Short report

Mortality among white, black, and Hispanic male and female state prisoners, 2001–2009

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ABSTRACT

Although much research considers the relationship between imprisonment and mortality, little existing research has tested whether the short-term mortality advantage enjoyed by prisoners extends to Hispanics. We compared the mortality rates of non-Hispanic white, non-Hispanic black, and Hispanic male and female state prisoners to mortality rates in the general population using data from the Deaths in Custody Reporting Program, the National Prisoner Statistics, the National Corrections Reporting Program, and the Centers for Disease Control and Prevention. The results indicate that the mortality advantage for prisoners was greatest for black males, followed by black females, Hispanic males, white females, and white males. Hispanic female prisoners were the only group not at a mortality advantage relative to the general population, with an SMR of 1.18 [95% CI: 0.93–1.43]. Taken together, the results suggest that future research should seek to better understand the curious imprisonment–mortality relationship among Hispanic females, although given the small number of inmate deaths that happen to this group (~0.6%), this research should not detract from broader research on imprisonment and mortality.
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1. Introduction and background

On any given day, 1.5 million Americans are imprisoned (Carson & Golinelli, 2013), prompting interest in the health and wellbeing of prisoners (Binswanger, Krueger & Steiner, 2009; Mumola, 2007; Noonan, 2012; Patterson, 2010; Rosen, Wohl & Schoenbach., 2011; Schnittker & John, 2007; Spaulding et al., 2011; Wilper et al., 2009; Fazel & Baillargeon, 2011). Some, although certainly not all, of this research has compared the mortality risks of prisoners to individuals in the general population, finding consistent evidence of a mortality advantage for black male prisoners and somewhat less consistent evidence of a mortality advantage for black female prisoners and white male and female prisoners (Noonan, 2012; Patterson, 2010; Rosen et al., 2011; Spaulding et al., 2011).

Largely missing from the literature on the mortality of prisoners is a consideration of Hispanic prisoners. This oversight is problematic for three reasons. First, as 20% of prisoners are Hispanic (Carson & Golinelli, 2013), knowing if there is a unique imprisonment–mortality

relationship for Hispanics is vital for understanding this relationship more broadly. Second, because the relationship between socio-economic status and mortality is different for Hispanics than other groups in the United States (Franzini, Ribble & Keddie, 2000), it would be reasonable to assume that the imprisonment–mortality relationship might be different for Hispanics than for other groups. Finally, inattention to Hispanics is not confined to research on the imprisonment–mortality research but is instead endemic to the broader research on the consequences of imprisonment (Wildeman & Muller, 2012), a pressing oversight that must be rectified if researchers are to better understand the causes and consequences of imprisonment. This report fills this gap by considering the imprisonment–mortality relationship for non-Hispanic white (hereafter white), non-Hispanic black (hereafter black), and Hispanic males and females.

2. Data and analytic strategy

2.1. Data

We use three sources for estimating the crude and age-specific mortality rates of state prisoners: the Deaths in Custody Reporting

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Program; the National Prisoner Statistics; and the National Corrections Reporting Program (Bureau of Justice Statistics, 2014a,b,c). For all analyses, we collapse data across nine years (2001–2009) for the entire population of state prisoners in order to make sure that we generate stable estimates of the imprisonment–mortality relationship for all six groups we consider.

The Deaths in Custody Reporting Program (hereafter DCRP) was created after the Death in Custody Act (P.L. 106-297) was passed in 2000. The DCRP began collecting individual records of deaths in 2001. DCRP data provide the numerator for analyses of state prisoner mortality, as deaths in local jails and federal prisons are excluded from the analysis. Although the National Prisoners Statistics (to be discussed below) data also include counts of inmate deaths, the DCRP data provide a more accurate count because they are based on individual records rather than aggregate counts and include all inmates who die in the custody of a state prison rather than only those who are currently sentenced as a state prisoner. The DCRP also include extensive information on the age, sex, race/ethnicity, and cause of death for all deaths.

