
NeoIPC

The role and potential of surveillance in preventing hospital-acquired infections among newborns

NeoIPC Clinical Practice Network Webinar, 23rd November 2023

Panellists:

Aikaterini (Katerina) Mougkou

Expert in Antimicrobial Resistance and Healthcare-Associated Infections, European Centre for Disease Prevention and Control (ECDC).

Katerina is a paediatrician with experience in clinical paediatric infectious diseases, infection prevention and control and healthcare-associated infections. Since 2020, she has been working at the European Centre for Disease Prevention and Control (ECDC) in the Disease Programme for antimicrobial resistance and healthcare associated infections (ARHAI). She received her medical degree from the University of Crete in Greece and a Diploma in Paediatric Infectious Diseases from the University of Oxford in England. She has worked in the paediatric infectious diseases departments at Athens Children's Hospital in Greece and Karolinska University Hospital in Sweden.

José Ignacio Pijoan Zubizarreta

Clinical Epidemiology Unit, Cruces University Hospital; Group Coordinator of Epidemiology and Public Health (CIB, Biocruces Bizkaia Health Research Institute), Basque Health Service (Osakidetza), Barakaldo, Spain.

José Ignacio Pijoan Zubizarreta is a Medical Doctor, currently working at Cruces University Hospital, in the Clinical Epidemiology Unit. He is a member of the Spanish team for the NeoIPC project, mostly focusing on Surveillance (under Work Package 5 - MEASURE). He is trained in Internal Medicine and has experience as a clinician. He also holds a Master of Science in Clinical Epidemiology and has experience as a clinical epidemiologist.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 965328.
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Panellists:

Christina Obiero

Researcher, KEMRI – Wellcome Trust Research Programme, Kilifi, Kenya.

Dr Christina Obiero is a medical doctor specialising in research and care of vulnerable young children and Public Health. Christina has worked at the Kenya Medical Research Institute – Wellcome Trust Research Programme since 2014 where she has led and co-led several research projects investigating the aetiology, diagnosis and treatment of serious infection in young children in resource-limited settings. Christina holds a Bachelor of Medicine and Surgery degree from the University of Nairobi and a Master of Public Health degree from the Bloomberg School of Public Health at the Johns Hopkins University. She recently defended her PhD in Medicine at the University of Amsterdam. She is an International Society for Infectious Diseases (ISID) Emerging Leader in Infectious Diseases and a member of the Delta Omega Alpha Chapter at the Bloomberg School of Public Health.

Brar Piening

Senior Physician, Institute of Hygiene and Environmental Medicine, Charité – Universitätsmedizin Berlin, Germany.

Brar is a Senior infection prevention and control doctor at Charité's Institute for Hygiene and Environmental Medicine in Berlin (Germany), which is also nominated as Germany's National Reference Centre for Surveillance of Nosocomial Infections since 1997. He has extensive experience in surveillance, and has been working on infection prevention and control and surveillance in neonates for over 20 years. He is the Scientific coordinator of the German surveillance system for high-risk neonates, and coordinates NeoIPC's WP5 - MEASURE, which is developing and evolving the NeoIPC surveillance toolkit.

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European Centre for Disease Prevention and Control

Why surveillance is important

Aikaterini Mougkou, ECDC Expert Antimicrobial Resistance and Healthcare-Associated Infections

Webinar: The role and potential of surveillance in the prevention of infections in NICU, 23 November 2023

Overview

- What is surveillance
- Why surveillance is useful
- Types of surveillance
- What to consider before starting surveillance
- ECDC's surveillance networks
- Why surveillance of healthcare-associated infections is important in neonatal units

Definition

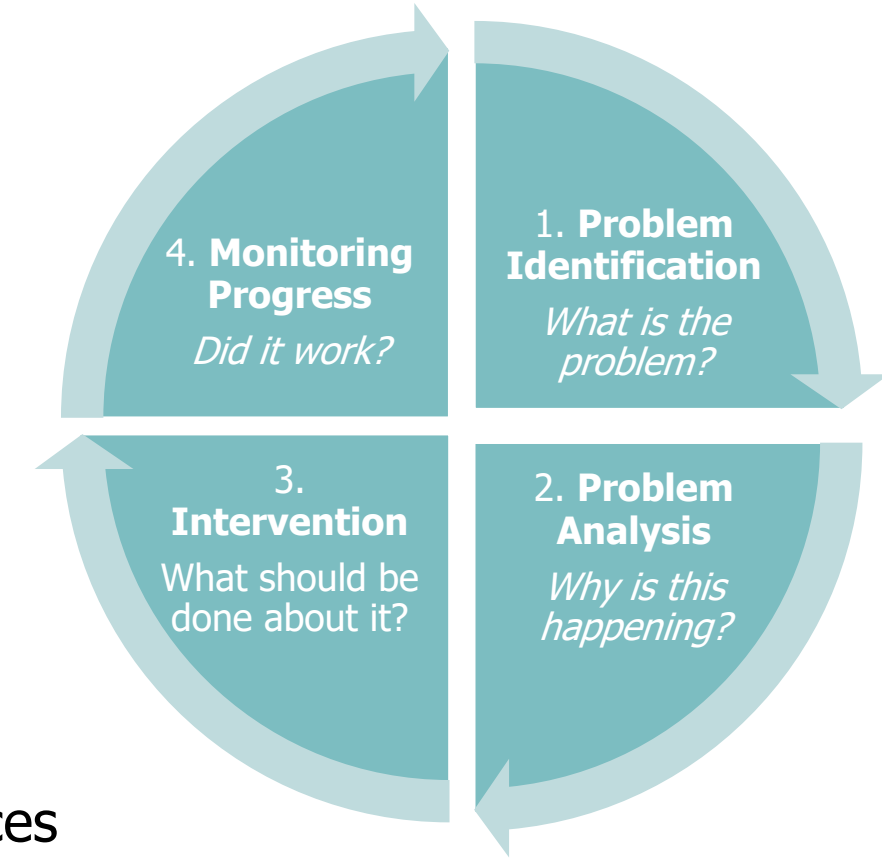
Surveillance

Systematic ongoing collection, collation and analysis of data for public health purposes and the timely dissemination of public health information for assessment and public health response as necessary.

Source: International Health Regulations, WHO, 2005.

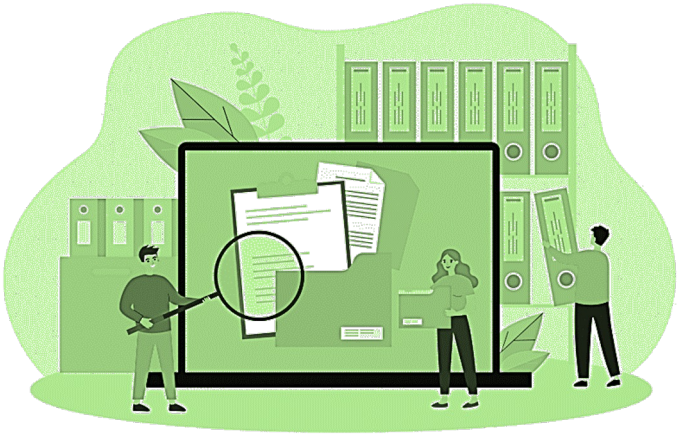
Why is surveillance necessary?

- To describe the epidemiology
- Monitor trends
- Assess impact of interventions
- Guide antimicrobial treatment
- Identify new pathogens or resistance mechanisms
- Detect outbreaks
- Monitor compliance with hospital policies and practices



Types of surveillance

- Active/passive
- Country-wide/sentinel facilities
- Hospital-wide/unit specific
- Syndromic (clinical)/diagnosis-based (laboratory-confirmed)
- Mandatory/voluntary
- Manual/automated
- Local/National/International/Network



What can we measure related to infection prevention and control (IPC)?

- Healthcare-associated Infections (HAIs)
  - Bloodstream infections
  - Pneumonia
  - Urinary tract infections
  - Surgical site infections
  - Device-associated infections
- Antimicrobial resistance (AMR)
- Antimicrobial consumption (AMC)
- Hand hygiene compliance (HHC)
- Consumption of alcohol-based handrub (ABHR)
- Adherence to IPC practices (e.g. central line insertion practices)

The most frequent healthcare-related adverse effect worldwide
Hundreds of millions of patients affected each year
Linked to increased mortality, long-term disability, prolonged hospital stays with increased costs
Up to one in two of certain types of HAIs are preventable

Source: WHO, 2023. https://www.who.int/news-room/feature-stories/detail/the-burden-of-health-care-associated-infection-worldwide; Schreiber PW et al. Infect Contril Hosp Epidemiol. 2018; 39: 1277-1295.

Before beginning surveillance, consider…

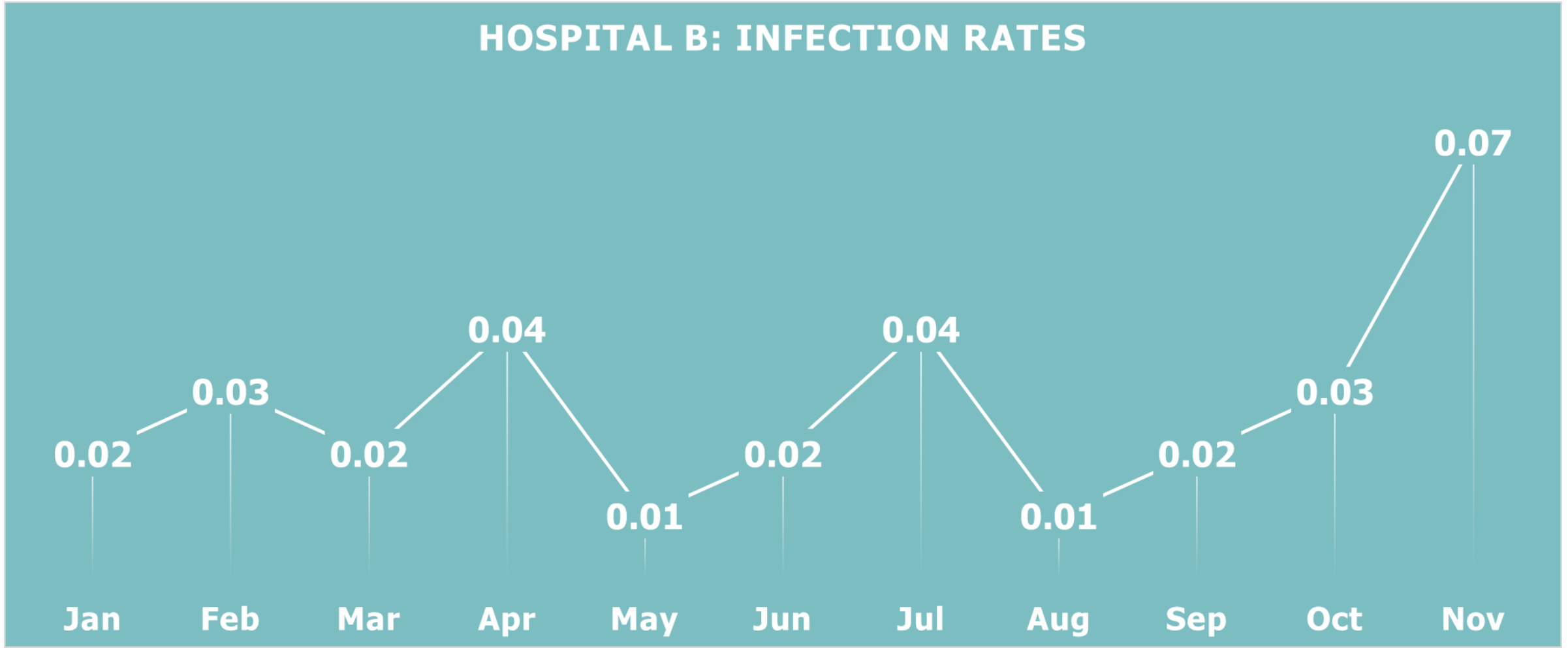
- Type of indicator to monitor
- Type of healthcare setting
- Data sources (patient records, laboratory, hospital pharmacy, etc) and collection method
- Feasibility of data collection (numerators, denominators)
- Case definitions (clinical/surveillance)
- Laboratory and information technology infrastructure
- Availability of resources (human and financial)
- Feedback and communication of results
- Evaluation of the surveillance programme

Why is surveillance important?

