



REVIEW ARTICLE

Evaluation of Updated NG51 Guidelines on Early Recognition and Sepsis Outcomes in Elderly Patients

Jack Greenwold*

University of Bristol, United Kingdom



*Corresponding author: Jack Greenwold, University of Bristol, 38 Cyprus Avenue, N3 1ST, UK, Tel: 07505963699

Abstract

On 31st January 2024, NICE updated NG51, following recommendations from the Academy of Medical Royal Colleges in 2022. After years of stalling progress for sepsis outcomes, particularly in the elderly population, this guideline update seeks to address sepsis mortality rates by introducing new recommendations surrounding early administration of antibiotics, and most significantly encouraging universal use of NEWS2 to identify deterioration, aiding identification of early septic patients. This review critically examines the evidence and arguments regarding the impacts of the updated NG51 guidelines on future sepsis identification, diagnosis and outcomes. Drawing on personal observations of sepsis management in the Emergency Department, this review also includes original recommendations for potential future updates to the NG51 guidelines.

sepsis treatment, given early intervention has proven to significantly mitigate mortality.

This academic review aims to critically evaluate the updated NG51 guidelines on early recognition and sepsis outcomes in elderly patients, analysing the impact in this vulnerable patient demographic. The 2024 NG51 update holds positive implications for sepsis outcomes, however, some limitations remain unresolved since its original publication in 2016. Given limited progress to improve outcomes in recent years, this review will propose original recommendations for research and updates for future guideline amendments.

Positive Implications of NG51 Updates

The 2024 NG51 update amends important considerations involving recognising sepsis early. Firstly, whilst sepsis is typically suspected in patients recording a temperature $> 39^{\circ}\text{C}$ or $< 36^{\circ}\text{C}$, some septic patients will record normal body temperature, previously including elderly patients, infants, cancer patients and severe sepsis patients. The 2024 update includes patients with spinal cord injuries, thus increasing vigilance for potential hidden cases of sepsis.

NG51 includes further details informing early antibiotic treatment. Evidence highlights prescribing antibiotics within the first hour of suspecting sepsis is crucial for successful recovery. From 2024, ambulance staff should administer antibiotics if the hospital transfer time exceeds one hour and if the patient meets any high-risk criteria, minimising delayed treatment. Outlined are the high-risk criteria for patients aged > 12 years: New altered mental state, respiratory rate > 25 bpm, requiring $> 40\%$ oxygen delivery to maintain SaO_2

Introduction

Sepsis is defined as life-threatening organ dysfunction due to an unregulated host response to infection. The Lancet Journal of Respiratory Medicine reported 245,000 sepsis cases annually in England, with a 20.3% mortality rate, responsible for more deaths than leukaemia, breast, bowel, and prostate cancer combined [1,2]. In 2016, the National Institute for Health and Care Excellence published NICE Guidelines 51 (NG51), a protocol for recognition, early diagnosis, and management of sepsis. On 31st January 2024, NICE updated NG51, following recommendations from the Academy of Medical Royal Colleges in 2022. Specifically, the elderly population typically suffer the least favourable sepsis outcomes, with mortality in 75-79 year-olds in England increasing by 351 annual deaths from 2015-22 [3,4]. Therefore, this update aims to address the challenges surrounding diagnosis and



Citation: Greenwold J (2025) Evaluation of Updated NG51 Guidelines on Early Recognition and Sepsis Outcomes in Elderly Patients. Int J Crit Care Emerg Med 11:168. doi.org/10.23937/2474-3674/1510168

Accepted: January 29, 2025; **Published:** January 31, 2025

Copyright: © 2025 Greenwold J. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

> 92% (SaO₂ > 88% in COPD), systolic BP < 90 mmHg (alternatively > 40 mmHg below their normal systolic pressure), heart rate > 130 bpm, no urine output in previous 18 hours, cyanosis, mottled/ashen skin.

Prior to the 2024 update, research at James Paget University Hospital discovered the significance of early antibiotic administration. The trust increased the number of patients receiving antibiotics within one hour of suspecting sepsis from 63% to 87%. Subsequently, sepsis mortality decreased by 2.4% and admission length decreased by 3.3 days [5]. Thus, promoting early antibiotic treatment in the updated NG51 guidelines aims to reduce mortality rates and hospitalisation, enhancing patient reintegration into society and improving outcomes.

