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Contribution of deaths of despair to the Hispanic mortality advantage in the USA by person, place and time: an ecological analysis of vital registration data

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ABSTRACT

Introduction In the USA, Hispanics exhibit longer life expectancy (LE) compared to non-Hispanic whites despite facing greater socioeconomic adversity and greater health risk factors, a phenomenon known as the Hispanic paradox. With recent increases in mortality due to 'deaths of despair' among non-Hispanic whites and other groups it is important to understand the contribution of deaths of despair to the Hispanic mortality advantage overall and how it varies by age and geography.

Methods Using national mortality data across three decades (1990–2019) we calculated LE at birth for Hispanics and non-Hispanic whites, overall and by place (established Hispanic destinations before 1990, and new Hispanic destinations by 2000, 2010 and 2020). We used the Arriaga method to decompose the contribution of deaths of despair to the Hispanic mortality advantage by age, time and place.

Results The Hispanic mortality advantage has progressively increased over time for both females and males. For females 15–39 years of age, the contribution of deaths of despair to a Hispanic mortality advantage rose from 0.02 years in 1990–1994 to 0.25 years in 2015–2019. For males, the contribution changed from 0.02 years to 0.50 years in the same period. The contribution of deaths of despair to the Hispanic mortality advantage appears smaller in established destinations, potentially plateauing for younger individuals, while presenting a marginal Hispanic disadvantage among older individuals in these areas.

Conclusion Despite persistent socioeconomic disadvantages, US Hispanics have continuously held higher LE compared to non-Hispanic whites since 1990. Among other causes, this advantage reflects the sustained increase of deaths of despair in contributing to the Hispanic mortality advantage, but its significance varies across geography with lower contributions in established Hispanic destinations.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Despite their lower socioeconomic status, Hispanics tend to have similar or lower mortality rates, compared with non-Hispanic white individuals. Previous research has explored variations in the Hispanic mortality advantage by nativity, sex/gender, race, age and geographical location.

WHAT THIS STUDY ADDS

⇒ Few studies have attempted to investigate whether the noted Hispanic mortality advantage is influenced by specific causes of death. This study found that the contribution of deaths of despair to the Hispanic mortality advantage has increased over time with marked geographical variations. Counties characterised as established Hispanic destinations show smaller contributions of deaths of despair to the Hispanic mortality advantage.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This in-depth examination of the role of deaths of despair in the observed Hispanic mortality advantage highlights key sex, age and geographical differences. By comprehending the influence of cause-specific mortality on the Hispanic paradox across different regions, we can better focus interventions on the areas where they are most needed.

INTRODUCTION

Minoritised racial and ethnic populations in the USA generally have lower socioeconomic status (SES) compared with the non-Hispanic white (NHW) population[1 2] and individuals with lower SES are at higher risk for disease, mortality and disability compared with individuals with higher SES.[2 3] This distinct and persistent patterning of SES by race and ethnicity is important because SES is a fundamental driver of health and mortality inequity across the life course.[3–7] For example, non-Hispanic black individuals and Native Americans, who have lower SES compared with NHW, have 4 and 7 years shorter life expectancies relative to their NHW counterparts.[8] Despite non-Hispanic black and Hispanic

individuals having similar low socioeconomic profiles, Hispanics, on average, have similar or lower mortality rates, especially at older ages and among immigrants, compared with those of NHW individuals.[3 9–12] This well-documented epidemiological finding, the combination of low SES and advantageous mortality outcomes, is termed the Hispanic paradox.[13]

The Hispanic paradox has been theorised to stem from factors such as migration, cultural-social buffering effects and potential data artefacts.[14] In exploring this phenomenon, comparisons across demographic factors such as nativity,[15 16] sex/gender,[17] race,[18] age[19] and geographical location[2] could offer insights into potential mechanisms or causes and help support or challenge hypotheses regarding the paradox, while also revealing crucial health inequities. For example, foreign-born Hispanics have a greater mortality advantage than US-born Hispanics.[3 12 18] Moreover, the Hispanic advantage among foreign-born Hispanics seems to be concentrated in older age groups, while it is absent in younger Hispanics.[15] Among the potential explanations for this age differential is that younger Hispanic immigrants are more vulnerable to negative influences of acculturation including poor dietary habits and other health behaviours in addition to lower migration return rates at younger ages or the absence of a 'salmon-bias' at younger ages.[15] There are also racial disparities in mortality among US-born Hispanics that resemble those observed in the non-Hispanic population.[18] Additionally, there are geographical variations to this pattern, as Hispanics living in areas with more established Hispanic populations (ie, where Hispanics make up 10% or more of a county's population) have a narrower mortality advantage compared with Hispanics living in areas with a less established Hispanic population.[2] Previous research has found that in less established destinations (eg, small, rural or suburban areas in the south or Midwest), factors such as concentrated disadvantage (ie, measure of socioeconomic conditions), per cent employed in manufacturing and social capital have been linked to larger mortality gaps between Hispanics and NHWs due to their influence on white mortality rates.[2] Additionally, independent of destination type, the percentage of recent Hispanic immigrants was also associated with larger mortality gaps, suggesting a compositional effect, where recent immigrants might exhibit better health compared with their native or earlier arriving counterparts.[2]

A few studies have sought to address whether the observed Hispanic advantage is driven by the relative influence of specific causes of death.[9] For example, the gap in life expectancy at age 50 between NHW and Hispanics in the USA from 1990 to 2010 was greater for females than males, especially due to smoking-related deaths.[20] However, the contribution of smoking to the paradox declined over time while the contribution of other causes increased. Deaths due to suicide, accidental drug and alcohol poisonings and alcohol-related liver disease (ALD), often grouped together as 'deaths of despair',[21] have increased in the USA over the last two decades and have contributed to increases in mortality, especially among midlife NHW.[21 22] While these causes may have initially contributed to the observed Hispanic paradox, recent studies that have explored trends in these deaths among other racial and ethnic groups have found that increases in deaths of despair are not restricted to NHW individuals.[23 24]