No data
No infections

If you cannot measure it,
you cannot improve it

Scenario



Infection Rate: Number of infections / Number of patients

ECDC Surveillance

ECDC's surveillance networks

- European Antimicrobial Resistance Surveillance Network (EARS-Net)
- European Antimicrobial Resistance Genes Surveillance Network (EURGen-Net)
- European Surveillance of Antimicrobial Consumption Network (ESAC-Net)
- Healthcare-Associated Infections Surveillance Network (HAI-Net)
  - HAIs in acute care hospitals
  - HAIs acquired in ICUs
  - Surgical site infections

Source: ECDC, 2023. https://www.ecdc.europa.eu/en/healthcare-associated-infections

European Centre for Disease Prevention and Control
An agency of the European Union

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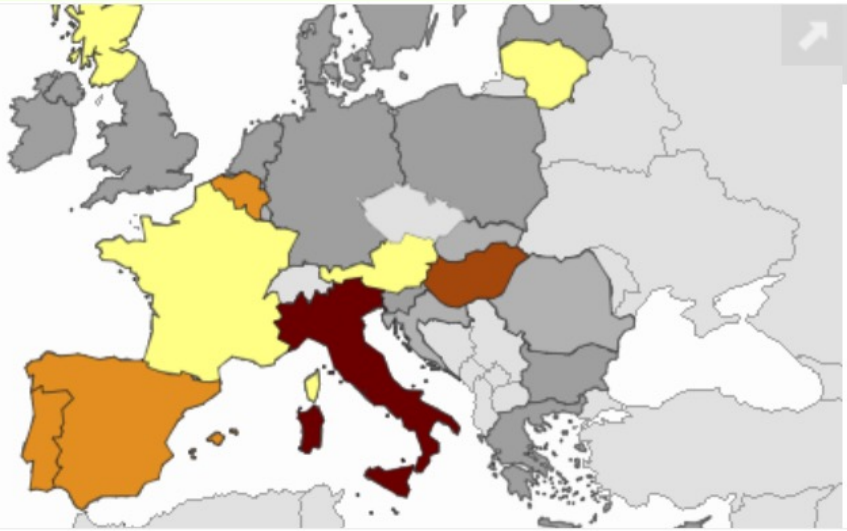
Infectious disease topics | Data | Analysis and guidance | Training and tools | About ECDC

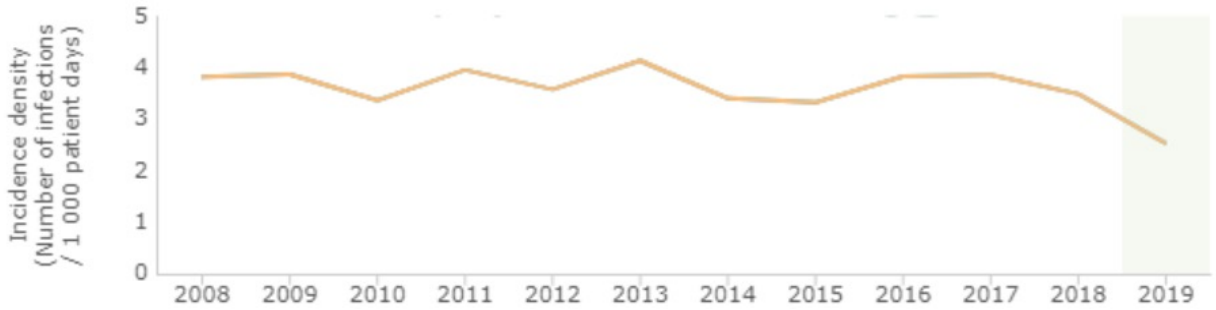
Surveillance Atlas of Infectious Diseases

Healthcare-associated infections in intensive care units | ICU-acquired infections | Bloodstream infections

Incidence density | 2019

Region	Incidence density (Number of infections / 1 000 patient days)
EU/EEA	2.5
EU	2.5
Austria	1.7
Belgium	3.4
Croatia	.
Estonia	.
France	1.4
Hungary	4.3
Italy	4.8





https://atlas.ecdc.europa.eu/public/index.aspx

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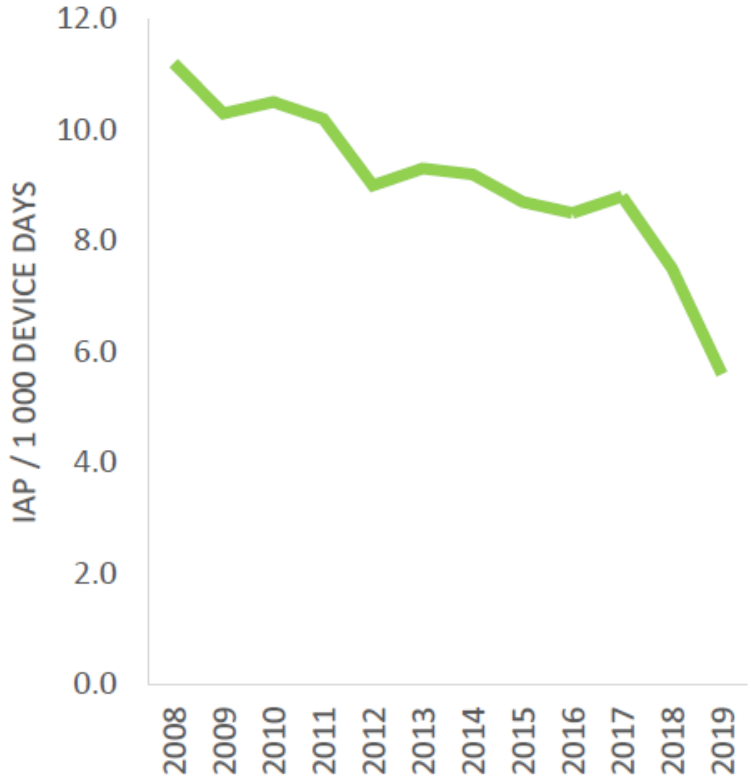
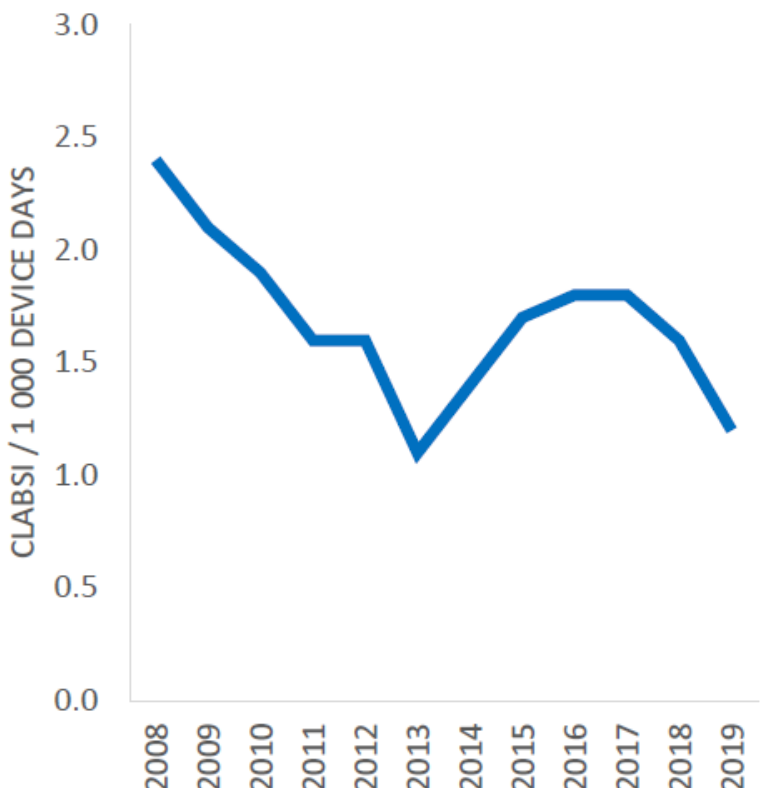
Incidence trend of intubation-associated pneumonia and central line-associated bloodstream infections*, 2008-2019

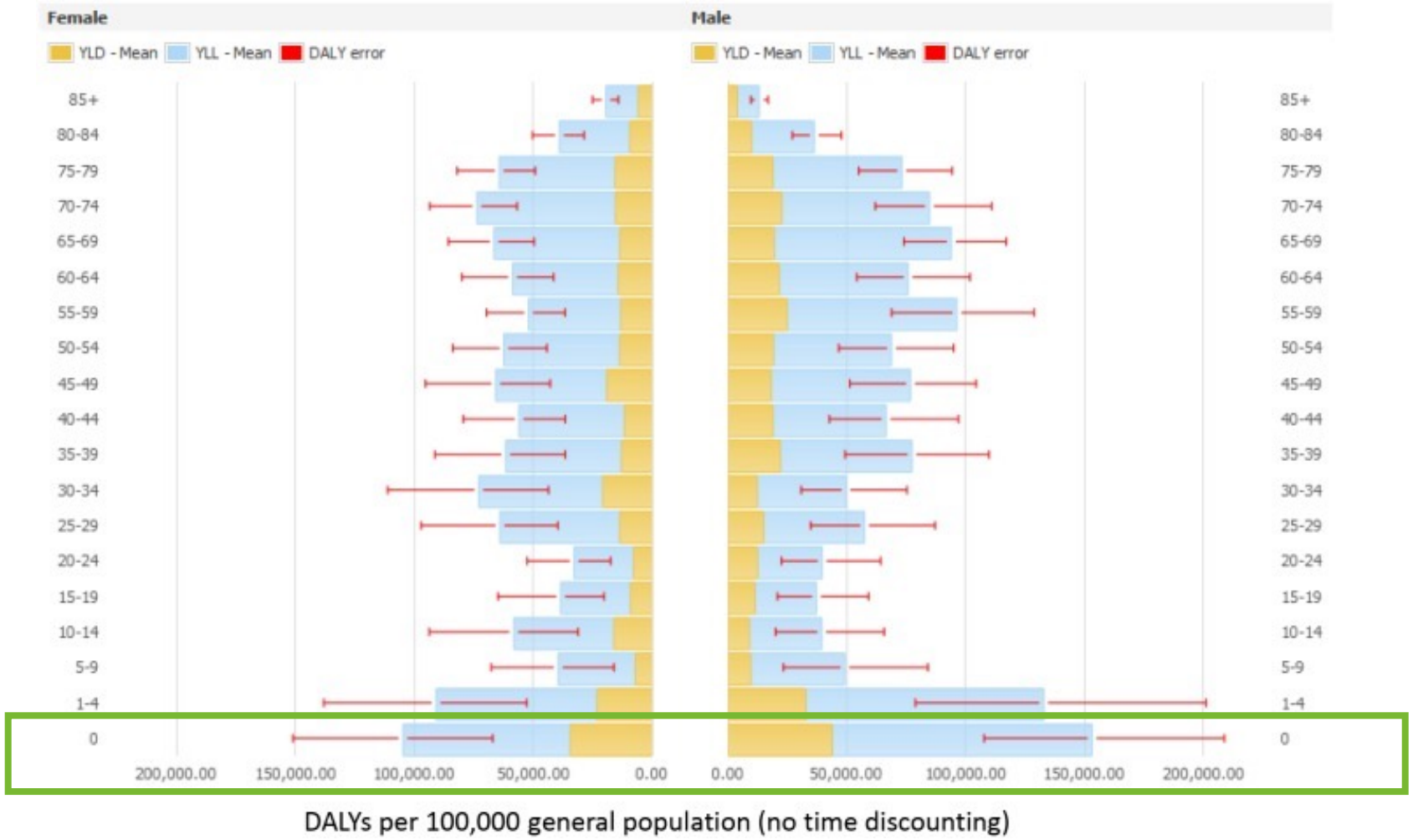




*Countries/networks with uninterrupted participation since 2008: Belgium, France, Italy/SPIN-UTI, Lithuania, Portugal and Spain.

Source: ECDC. Annual Epidemiological Report for 2019 – Healthcare-associated infections acquired in intensive care units. Stockholm: ECDC; 2023.

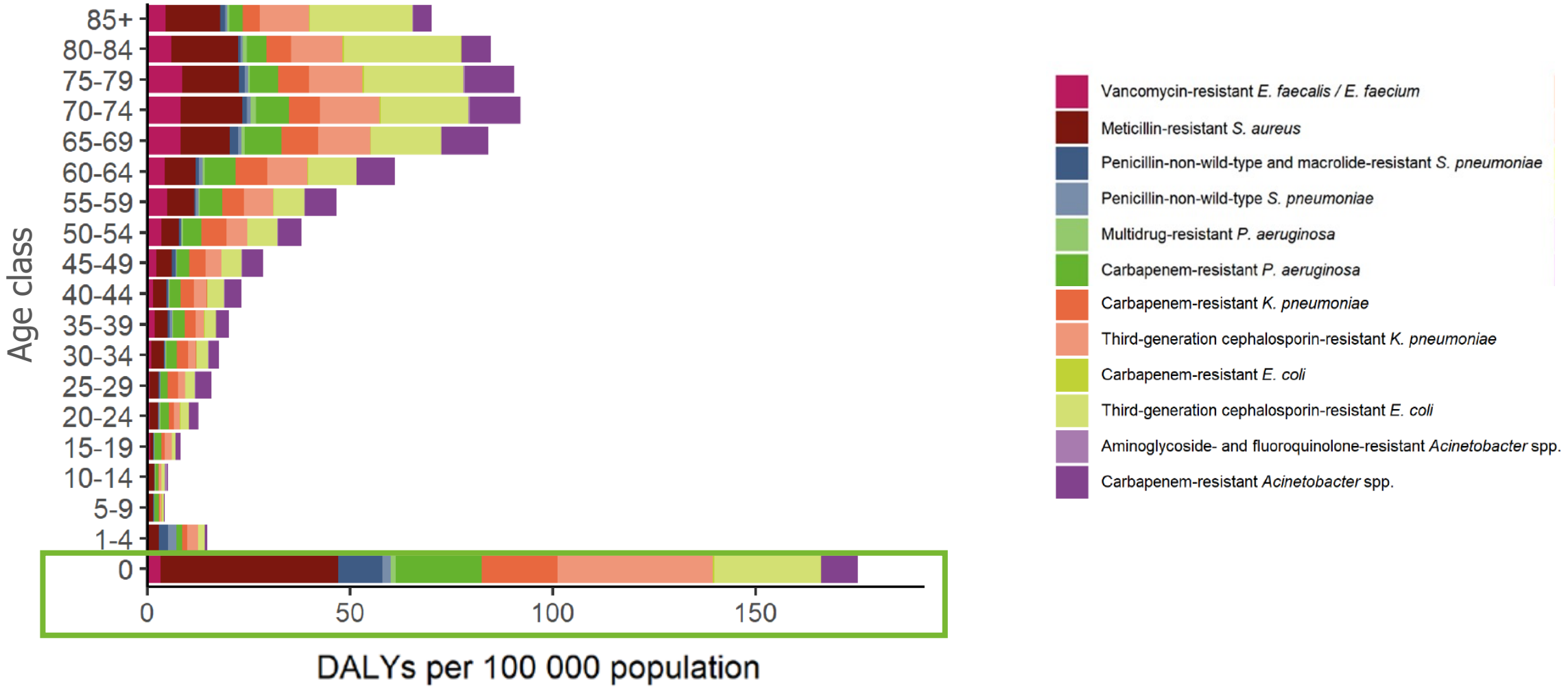
Burden of six healthcare-associated infections on European population health: estimating incidence-based disability-adjusted life years through a population prevalence-based modelling study



DALYs, disability-adjusted life years;
YLDs, years lived with disabilities;
YLLs, years of life lost.