The most significant update is introducing the National Early Warning Score (NEWS2) for use in hospital, mental health and ambulance settings. Early warning scores assess patient deterioration, monitoring: temperature, heart rate, respiratory rate, oxygen saturation, blood pressure, consciousness level [6].

A normal parameter scores 0, whilst the maximum score of 3 for a single parameter indicates increased risk of organ dysfunction [7]. NEWS2 facilitates regular vital sign monitoring, providing a visible trajectory of deterioration. Following recommendations by the Academy of Medical Royal Colleges in 2022, proposing “NEWS2 should be used to supplement clinical judgement to identify adult patients with suspected sepsis”, using NEWS2 allows stratification of patients into risk categories, shown in Table 1 [8].

This intervention supports clinical decision-making by providing additional time for information gathering for a more precise diagnosis. This simultaneously benefits clinicians with clear frameworks to plan the most appropriate treatment pathway, and enhances patient outcomes by promoting antimicrobial stewardship, limiting excessive antibiotics, thus reducing antibiotic resistance.

Currently, 100% of ambulance trusts use NEWS2 for initial assessment, contrasting 76% of acute trusts using NEWS2 in England, with remaining trusts opting for alternative early warning scores [9]. Mandating NEWS2 use in NG51 targets universal application, aiming to reduce current confusion caused by nationwide variations in early warning scores, thus minimising compromising patient safety. NHS England argue national standardisation of NEWS2 in acute hospitals could prevent 1800 deaths annually, further stressing

the significance of standardising NEWS2, proposed in NG51 [10].

Limitations of Updates

Despite NG51 addressing some concerns, sepsis remains challenging to detect and treat accordingly, with new guidance still leaving ambiguity for healthcare professionals. NG51 urges clinicians to consider every sepsis diagnosis unique and to recognise nuances in history-taking, negatively encouraging hyper-vigilance. Nuances in history-taking are seen as common early sepsis markers, including heart rate, blood pressure, oxygen saturation, altered mental state and body temperature, could remain normal despite underlying sepsis present, causing potential for more confusion than coherence for clinicians. Therefore, the headline “UK Sepsis Trust welcomes NICE sepsis guideline updates which herald end of confusing period for health professionals” arguably inflates the impact of NG51 [11].

Furthermore, a lack of guidance for sepsis over-diagnosis limits the value of NG51. Dr Paul Morgan, Sepsis Lead at Cardiff and Vale University Health Board, proposed “Could this pressure to improve sepsis management be counterproductive and lead to over-diagnosis of sepsis?”, suggesting hyper-vigilance, fuelled by new guidance, can generate over-diagnosis in non-septic patients [12]. Moreover, the published NG51 ‘Recommendations for Research’ suggests “The consequences of getting the decision-making wrong can be catastrophic and therefore many patients are potentially over-investigated and admitted inappropriately”, further implying the consequence of over-diagnosis from NG51.

Whilst over-diagnosis is favoured over risking consequences of misdiagnosis, treating non-septic patients with Sepsis Six results in unnecessary invasive procedures and antibiotic misuse, contributing towards antibiotic resistance. Given antibiotics are the most effective sepsis treatment, inappropriate use risks affecting effectiveness of future treatments, worsening sepsis mortality [13].

Regarding NG51 recommendations, a recent Netherlands-based trial suggested limited evidence behind the effectiveness of pre-hospital antibiotics. Despite administering antibiotic treatment (median 26 minutes) prior to hospital arrival, the study found no signs of prognosis improvement, questioning NG51 recommendations [14].

Table 1: Stratification of patients into risk categories using NEWS2 [8].

Risk Category	Time of Sepsis Six Treatment Activation
High	Within one hour of suspecting sepsis
Moderate	Deferred for up to 3 hours to gather more specific diagnosis
Low	Deferred for up to 6 hours to gather more specific diagnosis

Challenges in Elderly Patients

Recognising and managing sepsis is challenging for clinicians, this task becomes increasingly complicated involving elderly patients, dominating sepsis prevalence, given the mean sepsis patient age in 2021-22 being 71-years-old. Additionally, elderly patient outcomes are notorious, with 77% of sepsis-related deaths in England in people aged 75 years or older, therefore NG51 should aim to improve these outcomes given years of stalling progress [15].

