in outcomes for patients with sepsis and to identify those improvements that were needed in the short, medium and longer-term. The group considered the challenges integral to improving outcomes for patients with sepsis in specific settings and also in particular at-risk patient groups.

The programme board met six times altogether and discussed a diverse range of issues impacting on the identification and treatment of sepsis. Minutes from the meetings were uploaded on to NHS England's sepsis webpage¹² along with the

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Terms of Reference and membership of the group. Terms of Reference are given at Annex A.

In recognition of the range of factors involved in improving outcomes for patients with sepsis, we established six sub-groups to consider challenges and opportunities unique to those settings. The sub-groups were:

- Inpatient settings;
- Out of hospital settings;
- Clinical coding;
- Education and training;
- CQUIN (Commissioning for Quality and Innovation) and financial incentives; and
- Identifying opportunities and barriers.

Each of the subgroups was chaired by a member of the programme board with particular expertise in the field, and identified key issues relevant to their area and priorities for action. A prioritisation exercise and an analysis of the findings of all of the work streams revealed key themes and areas for action over which a consensus had been reached. This has driven the content of this action plan.

In addition, the programme board established an early link with the Academy of Medical Royal Colleges which set up a sepsis expert advisory group that provided valuable expertise that contributed to this work.

The programme board also sought to achieve a balance between drawing on national level expertise and learning from regional and local initiatives, such as the Academic Health Science Networks who are running the Patient Safety Collaboratives. This local intelligence, combined with the expertise of programme board members, has enabled us to arrive at some concrete areas for action which will be taken forward by members. We have also included a set of case studies and examples that we would like to share with others.

Separately to the recommendations for action, which will be taken forward by the organisations represented on the programme board, each section also contains key point boxes. The points summarised include key information for organisations to consider when developing their own plans to improve the identification and treatment of sepsis.

4 Preventing avoidable cases of sepsis

Evidence suggests that some cases of sepsis are preventable, particularly in groups of people who are at the greatest risk. Though anyone can be affected, those at the extremities of life – the very young and the very old – are particularly at risk, along with people who are immunosuppressed and pregnant women. For these groups measures to prevent infection and to recognise and treat infection promptly can prevent sepsis from developing.

The first part of this action plan therefore focuses on reducing the incidence of sepsis. There are some fundamental steps that can be taken to reduce the likelihood of sepsis developing from an infection across all of the at-risk groups:

- Good hand hygiene and handwashing techniques amongst the public and professionals in all sectors (in line with NICE Quality Standard on infection control¹³) will help to reduce the spread of infection, thereby reducing the chances of sepsis developing as a result.
- Secondary bacterial infection leading to sepsis is a known complication of influenza (flu), particularly in at-risk groups. Achieving high coverage of flu vaccination in target groups - pregnant women, over 65s, those in care homes and some with long-term conditions - will reduce the likelihood of at-risk groups suffering from influenza and possible sepsis as a result. The extension of the current national flu immunisation programme to include children in school years 1 and 2, and children aged 2, 3 and 4, will protect children and also help to further reduce the spread of infection to those at risk and to the healthy population.
- Vaccination has already made a major contribution to the prevention of sepsis. The high coverage of childhood vaccination for *Haemophilus influenzae* type B, meningococcal serogroup C and pneumococcal infection has not only protected the children who are vaccinated but has also reduced the circulation of these organisms in the community that can cause sepsis. Vaccination against viral infections – including measles and influenza – has also massively reduced the risk of secondary bacterial infection. As new vaccines become available, their uptake should be encouraged to reduce risk of infection and sepsis.

4.1 Older people

Older people are particularly vulnerable to community acquired pneumonia (CAP) and urinary tract infections (UTIs). One study cited by the recent NCEPOD report found that clinicians who cared for patients with sepsis identified the respiratory tract and urinary tract as the top two presumed sources of infection, with respiratory tract infections accounting for 48% of cases, and UTIs for 24% of cases.¹⁴

Both the influenza and pneumococcal vaccines will help to prevent some cases of pneumonia, and better adherence to the NICE Clinical Guideline (which recommends microbiological tests, timely diagnosis and treatment, antibiotic therapy, and giving

patient information¹⁵) will help to reduce the chances of sepsis developing as a result of pneumonia.

Older people are particularly vulnerable to UTIs, and are also more likely to have asymptomatic bacteriuria which does not require treatment with antibiotics. Taking preventative measures in settings with high volumes of older people – such as residential care homes – could help to reduce the incidence of UTIs. Such measures include adequate hydration through offering regular drinks, and effective management of incontinence, with invasive catheterisation being employed only when absolutely necessary and using sterile technique to reduce the chances of bacteria entering the bladder and causing infection. The early detection and treatment of UTIs is likely to reduce the development of sepsis and of chronic kidney infections.

Steps can also be taken to improve recognition of sepsis in older people, which often presents as delirium (acute confusion). Delirium can often be missed in emergency departments (EDs) and is associated with increased mortality, reduction in independence and cognitive decline. Many patients discharged from EDs with missed delirium – often with undiagnosed infection – have a higher mortality. Using a simple cognitive screen in addition to sepsis screening tools – for example through the AMT4¹⁶ (a screening instrument designed for rapid initial assessment of delirium) may detect a significant number of cases of delirium/sepsis in older people.

However, for people who are very frail or who have advanced dementia, infection is a common end of life phenomenon. Increasingly, these people will have Advanced Care Plans (ACPs) which should be respected. In particular, staff in EDs should routinely consult with patients' Summary Care Records to enable them to factor any ACP into their discussions and decisions about treatment with patients and their families.

Key points:

- Better adherence to the NICE Clinical Guideline on handwashing will reduce the chance of sepsis developing.
- Taking preventative measures, including adequate hydration and effective management of incontinence could help reduce UTIs for patients in care homes.
- Early detection and treatment of UTIs is likely to reduce the risk of sepsis.
- Using a simple cognitive screen in addition to sepsis screening tools may help detect delirium/ sepsis.
- Advanced Care Plans (ACPs) should be respected.

4.2 People who are immunosuppressed

Immunosuppression increases the risk of sepsis and makes it harder to diagnose and treat. Immunosuppression can occur due to underlying illness such as diabetes, chronic kidney disease, vascular disease and cancer, or because of previous health care interventions such as splenectomy.

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Other patients have impaired immunity because of current treatment, such as radiotherapy and chemotherapy. Treatments sometimes given to reduce the body's immune response, such as anti-rejection therapy in organ transplantation, or to manage allergic or auto-immune disease, increase the risk of sepsis. Premature babies and frail older people also have impaired immunity due to the immaturity or exhaustion of the immune system.

Immunosuppressive drugs are also often used to treat autoimmune conditions and vasculitis. Regular monitoring of temperature, and where appropriate, serial white cell counts should be measured in people having immunosuppressive treatment.

With a weaker immune system, these groups of patients are less able to fight infections, and there is greater potential for sepsis to develop, making preventative measures such as effective hand washing and vaccination especially important. Such patients (and their carers, medical and allied healthcare professionals) should also be warned of the signs and symptoms of sepsis, and given information on what to do if they become unwell.

Providing written information on sepsis alongside prescriptions for immunosuppressive drugs would also help people spot the signs and symptoms of sepsis at an early stage. The symptoms of sepsis usually develop quickly and include a fever, chills and shivering, a fast heartbeat and fast breathing. In some cases, symptoms of more severe sepsis or septic shock can develop within hours and can include feeling dizzy or faint, a change in mental state, diarrhoea, nausea and vomiting, slurred speech, severe muscle pain, severe breathlessness, decreased urine production, cold, clammy and pale or mottled skin, or loss of consciousness.¹⁷

Patients, relatives and staff should be aware that the signs and symptoms of sepsis can be masked or altered in people who are immunosuppressed and that a high index of suspicion should be maintained. For people receiving chemotherapy who are at significant risk of a fall in white cell count, prophylactic treatment, for example with Granulocyte-Colony Stimulating Factor (G-CSF), can ameliorate this fall and reduce the risk of sepsis.

Key points:

- Preventative measures such as effective hand washing and vaccination are especially important for immunosuppressed people and their carers.
- Patients and their carers should be warned of the signs and symptoms of sepsis, and given information on what to do if they become unwell.
- Patients, relatives and staff should have a high index of suspicion of sepsis for patients in this group.
- Regular monitoring of serial white blood cells in patients on long-term immunosuppressives is crucial.
- Prophylactic treatment can ameliorate a fall in white cell count for patients receiving chemotherapy and reduce the risk of sepsis.

