

# Why Is Infant Mortality in the United States So Comparatively High? Some Possible Answers

**Peter Muennig**  
Columbia University

**Megan M. Reynolds**  
University of Utah

**Boshen Jiao**  
Columbia University

**Roman Pabayo**  
University of Alberta

**Abstract** The infant mortality rate (IMR) is the rate of death of children younger than one year of age. In the United States, the IMR has been declining over time. However, it has been declining much more slowly than in other nations. As a result, the US global ranking in IMRs is also declining. This analytic essay explores some of the reasons why it might be undergoing this relative decline by critically dissecting secondary sources of data. We found that slow progress in reducing IMR over the past decade is partly due to lower birth rates among immigrants, who tend to have healthier babies than native-born mothers. However, this does not explain longer-term trends, which reveal a relative decline in the well-being of women of reproductive age. We speculate that longer-term declines are partially due to a deemphasis on government health and antipoverty programs. This deemphasis results not only in weaker socioeconomic support but also in rising medical costs, which are consuming an increasingly larger share of Americans' declining disposable income.

**Keywords** immigration, socioeconomic status, infant mortality, United States

The first year of life is an especially fragile time. The mortality rate during this period of life—referred to as the infant mortality rate (IMR), or the number of deaths of infants younger than one year per 1,000 live births, in a given calendar year—can be fifteen times higher than the rate for the second year of life (Murphy, Xu, and Kochanek 2013). The risk of infant mortality is highest around the time of birth, but it remains elevated for months afterward (Anderson 1999). IMRs are thought to be linked to both social and health service factors (Kruk et al. 2007). At the time this study

was conducted, the United States ranked about fiftieth internationally with respect to IMR (Murphy, Kochanek, and Xu 2015).

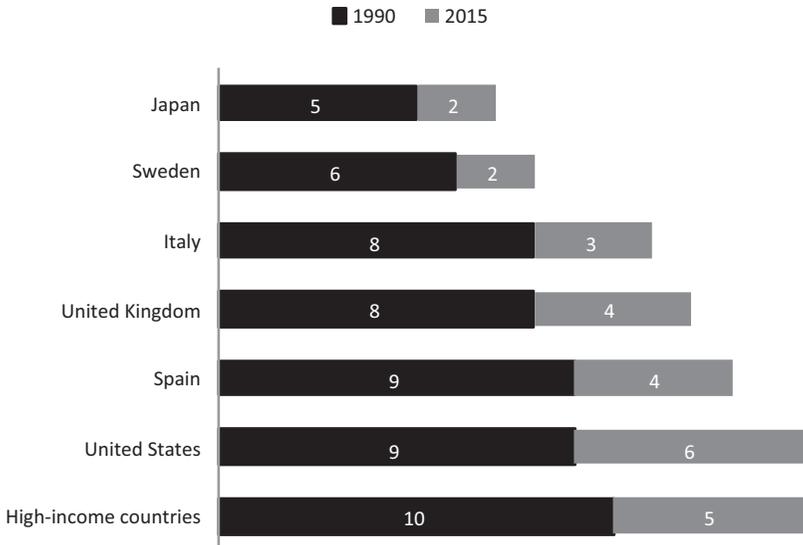
### **Is the United States Really Worse Off than Other Nations?**

One reason offered for its poor international performance is that the United States defines *infant mortality* differently than do other nations. For example, there are inconsistencies in what constitutes an infant *death* and what constitutes a *miscarriage* across nations (Hahn, Mulinare, and Teutsch 1992; Singh and Yu 1995). There may also be differences in the accuracy of infant mortality reporting across nations (Singh and Yu 1995).

Chen, Oster, and Williams (2015) set out to understand the extent to which variations in definitions of infant death—statistical artifact—might explain international differences in IMR rankings. Using detailed microdata for births, which allows IMRs to be defined in a standardized manner, they found that such variations may account for up to 40 percent of the current US disadvantage relative to Austria and Finland. Moreover, they discovered that most of the disadvantage between the United States and these comparison countries derives not from neonatal mortality (the first month of life) but from post-neonatal mortality (the following eleven months), which is likely to occur after the infant is discharged. This suggests US infant deaths are unlikely to be related to health service factors alone, or even primarily. Finally, Chen, Oster, and Williams found that whites with similar educational attainment had comparable birth outcomes across peer nations, suggesting race is a key driver of international differences in IMRs. We are left to conclude that social factors, rather than the health care delivery system, might have substantial power in explaining the US IMR rankings.

