

# Prevalence of Chronic Health Conditions Among Adults Released From the North Carolina Prison System, 2015-2016

David L. Rosen, Shavonda Thomas, Andrew L. Kavee, Evan A. Ashkin

**BACKGROUND** In the United States each year nearly 570,000 people return from state prisons to the community. Prevalence data of chronic health problems for this population are lacking, impeding planning of health care programs to serve people with chronic conditions who are re-entering the community.

**METHOD** We used medication dispensing records as a proxy for diagnoses in assessing the prevalence of 10 major and 20 substituent health conditions among incarcerated people released from the North Carolina state prison system from July 2015 through June 2016.

**RESULTS** Among 20,585 released people, 13% were female; 50% were black; 43% were white; and 4% were aged 55 years or older. Thirty-three percent had  $\geq 1$  condition and 13% had two or more. The prevalence of chronic health conditions was the following: psychiatric, 15%; cardiovascular, 15%; neurologic, 7%; pulmonary, 6%; diabetes mellitus, 3%; and infectious, 3%. Seventy-one percent of those aged 55 years or older had a chronic medical condition. Among those with a psychiatric condition, 56% had another chronic illness.

**LIMITATIONS** We could not identify unmedicated health conditions; medications prescribed across multiple disease categories were excluded from our analysis.

**CONCLUSION** In North Carolina, at least one in three people released from the state prison system had a chronic health condition, and among those with psychiatric conditions, most had comorbid medical disease. Coordination of health care after release from incarceration is essential to avoid preventable complications and unnecessary utilization of acute care services. Greater eligibility for Medicaid is needed to scale up transition programs for this population.

There are nearly 1.4 million people incarcerated in US state prisons [1]. Many incarcerated people suffer from chronic health conditions, mental illness, and substance use disorders. Although people have a constitutionally based right to health care during periods of incarceration, for the more than 570,000 incarcerated people who are eventually released from state prisons each year, accessing health care in the community can be challenging [1-4]. Upon release, people routinely struggle with food and housing insecurity, unemployment, lack of transportation, and substance use [5]. Among others, these challenges often take precedence over—and are barriers to—accessing health care [6].

In the context of these common barriers, US studies have shown that people released from prison have high rates of emergency department and hospital admissions, and those with communicable diseases too often have inadequate access to care and medication [7-9]. Several studies have also shown that compared to the general population, death rates among people released from prison are higher for not only drug overdose and trauma, but also for chronic health conditions [10, 11]. Conversely, greater continuity of care is likely to reduce unnecessary and expensive acute care visits, reduce the transmission of communicable diseases, and improve overall post-release mortality rates. Yet prison system efforts to facilitate continuity of care have traditionally been of limited scope and focused on a few health conditions [12].

The Transitions Clinic Network (TCN) is a group of affiliated clinics across the country that support continuity of care for people returning from incarceration. Currently there are 25 TCN clinics across 11 states and Puerto Rico [13]. Briefly, the TCN model utilizes highly trained community health workers who have the lived experience of previous incarceration to support patients newly released from incarceration in accessing a designated community clinic. These designated community clinics are designed to be responsive to the cultural, social, and economic needs of people returning to the community from correctional environments [14, 15].

To fully plan for and evaluate a Transitions Clinic, it is necessary to understand the baseline prevalence of health conditions in the correctional system from which patients are released, but Transitions Clinics have rarely had access to these data. In fact, few prison systems comprehensively track the prevalence of chronic health conditions [12], and the most frequently cited estimates of disease prevalence, those generated by the US Department of Justice's Bureau

Electronically published November 4, 2019.

Address correspondence to David L. Rosen, 130 Mason Farm Rd., Campus Box 7030, Chapel Hill, NC 27599 (drosen@med.unc.edu).

**N C Med J.** 2019;80(6):332-337. ©2019 by the North Carolina Institute of Medicine and The Duke Endowment. All rights reserved. 0029-2559/2019/80602

of Justice Statistics, rely on incarcerated people's self-reports [16, 17].

As we begin to establish TCN clinics in North Carolina, we sought to examine the prevalence of chronic health conditions among those released from the state prison system, which is the 12th largest in the United States and releases about 25,000 people back to their communities each year [18].