We build on recent studies by exploring trends in the Hispanic mortality advantage between 1990 and 2019 and examining to what extent the Hispanic advantage has changed due to deaths of despair among Hispanics, and whether there are individual-level (age, sex) or place-level (concentration and stability of the Hispanic population in the county) factors that modify the impact. We use vital statistics and census data to calculate all-cause mortality among Hispanics and NHW over time by sex, age and geography. We hypothesise that:

a. The Hispanic mortality advantage decreases over time because deaths of despair seem to be rising among Hispanic individuals.
b. The Hispanic mortality advantage varies by age category with younger Hispanic populations exhibiting lower or no mortality advantage.
c. Deaths of despair contribute to a wider Hispanic mortality advantage among older Hispanics and in areas with less established Hispanic communities (defined as areas with recent Hispanic population growth).

METHODS

Study setting and sources

We used data on deaths occurring from 1990 to 2019 among persons who were residents of the USA. Vital registration records with data on cause of death, county of residence, age, race, ethnicity and sex were collected from restricted data from the National Center for Health Statistics (NCHS).[25] Population data by county of residence, age, race and ethnicity was obtained from the US Census intercensal population estimations. Due to issues in the assignment of Hispanic ethnicity in vital registration or population denominators in specific states, we followed the NCHS policy for excluding states when calculating Hispanic or non-Hispanic mortality rates. We excluded data from Louisiana in 1990, New Hampshire 1990–1992 and Oklahoma 1990–1996.[26] This exclusion represents 0.4–0.8% of the Hispanic US population in those years.

Measures

Mortality rates

To calculate age, sex and race/ethnicity-specific mortality rates we pooled data into 5-year time periods between 1990 and 2019 (1990–1994, 1995–1999, etc). Age was categorised into 0–1 years, 1–4 years and 5-year groups thereafter (5–9, 10–14, etc), up to ages 85+ which were used as the open-ended age group. Sex compared males to females. The analysis was limited to NHW and Hispanic

individuals. Race and ethnicity were combined into an ethnoracial construct and operationalised as Hispanic versus NHW. Hispanics could be of any race. Last, while we excluded state-year observations with very poor ethnicity data (see above), there may also be remaining measurement errors of ethnicity in death certificates. To address this, we used age, sex and ethnicity-specific correction factors to upweight or downweigh mortality counts.[27]

Hispanic destination categories

We divided US counties based on the size of the Hispanic population and their growth from 1990 to 2020. We used similar methods as those described by Monnat in their categorisation of Hispanic counties: established, new and non-destinations.[28] Established counties are defined as counties where the per cent Hispanic population in 1990 was at least 10% (above the national average). New 2000 destinations are non-established counties (less than 10% Hispanic population by 1990) that (1) experienced Hispanic population growth of at least 150% and (2) grew by at least 1000 Hispanics between 1990 and 2000. Moreover, new 2010 destinations were those that did not meet the criteria to be categorised as new 2000 destinations based on growth between 1990 and 2000 but did meet the criteria based on Hispanic growth between 1990 and 2010. Finally, new 2020 destinations were those that did not meet the criteria to be categorised as established or new early destinations based on growth between 1990 and 2000 but did meet the criteria based on growth between 1990 and 2020. All other counties were considered not to be Hispanic destinations and not included in the analysis by place. A map of the counties by Hispanic destination type can be found in online supplemental figure 1. We modified the criteria for counties with less than 20 000 inhabitants where the absolute growth of the Hispanic population by 1000 was waived and instead we classified smaller counties if the per cent Hispanic exceeded the national average in 2000 (12.5%), 2010 (16.3%) and 2020 (19%), respectively.

Deaths of despair

To categorise the cause of death we regrouped the International Classification of Diseases, 9th and 10th revision (ICD-9 until 1999, and ICD-10 from 1999 onwards) codes using the list of codes available in online supplemental table 1. Deaths of despair are defined as deaths due to suicide, drug and alcohol poisoning and chronic liver disease and cirrhosis.[21] In secondary analyses, we disaggregated deaths of despair into suicide, poisoning-related (drug and alcohol poisonings) and liver-related (chronic liver disease and cirrhosis).

Statistical analyses

We conducted this analysis in three steps. First, we computed sex and race/ethnicity-specific life expectancy (LE) for each 5-year period from 1990 to 2019 (eg, 1990–1994, …, 2015–2019). For this, we used age-specific and sex-specific mortality rates and abridged life tables.[29] We computed the Hispanic mortality advantage as the gap (difference) in LE between Hispanics and NHW. A positive number meant Hispanics had an advantage compared with NHW. A negative number meant Hispanics had a disadvantage compared with NHW. We also computed the relative advantage as the ratio between Hispanics and NHW, with >1 meaning a Hispanic advantage and <1 meaning a Hispanic disadvantage.

Second, to examine whether the Hispanic mortality advantage has a strong age component and to assess the contributions of deaths of despair to this advantage, we used the Arriaga method[30] which decomposes differences in LE into differences in age and cause of death components. The age decomposition consists of the sum of two effects: the direct number of years that an age group adds to the LE gap, due to higher mortality in the specific age group in each racial or ethnic category; and the indirect effect on the higher mortality in that age group, leaving fewer survivors and affecting all later age groups in the life table. The age contribution is further divided into the number of years contributed by cause. The total contribution is simply the sum of across all age groups.