Complex histories often seen in elderly patients complicate early sepsis detection. Upon initial assessment, elderly septic patients often present with non-specific symptoms, including confusion, immobility, and incontinence, easily discouraging clinicians from diagnosing sepsis. Alternatively, many elderly patients suffer co-morbidities, and exacerbation can cause organ dysfunction, mirroring sepsis, misleading clinicians into a false sepsis diagnosis, which bears potentially fatal consequences. Moreover, some co-morbidities can cause a patient's blood variables to deviate outside the 'normal range,' potentially leading clinicians to over-diagnose sepsis due to misinterpreting these variables, which may be normal for the patient's co-morbidity. Thus, NG51 should further emphasise the importance of considering the patient's medical history to reduce over-diagnosis [16]. Subsequently, patients receive inappropriate or delayed treatments for sepsis, elevating mortality rates.

Furthermore, ethical considerations should be appropriately discussed when treating elderly sepsis patients. Treatments must respect patient autonomy and dignity, and clinicians must consider legal and ethical frameworks to guide treatment accordingly. Many elderly patients clarify their 'ceilings of treatment,' commonly including DNR and ReSPECT; these can impose significant limitations on sepsis treatment, which involves invasive interventions, notably lumbar punctures and administering intravenous antibiotics and fluids. These treatments must be evaluated alongside the patient's best interests, given many older patients argue quality of life supersedes intensive treatments that potentially lengthen life [17].

Moreover, whilst evidence regarding over-treating sepsis is limited, a 2020 study assessing elderly cancer patients highlighted "vulnerable older patients treated with intensive therapy may actually have higher all-cause mortality as a result of treatment toxicity", indicating the complications treating sepsis in elderly patients, as urgent clinical decisions require an understanding of complex physiology, twinned with patient beliefs and ethical considerations [18].

Considerations for Future Updates

Whilst NEWS2 should be encouraged to aid identifying suspected sepsis, the increasing emphasis

fuelled by NG51 poses a serious risk of NEWS2 over-reliance, highlighted by the Health and Safety Investigation Branch: "NEWS2 is not intended to be a stand-alone tool" [19].

Patient age is a common leading determinant for treatment, however future NG51 amendments should encourage using patient scoring systems, promoting holistic decision-making. The Clinical Frailty Score (CFS) could partner alongside NEWS2; a 2022 study discovered those classified as 'frail' (CFS 5-9) had a 10% increased sepsis mortality risk than 'non-frail' patients (CFS 1-4) [20]. During the COVID-19 pandemic, CFS was endorsed by NICE to identify at-risk patients, discovering for every one-point score increase, mortality rose by 12% [21,22]. CFS has only been validated in patients over the age of 65 years, but given the result is obtained within one minute, typically assessed in the emergency department triage or by paramedics, the score provides additional information to support clinical decision-making for an informed diagnosis.

Furthermore, the Katz Index of Independence in Activities of Daily Living can be utilised to aid sepsis prognosis and outcomes in hospitalised patients. The score assesses six Activities of Daily Living (ADL): Bathing, dressing, toilet use, transferring, continence and eating. A 2023 study found approximately 79% of elderly septic patients developed brain volume reduction, with a strong positive correlation to poor ADL function. Reduced ADL function significantly increases the risk of post-intensive care syndrome, decreasing the likelihood of successful reintegration into society for elderly patients [23]. Implementing the Katz Index to assess a patient's functional ability will assist clinicians in planning appropriate re-integrative care for elderly septic patients. This highlights the importance of encouraging the use of alternative scoring systems in future NG51 updates, supporting sepsis diagnosis and improving post-sepsis outcomes.

The original 2016 NG51 guidelines recommended research into developing "a set of clinical decision rules or a predictive tool to rule out sepsis" Whilst NEWS2 can certainly aid sepsis prediction, the fundamental 'rule-out' tool remains blood tests, listed as step 3 in the Sepsis Six pathway. However, since obtaining blood test results typically takes hours, patients are prescribed antibiotics prior to receiving a confirmed diagnosis. Elevated biomarkers, including white blood cell count (indicating active immune response), C-reactive protein (suggesting inflammation), and lactate (produced in hypoxic conditions, such as infection) are key indicators of sepsis in a blood test [24]. Bedside biomarker tests could therefore enhance early sepsis detection and limit over-diagnosis. Currently, tests are available, such as Actim CRP, a skin-prick blood test which records CRP levels within five minutes, contrasting hours awaiting blood test results [25]. Future research should therefore

investigate the association between bedside biomarker monitoring in suspected sepsis cases and the risk of severe illness or death.