## Methods

This study was approved by the University of North Carolina at Chapel Hill Institutional Review Board and by the review board of the North Carolina Department of Public Safety Division of Prisons.

### Data Source

In 2015 the prison system adopted an electronic health record system, but the record system does not yet include functionality to query and export diagnosis data. Given this limitation, we utilized prison system electronic pharmacy dispensing records to generate disease prevalence estimates. Every time a medication is dispensed within the prison system, an electronic record is generated consisting of the medication name, dose, and quantity.

For the period July 1, 2015 to June 30, 2016, we received all electronic medication dispense records as well as all incarcerated people's dates of birth, race/ethnicity, gender, dates of prison entry and exit, and the type of entry (eg, first prison incarceration, return from parole).

### Study Population

Our study population included all people who were aged 18 years or older at the beginning of their incarceration and were released from the North Carolina state prison system between July 1, 2015 and June 30, 2016.

### Classifying Medications into Health Condition Groups

We created a list of all medications dispensed during the study period. Two board-certified primary care physicians reviewed the list separately and classified each of them into one of 10 major disease categories, and 20 substituent categories. Creation of the categories was based on the physicians' clinical judgement and broadly informed by the International Classification of Diseases Ninth Revision, Clinical Modification chapters as well as the disease categories used in Agency for Healthcare Quality and Research's Clinical Classification Software. However, in some instances substituent categories were based on medication type (eg, diuretic) rather than on a specific health condition. Discrepancies in the classification of medications were resolved through discussion. Medications frequently used to treat a wide range of conditions (eg, aspirin) were not included in our analysis. A list of medications and the corresponding disease classification is available in an appendix (available in the online edition of the NCMJ).

## Analyses

For people with multiple releases during the study period, we included all of their dispensed medications during their incarcerations but described their characteristics at the time of their first release. We examined the distribution of each demographic variable in our population (gender, race and ethnicity, and calculated age at prison entrance), time served, and incarceration type. For race and ethnicity, we created analytic categories of non-Hispanic white, non-Hispanic black, non-Hispanic other, and Hispanic. We also created a 4-level categorical variable for age using the groups 18-34 years, 35-54 years, 55-64 years, and 65 years and older.

We used the medication data to code dichotomous variables indicating the presence or absence of each of our major and substituent health condition categories. We considered a single pharmacy dispensing record of any amount of medications as a sufficient surrogate for having the corresponding health condition. Using our constructed indicator variables, we estimated the population prevalence for each of our health condition categories. We note that prevalence estimates for the major groups include some cases not represented by our substituent groups. We also created an aggregate category to examine the prevalence of having any chronic non-psychiatric condition. We then estimated the percentage of people in our population who were coded as having one or two or more discrete major health condition categories. Because of the high rates of mental illness in prison populations and its strong association with premature mortality from other chronic conditions, we examined the percentage of patients with a mental health condition who had another chronic health condition. We conducted these latter two analyses for the entire population and stratified by age group. We then examined the distribution of ages among all people with a chronic health condition. We conducted all analyses using SAS version 9.4 (Cary, North Carolina).

## Results

Among 20,585 unique released people in our study population, 13% were female, 50% were non-Hispanic black, and 43% were non-Hispanic white. Sixty-three percent were aged 18-34 years, 33% were aged 35-54 years, and 4% were aged 55 years or older (see Table 1).

The prevalence of chronic health condition categories was the following: psychiatric, 15%; cardiovascular, 15%; neurologic, 7%; pulmonary, 6%; infectious, 3%; diabetes mellitus [DM], 3%; and endocrine non-DM, 2% (see Table 2).