Finally, to assess whether place, or type of Hispanic destination (established Hispanic destination vs new Hispanic destinations) changed our results, we stratified mortality data by destination type and re-ran the analysis using stratified data. All analyses were conducted in R V.4.2.1.[31]

RESULTS

Trends in the Hispanic mortality advantage

Figure 1 shows the trends in the Hispanic mortality advantage, measured as the difference in years in LE at birth between Hispanics and NHWs. Online supplemental figure 2 shows LE at birth by race, ethnicity and sex over time. While the Hispanic mortality advantage among females has a J-shaped curve, the mortality advantage among males increases consistently although at a slower pace in the first and last 5 years. Nonetheless, across time females experience a greater absolute advantage than males. Furthermore, the gap between males and females becomes less pronounced with time. In 1990–1994 Hispanic males had an additional 1.6 years of LE at birth compared with NHWs (74.8 vs 73.2 years) while Hispanic females had 3.6 years of additional LE at birth (83.4 vs 79.8). By 2015–2019, Hispanic males had an additional 4.1 years of LE at birth compared with NHWs (80.4 vs 76.3). In the same period, 2015–2019, Hispanic females had an additional 4.7 years of LE at birth compared with NHW females (85.9 vs 81.2 years). Online supplemental figure 3 shows the relative advantage, showing similar trends.

Contribution of age to the Hispanic mortality advantage

Over time, younger age groups contributed less to a Hispanic mortality advantage than older age groups

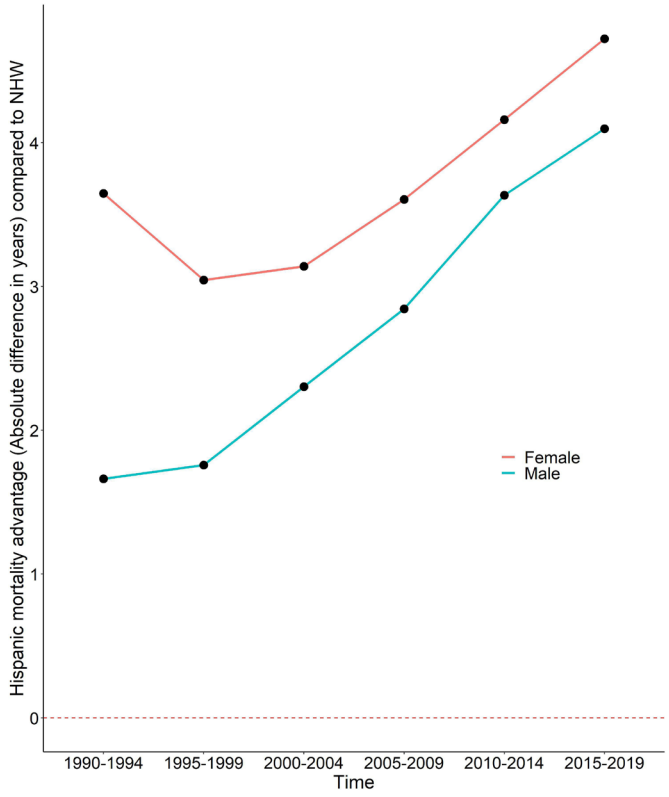

Figure 1 Trends in the Hispanic mortality advantage by sex from 1990 to 2019 in the USA. Hispanic mortality advantage refers to the absolute difference in life expectancy at birth between Hispanics and non-Hispanic whites. NHW, non-Hispanic white.

(figure 2). For both females and males, the contribution of those over 50 years of age to the Hispanic mortality advantage saw a small decline between 1990–1994 and 2000–2004 before increasing again in later periods. For example, among males, those over 50 years of age contributed to an increase in the Hispanic mortality advantage by 2.7 years in 1990–1994, this was reduced to 2.1 years by 2000–2004 and increased to 3.2 years by 2015–2019. Similarly, among females, those over 50 years of age contributed to an increase in the Hispanic mortality advantage by 3.8 years in 1990–1994, this was reduced to 2.8 years in 2000–2004 and increased to 4.1 years by 2015–2019.

For males, age groups 0–49 years of age contributed to a decrease in the overall Hispanic mortality advantage between 1990–1994 by 1.03 years and by 0.28 years in 1995–1999. This contribution to a decrease in the Hispanic mortality advantage is reversed in subsequent years and by 2015–2019, this age group contributed to an increase in the Hispanic mortality advantage by 0.86 years. For females, age groups 0–49 years of age contributed to a decrease in the overall Hispanic mortality advantage between 1990 and 1994 by 0.15 years. This contribution is reversed thereafter and by 2015–2019, this age group contributed to an increase in the Hispanic mortality advantage by 0.67 years.

Age cause decomposition

Figure 3 shows results from the age-cause decomposition of the difference in LE between Hispanics and NHWs specifically for deaths of despair. Among both females and males, deaths of despair play an increasingly important role in the Hispanic mortality advantage over time in those 15–39 and 40–64 years of age, suggesting that mortality rates for deaths of despair are increasing in these age groups among NHWs. For example, in 1990–1994, deaths of despair among females 15–39 years of age contributed to a Hispanic mortality advantage of 0.02 years. By 2015–2019, deaths of despair among females 15–39 years of age contributed to a Hispanic mortality advantage of 0.25 years. Similarly for males, in 1990–1994, deaths of despair among those 15–39 years of age contributed to a Hispanic mortality advantage by 0.02 years and by 2015–2019, this rose to 0.50 years. While deaths of despair in males 40–64 years of age contributed to a decrease in the overall Hispanic mortality advantage between 1990–1994 and 2000–2004, it contributed to an increase in the overall Hispanic mortality advantage between 2005–2009 and 2015–2019, indicating that mortality rates for deaths of despair were higher for Hispanic males in earlier years. For example, in 1990–1994, deaths of despair among males 40–64 years of age contributed to a decrease in the overall Hispanic mortality advantage by 0.16 years but by 2015–2019 deaths of despair among this age group contributed to an increase in the overall Hispanic mortality advantage by 0.23 years.

