

Impact of the new NICE guidance 2021 on management of early onset neonatal sepsis

Macaskill, Laura ; Slee, Samantha ; van Hasselt, Tim J; Naseem, Muhammed ; Ewer, Andrew; Surana, Pinki

DOI:

[10.1136/archdischild-2021-322822](https://doi.org/10.1136/archdischild-2021-322822)

License:

Creative Commons: Attribution-NonCommercial (CC BY-NC)

Document Version

Peer reviewed version

Citation for published version (Harvard):

Macaskill, L, Slee, S, van Hasselt, TJ, Naseem, M, Ewer, A & Surana, P 2021, 'Impact of the new NICE guidance 2021 on management of early onset neonatal sepsis', *Archives of disease in childhood. Fetal and neonatal edition*. <https://doi.org/10.1136/archdischild-2021-322822>

[Link to publication on Research at Birmingham portal](#)

Publisher Rights Statement:

This article has been accepted for publication in Archives of Disease in Childhood - Fetal and Neonatal Edition, 2021 following peer review, and the Version of Record can be accessed online at <http://dx.doi.org/10.1136/archdischild-2021-322822>

© Authors (or their employer(s)) Reuse of this manuscript version (excluding any databases, tables, diagrams, photographs and other images or illustrative material included where a another copyright owner is identified) is permitted strictly pursuant to the terms of the Creative Commons Attribution-Non Commercial 4.0 International (CC-BY-NC 4.0) <http://creativecommons.org/licenses/by-nc/4.0/>

General rights

Unless a licence is specified above, all rights (including copyright and moral rights) in this document are retained by the authors and/or the copyright holders. The express permission of the copyright holder must be obtained for any use of this material other than for purposes permitted by law.

- Users may freely distribute the URL that is used to identify this publication.
- Users may download and/or print one copy of the publication from the University of Birmingham research portal for the purpose of private study or non-commercial research.
- User may use extracts from the document in line with the concept of 'fair dealing' under the Copyright, Designs and Patents Act 1988 (?)
- Users may not further distribute the material nor use it for the purposes of commercial gain.

Where a licence is displayed above, please note the terms and conditions of the licence govern your use of this document.

When citing, please reference the published version.

Take down policy

While the University of Birmingham exercises care and attention in making items available there are rare occasions when an item has been uploaded in error or has been deemed to be commercially or otherwise sensitive.

If you believe that this is the case for this document, please contact UBIRA@lists.bham.ac.uk providing details and we will remove access to the work immediately and investigate.

Archives of Disease in Childhood

Impact of the new NICE guidance 2021 on management of early onset neonatal sepsis.

Journal:	<i>Archives of Disease in Childhood</i>
Manuscript ID	fetalneonatal-2021-322822
Article Type:	Letter
Date Submitted by the Author:	19-Jul-2021
Complete List of Authors:	Macaskill, Laura; Birmingham Heartlands and Solihull (Teaching) NHS Trust, Neonatal unit Slee, Samantha; Birmingham Women's and Children's NHS Foundation Trust, Neonatal Unit van Hasselt, Tim; Birmingham Women's and Children's NHS Foundation Trust, Neonatal Intensive Care; Birmingham Children's Hospital NHS Foundation Trust, Naseem, Muhammed; Birmingham Children's Hospital NHS Foundation Trust, Liver unit Ewer, Andrew; Birmingham Womens Hospital, Neonatal Unit Surana, Pinki; University Hospitals Birmingham NHS Foundation Trust, Birmingham Heartlands Hospital Neonatal Intensive Care Unit Paediatric Research Across the Midlands , (PRAM)
Keywords:	Neonatology, Sepsis

SCHOLARONE™
Manuscripts



I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our [licence](#).

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which [Creative Commons](#) licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

Impact of the new NICE guidance 2021 on management of early onset neonatal sepsis.

Macaskill L¹ BMBS. laura.macaskill@nhs.net

Slee SL²

van Hasselt TJ²

Naseem M³

Ewer AK²

Supervising consultant: Surana P¹ pinki.surana@uhb.nhs.uk

Paediatric Research Across the Midlands (PRAM) Network, UK.

