



Aging Behind Bars

**Trends and Implications of Graying Prisoners in the
Federal Prison System**

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Executive Summary

Over the past few decades, federal and state prison populations have increased dramatically. Accompanying this growth is a demographic shift to older prison populations. Older prisoners require special attention in prison, as they often suffer from chronic diseases, including diabetes, heart failure, cognitive impairment, and liver disease, as well as age-related disabilities. They are also more vulnerable to victimization in prison. However, relatively little is known about the implications of aging prisoners. This report aims to address this knowledge gap by presenting an in-depth examination of the growth patterns in the largest correctional system in the United States—the US Bureau of Prisons (BOP).

The highlights of this report include the following:

- The aging of the BOP population has accelerated since the early 2000s.
- The growth rate of older prisoners varies across offense type, gender, and race.
 - The proportion of older female prisoners is growing faster than that of older male prisoners, and providing health care services to aging women generally costs substantially more.
 - The aging of the BOP population is most pronounced among those convicted of violent and property offenses, whereas the proportion of older prisoners convicted of drug offenses has grown relatively slowly.
 - The aging of the BOP population is most pronounced among non-Hispanic white prisoners. The proportion of older Hispanic prisoners has been relatively stable over time.
- The cost for older prisoners escalates steeply as the cost ratio increases.
 - The fiscal burden of aging prisoners is applicable to a wide range of prison operations (e.g., medical supplies, welfare services, treatment, training), not just the upkeep of medical housing units.
 - If the cost of incarceration is the same for prisoners of all ages, each prisoner would consume approximately \$12,000 worth of inmate care and correctional programs per year.
 - If prisoners age 50 and older cost three times more than younger prisoners, the per person cost of providing care and programs in BOP would be approximately \$9,000 for those below age 50 and \$27,000 for those age 50 and older.
 - At five times more, older prisoners can consume up to one-half of the BOP's total allocation for inmate care and programs (approximately \$1.2 billion in FY 2012).
- Over the next five years, the proportion of those age 50 and older, especially those age 65 and older, is projected to increase at a considerably fast rate.

- There were slightly over 5,000 prisoners age 65 and older in FY 2011 (approximately 3 percent of the BOP population), and the number of those prisoners is projected to triple by FY 2019.
- By these projections, prisoners age 50 and older could make up nearly 28 percent of the BOP population by FY 2019—approximately a 10 percentage point increase from FY 2011.

The aging of the BOP population has already begun, driven in part by punitive sentencing practices and in part by the aging of society in general. It is complicated by other individual factors of aging prisoners such as gender and race. However, it is unclear how these demographic shifts, which could have serious fiscal and health care implications for the BOP population, are reflected in BOP's current practice and policy regarding the treatment and management of aging prisoners. There is little empirical knowledge to inform current practice or policy regarding the growing population of aging prisoners.

Our recommendations for policy and research include the following:

- Closely monitor the growth of the older prisoner population, as recent years have witnessed a considerable demographic shift in the BOP population, and it is expected to continue in the near future.
- Develop an empirically driven definition of older prisoners.
 - There is no definitive consensus as to the definition of older or “geriatric” prisoners, typically ranging from 50 to 65. Given that one of the primary motivations for examining aging prisoners is the economic burden facing all levels of governments, we recommend using data to empirically identify the age threshold at which older prisoners pose minimal risk of recidivism and can be more cost-effectively managed through noncustodial means.
- Expand data-driven knowledge on older prisoners.
 - The risk of recidivism drops as prisoners get older, and there will come a time when an additional year of prison time no longer yields a meaningful reduction in the risk of recidivism among older prisoners. Identifying such a point in one's incarceration history would have direct policy implications for the management of aging prisoners.
 - Scientifically sound estimates for the operating costs of incarceration should be developed for older prisoners. Existing cost estimates are often drawn from anecdotal evidence and are outdated and inadequate for formulating specific policy options for older prisoners.
- Develop cost-effective management plans for aging prisoners.
 - The current discussion about aging prisoners tends to focus on severely ill and dying geriatric prisoners. Correctional programs and policies for aging prisoners should not be limited to only this population, such as the existing hospice care, palliative care, or compassionate release programs. Consideration should also be given to devising management plans to better treat and monitor a broader population of older prisoners.

- The development of an easy-to-use assessment/screening tool for correctional officers would help detect common geriatric symptoms (e.g., sensory impairment, functional impairment, incontinence, and cognitive impairment) as well as prison-based functional impairment. After initial diagnosis at intake, such symptoms may be easily overlooked in the rigid routine of prison life. A screening tool that could be adopted for routine use would provide systematic information about the needs of aging prisoners and serve as an early intervention protocol for preventive care.
- Training correctional officers to be more knowledgeable about aging and the needs of aging prisoners would also help identify older prisoners who need to be monitored for health and safety concerns.
- Consideration should be given to expanding use of preventive health care (especially dental care), early diagnosis, and early treatment among aging prisoners, as these practices can avoid more serious health problems and lead to substantial savings in health care costs.
- Existing federal sentencing policy offers limited options to BOP for effectively addressing the needs of aging prisoners. The use of early release mechanisms for older prisoners should not be constrained to extraordinary cases. For effective management of aging prisoners, the use of early release mechanisms can be expanded to older prisoners whose risk to public safety is reasonably manageable and whose health care needs can be better met in the community.

Raising awareness of the needs of aging prisoners and equipping BOP with policy options to address such needs may not closely conform to some of the fundamental principles of punishment, such as retribution. However, it is important to recognize that poor management of prison systems can affect the rest of the criminal justice system, responsible for ensuring public safety, and potentially lead to a violation of prisoners' constitutional or statutory rights. These concerns are increasingly more relevant and should be balanced with the question of how well our prison system serves the principles of punishment.

The number of older prisoners is growing fast but is still relatively small, which may create the misconception that policy options for better managing older prisoners would not alleviate the current fiscal burden of the prison system to any substantial extent. However, as presented in this report, the population of older prisoners has grown markedly in recent years and is projected to have a steeper growth curve in the near future. The cost-effective management of this aging population will be of significant consequence to the BOP budget, and our recommendations for policy and research can be a starting point for addressing the costly demographic shift in the BOP population.

Introduction

The current growth in the number of older adults in the United States is unprecedented in our nation's history, and this growth will continue over the next few decades. The last baby boomer will turn 65 in 2030, at which time one in five Americans will be older than 65 (CDC 2013). Every facet of society will be affected by this demographic shift, including the criminal justice system. In state and federal prisons, the numbers and proportions of aging inmates are rapidly growing. According to the US Bureau of Justice Statistics (BJS), the number of state and federal prisoners age 55 or older almost quadrupled between 1995 and 2010 (Harrison and Beck 2004; Guerino, Harrison, and Sabol 2011). In comparison, the total prison population growth was less than half that rate during the same time period.

This explosive growth in the number of aging prisoners has serious safety and budgetary implications. The fact that older inmates incur the cost of incarceration, including medical expenditures, which are much higher than those for younger inmates raises particular concerns among policymakers and criminal justice professionals. It also forces state and federal governments to consider ways to avoid such correctional expenditures. Releasing older prisoners who pose little threat to public safety is one such mechanism by which to reduce the fiscal burden of aging prisoners. Fifteen states and the District of Columbia have procedures in place for releasing geriatric inmates (Chiu 2010). However, there is little guidance available as to how to implement such policy options as a cost-saving measure, let alone what to make of the current growth pattern of aging prisoners.

One reason for this lack of guidance is the deficiencies and fragmentation of existing research. Despite widely held beliefs regarding aging prisoners, such as the fact that they incur greater medical costs and pose less threat to public safety than younger prisoners, current understanding of issues related to aging prisoners is lacking in many areas of inquiry. There is also no consensus among researchers or practitioners as to what age prisoners should be considered older, aging, or geriatric (Williams, Stern, et al. 2012). While the National Institute of Corrections and several states define this population as being age 50 or older (Anno et al. 2004), others use 55 and older or 65 and older as a threshold to define "older prisoners."

Hence, the goal of this report is to stimulate policy discussion and empirical research on how to effectively manage the growing population of older prisoners through a case study on the largest correctional system in the United States, the Federal Bureau of Prisons (BOP). BOP was established in 1930 to provide more progressive and humane care for federal inmates, to professionalize the prison service, and to ensure consistent and centralized administration of the 11 federal prisons in operation at that time (BOP 2011). In addition to privately managed facilities and other residential arrangements, BOP currently operates 119 federal prisons to house approximately 173,000 federal offenders (BOP 2014). By examining how the BOP population has changed over time, this report aims to improve the understanding of issues related to aging prisoners and, in light of our findings, encourage a discussion about policies that have the potential to address these issues.