In contrast, across all time periods, deaths of despair contribute to a decrease in the Hispanic mortality advantage for females and males over 65 years of age, suggesting an important role of deaths of despair among older Hispanics (or less importance among NHW). However, this contribution to a decrease in the Hispanic advantage is minimal (in 2015–2019 it was 0.02 years for females and 0.01 years for males).

Online supplemental figure 4 shows the age-cause decomposition relative to all other causes. Deaths of despair are major contributors to the Hispanic advantage in younger (15–39) and midlife adults (40–64) between 2010–2014 and 2015–2019 periods for both females and males.

Online supplemental figure 5 shows the age cause decomposition of the difference in LE between Hispanics and NHWs for deaths of despair but disaggregates deaths of despair into its component causes. For both females and males, while suicide and poisoning deaths contribute to an increase in the Hispanic mortality advantage over time (with the exception of poisonings in males in the 1990–1994 period), deaths due to ALD contributes to a decrease in the Hispanic mortality advantage in most age-sex-time periods. For example, in 1990–1994, ALD among males 15–39 and 40–64 years of age contributed to a decrease in the overall Hispanic mortality advantage by 0.03 years and 0.17 years, respectively. The contribution of ALD to a decrease in an overall Hispanic mortality

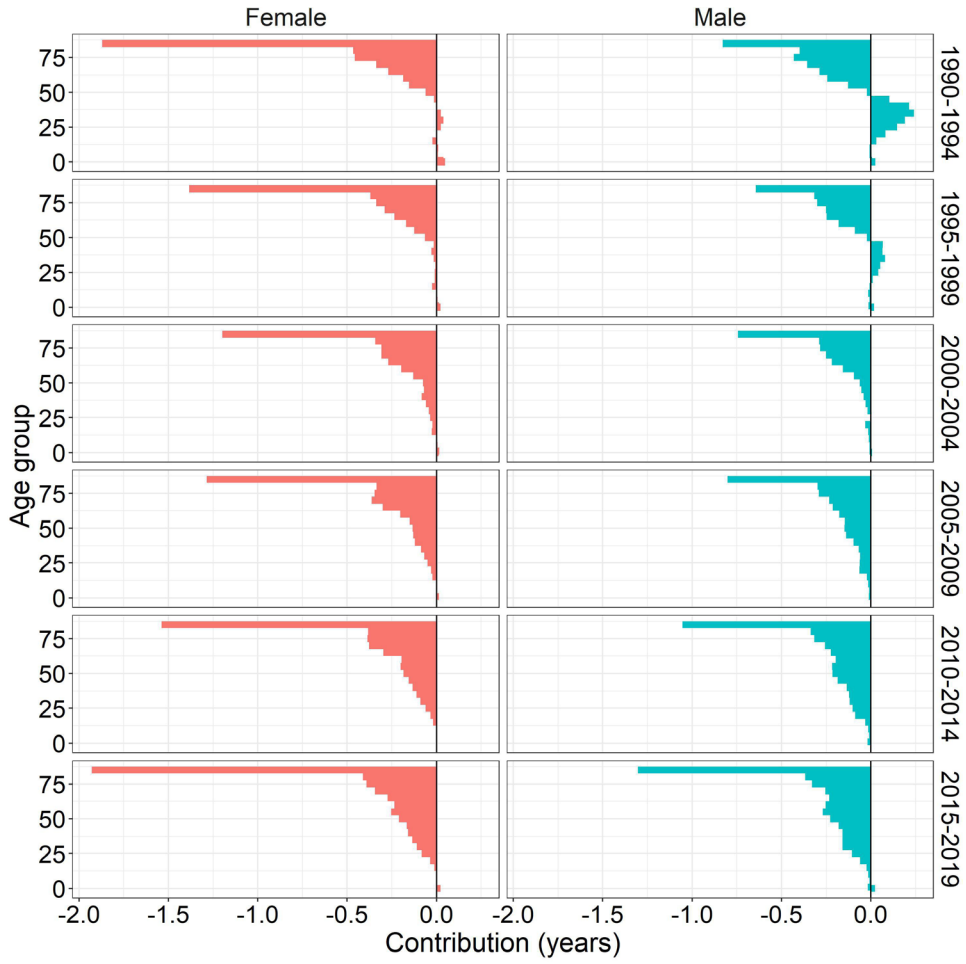

Figure 2 Contribution (in years) of all-cause age-specific death rates to the difference in life expectancy at birth between Hispanics and non-Hispanic white females and males over time. The sum of contributions over age results in the total difference in life expectancy at birth between Hispanics and non-Hispanic whites during the specific period.

advantage is especially consistent over time for older Hispanics but decreases over time for midlife males.