4.3 Pregnant women

The *Saving Lives, improving mother's care*¹⁸ report published in 2014 demonstrated that sepsis, along with influenza, is a leading cause of maternal mortality, accounting for death in a quarter of the women examined in the report.

Pregnant women are particularly at risk of developing sepsis due to changes in the immune system which occur during pregnancy: their risk is approximately 50% higher than that in young adults who are not pregnant. Those with multiple pregnancy, those from ethnic minorities and those with a history of fever or antibiotic therapy are particularly vulnerable¹⁹. Identifying pregnant women and postpartum women whose medical condition is deteriorating, and taking rapid action to diagnose and treat those with suspected sepsis, will reduce mortality in this group.

Routinely measuring pulse, temperature, respiratory rate and blood pressure in any ill pregnant woman is particularly important, as pregnant women can appear relatively well, and become very ill with sepsis quickly. The *Saving Lives* report highlighted the need for midwives, doctors and their health professionals to “think sepsis” and to implement sepsis bundles, including giving antibiotics within an hour if severe sepsis is suspected.

Preventing women from contracting flu during pregnancy would help to reduce subsequent deaths from sepsis, and pregnant women should be encouraged to take up the free flu immunisation that is available.

Key points:

- Pulse, temperature, respiratory rate and blood pressure should be routinely measured in any pregnant woman who is unwell.
- Midwives, doctors and health professionals should “think sepsis” and implement sepsis bundles if they suspect this diagnosis.
- Uptake of free flu immunisation by pregnant women should help reduce the risk of contracting flu during pregnancy and reduce associated deaths from sepsis.

4.4 Children and babies

The chances of neonatal sepsis occurring are increased by premature birth, the rupture of mother's membranes more than 24 hours before delivery, by the mother having Group B Streptococcus (GBS) infection whilst pregnant, having a previous baby with GBS, and maternal fever. GBS is the commonest cause of sepsis and meningitis in the neonatal period in the UK²⁰. Following the *Prevention of Early-onset Neonatal Group B Streptococcal Disease* guidelines published by the Royal College of Obstetricians and Gynaecologists (2007) should help to reduce the chances of GBS infections developing in babies, which could potentially lead to sepsis. Cases of sepsis in older children can be caused by illnesses such as UTIs, ear infections, pneumonia and meningitis.

The recent roll out of meningitis B vaccination to babies aged 2 months should help to protect against sepsis in babies and young children, as it protects against

meningococcal group B bacteria which are responsible for more than 90% of meningococcal infections in young children.

Varicella zoster (chicken pox) infection can predispose to superadded bacterial infection and sepsis in young children, though this is not routine unless there is an underlying co-morbidity. Immunisation should be considered by healthcare professionals, particularly for at risk groups such as children with chronic disease.

Key points:

- Following 'The Prevention of Early-onset Neonatal Group B Streptococcal Disease' will help reduce the chances of GBS infections developing in babies.
- Immunisation against Group B meningococcal and varicella zoster should be considered by healthcare professionals for risk groups, such as children with chronic disease.

4.5 Section Actions

In order to support the prevention of cases of sepsis where possible, as outlined above, the following actions will be undertaken:

Issue	Organisation	Action	Timescale
Preventing sepsis caused by UTIs	NHS England	Publish a continence framework in late 2015 outlining good practice, and supporting commissioners in commissioning services.	By end of December 2015
Preventing sepsis in pregnant women	NHS England	Publication of review of maternity services, which will make recommendations as to how to improve the safety of services and create the conditions for NICE and best practice guidelines to be followed. This should enable the management of pregnant women and postpartum women in line with recognised guidance, with regular physiological monitoring, helping to identify any deterioration in pregnant women which may be suggestive of sepsis.	By January 2016
Preventing sepsis in children	NHS England and Public Health England	Roll out of the free flu vaccine to primary school children in years 1 and 2, helping to mitigate the changes of sepsis	In progress

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Issue	Organisation	Action	Timescale
		occurring as a result of influenza.	
Preventing sepsis in older people	NHS England	Gather intelligence from members of Care England and National Care Forum (membership organisations for care homes) to find out about any examples of good practice already underway in care home sector and then share the learning from this.	By April 2016

5 Increasing awareness of sepsis amongst the public and professionals

Unlike other conditions such as heart attacks or stroke, which usually have very distinct features, sepsis is a syndrome which can be much harder to identify and distinguish from symptoms of influenza or other illness.

Key to improving outcomes in patients with sepsis is prompt recognition and commencement of treatment, and yet a recent survey carried out by YouGov and commissioned by the UK Sepsis Trust showed that 42% of the public in Great Britain had not heard of the term 'sepsis', and that 32% of respondents did not know whether sepsis was a medical emergency or not.²¹ This is supported by NCEPOD's narrative finding that patients with sepsis frequently delayed presentation to healthcare.

A number of high profile reports and investigations by the Parliamentary and Health Service Ombudsman (PHSO) have indicated that in many cases, people did not realise the severity of their symptoms or the need to present to health services, sometimes causing avoidable lasting ill-health or death. Such cases point to the need for better information about the signs and symptoms of sepsis so that individuals and their families, particularly those from high risk groups, can better understand when to seek help.

Clearly, the need to ensure the public are aware of sepsis must be balanced with the risk of creating excessive anxiety in response to symptoms which will, in most cases, not represent sepsis. Any public health messaging would also need to be very carefully managed and aligned with messaging around the AMR agenda to reflect the importance of appropriate use of antibiotics.

UK Sepsis Trust symptom checker card



Key points:

- Informing the public about the signs and symptoms of sepsis, particularly people in high risk groups, will help them better understand when to seek help.
- Public awareness of sepsis should be balanced with the risk of creating excessive anxiety.
- Public health messaging needs to be aligned with messaging around the AMR agenda.

UK Sepsis Trust Paediatric Pocket Guide

The UK Sepsis Trust has developed a short paediatric guide for parents, covering what sepsis is, and what symptoms to look for. This can be distributed to parents during routine contact with health services to raise awareness. The pocket guide is being used in selected GP surgeries in the Midlands and the NW and Lancashire together with in community pharmacies and has been submitted for consideration for inclusion in the Child Personal Health Record.



5.1 Section Actions

In order to support improved recognition amongst the public, the following actions will be undertaken:

Issue	Organisation	Action	Timescale
Improving public awareness	Public Health England	PHE will review the evidence and make recommendations to inform decisions about a possible public-facing campaign to raise awareness of sepsis.	Review completed by December 2015
	Health Education England	HEE will incorporate principles of communication with, and education of the public within educational/training resources that they develop.	Ongoing
	The UK Sepsis Trust	Development of 'Sepsis Savvy' microteaching sessions for	March 2016

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Issue	Organisation	Action	Timescale
		parents and lay people will help to raise awareness, continuation of media and social media outreach. The Sepsis Trust will also fill any gaps in formal education in collaboration with HEE.	

Recognising sepsis is not merely a challenge for the public – it can also be difficult to identify for professionals, with many of the symptoms being indicative of other illnesses.

Amongst residential care home staff awareness of sepsis is likely to be variable, as staff come from a wide range of skills and backgrounds, and there are no mandatory training standards. Over 500,000 older people live in care homes so ensuring that staff know when to suspect sepsis and are able to discuss the signs of sepsis with GPs, will be important to supporting prompt identification and treatment.

Sepsis e-learning for community and out of hospital staff

The North West Coast AHSN led by the North West Coast Patient Safety Collaborative and in collaboration with the UK Sepsis Trust has developed an e-learning package for use by out of hospital workers. This package was developed by a number of experts and patient representatives from the North West and further afield. The content has been verified by the UK Sepsis Trust and will form part of a suite of e-learning packages that will be made available to community and social care staff. The e-learning package will be available for use in February 2016.

In primary care settings, people present through a number of routes - many patients are seen initially by a nurse as triage in walk-in centres, and many carers, parents, and members of the public contact community pharmacy or NHS-111 for advice about patients with infections. Occasionally, some septic patients may even present directly to these services. It is essential that their triage is designed to identify sepsis.

General Practitioners (GPs) will see many patients with infection, yet only a very small proportion are likely to have sepsis, leading to a low suspicion of sepsis in primary care. With around 70% of cases arising in the community, ensuring that GPs are able to differentiate simple infection from likely sepsis is critical to improving outcomes. Training should also include the value of, and need for, appropriate use of vital signs recording and safety netting.