The organization of this report is as follows. First, it provides an overview of aging prisoners and the motivations for examining this population. We then present a description

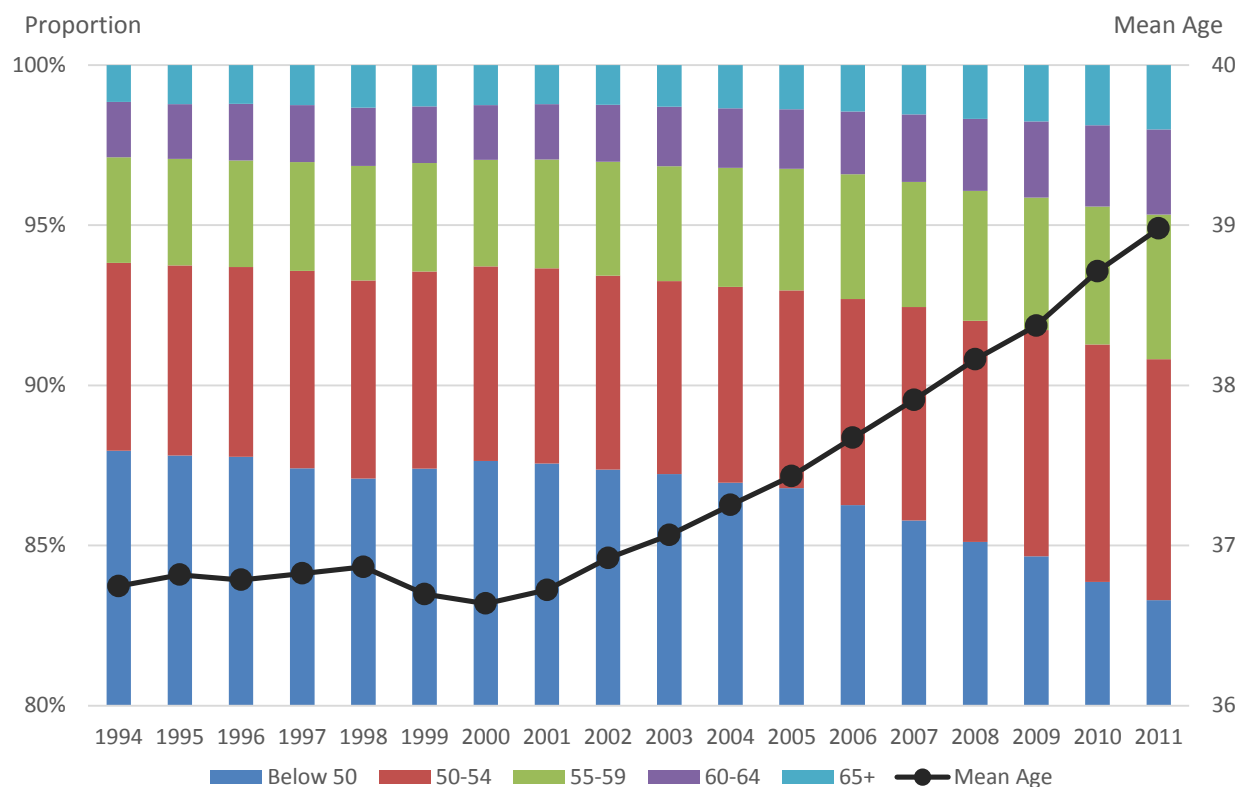
of administrative data and methods used in this report, followed by findings from the empirical analyses. The results sections illustrate various aspects of the BOP population with respect to the trends and characteristics of aging prisoners to provide a comprehensive landscape of the issue. The report then reviews the fiscal implications of aging prisoners through cost simulation in which different cost ratios for different age groups are applied to the itemized BOP budget. We then discuss the projected growth of aging prisoners in the BOP population through dynamic population projections. Finally, the report formulates several policy options that can address the need to better manage aging prisoners.

Background

1. Aging in Correctional Populations

The population of older prisoners has grown at a steadfast pace in recent years. As shown below, the mean age of federal prisoners was stable between 1994 and 2001, remaining around 36.5. However, over the following decade, the mean age increased to 39. Given that the median age of the US population increased from 35.3 in 2000 to 36.8 in 2011 (Census 2012), it appears that the prison population is increasing at a faster rate than that of the general population. Specifically, the proportion of prisoners age 50 or older¹ has increased from approximately 12 percent of the total prison population in 1994 to 17 percent in 2011. There were approximately 9,000 prisoners age 50 or older in 1994 and nearly 30,000 prisoners age 50 or older in 2011—a 330 percent increase. This is the fastest growing age group in the federal prison population.

Figure 1. Age Distribution of Federal Prisoners over Time (Year-end)



Source: US Bureau of Justice Statistics (BJS) Federal Justice Statistics Program (FJSP) data, as analyzed by the Urban Institute.

¹ The existing literature often uses 55 years or older as the benchmark for defining “older,” “elderly,” “aging,” or “geriatric” prisoners. While our research does not necessarily challenge this criterion, we present data on various age ranges to provide a more comprehensive picture of the aging prisoner population in this report.

2. A Burden on Corrections and Health Care Systems

There are significant ramifications of an aging prisoner population that are worth noting. First, older prisoners require more prison health care services than younger prisoners and may even require assistance with normal everyday activities, such as bathing, dressing, or eating. Further, prisoners tend to experience accelerated aging, as they might have been subject to traumatic life events, substance abuse, and poor health care (Williams, Goodwin, et al. 2012). Some evidence indicates that prisoners age 50 and older are more likely to have chronic health conditions or disabilities than their counterparts in the community (Colsher et al. 1992). The cost of incarcerating older prisoners can therefore be substantially higher than that of incarcerating younger prisoners.

Second, in addition to the implications for the criminal justice system, the increasing number of older prisoners has potentially serious ramifications for public health and the community. Since nearly all prisoners eventually come back to live in the community (Travis 2005), age-related health issues that were present in prison will unavoidably spill into communities and public health care systems (Williams, Goodwin, et al. 2012). These issues could be exacerbated by the reentry challenges these individuals face, such as unmet health care needs (Travis 2005).

As a result, aging prisoners are straining federal, state, and local governments, as well as public health care systems. In an era of shrinking government resources, government agencies must face the challenge of the increasing incarceration costs associated with aging prisoner populations. Furthermore, limited health care access and heightened health risk in prison can complicate issues related to aging prisoners. It is therefore important to understand the growth of aging prisoner populations and to consider cost-effective ways to provide these inmates with needed programs, services, and supervision.

3. Needs and Costs of Aging Prisoners

Prisoners tend to have the physiological age equivalent to, and experience similar health concerns as, individuals in the community who are 10 to 15 years older (Loeb, Steffensmeier, and Lawrence 2008; Beckett, Peternelj-Taylor, and Johnson 2003). Compared to their counterparts in the community, older prisoners have a greater incidence of disease, disability, and mental health diagnoses, including AIDS, hepatitis C, hypertension, major depression, and post-traumatic stress disorder (Fazel et al. 2001; Maruschak 2006; Williams et al. 2006; Williams and Abraldes 2007). Prisoners also tend to come from lower socioeconomic groups, which already experience a high prevalence of disease (Braveman et al. 2010). This, compounded by the traumatic experience of incarceration and the fragmented medical care available to this population before and after incarceration, contributes to the “accelerated aging” of prisoners (Maruschak 2006; Williams and Abraldes 2007).

These health risk factors and needs make the incarceration of older prisoners costly: one study found that the annual health care costs for inmates age 55 and older ranged from \$11,000 to \$40,000, or at least five times the health care costs for younger inmates

(Angelotti and Wycoff 2010). The Pew Charitable Trusts (2014) also found that states in which older inmates represented a relatively large share of the total prisoner population tend to incur higher per inmate health care spending. Furthermore, 76 million members of the baby boomer generation will reach retirement age over the next decade, with the aging trend expected to peak in 2030 (MacArthur Foundation 2010); as such, the proportion of older arrestees has increased and is expected to continue to grow (Cullen, Wozniak, and Frank 1985). Given these trends, along with existing policy and practice, the aging of the prison population is likely to continue and intensify for the foreseeable future. With the growing number of older prisoners and the increasing cost of health care, expenses associated with incarcerating older prisoners are likely to continue to increase at an alarming rate.

While there is broad recognition of the need to reform criminal justice policies that drive the size of prison populations (Samuels, La Vigne, and Taxy 2013), the aging of this population has received relatively little attention. This is in part because aging prisoners make up a relatively small proportion of the total prison population. For those who are primarily concerned about downsizing prisons, drug and other nonviolent offenders are more suitable populations to target for policy intervention, as they have been a primary driver of the overgrown prison population. However, it is worth emphasizing that the costs and collateral consequences of incarcerating older prisoners are more acute than those of younger prisoners. Correctional administrators are developing policies that address aging prison populations, but little empirical knowledge is available to shed light on the issue or the implications of such policies.

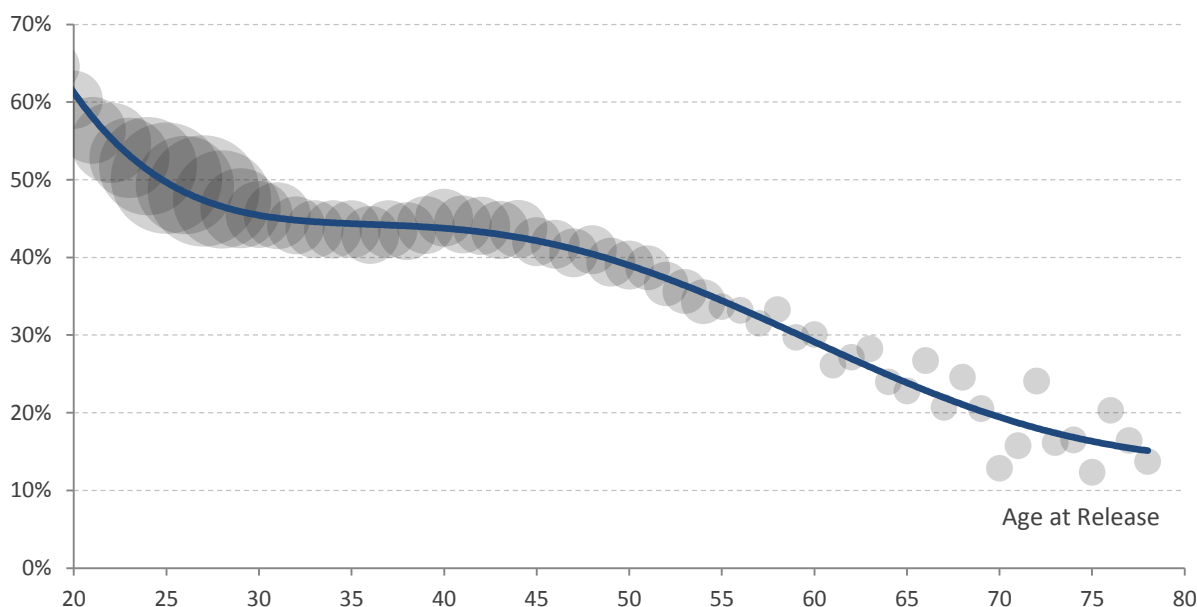
4. Public Safety Implications of Aging Prisoners

Older prisoners are substantially less likely to engage in additional criminal behavior after they are released from prison than younger prisoners (BJS 2014; Williams 2006). Figure 2 displays the pooled recidivism rates by age of prisoners released from 31 states in 2009, measured by return to the custody of state correctional systems.² The recidivism rate for 20-year-old released prisoners is approximately 60 percent but drops dramatically as individuals become older. Notably, the rate at which released prisoners return to correctional custody slows down around age 40 but still continues to fall as prisoners approach 80 and older.

