Senate Fiscal Agency

MICHIGAN'S PRISON HEALTH CARE:
COSTS IN CONTEXT

by

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INTRODUCTION

There has been increasing concern throughout the State of Michigan, and more specifically within the State Legislature, regarding the rising cost of health care for prisoners under the jurisdiction of the Michigan Department of Corrections (referred to herein as correctional health care). Between fiscal year (FY) 1999-2000 and FY 2008-09, there was an increase in correctional health care expenditures of 95.8%. Health care expenditures per prisoner increased by 89.9%. When this increase in spending is considered in context, it is far greater than increases in spending throughout other principal departments of State government occurring in the past 10 years, of which the highest was an anomaly at just under 60%.[1] In light of this, it would be easy to assume that this significant increase in spending reflects a failure on the part of the State to adequately manage correctional health care costs. If this assumption were correct, one would expect Michigan's spending on correctional health care to be an outlier when compared with national correctional health care data.

This paper examines whether Michigan's spending on correctional health care indicates a failure to manage costs. It has been written with three principal goals in mind. First, the authors seek to determine whether Michigan's correctional health care costs are part of a larger national trend or an outlier. Second, the authors seek to identify the cause or causes of rising expenditures for correctional health care costs in the State. Finally, this paper is intended to provide an overview of best practices being used nationwide to provide correctional health care at a sustainable cost.

Methodology

This paper examines age demographic and health care data for Michigan's and 33 other states' prison populations in order to estimate the cost impact of the aging of the prison population from calendar year (CY) 2000 to CY 2009. The authors took great care to ensure that the expenditures being compared between states are as comparable as possible, recognizing that not every state accounts for correctional health care in the same manner throughout the budgeting process. Whenever possible, the dollar amounts used to represent health care per diem costs in each state include expenditures for medical services, pharmaceuticals, and mental health services. Some states, such as Ohio, maintain corrections statistics based on calendar year, while other states, such as Michigan, maintain statistics based on a fiscal year model. Some states include mental health care costs in their per diem figures, while others do not. These discrepancies presented challenges but were not believed to be insurmountable.

Due to the difficulty of gathering national data and the inconsistency of accounting styles, an exact comparison was not possible. The authors, therefore, recognize that the study provided in this paper includes some shortcomings. While the data are not perfectly uniform, the authors do not believe that this compromises the integrity of the study. These differences are believed to have a minor effect. The basics of the modeling methodology are explained in greater detail in the following narrative. For a more detailed explanation of the statistical model, readers may consult Appendix 1.

Correctional Health Care – Costs and Utilization

Michigan Department of Corrections (MDOC) spending increased by 29% between FY 1999-2000 and FY 2008-09. The Department's budget primarily consists of facilities and health care costs, which combined accounted for 82% of the corrections budget in FY 2008-09. While facilities admittedly make up a far larger portion of the budget than health care, at approximately 66% in FY

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[1] These changes have been more thoroughly documented in the recent SFA publication "Michigan's Budget and Total State Spending: A 10 Year History (FY 1999-2000 – FY 2009-10)".

2008-09, costs have not been controlled. The majority of spending on facilities can be attributed to labor costs.

The Legislature has, in recent times, made a concerted effort to rein in facility costs through the closure of numerous correctional facilities and staff reductions. In the past 10 years, six correctional facilities and all 10 of Michigan's correctional camps have been closed. An additional three prisons have been consolidated as well.[2] The Department also reduced its staff by 3,156 individuals, or approximately 17%, between FY 1999-2000 and FY 2008-09. The State, however, did not experience the cost savings that were expected as a result of these measures. Because these actions failed to yield savings, the Legislature turned its attention to correctional health care spending. This attention led to a review of the MDOC's health care service provider contract and ultimately acted as a catalyst for change.

Before April 2009, Correctional Medical Services (CMS) was the contract provider for Michigan's correctional health care. Correctional Medical Services had maintained this contract since 1997 and was the first private vendor to receive such a contract from the Michigan Department of Corrections. CMS provided medical services through a contract with Blue Cross Blue Shield of Michigan (BCBSM), some mental health services, and pharmaceuticals for Michigan's inmates. A review of the company's performance indicated that, under the guidance of CMS, Michigan's inmates were using offsite facilities and services at a rate that was far greater than that of other inmate populations across the country. The State's outlier status was believed to be a contributing factor to rising costs and led the Legislature and the MDOC to seek a competing service provider that would be able to reduce utilization.