### **What Can We Learn from Comparative Trends?**

While international microdata are helpful, they are nonetheless limited to a few nations and the few variables that are consistently measured across those nations. One way of overcoming the problems inherent to international comparisons is to look at historical trends, rather than point-in-time snapshots, across countries. IMRs tend to improve within any given nation over time. Indeed, in the United States, the IMR declined over 80 percent between 1960 and 2014—from 26 to 6 deaths per 1,000 births (Matthews and Driscoll 2017).



**Figure 1** Change in Infant Mortality Rates over Time in the United States and Five Comparison Nations, 1990 and 2015

*Source:* Centers for Disease Control and Prevention 2017

*Note:* Numbers represent deaths per 1,000 births

This is a substantial decline, but is it large in comparison to other nations? Figure 1 shows that the US IMR was similar to IMRs of other peer nations several decades ago. However, over time, the rate of decline in the United States has been relatively slow. As a result, the IMR in the United States is now higher than in peer nations (Liu et al. 1992). Figure 1 shows that the United States actually had a somewhat lower IMR than the average for other high-income countries in 1990, as evidenced by the shorter black bar. By 2015, it had a higher IMR, as evidenced by the longer gray bar. This trend is even greater when the United States is compared with all nations (Centers for Disease Control and Prevention 2017).

These relatively worsening trends within the United States pose a challenge to Chen, Oster, and Williams's (2015) conclusion that the United States is not performing as badly as we thought relative to its counterparts with respect to IMRs. Given that national definitions of infant mortality do not tend to change over time, this supports our contention that the US disadvantage in observed IMR is likely to arise from structural conditions rather than statistical artifact.

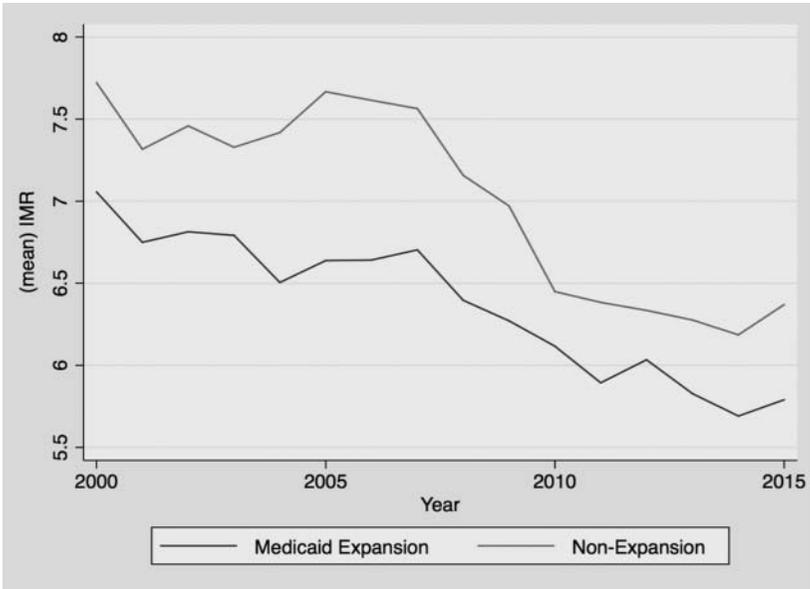
## What about the Health Care Delivery System?

Health services are one of the oft-cited structural conditions influencing health outcomes. In terms of serious illness requiring state-of-the-art care, if they can afford to, most individuals would probably prefer to have a complicated pregnancy treated in the United States. US health care quality is broadly perceived to be superior to that of most other nations. A slight majority of women delivering babies in the United States qualify for Medicaid, and Medicaid recipients, particularly urban dwellers, tend to have access to the highest-quality care through academic medical centers located in major metropolitan areas. Coverage for pregnant women has varied over time but has generally improved up to 2017 (Iglehart 1999; Kaiser Family Foundation 2017).

However, for uninsured women the costs have risen substantially over recent decades. This is especially problematic for uninsured women in poor states, where coverage for low-income people is limited and academic medical centers are less common. Because these factors impact health care access and use patterns, IMR rankings could partially reflect differences in urban “blue state” and rural “red state” health care delivery.