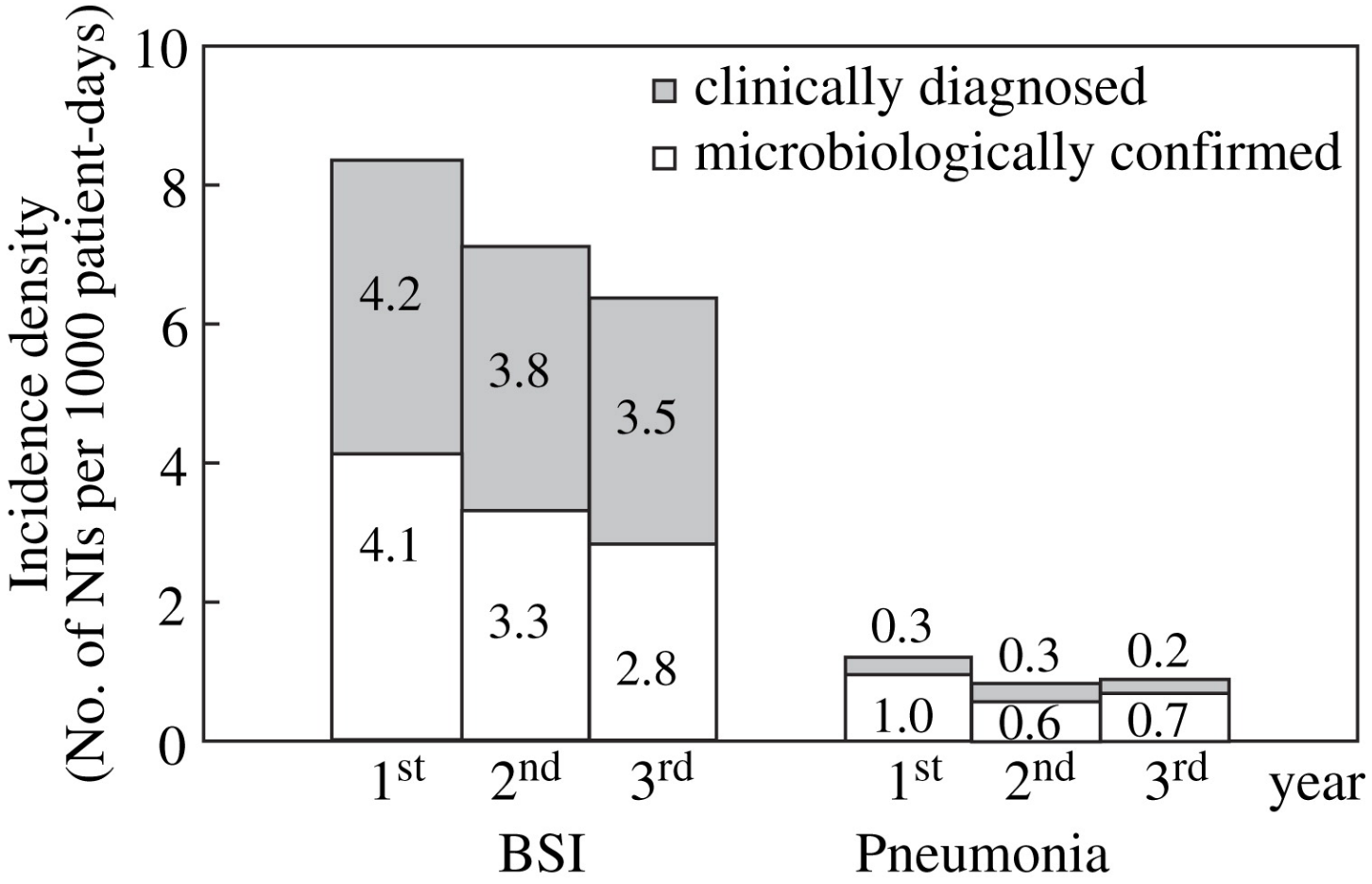
Source: Cassini A, et al. PLoS Med. 2016; 13(10): e1002150.

Estimated average burden of infections expressed in disability-adjusted life years (DALYs) per 100 000 population, by age group and antibiotic-resistant bacterium



Source: ECDC. Assessing the health burden of infections with antibiotic-resistant bacteria in the EU/EEA, 2016-2020. Stockholm: ECDC; 2022.

Reducing neonatal nosocomial bloodstream infections through participation in a national surveillance system



Source: Schwab F, et al. J Hosp Infect. 2007; 65(4): 319-25.

Children are not small adults

…and neonates are even more different

- Immaturity of neonatal immune response leading to increased susceptibility to pathogens
- Increased and long-lasting use of invasive medical devices
- Prolonged hospital stay of low-birth-weight infants
- Non-specific clinical manifestations of infection result in low threshold to initiate empirical antimicrobial treatment
- Type of HAIs, risk factors and IPC practices differ in the neonatal units

Show me the DATA

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EUROPEAN ANTIBIOTIC AWARENESS DAY
A EUROPEAN HEALTH INITIATIVE

Antimicrobial resistance targets: how can we reach them by 2030?

18 NOVEMBER 2023

Join the #EAAD talks on social media

https://antibiotic.ecdc.europa.eu/en/european-antibiotic-awareness-day-eaad-2023

Thank you

Surveillance in one Spanish (high-income country) NICU: at the crossroads of research, quality assessment and routine care

CPN Webinar

23rd NOVEMBER 2023

NeoIPC

Loureiro B[1,2], Pérez J[2],Pijoan JI[2,3] on behalf of the NeoKissEs-INBERBAC-Neo teams

[1]NICU, Cruces University Hospital, [2]Biobizkaia Health Research Institute, [3]Clinical Epidemiology Unit-Cruces University Hospital.

"Una manera de hacer Europa"

CRUCES UNIVERSITY HOSPITAL

Built in 1955 (in the middle of nowhere)

Current aspect (in the middle of a very populated neighbourhood, full of cars)

- Third-level, University Hospital, catchment population around 300,000 inhabitants
- 814 beds, three intensive care units, 33 surgery theatres
- Regional reference centre for transplantations, Large and Critical Burn Unit, specific cancer surgeries, cystic fibrosis, paediatric cancer, rare diseases, etc.
- Since 2014 has an officially accredited Health Research Institute attached

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NEONATAL UNIT

Level III-C unit (highest level in Spain): 12 NICU cots (38 overall), 13 neonatologists, 42 neonatal nurses (+1 supervisor & 1 clinical nurse) and 27 nursing auxiliaries

Referral centre for The Basque Country for heart surgery and some specific surgeries. ECMO available. Around 4,000 births per year, 350 neonates admitted and some 50 VLBW infants (some of them transferred from other neonatal units)

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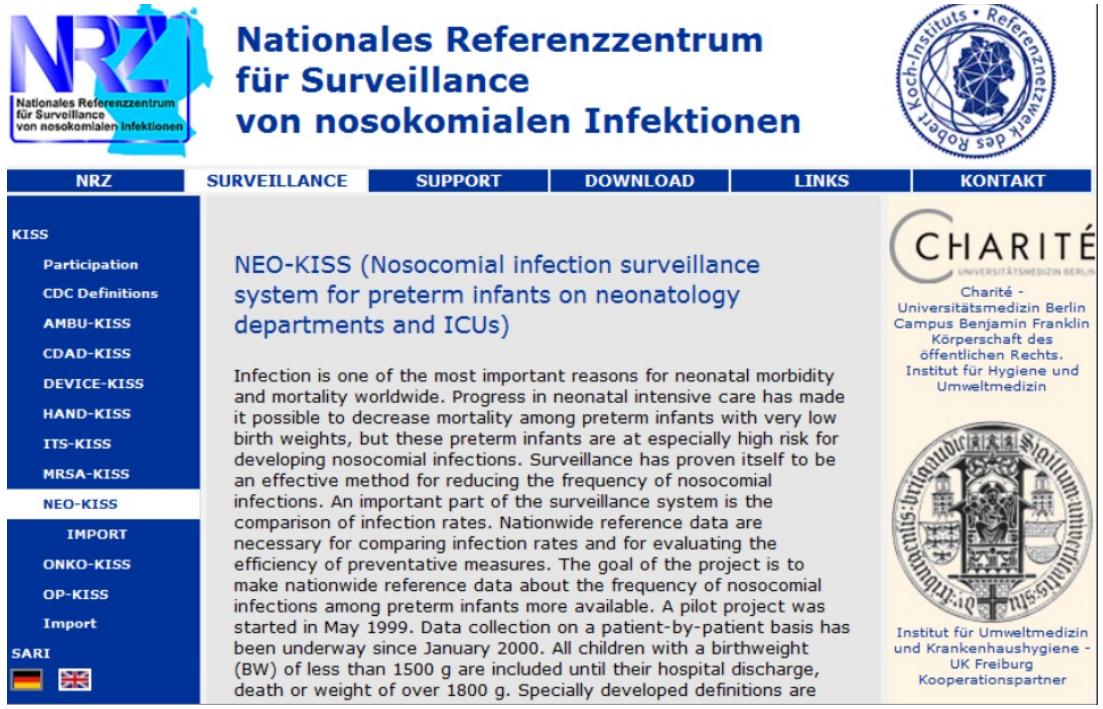

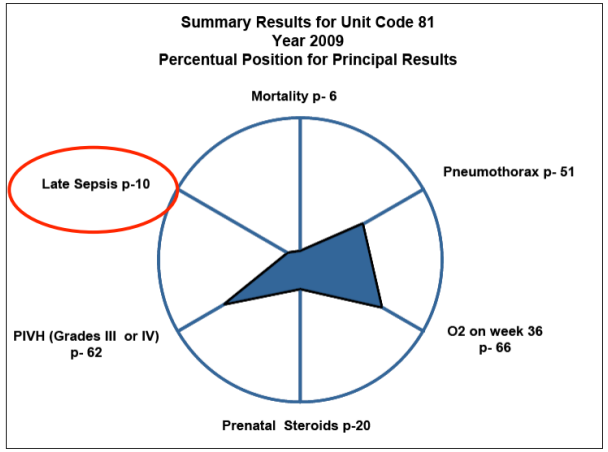

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NeoReviews™
AN OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF THE PEDIATRICS

International Perspectives: Preventing Sepsis in VLBW Infants: Experience from Neonatal Networks and Voluntary Surveillance Systems
Adolf Valls-i-Soler, Marisela Madrid, Christine Geffers and Helmut D. Hummler
Neoreviews 2010;11;e403
DOI: 10.1542/neo.11-8-e403

- Data collected in EuroNeoNet NICUs since 2013 in
  - Germany
  - Belgium
  - Spain
  - …

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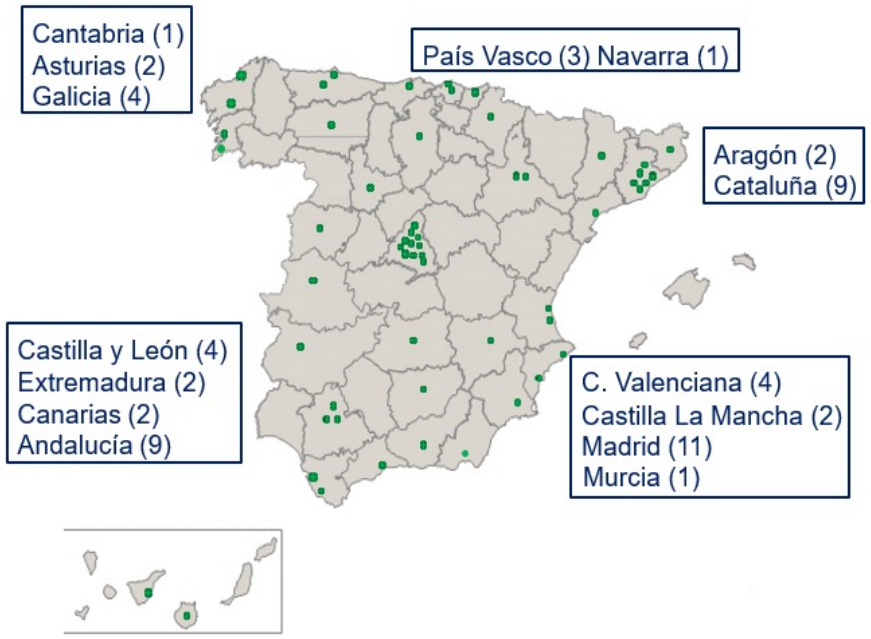
NeoKissEs SURVEILLANCE SYSTEM

Year	2015	2016	2017	2018	2019	2020	2021	2022
N. of hospitals	46	46	46	46	47	50	51	55

Number of hospitals recruited per year by NeoKissEs
(in 2023 two new hospitals; 81% III level units)