On April 1, 2009, the MDOC awarded a three-year correctional health care contract to a new provider – Prison Health Services (PHS). Prison Health Services has successfully reduced inmates' use of outside services and facilities, bringing Michigan's corrections population closer to national usage trends. There has been a 20% decline in emergency room use and a 40% decline in use of outpatient hospital services. Despite this drop, there has not been an accompanying decline in costs. While CMS has subcontracted with BCBSM, PHS has subcontracted with Aetna, which tends to pay higher reimbursement rates than BCBSM does. Higher reimbursement rates appear to be a reason for the continuing cost trends.

The Department of Technology, Management, and Budget (DTMB) and PHS are currently seeking quotes for services from subcontractors in order to get a clear picture of the costs associated with services. The DTMB will use the data, in conjunction with Medicare rate adjustors, to determine the appropriate level of spending for the service MDOC intends to provide. The DTMB is expected to use this information to seek rate reductions in subsequent contracts.

IDENTIFYING COST DRIVERS

Before any significant savings can be realized in correctional health care costs, one must understand what is driving the increased spending. After a review of Michigan's correctional health care costs compared with the costs in 33 other states, the data suggest that the following three principal factors are driving increased spending in correctional health care:

- Medical cost inflation, which is represented in the most rudimentary way by the Medical consumer price index.

- Changes in the demographics of the prison population.

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[2] Hollander, Lindsay. *Prison and Camp Closures*. Publication. Michigan Senate Fiscal Agency, State Notes May-June 2009. Web. 7 Sept. 2010.

- Increased costs associated with medical advancements for complex conditions that disproportionately affect the prison population.

Medical Cost Inflation

The medical consumer price index (CPI) represents an estimate of inflationary costs for medical services and products on a national scale. According to the National Bureau of Labor and Statistics, medical CPI increased by 44% from CY 2000 to CY 2009. This, of course, means that medical goods and services that had cost $1.00 in 2000, cost $1.44 in 2009. While this figure is a meaningful proxy for the change in purchasing power of United States dollars as it pertains to medical goods and services, the figure does not take into account certain intricacies within both the State of Michigan and the corrections system as a whole. The State of Michigan, for example suffers from a disproportionately higher rate of diabetes, at 9.3%, than the national average, at 8.3%.[3] Likewise, compared with the national population, the prisoner population has a disproportionately high rate of several medical problems, including but not limited to mental illness, HIV, and Hepatitis C. Therefore, it is likely that the national medical CPI underestimates the true effect that medical CPI has on Michigan's correctional health care costs.

Demographic Changes Driving Costs

The data suggest that three factors related to demographics are contributing to growing correctional health care costs. First, the prison population has grown over the past decade. Second, the prison population is older (see Figure 1). Third, a significant number of states have adopted tougher sentencing policies, leading to longer periods of incarceration for prisoners.

Figure 1
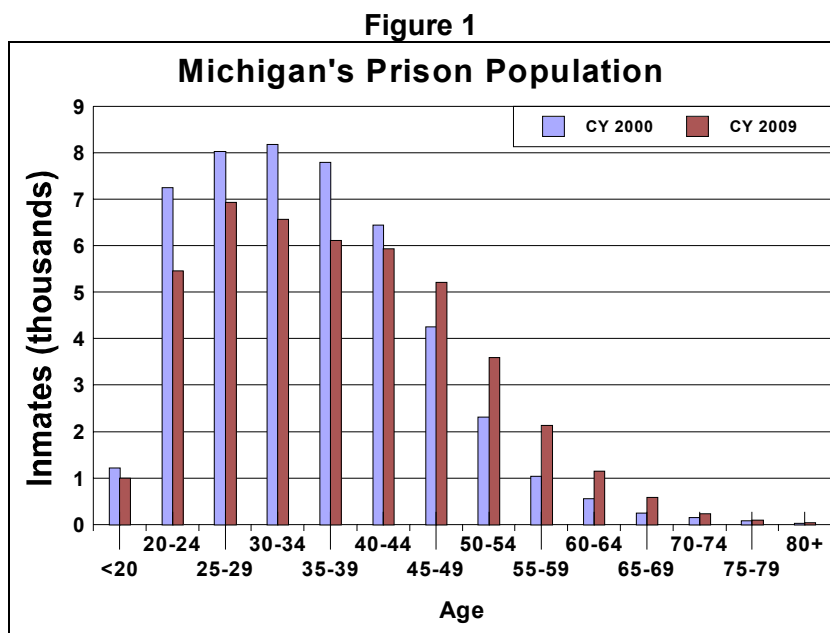
Source: Michigan Department of Corrections, 2000 and 2009 Statistical Reports.

