Brief Report

Exploring Trends in Neonatal Mortality among Infants ≤ 32 weeks Gestational Age at Birth in Latin America and the Caribbean units using the EpicLatino Network Database Compared to Canadian Neonatal Network 2022

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Posted Date: 28 March 2024

doi: 10.20944/preprints202403.1744.v1

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Exploring Trends in Neonatal Mortality among Infants ≤ 32 Weeks Gestational Age at Birth in Latin America and the Caribbean units using the EpicLatino Network Database Compared to Canadian Neonatal Network 2022

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Abstract: Introduction: Parameters used for neonatal mortality calculation vary among publications. Mortality in < 33 weeks gestational age at birth display global variations across different healthcare units. Objective: This study aims to explore trends in neonatal mortality among infants born preterm in the different units in Latin America and the Caribbean utilizing the EpicLatino Network Database in comparison to Canadian Neonatal Network (CNN) 2022. Materials and Methods: This study focused on an eight-year period, with a particular attention to mortality rates during the pre-pandemic (2015-2019) and pandemic/post pandemic (2020-2022) periods. Survival rates from CNN 2022 were included in the comparison analysis. Logistic regression analysis was confined to the 2020-2022 period. Adjustments were made for factors including gestational age, small for gestational age (SGA), Snape II score, inborn/outborn status, and center. As major malformations could account for mortality differences among units. The incidence of major congenital malformations, as defined by CNN, was compared among deceased patients. Results: A total of 15,454 records from 2015-2019 and 10,711 records from 2020-2022 were scrutinized. Overall, there were no significant differences in mortality rates between the two time periods (p=0.22). Moreover, the originating unit during the 2020-2022 period significantly influenced all statistical computations. Conclusions: Survival rates among infants < 26 weeks of gestation in Latin America and the Caribbean are on an upward trajectory, with the healthcare unit playing a pivotal role in this outcome within the EpicLatino database. Major malformations do not seem to be a significant contributing factor. These findings underscore the imperative of implementing quality improvement initiatives to elevate neonatal care standards in Latin America and the Caribbean.

Keywords: neonatal mortality; VLBW infants; EpicLatino; Canadian Neonatal Network; Latin America

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Introduction

The Canadian Neonatal Network™ (CNN)[1] is a collaborative effort of researchers specializing in neonatal care, established in 1995 under the guidance of Dr. Shoo Lee. This network upholds a standardized neonatal database, and its 2022 statistical report draws upon data gathered from 33 affiliated Health Care Organizations. EpicLatino,[2] launched in 2015, utilizes software akin to CNN 2010, albeit translated into Spanish.

Parameters used for mortality calculation vary among publications. The commonly employed metric estimates the neonatal mortality rate (within 28 days of birth). Typically, it is applied to populations, such as those in the Americas, where the reported rate by the Pan American Health Organization[3] decreased from 12.0 per 1000 live births in 2000–2004 to 7.4 per 1000 live births in 2020. More specific metrics, such as neonatal mortality rates among very low birthweight infants (VLBW), display global variations across different healthcare units. For instance, a study in Singapore[4] involving three units showed no mortality differences. In South America,[5] the causes of mortality vary significantly, but they have not been studied with respect to the originating unit. It is important to highlight that mayor congenital malformations could affect mortality.[6]

Objective

This study aims to explore trends in neonatal mortality among infants born preterm in the different units in Latin America and the Caribbean utilizing the EpicLatino Network Database in comparison to CNN 2022.

Materials and Methods

The EpicLatino database comprises 32 units across the region and tracks annual survival rates. This study focused on an eight-year period, with a particular attention to mortality rates during the pre-pandemic (2015-2019) and pandemic/post pandemic (2020-2022) periods. Survival rates from CNN 2022 were included in the comparison analysis.

Given variations in unit inclusion across different time spans within EpicLatino, logistic regression analysis was confined to the 2020-2022 period. Adjustments were made for factors including gestational age, small for gestational age (SGA), Snape II score, inborn/outborn status, and center. As major malformations could account for mortality differences among units. The incidence of major congenital malformations, as defined by CNN, was compared among deceased patients.[7] Statistical analyses were conducted using Stata 18 software.

