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Exposure to Incarceration, Aging, and Racial Disparities in Risk Factors for Covid-19¹

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Structured Abstract

Background: Formerly incarcerated men may be at heightened risk of severe COVID-19 infection due to greater prevalence of underlying chronic conditions associated with severity of illness. Because racial and ethnic minorities are disproportionately incarcerated, exposure to incarceration may also be a mechanism for racial disparities in COVID-19 outcomes.

Methods: Data are from the midlife health survey modules incorporated in more recent waves of the 1979 National Longitudinal Survey of Youth (NLSY79). Main outcomes of interest were doctor's diagnoses of high blood pressure, any heart problems, congestive heart failure, stroke, diabetes, non-skin cancer, and chronic lung disease. We estimated and tested for differences in the prevalence of these chronic conditions associated with increased risk of severe COVID-19 infection for middle-aged men by race and history of incarceration.

Findings: By age 50+, Black non-incarcerated men and Black and White formerly incarcerated men were significantly more likely to be diagnosed with at least one chronic condition associated with severe COVID-19 infection relative to non-incarcerated White men. Formerly incarcerated White men were also more likely to be diagnosed with two or more comorbidities.

Interpretation: This study highlights an important association between exposure to criminal justice system, racial health disparities, and COVID-19 infection. Specifically, it brings attention to the need for the inclusion of prevention and control of chronic conditions within reentry planning to mitigate the risk of severe COVID-19 infection.

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Keywords: mass incarceration; health disparities; reentry; aging; COVID-19

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, which causes coronavirus disease 2019 (COVID-19), has led to a global pandemic, killing hundreds of thousands around the world in less than one year from its onset. While the data are still preliminary, there is growing evidence that this disease may be associated with greater morbidity and mortality rates among men¹ and racial minorities,² and may have long-term³ health consequences. At the same time, both men and racial and ethnic minorities are disproportionately exposed to an incarceration.⁴ Other risk factors for severe COVID-19 infection are increased age and having chronic medical conditions.^{5,6} Due to the fact that the incarcerated population overlaps in multiple high risk categories for severe COVID-19 infection (e.g., male, aging, and minority), and may have heightened risk of certain chronic illnesses, this paper investigates whether formerly incarcerated middle-aged men are at increased risk of underlying illnesses associated with severe COVID-19 infection.

While a significant amount of attention has been paid to COVID-19 infection among incarcerated individuals, scant attention has been given to the health of formerly incarcerated individuals or the impact of COVID-19 on reentry practices. Understanding the health risk factors among the formerly incarcerated is important for several reasons: 1) previous research finds a negative association between incarceration and health, 2) individuals exposed to and impacted by mass incarceration policies during the height of the incarceration boom are aging; and 3) criminal justice system contact (either directly or indirectly) may be important in explaining racial disparities in COVID-19 infections.⁷

When it comes to aging and health, most research has focused on aging while in prison, even though 95 percent of state prisoners are eventually released.⁸ Between 1993 and 2013, the

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size of the 55 and older state prison population increased by 400 percent.⁹ Moreover, 48 percent of state prisoners released are age 35 or older.¹⁰ Though aging may create unique barriers to successful re-entry into society, there is a dearth of research on this topic, and, as a result, little attention has been given to the intersection between aging, incarceration, race, and COVID-19 outcomes.

This paper investigates whether a cohort of middle-aged men exposed to an incarceration are more likely to suffer from COVID-19 risk factors when compared to middle-aged men that have no reported incarceration by race and age. Specifically, we estimated the prevalence of and differences in the prevalence of reported diagnoses of chronic conditions associated with severe COVID-19 infection (i.e., high blood pressure, any heart problems, congestive heart disease, stroke, diabetes, chronic lung disease, and non-skin cancer) for a cohort of formerly incarcerated men in their forties and fifties by race. This study contributes to the current discussion on COVID-19, and differentiates itself from the literature by investigating, within an aging framework, whether formerly incarcerated individuals are more likely to be at greater risk of severe COVID-19 infection.

Data and Methods

The 1979 National Longitudinal Survey of Youth (NLSY 79) is a longitudinal sample survey representing the entire youth population in the United States between the ages of 14-22 by December 31, 1978. There were 12,686 men and women initially interviewed at baseline. However, by 1991 2,722 individuals comprising the military and low-income white subsamples were dropped from the sample. A total of 27 waves of the survey have been administered between 1979 and 2016.ⁱ Beginning in 1998, the NLSY 79 started administering extensive midlife health modules to participants as they turned 40. The health 40+ module was

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administered during waves 18-22 (1998-2006) of the survey, when participants were aged 40-49. A second health module was also administered to the same respondents as they turned age 50 or older (health 50+) during waves 23-27 (2008-2016) of the survey. We restricted our sample to male respondents with complete information for the health 40+ (n=4169) and the health 50+ (n=3695) modules.