This relationship between prisoners' age and recidivism reflects what is known as the aging-out phenomenon (Farrington 1986; Maruna 2001). Quite simply, this implies that individuals begin to age out of their criminal behavior as they become older. It is important to remember that there is always the possibility that older prisoners, if released, may revert to criminal behavior. It is therefore not practical to motivate a discussion of policy reform around the question: which prisoners have *zero* chance of recidivating? Instead, discussions should focus on which prison populations can be cost-effectively managed with available resources for supervision and treatment.

² The recidivism of prisoners released from state correctional systems is reported here because it was not possible to measure BOP's recidivism rate with the publicly available Federal Justice Statistics Program (FJSP) data.

Figure 2. Recidivism Rates of State Prisoners in Three-Year Follow-Up by Age at Release



Source: US Bureau of Justice Statistics (BJS) National Corrections Reporting Program, as analyzed by the Urban Institute.
Note: Due to sparse data points, age at release is capped at 80.

Because aging appears to directly contribute to prisoners' desistance from crime, it may be possible to pinpoint the most cost-beneficial age at which additional prison time no longer yields a meaningful reduction in prisoners' risk of recidivism while the cost of their incarceration continues to rise exponentially. It should be acknowledged that equipping BOP with policy options to target those prisoners may not conform to some of the fundamental principles of punishment, such as retribution. However, given that the economic burden of overgrown prisons and their negative consequences are the primary motivation for considering cost-effective policy options, it is important to recognize that poor management of prison systems can affect the rest of the criminal justice system, responsible for ensuring public safety, and potentially lead to a violation of prisoners' constitutional or statutory rights. These concerns are increasingly more relevant with aging prisoners, and are no less important than the question of how well our prison systems serve the philosophical principles of punishment (i.e., retribution, incapacitation, deterrence, and rehabilitation).

Along the same lines of reasoning, it is important not to limit the focus of the policy discussion to only releasing geriatric prisoners who are so physically or cognitively deteriorated that they do not pose a threat to public safety, because these offenders would likely still impose exorbitant costs on community health care systems. Policy options should be able to mitigate the accelerated aging that prisoners experience due to the stress and victimization associated with prison, as well as encourage preventive health care and cost-effective management strategies via noncustodial means (e.g., halfway homes, house arrest, probation/parole, etc.). Developing a comprehensive understanding of the public safety risk posed by older offenders, especially among the federal prison population, is the first necessary step to devise such policy options without compromising public safety.

Data and Methodology

This study examines administrative records of prisoners in the custody of BOP for fiscal years 1994 to 2011. The data are publicly available from the National Archive of Criminal Justice Data³ and contain information on all sentenced offenders (1) admitted into, (2) released from, and (3) held in the custody of BOP at year-end. The data include information that describes individual characteristics, such as age, race, and gender, as well as sentences and expected prison terms. These data are part of a statistical series compiled by BJS and include over 2.5 million cases. To understand the trends and growth of aging prison populations, the age distribution of federal prisoners was examined over time and by several case characteristics.

Supplemental to the statistical analysis of administrative data was a review of BOP's budgetary documents (US Department of Justice 2014). For FY 2014, BOP requested \$6,939 million to support over 43,000 positions. Given that age-specific estimates of the health care or incarceration costs are not available from BOP, this study applies different cost ratios for older and younger prisoners based on prior research to explore the financial implications of aging in prison.

This study also presents projections of the BOP population by age group based on stochastic models⁴ that take into consideration historical trends in a number of case characteristics such as gender, race, ethnicity, citizenship, offense type, region of conviction, time served, and release type. Beginning with an estimated base population for 2012, the population was advanced one year of age at a time and incorporated updated information on case characteristics for a given year (for more technical information on this methodology, please see the appendix).

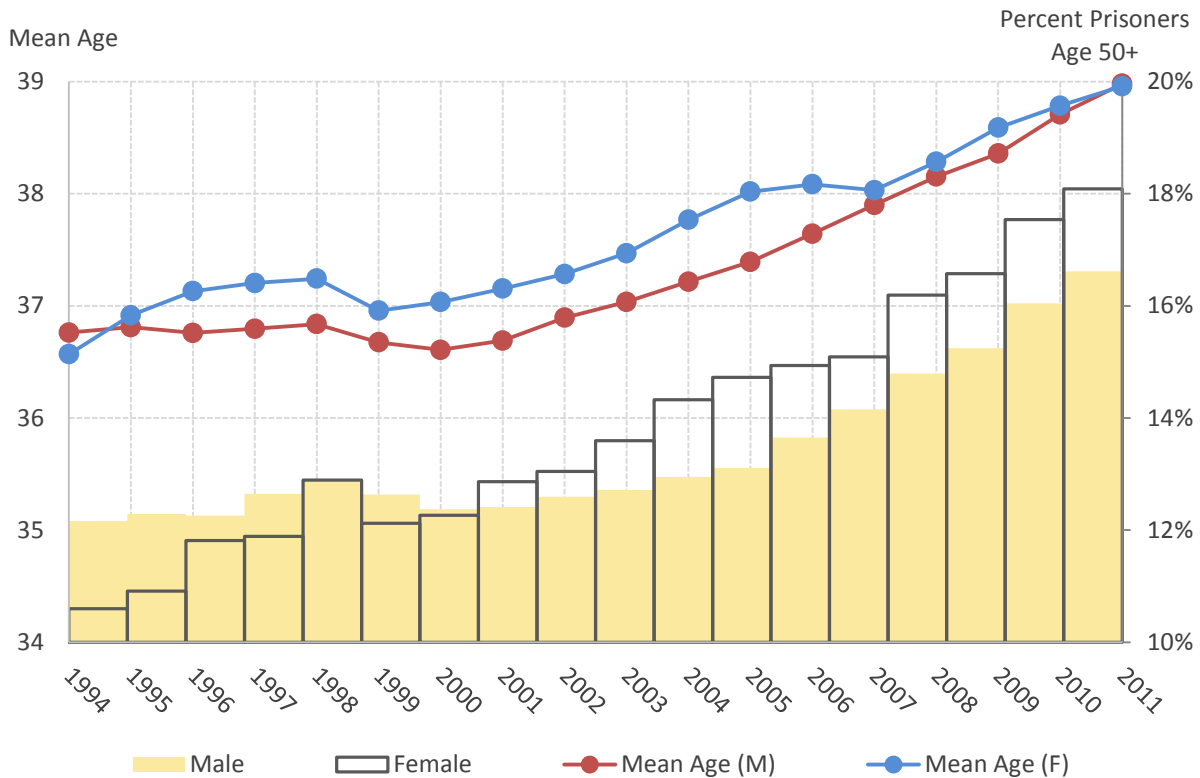
³ Comprehensive information on criminal case processing in the federal justice system is compiled through the Federal Justice Statistics Program and is available to the public. See <http://www.icpsr.umich.edu/icpsrweb/ICPSR/series/73> for details.

⁴ Stochastic means allowing for random variation so one can estimate the probabilities of outcomes in a forecast under different situations. In a practical sense, the world works in so many ways that will never be fully understood and may even seem random. Thus, adding randomness in the forecast can help better represent real-world situations in which uncertainty is present.

Trends in Prison Population Growth and Aging

To understand the extent and dynamics of aging prisoners, this section provides a descriptive overview of the age distribution of the BOP population. Beginning with gender, the line graphs in figure 3 show the average age of males and females at year-end over time.

Figure 3. Age Distribution of Federal Prisoners by Gender

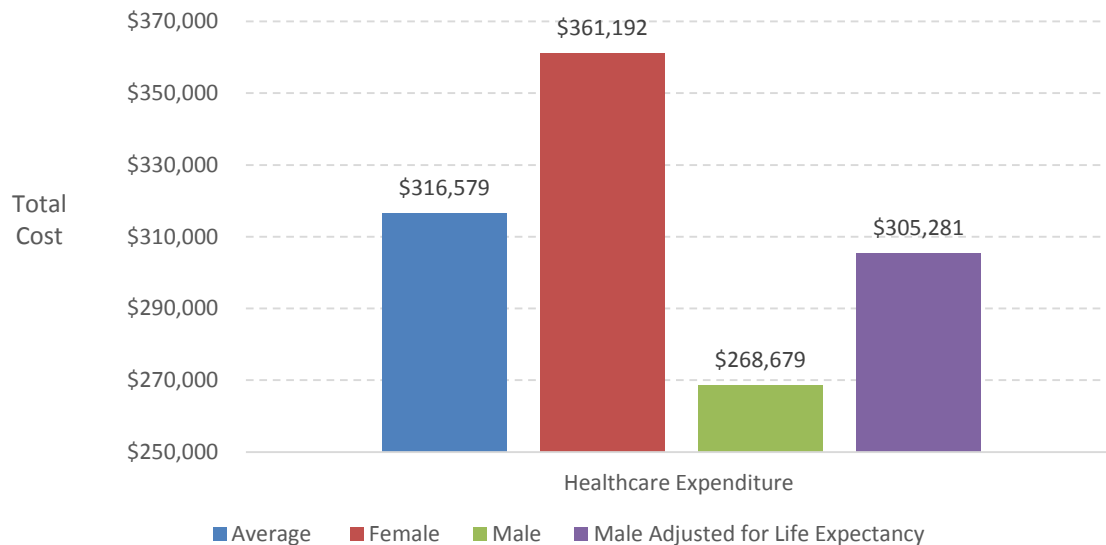


Source: US Bureau of Justice Statistics (BJS) Federal Justice Statistics Program (FJSP) data, as analyzed by the Urban Institute.

