VENTILATOR-ASSOCIATED PNEUMONIA IN NEWBORNS: A RETROSPECTIVE SINGLE-CENTRE 10-YEAR REVIEW OF INCIDENCE AND OUTCOMES

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Background

WHY

VAP is a critical concern in NICUs as morbidity and mortality remain high

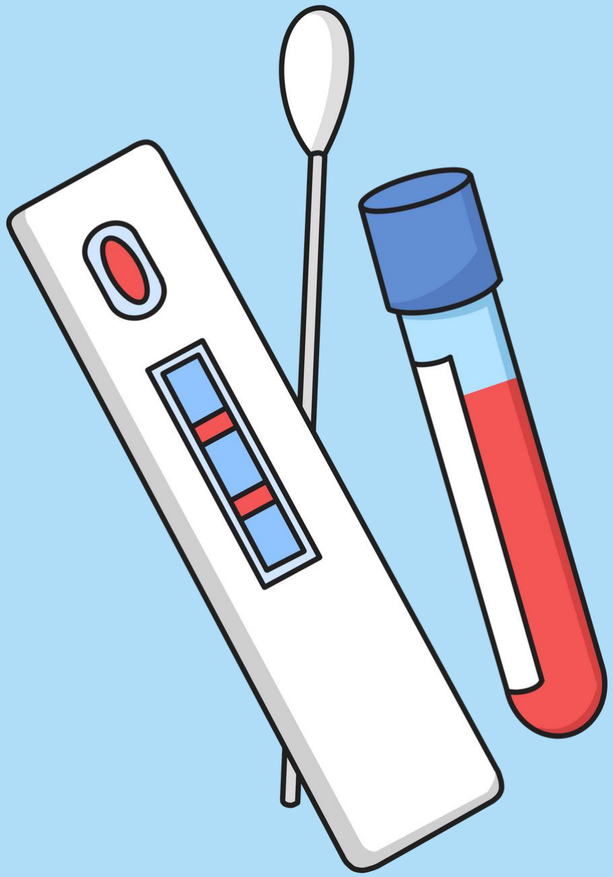
WHAT

The aim is to analyze VAP incidence, demographics, microbiology and outcome

WHERE

Results of our tertiary NICU at CHUV

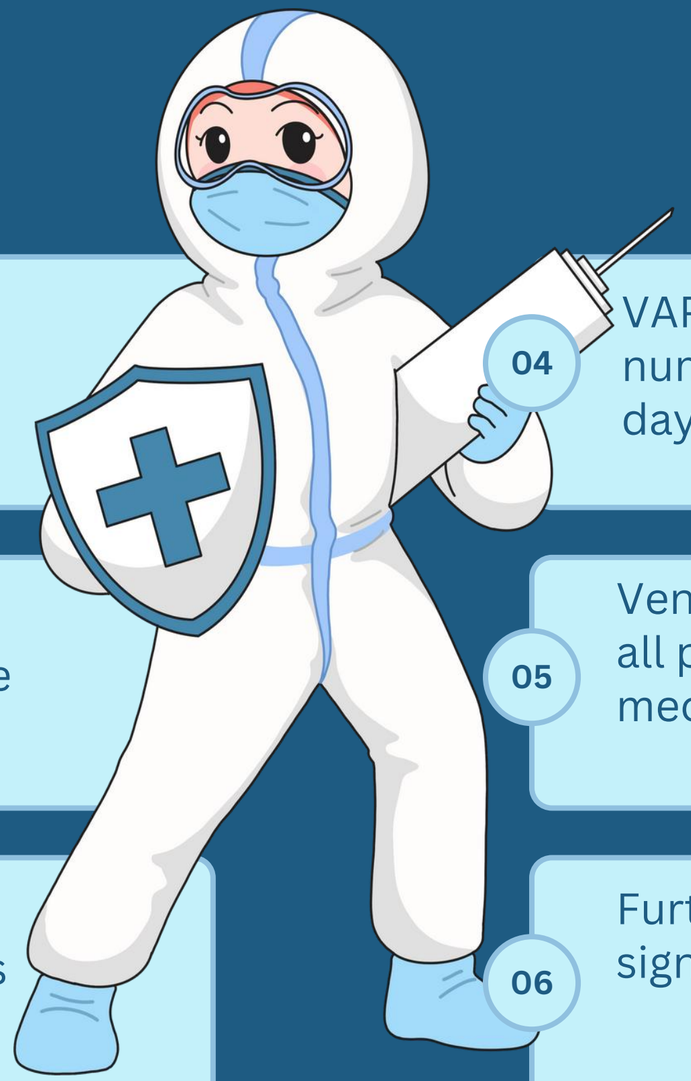
Methods



01 Retrospective study from January 2013 to December 2023

02 VAP cases were diagnosed according to the Centers for Disease Control and Prevention guidelines