Hispanic advantage by destination type

Based on Hispanic growth rate, 333 counties were classified as established destinations, 316 as new 2000 destinations, 581 as new 2010 destinations, 283 as new 2020 destinations and 1626 did not have a sizeable Hispanic population so were excluded from this analysis. Trends in the Hispanic mortality advantage by destination type are shown in figure 4. Established destinations have less of a mortality advantage than other destinations with a decrease in the Hispanic mortality advantage between 1990–1994 and 2000–2004 and then slight increases thereafter for both males and females. For example, in established destinations, while Hispanic females had 2.8 years higher LE than NHW females in 1990–1994, by 2000–2004 this difference had dropped to 2.1 years. By 2015–2019 the difference in LE between Hispanic females and NHW females in established destinations had increased to 2.7 years. In contrast, in 2015–2019, the difference in LE between Hispanic females and NHW females was 6.9 years in new 2000 destinations, approximately 6.3 years in both new 2010 destinations and new 2020 destinations. Furthermore, females exhibit a greater mortality advantage than males consistently over time. New 2000 destinations showed the greatest mortality advantage across time followed by New 2010 and 2020 destinations. However, in new 2000 destinations we have observed a stagnation or even decline of the Hispanic mortality advantage, while for new 2010 or 2020 destinations the advantage keeps increasing. In new 2000 destinations, the difference in LE between Hispanic females and NHW females was 9.4 years in 1990–1994 and has oscillated between 6 and 7 years thereafter. Importantly, the sex gap in the mortality advantage seems to apply only for established destinations, as all new destinations have no or little sex differences.

Age cause decomposition by destination type

Figure 5 shows the contribution of deaths of despair by age to the Hispanic mortality advantage by destination type. For females and males 0–14 years of age across all destinations, deaths of despair have little to no influence on the difference in LE between Hispanics and NHWs. For example, in established destinations in 1990–1994, deaths of despair contributed to a decrease in the overall Hispanic mortality advantage by 0.001 years for females

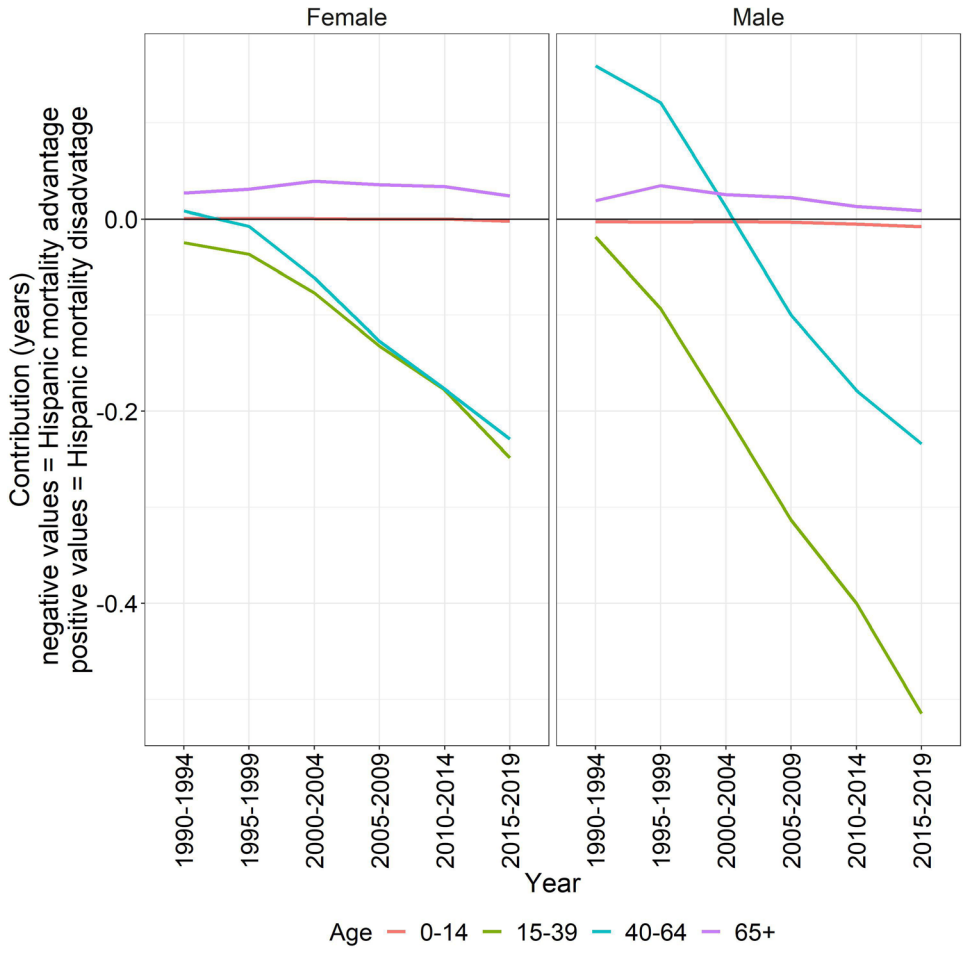

Figure 3 Contribution of deaths of despair to the differences in life expectancy between Hispanics and non-Hispanic white females and males by age across time. Negative values indicate a contribution to an increase in the Hispanic mortality advantage and positive values indicate a contribution to a decrease in the Hispanic mortality advantage.

and an increase in the overall Hispanic mortality advantage by 0.002 years for males. The contribution of deaths of despair at the other end of the distribution (ages 65+), shows some consistent small contribution to a decrease in the Hispanic advantage across time in established Hispanic destinations. For example, in established destinations in 1990–1994, deaths of despair contributed to a decrease in the overall Hispanic mortality advantage by 0.03 years for both females and males. Meanwhile, a small contribution to an increase in the Hispanic advantage is evident across time for males but not females in other types of destinations. For example, in new 2000 destinations, deaths of despair in males 65+ contributed to an increase in the Hispanic mortality advantage by 0.05 years in 1990–1995 and 0.03 years by 2015–2019.