Geographical distribution of NeoKissEs NICUs

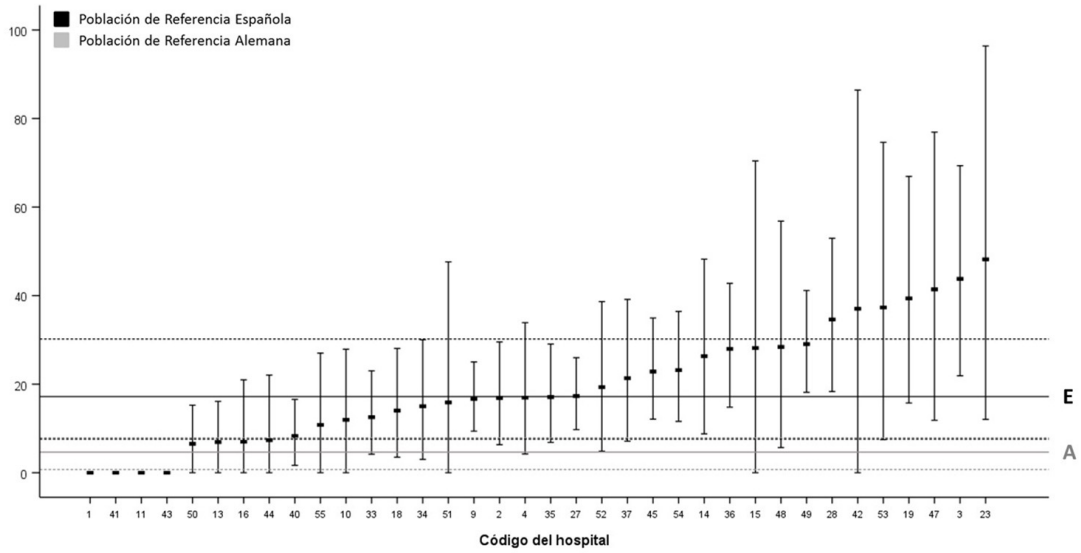
Cover page of the annual NeoKissEs report

Informe Comparativo
Indicadores del Sistema de Vigilancia de la Sepsis Nosocomial
NeoKissEs y de la intervención *INBERBAC-Neo*

Evaluación de la efectividad de un sistema de vigilancia sobre las tasas de infección nosocomial en recién nacidos de muy bajo peso (PI13/00587).

Evaluación de una intervención basada en la evidencia para reducir la bacteriemia asociada a catéter vascular central en recién nacidos de muy bajo peso (PI17/00565).

Periodo de Análisis
1 enero- 31 diciembre de 2022



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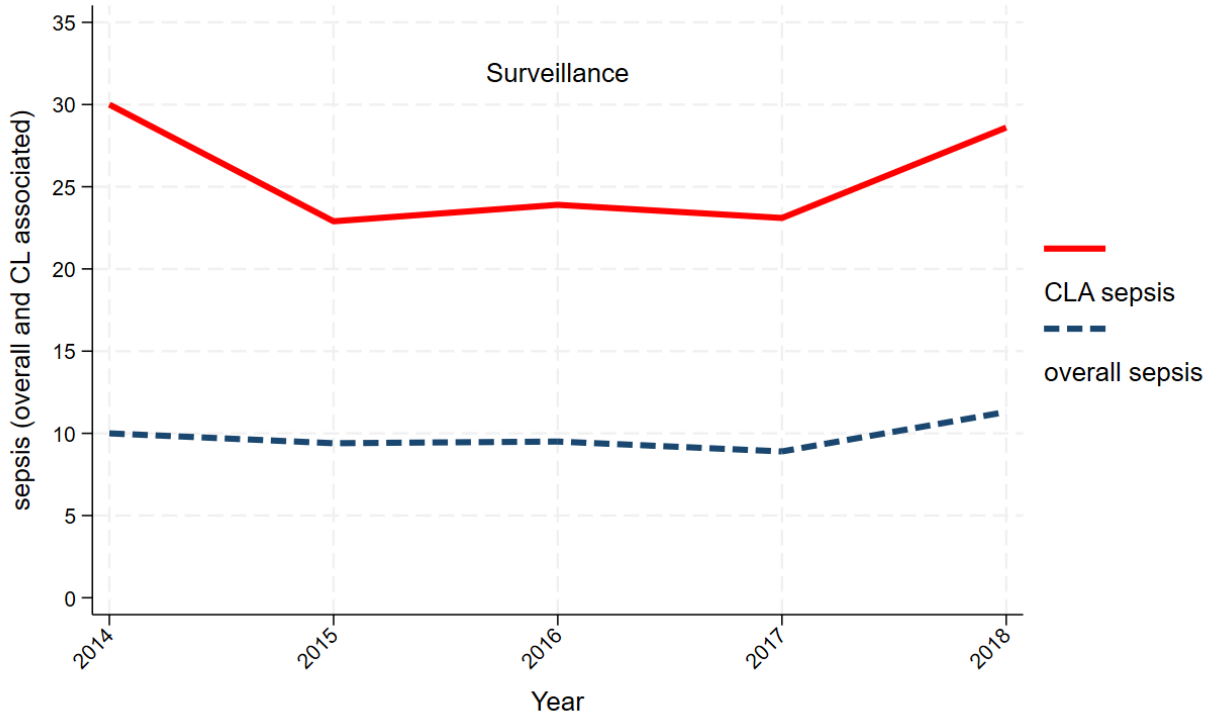

Surveillance: high sepsis rates ➔ corrective actions

Action 1 (hospital & unit managers)

Detection of colonized neonates
Neonatal Unit and NICU (Cruces University Hospital, 2018)

Objectives
1) Early detect and isolate patinets colinized by multi-resistant bacteria
2) Prevent cross-transmission of multi-resistant bacteria in the Neonatal unit and NICU

Microorganisms to be isolated

Gram-positive bacteria
1) Methicillin resistant *Staphylococcus aureus*
2) Vancomycin resistant *Enterococcus spp*

Gram-negative bacteria
3) Extended spectrum betalactamase producing *Enterobacteria*
4) Carbapenemases producing *Enterobacteria*
5) Multiresistant Pseudomonas aeruginosa
6) Multiresistant Acinetobacter baumanii
7) Serratia marcescens
8) Pseudomonas aeruginosa and Stenotrophomonas

Weekly sampling (Wednesdays before 10AM)
1) Nasal swabs
2) Pharyngeal swabs
3) Rectal swabs

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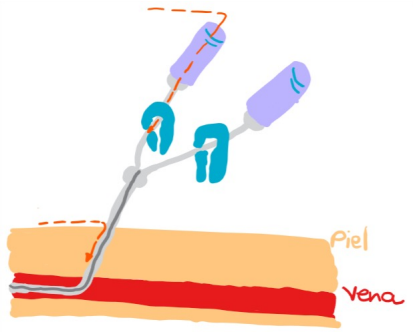
Evidence-Based Bundle for Bloodstream Infections in Neonatal Intensive Care Units

NeoIPC

1. Adequate hand washing.
2. Cleaning the skin with chlorhexidine.
3. Using full-barrier precautions during the insertion of central venous catheters.
4. Removing unnecessary catheters.
5. Hygienic handling of catheters.

STRUCTURE OF INBERBAC-NEO EDUCATIONAL INTERVENTION

- ✓ Introduction
- ✓ HAIs: definitions, classification
- ✓ General preventive measures for sepsis and BSI
- ✓ Hand hygiene
- ✓ Central vascular catheters (CVC): types and main features
- ✓ CVC: insertion
- ✓ CVC: maintenance and withdrawal
- ✓ Summary



Action 2: (research team)

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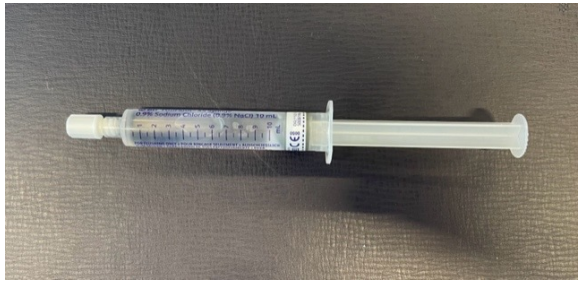
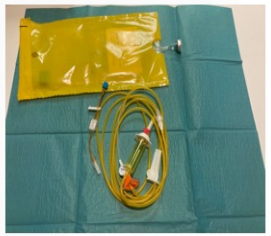
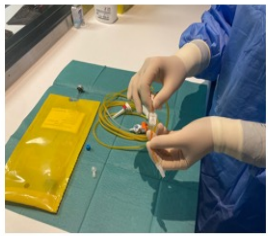
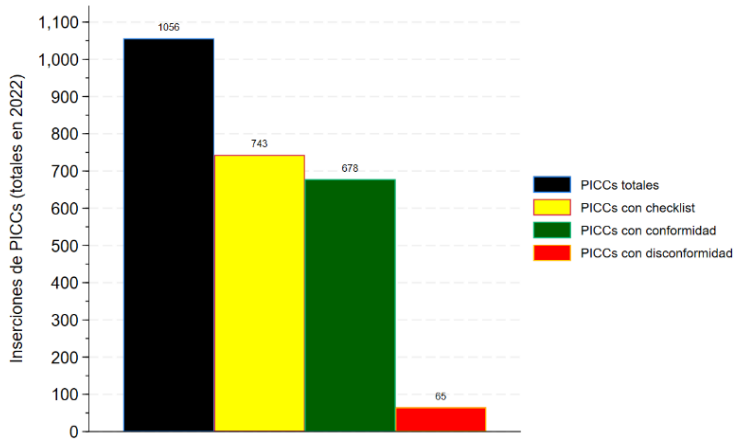
PERCEIVED BENEFITS OF SURVEILLANCE + ZERO STRATEGY

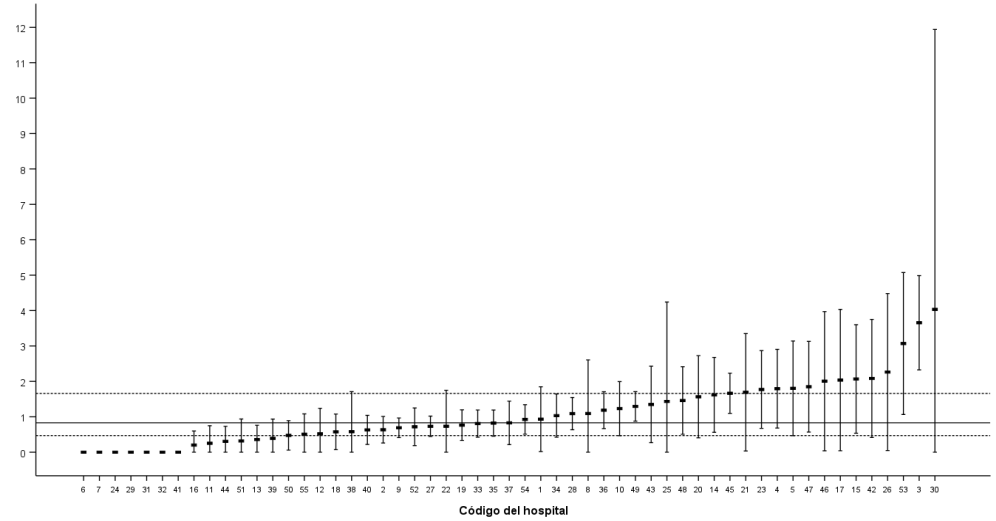
In recent years, several changes have been made to reinforce infection prevention and control in our Neonatal Unit











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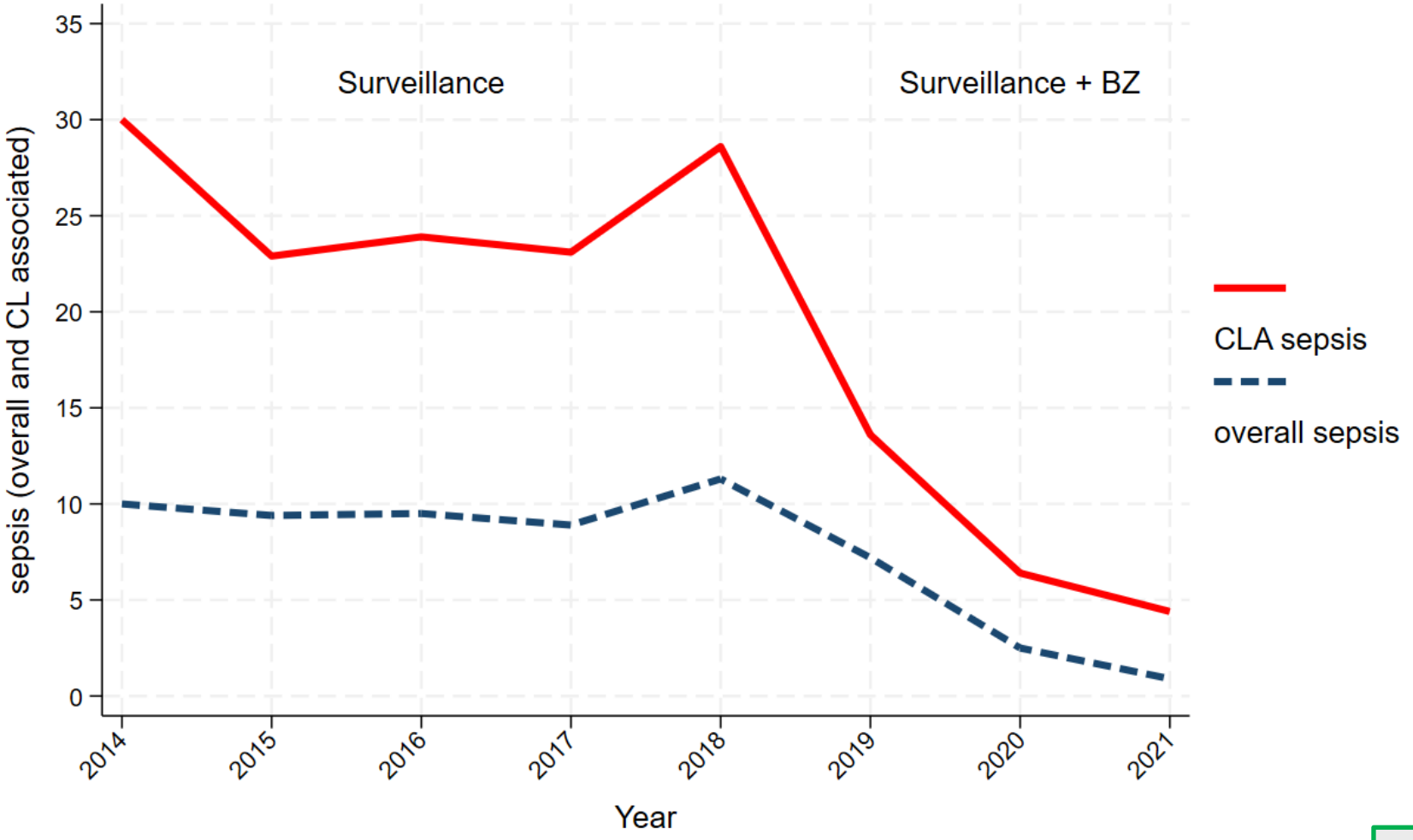