Thirty-three percent of people in our study (N = 6802) had at least one major condition, with the prevalence increasing by age group: 23% among those aged 18-34 years, 49% among those 35-54 years, 70% among those 55-64 years, and 84% among those 65+ years. Overall, 13% (N = 2639) had chronic conditions in two or more of our major condition categories, with the percentage ranging from 7% among

**TABLE 1.**  
**Characteristics of Adults Released From the NC Prison System From July 1, 2015 to June 30, 2016**

Characteristic	N	%
All	20,585	100
Age (at entry, years)		
18-34	13,038	63.3
35-54	6,769	32.9
55-64	683	3.3
65+	95	0.5
Gender		
Male	17,941	87.2
Female	2,644	12.8
Race		
Black, non-Hispanic	10,351	50.3
White, non-Hispanic	8,866	43.1
Other, non-Hispanic	709	3.4
Hispanic	659	3.2
Incarceration type		
First prison incarceration	7,222	35.1
Re-incarceration: new sentence	9,611	46.7
Re-incarceration: existing sentence,* other	3,752	18.2
Time served (days)		
Q1 (0-91)	5,134	24.9
Q2 (92-219)	5,153	25.0
Q3 (220-526)	5,155	25.0
Q4 (527-16,318)	5,143	25.0
Note: Quartile (Q) *returning from parole.		

those aged 18-34 years to 54% among those 65+ years (see Figure 1).

Among the 15% (3,139) of our population with a psychiatric condition, 56% (N = 1,761/3,139) had at least one non-psychiatric chronic condition, with the prevalence ranging from 44% (675/1,527) among those aged 18-34 years to 91% (20/22) among those aged 65+ years (see Figure 2).

Among the 33% of people with any chronic health condition, 43% (N = 2942) were aged 18-34, 49% (N = 3,304) were aged 35-54 years, 7% (N = 476) were aged 55-64 years, and 1% (N = 80) were aged 65+ years.

## Discussion

Despite the growing body of academic literature focused on the health of people in the criminal justice system [19], there is a dearth of clinically informed epidemiologic data to enumerate the chronic health problems of incarcerated people returning to the community. The lack of these data can inhibit planning by Transitions Clinics and other groups providing health and social services to released people.

In our one-year study, we found that nearly 7,000—or one in three—people returning from prison had a chronic health condition. The prevalence of health problems increased with age, with greater than 70% of those aged 55 years or older having at least one chronic condition. These estimates reflect a refinement of national estimates based on self-reports and underscore the significant numbers of people who are returning to the community each year and require

continuity of care and regular medication to address their chronic health needs.

In addition to the large overall number of returning prisoners with health problems and the high prevalence of health conditions among older people, we found that among the 15% with psychiatric conditions, more than half had a concurrent non-psychiatric chronic condition. This finding is particularly concerning given that people with severe mental illness often receive inadequate care for their comorbid conditions, which contributes to the shortening of their life expectancies by an average of 13 to 30 years [20].

Similar to the observed prevalence of mental health problems, we found that 15% of our study population had cardiovascular disease. Although the risk of cardiovascular morbidity and mortality among former prisoners has received less attention than that of other causes, existing studies suggest that (as in the general population), cardiovascular disease is among the leading causes of death for

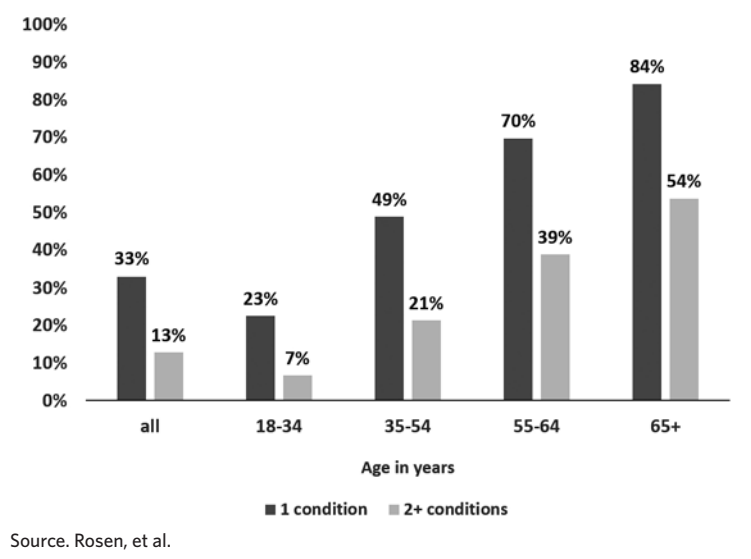
**TABLE 2.**  
**Distribution of Health Conditions Among Adults Released From the North Carolina State Prison System From July 1, 2015 to June 30, 2016**