Also, US states with higher IMRs (e.g., Alabama at 8.7 deaths/1,000 births in 2016) also tend to have weaker health care delivery systems than the states with lower IMRs (e.g., California at 4.3 deaths/1000 births in 2016) (Agency for Healthcare Research and Quality, 2016). Importantly, however, the correlation between health care delivery and IMR has been consistent over time, unlike the US relative rankings. Moreover, IMRs have not improved appreciably in those states that expanded Medicaid coverage under the Affordable Care Act (fig. 2). A much earlier state-specific expansion of Medicaid in Tennessee also had little impact on IMR (Piper, Ray, and Griffin 1990). Taken together, these results support the contention that the US declines are, at least to some extent, social in nature.

Nevertheless, characterizing health system performance strictly in terms of quality and availability is an oversimplification; costs, both for the individual and for society as a whole, are also pertinent. The costs associated with taking advantage of the US health care delivery system vastly surpass those of other countries over time (Garber and Skinner 2008). In 1975, US per capita medical costs were roughly equal to Switzerland's, the second most expensive system in the world; presently, per capita medical costs are nearly twice those of Switzerland, still the second biggest spender (Muennig and Glied 2010). These high and rising health care costs, now larger than the entire gross domestic product of Britain, have produced a persistent decline in disposable income for the average middle-class American family,



**Figure 2** Mean Infant Mortality Rates for States That Did and Did Not Expand Medicaid under the Affordable Care Act

*Notes:* IMR = mean infant mortality rates; colored lines indicate states that did (blue) and did not (red) expand Medicaid under the Affordable Care Act.

even as real wages have risen for those on the higher end of the middle class (Polsky and Grande 2009). The timing of this phenomenon is of special relevance to the present analysis. Escalating health care costs began taking their toll on disposable incomes in the 1980s, approximately when the United States began its gradual slide down the international IMR rankings.

It would seem, then, that the health care delivery system is less likely to be at fault for the declining US IMR than the rising costs of accessing it. That is, the costs that Americans pay for everyday health care—ranging from EpiPens to treating high cholesterol—seem to be driving our ability to pay for potentially other lifesaving goods, like housing. We must therefore investigate factors that explain why Americans have become increasingly vulnerable to the effects of these escalating costs.

### **Can Deprivation and Discrimination among Women of Childbearing Age Explain the Low US IMR Rankings?**

Despite the US top-tier labor and delivery wards, we observe broad problems that are well documented in the comprehensive Institute of Medicine

report *US Health in International Perspective: Shorter Lives, Poorer Health* (Woolf and Aron 2013). These problems, such as high rates of poverty and racism, account for a considerable portion of the burden of disease among US adults that contributes to differences in health and longevity across nations (Muennig et al. 2010). As previously mentioned, white women, who on average suffer much less material hardship in the United States, have birth outcomes comparable to those in Austria/Finland. Therefore, material hardship and racism represent potentially potent but understudied explanations for poor health outcomes among women of reproductive age, including birth outcomes. Still, material hardship and racism cannot be the only problems; the United States also ranks behind Cuba in IMR, whose average citizen earns less than the poorest Americans (less than \$2 per day) (Singh and Yu 1995). Therefore, further investigation of possible causes of the relatively poor performance in US IMR rankings is needed.

### **Is a Weak Social Safety Net to Blame for the Decline in US IMR Rankings?**

A search for additional contributors to the poor US performance might begin with an examination of the US social safety net. Compared to Europe (and, arguably, even Cuba), the “welfare state” is significantly less oriented toward redistributing resources downward in the United States. Downward redistribution through social safety net programs has the potential to increase maternal educational attainment and income, each a principal predictor of infant mortality (Singh and Yu 1995). One potential explanation for the relatively weak showing in the United States is that other nations with more rapid progress in reducing IMR may have made greater investments than the United States in their social safety nets over time, thereby improving the health and well-being of women of reproductive age (Danziger and Danziger 2009; Mahoney and Rueschemeyer 2003).

Overall social expenditures over time reveal that the United States has actually been catching up with other nations over the past few decades (Organisation for Economic Co-operation and Development, n.d.). However, much of this convergence in spending is due to the high rate of medical inflation in the United States (Charlesworth 2014) and to interest payments on government debt, which might crowd out other lifesaving social expenditure investments. These interest payments, and the debt to which they are attributable, were generated by military spending, unlikely to generate the same returns to health as spending on schooling investments, income supports, and housing subsidies, for example.