BZ: starts at the end of 2018

Calendar: days without sepsis events at the NICU

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GREAT SUCCESS BUT: PERCEIVED BARRIERS TO FULL IMPLEMENTATION

- **Lack of culture** of critical evaluation of procedures and results (learning from errors for improvement).
- **Lack of tradition** of teamwork (doctors, nurses, assistants, consultants) regarding safety as a global threat
- **Lack of recognition** of the importance of time devoted to research/QI activities.
- **Staff unstability:** especially nursing and nursing assistants (high turnover).
- **Still no routine assessment** of hand hygiene compliance
- **High workload, suboptimal infrastructure…**

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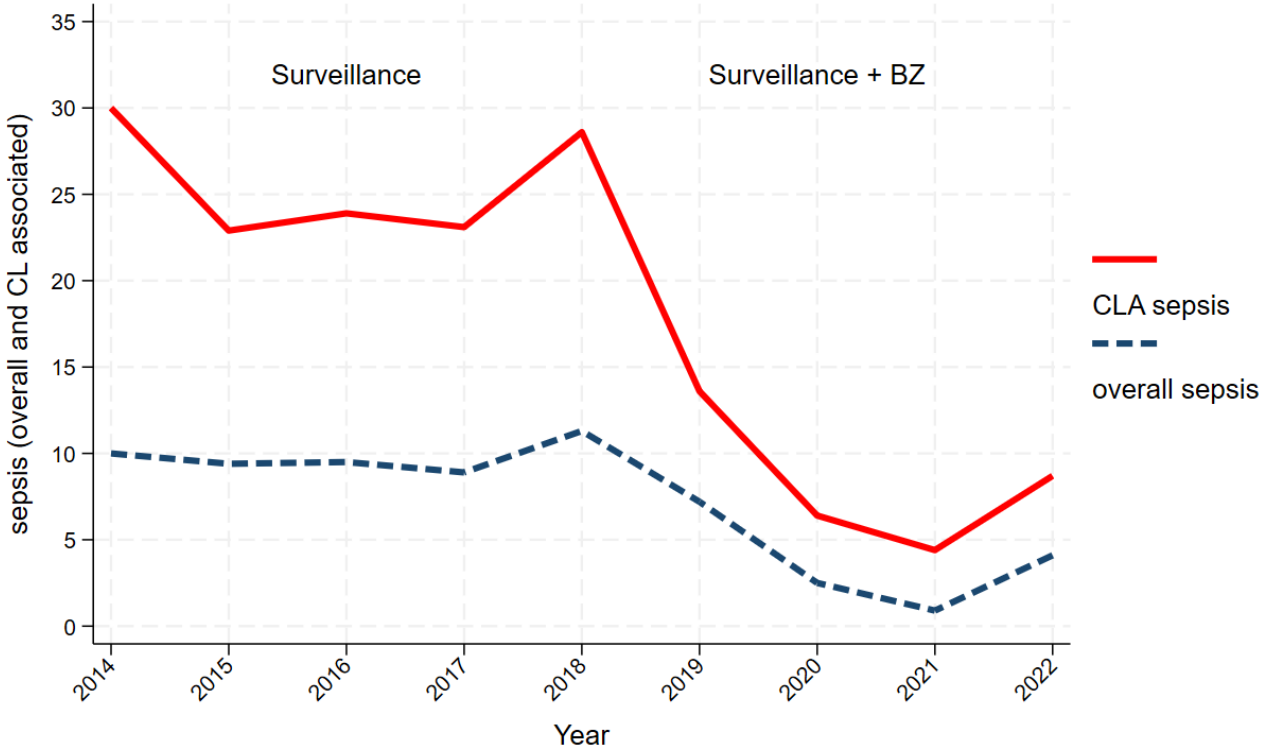
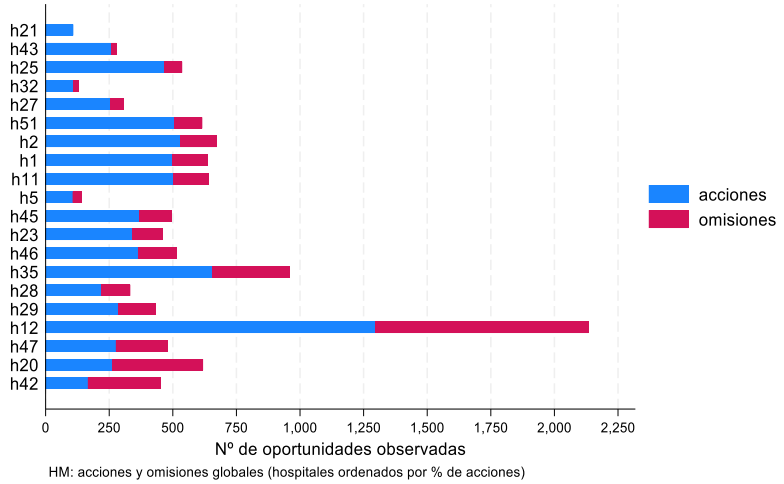


Sepsis rates are increasing in the last years



Our unit is not reporting hand hygiene compliance data

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CONCLUSIONS - REFLECTIONS

- ✓ Sepsis rates have declined in a pronounced way in the first years of the intervention.
- ✓ Increasing implementation of evidence/experience recommended practices witnessed.
- ✓ Sepsis rates are increasing in the last years, though.
- ✓ Lot of problems, barriers and difficulties still ahead:
  - Standardized hand hygiene compliance assessment and feedback and training needed.
  - Stable schedule of meetings of a fully multidisciplinary safety team at the unit (including IPC staff, Microbiology staff, etc.) should be reinforced.
  - Standardized ways of safety data and information communication and dissemination throughout the whole NICU personnel highly recommended.
  - Need to keep on relentlessly trying to improve clinical procedures and turn “failures” into opportunities for improvement.

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Martha´s mother:

"The hospital where my daughter Martha has died (13 years old, died from a sepsis episode) has confirmed me that her death has nothing to do with the insufficient resources or overstretched doctors and nurses, **BUT** with the way that hospitals work in silos and the predominant culture, dominated by hierarchy, status and overconfidence"

Wise J. *Sepsis: Why the lack of progress?*

BMJ2023:383:p2502
Doi:10.1136/bmj.p2502

Every sepsis episode in a newborn is a catastrophe. Many of them can be avoided
➔ let´s just make it happen

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Surveillance of Healthcare-acquired Infections in LMICs

Dr. Christina Obiero

NeoIPC Webinar

23rd November 2023

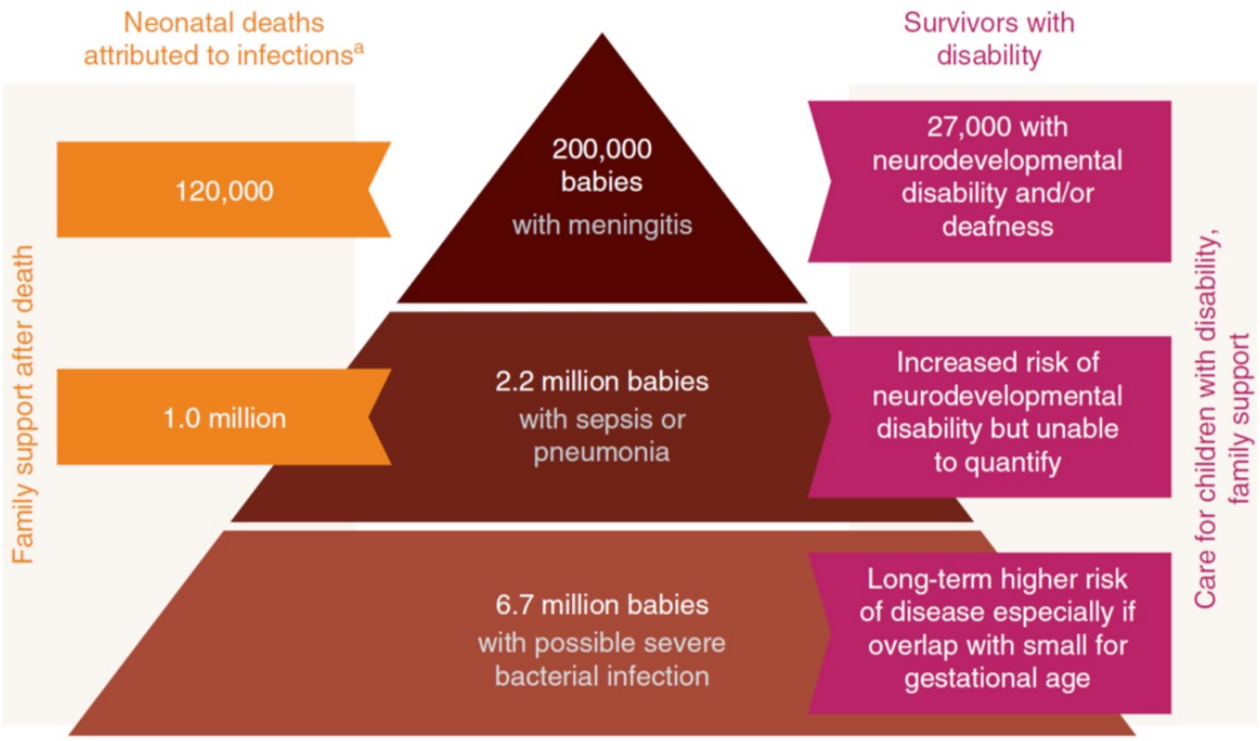
KEMRI | Wellcome Trust

Outline

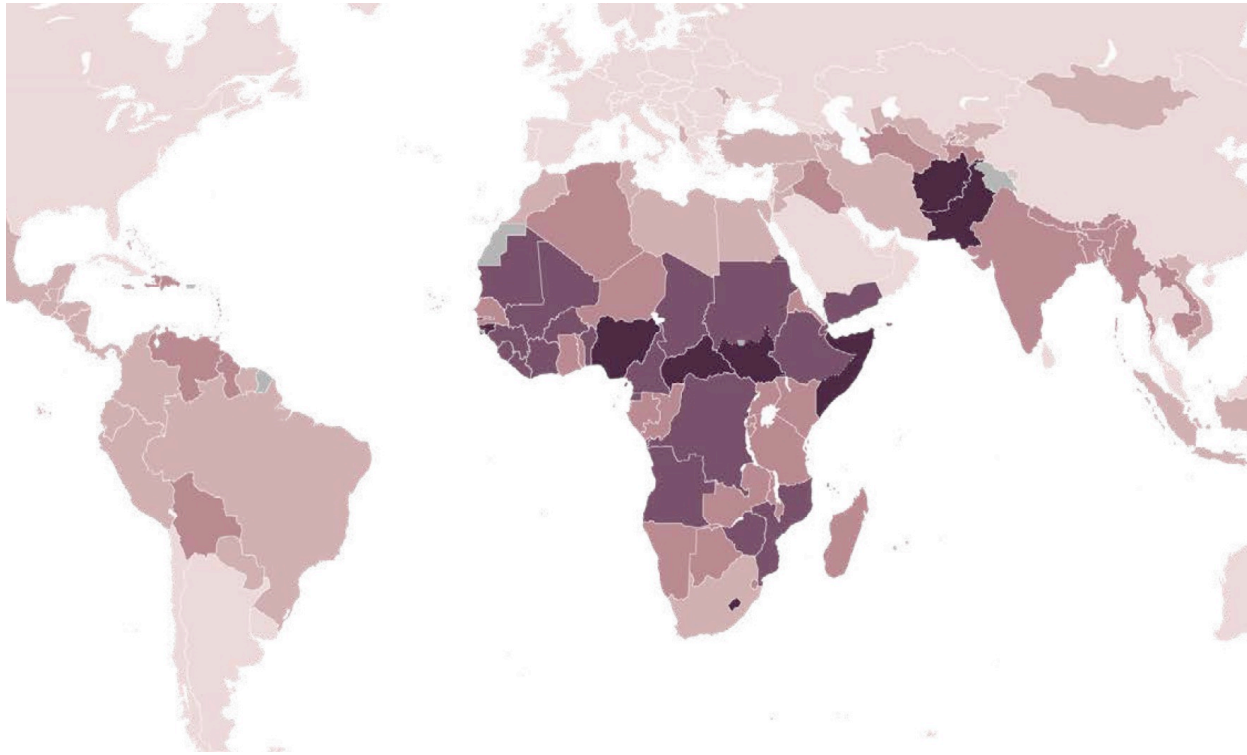
- Burden of neonatal infections in LMICs
- Role of surveillance in LMICs
- Surveillance platforms in Kenya and related research
- Planned work: SNIP-Africa

What are neonates dying from and where are most of them dying?