¹Neonatal Intensive Care Unit, Birmingham Heartlands Hospital, University Hospitals Birmingham NHS Foundation Trust, Birmingham, UK

²Neonatal Intensive Care Unit, Birmingham Women's Hospital, Birmingham Women's and Children's NHS Foundation Trust, Birmingham, UK

³Liver Unit, Birmingham Children's Hospital, Birmingham Women's and Children's NHS Foundation Trust, Birmingham, UK

Keywords: Neonatology; sepsis; KP-SRC, NICE

Word Count: 500 words

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Impact of the new NICE guidance 2021 on management of early onset neonatal sepsis.

In April 2021 the National Institute for Health Care Excellence (NICE) published new guidelines for neonatal infection,¹ replacing the 2012 guidance. In order to reduce antibiotic usage in healthy infants, NICE modified risk factors and allowed use of Kaiser Permanente Sepsis Risk Calculator (KP-SRC)² as an alternative with prospective audit. KP-SRC provides recommendations for antibiotics, culture with observation or observation only. Previous studies³, including from our group⁴, demonstrated significant reductions (up to 84%) in antibiotic usage on virtual application of KP-SRC compared to NICE 2012. No studies examining the impact of NICE 2021, or its effect in conjunction with KP-SRC, have yet been published.

We performed a retrospective application of NICE 2021 using data collected from 11 neonatal units in the West Midlands, UK. We included all infants born ≥ 34 weeks' gestation between 1 January 2020 and 29 February 2020, not directly admitted to NNU, commenced on antibiotics following NICE 2012. KP-SRC was also retrospectively applied (EOS incidence rate 2/1000; regional rates vary from 0.7-1.3/1000).

Figure 1: Retrospective virtual application of NICE Guidelines for Neonatal Infection 2021, compared to KP-SRC and previous NICE Guidelines 2012

Data from 626 infants was collected and 572 were included for analysis (Figure 1). NICE 2012 recommended antibiotics in 95.5% (of the 626), therefore 4.5% may have had unnecessary treatment. NICE 2021 reduced antibiotic usage by 39.5% compared to appropriate application of NICE 2012. When KP-SRC was additionally applied there was an overall reduction from NICE 2012 of 82%. If those recommended cultures by KP-SRC also received antibiotics, as recommended by regional guidelines, the overall reduction from NICE 2012 would be 63.5%.

Table 1: Estimated percentages of live births >34 weeks receiving antibiotics in postnatal settings, following virtual application of NICE 2021 guidelines and KP-SRC.

	Live births Total Jan- Feb 2020	Current practice Abx	NICE 2012 Applied*	KP-SRC 2/1000 Abx indicated plus NICE 2012*	KP-SRC 2/1000 Abx and Culture indicated plus NICE 2012*	NICE 2021*	KP-SRC 2/1000 Abx indicated plus NICE 2021*	KP-SRC 2/1000 Abx and Culture indicated plus NICE 2021*
n	7833	624	572	118	306	346	103	209
%		8.0	7.3	1.5	3.9	4.4	1.3	2.7

*Analysis of 599 infants with complete data

Abx: Antibiotics

NICE 2012: Neonatal infection (early onset): antibiotics for prevention and treatment, Clinical guideline [CG149] 2012

KP-SRC: Kaiser Permanente Sepsis Risk Calculator

NICE 2021: Neonatal infection: antibiotics for prevention and treatment NICE guideline [NG195] 2021

At baseline, 7.3% of live births >34 weeks in postnatal settings were recommended antibiotics using NICE 2012 (Table 1). NICE 2021 may reduce this to 4.4% and KP-SRC may reduce it to 2.7%, treating those recommended both culture and antibiotics.

Three infants had a positive blood culture (0.5%), all were recommended antibiotics using both NICE 2012 and 2021. One had Group B Streptococcus bacteraemia (CRP 28), KP-SRC recommended antibiotics. Two infants had Escherichia coli bacteraemia; both were pyrexial. One with CRP 88, KP-SRC recommended culture and one with CRP 37 KP-SRC recommended observations. As symptomatic, it is likely that these infants would receive antibiotics under whichever system used. All cerebrospinal fluid cultures were negative. No infants received mechanical ventilation or inotropes, and there were no deaths.

Of the 26 (4.5%) infants with CRP>60, NICE 2021 recommended antibiotics in 18 and KP-SRC recommended antibiotics in 9, culture in 11 and observations in the rest (6).