Both male and female prisoners have become older, on average, from an average of approximately 36.5 in 1994 to 39 in 2011. The mean age fluctuated slightly between 1994 and the early 2000s but began climbing steadily thereafter. The aging phenomenon is more pronounced in the proportion of prisoners age 50 and older. The bar graphs in figure 3 show that male prisoners age 50 and older made up approximately 12 percent of the entire male prisoner population in 1994 (yellow bars), while female prisoners age 50 and older made up roughly 10 of the prison population that year (white bars with gray outline). Notably, the proportion of older female prisoners eclipsed that of older male prisoners in 2001, and this difference has become even more pronounced since then, with more than 18 percent of the female prison population and 16.5 percent of the male prison population made up of prisoners older than 50 in 2011.

The implications of this finding are important because female health care costs are generally higher than male health care costs (Alemayehu and Warner 2004). As shown in figure 4, per capita lifetime health care expenditure is estimated to be higher for females (\$361,192) than males (\$268,679). This difference is, in part, due to women’s longer life expectancy, but even after adjusting for the life expectancy, the expected health care expenditure for females is roughly 20 percent higher than that for males. Mapping these lifetime health care cost estimates directly onto correctional health care costs would be difficult as health care needs and services are not equivalent between prison and community settings. For example, there would be fewer maternal needs in prison, but female prisoners may have a higher risk of maternal complications. The general principle that it costs more to provide health care services to aging females than aging males nonetheless remains highly relevant to today’s demographic change in prison.

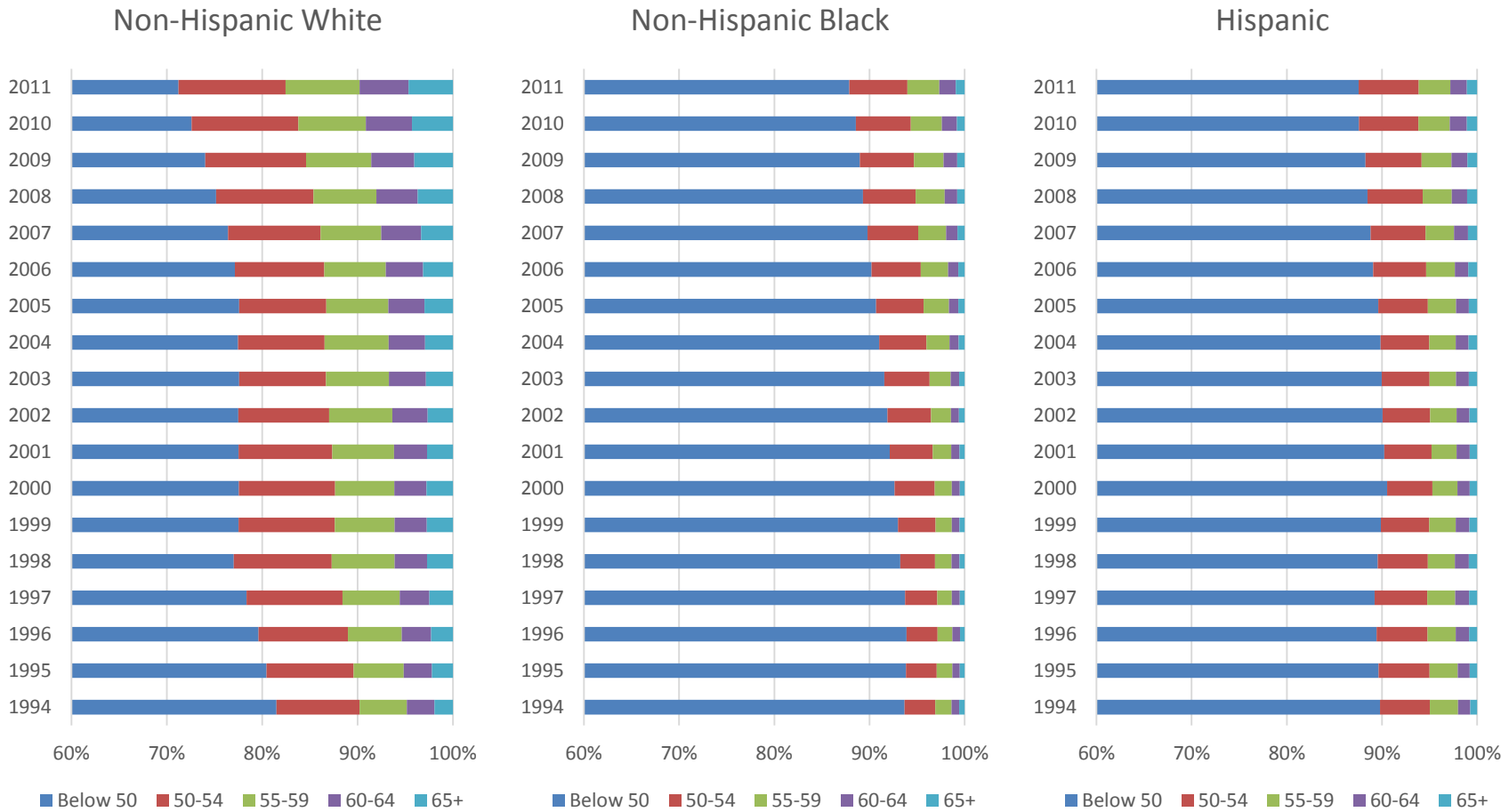
Figure 4. Lifetime Per Capita Health Care Expenditure



Source: Alemayehu and Warner (2004).

Figure 5 displays the proportion of prisoners’ age groups by race and ethnicity: non-Hispanic whites, non-Hispanic blacks, and Hispanics. There are several patterns in the age distribution that are noteworthy. First, the aging of the BOP population is most clearly pronounced in the non-Hispanic white group. Nearly 30 percent of non-Hispanic white prisoners were age 50 or older in 2011 while only slightly over 10 percent of non-Hispanic black prisoners and Hispanic prisoners were age 50 and older in that year. Second, the growth rate of aging non-Hispanic white prisoners has accelerated since 2006.

Figure 5. Age Distribution of Federal Prisoners by Race and Ethnicity



Source: US Bureau of Justice Statistics (BJS) Federal Justice Statistics Program (FJSP) data, as analyzed by the Urban Institute.
 Note: Non-Hispanic white (n=52,970), Non-Hispanic black (n=75,117), and Hispanic (n=67,329) in FY 2011.

Although the proportion of older non-Hispanic black prisoners is relatively small, the growth rate of this population is also on the rise. In 1994, an average non-Hispanic black prisoner was approximately 34 years old, while in 2011, the average jumped to 38 years old. At this rate of increase, older non-Hispanic black prisoners will become more similar in age to non-Hispanic white prisoners. By contrast, Hispanic prisoners were on average 36 years old in 1994 and 37 years old in 2011, demonstrating a slower aging rate than non-Hispanic whites and non-Hispanic blacks.

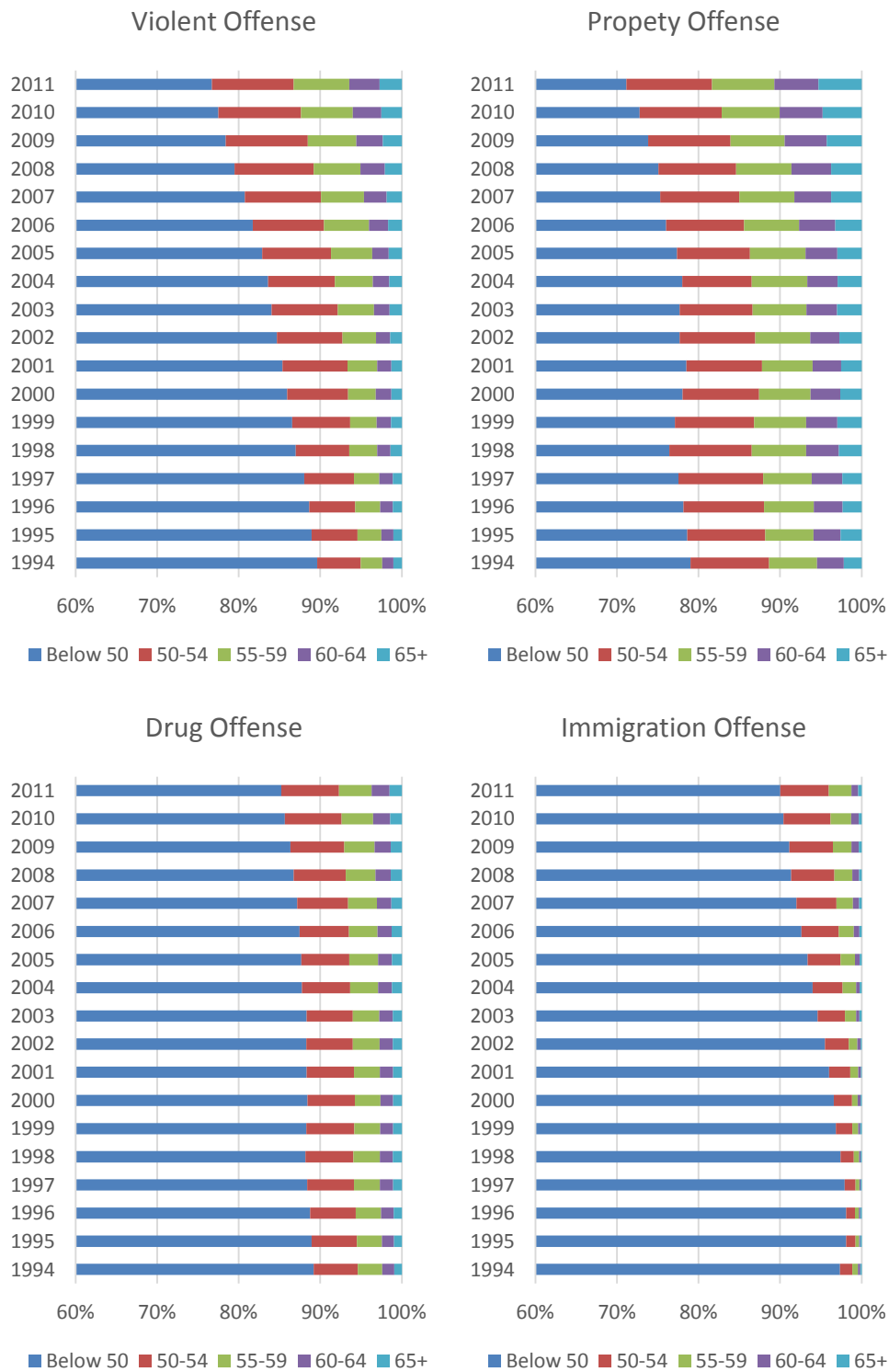
These trends warrant further monitoring over the next decade. As the prevalence of diseases and age-related disabilities may vary across different racial groups due to social, environmental, and genetic factors, it would be worthwhile to examine how the level of increased medical needs in federal prison, if any, can be explained by changes in the race-age distribution of federal prisoners.