Summary of outcomes in terms of deaths and disability for neonates



Child mortality rate, 2020

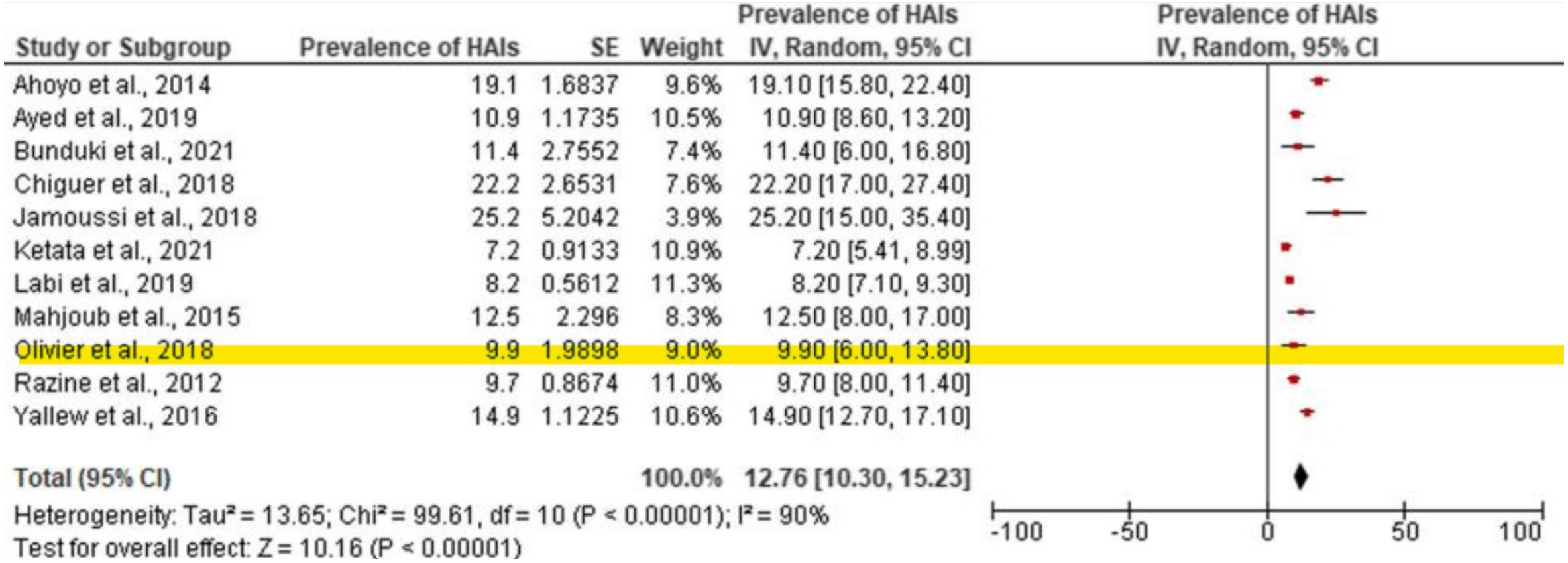


https://ourworldindata.org/child-mortality
http://ghdx.healthdata.org/gbd-results-tool

Seale, A. C., et al. (2013). "Neonatal severe bacterial infection impairment estimates in South Asia, sub-Saharan Africa, and Latin America for 2010." Pediatr Res 74 Suppl 1: 73-85
United Nations Inter-agency Group for Child Mortality Estimation (UNIGME), 'Levels & Trends in Child Mortality: Report 2021, Estimates developed by the United Nations Inter-agency Group for Child Mortality Estimation', United Nations Children's Fund, New York, 2021.

Surveillance of HAIs and AMR in LMICs

Forest plot of the prevalence of HAIs among hospitalized patients in Africa



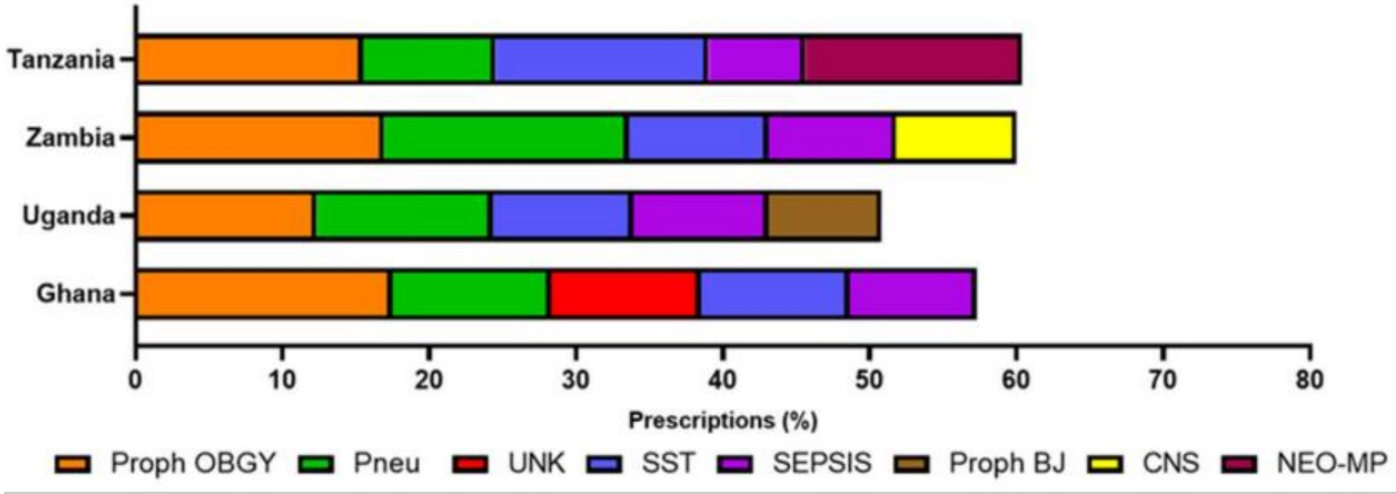
Abubakar, U., et al. (2022). "Healthcare-associated infections in Africa: a systematic review and meta-analysis of point prevalence studies." J Pharm Policy Pract 15(1): 99.

Surveillance of antibiotic use in LMICs

Types of indication for antimicrobial prescribing

	Ghana	Tanzania	Uganda	Zambia
Total Number of Prescriptions	2435	290	710	402
Therapeutic use	1344 (55.2%)	134 (46.2%)	477 (67.2%)	288 (71.6%)
Community-Acquired infection; CAI	1074 (79.9%)	89 (66.4%)	416 (87.2%)	257 (89.2%)
Healthcare-Associated Infection; HAI	270 (20.1%)	45 (33.6%)	61 (12.8%)	31 (10.8%)
Prophylactic use	805 (33.1%)	145 (50.7%)	225 (31.7%)	102 (25.4%)
Medical Prophylaxis; MP	172 (7%)	46 (16%)	50 (7%)	17 (4%)
Surgical Prophylaxis; SP	633 (26.0%)	99 (34.1%)	175 (24.6%)	85 (21.1%)
Surgical Prophylaxis One dose; SP1	42 (6.6%)	3 (3.0%)	2 (1.1%)	1 (1.1%)
Surgical Prophylaxis One day; SP2	113 (17.9%)	0 (0%)	3 (1.7%)	2 (2.3%)
Surgical Prophylaxis > 1 day; SP3	478 (75.5%)	96 (97.0%)	170 (97.1%)	83 (96.5%)
Other (OTH)	19 (0.7%)	1 (0.3%)	1 (0.1%)	8 (2%)
Unknown (UNK)	267 (11%)	10 (3%)	7 (1%)	4 (1%)

Most common reason for prescribing antimicrobials across 17 hospitals



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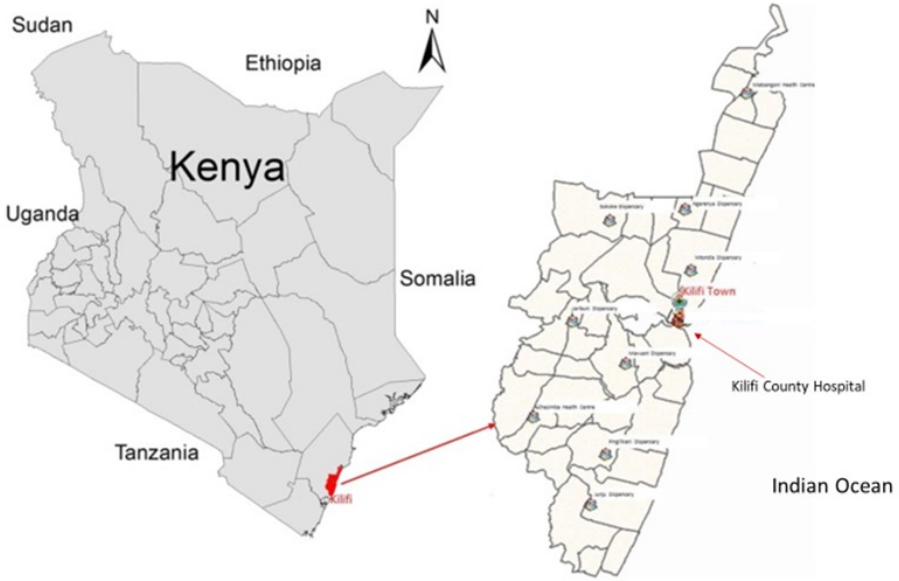
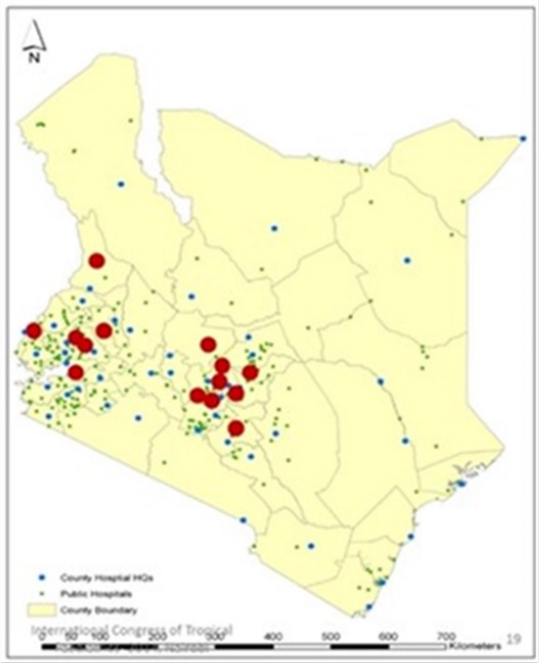
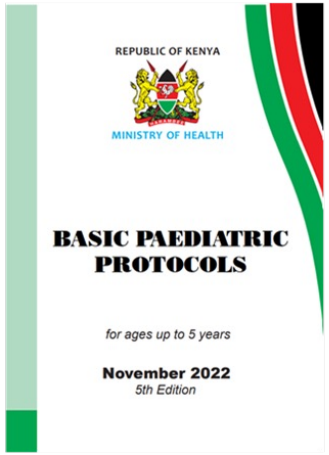
Surveillance platforms in LMICs – Kilifi and Nairobi, Kenya

Kilifi Surveillance Platform



Clinical Information Network (CIN)





Oct. 2013
8 Hospitals

→

2014
15 Hospitals
14 Paediatric
1 Neonatal

→

2022
24 Hospitals
18 Paediatric & Neonatal
2 Neonatal
12 Pneumonia trial
6 RTS,S sentinel surveillance
10 NEST project
13 COVID (in 2020) – Adult wards

Berkley, J. A., et al. (2005). "Bacteremia among children admitted to a rural hospital in Kenya." N Engl J Med 352(1): 39-47.
Ayieko, P., et al. (2016). "Characteristics of admissions and variations in the use of basic investigations, treatments and outcomes in Kenyan hospitals within a new Clinical Information Network." Arch Dis Child 101(3): 223-229.

Point prevalence survey during NeoObs

Bangladesh
Brazil
China
Greece
India
Italy
Kenya
South Africa
Thailand
Vietnam
Uganda

Neo-Infection-PPS: Infection Point Prevalence Survey

Neo-Infection-PPS CRF 1: Section A: Unit Data

FILL IN ONE CRF 1 FOR THE WHOLE UNIT

Hospital _____ Staff Initials: _____ Survey date: __ / __ /____*dd/mmm/yyyy*

Hospital type:☐ Primary ☐ Secondary ☐ Tertiary ☐ Specialised, specify : _____

Type of neonatal department
Low dependency special care☐ | Including High dependency☐ Including intensive care☐

Is neonatal surgery performed at this facility? Yes ☐ | No ☐
Including abdominal surgery? Yes ☐ | No ☐
Is there an obstetric delivery ward in this hospital? Yes ☐ | No ☐

Hospital ownership: Public ☐ | Private, for profit ☐ | Private, not-for-profit ☐ | Unknown☐

Activity in a 6 month period: *(please choose most recent period where data available)*
(if 6 months of data is unavailable, please enter a time period of available data (>1 month)

Number of live births at this hospital in a 6 month period:_____
Start date:__/__/____ dd/mmm/yyyy End date:__/__/____ dd/mmm/yyyy

Number of Neonatal admissions to neonatal departments in a 6 month period:_____
Start date:__/__/____ dd/mmm/yyyy End date:__/__/____ dd/mmm/yyyy
Which types of care are included in this number of admissions?
*NICU☐ High dependency☐ Special care ☐ Postnatal care☐ Other☐(Specify)*_____

No of blood cultures performed (in 6 mth period) in neonates (age<28 days):_____
Start date:__/__/____ dd/mmm/yyyy End date:__/__/____ dd/mmm/yyyy
No of POSITIVE blood cultures (in same period) in neonates (age<28 days):_____
Does this include contaminants? Yes ☐ | No ☐

Staff at time of PPS
How many of each of the of the following staff were working on the neonatal unit when the PPS is conducted?