An audit tool has been made available to enable GPs to assess their treatment of febrile children under 5 against NICE guidelines. This should help to raise awareness

of sepsis in general practice and enable GPs to reflect on their treatment of this group of patients²².

NEWS tool & ambulance service toolkit: East of England Ambulance Service

The East of England Ambulance Service has made sepsis one of their priorities for quality improvement, and has rolled out a training programme for all staff helping them to spot the signs and symptoms of sepsis. They have adopted the use of the NEWS tool & ambulance service toolkit produced by the UK Sepsis Trust and College of Paramedics, and going forward, plan to give all staff a sepsis 'manual' and develop a video on sepsis that can be viewed from smartphones. They have also developed a flyer for nursing and care home staff providing clarity on when to call emergency services using a traffic light system.

Any missed cases of sepsis are declared a Serious Incident (SI) and learning from these cases is disseminated amongst Trust staff and CCGs, as well as forming the basis for discussion at meetings to discuss quality with commissioners.

Ambulance staff are often people's first point of contact with health services, and they can play a critical role in warning hospitals about the arrival of a patient with suspected sepsis. Several ambulance trusts are focussing on ensuring paramedics are able to recognise the signs of sepsis, and are using the National Early Warning Score (NEWS) track and trigger tool.

Awareness of sepsis amongst staff in hospitals is variable, and is likely to vary between clinical groups. Though pockets of good practice exist, and despite the fact that sepsis is included in some form in all of the Royal Colleges' training curricula, according to the results of a Freedom of Information (FOI) request submitted by the Sepsis All Party Parliamentary Group (APPG), an average of two-thirds of nursing and medical staff are trained in sepsis recognition with a range from 8% to 100%. Almost half of all trusts in this survey on sepsis said they could not provide evidence to demonstrate that their relevant medical workforce had received training in sepsis recognition.²³

Collaborative learning model: Wessex Patient Safety Collaborative (PSC)

Wessex PSC has selected sepsis as a priority work stream and is supporting staff across the region to identify and provide the safest care possible, through a collaborative learning model where teams learn from each other and topic experts.

They use the Institute for Healthcare Improvement's (IHI) Breakthrough Series to support the improvement teams across Wessex. As part of this, Health and Social Care professionals will spend an entire year focussed on making small changes to gradually improve the delivery of care. Wessex PSC is supporting these changes using Plan-Do-Study-Act cycles and structured learning events. Senior executives and managers from participating organisations will be involved to provide leadership and commitment.

Key points:

- GPs should use written and verbal safety netting resources in cases of febrile illness
- Ensuring that care home staff are confident in, and able to discuss the signs of sepsis with GPs, is important to supporting prompt identification and treatment in care homes.
- Triage in primary care settings should be designed to identify sepsis.
- GP training should include the value of, and need for, appropriate use of vital signs recording and safety netting in patients who are unwell with infections.
- Audit tools are available to enable GPs to assess their treatment of febrile children under 5 against the NICE guideline.
- Paramedics can be aided to recognise the signs of sepsis through using NEWS track and trigger tools.

5.2 Section Actions

In order to support improved recognition amongst professionals, the following actions will be undertaken:

Issue	Organisation	Action	Timescale
Identifying sepsis in pre-hospital care	College of Paramedics	Support the on-going recognition of sepsis by continuing to provide pre-hospital sepsis conferences/workshops for its members, with wider attendance by other interested parties. Continue to provide updates via News Digest to College members.	On-going
Improving GP's	Health Education	Development of an e-learning module for primary care.	March 2016

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Issue	Organisation	Action	Timescale
awareness of and education around sepsis	England		
	Royal College of General Practitioners	Subject to approvals, appointment of clinical champion to provide national level leadership for better identification and treatment of sepsis. Development of online learning package and inclusion of sepsis in RCGP's clinical priority list.	2016
	Royal College of Physicians of London	Rolling out the new RCP Internal Medicine curriculum based on competencies in practice, one of which is managing the acutely deteriorating patient	Curriculum in development
	NHS England	Development of voluntary audit tool to allow GPs to assess their management of children with fever in line with NICE guidelines. Feverish illness can be a precursor to sepsis	By end of 2015
Improving broader professional awareness of sepsis	Health Education England	HEE to undertake a scoping exercise to assess the current provision of learning materials available to support recognition and treatment of sepsis in different sectors and different healthcare groups, identifying areas of good practice, gaps in current material available, and making recommendations for commissioning of new materials. Primary care and paediatrics are expected to be an early focus.	March 2016
	Academic Health Science Networks/ Patient Safety Collaboratives	The Patient Safety Collaboratives will support the implementation of professional training across care settings, including the community through their networks in collaboration with HEE, Leadership Academy and other partners.	Ongoing
	UK Sepsis Trust	Production of educational resources to supplement formal education in collaboration with Health Education England.	Ongoing

6 Improving the identification and treatment of sepsis across the whole care pathway

Though areas of good practice exist in distinct settings and localities, improvements are needed to ensure that sepsis is identified promptly and is appropriately treated across the whole care pathway, irrespective of where the patient accesses care, and with joined up care throughout. Healthcare workers need to be trained to first recognise the fact that the patient is deteriorating and then whether or not this is due to sepsis. It is anticipated that a simple definition of sepsis may emerge in the international consensus recommendations in 2016 and this should facilitate staff training.

Taking vital signs (pulse, blood pressure, temperature and respiratory rate) wherever the patient is – including primary care, emergency departments, and inpatient wards – is critical in enabling the detection of the deteriorating patient, and sepsis is a common cause of deterioration. However, the recent NCEPOD report found deficiencies in taking vital signs in both primary and secondary care, suggesting that improvements could be made across the patient pathway.

6.1 First contact with health services and initial assessment

Cases of suspected sepsis can easily be missed during initial contact with health services. This can be a particular issue in general practice, where GPs will typically see many patients with infections, but few who have sepsis. A low suspicion of sepsis is likely to be compounded by the fact that, according to the NCEPOD report, in the cases they examined, GPs did not consistently record vital signs which would help to diagnose sepsis, with temperature and blood pressure being noted in less than half of all cases.

People who are normally fit and healthy can compensate physiologically as sepsis develops and maintain their blood pressure until their illness is quite advanced. A normally fit patient who reports feeling extremely ill, or a GP with a ‘gut feeling’ that this patient is ill, should trigger urgent action even if the patient’s blood pressure is normal.

GP Sepsis Screening and Action Tool Protocol

In Primary Care, the lack of laboratory services limits the ability to distinguish between sepsis, severe sepsis and septic shock (according to international definitions) in many cases. However, there are screening tools available to support GPs identify sepsis.

One example is the GP Sepsis Screening and Action Tool Protocol which has been developed by TPP (a UK based IT company) for GPs and uses SystmOne. The protocol follows guidance from the UK Sepsis Trust and uses information and data recorded in the SystmOne patient record to assess whether a patient has suspected sepsis.

For relevant patients, if information suggestive of sepsis is recorded, the protocol will automatically launch and prompt for the recording of other vital clinical information. It

reminds the clinician to follow guidance provided by the UK Sepsis Trust for the early identification and management of sepsis.

It's now live on SystmOne and is therefore available to around 30% of practices across the country. It has the potential to be amended if necessary when the new international definitions of sepsis are published.

More could be made of the role of ambulance services in identifying sepsis. Increasingly across the UK there are examples of ambulance trusts adopting tools to spot patients with suspected sepsis. Sepsis is included in the Joint Royal Colleges Ambulance Liaison Committee's guidelines as a time-critical condition. Additionally, some Trusts have developed material on sepsis to be included in their 'frequent callers programme' for care and residential homes to provide advice about management of suspected sepsis cases. Much of the primary contact for infections is through community pharmacy²⁴ either directly or from carers. Recognition of potential sepsis and sign-posting patients to the appropriate acute healthcare contact is key.

It may be that specific point of care testing can support recognition of sepsis in the community. Through their work on developing guidelines on sepsis, NICE is considering the evidence for this. NICE plan to publish a clinical guideline on sepsis in 2016.

6.2 Interfaces between primary and secondary care

As the PHSO and NCEPOD have noted previously, there is currently no information available on the incidence of sepsis presenting to primary care and to the ambulance service and this inhibits the development of collaborative clinical pathways that have been effective in improving outcomes for other critical conditions.

The NCEPOD report highlighted that communication between primary and secondary care can often be poor, and in just 6% of the cases they examined were pre-alerts sent to hospital to warn about the arrival of a potentially septic patient. They also found that referral letters were missing in 43% of cases arising from primary care and only half of hospitals had an agreed pre-alerting system with their local health economies for patients with sepsis.