Data from the National Prisoner Statistics (hereafter NPS) and the National Corrections Reporting Program (hereafter NCRP) provide the denominator. Because both datasets provide year-end estimates of state prisoners, we average estimates of the year-end prison population to generate midyear population estimates, which we use as the denominator for all analyses. In order to generate age-specific estimates of prisoners by race/ethnicity and sex, we apply the age distribution from the NCRP to the custody count totals from the NPS, which has information on the prison population, but not on its age distribution. By combining these datasets, we generate precise counts of state prisoners by race/ethnicity and sex—because the NPS are weighted by race/ethnicity to align with the self-reported racial/ethnic distribution of the 2004 Survey of Inmates (Carson, 2014)—as well as a precise count of the number of prisoners in any given age group by race/ethnicity and sex by using the NCRP—because the age distribution of white, black, and Hispanic male and female state prisoners in the NCRP is similar. Because of this, missingness on race/ethnicity in the NCRP will have a minimal effect on our results. When race/ethnicity is missing in the NCRP, we impute it assuming that they are missing completely at random.

Data from the Centers for Disease Control and Prevention (hereafter CDC) provide information on the number of deaths and the number of individuals in the population by age, sex, and race/ethnicity through CDC Wonder for the nine years of data we analyze (Centers for Disease Control and Prevention, 2014a,b).

2.2. Analytic strategy

Our analysis proceeds in three stages. In the first, we present crude mortality rates for state prisoners using data from the DCRP, NPS, and NCRP and the general population using data from CDC Wonder. In the second, we present age-adjusted mortality rates under the counterfactual scenario in which all individuals in the prison population and the total general population had the age distribution of the total population. In the third, we present standardized mortality ratios (SMRs) based on the age-adjusted estimates presented in the second stage.

In each stage of the analysis, we provide estimates based on the population. We do not include state-specific analyses, and we base all analyses on the total number of deaths in the entire period. Although our results provide descriptive insight into the imprisonment–mortality association, they should not be interpreted causally, as research provides reasons both to expect our analyses to underestimate (Massoglia & Pridemore, 2015) or overestimate (Bacak & Wildeman, 2015) the protective effect of imprisonment.

3. Results

3.1. Deaths and denominators

Before moving on to the results it is worth noting, as Table 1 does, the proportion of state inmate deaths that happen in each of the six race/ethnicity by sex groups. Of the 16,168 state inmates who died over this period, 41.4% (6686) were white males, 41.1% were black males (6638), 12.2% were Hispanic males (1973), 2.2% were white females (353), 2.6% were black females (428), and only 0.6% were Hispanic females (90). Thus, even though the analyses we present below are the first to thoroughly consider the imprisonment–mortality association for Hispanic state inmates, these groups combined make up only 12.8% of all deaths among state inmates over this period. As such, although our analyses are important for how they round out knowledge about the imprisonment–mortality association, the size of the groups affected remains small.

3.2. Crude mortality rates

Table 2 compares the crude mortality rates of prisoners with the mortality rates of individuals in the general population. Consistent with previous research, crude mortality rates are statistically significantly lower for prisoners than for members of the population. This is especially the case for black male prisoners, whose mortality rate is about one-third that of black males in the general population (152 per 100,000 relative to 472 per 100,000), but it is also the case for white males, Hispanic males, black females, and white females. The one group of prisoners that is not at a statistically significant mortality advantage is Hispanic females, whose mortality rate is 97 per 100,000, which is lower, although not statistically significantly so [95% CI: 77–117], than the mortality rate of Hispanic females in the population at 105 per 100,000 [95% CI: 104–105].

Table 1
Number of state prisoners (N) and deaths (D) for males and females aged 18–54 in state prison by race/ethnicity, 2001–2009.