Figure 6 displays the age distribution of federal prisoners by offense type while figure 7 displays their mean age over time. The proportion of older prisoners is markedly different across offense categories, and so is the growth rate of older prisoners over time. In 1994, approximately 10 percent of prisoners convicted of a violent offense were age 50 or older. That proportion increased to 23 percent over 17 years. For those convicted of property offenses, the proportion of prisoners age 50 and older increased from 21 percent in 1994 to 29 percent in 2011. Property offenders had a mean age of around 42 in 2011, and prisoners age 50 and older make up the largest proportion of the prisoner population among those convicted of property charges. In particular, those age 65 and older account for more than 5 percent of prisoners convicted of property offenses in 2011, while the proportion of the same age group is considerably smaller in other offense categories (2.7 percent for violence offenses, 1.5 percent for drug offenses, and 0.4 percent for immigration offenses).

However, the growth rate of older prisoners is faster among those convicted of violent offenses than property offenses. During the study period from 1994 to 2011, there was a persistent increase in the percentage of violent offenders in the 50–54, 55–59, 60–64, and 65+ age groups, and their mean age increased from approximately 37 to over 40. This pattern is contrasted by stability in the proportion of older prisoners convicted of drug offenses whose mean age increased less drastically during this period. The implications of this finding are potentially important for the current debate on how to reduce the burden of overgrown prisons. Numerous states and the federal government, tasked with downsizing their prison populations, have developed policy interventions primarily focused on reducing the number of low-risk drug offenders (DeSilver 2014). However, as the aging of prisoners is more pronounced among violent and property offenders,⁵ policy reforms aimed at these populations should also be considered in conjunction with reforms targeting low-risk drug offenders.

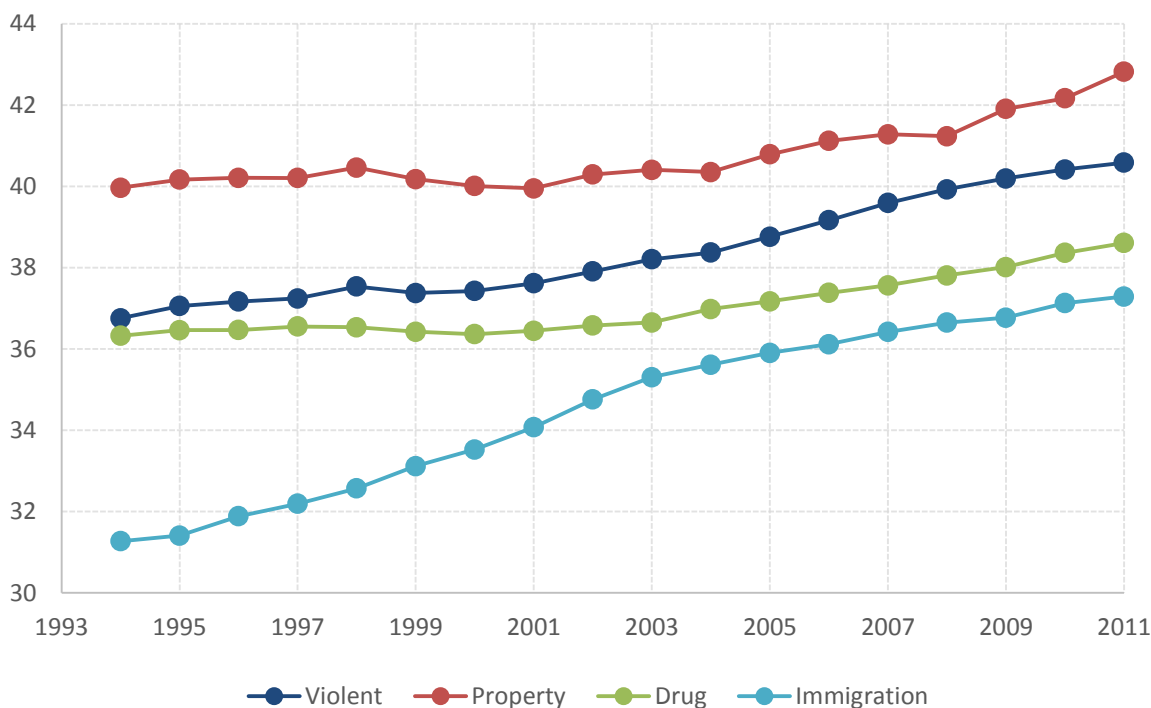
⁵ This finding should not be interpreted to undermine the potential of the current policy intervention, specifically targeting drug offenders. Of all prisoners age 65 and older in the BOP population, those convicted of drug offenses still make up approximately 37 percent (n=1,515 in FY 2011).

Figure 6. Age Distribution of Federal Prisoners by Offense Type



Source: US Bureau of Justice Statistics (BJS) Federal Justice Statistics Program (FJSP) data, as analyzed by the Urban Institute.

Figure 7. Mean Age of Federal Prisoners by Offense Type



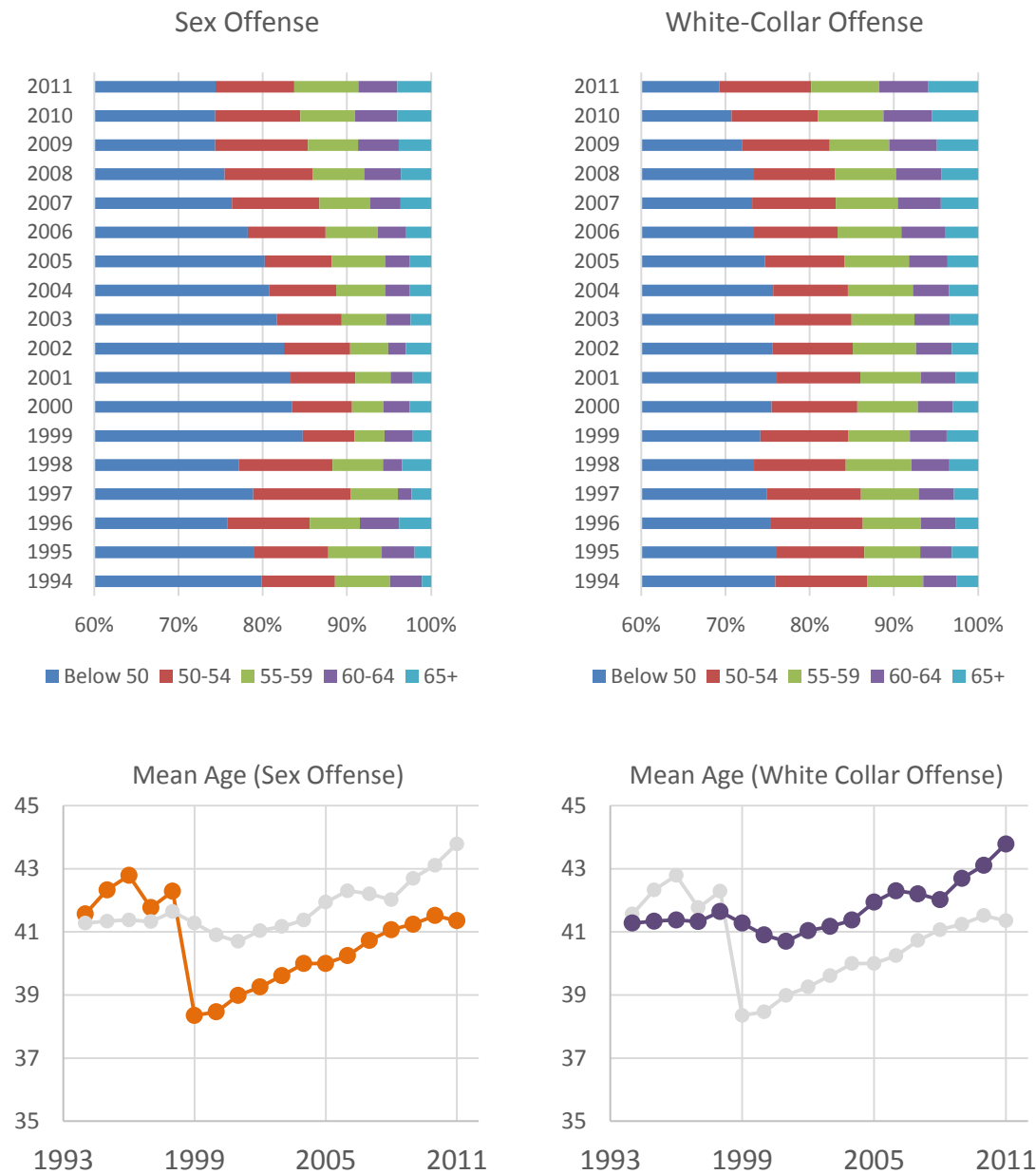
Source: US Bureau of Justice Statistics (BJS) Federal Justice Statistics Program (FJSP) data, as analyzed by the Urban Institute.