Both the national and state prison populations have grown measurably since 2000. The authors examined available prisoner age demographic data from 34 states, including Michigan, which collectively represent over three-fourths of the nation's state prison population. Total prison population in these 34 states grew about 9% in the last nine years. In the State of Michigan alone,

[3] "Adults with Diabetes - United States." *Kaiser State Health Facts*. Web. 07 Sept. 2010.
<http://www.statehealthfacts.kff.org/profileind.jsp?cmprgn=24&cat=2&rgn=1&ind=70&sub=22>.

the prison population grew by approximately 1,400 inmates or 3.1% in the last decade. This growth would be much greater were it not for a concerted effort, in recent times, by the MDOC and Governor Granholm's administration, to bring down costs by encouraging the parole of eligible inmates. This has resulted in a 25.7% increase in the number of individuals supervised, equal to an increase of 16,586 individuals when FY 1999-2000 populations are compared with the total population for FY 2009–10.

The Impact of an Aging Prison Population

The aging of the prison population has had a more significant impact on correctional health care costs than growth has had (see Figure 2). The population is aging, in part, due to the fact that the United States population, from which the inmates are drawn, is aging as well. According to the U.S. Census Bureau, the median age of the United States population was 35.3 years in 2000 and is projected[4] to be 36.9 years in 2010. According to additional projections by the U.S. Census Bureau, the subset of the population that is between the ages of 40 and 55 has grown by 9.3% in the past 10 years. This growth is meager compared with the 29.1% increase in the population that is 55 and older. A quick glance at Michigan-specific population data indicates that, in 2000, roughly 26% of the adult male population[5] was over the age of 55. In 2010, that percentage has increased to about 33%. The percentage of the adult male population over the age of 40 also has grown, increasing from 59% in 2000 to 63% in 2010 (see Figure 2).

Figure 2
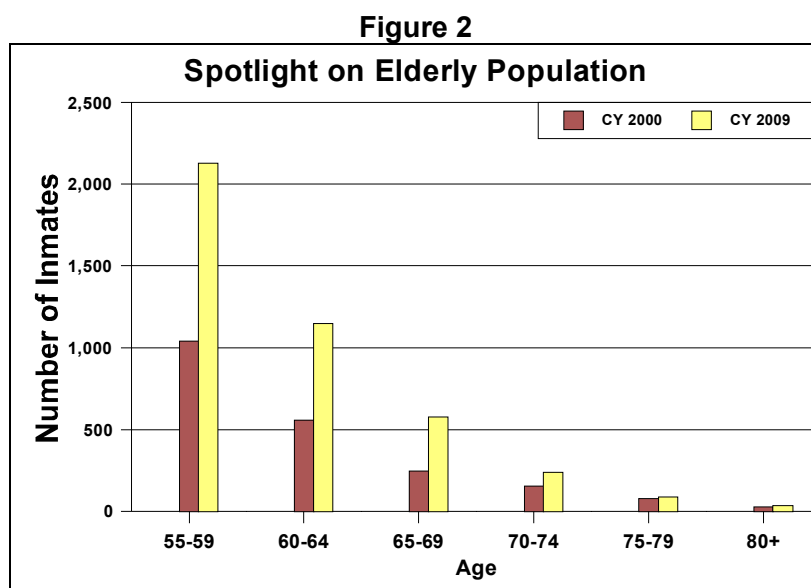
Source: Michigan Department of Corrections, 2000 and 2009 Statistical Reports.

The number of elderly[6] prisoners incarcerated has risen significantly throughout the country and within the State of Michigan. The model described in Appendix 1 indicates that the percentage of prisoners, nationally, aged 55 and up grew from 3.6% in 2000 to 7.7% in 2009. The model further indicates that the percentage of prisoners aged 40 and up grew from 31% in 2000 to 38% in 2009.