		18–24		25–34		35–44		45–54		Total	
		N	*D*	*N*	*D*	*N*	*D*	*N*	*D*	*N*	*D*
Total		1,796,202	543	3,713,397	2025	3,216,136	4901	1,804,625	8699	10,530,360	16,168
Male	White	509,970	211	1,107,498	700	1,153,588	1901	726,907	3874	3,497,963	6686
	Black	808,735	230	1,564,502	892	1,275,079	2075	712,747	3441	4,361,063	6638
	Hispanic	383,646	70	784,906	305	519,967	604	242,312	994	1,930,831	1973
Female	White	45,148	20	129,919	55	137,405	113	64,354	165	376,826	353
	Black	34,104	9	90,288	56	99,592	172	46,616	191	270,600	428
	Hispanic	14,599	3	36,283	17	30,505	36	11,689	34	93,077	90

Table 2
Crude mortality rates (per 100,000) for males and females aged 18–54 in state prison and in the general population by race/ethnicity, 2001–2009.

		Incarcerated			General		
		Rate	**95% CI**		**Rate**	**95% CI**	
Total		**154**	151	156	**239**	239	239
Male	White	**191**	187	196	**281**	280	281
	Black	**152**	149	156	**472**	470	473
	Hispanic	**102**	98	107	**212**	211	213
Female	White	**94**	84	103	**164**	163	164
	Black	**158**	143	173	**307**	306	309
	Hispanic	**97**	77	117	**105**	104	105

Table 3
Adjusted mortality rates (per 100,000) for males and females aged 18–54 in state prison and in the general population by race/ethnicity, 2001–2009.

		Incarcerated			Total		
		Rate	**95% CI**		**Rate**	**95% CI**	
Total		**210**	207	213	**237**	236	237
Male	White	**232**	226	237	**280**	280	280
	Black	**212**	207	218	**506**	504	508
	Hispanic	**171**	163	178	**252**	251	253
Female	White	**119**	107	132	**156**	155	156
	Black	**194**	176	212	**293**	292	294
	Hispanic	**137**	109	166	**117**	116	118

3.3. Age-standardized mortality rates

Table 3 provides the same comparison of mortality rates across the imprisoned population and the general population. Age-standardizing to the age distribution of the total population of individuals in the general population leads to markedly higher mortality rates for prisoners, which is not surprising since the age distribution of inmates is well-known to be markedly younger than the age distribution of the general population. Nonetheless, with the exception of Hispanic females, prisoners continue to have a lower mortality rate than individuals in the general population. And these differences, moreover, continue to be substantial in most cases.

After age-standardization, Hispanic female prisoners are at a mortality disadvantage—at 137 per 100,000 relative to 117 per 100,000 for Hispanic females in the general population—but the difference is not statistically significant. Nonetheless, this result provides preliminary support for the idea that the imprisonment–mortality relationship is unusual for Hispanic females.

3.4. Standardized mortality ratios

Table 4 presents standardized mortality ratios for prisoners relative to the general population, as well as observed and expected death counts for state prisoners in each of these six groups. Consistent with the results from previous sections, the SMR is lowest for black males at 0.42 [95% CI: 0.41–0.43], with black female prisoners [SMR=0.67; 95% CI: 0.60–0.73] and Hispanic male prisoners [SMR=0.68; 95% CI: 0.64–0.71] having the next lowest SMRs. White male and female prisoners had higher SMRS, at 0.77 and 0.83 respectively, indicating a smaller mortality advantage for prisoners. Hispanic females, with an SMR of 1.18 [95% CI: 0.93–1.43] relative to Hispanic females in the general population, were the one group of prisoners that did not have a statistically significant mortality advantage over individuals in the

Table 4
Standardized mortality ratios (SMRs) of male and female state prisoners aged 18–54 relative to males and females in the general population aged 18–54 by race/ethnicity, 2001–2010.

		Deaths		SMR	95% CI	
		Observed	**Expected**			
Total		16,168	18,166	**0.89**	0.87	0.90
Male	White	6686	8055	**0.83**	0.81	0.85
	Black	6638	15,805	**0.42**	0.41	0.43
	Hispanic	1973	2901	**0.68**	0.64	0.71
Female	White	353	458	**0.77**	0.68	0.84
	Black	428	639	**0.67**	0.60	0.73
	Hispanic	90	76	**1.18**	0.93	1.43

general population. Although the SMR for Hispanic females was not statistically significant at the conventional .05 level, it was statistically significant at the .10 level. And it was also substantial, indicating that Hispanic female prisoners died at a rate 18% higher than Hispanic females in the population.