Leeds CQUIN initiative

The Leeds Teaching Hospital Trust has developed a Local Clinical Quality Incentive Scheme to improve compliance with best practice for adult patients admitted acutely with severe sepsis, within their emergency departments, surgical admissions and medical admissions units.

It has introduced a new plan which outlines specific steps to support the early detection and treatment and ultimately reduce mortality from sepsis within the trust. The comprehensive plan covers actions such as, establishing a trust clinical lead for sepsis, introducing the care bundle, rolling out screening tools, developing processes, identifying data collection mechanisms and educating staff.

6.3 Identifying and treating sepsis in emergency departments (ED)

Presentation to the ED provides a key opportunity to identify patients with sepsis from pre-hospital settings and to initiate prompt and effective care pathways for their management. For 2015/16, NHS England introduced a national CQUIN measure based on two parts to incentivise i) the screening of patients arriving to EDs in a clinical state suggestive of sepsis, and ii) the administration of intravenous antibiotics within one hour in patients who screened positively for sepsis.²⁵

Sepsis can develop from an infected source such as hidden abscesses or obstructions. Sometimes it is difficult to identify the source, and investigations including urgent imaging may be necessary to find it, as source control is an essential part of treating sepsis. Where the source is a perforated abdominal organ, an abscess or an organ with obstructed drainage, then effective treatment of sepsis is not possible without urgent surgical or radiological intervention, which must be undertaken in parallel with resuscitation and antibiotic treatment. Although identifying and treating the source of infection and achieving prompt source control are critical to outcomes achieved,²⁶ delays are common. NCEPOD felt that there were delays in achieving source control in 43% of relevant cases examined. Guidelines from the Royal College of Surgeons of England recommend that surgical or radiological measures should be undertaken to achieve source control immediately (within 3 hours) in patients with septic shock, within 6 hours for patients with severe sepsis, and within 18 hours for patients with uncomplicated sepsis.²⁷

Nottingham University Hospitals: Rapid audit feedback

Rapid treatment of severe sepsis can save lives but requires a coordinated response. Trust-wide audit at Nottingham University Hospitals in 2006 and 2009 showed significant care deficiencies when compared with international guidelines. Whilst system improvements were tackled with improved infrastructure, antibiotic logistics, and staff education, sepsis care remained reliant on individual clinician response. To make sepsis 'personal' they created a rapid audit-feedback mechanism. Every patient audited generated an email report to the treating clinical team. NUH's rolling Trust-wide audit programme has now provided individualised feedback on over 400 cases since November 2011.

Antibiotic administration in <1hour has risen from 40% to over 80% and 'pre-ICU' bundle compliance has risen from 25% to 70% across the Trust, with evidence of consistent and sustained response. Outcomes have improved, with crude critical-care sepsis mortality falling from 42% to 28% and their septicaemia Standardised Mortality Ratio (SMR) dropping from 119 to 86 since 2009. By defining clear goals and expectations, their audit concept has changed from statistic gathering to promoting personal accountability. The NUH Sepsis programme has been innovative, data-driven and clinically led. They are keen to share their experience so that others can improve performance in this wide reaching but previously neglected disease process.

Sepsis responds well to treatment when initiated early, and the emergency department setting is often the first opportunity to screen patients who arrive in a clinical condition suggestive of sepsis, and to administer treatment required.

Measuring vital signs is a crucial step, yet NCEPOD found that 18% of patients did not have vital signs recorded at all and only 27% of patients had an Early Warning Score employed in aiding diagnosis of sepsis.

6.4 Identifying deteriorating patients

Given the lack of clear systems to reassess patients to check for deterioration ('safety netting') some cases of deterioration may not be identified with the appropriate speed for action in primary care.

In secondary care, The National Early Warning Score (NEWS) provides a mechanism to assess patients and identify deterioration in hospital. However, there is a lack of consistency in early warning systems used across the UK as the NEWS system is not currently used in all Trusts. This can lead to a lack of consistency in detecting whether a patient's condition deteriorates. Consideration should be given to adding a plus 1 to the NEWS for "gut feel" to lower the threshold for referral up the chain and to help overcome human factors that would otherwise prevent escalation.

The NCEPOD report recommended that all Trusts should also have a formal protocol for early identification and management of sepsis and should also appoint a Clinical Lead for sepsis to champion best practice and take responsibility for the clinical governance of management of sepsis. This Lead should also work closely with those responsible for antimicrobial stewardship in their hospital.

Lister Hospital: e-observation system

Lister Hospital in Stevenage has switched from recording patients' observations on paper to a faster and more efficient electronic system. With the new system, nurses will use handheld devices to submit observations and the machine will do the rest automatically. If a patient starts deteriorating it will automatically send a message to the critical care outreach team to say the patient may be ill. A member of the CCOT will then phone the ward and see what is wrong.

As well as monitoring patients' observations, it will also include information about their previous admissions. It also reminds nurses when they are due to take someone's observations and lets them pass a patient on to a specific doctor if there is a problem. The system will also allow doctors to write prescriptions electronically which will speed up the discharge of people who are waiting for drugs.

The system was funded by a £750,000 grant the NHS trust received from the Nurses Technology Fund. It runs on open source code which means there are no expensive licences to pay or limits on the number of people who can use it. This also means that other hospitals can use, adapt and improve the system without having to pay anything.

Deterioration (including sepsis) in children can be extremely difficult to identify, and vital signs often require triangulation with level of parental or clinician concern. There is also currently no national paediatric early warning score or chart used for the recognition and response to deterioration in children, leading to an inconsistent approach in the use of early warning scores to support screening for sepsis in children.

E-observation tools can prompt staff to enter data. When combined with NEWS, this can aid identification of patient deterioration. Such tools can also prompt regular assessment and escalate automatically to senior staff if deterioration is identified. Some systems include an automatic escalation to Critical Care Outreach Teams (CCOTs) when patients deteriorate, prompting them to investigate the patient concerned.

E-prescribing has been shown to demonstrate both long-term improvements in patient safety and cost savings. It can also reduce the time between a drug being prescribed and a patient receiving it, which may be crucial in a patient with severe sepsis who requires antibiotics within an hour. NHS England estimates that around 50% of Trusts are currently in the process of implementing e-prescribing systems, with around 15% actually using them. This means that there is a significant potential for other Trusts to realise the safety and cost benefits of implementing e-prescribing.

The effectiveness of these tools relies on the appropriate training of all staff involved in how to take physiological measurements, how to record them accurately, and how to respond to prompts. In addition to more formal training, training that is provided in small “bite size” chunks and repeated regularly may be more effective – so called ‘drive-by teaching’. This can be delivered in clinical areas to health care assistants and other frontline staff on a regular iterative basis.

There are a range of e-prescribing and e-observation systems available. Organisations using these systems should assure themselves that they meet professional standards, Information Governance standards and technical specifications. NHS England is supporting communities of NHS Organisations and NHS clinicians who are developing and in some cases using Open Source Solutions for e-observations and e-prescribing. Open Source solutions are free to use and modify, and standards are maintained through a ‘custodian’ model that assures safety and integrity²⁸.

Promoting professional awareness and training

In January 2015, Frimley Health NHS Foundation Trust launched a new initiative to deliver education and learning to ward staff. A team of senior nurses including heads of nursing, specialist nurses and practice development nurses visit ward areas to talk to staff about sepsis.

Acknowledging that it is not always easy for clinical staff to come away from their work place to attend learning sessions, the idea is that the team take the learning session to the ward staff. They provide a 10 minute presentation on sepsis and answer any questions in an informal manner. It also provides the team with an opportunity to find out any issues with the processes of care and any concerns that staff in the clinical areas have regarding this.

Neutropenic Sepsis: Whittington Hospital Trust

Neutropenic sepsis/febrile neutropenia (NS/FN) is a potentially fatal complication of chemotherapy. National guidance recommends that the first dose of antibiotics should be given within 60 minutes of a patient presenting. To improve the ‘door to

needle' time, Whittington Health, in conjunction with London Ambulance, developed a patient specific protocol (PSP) to rapidly identify all at risk patients.

Patients included on the PSP register who became unwell while receiving chemotherapy were instructed to ring 999, rather than use any other emergency access route. The PSP dictated an automatic blue light response from the ambulance service and a pre-approved treatment plan, including the patient going immediately to a resuscitation room.