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[4] Final figures are pending the tabulation of the 2010 Census data.
[5] The authors chose to refer to the adult male population, at times, throughout this paper as a proxy for the entire population. This is because the percentage of women incarcerated is negligible while over 90% of the prison population nationwide is male, making the male population a worthwhile proxy.
[6] While states vary in their definition of elderly, using anything from 50 to 65 years of age as an identifier, for the purposes of this publication it was important to use a singular definition. In this paper, an elderly inmate is designated as any incarcerated individual over the age of 55, which is in keeping with the definition used by the National Institute of Correctional Healthcare (NICH).

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Data suggest that an aging population more adversely affects Michigan than the country as a whole. One could speculate that this is due to Michigan's poor economy and the exodus of young Michiganders. These occurrences seem to have resulted in a prison population in Michigan that is aging more rapidly than the prison population in other places throughout the country. In Michigan, the percentage of prisoners aged 55 and up grew from 4.4% in 2000 to 9.4% in 2009. Data suggest this trend is likely to continue given the fact that the population of Michigan prisoners aged 40 and up grew from 32% in 2000 to 42% in 2009.

In addition to an aging population, both Michigan and the country as a whole are experiencing increased costs associated with inmates serving longer sentences. Tougher sentencing practices, meaning longer time served, also have played a role in rising costs. Michigan implemented "Truth in Sentencing" (TIS) in 1998, effectively eliminating "good time" credits and leading to an increase in the average length of time an inmate serves. Policies like this ensure that those who are incarcerated serve the full minimum sentence ordered by the courts, without deference to good behavior, age, or other extraneous factors. Thus, while young people are said to be most often incarcerated, TIS often mandates that the MDOC keep offenders imprisoned until they have completed their minimum sentence, creating an older prison population, on average, than was previously present in MDOC facilities.

It should come as no surprise that average health care costs are greater for older populations. Average health care costs for a 40-year-old are twice what they are for people in their early 20s. Average health care costs for people in their 70s are three times as much as health care costs for people in their early 40s.

When there are demographic shifts in the age of a population, the expected health care costs will change as well. Table 1 provides an example of a program that covers 12,000 people. In 2000, the population features 10,000 people under the age of 40 and 2,000 people aged 40 or over. The groupings of those under 40 and those 40 and above are commonly referred to as population "bins" (as each individual is placed in a "bin"). By 2009, the program still covers 12,000 people, but 8,000 are under the age of 40 and 4,000 are aged 40 or over. If one assumes that average health care costs are $5,000 for those under 40 and $8,000 for those aged 40 or over, average health care costs will increase by 9.1% just due to changes in population demographics alone.

Table 1

	2000 Population	2009 Population	Average Health Care Costs	2000 Total Cost	2009 Total Cost
EFFECT OF CHANGES IN AGE DEMOGRAPHICS ON AVERAGE COST, TWO-BIN MODEL					
Age Range					
<40	10,000	8,000	$5,000	$50,000,000	$40,000,000
40+	2,000	4,000	$8,000	$16,000,000	$32,000,000
Total	12,000	12,000		$66,000,000	$72,000,000
			Cost per person:	$5,500	$6,000
			% Percent Increase:		9.1%

Changing Demographics, Changing Costs

In Appendix 1, a more complex model with 14 different age bins is presented. These bins match the age ranges for prison population reported by the Michigan Department of Corrections (less than 20, 20-24, 25-29, etc. to 75-79 and 80+). National data on health care costs by age were used to derive average cost figures, health care cost "proxies", for each age bin. The health care cost proxies were then applied to the Michigan prison population in 2000 and 2009, to estimate the percentage increase in average health care costs, all other factors held constant, due to the aging of the prison

population. The results are presented in Table 5 in Appendix 1. Table 5 indicates that one would expect correctional health care costs to have increased by 14.6% simply due to the changes in the age demographics of the Michigan prison population.

The National Picture

Using mathematical modeling and the data from 33 other states along with Michigan, a national estimate of the impact of the aging prison population on prison health care costs was derived. The results are shown in Table 6 in Appendix 1. Among the 34 states for which complete demographic data were available, the estimated average health care cost increased by 12.2% from 2000 to 2009 due to changes in age demographics alone. A look at national summary data for Federal and state prison as well as local jail populations indicated an average prison health care cost increase of 11.7% due to demographic changes, which was well in line with the 12.2% increase for the 34 states.