Prisoners convicted of immigration offenses also show a distinctive pattern. Immigration cases have been the largest single type of federal offenses for the past four years, accounting for over 30 percent of all cases (Schmitt and Duker 2012). As the proportion of prisoners younger than 50 is larger for those convicted of immigration offenses than for those convicted of violent, property, or drug offenders, the average age of prisoners with immigration cases is also the lowest. However, the rate of aging among this population is the greatest, as the mean age increased by six years—from approximately 31 in 1994 to 37 in 2011. Furthermore, the proportion of the 50–54 and 55–59 age groups for immigration cases has grown at an exceptional rate—a 400 percent increase from 1994 to 2011. The majority of these offenders sentenced under the immigration guidelines were involved in either the unlawful entry into the United States or remaining in the United States without authority (83.7 percent across the two categories combined). It is difficult to tell how this demographic shift in immigration cases affects the landscape of current issues regarding the burden of overgrown prisons, but it certainly merits careful consideration and systematic examination, as immigration cases have begun clogging the federal justice system.

Some offense types are more likely to be committed by older offenders. Federal sex crimes and white-collar crimes are two such examples. As these offenders tend to be admitted to prison at later ages, policy interventions or correctional programs targeted for

older prisoners might be more relevant to them. However, there is little known about federal prisoners convicted of these two offenses, such as the growth rate in the number of such prisoners and their risk and needs profiles. As a first step, figure 8 exhibits the age distribution of prisoners convicted of these two offenses.

Figure 8. Age Distribution of Federal Prisoners by Offense Type



Source: US Bureau of Justice Statistics (BJS) Federal Justice Statistics Program (FJSP) data, as analyzed by the Urban Institute.

The mean age of prisoners convicted of sex crimes and white-collar crimes (e.g., embezzlement, fraud, forgery, and counterfeiting) is displayed in the bottom panel of figure 8. As one might expect, the mean age of white-collar crime cases is fairly high—higher than any of the other offense types examined in figures 6 and 7, according to the 2011 figures. The mean age of prisoners convicted of a sex crime did not change much from approximately 42 in 1994 to 41 in 2011. However, there was a significant drop in mean age in 1999, after which point the mean age gradually recuperated. The proportion of different age groups making up prisoners convicted of sex offenses was rather unstable in the late 1990s but has gradually adjusted since then.

The descriptive analyses presented here cannot offer a conclusive explanation for the shift in sex crime cases, but the demographic trends of this group are certainly distinctive. The late 1990s and early 2000s were a pivotal period for women's rights in the federal justice system. The US Department of Justice established the Violence Against Women Office in 1995 to develop strategies to fight violence against women and reauthorized the federal Violence Against Women Act in 2000. Moreover, state legislatures introduced the idea of sex offender registration and zero-tolerance on domestic violence around that time. An attention to the problem of violence against women in prison also emerged in the late 1990s. As these policy interventions and social movements largely aimed to change attitudes toward domestic violence, foster awareness of violence against women, and improve the manner in which criminal justice agencies respond to it (Seghetti and Bjelopera 2012), it is possible that younger women were initially more responsive to such policy changes, thereby increasing the relative proportion of younger offenders with whom these women interacted.

Cost of Aging Prisoners

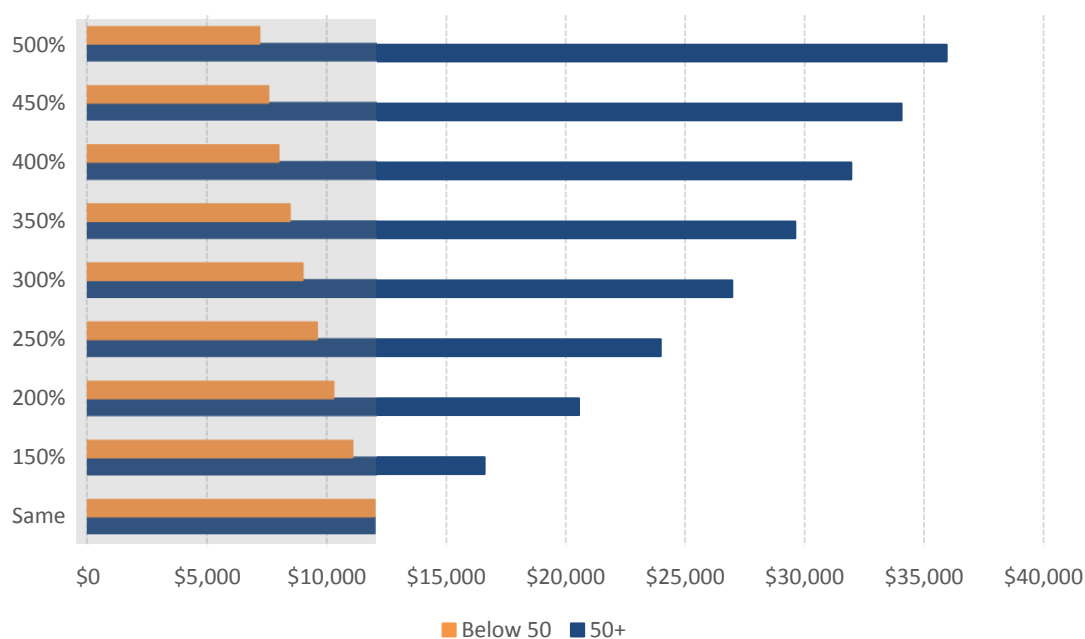
While much of the debate on aging prisoners centers on the extent to which conditions of confinement meet the needs of elderly prisoners with serious health issues (Human Rights Watch 2012), the fiscal implications of aging prisoners are broad. As discussed above, physiological functions decline more quickly among prisoners than nonprisoners, as prisoners tend to have experienced unhealthy lifestyles as well as unsteady or insufficient health care. Prisoners tend to experience accelerated aging and therefore suffer from a high rate of age-related disabilities and chronic health issues at a younger age than their counterparts in the community. Not only do older prisoners generally require more treatment and medical care, but they also require more time and effort for the same quantity of service or guard-inmate interaction (e.g., a staff visit to administer a tablet of aspirin for a headache or to monitor daily chores) than younger prisoners.

For example, older prisoners may need extra blankets to stay warm in winter, extra time to finish chores (Human Rights Watch 2012), and extra surveillance and protection not to be victimized (Chiu 2010). The fiscal burden of aging prisoners may be applicable to a wide range of prison operations, not just the upkeep of medical housing units. However, neither the budgeting nor operation of prison systems is conducive to calculating the age-specific costs of incarceration. Some crude estimates available from prior research indicate that the average annual health care cost of \$4,800 for prisoners ages 35–39 would increase twofold for those ages 50–54 and eightfold for those age 80 and above (Angelotti and Wycoff 2010). Considering a broader range of costs (including even post-release supervision, public benefits, housing costs), another study estimates that the annual incarceration cost of a state prisoner of average age is \$34,135, whereas it costs \$68,270 per year to house each prisoner age 50 and older (American Civil Liberties Union 2012). An exact comparison between different age groups is not feasible without cost data broken down by age groups, but those estimates are informative for planning and policy development.

Based on the FY 2012 BOP budget, the following analyses illustrate the implications of having higher costs of incarceration for older prisoners. BOP's FY 2012 budget consists of inmate care and programs (\$2.4 billion), institutional security and administration (\$2.9 billion), contract confinement (\$1 billion), and management and administration (\$210 million). As the inmate care and programs category⁶ is directly relevant to the increased cost of incarceration for aging prisoners, figure 9 estimates how the allocation for inmate care and programs (\$2.4 billion) might be spent on two prisoner age groups: (a) those 50 and older, consisting of 17 percent of the total inmate population; and (b) those younger than 50, consisting of 83 percent of the total inmate population.

⁶ The inmate care and programs category covers the operational costs of functions directly related to providing inmate care, including inmate food, medical care, drug treatment, and psychological services; education and vocational training; institutional and release clothing; welfare service; and transportation.

Figure 9. Per Inmate Cost of Inmate Care and Programs by Age Group



Source: US Bureau of Justice Statistics (BJS) Federal Justice Statistics Program (FJSP) data, as analyzed by the Urban Institute
 Note: Calculations based on FY 2011 data.

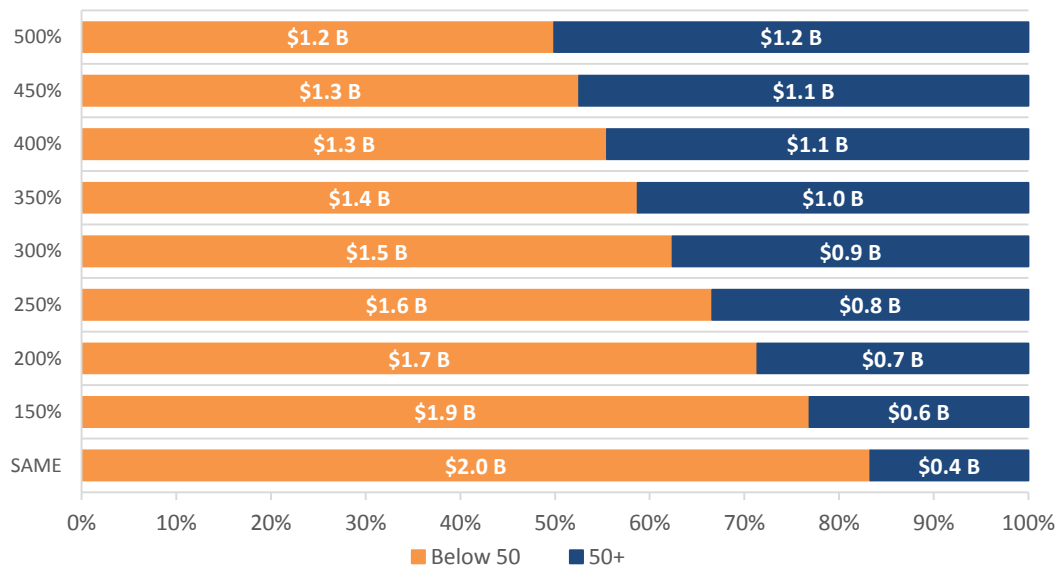
This cost simulation shows how many resources can be consumed by older prisoners as we assume different cost ratios, ranging from 1:1 (same) to 5:1 (500 percent), for providing inmate care and program services to older prisoners versus younger prisoners. Each prisoner would consume roughly \$12,000 worth of care and programs per year if the cost of incarceration was the same for both age groups. If it costs three times more to house those age 50 and older, the per person cost of providing care and programs in BOP would be approximately \$9,000 for those below age 50 and \$27,000 for those age 50 and older. Without careful research to estimate the age-specific cost of incarceration, it is difficult to determine which cost ratio most closely reflects the reality. Yet, it is important to note how quickly the cost for older prisoners escalates as the cost ratio increases, and that is the main finding of this cost simulation.