For females, the contribution of deaths of despair to the Hispanic mortality advantage seems to be increasing with time across younger and midlife adults (15–39 and 40–64), except for a plateauing of this contribution in established destinations in 2010–2014 and onwards, especially among younger females 15–39 years of age. For example, in new 2000 destinations, deaths of despair among younger females 15–39 years of age contributed to an increase in the Hispanic mortality advantage by 0.05 years in 1990–1994 and 0.28 years by 2015–2019. For males, we found very similar patterns, with stronger increases in the contributions to the overall mortality advantage compared with females, especially in the 15–39 age group. For example, in new 2000 destinations, deaths of despair among males 15–39 years of age contributed to an increase in the Hispanic advantage by 0.16 years in 1990–1994 and 0.55 years in 2015–2019.

Online supplemental figures 6 and 7 show results from our decomposition analyses disaggregating deaths of despair by type (deaths due to suicide, drug and alcohol poisoning and deaths due to chronic liver disease and ALD) and by Hispanic destination type, for females and males, respectively. For females in established Hispanic destinations, while deaths due to drug and alcohol poisoning have contributed increasingly to an increase in the Hispanic mortality advantage particularly between those 15–64 years of age, ALD mortality among those 65–89 years of age has contributed increasingly to a decrease in the Hispanic mortality advantage, especially compared with newer destinations where this contribution of ALD is weaker. For example, in 2015–2019 in established destinations, ALD mortality for females and males 65 years of age and older contributed to a

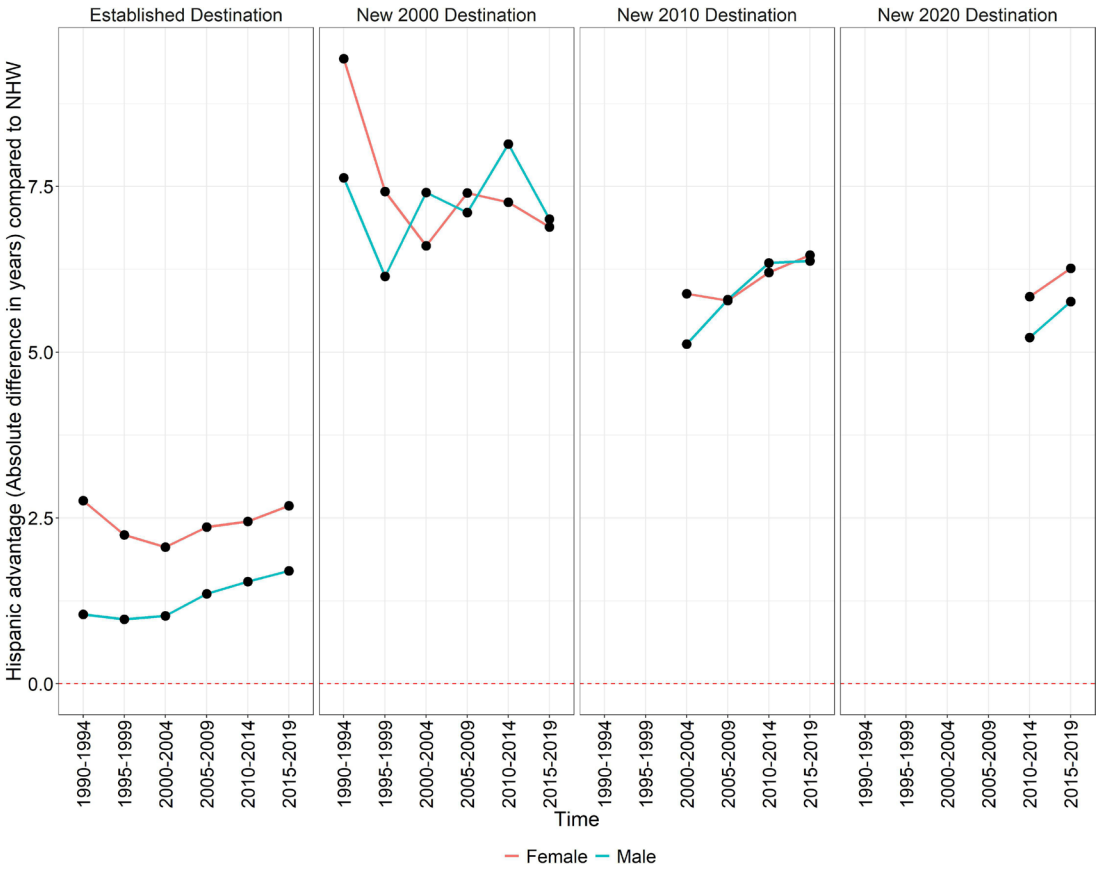

Figure 4 Trends in the Hispanic mortality advantage from 1990 to 2019 in the USA by sex and destination type. Hispanic advantage refers to the absolute difference in life expectancy at birth between Hispanics and non-Hispanic whites. NHW, non-Hispanic white.

decrease in Hispanic mortality advantage by 0.06 years. In fact, among males, ALD mortality in those 15 years of age and older consistently contributes to a decrease in the Hispanic mortality advantage in those living in established Hispanic destinations but not those living in other destinations. For example, in 2015–2019 in established destinations, ALD mortality for males 15 years of age and older contributed to a decrease in Hispanic mortality advantage by 0.15 years.

DISCUSSION

In this paper examining the contribution of deaths of despair to the Hispanic mortality advantage, we found three key results. First, contrary to our hypothesis we found that the Hispanic mortality advantage has been increasing over time for both females and males although in recent years this increase has slowed for males. Consistent with our hypothesis these patterns are primarily driven by a greater advantage among older adults with younger adults displaying less advantage, including an initial disadvantage for males. Second, contrary to our hypothesis the contribution of deaths of despair in those 15–39 and 40–64 years of age to the Hispanic mortality advantage has been increasing over time, reversing from contributing to a decrease in the Hispanic mortality advantage for males 40–64 years of age to contributing to Hispanic mortality advantage by 2000–2004. Third, while deaths of despair in those 15–39 and 40–64 years of age contribute to a Hispanic mortality advantage across destinations and time, the contribution in established destinations is smaller than the contribution in newer destinations. This is especially true for males and females 15–39 years of age, for whom the contribution of deaths of despair to a Hispanic mortality advantage in established destinations may have plateaued in recent years. We also found that the contribution of specific causes of death of despairs varied widely, with liver disease generally contributing to a lower advantage.