03 1° outcome: annual incidence of VAP over the ten years of analysis



04 VAP incidence was expressed as the number of VAP cases/1000 ventilation-days

05 Ventilation-days: total number of days all patients in the NICU received mechanical ventilation, divided by 1000

06 Further data: demographics, clinical signs, pathogens, outcomes

Diagnosis according to CDC guidelines

Mechanical ventilation > 48h

Thoracic X-ray compatible with pneumonia

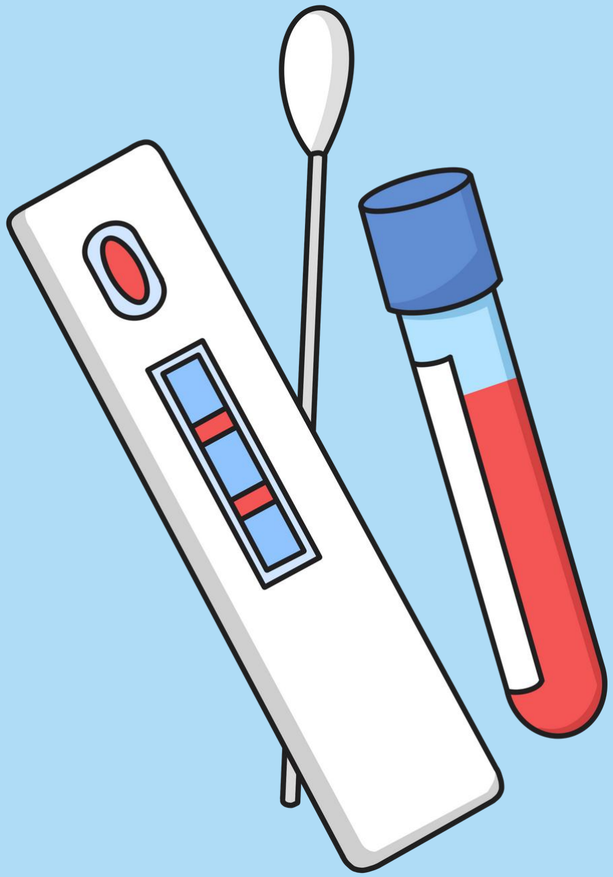
Worsening of gas exchange

and at least three of the following criteria:

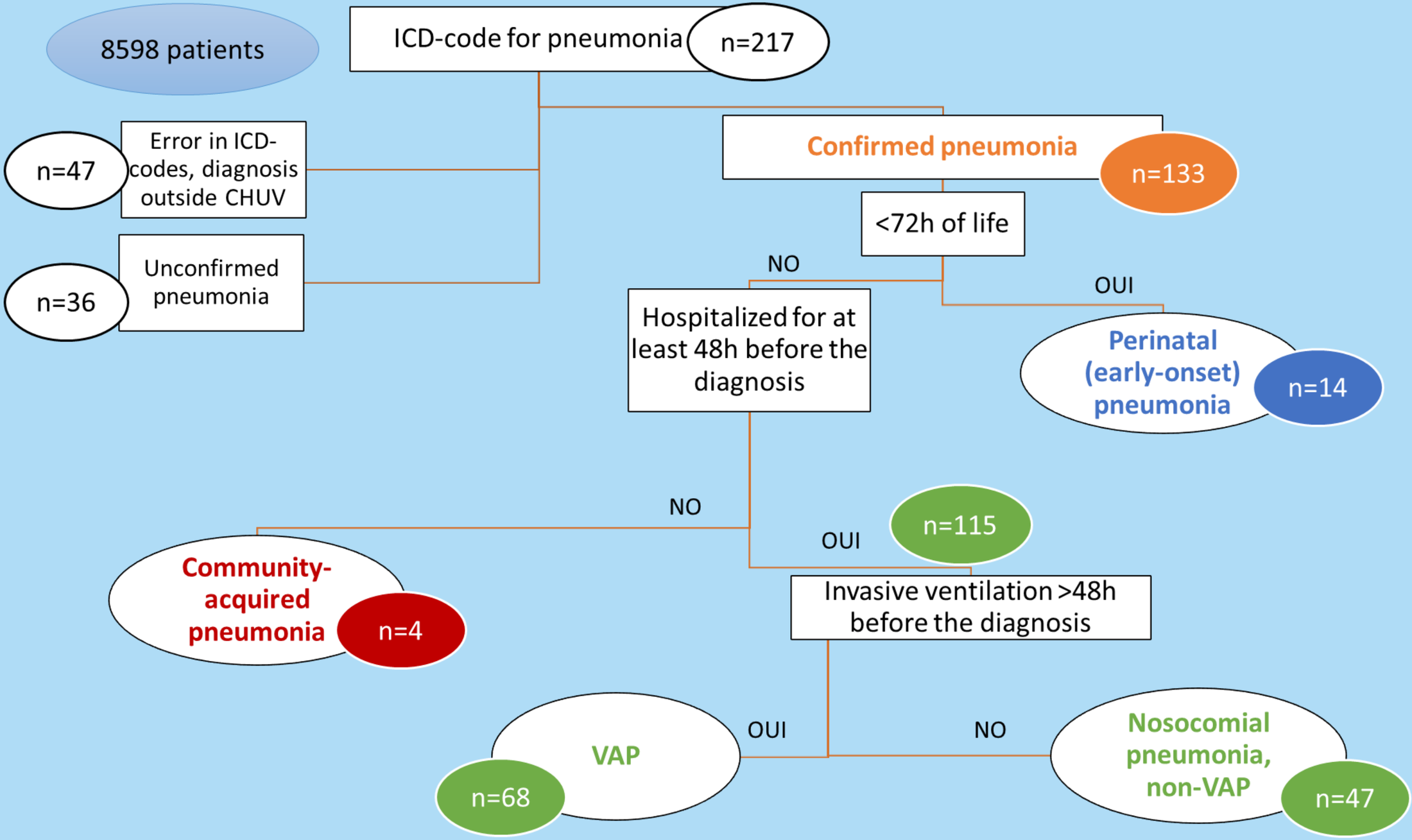
- **T° instability**
- **Cough**
- **Leukopenia/Leukocytosis**
- **Change in aspect and amount of secretions**
- **Apnea, respiratory distress**
- **Wheezes, crackles**
- **Bradycardia, tachycardia**