The NLSY 79 asks questions about incarceration and criminal participation only in 1980. Nonetheless, residence at the time of interview, which is asked in every year of the survey, can be used to backout incarceration status, thereby yielding a lifetime incarceration history for each individual. Two lifetime incarceration status variables were constructed for age 40-49 and age 50+ using the respondents residence (i.e., jail or prison) at the time of the interview. These dichotomous variables take into consideration reported incarceration status for all years prior to the year of the respondents health 40+ (n=509) and health 50+ (n=540) modules. Individuals incarcerated at the time of the health modules are excluded from the analysis (n=97 and n=38 for the health 40+ and health 50+ modules, respectively). Missing values for incarceration status over the years were imputed as 0. Because incarceration must coincide with a survey wave, it is possible that individuals with short incarceration spells are coded as not incarcerated. This could lead to a downward bias in the difference between those formerly incarcerated and those with no reported history of incarceration. The final sample of men for the health 40+ survey module (n=4,054) was 14% Black, 7% Hispanic, and 7% previously exposed to an incarceration. Likewise, the final sample of men for the health 50+ survey module (n=3,635) consisted of 14% Black, 7% Hispanic, and 8% formerly incarcerated.

Health outcomes were binary variables of reported doctor's diagnoses of chronic health conditions associated with severe COVID-19 infection such as high blood pressure, any heart

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problems (i.e., heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems), congestive heart failure, stroke, diabetes, chronic lung disease and cancer.⁵ Due to small cell sizes for some of the chronic cardiovascular diseases (in the health 40+ module), we also constructed a composite binary variable if a respondent reported having ever been diagnosed by a doctor with any cardiovascular disease (i.e., high blood pressure, any heart problems, congestive heart failure, or stroke). Finally, we constructed a binary variable if the respondent has been diagnosed with any of the abovementioned chronic illnesses; as well as a binary variable measuring comorbidity if the respondent is diagnosed with 2 or more of the aforementioned chronic illnesses.

We estimated prevalence of the aforementioned chronic illnesses by incarceration status weighted by the NLSY 79 constructed multiyear sample weights to account for the study design; and conduct t-tests of differences in prevalence between those reporting exposure to an incarceration and those with no reported exposure. We also restricted the sample to non-Hispanic Black (n=1209 and n=1,120 for the health 40+ and health 50+ survey modules, respectively) and non-Hispanic, non-Black (n=2041 and n=1809 for the health 40+ and health 50+ survey modules, respectively) men, which we will refer to as Black and White, respectively, for brevityⁱⁱ, and ran linear probability models to estimate differences in prevalence by race and age. All regression models were conducted in Stata/MP 15.1¹¹ and were weighted by NLSY 79 constructed multiyear sample weights to account for sample attrition and study design. Regression models also included baseline urban, region, and standard metropolitan statistical area (smsa) location fixed effects. Heteroscedastic robust standard errors were estimated using the hc3 option. All hypothesis tests were two-tailed.

Role of Funding Source

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Results

Figures 1 and 2 provide prevalence estimates for reported chronic health conditions associated with greater risks of severe COVID-19 infection for men with a reported incarceration and those that have no reported incarceration by the time of the NLSY79 40+ and 50+ health modules respectively. Figure 1 shows that formerly incarcerated men ages 40-49 have a higher prevalence of diagnosis with at least one chronic cardiovascular illness (4.1 percentage points higher, 95% CI -1.3-9.5), including high blood pressure (3.8 percentage points higher, 95% CI -1.4-9), any heart problem (1.7 percentage points higher, 95% CI -1.1-4.4), and congestive heart failure (.7 percentage points higher, 95% CI -.5-2), however, none of these differences are statistically significant. Formerly incarcerated men are also marginally significantly more likely to report having ever been diagnosed by a doctor with a stroke between ages 40-49 (1.7 percentage points higher, 95% CI -.1-3.6). Nonetheless, caution should be taken when interpreting this result due to small cell sizes: only 25 respondents reported having ever been diagnosed with a stroke in their 40s. There were no statistically significant differences between formerly incarcerated men and non-incarcerated men in their 40s for diabetes, chronic lung disease, and non-skin cancer. Moreover, those with a reported incarceration are not significantly more likely to be diagnosed with any chronic illness. However, among those diagnosed with at least one chronic illness, the formerly incarcerated may have greater comorbidity: they are

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marginally significantly more likely to be diagnosed with at least two chronic conditions associated with severe COVID-19 infection (10 percentage points higher, 95% CI -1.6-21.5).