Like access to quality health care, the social safety net is also unevenly distributed geographically within the United States. States and cities with high social expenditures rival the best European nations with respect to IMRs. As Michael K. Gusmano eloquently points out in his commentary in this issue, US cities have among the lowest urban IMRs in the world. Poor rural counties in the United States, on the other hand, have higher birth rates than wealthier states (Finer and Zolna 2011). Such poor states tend to have relatively greater numbers of women at risk for poor birth outcomes, such as low paternal involvement (Alio et al. 2011) and high incarceration rates (Council 2014). Increasing rates of male incarceration in rural and semi-rural areas also shrink the pool of suitable mates, potentially making it more difficult for women to negotiate the use of birth control, further increasing the number of children born to low-income women (Golembeski and Fullilove 2005).

Higher birth rates can increase poverty and therefore increase IMRs within a given geographic region. Therefore, the higher birth rates in these areas can produce long-term problems for poor families that worsen over time. This is because children are costly and therefore may intensify intra-generational poverty persistence and because poor families have limited access to quality schooling in the United States, contributing to an inter-generational trend toward worsening disparities in socioeconomic status over time (Muennig 2015). Other nations tend to be more effective at breaking intra- and intergenerational cycles of poverty, largely through the use of social welfare programs. For instance, Sweden has much greater intergenerational mobility from lower to upper socioeconomic strata (Black and Devereux 2010). The increasing “stickiness” of the American socioeconomic structure is reflected in income inequality trend data. Absolute income inequality is worsening in the United States over time relative to other nations (Dabla-Norris et al. 2015). Indeed, about 15 percent of American adults live in poverty, but half of all children do (Denavas-Walt, Proctor, and Lee 2005).

In sum, a weak social safety net may be elevating birth rates and exacerbating risks among high-risk women in the United States relative to other nations, as the rate has been increasing over time. If this phenomenon is at the heart of the decline in US IMR rankings, then the solutions present themselves nicely: increasing the accessibility of our high-quality health care system and, more crucially, bolstering our welfare system, particularly in low-income rural areas. In addition to navigating the political challenges around improving welfare programs in poor areas, though, we must make certain that this policy prescription is appropriate.

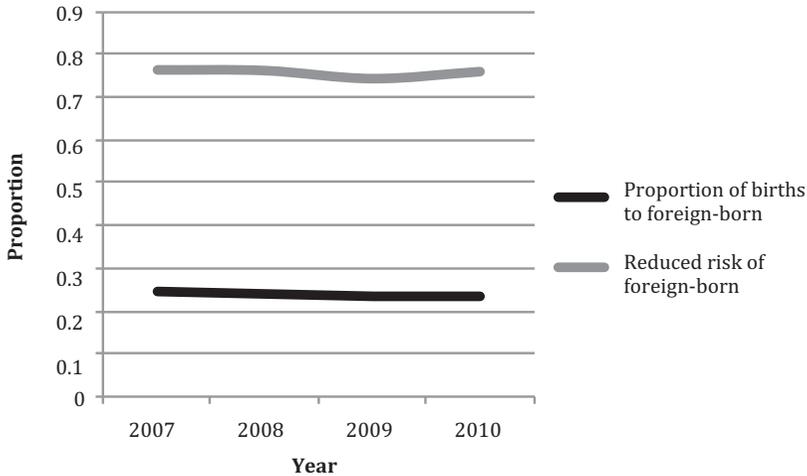
## The Immigrant Paradox

Overlooked in much of the academic work on cross-national disparities in IMRs is the confounding effect of births to low-income foreign-born women. Immigrant women tend to have lower IMRs than native-born women despite lower incomes on average (Singh and Yu 1996). Immigrants also account for much of the increase in births to low-income women in the United States over time (Pew Research Center 2015). While births among the foreign born amounted to a small proportion of all US births three decades ago, they now account for nearly a quarter (Pew Research Center 2015). Because the IMR is much lower among foreign-born than native-born populations, the rise of births to immigrant mothers should be improving the international rankings of the United States, rather than causing them to decline (Collins et al. 2013; Mathews and MacDorman 2013).