Type of staff	*Night shift (night before PPS)*	*Day shift (after 0800)*
Doctors		
Nurses		
Nurse assistants		
*Cleaning staff (Specify)*_____		
*Other(Specify)*_____		

Place of birth: This hospital☐ Another hospital☐ Home☐
Date of Admission to this neonatal unit: __ / __ /___*dd/mmm/yyyy(admission to an area included in PPS)*
Where was the baby admitted from? This hospital☐ Another hospital (referral) ☐ Home☐
Has the baby had any previous admission(s) to a neonatal unit? ☐ No ☐ Yes
If yes, where? This hospital☐ Another hospital☐
Reason for current admission: Baby unwell +/- requiring support☐*-> if yes - due to suspected infection?* No☐ Yes☐
Elective admission for procedure/intervention/diagnosis ☐ Routine observation only ☐ Maternal reason only☐
Social reason☐

Comorbidities since birth:
Unknown ☐ **None**☐ **Asphyxia**☐ **Prematurity**☐ **Hyaline membrane disease (RDS)** ☐
Jaundice☐ **Chronic lung disease**☐ **Intraventricular haemorrhage**☐
Congenital anomaly☐ **(specify)**_____**Other(s)** ☐ **(specify)**_____
Previous sepsis (treatment completed before PPS)☐ **(specify)**_____

Antimicrobial name	Route	Start date of antimicrobial dd/mmm/yyyy	Indication for antimicrobial
1		___/____/____ *dd/mmm/yyyy*	☐ Treatment of an infection ☐ Prophylaxis (risk factors for neonatal sepsis) ☐ Prophylaxis for surgical procedure ☐ Other*(please specify)*_____
2		___/____/____ *dd/mmm/yyyy*	☐ Treatment of an infection ☐ Prophylaxis (risk factors for neonatal sepsis) ☐ Prophylaxis for surgical procedure ☐ Other*(please specify)*_____

Neo-Infection-PPS CRF 3 Section A – Current Infections

Please Fill if CURRENTLY BEING TREATED for an infection *(not including prophylaxis + NOT HIV treatment)*

BOX 1: What acute infection(s) does the baby have?

Infection 1: **Start date of treatment for this episode ___/____/_____(dd/mmm/yyyy)**

Tick any infections which were part of the same infection episode (ie treatment started at the same time and they are currently still being treated).
Start of treatment=first day of treatment for THIS infection episode, even if the antibiotic has changed after this.

Column A	B	*Please tick the large box in column B to select a diagnosis from column A, and then tick any boxes which apply to that diagnosis in column C. One of the options in the white section in column C must be selected for diagnoses 3-8. In addition, grey shaded questions must be answered for diagnoses 3,5,7,9 and 10. 'Other' can include any infection (including viruses) which is currently being treated.* Column C
1.Culture positive sepsis *(BC positive or catheter tip)*	☐	
2.Culture positive meningitis *(CSF culture positive)*	☐	
3.Culture negative sepsis (all cases of suspected sepsis without positive culture)	☐	Blood culture negative ☐ Blood culture not done ☐ Blood culture done, result awaited ☐ Did the baby fulfil neoOBS sepsis criteria in this episode (≥2 criteria, ≥ 1clinical) ? N☐ Y☐ Decision to treat with antibiotics for at least 5 days even if culture negative? N☐ Y☐
4.Culture negative meningitis	☐	CSF negative ☐ CSF not done ☐ CSF done, result awaited ☐
5.Pneumonia	☐	CXR not done ☐ CXR abnormal due to pneumonia ☐ Was an endotracheal tube in place at any time within 48 hrs before infection? N☐ Y☐
6.Necrotising Enterocolitis	☐	Clinically suspected only ☐ Diagnosed by X-ray ☐ Diagnosed at surgery or histology ☐
7.Urinary Tract Infection	☐	Culture positive (>105 Colony Forming Units/mL) ☐ Urinary catheter in situ at any time in 7 days before infection? N☐ Y☐
8.Skin/Soft tissue infection	☐	Skin/soft tissue infection ☐ Surgical site infection ☐
9.Other	☐	Please specify: Decision to treat with antibiotics for at least 5 days even if culture negative? N☐ Y☐
10.Other	☐	Please specify: Decision to treat with antibiotics for at least 5 days even if culture negative? N☐ Y☐

NeoObs PPS Case definitions

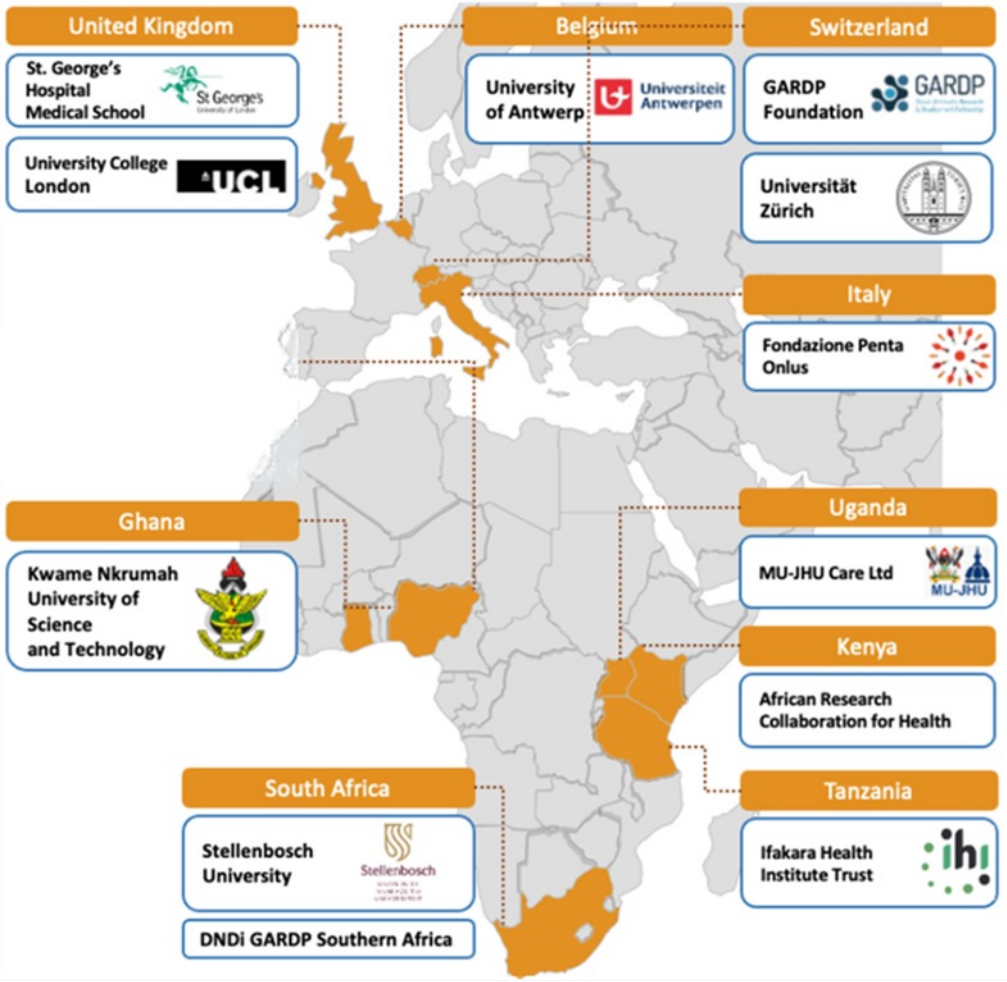
Infection	Definition
Culture-positive sepsis	A recognized pathogen cultured from blood (or catheter tip) AND NeoObs criteria OR decision by clinician to treat with antimicrobials
Culture-positive meningitis	A recognized pathogen cultured from CSF AND NeoObs criteria OR decision by clinician to treat with antimicrobials for meningitis
Culture-negative sepsis	Being treated with antimicrobials, AND fulfils/does not fulfil NeoObs criteria AND no positive blood or catheter tip culture (culture not done/culture done, and negative/culture done but awaiting results)
Culture-negative meningitis	Being treated with antimicrobials, AND fulfils NeoObs criteria OR suspicion of meningitis (clinical features/raised CSF WBC but negative CSF culture/CSF culture awaited/CSF culture negative), without positive CSF culture
Pneumonia	Respiratory compromise AND a new infiltrate, consolidation, or pleural effusion on chest X-ray AND at least 4 of: temperature > 38 °C or < 36.5 °C or temperature instability, tachycardia or bradycardia, tachypnoea or apnoea, dyspnoea, increased respiratory secretions, new onset of purulent sputum, isolation of a pathogen from respiratory secretions, CRP > 2.0 mg/dL, I/T ratio > 0.2., OR strong clinical suspicion of pneumonia
Necrotising enterocolitis	≥2 of the following (vomiting, abdominal distension, pre-feeding residuals or persistent microscopic or gross blood in stools) without other explanation, OR ≥1 characteristic radiographic abnormality (pneumoperitoneum, pneumatosis intestinalis or unchanging 'rigid' loops of small bowel) OR histopathological evidence of NEC OR evidence of NEC at laparotomy OR strong clinical suspicion of NEC
Urinary tract infection	Has 2 criteria of sepsis as above, at least one of which is clinical AND a positive urine culture, that is, ≥ 105 microorganisms/ml of urine with no more than two species of microorganisms

SNIP-AFRICA

Severe neonatal infection adaptive platforms in Africa (SNIP – Africa)

Objectives

- Build a sustainable and governance structure spanning the global South and North for implementation of adaptive trials for severe childhood infections
- Implement an adaptive trial to address optimal selection of empiric antibiotic regimens for the treatment of neonatal sepsis in the ‘drug-regimen’ domain
- Conduct pharmacokinetic (PK) studies in the ‘dose’ domain
- Survey neonatal sepsis epidemiology and management
- Provide training on innovative clinical trials to sSA researchers and clinicians
- Engage with families, clinicians and regulators to facilitate efficient and ethical adaptive trial implementation



SNIP-AFRICA

Clinical and microbiological surveillance

- Set up a surveillance platform for continuous evaluation of hospitalised neonates
  - Routine clinical screening and data capture
  - Light and translatable approach – simple/minimal clinical and microbiological dataset
- Real time data dashboard driving quality improvement at the level of contributing sites
  - Share key metrics
  - Monitor trends, outbreak prediction
- Define a workflow for efficient fit-for-purpose microbiological surveillance
  - Analytical approach to monitor rapidly emerging shifts in causative bacteria
  - Training and capacity building
- Identify trends in resistant bacterial invasive and carriage isolates to support adapting antimicrobial trial targets and inform selection of empiric regimens
  - Molecular assessment of invasive and colonising/environmental bacteria

Clinical and microbiological surveillance cont'd

SNIP-AFRICA

Hospital name and location	Level of specialised neonatal care	Annual births (n)	Annual admissions (n)		Neonates in the NNU/day
			Inborns	Outborns	
St. Francis Referral Hospital, Tanzania	Including high dependency	2,750	800	250	19
Komfo Anokye Teaching Hospital, Ghana	Including intensive care	3,500	550	450	126
Kilifi County Hospital, Kenya	Including high dependency	6,000	745	611	48
Coast General Teaching and Referral Hospital, Kenya	Including high dependency	7,260	1,970	408	66
Mbagathi Hospital, Kenya	Including high dependency	10,000	1,500	650	87
Tygerberg Hospital, South Africa	Including intensive care	8,000	1,800	700	115
Kawempe National Referral Hospital, Uganda	Including high dependency	25,000	7,700	2,300	80

Abbreviations: no., number; NNU, neonatal unit.

Acknowledgements

KEMRI | Wellcome Trust

GARDP
Global Antibiotic Research & Development Partnership

Penta
Child Health Research

UZH
Implementation Science in Healthcare

UNIVERSITY OF OXFORD

DNDi
Best Science for the Most Neglected

GARDP
Global Antibiotic Research & Development Partnership

UKRI MRC Clinical Trials Unit

UCL

St George's University of London

Stellenbosch UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

KCCR

MU-JHU CARE LTD
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research | training | services

University of Antwerp
Laboratory of Medical Microbiology
Vaccine and Infectious Disease Institute

SNIP-AFRICA (Project No. 101103201) is part of the EDCTP3 Programme supported by the European Union

EDCTP

Webinar on Surveillance of Hospital-Acquired Infections in the NICU

The NeoIPC Surveillance Toolkit

Panellist

Brar Piening

Senior IPC Physician

23rd of November 2023

Potential Conflicts of Interest

Basically none, but…

- I‘m working at a research institute receiving ongoing governmental funding for maintaining and evolving a system to support the surveillance of hospital-acquired infections (HAI-Surveillance) in German hospitals
- I have received direct and indirect public support (funded personally, funded co-workers) for research projects in the field of HAI-Surveillance in the past and I am currently Charité‘s project coordinator in an EU-funded project (NeoIPC, Horizon 2020) in this field.
- I am convinced that HAI-Surveillance helps to improve quality of care and should be considered a basic requirement in hospitals.