Results

This is a retrospective study from a database. A total of 15,454 records from 2015-2019 and 10,711 records from 2020-2022 were scrutinized. Figure 1 delineates the distribution of gestational ages. Overall, there were no significant differences in mortality rates between the two time periods ($p=0.22$). Similarly, post-covariate adjustments revealed no significant variation in mortality rates within the EpicLatino database ($p=0.841$). The incidence of major malformations was only significant among deceased patients from Unit 13, which exhibited a markedly higher incidence compared to other units.

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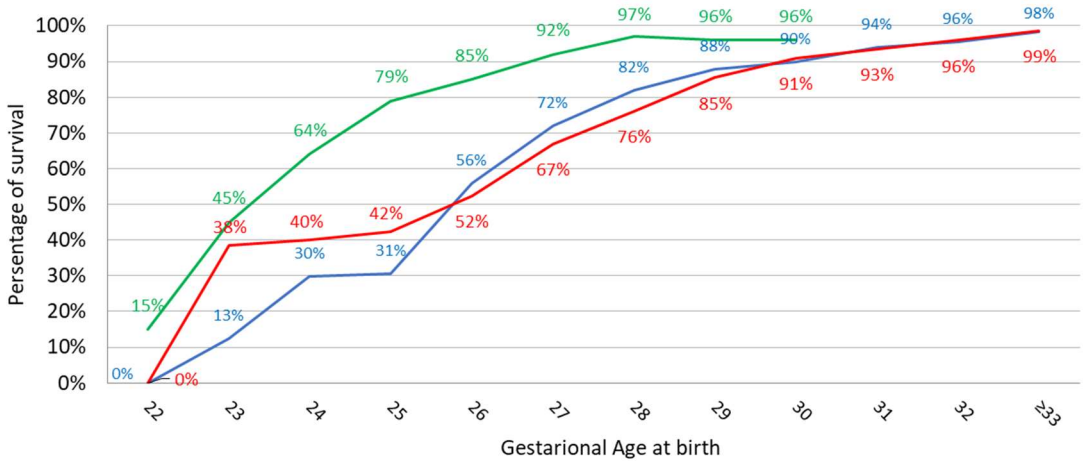

Total Casos	3	29	114	209	307	415	560	584	754	875	1.254	21061
	1	13	40	85	130	169	213	288	326	438	584	8423
CNN 2022	78	171	211	266	270	356	433	533	12349*			

Figure 1. Survival in 2 time periods, 2015-2019 and 2020-2022 by gestational age without readmissions compared to CNN 2022. *≥30 weeks. In blue EpicLatino number of cases 2015-2019, in red 2020-2022, in green CNN 2022.

Adjusted and unadjusted analyses stratified by gestational age unveiled a decline in mortality rates for infants born with a gestational age less than 26 weeks (OR 0.61 [0.38-0.99, 95% CI], p=0.044). Conversely, no statistically significant difference was observed for infants between 27-29 weeks of gestational age.

Significantly, the CNN survival rate, depicted in green, showcased a notable disparity.

Moreover, the originating unit during the 2020-2022 period significantly influenced all statistical computations (refer to Figure 2). Substantial variations were noted among units when compared to a designated base unit (Unit 3), which impacted outcomes. All adjusted variables, except for inborn/outborn status, exhibited notable differences.