The adjusted IMR risk reduction associated with foreign-born versus native-born status is about 40 percent (Mathews and MacDorman 2013). Chen, Oster, and Williams (2015) cannot account for country of birth in their data, and it is likely it would have attenuated or nullified their finding that whites have comparable IMRs across nations. In essence, the inclusion of foreign-born individuals artificially reduces the IMR among whites because most foreign-born persons in the United States, such as Latinos, identify as “white.” For this reason, foreign-born women should be factored out of any analysis exploring international differences in IMR.

Wealthy peer nations that long ago passed the United States in IMR rankings also have large foreign-born populations. However, unlike immigrants to the United States, immigrants to Europe are slightly less, rather than more, healthy than their native-born counterparts (Gissler et al. 2009). Moreover, the middle-income countries that are now passing the United States in IMR rankings tend to have small foreign-born populations (and many are also sending their healthiest people to the immigrant population within the United States) (Muennig and Fahs 2002).

To examine the contribution of the healthy foreign-born population to US IMRs among the population at large, we explored microdata available with special permission from the Centers for Disease Control and Prevention. When examining these data, it is important to keep in mind that the demographic mix of foreign-born women varies over time (Muennig, Wang, and Jacobowski 2012) and that the longer a woman spends in the United States, the higher her risk of infant mortality (Antecol and Bedard 2006). This analysis is meant to answer two questions about the increase in IMRs in the United States relative to other nations over time: To what extent



**Figure 3** Proportion of Births and Risk of Infant Mortality for Foreign-Born to US-Born Women: All Births, United States, 2007–10

Source: Agency for Healthcare Research and Quality 2016

might increasing births to low-income, high-risk women be relevant? And conversely, to what extent might decreasing births to foreign-born women be relevant?

Unfortunately, we had data only on US births between 2007 and 2010. In this short time series, we found that the proportion of all births to foreign-born women declined at a steady rate of 2 percent (fig. 3, bottom line). The infant mortality risk for foreign-born relative to US-born women reveals a net increase in risk of roughly a quarter of a percentage point per year. Because infant deaths are relatively rare, these estimates should be interpreted with some caution. Despite this, and despite the fact that changes are slight and happen to coincide with the Great Recession, they do hint at an explanation for why the United States is now dropping in international rankings.

In the end, however, this analysis points to the “immigrant paradox” as a contributor to IMR ranking decline only in the immediate term. While individuals from outside United States are less likely to move to the United States now than in the past, the population nevertheless doubled between 1990 and 2013, rising from 20 million to 41 million (Pew Research Center 2015). Therefore, until the past few years as immigration rates plummeted in the United States, births among foreign-born women likely had the opposite effect, lowering IMR rates and tempering what would have otherwise been a much more rapid decline in international IMR rankings.

## How Are Demographic and Social-Psychological Risk Factors Changing among Women of Childbearing Age in the United States?

As with any phenomena involving birth rate trends, it is essential to examine how the overall picture of demographic and social-psychological risk factors might be changing for women of reproductive age. Table 1 summarizes relevant findings from extant research and our own analysis of the General Social Survey (GSS). Conducted since the early 1970s, the GSS is a representative sample of the US population's ideas, beliefs, and attitudes. Our analysis simply examined historical means after adjusting for age, gender, and race. Because immigration rates have increased in recent decades, we examined trends only among those born in the United States. The GSS has been widely used and validated (Muennig et al., 2011); it also has been linked to adult mortality data.

The extant research indicates that, while maternal age is increasing in the United States, it is increasing even more rapidly in some other nations, many of which have lower IMRs than the United States (Cocchi et al. 2010). Likewise, teen pregnancy rates are on the decline over time in the United States and have reached historic lows (Kost and Henshaw 2013), and that decline is steeper than in other nations (Darroch, Singh, and Frost 2001). Smoking during pregnancy has also declined sharply in the United States (Muennig and Glied 2010; Tong et al. 2009).

On the other hand, psychological stress is increasing over time for women of childbearing age, and this is only in the United States (Cohen and Janicki-Deverts 2012). Psychological stress is associated with a number of risk factors for IMR, including blood pressure dysregulation, diabetes, and substance abuse (Laxmaiah Manchikanti et al. 2012; McEwen 1998). Research has also demonstrated direct links to adverse birth outcomes (Peacock, Bland, and Anderson 1995).