By age 50 and olderⁱⁱⁱ (Figure 2), formerly incarcerated respondents had statistically higher prevalence of being diagnosed with any chronic cardiovascular condition (12.3 percentage points higher, 95% CI 5.9-18.8) relative to respondents with no reported incarceration. More specifically, formerly incarcerated men have significantly higher prevalence of having ever been diagnosed by a doctor with high blood pressure (12 percentage points higher, 95% CI 5.5-18.4), any heart problems (6 percentage points higher, 95% CI 1.5-10.6), and congestive heart failure (3 percentage points higher, 95% CI .1-5.9) by age 50+. Moreover, formerly incarcerated men have a significantly higher prevalence of having ever been diagnosed with chronic lung disease (5.4 percentage points higher, 95% CI 1.5-9.4), any chronic illness (13.3 percentage points higher, 95% CI 6.9-19.6), and with at least two chronic diseases (9.1 percentage points higher, 95% CI .3-17.9) relative to their non-incarcerated counterparts.

Table 1 provides the percentage point differences in prevalence of chronic illnesses associated with severe COVID-19 infection by race, incarceration status, and age for Black and White men. The first three columns provide results for diagnosed chronic health conditions at ages 40-49. The results show that formerly incarcerated Black men in their 40s are marginally significantly more likely to have ever been diagnosed with cardiovascular disease than White men with no reported incarceration (6.4 percentage points higher, 95% CI -.4-13.3). This result seems to be driven by a higher prevalence of being diagnosed with high blood pressure (6.2 percentage points higher, 95% CI -.4-12.8) and having had a stroke (2.6 percentage points higher, 95% CI .1-5.1). Non-incarcerated Black men in their 40s were also marginally significantly more likely to be diagnosed with high blood pressure compared to White men with

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no reported incarceration (3.3 percentage points higher, 95% CI -.1-6.8). Formerly incarcerated Black men were also 1.3 percentage points less likely (95% CI -2.7-.2) to be diagnosed with non-skin cancer relative to non-incarcerated White men.

The last three columns of Table 1 provide differences in prevalence for diagnosed chronic health conditions by age 50+ by race. Once again, the reference group is White men with no reported incarceration. Black men with no reported incarceration, and formerly incarcerated Black and White men were all significantly more likely than non-incarcerated White men to be diagnosed with cardiovascular disease (10.9 [95% CI 6.1,15.7], 19.1 [95% CI 11.4, 26.9], and 15 [95% CI 4.7, 25.2] percentage points higher, respectively) by their 50s. Among the reported cardiovascular diseases associated with severe COVID-19 infection, formerly incarcerated Black men were also significantly more likely to have ever been diagnosed with high blood pressure (18.8 percentage points higher, 95% CI 11.0-26.6) and marginally significantly more likely to have ever been diagnosed with a stroke (3.6 percentage points higher, 95% CI -.1-7.2) than non-incarcerated White men. White formerly incarcerated men were significantly more likely to have been diagnosed with high blood pressure (14.8 percentage points higher, 95% CI 4.7-25.2), any heart problem (10.5 percentage points higher, 95% CI 3.0-18.1), and congestive heart failure (5.0 percentage points higher, 95% CI .02-10.0) than White non-incarcerated men. Black men were significantly more likely to have been diagnosed with high blood pressure and marginally more likely to have been diagnosed with a stroke relative to non-incarcerated White men. However, non-incarcerated Black men were less likely to be diagnosed with any heart problem relative to the comparison group.

In addition to cardiovascular disease, non-incarcerated Black men were more likely to be diagnosed with diabetes (3.2 percentage points higher, 95% CI .02-6.3) and formerly

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incarcerated White men were more likely to be diagnosed with chronic lung disease (7.7 percentage points higher, 95% CI 1.3-14.2) relative to White men with no reported incarceration. Moreover, all three disadvantaged groups were significantly more likely to be diagnosed with any chronic illness relative to non-incarcerated White men. However, White formerly incarcerated men were the only group to have a significantly higher prevalence of multiple comorbidities relative to non-incarcerated White men (19.5 percentage points higher, 95% CI 5.9-33.1).