Using these cost estimates, figure 10 shows the breakdown of total spending on inmate care and programs for FY 2012. Again, if the same cost ratio is applied to those below age 50 and those age 50 and older, 83 percent of the BOP’s allocation would be consumed by the younger age group (\$2 billion) and 17 percent by the older age group (\$400 million). The total amount spent on the older age group doubles (\$800 million) when the cost ratio reaches 2.5:1—that is, if it costs 2.5 times more to incarcerate prisoners age 50 and older. By applying the cost ratio of 5:1, which is within a reasonable range based on existing research, the total spending on inmate care and programs for those age 50 and older would increase to \$1.2 billion—equal to the amount consumed by the younger age group. These estimates indicate that, despite the fact that older prisoners are a fraction of

the total BOP population, they can consume up to half of the allocation for inmate care and programs.

The number of older prisoners is growing fast but is still relatively small, which may lead to the misconception that policy options for better managing older prisoners would not alleviate the current fiscal burden of prison systems to any meaningful extent. However, as illustrated in these cost ratio estimations, the growth of the older prisoner population can be of significant consequence to the BOP budget.

Figure 10. Total Cost of Inmate Care and Programs by Age Group



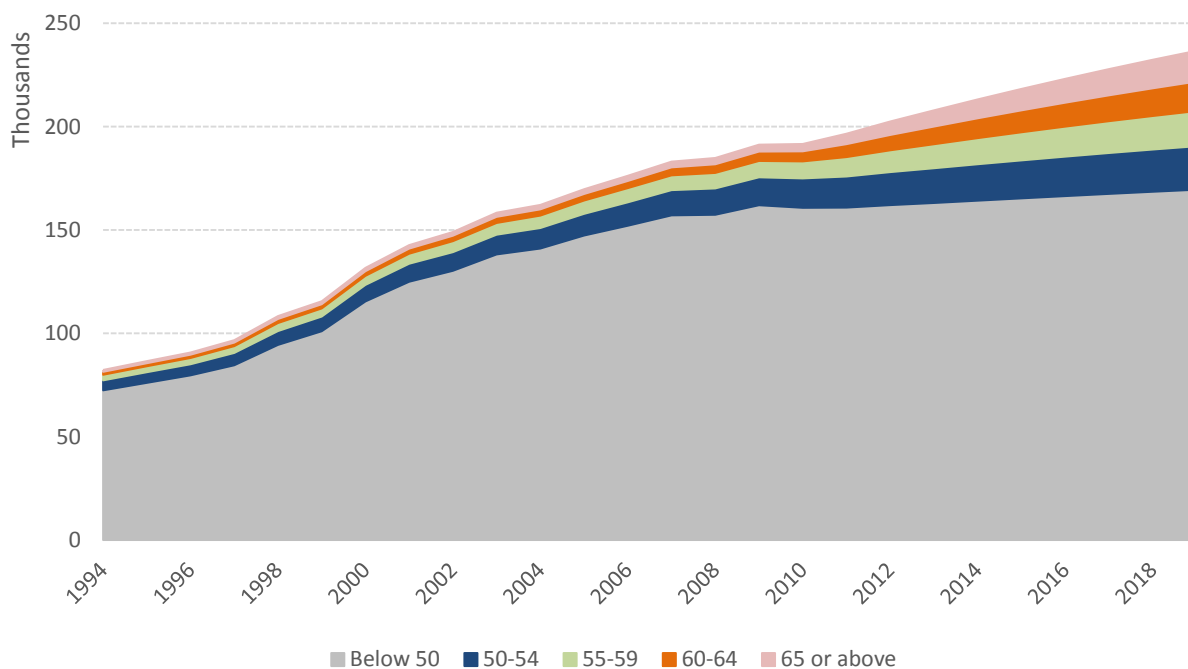
Source: US Bureau of Justice Statistics (BJS) Federal Justice Statistics Program (FJSP) data, as analyzed by the Urban Institute
 Note: Calculations based on FY 2011 data.

According to one estimate, reducing drug sentences by 20 percent would lead to an estimated cost savings of \$1.1 billion over 10 years for BOP (Samuels, La Vigne, and Taxy 2013)—potentially the same amount spent during a single year on prisoners age 50 and older for inmate care and programs if the 4.5:1 ratio is assumed. If BOP manages that spending with 10 percent increased efficiency every year by expanding the use of early or medical release programs for older prisoners as well as preventive health care to avoid more serious health problems, it is feasible to achieve a substantial amount of cost savings over time.

Population Projections by Age Groups

As indicated in the previous sections of this report, BOP is experiencing a costly shift in the demographic makeup of its population. This section examines how that shift impacts the future growth of the BOP population across age groups. In considering the question of “what if current trends were to continue and there were no endogenous policy changes?” population projections can offer useful insights for planning and policy development. Although population projections are widely used in various policymaking processes, it should be noted that developing precise information about future population levels is not feasible by the very nature of forecasting. Population projections require an extensive list of parameters to be held constant or follow simple trends of growth over the projection period. The projected growth of the BOP population shown below is also subject to such assumptions (see the appendix for technical details).⁷

Figure 11. Population Projections by Age Group



Source: US Bureau of Justice Statistics (BJS) Federal Justice Statistics Program (FJSP) data, as analyzed by the Urban Institute.

⁷ The overall projected growth patterns presented in this report are not substantially different from those produced by BOP (Government Accountability Office [GAO] 2012), and BOP’s projection methods have shown to be sufficiently accurate (GAO 2009). However, it should be noted that our estimates are more conservative than BOP’s projections. Different methods and data used in the two population projections can explain such discrepancies. Also, those discrepancies are within the variability of our estimates, and should not impede the goal of this report to contribute to the discussion of planning and policy formulation.

Figure 11 shows the projected growth of the BOP population by age group. Based on the number of prison admissions by demographic characteristics (gender, race, and ethnicity), region, and crime type, as well as current trends in time served for each age group, multiple equations were estimated simultaneously to produce stochastic forecasts until 2019. The projected growth in the BOP population is quite informative. Much of the projected growth in the near future is driven by older prisoners. Over the next five years, the proportion of those age 49 and younger is expected to have a marginal growth. However, during that same time, the proportion of those age 50 and older, especially those age 65 and older, is projected to increase at an exceedingly fast rate.

By these projections, prisoners age 50 and older could make up nearly 28 percent of the BOP population by FY 2019—approximately a 10 percentage point increase from FY 2011. In addition, there were slightly over 5,000 prisoners age 65 and older in FY 2011 (approximately 3 percent of the BOP population), and the number of those prisoners is projected to triple by FY 2019. Based on the indications of the previous sections of this report, the fiscal burden of this growing number of older prisoners could be substantial.

Recommendations for Policy and Research

Prisoners commonly experience accelerated aging and, accordingly, have physiological ages equivalent to individuals in the community who are 10 to 15 years older (Loeb et al. 2008; Beckett et al. 2003). However, there is no consensus as to what constitutes as “older prisoners.” The terms “older,” “elderly,” and “geriatric” are used quite subjectively and interchangeably, which creates challenges in the collection and reporting of standardized data on aging prisoners. The dearth of consistent, systematic information about challenges and issues associated with studying aging prisoners makes it difficult to formulate meaningful policy recommendations about how to effectively manage these populations (Williams et al. 2012). As such, there are three primary recommendations for policy and research that stem from this work.

1. Develop an Empirically Driven Definition of Older Prisoners

First, it is imperative to develop and adopt a consistent definition of “older prisoners.” The definition of older prisoners discussed in the literature varies substantially, typically in the range of 50 to 65. The operational definition of being “old” or “geriatric” varies even further across jurisdictions. Fifteen states and the District of Columbia that currently have protocols in place for releasing geriatric prisoners use different ages for determining the eligibility for such release (Chiu 2010). BOP’s compassionate release program, for instance, defines “elderly inmates” as those age 70 years or older (BOP 2013).

The absence of evidence-based guidance to inform sentencing and correctional policies leaves jurisdictions no option but to rely on anecdotes and tradition in managing their older prisoner populations, thereby creating variation across statutes or procedures for early release mechanisms (e.g., compassionate release or medical parole), as well as uncertainty in how such policies and programs would affect the health care of older prisoners, the prison administration, and safety of the public.

Given that one of the primary motivations for examining aging prisoners is the economic burden they present to all levels of justice systems, it seems reasonable to empirically identify the age of prisoners at which (a) their risk of recidivism can be reasonably managed through more affordable options than incarceration such as community supervision, and (b) the cost of their incarceration sharply increases due to physical and/or cognitive functional limitations associated with their aging. This approach for defining older prisoners would be more meaningful to policy and practice than the traditional way of thinking about older prisoners.

2. Expand Data-Driven Knowledge Base

To that end, systematic effort should be devoted to understanding the patterns and rates of recidivism by age group. The risk of recidivism diminishes with the age of prisoners. The aging-out phenomenon (Farrington 1986; Maruna 2001) or the incapacitation effect (Zimring and Hawkins 1995) provides a rationale for expecting such a relationship. Empirically deriving an age threshold among older prisoners, if it exists, after which point recidivism rates are substantially lower and an additional year of prison time no longer yields a meaningful reduction in the recidivism rates would have direct policy implications for the management of aging prisoners.

