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Short Communication

Contribution of preivable live births to disparity in infant mortality of US-born Puerto Ricans compared with infants of other Hispanic origins

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ABSTRACT

Objectives: Although US-born Hispanics experience infant mortality rates (IMRs) which are lower than the national rate, within the Hispanic population, infants of Puerto Rican origin experience higher IMRs than other Hispanics. We aimed to describe the contribution of deaths among preivable live-born infants to disparity in IMRs comparing Puerto Rican infants to infants of other Hispanic origins.

Study design: Retrospective, descriptive analysis.

Methods: We analyzed data from the Centers for Disease Control and Prevention (CDC) WONDER online database representing linked US live births and infant deaths from 2005 to 2014. Data were stratified by race and ethnicity as well as by Puerto Rican and non-Puerto Rican Hispanic origin. Live births <23 weeks of gestation were classified as preivable. Ten-year IMRs were calculated as the number of deaths divided by the number of live births for each group over the entire decade.

Results: Puerto Rican IMR of 7.34 (per 1000 live births) was higher than the US rate of 6.34 as well as the non-Puerto Rican Hispanic IMR of 5.15. Approximately 22% of US deaths were attributable to preivable live births compared with 27% among Puerto Ricans and 20% among non-Puerto Rican Hispanics. The contribution to IMR of preivable births among Puerto Ricans measuring 1.96 per 1000 total live births was 42% higher than the US rate of 1.38 and 90% higher than the non-Puerto Rican Hispanic rate of 1.03.

Conclusions: Further research is needed to develop interventions to reduce disparity in preivable birth rates, particularly among infants of Puerto Rican origin.

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A nation's infant mortality rate (IMR), calculated as the number of deaths among children younger than 1 year of age per 1000 live births in the same year, is indicative of broader population health and social well-being.¹ Consequently, emphasis has been placed on identifying and reducing racial disparities in US IMRs.^{2–4} Previous research has reported that Hispanics paradoxically experience health advantages, including lower IMRs, compared with other minority populations.^{5,6} While taken as a single group, Hispanic IMRs have been similar to those of non-Hispanic whites for more than two decades.^{7,8} However, within the Hispanic population, which accounts for approximately 25% of US-born infants, disparities have been identified. Researchers have reported elevated IMRs among Puerto Rican infants compared with those of the general US population as well as in comparison to infants of other Hispanic origins.^{2,5,7} Racial differences in previsible live birth rates are one important contributor to IMR disparities among non-Hispanic black and white populations.^{3,4} We hypothesized that similar differences may explain disparities in the Hispanic population. Thus, we aimed to describe the contribution of previsible births to disparity in US-born Hispanic IMRs with a focus on infants of Puerto Rican origin.

For this retrospective, descriptive study, we obtained linked birth and infant death records from the Centers for Disease Control and Prevention (CDC) WONDER online database representing the 10-year period, 2005–2014.⁹ The number of infant deaths and live births represents complete counts and as a result are not subject to sampling error.¹⁰ Data were aggregated by race (non-Hispanic black, non-Hispanic white, and Hispanic) and by Hispanic origin (Central or South American, Cuban, Mexican, Puerto Rican, or other Hispanic). We calculated 10-year IMRs (as the total number of deaths per 1000 live births over the entire decade, 2005–2014) among racial and ethnic groups including calculations of contributions to IMR from deaths among previsible and viable live-born infants in each group.

Despite continued improvement in survival of early gestation infants, during the study period, the recommendation for standard procedure was to not resuscitate infants born before 23 weeks of gestation. Thus, for this analysis, live births occurring <23 weeks of gestation were classified as previsible. The contribution of deaths among previsible live births to IMRs was calculated as the number of reported deaths among live births <23 weeks of gestation divided by the total number of births at any gestational age in each racial or ethnic group. Deaths among previsible live births were subtracted from total deaths in each group to calculate an adjusted IMR indicating mortality from all causes among viable live-born infants (≥ 23 weeks of gestation). All calculations were performed using Excel 2013 (Microsoft Corporation).

Over the decade, the Puerto Rican 10-year IMR was 7.34 per 1000 live births compared with the total US rate of 6.34. Non-Puerto Rican Hispanic IMR was 5.15, and IMRs among all non-Puerto Rican Hispanic subgroups were lower than the total US rate: Central and South American, 4.46; Cuban, 4.51; Mexican, 5.21; other Hispanic, 5.84. As Puerto Rican IMR was the only Hispanic IMR higher than the overall US rate, subsequent analyses of Hispanic groups compared Puerto Rican

with non-Puerto Rican Hispanic populations. To determine the impact on outcomes of racial differences among Puerto Rican and non-Puerto Rican Hispanics, we included stratifications by black and white race within the Puerto Rican and non-Puerto Rican Hispanic populations. We did not include in our analysis those with other or unknown race within the Hispanic population.

In Table 1, we present total IMRs as well as previsible and viable components of IMR by race and Hispanic origin, with a focus on Puerto Rican and non-Puerto Rican Hispanic subgroups. We also list the number of previsible live births, the percentage of total live births with a previsible gestational age, the number and rate per 1000 of those previsible live births with a linked death record, and the percentage of total deaths comprised by those previsible infants. One limitation of the CDC WONDER linked data set is that even among previsible-aged infants, not all birth records were linked to a corresponding death record. The table also includes absolute risk differences comparing the number of reported deaths in a racial or ethnic group per 1000 births to the overall US rate. For example, for every 1000 Puerto Rican live births, there were 0.59 additional deaths among Puerto Rican infants with previsible gestational ages and 0.42 additional deaths among Puerto Rican infants with viable gestational ages resulting in 1.0 additional Puerto Rican infant deaths overall compared with the rate per 1000 US live births. Finally, each group's previsible and viable contributions to total IMR as a relative rate compared with the US IMR for the decade are presented. For example, while 21.7% of US deaths were attributable to previsible live births, the proportion was 26.7% among Puerto Ricans (20.0% among non-Puerto Rican Hispanics). The greatest proportion of deaths attributable to previsible live-born infants occurred within the Puerto Rican black population (28.7%) and only slightly higher than the proportion among non-Hispanic blacks (28.5%). The 26.7% proportion of previsible births among Puerto Rican white infant deaths was considerably higher than the proportion among either non-Puerto Rican white Hispanics (19.9%) or non-Hispanic whites (17.7%). The table similarly shows that with the exception of the non-Hispanic black population, the Puerto Rican groups had the highest percentages of live births within the previsible range—0.23%, 0.30%, and 0.22% of all Puerto Rican, Puerto Rican black, and Puerto Rican white births, respectively, compared with 0.17% of all US births.

Although Puerto Rican black and non-Puerto Rican black Hispanic IMRs were higher than the corresponding white Hispanic groups, less disparity was detected than in the comparison of non-Hispanic black and non-Hispanic white IMRs. Puerto Rican black and Puerto Rican white total IMR as well as previsible and viable IMR components were all elevated compared with the equivalent rates among all US births. Similarly, among non-Puerto Rican Hispanics, both black and white total IMRs were lower than the US rate as were the viable birth components of IMR. However, non-Puerto Rican black Hispanics had a slightly higher contribution to IMR from previsible births than the corresponding US rate.

The contribution to IMR of previsible births among Puerto Ricans measuring 1.96 per 1000 total live births was 42% higher than the US rate of 1.38 and 90% higher than the non-Puerto Rican Hispanic rate of 1.03 (or 0.59 per 1000 higher

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