Finally, we also changed the reference group to test if there were significant differences in the prevalence of reported chronic illnesses associated with severe COVID-19 infection across the four groups.^{iv} For cardiovascular diseases, we found formerly incarcerated Black men were significantly more likely than non-incarcerated Black men to be diagnosed with a cardiovascular disease (8.2 percentage points higher, 95% CI .3-16.1). Moreover, relative to formerly incarcerated White men, non-incarcerated Black men (13.7 percentage points lower, 95% CI -21.5- -5.8) and formerly incarcerated Black men (10.9 percentage points lower, 95% CI -19.4- -2.3) had significantly lower prevalence of any heart problem. Non-incarcerated Black men were also marginally significantly less likely to be diagnosed with congestive heart failure than formerly incarcerated White men (4.5 percentage points lower, 95% CI -9.6-.6). In terms of other reported chronic illnesses, formerly incarcerated White men are more likely to be diagnosed with chronic lung disease than non-incarcerated Black men (8.9 percentage points higher, 95% CI 2.4-15.5). Formerly incarcerated Black men also had a significantly higher prevalence of being diagnosed with at least one chronic condition relative to non-incarcerated Black men (10 percentage points higher, 95% CI 2.3-17.7). Finally, formerly incarcerated White men had a greater prevalence of multiple comorbidity diagnoses than non-incarcerated Black men (17.7

percentage points higher, 95% CI 3.5-31.9) and formerly incarcerated Black men (24.8 percentage points higher, 95% CI 8.8-40.9).

Discussion and Conclusion

Within an aging framework, this article investigates whether individuals exposed to an incarceration have greater prevalence of chronic conditions associated with severe COVID-19 infection, and, therefore, greater risk of morbidity and mortality from COVID-19 for a cohort of men in their 40s and 50s. While there is suggestive evidence that formerly incarcerated men and non-incarcerated Black men in their 40s may be at heightened risk of severe COVID-19 infection, by age 50+ individuals exposed to an incarceration have much higher prevalence of cardiovascular and chronic lung diseases associated with severe COVID-19 infection. Overall, we find that black men regardless of incarceration status, and formerly incarcerated White men in their 50s are more likely to be diagnosed with at least one chronic illness associated with severe COVID-19 infection relative to White men with no reported incarceration. In addition, formerly incarcerated White men are more likely to be diagnosed with two or more comorbidities relative to non-incarcerated Black men, formerly incarcerated Black men, and non-incarcerated White men. Therefore, Black and White middle aged men who have been exposed to an incarceration may be at higher risk of contracting severe COVID-19 infection.

Prior research shows that incarceration is associated with increased transmission of infectious disease and chronic illness,⁷ in general, and COVID-19 transmission^{12,13} in particular. As a result, there is heightened concern that prisons and jails could foster infection for COVID-19. Some states have responded through early release of those incarcerated.^v However, releasing these individuals without proper reentry services may increase the risk of infection, morbidity, or mortality of the disease among this group. Specifically, reentry barriers faced by the formerly

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incarcerated such as housing insecurity, disruption in social networks, and limited job opportunities,^{14,15} could make this group more likely to become infected with the virus. The stressful living conditions during an incarceration and the stigma of a conviction and incarceration post-release could also lead to greater prevalence of chronic illnesses and, therefore, greater likelihood of severe COVID-19 infection. It should be noted that incarceration can indirectly affect chronic health conditions among family members when a loved one is incarcerated. Prior research finds women who have a family member incarcerated are at increased odds of being obese and having a heart attack or stroke,¹⁶ highlighting an important mechanism through which incarceration can impact the risk of severe COVID-19 infection within families and communities disproportionately exposed to incarceration.

This study buttresses the importance of holistic reentry planning that incorporates medical history follow up; it highlights the need for better prevention and control of chronic conditions for black and white formerly incarcerated men to mitigate the risk of severe COVID-19 infection and other chronic health conditions. This is especially true given the heightened risk of infection during incarceration and the potential long-term health consequences of the disease.³ It also sheds light on the importance of improving data collection efforts to understand how criminal justice involvement impacts health over the life course. The findings suggest that White men exposed to an incarceration have similar chronic health outcomes as Black men, and there is some evidence that formerly incarcerated Black men may have worse health outcomes than non-incarcerated Black men. Finally, given the Black community's disproportionate contact with the criminal justice system, this paper highlights an important association between the criminal justice system, racial health disparities, and COVID-19 infection.