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Surveillance in the NICU

What am I talking about?

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KISS Krankenhaus-Infektions-Surveillance-System
Modul NEO-KISS
Berechnungszeitraum: Januar 2018 bis Dezember 2022

Erstellungsdatum: 24.Februar 2023

Referenzdaten für Neonatologische Abteilungen. Geburtsgewicht 500 bis 999

Anzahl Abteilungen:	206
Anzahl Patienten:	15.047
Anzahl Patiententage:	715.381
Mittlere Surveillancedauer (Tage):	47,54

Tabelle 1: Device-Anwendungsraten [1]

Device	Anzahl Device-Tage	gepoolter arithm. Mittelwert	25%-Quantil	Median	75%-Quantil
Gefäßkatheter					
-ZVK	220.449	30,82	20,62	28,21	36,45
-PVK	151.791	21,22	13,68	19,46	26,69
Beatmung	575.275	80,42	68,47	79,19	87,27
-INV	104.462	14,60	8,22	12,91	17,66
-NIV	470.813	65,81	53,75	64,29	72,34
Antibiotika	167.336	23,39	16,05	22,21	27,34

Tabelle 2: Inzidenzdichten [2,3]

Art der Infektion	Anzahl Infektionen	gepoolter arithm. Mittelwert	25%-Quantil	Median	75%-Quantil
schwere Infektion	2.921	4,08	1,69	3,34	4,90
-Pneumonie	314	0,44	0,00	0,00	0,49
-Sepsis	2.607	3,64	1,30	2,99	4,39
NEC	614	0,86	0,00	0,60	1,18

1 Device-Anwendungsrate: Anzahl Device-Tage/ Anzahl Patiententage * 100

2 Inzidenzdichte: Anzahl Infektionen/ Anzahl Patiententage * 1000

3 schwere Infektion: Summe für Sepsis und Pneumonie

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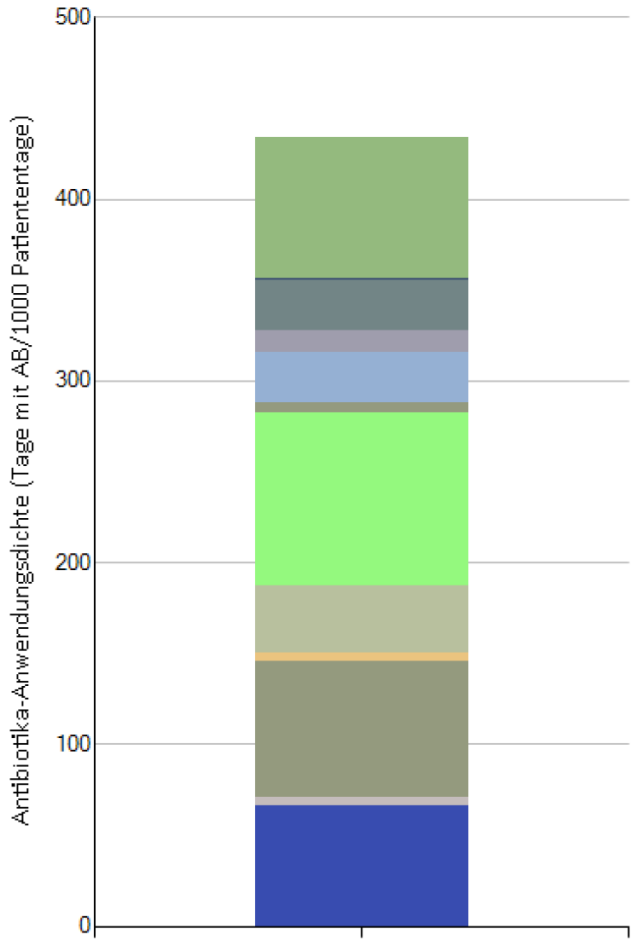
Abbildung 1: Antibiotika-Anwendungsdichte



Gruppendefinitionen

PENMID	Penicilline mit erweitertem Wirkungsspektrum (J01CA)
CHINOL	Chinolone (J01M)
PENBLI	Kombinationen von Penicillinen, inkl. Beta-Lactamase-Inhibitoren (J01CR)
PENAND	Andere Penicilline (J01CE, J01CF, J01CG)
MAKROL	Makrolide (J01FA)
IMIDAZ	Imidazol-Derivate (J01XD)
GLYCOP	Glycopeptid-Antibiotika (J01XA)
CEPH34	Cephalosporine der 3. und 4. Generation (J01DD, J01DE)
CEPH12	Cephalosporine der 1. und 2. Generation (J01DB, J01DC)
CARBAP	Carbapeneme (J01DH)
OTHER	Andere
AMINOK	Aminoglykosid-Antibiotika (J01G)

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NeoIPC

The NeoIPC Surveillance Toolkit

Free tools to support surveillance of nosocomial infections in NICU's worldwide.

To find the current
set of tools, visit
www.neoipc.org/surveillance/resources

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Why Do We Call It a Toolkit?

Multiple standardised tools

- Methods
- Definitions
- Reports

Fit in various settings

- Paper-based
- Electronic
- Semi-automated

Reusable and extensible

- Local/regional deployment
- Adjustments/extensions

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What Does It Contain?

- Surveillance protocol for high-risk infants
- Printable data collection sheets
- Training material
- Web-based data collection platform and reporting (DHIS2)
- Basic implementation support

This page contains the protocols and data sheets necessary for carrying out **surveillance of healthcare-associated infections (HAI) in neonatology** using the system developed by the NeoIPC Consortium. The protocol provides methodological reference and offers support for carrying out HAI surveillance in neonatal units, whether they are taking part in the NeoDeco study or not.

Surveillance protocol – Core module

Infection Surveillance for Neonatology – Core Module: Very Low Birth Weight (VLBW)/Very Preterm (VP) Infants — Download

Data collection sheets

General

Master Data Collection Sheet — Download

Patient Progress Chart — Download

Surgical Procedure Datasheet — Download

Pseudonymization Table Datasheet — Download

Pseudonymization Table (.xlsx) — Download

Pseudonymization Table (.ods) — Download

Infection

Infection Definitions — Download

Primary Blood Stream Infection (BSI) Datasheet — Download

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Surveillance in High-Risk Infants

- Who?
  - Infants with a birth-weight < 1500g and/or a gestational age <32 weeks
- Why?
  - Hospital-acquired infections and antibiotic resistance cause relevant morbidity and mortality in this population
  - Focus reduces workload ➔ all patients benefit from IPC improvements
- What

  Outcomes: Clinical sepsis/BSI, SSI, Pneumonia, NEC

  Risk/protective factors: CVC, PVC, Ventilation, NIV, AB-use, KC, Human milk, Probiotics

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How Can You Participate or Collaborate?

There are multiple ways!

- Just start in your hospital
  - Pen + paper + calculator
  - Spreadsheets
  - Local DHIS2-deployment
- Found or find a regional/national network
  - National/regional DHIS2-deployment
- Participate in the NeoIPC Surveillance managed by Charité
  - Use Charité's EU-based DHIS2 deployment (collaboration agreement needed for GDPR compliance e-mail: NeoIPC-Support@charite.de)

… using the methods and definitions in the toolkit to compare your collected data with published benchmarks

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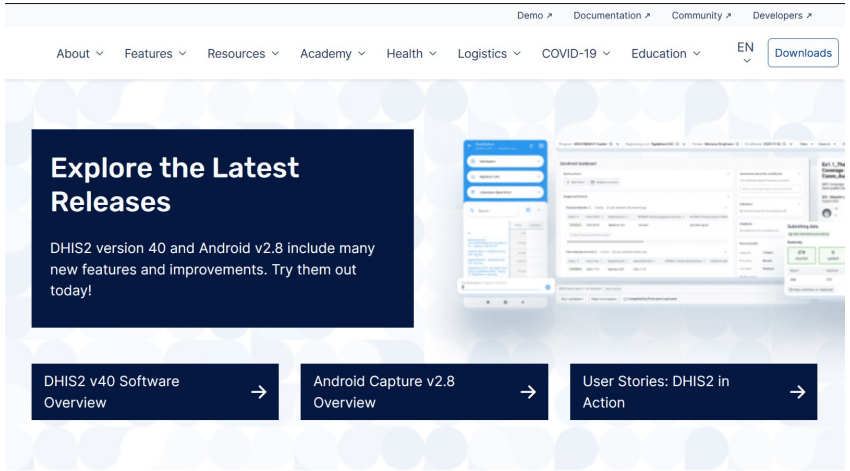
DHIS2

Open source, web-based platform, most commonly used as a health management information system

In use in more than 100 countries

Software development in global collaboration managed by the HISP Centre at the University of Oslo



UiO : HISP Centre
University of Oslo

https://dhis2.org/

The world's largest health information management system – developed through global collaboration led by UiO

DHIS2 began in post-Apartheid South Africa and is now a global open-source project coordinated by the HISP Centre at the University of Oslo (UiO). More than 80 countries worldwide use DHIS2 for collecting and analyzing health data. 3.2 billion people (40% of the world's population) live in countries where DHIS2 is used. DHIS2 is offered free of charge as a global public good.

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What Is Planned?

For sure!

- Reference data
- More/advanced reports
- Infrastructure to support translation and publication of tools
- DHIS2
  - Metadata package
  - “Capture” support
  - Mobile device support (Android)
- Early-onset sepsis reporting

Maybe?

- Further protocols
  - Unit based surveillance
  - Point prevalence surveys
- Advanced IT infrastructure
  - Data transfer tools
  - FHIR-Interfaces
- More training material
- More stakeholder involvment
  - Parents
  - Policy makers

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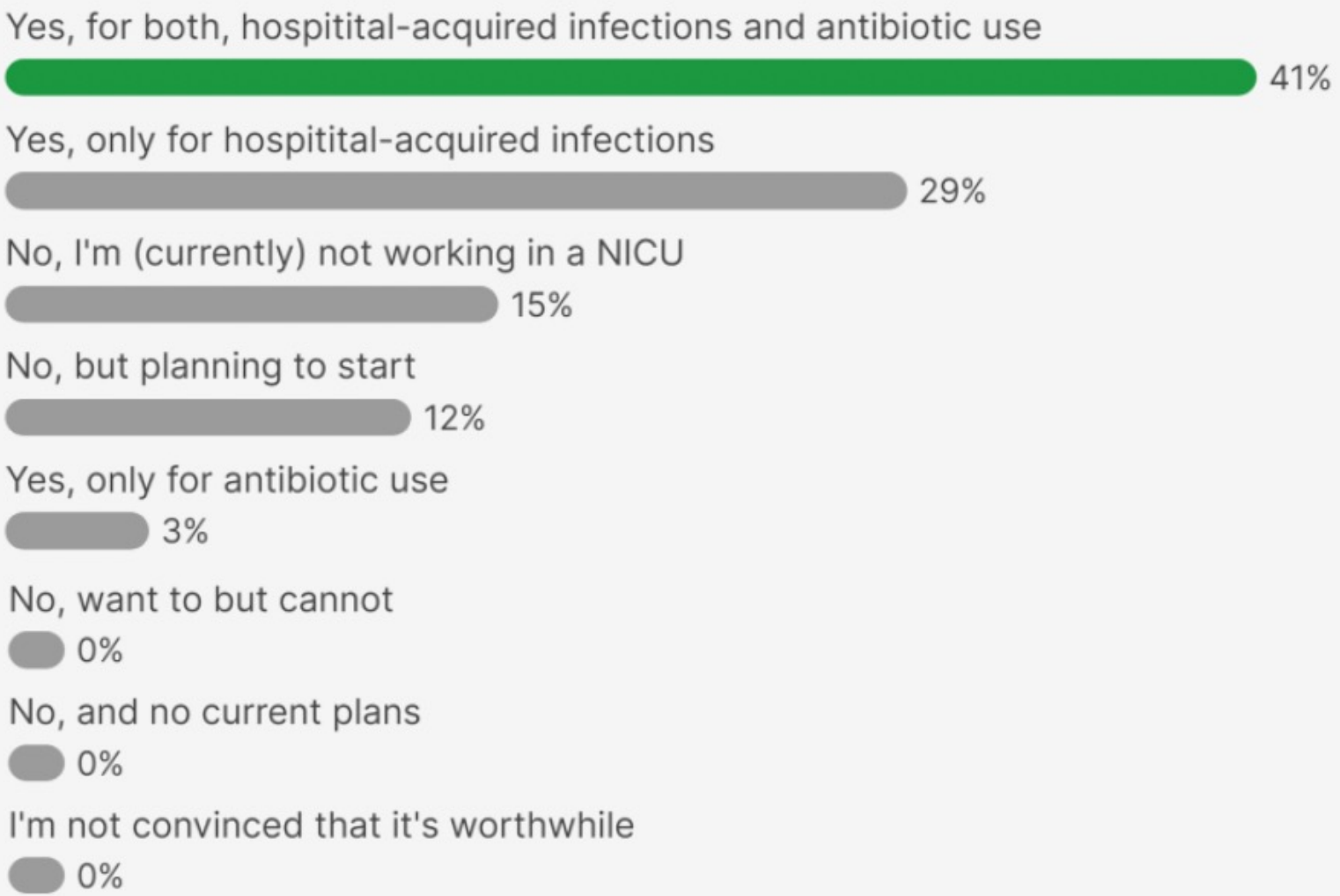
Is your team currently performing surveillance* of hospital-acquired infections and/or antibiotic use in high-risk neonates?



34 people participated in the poll

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Thank you

For more information about the project, visit www.neoipc.org

Join the NeoIPC Clinical Practice Network: bit.ly/cpn-registration

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