Overall just 3.8 per cent of all patients treated with Systemic Anti-Cancer Therapy (SACT) used the protocol (9.5 per cent of high risk patients), which reduced the added burden to the ambulance service but offered huge benefit to patients receiving high risk regimens.

This oncologist-led programme, won the patient safety award in the Quality in Care (QiC) Excellence in Oncology Awards in 2013.

West of England AHSN: Collaborative working across a network

The West of England AHSN is aiming to support organisations in their region to achieve a measurable and sustainable reduction in morbidity and mortality as a result of sepsis through an 18 month improvement programme. This is based on the Institute for Healthcare Improvement's (IHI) breakthrough collaborative method aiming to improve awareness and recognition of sepsis leading to quicker and standardised treatment and response. Their four primary drivers are to:

1. Facilitate and support a collaborative network.
2. Agree common standards for measurement and data collection.
3. Increase awareness and recognition of sepsis in primary and community settings.
4. Quicker and standardised response for patients who have been screened for sepsis.

Using the AHSN's network and membership model, their aim is for all healthcare organisations in the region to use the Sepsis Six care bundle or other agreed evidence informed practice to reduce the number of people dying. Other benefits include embedding the shared language of early warning scores and SBAR (situation, background, assessment, recommendations – a tool to support good communication) at transfers of care for patients with sepsis and suspected sepsis.

Immediate Life Support (ILS)

The Resuscitation Council (UK) Immediate Life Support (ILS) course provides training in the prevention and management of cardiac arrest. Patients suffering from cardiac arrest often show signs of physiological deterioration in the 24-h period prior to the event. This course was introduced at Hammersmith Hospital to improve the incidence and outcome of in-hospital cardiac arrest calls and includes early recognition of sepsis to improve deteriorating in-patient outcomes.

By identifying patients early in the pre-arrest phase, the hospital observed an overall increase in survival to hospital discharge as a proportion of emergency alert calls and is a demonstration of how a simple but sustained educational programme, which

empowers staff at all levels to access immediate help, can lead to behavioural change across a large NHS organisation with beneficial outcomes.

Key points:

- Taking and recording of vital signs is critical in enabling the detection of a deteriorating patient.
- The National Early Warning Score provides a mechanism to assess patients and identify deterioration.
- Tools are available for ambulance trusts to help spot patients with suspected sepsis.
- Community pharmacies can play a significant role in the recognition of potential sepsis and should sign-post patients and carers to the appropriate healthcare contact.
- Guidelines from the Royal College of Surgeons of England recommend that surgical or radiological measures should be undertaken to achieve source control immediately (within 3 hours) in patients with septic shock, within 6 hours for patients with severe sepsis, and within 18 hours for patients with uncomplicated sepsis.
- Trusts should have a formal protocol for early identification and management of sepsis and should also appoint a Clinical Lead for sepsis to champion best practice and take responsibility for the clinical governance of patients with sepsis.
- E-prescribing and E-observation tools have been shown to demonstrate long-term improvement in patient safety and cost and should be widely adopted along with NEWS.

6.5 Section Actions

In order to better enable the prompt recognition and treatment of patients across the care pathway, the following actions will be undertaken:

Issue	Organisation	Action	Timescale
Improving recognition of sepsis	The UK Sepsis Trust	Development of Clinical Toolkit and Screening Tool for community based settings.	September 2016
	The UK Sepsis Trust	Development of Clinical Toolkit and Screening Tool for maternal sepsis	April 2016
Improving communication and transfers of care	UK Sepsis Trust	Explore potential options to develop acronym and associated score or similar, along the lines of 'FAST' used for stroke, to facilitate better communication about suspected sepsis patients	End 2016
	Academic Health Science Networks/	The Patient Safety Collaboratives will support local organisations to identify and spread best practice	Ongoing

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Issue	Organisation	Action	Timescale
	Patient Safety Collaboratives	to improve the communication between settings and transfers of care.	
Identifying sepsis in primary care	UKST and RCGP	Develop with RCGP approved safety netting tools for adults, pregnant women and children, test and disseminate	2015
Identifying best practice and innovation for better community pathways	Academic Health Science Networks/ Patient Safety Collaboratives	The Patient Safety Collaboratives will support local organisations to identify best practice and innovation for better care pathways, including community, through their networking activities.	Ongoing
Identifying sepsis in hospital Trusts	Care Quality Commission (CQC)	<p>The CQC already look at sepsis management through their mortality outliers work (process through which CQC follow up on data that identifies where, within an organisation, the number of patients who have died after being admitted to hospital for a particular condition is significantly higher than expected). This forms part of their intelligent monitoring process.</p> <p>In future inspections, CQC will also consider data from the 2015/16 sepsis CQUIN measure. On publication of NICE guideline CQC will consider how Trusts have used evidence based guidelines.</p>	<p>Looking at CQUIN data: April 2016</p> <p>Consideration of use of evidence based guidelines: on publication of NICE guidance</p>
Identifying and responding to deteriorating children and adults	NHS England in partnership with RCPCH and RCP	Subject to patient safety expert and steering group approval, issue Patient Safety Resource Alert highlighting all relevant RCP, RCPCH and NHS England resources, including the RCP's revised NEWS and a co-badged framework from RCPCH and NHS England to encourage greater focus on the whole of a Paediatric Early Warning System rather than score.	March 2016

7 Improving consistency of standards and reporting

7.1 Bringing clarity and consistency to definitions used to describe sepsis

Currently, a variety of terms are used across the system to describe different severities of sepsis. This can be confusing, as professionals will not always share the same understanding of any given term.

Sepsis arises when the body's response to an infection causes systemic effects, which is manifested by two or more Systemic Inflammatory Response Syndrome (SIRS) criteria. In the absence of organ failure, this is termed 'uncomplicated sepsis'. 'Severe sepsis' occurs when there is organ failure, and 'septic shock' is used when there is hypoperfusion resistant to fluid therapy.²⁹ 'Red flag' sepsis is the term used by the UK Sepsis Trust, NHS England and several of the Royal Colleges when a patient is clearly unwell, but they do not fulfil the criteria for severe sepsis on physiological or near-patient assessment alone. Rationalising the number of terms used and being clearer about their meaning would lead to greater consistency and aid communication between different professionals and settings.

The international sepsis definitions are expected to be amended in 2016³⁰, and it is anticipated that this will simplify the terms used to describe sepsis and bring greater clarity to their meaning: the new definitions for the bedside identification of patients at risk of sepsis are likely to be similar to Red Flag Sepsis.

7.2 Defining best practice standards

The Sepsis Six care bundle is widely recognised as best practice in identifying and treating sepsis, and has been shown to be associated with significant mortality reductions when applied within one hour³¹. It is the bundle used by 94% of Trusts in the UK (NCEPOD 2015) and is standard across Scotland and Wales. However, there are also a small number of other basic care bundles in use in isolated Trusts for the immediate management of patients with sepsis. Having definitive, clear national guidelines on best practice in management of sepsis will provide a uniform 'gold standard' of care – NICE are expected to publish a Guideline on sepsis in 2016.

7.3 Improving reporting: Coding

Currently, the number of cases of sepsis in England per year can appear unclear as different figures are published and quoted. According to Hospital Episode Statistics (HES), in 2013/14 there were³²:

- 105,642 admissions with a diagnosis of sepsis;
- 117,580 people who had one or more diagnosis of sepsis while in hospital;
- 122,822 were discharged from hospital with a diagnosis of sepsis; and
- Overall, 202,700 episodes of sepsis recorded.

Furthermore, analysis of HES data also shows significant variation in rates of admission where sepsis is present, and this variation persists after accounting for associated factors such as age, sex and admission method. Whilst some variation due to clinical factors and case mix is to be expected, it is likely that there are

systemic recording issues driving some of the variation. The inability to separate clinical and systemic issues limits the utility of the data to drive improvement in sepsis care.

According to an FOI request for the APPG the number of cases of sepsis coded in 2015 has increased by 68% in one year³³ – suggesting that improvements are starting to be seen in the coding for sepsis - clinical advice suggests that variation persists in those cases . Whilst some teams or clinicians may be minded to code for sepsis, others may code for the underlying infection such as influenza. Analysis of clinical codes available and discussion with experts demonstrates that there are no clear coding instructions specific to sepsis at present.

Consistent and complete clinical coding will greatly improve the ability to monitor and improve sepsis services for patients. In time, with more robust data, it would enable more detailed understanding of the disease as well as the associated economic burdens, and allow further analysis of the opportunities for improvement, for example, through inclusion in NHS England's Right Care programme.