References

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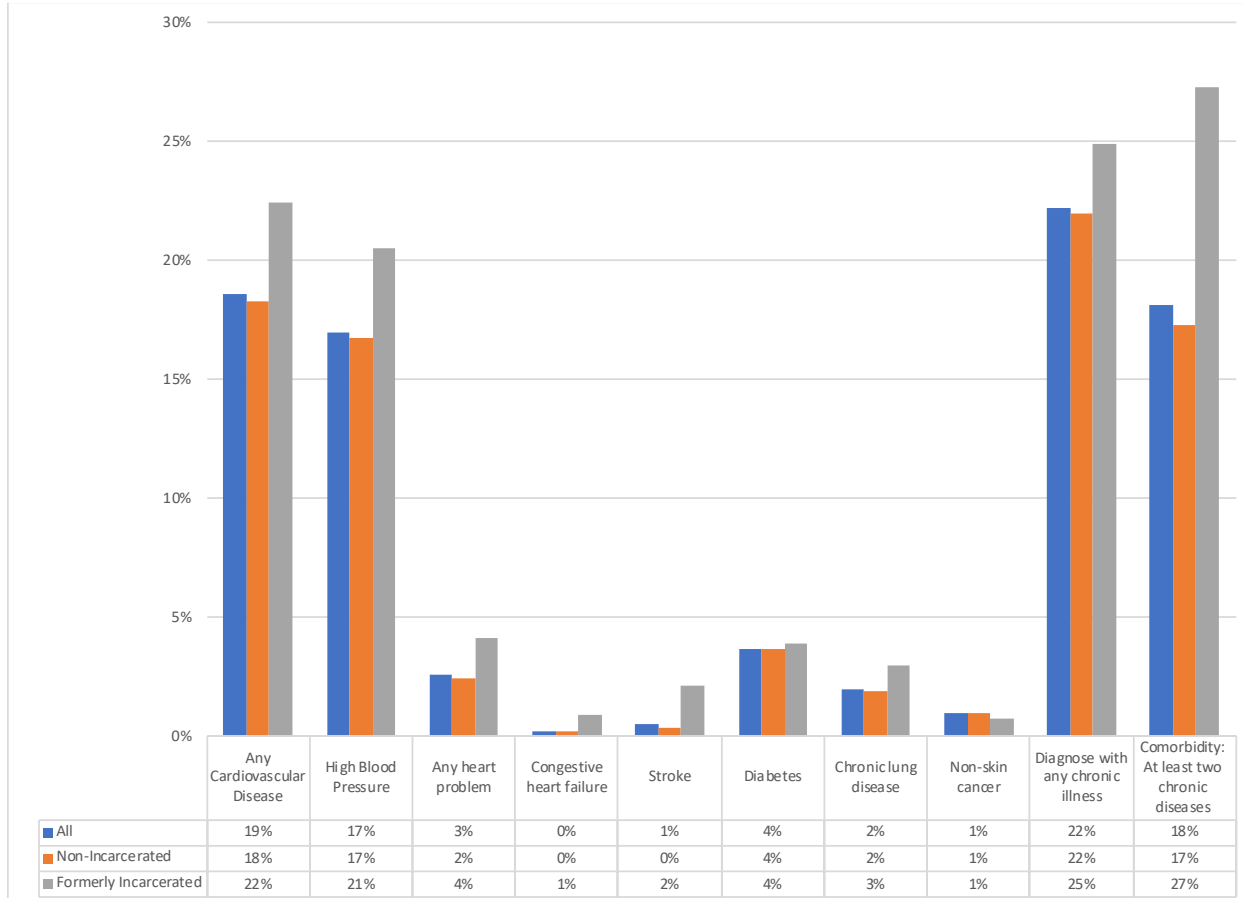
1. Jin, J. M., Bai, P., He, W., Wu, F., Liu, X. F., Han, D. M., ... & Yang, J. K. (2020). Gender differences in patients with COVID-19: Focus on severity and mortality. *Front Public Health*, 8, 152.
2. Yancy, C. W. (2020). COVID-19 and African Americans. *JAMA*.
3. Carfi, A., Bernabei, R., & Landi, F. (2020). Persistent symptoms in patients after acute covid-19. *JAMA*. doi:10.1001/jama.2020.12603
4. Cox, R. Crime (2010). Incarceration, and Employment in Light of the Great Recession. *Rev Black Polit Econ*, 37, 283–294. <https://doi.org/10.1007/s12114-010-9079-6>
5. Stokes, E. K., Zambrano, L. D., Anderson, K. N., Marder, E. P., Raz, K. M., Felix, S. E. B., ... & Fullerton, K. E. (2020). Coronavirus Disease 2019 Case Surveillance—United States, January 22–May 30, 2020. *Morbidity and Mortality Weekly Report*, 69(24), 759. DOI: <http://dx.doi.org/10.15585/mmwr.mm6924e2>
6. Clark, A., Jit, M., Warren-Gash, C., Guthrie, B., Wang, H. H., Mercer, S. W., ... & Checchi, F. (2020). Global, regional, and national estimates of the population at increased risk of severe COVID-19 due to underlying health conditions in 2020: a modelling study. *The Lancet Global Health*. [https://doi.org/10.1016/S2214-109X\(20\)30264-3](https://doi.org/10.1016/S2214-109X(20)30264-3)
7. Cox, R. (2018). Mass Incarceration, Racial Disparities in Health, and Successful Aging. *Generations*, 42(2), 48-55.
8. Carson, E. A., Sabol, W. J., Bureau of Justice Statistics (BJS), US Dept of Justice, Office of Justice Programs, & United States of America. (2016). Aging of the State Prison Population, 1993–2013. *Washington: Bureau of Justice Statistics*. Retrieved from <https://www.bjs.gov/content/pub/pdf/aspp9313.pdf>.
9. Hughes, T., & Wilson, D. J. (2003). Reentry trends in the United States: Inmates returning to the community after serving time in prison. *Washington, DC: US Department of Justice, Bureau of Justice Statistics*. Retrieved from <http://www.bjs.gov/content/pub/pdf/reentry.pdf>
10. Durose, M. R., Cooper, A. D., & Snyder, H. N. (2014). Recidivism of prisoners released in 30 states in 2005: Patterns from 2005 to 2010. *Washington, DC: Bureau of Justice Statistics*, 28. Retrieved from <https://www.bjs.gov/content/pub/pdf/rprts05p0510.pdf>.
11. StataCorp (2017). *Stata Statistical Software: Release 15*. College Station, TX: StataCorp LLC.
12. Saloner, B., Parish, K., Ward, J. A., DiLaura, G., & Dolovich, S. COVID-19 Cases and Deaths in Federal and State Prisons. *JAMA*. doi:10.1001/jama.2020.12528