Centers for Disease Control and Prevention. https://www.cdc.gov

Results



Flowchart of patient selection



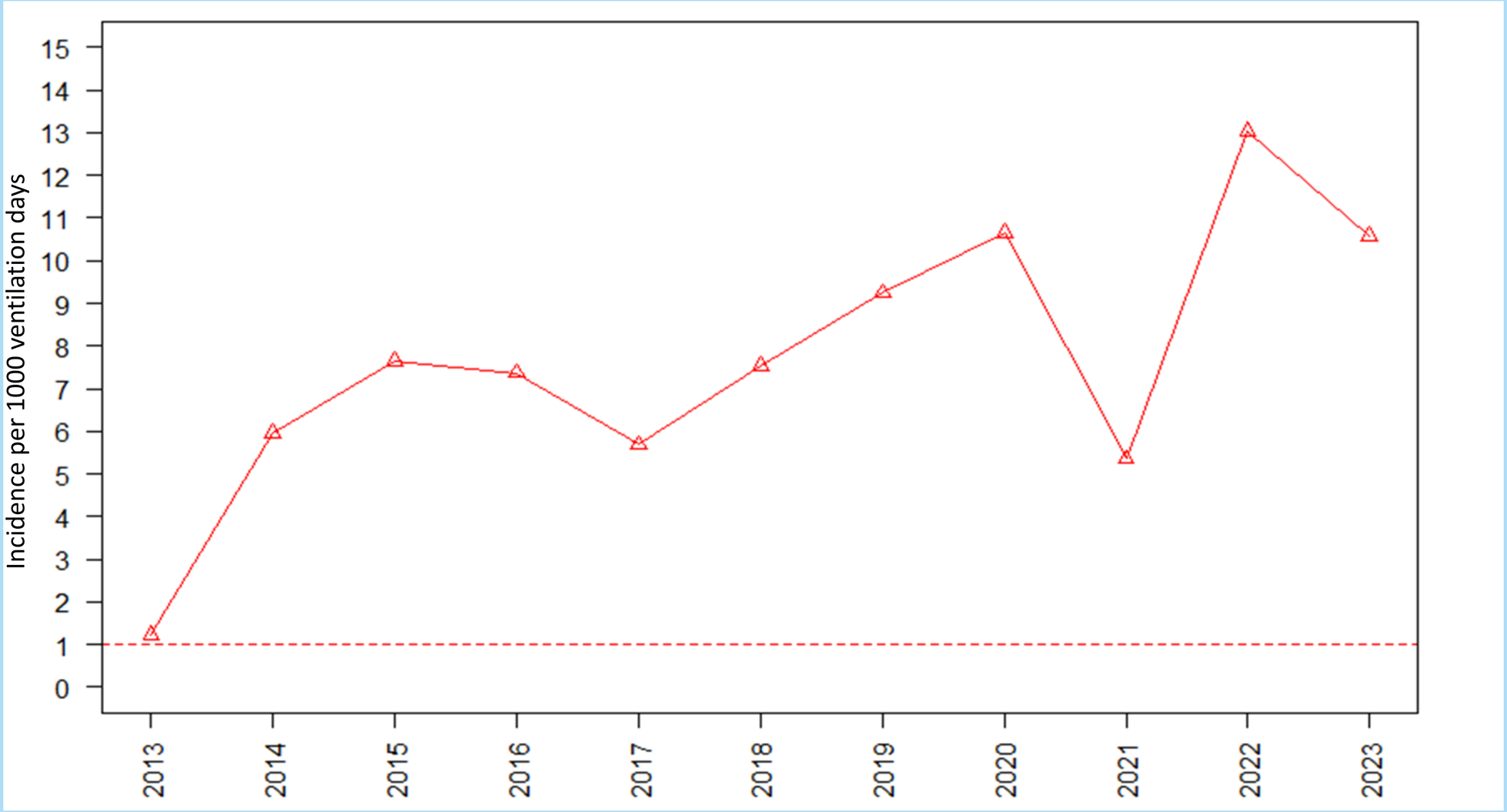
Clinical characteristics and pathogens

Median gestational age, weeks (IQR)	27 (24 – 40)
Median birthweight, grams (IQR)	897 (440 – 4520)
Median postnatal age at diagnosis, days (IQR)	20 (3 – 92)
Median duration of mechanical ventilation at VAP diagnosis, days (IQR)	7 (2 – 39)
Mortality, n (%)	9 (13)
Main pathogens, n (%) *Klebsiella pneumoniae* *Pseudomonas aeruginosa* *Staphylococcus epidermidis* *Staphylococcus aureus*	 8 (12) 7 (10) 7 (10) 6 (9)

Results: benchmarking

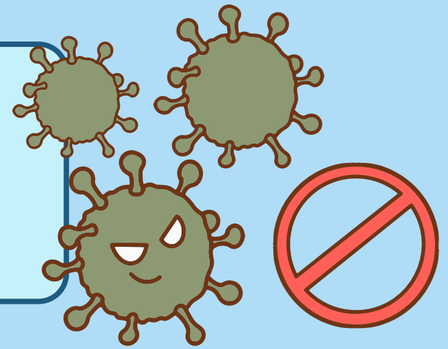
Authors	Journal	Institution or country	Years of analysis	Number of VAP cases	VAP/1000 ventilation days	Mortality
		CHUV	**2013 – 2023**	**68**	**7.3 (5.6 – 9)**	**13%**
Goerens, Anouk, Stocker, et al.	Frontiers in Pediatrics	Lucerne, CH	2015 – 2017	10	4.5 (0 – 6.9)	-
Cernada et al.	Pediatric Critical Care Medicine	Valencia, Spain	2009 – 2011	18	10.9	31%
Geffers et al.	Journal of Hospital Infection	Germany, NEO-KISS surveillance system	2000 – 2005	142	2.7 (0 – 4.4)	-
Patrick et al.	Pediatrics	USA 173 hospitals	2007 – 2012	347	0.97 (0.93 – 0.99)	-