Major condition group	Sub-group	N	%
Any	Total	6,802	33.0
Cardiovascular	Total	3,129	15.2
	Antiarrhythmic	6	0.0
	Hypertension	2,752	13.4
	Statin	936	4.5
Diabetes (DM)	Diuretic	277	1.3
	Total	681	3.3
	Insulin (injectable)	138	0.7
non-DM Endocrine	Insulin (oral)	9	0.0
	Total	339	1.6
	Thyroid	330	1.6
Infectious Diseases	Hyper-parathyroid	8	0.0
	Total	553	2.7
	Hepatitis C	6	0.0
Neurologic	HIV	284	1.4
	Tuberculosis	265	1.3
	Total	1,518	7.4
	Alzheimer's	4	0.0
	Multiple Sclerosis	2	0.0
Psychiatric	Parkinson's	10	0.0
	Seizure	538	2.6
	Tremor	1	0.0
	Total	3,139	15.2
	Antipsychotic	1,050	5.1
	Benzodiazepine	28	0.1
Pulmonary	Depression	1,762	8.6
	Total	1,232	6.0
Renal	Total	18	0.1
Rheumatologic	Total	78	0.4
Pain	Total	471	2.3
	Narcotic	308	1.5
Any non-psych "chronic"*	Total	4,381	21.3

Note: "Totals" include prevalent cases not represented by the sub-group categories; Diabetes Mellitus (DM).

\*any Cardiovascular, Diabetes, non-DM Endocrine, HIV or Pulmonary.

**FIGURE 1.**  
**Prevalence of Any Or 2+ Major Condition Groups Among Adults Released From the North Carolina State Prison System July 1, 2015-June 30, 2016**



people released from prison [10, 11]. For example, a study of incarcerated people released from Washington state prisons between 1999 and 2009 [21] found that following overdose, cardiovascular disease was the second leading cause of death (13%), and in a North Carolina study, the risk of death from heart disease among formerly incarcerated people was 4.5 times that of the general population [22]. Despite these findings, less than 30% (N = 14) of state prison systems reportedly target cardiovascular disease for continuity of care, and the North Carolina prison system has been among those not supporting this continuity [12].

Although we used prescription data as a surrogate to estimate disease prevalence, in some instances low prevalence estimates simply reflect a lack of screening or treatment. The two most prominent examples are hepatitis C (HCV) and opioid use disorder (OUD). The low prevalence of HCV we observed is likely a result of low testing rates in prison. HCV testing is uncommon across many systems because of the high price of therapies, despite their effectiveness. Nationally the prevalence of HCV in the prison population has been estimated to be 18%, and we have found a similar prevalence among a small sample of people released from the North Carolina prison system (20%, N = 74) [23]. Similarly, the absence of prescription records corresponding to medication assisted treatment (MAT) for OUD is a reflection of treatment practices and not the underlying prevalence. The need for MAT in prison and at release was highlighted by a recent North Carolina study which found that in the first two weeks following prison release, there was a 74 and 40 times greater risk of death from heroin and opioid overdose, respectively, as compared to the risks among those in the general population [24]. Although the need for OUD treatment during and following incarceration has gained significant attention in North Carolina and across the country, like

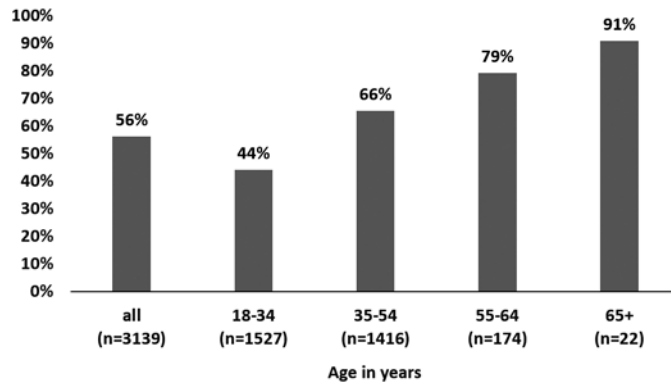
other chronic health conditions, the health care resources for people released from prison are inadequate.