Because of the small number of excess deaths for Hispanic female state prisoners (14) and the statistical insignificance of the SMR for this group, there is only weak evidence that imprisonment is associated with *elevated* mortality for Hispanic females. Nonetheless, since the results for the other five groups imply that imprisonment is associated with *lower* mortality, there is still evidence that the imprisonment–mortality association is different for Hispanic females.

4. Discussion

Despite the substantial literature on the imprisonment–mortality relationship, no previous research has assessed how this relationship varies across race/ethnicity, even if some research in this area does report crude mortality rates for Hispanic prisoners. The goal of this research note was to provide a more complete portrait of the imprisonment–mortality relationship by estimating this relationship for white, black, and Hispanic males and females using the same methods.

The results provide support for two conclusions. First, most inmates enjoy a mortality advantage over same-sex and same-race/ethnicity individuals in the general population, with the advantage largest for black males, a group which represents roughly 2 in 5 of deaths among state prisoners according to Table 1 (Patterson, 2010). Second, the one group of prisoners that does not enjoy a statistically significant mortality advantage is Hispanic females, a group which represents roughly 1 in 200 deaths among state prisoners according to Table 1. And, in fact, Hispanic female prisoners die at a rate about 18% higher than similarly-aged Hispanic females in the population, although this difference is not statistically significant at the .05 level (though it is at the .10 level). In supplementary analyses that considered other Bureau of Justice Statistics data on Hispanic female prisoners, we confirmed these differences were not driven by Hispanic female prisoners being more disadvantaged than other prisoners in length of stay, offense type, or average age, indicating that the drivers of these relationships are not related in any discernible way to differences in the severity of criminal justice contact among Hispanic females. Although it is unclear why Hispanic female state prisoners seem to benefit the least—or even suffer—in terms of mortality reductions as a result of their imprisonment, it may be the case that this pattern is partially driven by the very low mortality rates of Hispanic females in the general population and partially driven by the

fact that Hispanic females who experience incarceration may disproportionately come from subgroups of the Hispanic population who experience high mortality rates (e.g., Puerto Ricans) relative to other subgroups (e.g., Mexican immigrants) (Rumbaut, 2008).

Nonetheless, the analyses presented here have two serious limitations. First, we provide no insight into why the imprisonment–mortality association is different for Hispanic females than for other groups (although we do hypothesize briefly above). Second, and as has long been documented in critiques of this broader area (Wildeman, 2011), the associations presented here are not causal.

In order to overcome these limitations, we provide two suggestions for future research. First, consistent with previous critiques of this area (Wildeman, 2011), we suggest providing stronger causal tests of the relationship between imprisonment, release, and mortality. Such tests could rely on exogenous shocks in imprisonment, as has some research on the consequences of imprisonment for other outcomes (Kling, 2006; Loeffler, 2013), or other methods that use quasi-experimental research designs to estimate effects, as has some research on the health consequences of imprisonment (Schnittker & John, 2007; Massoglia, 2008). Second, future research on the imprisonment–mortality relationship must test the mechanisms leading to a distinctive imprisonment–mortality relationship for Hispanic females, especially since the relationship for Hispanic males does not differ from the relationship for other males.

Acknowledgments

References

Binswanger, I. A., Krueger, P. M., & Steiner, J. F. (2009). Prevalence of chronic medical conditions among jail and prison inmates in the USA compared with the general population. *Journal of Epidemiology and Community H, 63*, 912–919.

Bureau of Justice Statistics. Data collection: deaths in custody reporting program (DCRP). [Internet]. (2014a). Available from: ⟨http://www.bjs.gov/index.cfm?ty=dcdetail&iid=243⟩.