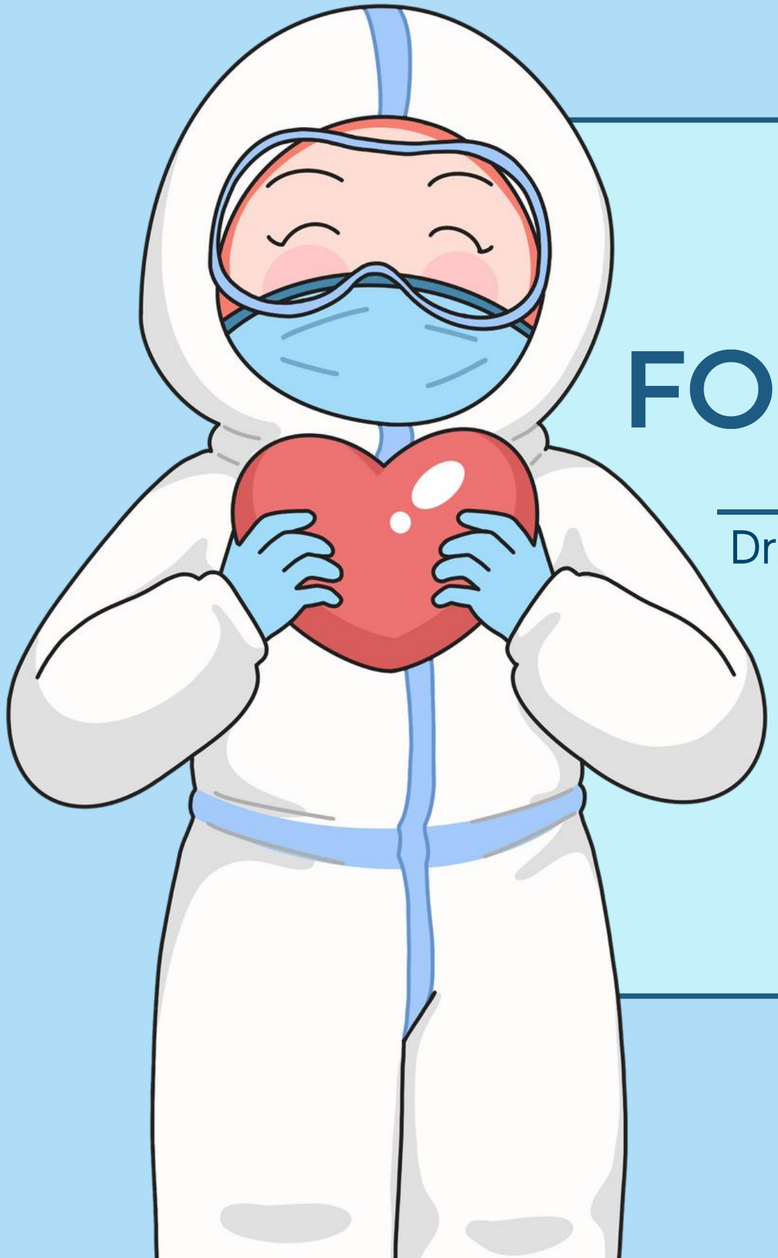
Results: VAP incidence over time



Discussion

- VAP has a high burden, mainly affecting preterm newborns
- Benchmarking is important to guide quality and outcome improvements
- Implementation of bundles of care allowed NICUs to largely decrease their VAP incidence





THANK YOU FOR YOUR ATTENTION

Dr. med Carlotta Capello Mainardi