PLEASE REQUEST PERMISSION TO CITE

13. Reinhart, E., & Chen, D. (2020). Incarceration And Its Disseminations: COVID-19 Pandemic Lessons From Chicago’s Cook County Jail: Study examines how arrest and pre-trial detention practices may be contributing to the spread of COVID-19. *Health Affairs*, 10-1377.
14. Cox, R., Lahey, J., Rhoades, H., Henwood, B., & Wenzel, S. (2020). Does the Timing of Incarceration Impact the Timing and Duration of Homelessness? Evidence from “The Transitions to Housing” Study. *Justice Q*, 1-25. DOI: [10.1080/07418825.2019.1709883](https://doi.org/10.1080/07418825.2019.1709883)
15. Cox, R. (2016). The Effect of Private Sector Work Opportunities in Prison on Labor Market Outcomes of the Formerly Incarcerated. *J Labor Res*, 37(4), 412-440. <https://doi.org/10.1007/s12122-016-9229-0>
16. Lee, H., Wildeman, C., Wang, E. A., Matusko, N., & Jackson, J. S. (2014). A heavy burden: the cardiovascular health consequences of having a family member incarcerated. *Am J Public Health*, 104(3), 421-427. <https://doi.org/10.2105/AJPH.2013.301504>

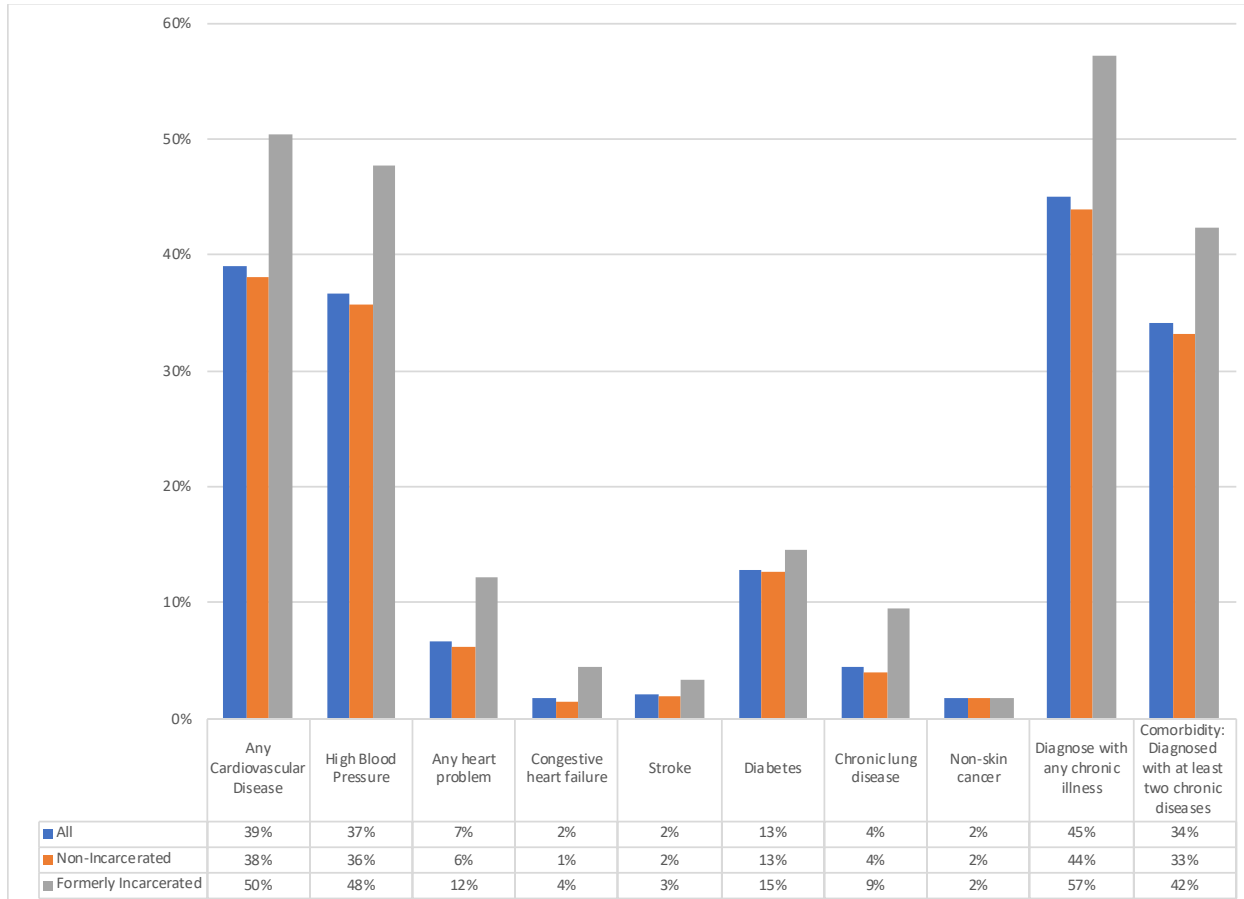
Figures

Figure 1. Distribution of Reported Diagnoses of Chronic Health Conditions for Men Ages 40-49 by Incarceration Status



Notes: Figure by authors of sample weighted means calculated using the 1979 National Longitudinal Survey of Youth health 40+ survey module. Individuals missing type of residence at interview information across waves imputed as not incarcerated for the relevant waves. Total unweighted respondents are 4,054 men: 3,632 with no reported incarceration and 422 formerly incarcerated. Number of unweighted observations used to calculate the prevalence of comorbidities are 942 men with at least one diagnosis with a chronic illness of which 838 had no reported incarceration and 104 were formerly incarcerated. Any