In response to existing deficits in continuity of care, we are collaborating with the state prison system, county health departments, and federally qualified health centers to implement the TCN model at multiple sites across the state to foster greater continuity of care for people released from prison. The program, named the Formerly Incarcerated Transition (FIT) Program and led by coauthor Ashkin, has been initiated in four counties in North Carolina, three of which are located in Central North Carolina and a fourth in Mecklenburg County. Prompted in part by our findings around comorbidities among those with psychiatric conditions, we are initiating one of the FIT Program sites at an existing primary care clinic that is co-located within a behavioral health campus for people with serious mental illness (SMI). To our knowledge, this is the first time that a TCN clinic will be specifically focused on serving the health needs of those with SMI. Considering that prisons and jails have become the *de facto* safety net provider for people with SMI, creating and evaluating TCN models for those with SMI is a high public health priority.

At their full capacity, we anticipate that these four clinics will allow us to work with approximately 250 clients at one time. Yet with such large numbers of people with chronic health problems released from prison and such a geographically large and diverse state, scalability is clearly a challenge.

A principle component of this challenge is to obtain sufficient funding to provide health care for these patients. Our earlier analyses suggest that a substantial population of prisoners with chronic health problems in Medicaid non-expansion states fall into the Medicaid “gap,” in which they are too financially impoverished to purchase health insurance, but do not qualify for traditional Medicaid [25]. Indeed, opening

**FIGURE 2.**  
**Prevalence of Any Non-Psychiatric Major Condition Group Among Adults With a Psychiatric Condition Released From the NC State Prison System July 1, 2015-June 30, 2016 (N = 3,139)**



Source. Rosen, et al.

in a non-expansion state, we are finding that the majority of our patients have no medical insurance and cannot afford even the low sliding-scale fees at community health centers and their discounted pharmacy services. Presently, we have raised private funds to support a voucher system that can cover these costs for our patients, but this funding is limited.

The most direct remedy for this challenge would be the expansion of Medicaid—or a regulatory provision granting recently released people temporary Medicaid coverage. However, given the state legislature’s historical position on Medicaid expansion, the plausibility of either of these options is uncertain [26].

In this context of limited resources, we propose four near-term priorities, which we seek to achieve in the next two years (by 2021), to further address the health needs of those released from prison. First, we propose opening additional FIT Program clinics so that at least 800 people, or 10% of those annually released with chronic conditions, can receive continuous care between correctional and community settings. We aim to initiate these clinics in every region of the state. Second, we plan to support FIT Program sites’ capacity in treating patients with MAT for OUD. Third, we plan to conduct outreach to non-FIT Program safety net clinics that likely interact with large numbers of released people (eg, community clinics, emergency departments) to promote culturally sensitive and non-stigmatizing care for justice-experienced people. And fourth, we plan to encourage schools of medicine and allied health professionals to incorporate these same skills and values into their curriculum so that they become ingrained in the health care workforce.

In addition to informing programs supporting continuity of care in North Carolina, our findings contribute to the wider epidemiologic literature examining disease prevalence among correctional populations. This contribution is notable considering that prevalence data from US prisons have been difficult to obtain historically. The most widely cited prevalence estimates, those stemming from

a nationally representative survey conducted from the US Department of Justice’s Bureau of Justice Statistics (BJS) in 2004 and 2011, relied on self-reports to estimate prevalence of 15 health care conditions [16, 17]. The validity of the BJS survey items remains unassessed, and may be subject to issues of recall bias, stigma, education, and perceived secondary gains. National data based on clinical diagnosis data do not exist, and to our knowledge, a 2006-2007 study from the Texas state prison system is the only statewide prevalence study to use diagnosis data [27]. This lack of prevalence data is corroborated by a recent nationwide survey of prison system administrators, which found that while many prison systems track the prevalence of the most expensive conditions amongst their populations, few comprehensively track the prevalence of all chronic conditions in their state [12]. More systematic efforts at tracking disease prevalence are needed both in North Carolina and across the country if prison systems and their surrounding communities are to adequately care for released people.