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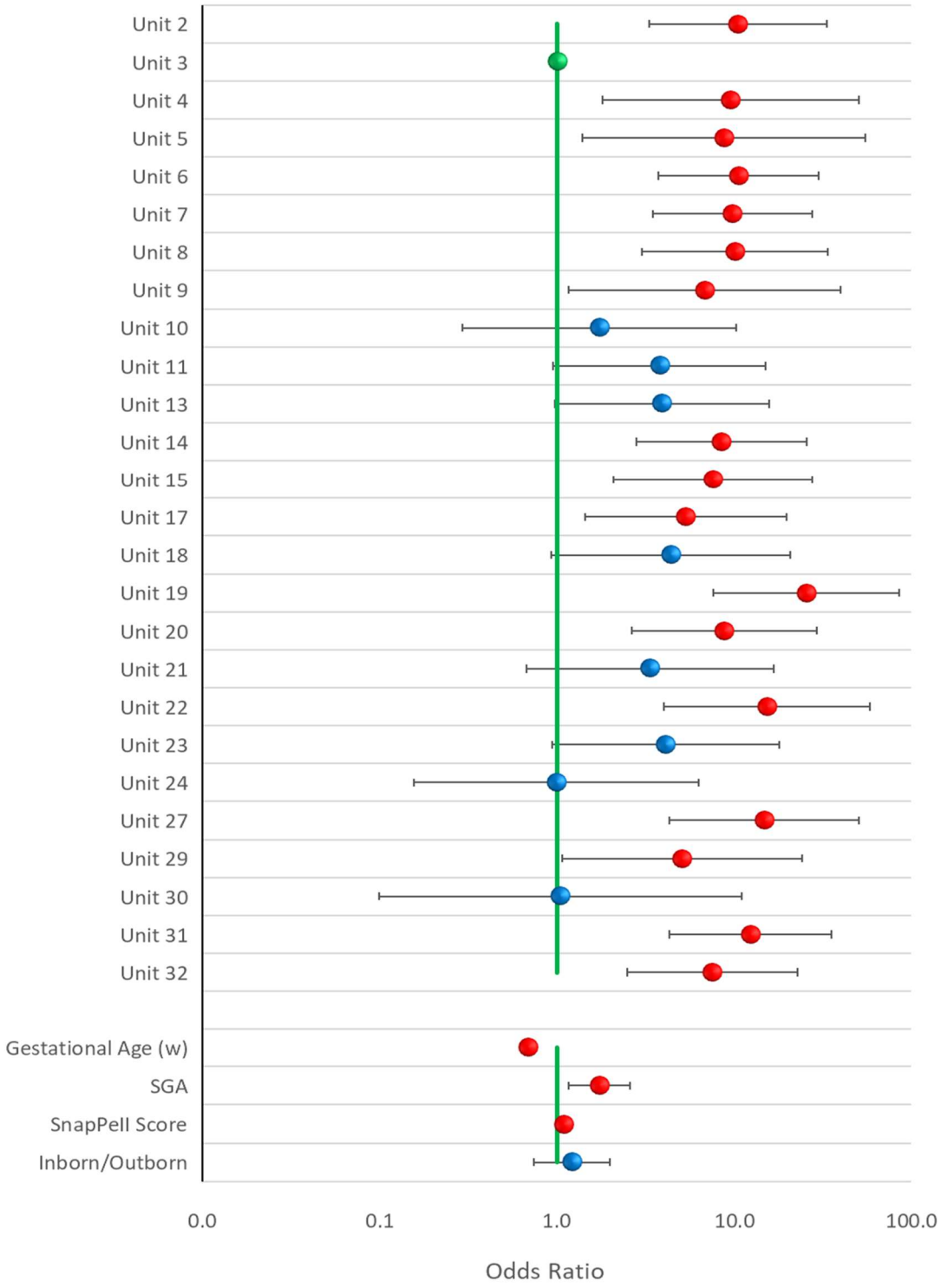

Figure 2. Mortality's logistic regression of adjusting variables and EpicLatino units during 2020-2022 in ≤ 32 weeks GA using Unit 3 as the base for very low mortality and enough number of cases. Some units were excluded for absent or very low number of cases. In green the base unit, in red the significantly different units. Among patients that died in the different units, except unit 13 that had more mayor malformations (as defined by de CNN[7]), all other units didn´t differs statistically in the number of mayor malformations.

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Conclusion:

Survival rates among infants < 26 weeks of gestation in Latin America and the Caribbean are on an upward trajectory, with the healthcare unit playing a pivotal role in this outcome within the EpicLatino database. Major malformations do not seem to be a significant contributing factor. Nonetheless, disparities with CNN 2022 data were apparent. These findings underscore the imperative of implementing quality improvement initiatives to elevate neonatal care standards in Latin America and the Caribbean.

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