cardiovascular disease is equal to 1 for respondents having ever been diagnosed with high blood pressure, any heart problem, congestive heart failure or stroke, and 0 otherwise. Any heart problems is defined as heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems. Diagnosis with any chronic illness is defined as having been diagnosed with high blood pressure, any heart problem, congestive heart failure, stroke, diabetes, chronic lung disease, or non-skin cancer. Comorbidity is equal to 1 if diagnosed with two or more chronic illnesses and 0 if diagnosed with only one.

Figure 2. Distribution of Reported Diagnoses of Chronic Health Conditions for Men Age 50+ by Incarceration Status



Notes: Figure by authors of sample weighted means calculated using the 1979 National Longitudinal Survey of Youth health 50+ survey module. Individuals missing type of residence at interview information across waves imputed as not incarcerated for the relevant waves. Total unweighted respondents are 3,635 men: 3,208 with no reported incarceration and 427 formerly incarcerated. Number of unweighted observations used to calculate prevalence of comorbidities are 1,719 men with at least one diagnosis with a chronic illness of which 1488 had no reported incarceration and 231 were formerly incarcerated. Any cardiovascular disease is defined as having ever been diagnosed with high blood pressure, any heart problem, congestive heart failure or stroke. Any heart problems is defined as heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems. Diagnosis with any chronic illness is defined as diagnosed with high blood pressure, any heart problem, congestive heart failure, stroke, diabetes, chronic lung disease, or non-skin cancer. Comorbidity is equal to 1 if diagnosed with two or more chronic illnesses and 0 if diagnosed with only one.