We found an increase in the Hispanic mortality advantage over time for both female and males although the increase appears to slow for males between 2010–2014 and 2015–2019. This finding is consistent with earlier work exploring the Hispanic mortality advantage between 1990 and 2010, which found a widening Hispanic mortality advantage compared with NHW.[20] More recently, a 2016 NCHS report found small LE gains for NHW adults compared with other groups including Hispanics.[32] Additionally, a recent study exploring premature mortality in adults 25–64 years of age found excess mortality in whites compared with a decrease in premature mortality in Hispanics.[33] Yet, some scholars have started to question whether the Hispanic mortality advantage may soon

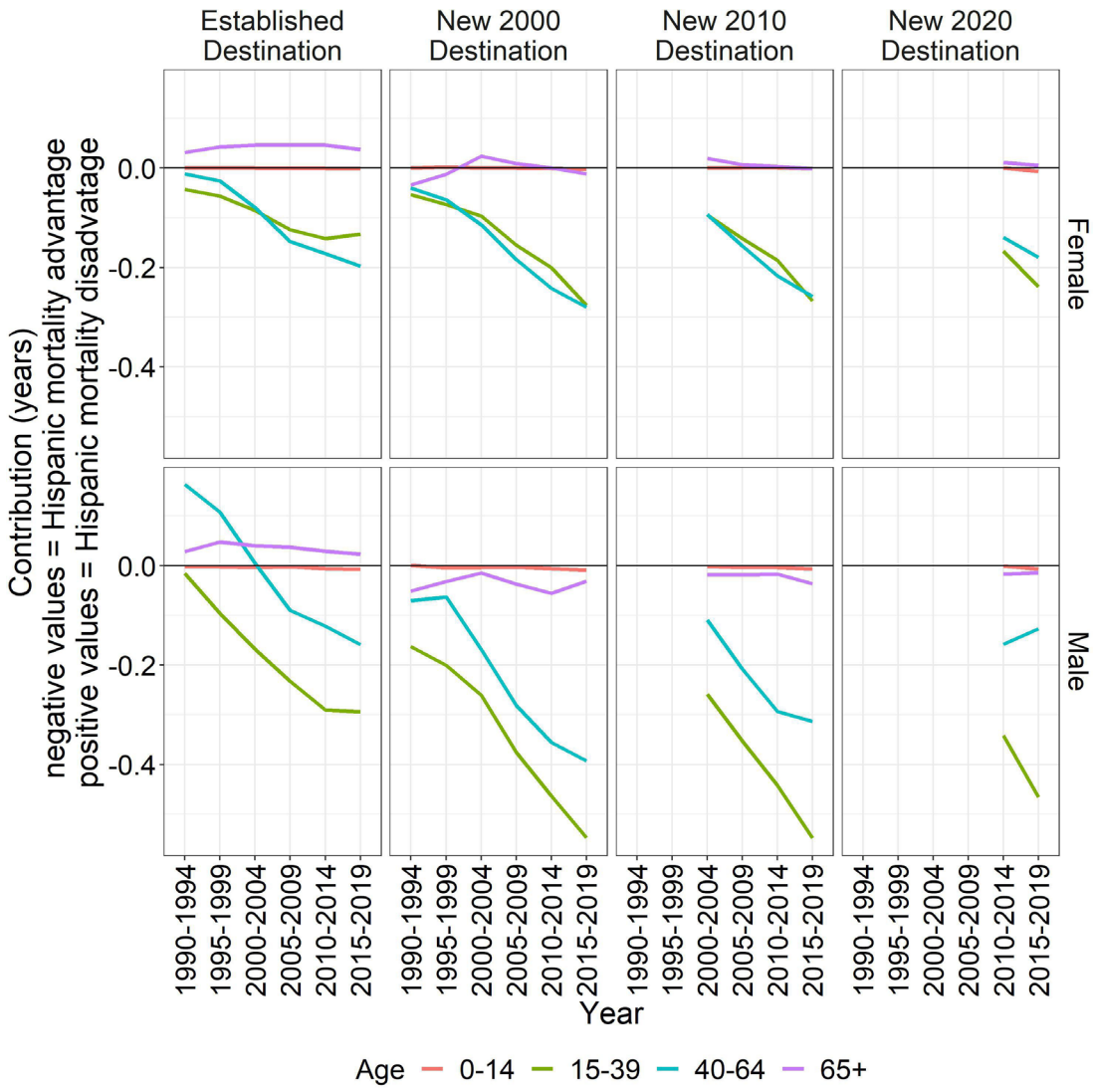

Figure 5 Decomposition of differences in life expectancy between Hispanics and non-Hispanic white females and males by deaths of despair and age in different types of Hispanic destinations across time. Negative values indicate a contribution to an increasing Hispanic mortality advantage and positive values indicate a contribution to a decreasing Hispanic mortality advantage.

decline citing increases in obesity, diabetes and other chronic conditions among US Hispanics.[34–36] Moreover, studies have pointed to increases in midlife mortality across race and ethnic groups including Hispanic populations.[37] Nonetheless, we did not find evidence of a decline in the Hispanic mortality advantage between 1990 and 2019. Although not examined here, recent analysis incorporating data from 2020 has explored changes in Hispanic mortality attributed to the COVID-19 pandemic and found important declines in the Hispanic mortality advantage in more recent years,[38] with Hispanics exhibiting much higher (but declining) excess mortality rates compared with NHW during 2020 and 2021.[39]

