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**Ocena skuteczności działań prewencyjnych celem redukcji  
częstotliwości sepsy o późnym początku oraz kolonizacji  
alarmowymi szczepami bakterii na Oddziale Intensywnej Terapii  
Noworodka**

**Rozprawa doktorska na stopień doktora nauk medycznych i nauk o zdrowiu  
w dyscyplinie nauki medyczne**

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Obrona rozprawy doktorskiej przed Radą Dyscypliny Nauk Medycznych  
Warszawskiego Uniwersytetu Medycznego

Warszawa 2024

## **Abstract in English**

### **Title**

**Assessment of the effectiveness of preventive measures to reduce the incidence of late-onset sepsis and colonization with alarm strains of bacteria in the Neonatal Intensive Care Unit**

### **Background**

Nosocomial infections, defined as late-onset sepsis (LOS), are still responsible for a large percentage of mortality and potential serious complications in Neonatal Intensive Care Units (NICU) (1-4). Pathogenic, hospital bacterial flora poses a threat to prematurely born neonates (5). Despite gradual improvement in survival rates of extremely immature newborns, Poland still has worse perinatal outcomes than comparable countries in the European Union (6). Awareness of the problem, requires further scientific research to improve neonatal outcomes. Hand hygiene of medical staff is a key risk factor for LOS, as well as the transmission of pathogenic bacterial flora (7–9). Therefore, it is crucial to follow appropriate aseptic rules and medical procedure protocols in the NICU in order to minimize the epidemiological risk.

### **Aim of the study**

Assessment of the introduction of the "Patient Zone" procedure and aseptic technique training in the Neonatal Intensive Care and Pathology Department, in reducing the incidence of LOS and colonization with alarm strains of bacteria.

### **Methods**

This is a prospective observational study in a historical cohort. The control group were neonates born at the University Center for Women's and Newborn Health of the Medical University of Warsaw in 2017-2018 (n= 565), and the study group – neonates born between 2021-2022, after the introduction of abovementioned procedures (n= 575). The data were collected on paper Case Report Form (CRF) and then subjected to statistical analysis in the R program.

## **Results**

In the control group, the incidence of LOS was 5% vs. 1.6% in the study group ( $p = 0.002$ ). The median duration of LOS during hospitalization in the control group was 12.5 days vs. 16 days in the study group ( $p = 0.594$ ). Alarm pathogens were detected in 8.7% of newborns in the control group vs. 7.0% in the study group ( $p = 0.332$ ). In the case of hospitalization lasting at least 17.5 days in the control group, the risk of colonization with alarm pathogens increased relevantly with 81% sensitivity and a specificity of 75% ( $p < 0.001$ ), in comparison to 21.5 days in the study group with a sensitivity 95% and specificity 85% ( $p < 0.001$ ). In both groups gestational age below 31,5 weeks is associated with increased risk of LOS (sensitivity 85% and specificity 85% in the control group ; sensitivity 100 % and specificity 80% in the study group ( $p < 0,001$ )).

## **Conclusions**

The preventive actions taken contributed to a substantial reduction in the incidence of LOS, but no statistically significant difference was demonstrated in terms of colonization with alarm strains of bacteria.