Clinician and Coder Partnership for Sepsis: Kent Surrey Sussex AHSN

The Kent Surrey Sussex (KSS) AHSN Patient Safety Collaborative has been analysing data for sepsis admissions and has identified significant variation between organisations across the KSS region. Following more detailed analysis in one Trust, KSS ascertained that there were variations in the documentation of diagnosis and subsequent coding. KSS developed a basket of sepsis codes under the guidance of their clinical reference group and coding leads.

One of the key outputs from the work is the spread of the message to clinical staff that they need to document sepsis first and the infected organ second e.g. sepsis secondary to a UTI or sepsis secondary to cellulitis. KSS hope that by encouraging the development of a common language and by putting some simple rule sets in place to give the coders a little more flexibility in coding for sepsis and severe sepsis, that over time we will improve accuracy, allowing them to see whether they are successfully saving lives by delivering consistent, timely and good care.

Key points:

- The international sepsis definitions are expected to be amended in 2016.
- The Sepsis Six care bundle is widely recognised as best practice in identifying and treating sepsis, and has been shown to be associated with significant mortality reductions when applied within one hour.
- NICE is expected to publish a Guideline on sepsis in 2016.
- Consistent and complete clinical coding will greatly improve the ability to monitor and improve sepsis services for patients.

7.4 Section Actions

The following actions will be undertaken to improve the consistency of standards and reporting:

Issue	Organisation	Action	Timescale
Defining best practice standards	NICE	Publication of Clinical Guideline on sepsis in 2016. Publication of Quality Standard on sepsis in 2017.	Clinical Guideline – July 2016 Quality Standard: end 2017
Improving consistency of coding	Health and Social Care Information Centre (HSCIC)	HSCIC to produce SNOMED code sets representing the standard/acceptable clinical phrases for sepsis following publication of new international definitions of sepsis. Subject to the appropriate work package and funding the HSCIC, in conjunction with NHS England, will also seek to publish sets of acceptable phrases with justification, examples, guidance, and advice on 'coding leads' in Trusts.	End 2016
Understanding sepsis mortality	Health and Social Care Information Centre (HSCIC)	Subject to the appropriate work package and funding, the HSCIC will investigate the feasibility of trust level sepsis mortality data derived from its SHMI publication.	End 2016

8 Ensuring appropriate antibiotic use

The prevalence of antimicrobial resistance (AMR) has risen alarmingly over the last 40 years, leading to increased pressure on existing antibiotics and greater challenges in treating patients. *Start Smart then Focus*³⁴ outlined the principles of antimicrobial stewardship that are vital to combating AMR, and these form an important element of the UK Five Year Antimicrobial Resistance Strategy. These principles are focussed on only using an antibiotic when it is really needed, selecting the most appropriate antibiotic from the local formulary when starting to treat a patient presenting with infection, and then obtaining culture and sensitivity of the infecting organism by 48 hours to enable adjusting to a more specifically focussed antibiotic if appropriate.

In order to ensure adequate antimicrobial stewardship, clear and evidence-based guidance on the use of antimicrobial agents must be followed. As the Chief Medical Officer's report on antimicrobial resistance highlighted³⁵, at present there is variability in the criteria used by clinicians to prescribe antibiotic therapy, particularly when the diagnosis is uncertain. Antimicrobial consumption continues to rise by around 4% per year for patients in hospitals³⁶ and a review of empiric IV therapy at 48-72 hours after admission showed a low cessation or de-escalation rate³⁷. Current hospital medicines benchmarking data suggest a continued growth in use of broad spectrum antibiotics in emergency departments, so ensuring that a review occurs is paramount to minimize further rises in bacterial resistance to antibiotics.

Going forward it will be important to guard against increasing the inappropriate use of broad spectrum antibiotics through efforts to increase the awareness, identification and treatment of sepsis. The NCEPOD report recommended that antimicrobial stewardship be incorporated into sepsis improvement programmes with input from microbiologists, in addition to recommending rapid control of sources of infection.

At a local level, compliance with antibiotic policies to guide prescribing will be important in mitigating the risk of increasing overall antibiotic use. Directors of Infection Prevention and Control are ideally placed to lead this agenda in Trusts with input from consultant microbiologists on ward rounds in reviewing all patients with suspected sepsis particularly in intensive care units (ICUs) and neonatal intensive care units.

To a large extent, national efforts to improve the identification and treatment of sepsis have also been mindful of the need to balance this with the AMR agenda. For example, the UK Sepsis Trust's clinical toolkits – that have been adopted widely in the NHS – make clear that IV antibiotics should only be administered where red flag sepsis, septic shock or severe sepsis are indicated, rather than a blanket approach for all cases of sepsis. The clinical indications for antibiotics will become even clearer when new definitions and associated guidance are published next year.

The evidence around the impact and effectiveness of the administration of antibiotics continues to attract some debate. Whilst administration of the Sepsis Six care bundle has been shown to reduce mortality by nearly half in patients with severe sepsis - with antibiotics forming a vital part of that care bundle - other studies have suggested a much more limited impact on outcomes in patients with sepsis.^{38,39}

A significant amount of research is underway and the evidence in this area is expected to become clearer over the coming months and years. As this happens, NICE, the UK Sepsis Trust, Royal Colleges and Health Education England will update their guidelines, recommendations and training materials to reflect the latest evidence.

Key points:

- In order to ensure adequate antimicrobial stewardship, clear, evidence based guidance on the use of antimicrobial agents must be followed.
- Antimicrobial stewardship should be incorporated into sepsis improvement programmes with input from microbiologists, in addition to recommending rapid control of sources of infection.
- Using antibiotic policies to guide prescribing is important in mitigating the risk of increasing overall antibiotic use. Directors of Infection Prevention and Control are ideally placed to lead this agenda in Trusts with input from Consultant Microbiologists on ward rounds.
- IV antibiotics should only be administered where red flag sepsis, septic shock or severe sepsis are indicated, rather than a blanket approach for all cases of sepsis.

8.1 Section Actions

In order to better ensure appropriate antibiotic use, the following actions will be undertaken:

Issue	Organisation	Action	Timescale
Ensuring appropriate antibiotic use	NHS England	Ensure that national work and communications around sepsis and AMR are complementary and clear	Ongoing
	NHS England, NICE, the UK Sepsis Trust, Royal Colleges, Health Education England	As evidence about effectiveness of antibiotics in treating severe sepsis becomes clearer, guidelines, recommendations and training materials will be refreshed	Ongoing

9 Summary and next steps

The actions outlined in this report are summarised below by theme and their target audience.

Responsibility for leadership on Patient Safety Domain will be moving to a new body, NHS Improvement, from April 2016. NHS Improvement will support this plan as well as looking for further opportunities to reduce the morbidity and mortality associated with sepsis in the NHS.

The Patient Safety Collaboratives (PSC) Sepsis Cluster, led by the Academic Health Science Networks (AHSNs), will continue to support alignment between local initiatives and national priorities, facilitating sharing of best practice and information.

Organisations involved in this work have voluntarily agreed to these actions, and they have no mandatory basis.

Theme	Action	Organisation	Aimed at ...	Timescales
Preventing avoidable cases of sepsis	Publication of a continence framework in late 2015 outlining good practice and supporting commissioners in commissioning of continence services.	NHS England	Commissioners and providers	By end of December 2015
	Publication of review of maternity services, which will make recommendations as to how to improve the safety of services and create the conditions for NICE and best practice guidelines to be followed. This should enable the management of pregnant women and postpartum women in line with recognised guidance, with regular physiological monitoring, helping to identify any deterioration in pregnant women which may be suggestive of sepsis.	NHS England	Commissioners and providers	By January 2016

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Theme	Action	Organisation	Aimed at ...	Timescales
	Roll out of the free flu vaccine to primary school children in years 1 and 2, helping to mitigate the changes of sepsis occurring as a result of influenza.	NHS England and Public Health England	Providers and the public	In progress
	Gather intelligence from members of Care England and National Care Forum (membership organisations for care homes) to find out about any examples of good practice already underway in care home sector and then share the learning from this.	NHS England	Care homes	April 2016
Increasing awareness of sepsis amongst the public	PHE will review the evidence and make recommendations to inform decisions about a possible public-facing campaign to raise awareness of Sepsis	Public Health England (PHE)	The public	Review completed by December 2015
	HEE will incorporate principles of communication with, and education of the public within educational/training resources that they develop.	Health Education England (HEE)	Health and care professionals	Ongoing
	Development of 'Sepsis Savvy' microteaching sessions for parents and lay people will help to raise awareness, continuation of media and social media outreach. The Sepsis Trust will also fill any gaps in formal education in	UK Sepsis Trust	Lay people and the public	March 2016