Our finding of a greater contribution to the mortality advantage among older versus younger Hispanics is consistent with previous studies exploring age variation in the Hispanic paradox.[9 40 41] One study comparing mortality rates in Hispanic and NHW in California found worse mortality rates in Hispanic males 15–19 and 20–24 years of age, labelling this the Hispanic adolescent male mortality peak.[40] A more recent national study looking at the Hispanic paradox in Hispanic subgroups found that the advantage for Mexican Americans and Puerto Ricans at older ages did not extend to younger adult ages.[41] In fact, among Mexican Americans 25–64 years of age, both US-born and foreign-born, there was a mortality disadvantage relative to NHW partially due to external causes of death.

Our finding that death of despair among those 15–39 and 40–64 years of age contributed to an increase in the Hispanic mortality advantage supports previous studies that point to a disproportionate effect of deaths of despair on white adults compared with minoritised racial and ethnic groups.[21] However, when separating deaths of despair into its component causes, we found that unlike drug and alcohol poisoning and suicide, deaths due to liver disease contributed to a decrease in the Hispanic mortality advantage for females 65–89 and males 15–89

years of age. Previous research that has found that adolescent and young adult behaviour consistent with despair outcomes (ie, heavy drinking, drug use and suicidal ideation) between 1994 and 2017 was similar across all race/ethnic groups.[42] Future research is needed to explore why the observed mortality patterns emerge despite evidence of similar risky behaviour during adolescence. These differences in the contribution of the component causes of deaths of despair to the Hispanic mortality advantage go against the idea of a common cause (usually named despair) for these types of deaths.

Our finding that deaths of despair contributed to a wider Hispanic mortality advantage in non-established destinations compared with established destinations lends support to previous work that has found less advantage in mortality rates in established Hispanic communities.[2] These differences across destination types may be driven by differences in generation with newer Hispanic destinations likely to hold a greater number of first-generation immigrants. One study exploring risk factors for opioid misuse found that the prevalence of prescription opioid misuse in older generation Hispanics surpassed that of NHW and that for non-US born Hispanics, each year lived in the USA was linked with 6% increased odds of prescription opioid misuse.[43] Scholars have theorised that the stress of being an ethnic minority in the USA, coupled with enduring structural oppression and systemic inequality, may lead to the adoption of unhealthy coping mechanisms such as substance misuse. However, our results should not be interpreted as referring necessarily to new Hispanic immigrants, but rather to Hispanics living in areas with increases in the Hispanic population which may or may not translate to new Hispanic immigrants.

This study had several limitations. First, we were not able to assess variation in the Hispanic mortality advantage by Hispanic subgroups. Previous studies have found differences in mortality patterns and advantage between Hispanic subgroups.[33 41] Second, we have no data on immigration legal status or citizenship. A recent study exploring differences in physical and mental health between Hispanics and NHW found better health outcomes between undocumented Hispanics versus documented Hispanics when compared with NHW.[44] Third, we have no data on nativity (different from citizenship). Several studies have found that many immigrant groups including Hispanics have a mortality advantage compared with their native-born counterparts.[15 16] Fourth, we followed NCHS guidelines and tried to limit coding bias by (1) restricting the analysis to states and years when Hispanic ethnicity was better captured, and (2) applying age, sex and ethnicity correction factors to mortality counts. However, differences in coding practices across states may still have influenced our results. Research exploring misclassification on birth certificates has found that while misclassification for Hispanics has declined overall (5% for deaths in 1990–1998 to 3% for deaths in 1999–2011), there is wide variation by place, with misclassification being higher in areas with low Hispanic concentration compared with areas with high Hispanic concentration. If the misclassification of race/ethnicity in areas of less establish destination leads to an underestimation of mortality, that would mean that our observed advantage would be overestimated in those areas. Finally, Hispanic death rates could be influenced by the so called 'salmon bias' in which the outmigration of individuals counted as part of the population are said to underestimate the true mortality rate experienced in the Hispanic population. Nonetheless, previous findings have suggested that the effect of a potential salmon bias is not strong enough to explain the Hispanic mortality advantage.[12 45] Despite these limitations, this study has several strengths. First, it provides a comprehensive analysis of the Hispanic mortality paradox across Hispanic immigrant destination place, age and time simultaneously. These factors have been previously studied independently.[2 19] Moreover, we have explored the role of deaths of despair in driving the observed differences in longevity between Hispanics and NHW across person, place and time. Although previous studies had looked at cause-specific contributions to the Hispanic mortality advantage such as smoking,[20 46] to our knowledge no other study had explored how deaths of despair contribute to this advantage.

CONCLUSION

We found that the Hispanic mortality advantage compared with NHW is heterogeneous across different Hispanic destinations and that deaths of despair specifically among young and middle-aged adults have contributed to a rise in this advantage. The rise of new Hispanic destinations across the USA has led to an increased interest in exploring the spatial heterogeneity of the Hispanic paradox.[2] The observed geographical heterogeneity in the contribution of deaths of despair to the Hispanic mortality advantage suggests a need for close surveillance of the problem of deaths of despair among younger Hispanics in established Hispanic destinations where the Hispanic mortality advantage is lower, and trends have plateaued. Future research would benefit from deeper exploration between Hispanic subgroups (ie, by nativity, citizenship and country of origin). Understanding the contribution of various causes to the Hispanic paradox across space and demographic characteristics can help target potential interventions to the appropriate areas.

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