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Tables

Table 1. Differences in Prevalence of Reported Diagnoses of Chronic Health Conditions Between Formerly Incarcerated and Non-Incarcerated Men by Race

	Health 40+ Survey (Ages 40-49)			Health 50+ Survey (Ages 50+)		
	Black Not Incarcerated % Pts [95% CI]	Black Incarcerated % Pts [95% CI]	Non-Black Incarcerated % Pts [95% CI]	Black Not Incarcerated % Pts [95% CI]	Black Incarcerated % Pts [95% CI]	Non-Black Incarcerated % Pts [95% CI]
Any Vascular Disease	3.0% [-.6,6.6]	6.4%+ [-.4,13.3]	4.5% [-3.9,12.9]	10.9%*** [6.1,15.7]	19.1%*** [11.4,26.9]	15.0%** [4.7,25.2]
High Blood Pressure	3.3%+ [-0.1,6.8]	6.2%+ [-0.4,12.8]	4.2% [-3.9,12.4]	12.7*** [7.9,17.4]	18.8%*** [11.0,26.6]	14.8%** [4.5,25.0]
Any heart problem	-1.3%+ [-2.7,0.2]	-1.7% [-3.8,0.5]	3.3% [-1.3,7.9]	-3.1%** [-5.5,-0.8]	-0.4% [-4.5,3.8]	10.5%** [3.0,18.1]
Congestive heart failure	0.1% [-0.3,0.6]	0.4% [-1,1.8]	.9% [-1.2,2.9]	0.5% [-0.6,1.7]	0.9% [-1.3,3.2]	5.0%* [0.02,10.0]
Stroke	0.5% [-0.2,1.3]	2.6%* [0.1,5.1]	1.7% [-1.2,4.6]	1.5%+ [-0.1,3.0]	3.6%+ [-0.1,7.2]	0.4% [-2.8,3.6]
Diabetes	0.2% [-1.3,1.8]	-0.2% [-2.8,2.4]	0.2% [-3.6,4.1]	3.2%* [0.02,6.3]	-0.3% [-5.4,4.7]	4.6% [-3.1,12.2]
Chronic lung disease	-0.7% [-1.8,0.5]	0.6% [-1.6,2.9]	0.7% [-2.6,4.0]	-1.2% [-3.1,0.7]	1.7% [-2.1,5.5]	7.7%* [1.3,14.2]
Non-skin cancer	-0.5% [-1.4,0.4]	-1.0%+ [-2.0,0.04]	0.1% [-2,2.2]	0.1% [-1.2,1.4]	-0.5% [-2.3,1.2]	0.3% [-2.6,3.3]
Diagnose with any chronic illness	2.5% [-1.3,6.4]	4.6% [-2.4,11.6]	2.9% [-5.8,11.6]	9.2%*** [4.3,14.0]	19.1%*** [11.6,26.7]	15.5%** [5.3,25.7]
Comorbidity: Diagnosed with at least two chronic diseases	-2.5% [-9.2,4.3]	6.0% [-6.7,18.7]	14.0% [-4.4,32.5]	1.8% [-4.7,8.2]	-5.3% [-15.3,4.6]	19.5%** [5.9,33.1]

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+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Notes: Individuals missing type of residence at interview information across waves imputed as not incarcerated for the relevant waves. Coefficients estimated using linear probability models adjusted for heteroscedastic standard errors. Health 40+ regressions have 3,250 unweighted respondents comprised of 1,209 Black and 2,041 White men for the main analyses, and an unweighted 759 Black ($n=314$) and White ($n=445$) men for the comorbidity analysis. Health 50+ regressions have 2,929 unweighted respondents comprised of 1,120 Black and 1,809 White men for the main analyses; and an unweighted 1,403 Black ($n=620$) and White ($n=783$) men for the comorbidity analysis. Reference group is White men with no reported incarceration.

- i Response rates (excluding the deceased) for the survey varied between 87% in 1998 to 76% in 2016.
- ii It is important to note that while non-Hispanic, non-Black includes American Indian/Native Americans, Hawaiian/Pacific Islanders, Asian, and those who reported another race besides Black and White, roughly 80% of this category is White. Therefore, for brevity, we refer to this category as White acknowledging that it is comprised of individuals with racially and ethnically diverse backgrounds.
- iii Note, affirmative responses for chronic condition diagnoses in the health 40+ module was used for individuals missing responses in the health 50+ module.
- iv Results available from authors upon request.
- v See the Prison Policy Initiative for information on state responses to COVID-19 <https://www.prisonpolicy.org/virus/virusresponse.html>.