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Theme	Action	Organisation	Aimed at ...	Timescales
	collaboration with HEE.			
Increasing awareness of sepsis amongst professionals	Support the on-going recognition of sepsis by continuing to provide pre-hospital sepsis conferences/workshops for its members, with wider attendance by other interested parties. Continue to provide updates via News Digest to College members.	College of Paramedics	Ambulance services	Ongoing
	Development of e-learning module for primary care.	Health Education England (HEE)	General Practitioners (GPs)	March 2016
	Subject to approvals, appointment of clinical champion to provide national level leadership for better identification and treatment of sepsis. Development of online learning package and inclusion of sepsis in RCGP's clinical priority list.	Royal College of General Practitioners (RCGP)	General Practitioners (GPs)	2016
	Rolling out the new RCP Internal Medicine curriculum based on competencies in practice, one of which is managing the acutely deteriorating patient.	Royal College of Physicians of London	Physicians	Curriculum in development
	Development of voluntary audit tool to allow GPs to assess their management of children with fever in line with NICE guidelines. Feverish illness can be a pre-cursor to sepsis	NHS England	General Practitioners (GPs)	By end of 2015

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Theme	Action	Organisation	Aimed at ...	Timescales
	HEE to undertake a scoping exercise to assess the current provision of learning materials available to support recognition and treatment of sepsis in different sectors and different healthcare groups, identifying areas of good practice, gaps in current material available, and making recommendations for commissioning of new materials. Primary care and paediatrics are expected to be an early focus.	Health Education England	Health and care professionals	March 2016
	The Patient Safety Collaboratives will support the implementation of professional training across care settings, including the community through their networks in collaboration with HEE, Leadership Academy and other partners.	Academic Health Science Networks/ Patient Safety Collaboratives	Out of hospital health and care staff	Ongoing
	Production of educational resources to supplement formal education in collaboration with Health Education England.	UK Sepsis Trust	Health and care professionals	Ongoing
Improving identification and treatment of	Development of Clinical Toolkit and Screening Tool for community based settings.	UK Sepsis Trust	Out of hospital health and care staff	September 2016
	Development of Clinical Toolkit and Screening tool for maternal sepsis	UK Sepsis Trust	Providers of maternity	April 2016

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Theme	Action	Organisation	Aimed at ...	Timescales
sepsis across whole care pathway			services	
	Explore potential options to develop acronym and associated score or similar, along the lines of 'FAST' used for stroke, to facilitate better communication about suspected sepsis patients.	UK Sepsis Trust	Health and care professionals and the public	End of 2016
	The Patient Safety Collaboratives will support local organisations to identify and spread best practice to improve the communication between settings and transfers of care.	Academic Health Science Networks/ Patient Safety Collaboratives	Health and care professionals	Ongoing
	Develop with RCGP approved safety netting tools for adults, pregnant women and children, test and disseminate.	UK Sepsis Trust and RCGP	General Practitioners	2015
	The Patient Safety Collaboratives will support local organisations to identify best practice and innovation for better care pathways, including community, through their networking activities.	Academic Health Science Networks/ Patient Safety Collaboratives	Out of hospital health and care staff	Ongoing
	The CQC already look at sepsis management through their mortality outliers work (process through which CQC follow up on data that identifies where, within an organisation, the number of patients who have died after being admitted to hospital for a particular condition is	Care Quality Commission (CQC)	All providers who accept emergency admissions and quality (for the 2015/16 CQUIN)	Looking at CQUIN data: April 2016 Consideration of

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Theme	Action	Organisation	Aimed at ...	Timescales
	<p>significantly higher than expected). This forms part of their intelligent monitoring process.</p> <p>In future inspections, CQC will also consider data from the 2015/16 sepsis CQUIN measure. On publication of NICE guideline CQC will consider how Trusts have used evidence based guidelines.</p>			use of evidence based guidelines: on publication of NICE guidance
	<p>Subject to patient safety expert and steering group approval, issue Patient Safety Resource Alert highlighting all relevant RCP, RCPCH and NHS England resources, including the RCP's revised NEWS and a co-badged framework from RCPCH and NHS England to encourage greater focus on the whole of a Paediatric Early Warning System rather than score.</p>	NHS England in partnership with RCPCH and RCP	All secondary care providers	March 2016
Improving consistency of standards and reporting	<p>Publication of Clinical Guideline on sepsis in 2016.</p> <p>Publication of Quality Standard on sepsis in 2017.</p>	NICE	All providers of health and care services	CG to be published 2016 QS to be published in 2017
	<p>HSCIC to produce SNOMED code sets representing the standard/acceptable clinical phrases for sepsis following publication of new international definitions of sepsis.</p>	Health and Social Care Information Centre (HSCIC)	Primary and secondary care providers	End 2016

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Theme	Action	Organisation	Aimed at ...	Timescales
	Subject to the appropriate work package and funding the HSCIC, in conjunction with NHS England, will also seek to publish sets of acceptable phrases with justification, examples, guidance, and advice on 'coding leads' in Trusts.	Health and Social Care Information Centre (HSCIC)	Primary and secondary care providers	End 2016
	Subject to the appropriate work package and funding, the HSCIC will investigate the feasibility of trust level sepsis mortality data derived from its SHMI publication.	Health and Social Care Information Centre (HSCIC)	Primary and secondary care providers	End 2016
Ensuring appropriate antibiotic use	Ensure that national work and communications around sepsis and AMR are complementary and clear.	NHS England	Commissioners and providers	Ongoing
	As evidence about effectiveness of antibiotics in treating severe sepsis becomes clearer, guidelines, recommendations and training materials will be refreshed.	NHS England, NICE, the UK Sepsis Trust, Royal Colleges, Health Education England	Organisations across health and care landscape	Ongoing

Glossary

Academic Health Science Networks (AHSNs): membership organisations within NHS in England. They were created in May 2013 with the aim of bringing together health services, and academic and industry members to drive improvement in quality of services and contribute to economic growth in the area.

Acid-base balance: this refers to the mechanisms the body uses to keep its fluids close to neutral pH (that is, neither basic nor acidic) so that the body can function normally.

Antimicrobial: a drug that selectively destroys or inhibits the growth of microorganisms. Sometimes referred to as an 'antimicrobial agent'. Examples include antibiotics (also known as antibacterials), antiviral, and antifungal agents.

Antimicrobial resistance: The ability of a microorganism to grow or survive in the presence of an antimicrobial at a concentration that is usually sufficient to inhibit or kill microorganisms of the same species and that exceeds concentrations achievable in the human / animal / patient.

Antimicrobial stewardship: The use of co-ordinated interventions to improve and measure the use of antimicrobials by promoting optimal drug regimen, dose, duration and route. The aim is for optimal clinical outcome and to limit selection of resistant strains. This is a key component of a multi-faceted approach to preventing antimicrobial resistance.

Asymptomatic bacteriuria: The occurrence of bacteria in the urine without causing symptoms.

Catheterisation: the use of or insertion of a catheter (small, flexible tube) into the bladder, trachea, or heart.

Clinical coding: the translation of medical terminology describing the reason for a patient's encounter, such as a patient's complaint, problem, diagnosis, treatment or other reason for medical attention; into statistical code to support both statistical and clinical uses

CQUIN: The CQUIN (Commissioning for Quality and Innovation) payment framework enables commissioners ('buyers' of health services) to reward excellence, by linking a proportion of English healthcare providers (such as hospitals, mental health trusts, ambulance services) income to the achievement of quality improvement goals. There are usually four or five national and some locally determined goals. Sepsis was introduced as a national goal in 2015/16.

Hypoperfusion: (shock) - the inadequate delivery of blood to body tissues, resulting inadequate supply of oxygen and nutrients to the body tissues.

Immunosuppression: A situation in which the body's immune system is intentionally stopped from working, or is made less effective, usually by drugs,

especially in order to help the body accept an organ that has been taken from another person's body:

NCEPOD: National Confidential Enquiry into Patient Outcome and Death – is an organisation whose purpose is to assist in maintaining and improving standards of medical and surgical care for the benefit of the public by reviewing the management of patients, by undertaking confidential surveys and research, and by maintaining and improving the quality of patient care and by publishing and generally making available the results of such activities.

Neonatal sepsis: sepsis occurring in babies up to 90 days after birth.