Current NICE guidance states NEWS2 use is not mandatory in primary care. In secondary care settings, NEWS2 has a clear 'tracking' value, as patients are monitored at regular time intervals. This poses a significant challenge in primary care due to impracticalities surrounding regular patient monitoring. Despite this, there is an argument to encourage NEWS2 use in primary care, supported by recent recommendations by the Royal College of General Practitioners "for GPs to use NEWS2 scores as part of their clinical assessment of acutely deteriorating patients" [26]. A 2021 study found in a sample of 206 GPs, overwhelmingly 98.1% concluded 'gut feeling' was their most used diagnostic method for suspecting sepsis. Only 1.5% of participants used the UK Sepsis Trust criteria as their main method for identifying sepsis [27].

Given a considerable proportion of primary care consultations involve elderly patients, who may present with infection, using NEWS2 and other scoring systems for clinical decision-making, rather than reliance on 'gut feeling', could prompt earlier identification of sepsis in community settings, improving outcomes. Dr Ron Daniels, CEO of UK Sepsis Trust, argued involving GPs in sepsis detection "is increasingly relevant as transit times increases and could be potentially transformational in terms of patient outcomes" [28]. Thus, investigating a correlation between NEWS2 use in primary care for infectious patients and sepsis incidence in the community is important for future research in identifying sepsis, particularly involving hidden cases amongst elderly patients.

Similarly, proposing NEWS2 use in care homes has proven popular, given tracking deterioration can support care staff to make decisions regarding escalating health concerns in addition to improving clearer communication between care and healthcare staff [29]. Therefore, updating NG51 to encourage GP and care staff to use NEWS2 for elderly patients presenting with infection could minimise current misdiagnosis, thus being hugely impactful.

NG51 in Practice

Fundamentally, the updated NG51 must work effectively in practice, ensuring healthcare colleagues universally understand the guidelines to enhance sepsis recovery. In the Bristol Royal Infirmary Emergency Department, I observed the positive implications and challenges adhering to new guidance. A 79-year-old male patient presenting with breathlessness, a soaring NEWS2 (HR 140bpm, RR 30bpm and SaO₂ 88%) and an X-Ray indicating pneumonia, stratified the patient as high-risk. Due to an extended ambulance transit time,

antibiotic treatment commenced within 1.5 hours of hospital admission. This case suggested the NG51 updates are still only partially implemented in practice, as the ambulance staff did not administer antibiotics to the patient prior to hospital arrival, despite being able to do so following the 2024 guidelines. Nevertheless, despite delayed treatment, ideally within the first hour, intervention using Sepsis Six resulted in the patient making a full recovery, highlighting the effectiveness of NICE guidelines.

However, another patient highlighted the challenges involving NG51, presenting with abdominal pain and tachycardia, accompanied by acidaemia and raised lactate following blood results. Whilst the patient's clinician desired commencing Sepsis Six, the emergency consultant argued antibiotic prescription as unnecessary given the patient's current markers. Following analgesia treatment, the patient recovered, avoiding sepsis over-diagnosis. This displayed the difficulties surrounding accurate sepsis diagnosis; understanding some patients will be over-diagnosed due to caution, meanwhile reluctance to administer antibiotics or missing 'key' early markers can mis-diagnose patients. Despite increased support for detection in the updated guidelines, individual variation in diagnosis limits strict adherence to NG51 in practice.

Conclusion and Reflections

In conclusion, the 2024 NG51 update aims to advance sepsis outcomes in England by addressing key improvements in identifying and treating suspected sepsis cases. Recognising sepsis is a subjective challenge for clinicians daily, and by standardising NEWS2 use to detect patient deterioration and early sepsis, healthcare staff will be capable of administering antibiotic treatment promptly. Moreover, NG51 is coherent and thorough, with important clinical decision-making supported by the outlined NEWS2 risk categories. Upon reflection, diagnosing sepsis in elderly patients will remain challenging for the foreseeable future, and whilst NG51 will continue supporting clinicians with new tools, such as NEWS2, this alone is unlikely to transform sepsis management. Whilst NG51 has future potential to include guidance for primary care, elderly patients and including additional diagnostic tools, being fortunate enough to observe Sepsis Six treatment initiated in the Emergency Department highlighted the optimal partnership between clinical decision-making and the coherency and clarity of NG51 to improve sepsis outcomes in elderly patients.

Acknowledgments

I would like to thank my supervisors, Dr. Ed Luff and Dr Sian Veysey, as well as recognising the various doctors I had the privilege to work alongside at the Bristol Royal Infirmary Emergency Department, with special thanks to Dr. Simon Laing and Dr. Lauren Bose for their

mentoring and passion for emergency medicine, guiding me through challenging patient cases in the Emergency Department in a supportive manner.