For a closer look at social stressors, we turn to our original analysis using the General Social Survey. We assessed whether the US social landscape is looking more or less desperate over time for women of reproductive age by observing trends in health-relevant stress measures captured by the General Social Survey. We also assessed whether the temporal patterning of these stressors coincided with the rapid fall in the US IMR rankings beginning in the 1980s.

Among women between eighteen and forty years of age, we observed some discouraging trends: since the 1980s, declining belief that people try to be fair, declining trust, and declining self-rated health. In the 2000s a

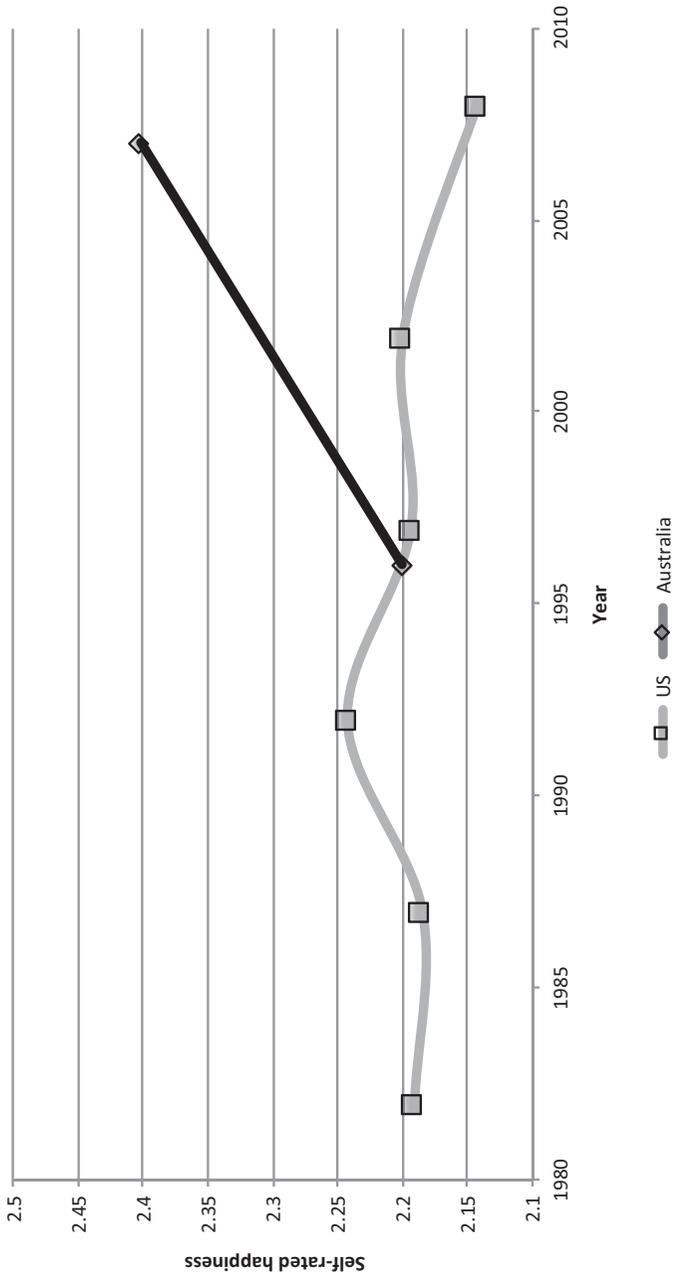
**Table 1** Candidate Demographic and Social-Psychological Explanations for the Worsening US Ranking in Infant Mortality Rates over Time, among Women of Reproductive Age

Outcome Measure	Explains US Trend?
Extant research	
Health system performance	No
Teen pregnancy	No
Childbearing at older ages	No
Smoking	No
Income inequality	No
Black-white health disparities	Yes
Disposable income	Yes
High-low education disparities	Yes
Our analysis of the General Social Survey†	
Self-rated happiness is declining	Yes
Living standard of respondent lower than parents' standards	Yes
Marital happiness declining	Yes
Respondent sees people in society as being less fair	Yes
Respondent believes people in society cannot be trusted	Yes
Self-rated health is declining	Yes
Satisfaction with job is declining	Yes
Perception of job security is declining	Yes
Recreational sexual intercourse is declining (no. per week)	Yes
Satisfaction with life is declining	Yes