Parliamentary and Health Service Ombudsman: An organisation set up by the Government to look into complaints where an individual believes there has been injustice or hardship because an organisation has not acted properly or fairly, or has given a poor service and not put things right.

Patient Safety Collaboratives: A new programme to improve the safety of patients and ensure continual patient safety learning sits at the heart of healthcare in England. A network of 15 Patient Safety Collaboratives is led by England's [15 Academic Health Sciences Networks \(AHSNs\)](#) to tackle the leading causes of avoidable harm to patients. The collaboratives aim to empower local patients and healthcare staff to work together to identify safety priorities and develop solutions. These will then be implemented and tested within local healthcare organisations before being shared nationally with the other collaboratives.

Prophylactic: medication or a treatment designed and used to prevent a disease from occurring

'Red flag' sepsis: A term adopted by the Sepsis Trust, NHS England and several of the Royal Colleges used when a patient is clearly unwell, but they do not fulfil the criteria for severe sepsis on physiological or near-patient assessment alone.

Secondary care: medical care provided by a specialist or facility following referral by a primary care physician, that requires more specialized knowledge, skill, or equipment than the primary **care** physician has

Sepsis: A common and potentially life-threatening condition triggered by an infection. In sepsis, the body's immune system goes into overdrive, setting off a series of reactions including widespread inflammation, swelling and blood clotting. This can lead to a significant decrease in blood pressure, which can mean the blood supply to vital organs such as the brain, heart and kidneys is reduced.

Sepsis is currently defined by the presence of manifested by two or more Systemic Inflammatory Response Syndrome (SIRS) criteria with an associated infection.

Sepsis Six: a 'bundle' of six elements of care that, when implemented as a group, have an effect on outcomes beyond implementing the individual elements alone. Sepsis Six simplifies the complex processes of the care of patients with severe sepsis.

Severe sepsis: this occurs when sepsis (manifested by two or more Systemic Inflammatory Response Syndrome (SIRS) criteria) is accompanied by organ failure.

Septic shock: this is identified by sepsis with organ failure and hypoperfusion.⁴⁰

Systemic Inflammatory Response Syndrome (SIRS) criteria: This is the body's response to a variety of severe clinical insults. It is characterised by the presence of two or more of the following features:

- o Temperature $>38^{\circ}\text{C}$ or $<36^{\circ}\text{C}$
- o Heart rate $> 90/\text{min}$
- o Respiratory rate $> 20/\text{min}$ or $\text{PaCO}_2 < 4.3\text{kPa}$
- o White cell count $> 12 \times 10^9/\text{l}$ (in those with normal bone marrow activity)

Uncomplicated sepsis: Sepsis is defined by two or more Systemic Inflammatory Response Syndrome (SIRS) criteria in the presence of infection. In the absence of organ failure, this is termed 'uncomplicated sepsis'.

Annex A: Terms of Reference of Cross System Programme Board

Purpose

The purpose of the cross-system sepsis programme board is to drive the change required for quality improvement in the prompt identification and treatment of sepsis to occur, with the aim of improving patient outcomes and reducing mortality and morbidity currently associated with sepsis.

The group will provide a forum for collaboration across key partners from the health and care landscape, providing:

- The opportunity to coordinate actions across organisations to drive quality improvement;
- The opportunity to consider where current gaps lie and how these should be addressed; and
- A shared view of the issues and opportunities for improvement currently associated with sepsis.

Objectives

The objectives of the group will be to:

- Provide clinical expertise and advice on the current barriers and issues to driving quality improvement, and how these can be overcome;
- Advise on the overall strategy required to drive improvement in the identification and treatment of sepsis, drawing on work underway across NHS England and the wider system. This includes the use of financial and non-financial tools and levers required to drive improvement; and
- Identify those areas in which efforts need to be targeted in the short, medium and long-term, making decisions and/or recommendations about those tools and levers needed to drive improvement in 2015/16, 2016/17, and beyond.

Scope

The group will consider the identification and treatment of sepsis across and between different settings including acute services, primary care, out of hours services, community care and ambulance services.

The group will also consider specific needs of different groups and those particularly at risk, for example, children and older people. Overall, the group will provide advice on effective management of sepsis in all ages.

Membership

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The group will need to draw on the expertise of a range of different partners from time to time. The Programme Board consists of the following representatives:

Name	Representing (organisation/profession)
Celia Ingham Clark (CHAIR), Director, Reducing Premature Mortality	NHS England
Mike Durkin, Joint Chair, Director, Patient Safety(Co- CHAIR)	NHS England
Alastair Henderson, Chief Executive	Academy of Medical Royal Colleges
Andrew Frankel , Postgraduate Dean	Health Education South London
Damian Riley, Regional Medical Director, North	NHS England
Derek Bell, Acute Physician, Chelsea & Westminster Hospital NHS Foundation	Expert clinician
Edward Baker, Deputy Chief Inspector of Hospitals	Care Quality Commission (CQC)
Gerrard Phillips, Senior Censor, Vice President for Education & Training, RCP London	Royal College of Physicians
Graham Prestwich, Lay Member, Patient and Public Involvement, Leeds North Clinical Commissioning Group	Representative of patients, carers and the public
Hugo Mascie-Taylor, Medical Director	Monitor
Ian Gould, Consultant Microbiologist	Royal College of Pathologists
Ian Maconochie, Consultant in Paediatric Accident & Emergency Medicine	Royal College of Paediatrics and Child Health
Isabel Oliver, Director of the Field Epidemiology Service	Public Health England (PHE)
Jacqueline Barnes, Chief Nurse, Coventry and Rugby CCG & Warwickshire North CCG	CCG representative
Jacqueline Cornish, National Clinical Director, Children, Young People & Transition to Adulthood	NHS England
Jason Yiannikou, Deputy Director, Quality Improvement Team	Department of Health
Jayne Wheway, Head of Patient Safety – Children, Young People & Maternity	NHS England
Jeff Keep, Consultant and Honorary Senior Lecturer in Emergency Medicine & Major Trauma, King's College Hospital, London	Royal College of Emergency Medicine

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Jeremy Tong, Consultant Paediatric Intensivist, University Hospitals of Leicester NHS Trust	Expert clinician
Jonathan Benger, National Clinical Director,	NHS England
Jonathan Hope, Statistical Section Head, Statistical Response Unit	HSCIC
Karen Warner, Associate Director of Quality & Nursing, Yorkshire Ambulance Service	Ambulance services representative
Kathy McLean, Medical Director	NHS Trust Development Authority (NHS TDA)
Mark Baker, Director of the Centre of Clinical Practice	National Institute for Health and Care Excellence (NICE)
Martin Severs, Chief Executive	Health and Social Care Information Centre (HSCIC)
Martyn Diaper, Head of Patient Safety (Primary Care)	NHS England
Mike Surkitt-Parr, Head of Patient Safety	NHS England
Paul Mackenzie, Patient safety Collaborative Sepsis Cluster Lead	North West Coast Academic Health Science Network
Paul Stonebrook, Health Improvement Directorate, National Programme Delivery	Department of Health
Philip Howard, Consultant Pharmacist in Antimicrobials at the Leeds Teaching Hospitals NHS Trust	Royal Pharmaceutical Society
Prof Gordon Carlson. Consultant Colorectal and General Surgeon	Royal College of Surgeons of England
Richard Healicon, Programme Delivery Lead, Domain 1 – Living Longer Lives	NHS Improving Quality (NHSIQ)
Richard Jennings, Infectious Diseases Specialist, Whittington Hospital	Expert clinician
Ron Daniels, Chief Executive	UK Sepsis Trust
Simon Stockley, General Practitioner	Royal College of General Practitioners
Suman Shrestha, Advanced Critical Care Practitioner	Royal College of Nursing
Tracy Nicholls, Head of Clinical Quality, East of England Ambulance Service NHS Trust	Ambulance services representative

Working arrangements

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Initially, the group will meet once every two months, and the frequency of meetings will be considered every six months. Work will be undertaken between meetings, and members will contribute to, and approve work, via email correspondence.

The Secretariat (Quality Strategy Team, NHS England) will be responsible for circulating papers and minutes of meetings. Papers for meetings will be circulated no later than 3 working days before meetings, and minutes will be circulated no later than 2 weeks after meetings.

The group will be quorate if at least one of the co-Chairs and a third of total membership are present.

Members of the cross-system steering group will be accountable to the individual organisations that they represent and will report through the relevant organisation's governance structures.

Endnotes

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