Conflicts of Interest

No conflicts of interest.

References

1. The UK Sepsis Trust (2024) References & Sources - The UK Sepsis Trust.
2. Cancer Research UK (2015) Cancer mortality statistics.
3. Nomis - Official Labour Market Statistics.
4. WHO (2024) Sepsis.
5. HSJ Solutions (2017) Early identification of sepsis helps reduce sepsis mortality rates.
6. Inada-Kim M (2022) NEWS2 and improving outcomes from sepsis. *Clinical Medicine* 22: 514-517.
7. Royal College of Physicians (2017) Chart 1: The NEWS scoring system National Early Warning Score (NEWS) 2.
8. Academy of Medical Royal Colleges (2022) Statement on the initial antimicrobial treatment of sepsis.
9. Gildea A, Mulvihill C, McFarlane E, Gray A, Singer M (2024) Recognition, diagnosis, and early management of suspected sepsis: Summary of updated NICE guidance. *BMJ* 385: q1173.
10. NHS England (2021) National Early Warning Score (NEWS).
11. Stevenson-Rose L (2024) UKST welcomes NICE sepsis guideline updates which herald end of confusing period for health professionals.
12. Morgan P, Majeed A (2019) Sepsis: Getting the balance right. *BMJ*: l6700.
13. Reinhart K (2023) How antimicrobial resistance amplifies the burden of sepsis.
14. Alam N, Oskam E, Stassen PM, van Exter P, van de Ven PM, et al. (2018) Prehospital antibiotics in the ambulance for sepsis: A multicentre, open label, randomised trial. *Lancet Respir Med* 6: 40-50.
15. Singer M, Inada-Kim M, Shankar-Hari M (2019) Sepsis hysteria: Excess hype and unrealistic expectations. *Lancet* 394: 1513-1514.
16. Goodacre S, Fuller G, Conroy S, Hendrikse C (2023) Diagnosis and management of sepsis in the older adult. 382: e075585.
17. Shrestha A, Martin C, Burton M, Walters S, Collins K, et al. (2019) Quality of life versus length of life considerations in cancer patients: A systematic literature review. *Psychooncology* 28: 1367-1380.
18. DuMontier C, Loh KP, Bain PA, Silliman RA, Hshieh T, et al. (2020) Defining undertreatment and overtreatment in older adults with cancer: A scoping literature review. *J Clin Oncol* 38: 2558-2569.
19. Tavaré A, Pullyblank A, Redfern E, Collen A, Barker RO, et al. (2022) NEWS2 in out-of-hospital settings, the ambulance and the emergency department. *Clin Med* 22: 525-529.
20. Fernando SM, McIsaac DI, Perry JJ, Rochwerf B, Bagshaw SM, et al. (2022) Preexisting clinical frailty is associated with mortality in critically ill patients with sepsis. *Critical Care Medicine* 50: 728-736.
21. NHS Specialised Clinical Frailty Network (2018) Clinical Frailty Scale. Specialised Clinical Frailty Network.
22. Pranata R, Henrina J, Lim MA, Lawrensia S, Yonas E, et al. (2021) Clinical frailty scale and mortality in COVID-19: A systematic review and dose-response meta-analysis. *Arch Gerontol Geriatr* 93: 104324.
23. Hosokawa T, Kinoshita K, Ihara S, Nakagawa K, Iguchi U, et al. (2023) Relationship between brain volume reduction during the acute phase of sepsis and activities of daily living in elderly patients: A prospective cohort study. *PLoS One* 18: e0284886.
24. NICE (2016) Recommendations for research. Sepsis: recognition, diagnosis and early management.
25. Actim® CRP
26. Royal College of General Practitioners (2022) NEWS2 score for assessing the patient at risk of deterioration.
27. Mulders MCF, Loots FJ, van Nieuwenhoven J, ter Maaten JC, Bouma HR (2021) Use of sepsis-related diagnostic criteria in primary care: A survey among general practitioners. *Fam Pract* 38: 617-622.
28. Tavaré A, O'Flynn N (2017) Recognition, diagnosis, and early management of sepsis: NICE guideline. *Br J Gen Pract* 67: 185-186.
29. Vardy E, Lasserson D, Barker R, Hanratty B (2022) NEWS2 and the older person. *Clin Med* 22: 522-524.