Source: Peer-reviewed literature. See text for sources and explanations. †Source: GSSNDI

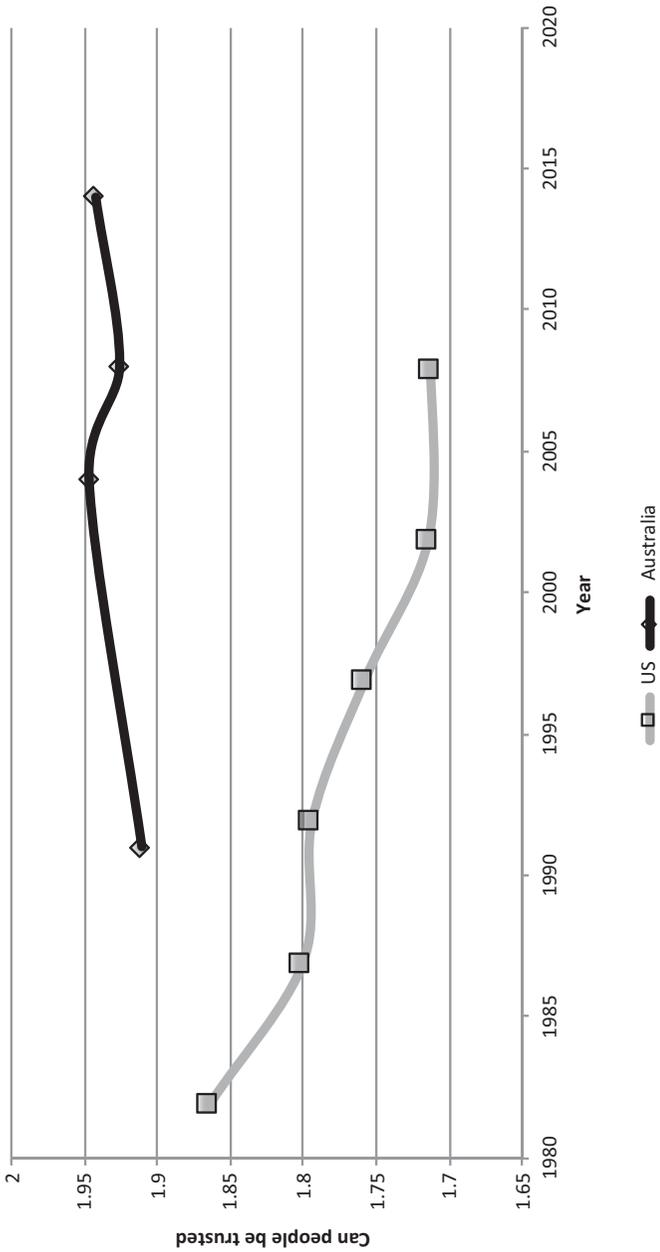
downturn in overall happiness, marital happiness, job security, and recreational sexual intercourse occurred, as well as a leveling out of real income and an increasing perception that respondents' standard of living is lower than that of their parents. To further evaluate this possible explanation, we compared trends for women eighteen to forty-five years of age for two available measures in the United States and Australia: happiness and trust (figs. 4 and 5). Australia has a demographic composition similar to that of the United States but much steeper declines in IMR over time. For these two measures, outlooks are improving in Australia but declining in the United States. Therefore, it does seem that broader social malaise in the United States over time could be contributing to IMR ranking decline.

One potential source of this American malaise is the shift to post-industrialism, which has eliminated and relocated jobs through automation and globalization. Certainly, the middle class in virtually every wealthy



**Figure 4** Trends in Self-Rated Happiness among Respondents of Reproductive Age (18–45 Years) in the United States and Australia: General Social Survey, 1979–2012

Source: NORC, University of Chicago



**Figure 5** Trends in Trust in Others among Respondents of Reproductive Age (18–45 years) in the United States and Australia: General Social Survey, 1979–2012

Source: NORC, University of Chicago

nation has had to confront these economic forces. But for families outside of the United States, cheaper consumer products have translated into higher, or at least sustainable, levels of disposable income. This is not true for many middle-class American families, for whom the additional disposable income is absorbed by escalating health care costs (Polsky and Grande 2009). This means that macroeconomic shifts may have taken a heavier toll on Americans' standard of living. Because the resulting psychological stress and material hardship are long-established risk factors for maternal and infant mortality, this means these macroeconomic shifts may also have taken a heavier toll on Americans' health (Miller 1985; Peacock, Bland, and Anderson 1995). This brings us full circle, revisiting our earlier discussion of the US health care system. It may well be that Americans pay more, and benefit less, from the development of expensive, state-of-the-art technologies that the rest of the world adopts and then makes affordable to their citizens.