In Appendix 2, the impact of age demographics is removed from the 89.9% average Michigan per prisoner health care cost increase, leaving a 65.7% increase in health care costs that must still be addressed. This equates to a 5.77% yearly increase in average prison health care costs from FY 1999-2000 to 2008-09.

Further analysis indicates that Michigan spending on correctional health care trends closely with its national counterparts. The authors were able to look at 24[7] states that had useful demographic data as well as health care cost data. The results are described in Appendix 2 and are displayed in Table 7. For each state, the impact of changes in age demographics was removed and then an average annual prison health care cost increase was calculated. The overall average increase was 7.01% per year. If high- and low-end outliers are removed, the average increase was 5.81% per year. In either case, Michigan's 5.77% increase appears to be fairly typical for these states.

Treating the Prison Population

Treating medical issues within the prison population has become an increasingly costly endeavor. This is, in part, because the prison population suffers from a number of illnesses at a disproportionately higher rate than the general population. It is also a result of advancements in medicine that have yielded successful but expensive results. Treatment for problems such as mental illness, Hepatitis C, and HIV/AIDS remain expensive and disproportionately necessary within the prison population.

Some reports estimate that approximately 20% of inmates older than 55 suffer from at least one type of mental illness.[8] However, there are no concrete data regarding the prevalence of mental illness in prison populations at this time. Inmates are often predisposed to suffer from mental illness because of their behavior and lifestyle prior to incarceration. In addition, reports suggest that stressors experienced during imprisonment are likely to exacerbate pre-existing mental illness. Psychological stressors include the thought of lifetime confinement, separation from one's family, and the fear of victimization. It is worth noting that the fear of victimization is thought to disproportionately affect older inmates.[9]

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[7] While the authors were able to locate demographic data for 34 states, only 24 of these states maintained adequate data for both demographics and health care costs.
[8] Tina Chiu, *It's About Time: Aging Prisoners, Increasing Costs, and Geriatric Release*. New York: Vera Institute of Justice, 2010. p.5
[9] Chiu, p.5

While 10 years ago very little was done to treat mental illness within the corrections system, today it has become a focal point for correctional health efforts. Many states' corrections departments are under pressure from mental health advocacy groups to provide better care for mentally ill inmates. In many cases, this means a combination of counseling and antipsychotic drugs. Antipsychotic drugs have vastly improved over the past 10 years, offering potentially better results for patients. Pharmaceutical costs associated with providing antipsychotic drugs to a growing population of mentally ill inmates are also a driving factor behind increased costs. Between FY 2003-04[10] and FY 2008-09, the per member per month (PMPM) costs for atypical antipsychotic drugs increased from $11.95 to $25.45.

Recent information provided by the MDOC indicates psychiatrists provided for MDOC's use by the Michigan Department of Community Health (MDCH) are prone to prescribe a disproportionately greater number of newer, more expensive antipsychotic pharmaceuticals than their colleagues prescribe in other states. Such practices are not proven to have better results and are contributing to higher correctional costs. The MDOC is currently exploring methods to encourage MDCH psychiatrists to use antipsychotic drugs that have been used more widely and have a history of success yet are also less costly. In June 2010, the MDOC hired a chief psychiatrist who will be responsible for setting policy parameters and creating a standard formulary for MDOC/MDCH prescriptions. There is also a renewed effort to educate MDCH employees about these drugs because they do a great deal of the prescribing. Ideally, these efforts will reduce the use of nonformulary drugs. However, changing medications for a mentally ill patient (or in this case – a population of mentally ill patients) cannot be done in haste as each patient reacts to different medications differently. Any process to switch this population's medication to more conventional and less expensive drugs will need to be done with this caution in mind.

In addition to the growing costs of treating mental illness, the MDOC has experienced rising treatment costs for Hepatitis C. Illnesses such as Hepatitis C are more prevalent in the prison population due to the risky practices this population tends to engage in before incarceration. While treatment 10 years ago existed, it was not as sophisticated or successful, in many cases, as it is today. The PMPM costs for Hepatitis C treatment rose from $2.21 in FY 2003-04 to $4.15 in FY 2008-09. These costs only encompass lab and pharmaceutical expenditures because hospitals do not keep records on MDOC's patient costs based on illness.