In addition, scientifically sound estimates for the operating costs of incarceration should be developed for different age groups. Widely circulated or cited estimates for the annual cost of incarcerating older prisoners are often drawn from anecdotal evidence (National Institute of Corrections 2004). Those estimates are taken for granted (American Civil Liberties Union 2012; Osborne Association 2014; Pew Charitable Trusts 2008), but require further scrutiny and refinement for meaningful policy discussion.

Since breaking down prison expenditures by age groups from standard budget data (a top-down approach) is normally not feasible, it would be useful to devise consistent, systematic ways to gather information about the use of prison resources by age groups (a bottom-up approach) so that the compositional elements of the prison system are linked together, forming a fuller understanding about the costs of incarceration. Furthermore, it would be promising to conduct a time-motion study in prison to develop scalable, replicable, and standardized measurements on how much more effort is needed for older prisoners to carry out daily activities and how much more effort is needed for correctional officers to manage older prisoners.

3. Develop Cost-Effective Management Plans for Aging Prisoners

Current discussion about aging prisoners tends to focus on severely ill or actively dying geriatric prisoners. Correctional programs and policies for aging prisoners have accordingly evolved around hospice care, palliative care, or geriatric release programs. However, this discussion should not only be limited to expanding use of such options for severely ill geriatric prisoners.

As demonstrated above, the potential cost of incarcerating older prisoners can be substantial despite the fact that they only account for a fraction of the BOP population. It is worth reiterating that older prisoners consume more resources not only on medical care, but also over a wide range of prison operations in the daily routine of prison life. Consideration should be given to devising policy options to better manage and treat a broader population of older prisoners to avoid serious health problems among aging prisoners and hefty costs for inmate care.

Once older prisoners become severely ill, the cost of providing proper care and supervision is extremely high whether they are in prison or in the community. It is therefore reasonable to identify strategies for releasing prisoners before they would pose major costs to community health care systems. In addition to minimizing the immediate costs of incarcerating prisoners determined to have a low risk of reoffending, these strategies would have the added bonus of mitigating the accelerated aging that prisoners experience in custodial settings. Equally important is expanding the use of preventive health care, which is important for helping prisoners avoid more serious health problems later in their lives (Nijhawan et al. 2010).

In order to identify and classify older prisoners that need to be monitored for health and safety concerns in prison, BOP, as well as other correctional agencies around the country, should consider developing an easy-to-use assessment/screening tool for correctional officers that would detect common geriatric symptoms (e.g., sensory impairment, functional impairment, incontinence, and cognitive impairment) as well as prison-based functional impairment. Such symptoms and conditions can be easily

overlooked in the rigid routine of prison life. A tool would provide systematic information about the needs of aging prisoners and serve as an early intervention protocol for preventive care. It would also be helpful to train correctional officers to be more knowledgeable about aging and needs of aging prisoners.

Lastly, BOP's compassionate release program is very selective. The use of early release mechanisms for older prisoners should not necessarily be constrained to extraordinary cases. For effective management of aging prisoners, the use of early release mechanisms can be expanded to older prisoners whose risk to public safety is reasonably manageable and whose health care needs can be better met in the community.

Conclusions

The two main goals of this report are to raise awareness of issues related to aging prisoners and to stimulate a debate on how to manage aging prisoners through an empirical examination of the BOP population. The findings from this research demonstrate that the federal prison population has already begun to age, and the proportion of aging prisoners is expected to grow considerably over the next several years. What we have witnessed so far may be just the tip of the iceberg. This phenomenon will likely continue to have significant implications for BOP and Congress, especially given the fiscal impact of an aging prison population and the ever-rising cost of incarceration.

However, there is also little guidance on how to effectively manage this population, due to the number of gaps in current research and practice. It is important to develop empirically-driven criteria for defining older prisoners, as well as screening criteria customized for prison settings for assessing their functional impairment and health care needs. The risk of victimization and injuries in prison among aging prisoners should also be understood better, and should be balanced with the risk of criminal recidivism they may pose if released and managed in the community. Some of the recommendations discussed in this report have been echoed by other scholars (Williams et al. 2006), and they are much needed and long overdue.

Almost all prisoners eventually return to their communities. As such, prisoners' aging-related health issues do not only cause financial hardship to the correctional systems, but they will also spill into communities and public health care systems. With a growing number of aging prisoners, it is critical to broaden our attention to a wider group of aging prisoners and devise cost-effective management plans that expand the use of noncustodial sentencing options for those with "tolerable" risk to public safety and preventive care to avoid more serious health problems. These policy options may improve correctional administrators' and policymakers' ability to minimize the fiscal impact of aging prisoners and better manage this growing segment of the prison population.

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Appendix. Population Forecasts

The aging prison population can be explained through two obvious mechanisms. First, if individuals entering prison are older, that will explain an increase in the prisoners' age at year-end. Because our society is aging, individuals committing a crime, those arrested by the police, and those sentenced to prison may also be older. Second, the prison population may get older as prisoners stay longer in prison. In other words, longer prison terms lead to a greater accumulation of older prisoners.

The number of older prisoners can therefore be expressed as some function of prison admissions and time served. The population projections presented in the report build upon this basic principle and exploit detailed information about the characteristics of prison admission cohorts (e.g., demographics, offense type, and region), as well as stock populations (e.g., time remaining) and release cohorts (e.g., time served).

Our forecast models consist of a collection of stochastic equations capturing the temporal trend in those characteristics of the prison population. The equations were simultaneously estimated to determine the number of prisoners for each age group. The first year for which forecasts were produced was FY 2012. Our dynamic forecasts were then produced for each year thereafter, one at a time, using all available observed and forecast values from previous years.

It is important to note that there is a certain level of uncertainty involved in any forecast, the general process of which can be illustrated as following:

$$Y_t = a + bX_t + \varepsilon_t$$

Where Y_t is the number of prisoners at time t ; X_t is a vector of predictors at time t (e.g., the number of admissions); and ε_t is a zero-mean error term. Suppose we fit the equation by ordinary least squares (OLS) using observations 1,...,T and obtain the point estimates \hat{a} and \hat{b} . If data for variable X at time T+1 is available, we could forecast:

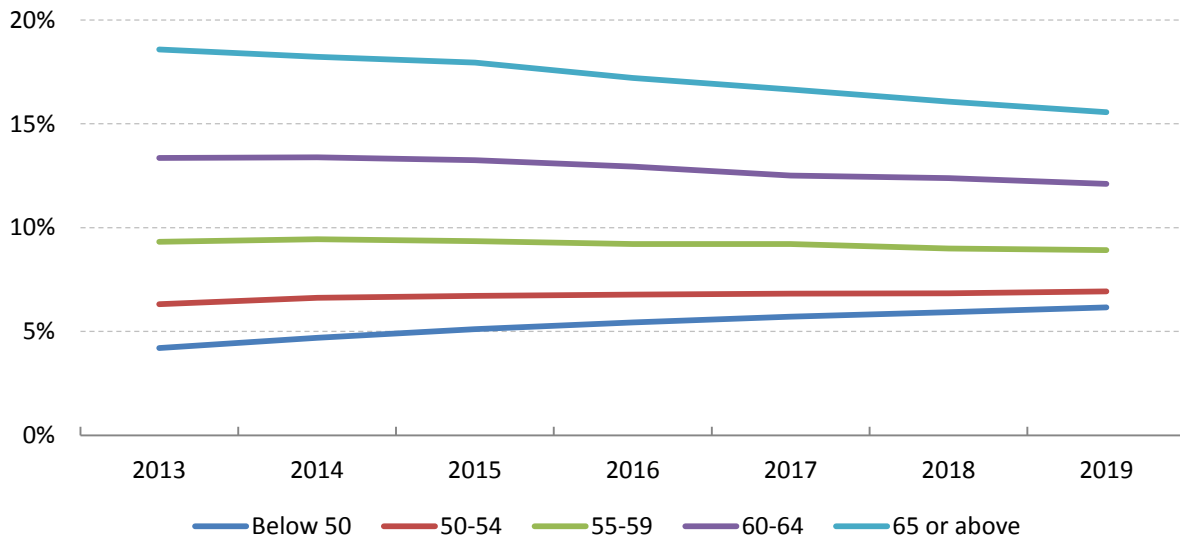
$$\hat{Y}_{T+1} = \hat{a} + \hat{b}X_{T+1}$$

There is no guarantee that \hat{Y}_{T+1} will equal Y_{T+1} because (1) \hat{b} may not accurately reflect the relationship between Y and X and (2) the equation also had an error term (ε_t). This uncertainty associated with our population projections was quantified through simulation, replicating our analysis 1,000 times with random draws from an error distribution. The below figure depicts the standard deviation of our forecasts, which measures the amount of variation or dispersion from the average forecasts out of 1,000 repetitions.

Overall, our forecasts show an acceptable level of precision. The magnitude of the standard deviation ranges from 4 to 19 percent of the estimated number of prisoners, with an average of approximately 10 percent. Suppose that the average height for adult men is approximately 70 inches, with a standard deviation of 7 inches (10 percent of the average height). This 10 percent variability can be translated such that most men (approximately 68 percent) have a height in the range of 63 and 77 inches. This much uncertainty would not be

reasonable for a tailor who fits the clothing, but sufficiently tolerable for a carpenter who designs a bed.

Figure 12. Uncertainty in Population Forecasts by Age Group and Year



Source: US Bureau of Justice Statistics (BJS) Federal Justice Statistics Program (FJSP) data, as analyzed by the Urban Institute.

The uncertainty estimates for BOP’s population projections are not available in the literature (GAO 2009) so our projections cannot be compared to BOP’s projections in a more meaningful way. However, for general planning and policy formulation, our population projections would be adequate to provide insights into the timing of the projected growth of older prisoners. However, it should also be taken into consideration that our forecasts for older age groups have greater uncertainty than younger age groups.