### Limitations

Our study has several limitations, most related to our use of pharmacy dispensing records as a surrogate for having a health condition. As in any large health care system, it is possible that medications could have been incorrectly or inappropriately dispensed or dispensed for a short period of time and stopped, indicating an acute and not chronic health problem. These scenarios would artificially inflate our prevalence estimates. However, in the prison setting, where resources including medications can be rationed and care can be difficult to access, we believe that use of pharmacy data in our study was much more likely to result in conservative prevalence estimates. Another consideration is that some of the medications could have been prescribed and dispensed for off-label use, which would not necessarily impact our overall prevalence estimate, but could inappropriately overstate the prevalence estimate for a medication’s



approved condition while underestimating the prevalence estimate for the condition associated with its off-label use. To mitigate this issue, we excluded from our analysis medications that frequently have off-label use, or more generally, medications that are approved for a wide range of health conditions. The largest group of medications falling into this category were anti-seizure medications that are commonly used as mood stabilizers for people with certain types of mental illness. Finally, our mapping between medications and health conditions was based on clinical judgement. We have provided our mappings so that these can be used and improved upon in the future.

## Conclusion

In conclusion, we found that nearly 7,000 people, constituting one in every three, returning from the state prison system to the community had a chronic health condition that required follow-up clinical care and medication. Additionally, the prevalence of comorbid chronic medical problems was particularly high among those with mental health diagnoses. Creating adequate continuity of care for the post-release population is a significant challenge but should be prioritized at the state and local level. In addition to Medicaid expansion, there are several near-term approaches to build capacity and improve health care for those returning from prison back to their communities. **NCMJ**

**David L. Rosen, PhD, MD** assistant professor, UNC School of Medicine, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina; adjunct assistant professor, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.  
**Shavonda Thomas, MD, MPH** internist, Novant Health, Winston-Salem, North Carolina.

**Andrew L. Kavee, MA** applications specialist, UNC Cecil G. Sheps Center for Health Services Research, Chapel Hill, North Carolina.

**Evan A. Ashkin, MD** professor of family medicine, University of North Carolina at Chapel Hill School of Medicine, Chapel Hill, North Carolina; director, Formerly Incarcerated Transition (FIT) Program

## Acknowledgments

We acknowledge the North Carolina Department of Public Safety for their assistance providing the data used in this analysis.

The authors have no relevant conflicts of interest.