Bureau of Justice Statistics. Data collection: national prisoner statistics (nps). [Internet]. (2014b). Available from: ⟨http://www.bjs.gov/index.cfm?ty=dcdetail&iid=269-Additional_Info⟩.

Bureau of Justice Statistics. Data collection: national corrections reporting program (NCRP). (2014c). Available from: ⟨http://www.bjs.gov/index.cfm?ty=dcdetail&iid=268⟩.

Bacak, V., & Wildeman, C. (2015). An empirical assessment of the "healthy prisoner hypothesis". *Social Science and Medicine, 138*, 187–191.

Carson, E. A., & Golinelli, D. (2013). *Prisoners in 2012 – advance counts*. Washington, DC: Bureau of Justic Statistics.

Carson, E. A. (2014). *Prisoners in 2013*. Washington, DC: Bureau of Justice Statistics.

Centers for Disease Control and Prevention, CDC Wonder. Bridged-race population estimates 1990–2012 request [Internet] (2014a). Available from: ⟨http://wonder.cdc.gov/Bridged-Race-v2012.HTML⟩.

Centers for Disease Control and Prevention, CDC Wonder. Underlying cause of death, 1999–2010 request. [Internet] (2014b). Available from: ⟨http://http:/wonder.cdc.gov/ucd-icd10.html⟩.

Fazel, S., & Baillargeon, J. (2011). The health of prisoners. *Lancet, 377*, 863–876.

Franzini, L., Ribble, J. C., & Keddie, A. M. (2000). Understanding the Hispanic paradox. *Ethnicity and Disease, 11*, 496–518.

Kling, J. R. (2006). Incarceration length, employment, and earnings. *American Economic Review, 96*, 863–876.

Loeffler, C. E. (2013). Does imprisonment alter the life course? Evidence on crime and employment from a natural experiment. *Criminology, 51*, 137–166.

Mumola, C. J. (2007). *Medical causes of death in state prisons, 2001–2004*. Washington, DC: Bureau of Justice Statistics.

Massoglia, M., & Pridemore, W. A. (2015). Incarceration and health. *Annual Review Sociology, 41*, 291–310.

Massoglia, M. (2008). Incarceration as exposure: the prison, infectious disease, and other stress-related illnesses. *Journal of Health and Social Behavior, 49*, 56–71.

Noonan, M. E. (2012). *Mortality in local jails and state prisons, 2000–2010 – statistical tables*. Washington, DC: Bureau of Justice Statistics.

Patterson, E. (2010). Incarcerating death: mortality in U.S. state correctional facilities, 1985–1998. *Demography, 47*, 587–607.

Rosen, D. L., Wohl, D. A., & Schoenbach., V. J. (2011). All-cause and cause-specific mortality among black and white north carolina state prisoners, 1995–2005. *Annals of Epidemiology, 21*, 719–726.

Rumbaut, R. G. (2008). Undocumented immigration and rates of crime and imprisonment: popular myths and empirical realities In: A. Kashu (Ed.), *The role of local police: striking a balance between immigration enforcement and civil liberties* (pp. 119–139). Washington, DC: Poloce Foundation.

Schnittker, J., & John, A. (2007). Enduring stigma: the long-term effects of incarceration on health. *Journal of Health and Social Behavior, 48*, 115–130.

Spaulding, A. C., Seals, R. M., McCallum, V. A., Perez, S. D., Brzozowski, A. K., & Steenland, N. K. (2011). Prisoner survival inside and outside of the institution: implications for health-care planning. *American Journal of Epidemiology, 173*, 479–487.

Wilper, A. P., Woolhandler, S., Boyd, J. W., Lasser, K. E., McCormick, D., Bor, D. H., et al. (2009). The health and health care of US prisoners: Results of a nationwide survey. *American Journal of Public Health, 9*, 666–672.

Wildeman, C., & Muller, C. (2012). Mass imprisonment and inequality in health and family life. *Annual Review of Law Social Science, 8*, 11–31.

Wildeman, C. (2011). Invited commentary: (Mass) imprisonment and (inequities in) health. *American Journal of Epidemiology, 173*, 488–491.