## Conclusions

We have examined a number of possible explanations for the relatively weak US IMR rankings. We have cast doubt on two of the more popular accounts: that the poor US showing is an artifact of cross-national reporting differences and that the quality of health care during labor and delivery is somehow to blame. Additionally, access to this care, while weaker in the United States than in other nations, has not substantially declined for pregnant women. We have also highlighted the role of one overlooked factor likely to have obscured the extent of the declining performance in US IMRs: positive net migration, which produced an artificial reduction in the US IMR until the mid-2000s, when the numbers of births among this population began to decline.

In addition to challenging existing explanations of US IMRs, we have raised for consideration four largely neglected possibilities. First, while this impacts only about 5 percent of all births, skyrocketing costs may have adversely affected birth outcomes among women who deliver babies without health insurance. Second, deprivation and discrimination could be raising IMRs among a significant portion of women of childbearing age. Third, the weak social safety net, especially in less advantaged rural parts of the nation, could contribute to accelerating high-risk deliveries among low-income native-born women. Finally, lower-income women of reproductive age may increasingly be experiencing duress across a range of measures

of well-being, including those related to social capital, happiness, and even recreational sexual intercourse.

It is unlikely that any one of these long-term factors—even those that uniquely distinguish the United States from other nations, such as rapidly rising health costs (Garber and Skinner 2008), widening political divides, increasing income inequality, and declining social capital (Muennig, Rosen, and Johnson 2013; Putnam 1995)—is solely to blame for the relative decline of the United States in global IMR rankings.

The multifactorial nature of the problem is highlighted by recent events. The opioid epidemic hit hard for lower-income women, the group with the highest birth rate (Skolnick 2017). And immigration is on the decline, removing healthy mothers from the total number of women giving birth every year. But there have been recent positive trends, too. For example, one bright spot has been a faster decline in smoking rates among women of reproductive age in America than in other nations, and reductions in fear of crime victimization (Muennig and Glied 2010). The “cause” of America’s woes are undoubtedly multifactorial in nature. The next step would be to painstakingly track the attributable risk of each of the major risk factors so that we can better understand what is particularly problematic in the United States. Until then, while the complete explanation for the fall in US international rankings remains hazy, with a little imagination and a comparative perspective, at least some images emerge from the fog.

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**Peter Muennig** is professor in the Department of Health Policy and Management at Columbia University. His research focuses on eliminating the preventable burden of disease through the optimal mix of actionable medical and nonmedical social policies. He does so primarily via randomized controlled trials of social policies coupled with cost-effectiveness analysis.

pm124@columbia.edu

**Megan M. Reynolds** is assistant professor of sociology at the University of Utah. Her research examines health and health inequalities in order to understand processes of stratification and their consequences. She is particularly interested in the roles of policy, politics, and power in influencing well-being and how these factors interact with gender and ethnicity to condition the health of immigrant groups. She has published work in *Social Forces*, *Journal of Health and Social Behavior*, *Social Science and Medicine*, and *American Journal of Preventive Medicine*.

**Boshen Jiao** is a research associate in the Global Research Analytics for Population Health at Columbia University. He is interested in developing decision-analysis models to evaluate cost effectiveness or comparative effectiveness of health interventions as well as conducting statistical analyses to predict and assess health outcomes.

**Roman Pabayo** is assistant professor of epidemiology at the University of Alberta School of Public Health and is a visiting scholar at Harvard's T. H. Chan School of Public Health. He is a trained social epidemiologist. His current research focuses on the social determinants of health outcomes such as infant mortality, depression, and cardiovascular disease. His articles have appeared in *American Journal of Public Health*, *Pediatrics*, and *Journal of Epidemiology and Community Health*.

### Acknowledgments

We thank Priya Vedula for her contributions to the Medicaid analyses for this article.

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