## References

- Carson EA. Prisoners in 2016. Washington, DC: US Department of Justice, Bureau of Justice Statistics; January 2018. <https://www.bjs.gov/content/pub/pdf/p16.pdf>. Published January 2018. Accessed September 25, 2019.
- Estelle v Gamble, US 97, 429 (1976).
- Hughes T, Wilson DJ. Reentry Trends in the United States: Inmates returning to the community after serving time in prison. Bureau of Justice Statistics website. <https://www.bjs.gov/content/reentry/reentry.cfm>. Accessed December 12, 2018.
- Mallik-Kane K. Returning Home Illinois Policy Brief: Health and Prisoner Reentry. Washington, DC: Urban Institute; 2005. <https://www.urban.org/sites/default/files/publication/42876/311214-Returning-Home-Illinois-Policy-Brief-Health-and-Prisoner-Reentry.PDF>. Published August 2005. Accessed July 29, 2019.
- Western B, Braga AA, Davis J, Sirois C. Stress and hardship after prison. *AJS*. 2015;120(5):1512-1547.
- Haley DF, Golin CE, Farel CE, et al. Multilevel challenges to engagement in HIV care after prison release: a theory-informed qualitative study comparing prisoners' perspectives before and after community reentry. *BMC Public Health*. 2014;14:1253.
- Wang EA, Wang Y, Krumholz, HM. A high risk of hospitalization following release from correctional facilities in Medicare beneficiaries: a retrospective matched cohort study, 2002 to 2010. *JAMA Intern Med*. 2013;173(17):1621-1628.
- Frank JW, Linder JA, Becker WC, Fiellin DA, Wang EA. Increased hospital and emergency department utilization by individuals with recent criminal justice involvement: results of a national survey. *J Gen Intern Med*. 2014;29(9):1226-1233.
- Baillargeon J, Giordano TP, Rich JD, et al. Accessing antiretroviral therapy after release from prison. *JAMA*. 2009;301(8):848-857.
- Binswanger IA, Stern MF, Deyo RA, et al. Release from prison—a high risk of death for former inmates. *N Engl J Med*. 2007;356(2):157-165.
- Rosen DL, Schoenbach VJ, Wohl DA. All-cause and cause-specific mortality among men released from state prison, 1980-2005. *Am J Public Health*. 2008;98(12):2278-2284.
- The Pew Charitable Trusts. Prison Health Care: Costs and Quality. How and why states strive for high-performing systems. Philadelphia, PA: The Pew Charitable Trusts; 2017. [https://www.pewtrusts.org/-/media/assets/2017/10/sfh\\_prison\\_health\\_care\\_costs\\_and\\_quality\\_final.pdf](https://www.pewtrusts.org/-/media/assets/2017/10/sfh_prison_health_care_costs_and_quality_final.pdf). Published October 2017. Accessed Sept 23, 2018.
- Transitions Clinic Network website. <http://transitionsclinic.org>. Accessed December 13, 2018.
- Shavit S, Aminawung JA, Birnbaum N, et al. Transitions clinic network: challenges and lessons in primary care for people released from prison. *Health Aff*. 2017;36(6):1006-1015.
- Wang EA, Hong CS, Shavit S, Sanders R, Kessell E, Kushel MB. Engaging individuals recently released from prison into primary care: a randomized trial. *Am J Public Health*. 2012;102(9):e22-e29.
- Maruschak LM. Medical Problems of Prisoners. Washington, DC: US Department of Justice, Bureau of Justice Statistics; 2008. <https://www.bjs.gov/content/pub/pdf/mpp.pdf>. Updated April 22, 2008. Accessed July 30, 2019.
- Maruschak LM, Berzofsky M, Unangst J. Medical Problems of State and Federal Prisoners and Jail Inmates, 2011-12. Washington, DC: US Department of Justice, Bureau of Justice Statistics; 2015. <https://www.bjs.gov/content/pub/pdf/mpsfjii112.pdf>. Published February 2015. Accessed July 30, 2019.
- North Carolina Department of Public Safety Automated System Query: Prison Exits 7-1-2015 thru 6-30-2016. Raleigh, NC: NC DPS; 2018. <http://webapps6.doc.state.nc.us/apps/asqExt/ASQ>. Accessed December 12, 2018.
- Rosen DL, Quist A, Grodensky CA. An evaluation of published US correctional health research, 2006-2015. Poster presentation at: 9th Academic and Health Policy Conference on Correctional Health; 2016; Baltimore, MD.
- Chesney E, Goodwin GM, Fazel S. Risks of all-cause and suicide mortality in mental disorders: a meta-review. *World Psychiatry*. 2014;13(2):153-160.
- Binswanger IA, Blatchford PJ, Mueller SR, Stern MF. Mortality after prison release: opioid overdose and other causes of death, risk factors, and time trends from 1999 to 2009. *Ann Intern Med*. 2013;159(9):592-600.
- Jones M, Kearney GD, Xu X, Norwood T, Proescholdbell SK. Mortality rates and cause of death among former prison inmates in North Carolina. *N C Med J*. 2017;78(4):223-229.
- Spaulding AC, Anderson EJ, Khan MA, Tabora-Vidarte, CA, Phillips, JA. HIV and HCV in U.S. prisons and jails: the correctional facility as a bellwether over time for the community's infections. *AIDS Rev*. 2017;19(3):134-147.
- Ranapurwala, SI, Shanahan ME, Alexandridis AA, et al. Opioid overdose mortality among former North Carolina inmates: 2000-2015. *Am J Public Health*. 2018;108(9):1207-1213.
- Rosen DL, Grodensky CA, Holley TK. Federally-assisted healthcare coverage among male state prisoners with chronic health problems. *PLoS One*. 2016;11(8):e0160085.
- Guyon J, Serafi K, Bachrach D, Gould A. State strategies for establishing connections to health care for justice-involved populations: the central role of Medicaid. *Commonw Fund*. 2019;1-12.
- Harzke AJ, Baillargeon JG, Pruitt SL, Pulvino JS, Paar DP, Kelley MF. Prevalence of chronic medical conditions among inmates in the Texas prison system. *J Urban Health*. 2010;87(3):486-503.