We conclude that NICE 2021 may reduce antibiotic exposure in infants on the postnatal ward by up to 39.5%. Subsequent implementation of KP-SRC to those infants could reduce antibiotic exposure by up to 63.5%–82%. In clinical practice,, some infants on KP-SRC observations may later become symptomatic needing treatment and therefore the reduction may be slightly less. A prospective audit with KP-SRC as recommended by NICE would be beneficial in reviewing the safety and efficacy of KP-SRC.

Word count: 500 words

Acknowledgements:

We would like to acknowledge the input of all the units in the West Midlands operational network who took part in the data collection and all of our PRAM collaborators. Specific mention goes to PRAM lead Helen Mcdermott for her support and guidance and to Megha Jagga for her input in the beginning of the project.

The authors have no competing interests to declare and received no funding.

References

1) National Institute for Health Care Excellence (NICE). Neonatal infection: antibiotics for prevention and treatment. NICE guideline [NG195]. Published: 20 April 2021. Available from: <https://www.nice.org.uk/guidance/ng195>.

2) Kuzniewicz MW , Puopolo KM , Fischer A , et al . A quantitative, Risk-Based approach to the management of neonatal early-onset sepsis. JAMA Pediatr 2017;171:365–71.doi:10.1001/jamapediatrics.2016.4678
pmid:<http://www.ncbi.nlm.nih.gov/pubmed/28241253>

3) Goel N , Shrestha S , Smith R , et al . Screening for early onset neonatal sepsis: NICE guidance-based practice versus projected application of the Kaiser Permanente sepsis risk calculator in the UK population. Arch Dis Child Fetal Neonatal Ed 2020;105:118–22.doi:10.1136/archdischild-2018-316777
pmid:<http://www.ncbi.nlm.nih.gov/pubmed/31296696>

1
2
3 4) Van Hasselt TJ, McDermott H, Surana P, et al Impact of neonatal sepsis
4 calculator in West Midlands (UK), Archives of Disease in Childhood - Fetal and
5 Neonatal Edition Published Online First: 08 December 2020. doi:
6 10.1136/archdischild-2
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Confidential: For Review Only

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

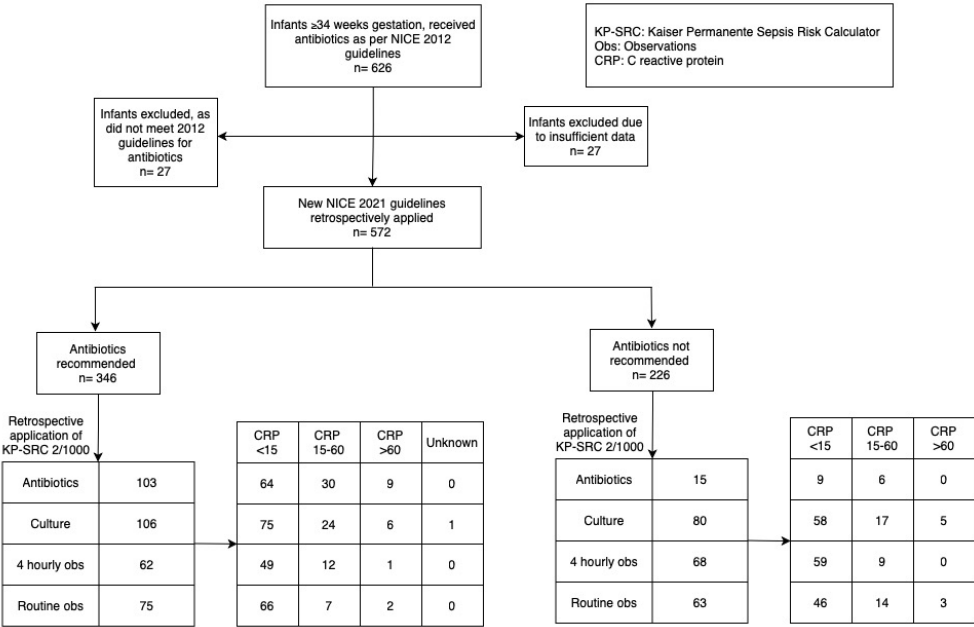


Figure 1: Retrospective virtual application of NICE Guidelines for Neonatal Infection 2021, compared to KP-SRC and previous NICE Guidelines 2012

343x221mm (72 x 72 DPI)