Figure 3
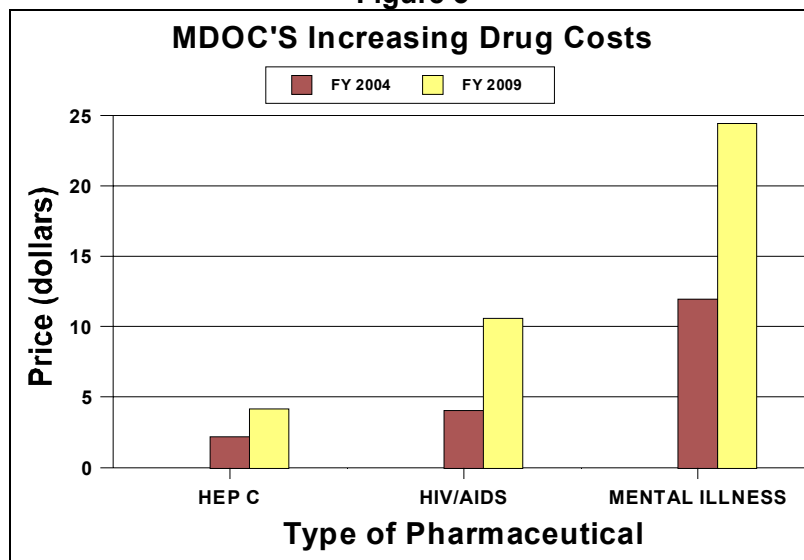
Source: Michigan Department of Corrections.

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[10] Data for PMPM costs for pharmaceuticals are available only beginning in FY 2003-04.

Finally, the prison population is disproportionately affected by HIV/AIDS. Like Hepatitis C, this is likely a result of risky behavior that inmates are prone to engage in before incarceration. While HIV/AIDS has become increasingly more manageable, it remains an expensive and incurable illness. Between FY 2003-04 and 2008-09 alone, the PMPM cost for HIV/AIDS pharmaceuticals rose from $4.06 to $10.61.

Michigan's inmates' need for expensive health services is a driving factor in increased costs. In total, Michigan's PMPM costs, as they pertain to the aforementioned illnesses, increased by $20.99 between FY 2003-04 and 2008-09. When accounting for the FY 2008-09 inmate population, this increase in per-member cost is responsible for a total increase of $11.3 million over the past five years.

METHODS OF CONTAINING PRISON HEALTH CARE COSTS

The data clearly show that the growing correctional health care costs being experienced in Michigan are also being experienced, to different degrees, nationwide. They are a product of medical inflation costs, a changing demographic among the prison population, and increased costs for advanced medical technology (see Figure 3). Some costs, such as those associated with medical inflation, simply cannot be avoided. Other costs, such as those associated with an aging demographic, would be very difficult to address without amending the Truth in Sentencing statute. Even statutory changes to Truth in Sentencing could not contain the aging of the State's population as a whole. Therefore, it would seem that any attempt to contain the growing correctional health care costs must explore innovative methods and best practices being used successfully across the country.

Research found that there are five principal innovative cost containment measures currently being explored by other states: telemedicine, inmate co-pays, geriatric release, university consortiums, and increased use of Medicaid eligibility.

Telemedicine

Telemedicine is being employed by many states across the country to bring down both administrative and medical services costs. Telemedicine is a method of providing health care that uses video conferencing to connect inmates and medical providers. The practice of telemedicine might not significantly reduce health care costs, but it undoubtedly saves the state money by avoiding administrative, security, and travel costs associated with offsite medical services.

Telemedicine is a growing part of the MDOC's health care management services portfolio. When Michigan's correctional health care was managed by CMS, telemedicine was used to manage infectious diseases (e.g., Hepatitis C and HIV/AIDS) but was never fully implemented in other areas of medicine. However, extensive use of telemedicine was a condition of the contract awarded to PHS. Today, all of Michigan's Correctional facilities have telemedicine capabilities. Telemedicine is used primarily to treat infectious disease (with the assistance of in-house nursing staff) and in rural communities where there are often staff vacancies. Looking ahead, the MDOC hopes to begin using telemedicine to treat patients with cardiac conditions.

Co-Pays

Several of the states assessed in this paper charge inmates a co-pay for medical services. Michigan is no exception. A nominal fee is charged to inmates for medical services although indigent inmates are exempt from this fee. Co-pays are generally $5. Even populations subject to co-pays for service may ultimately not pay a fee for service. This is because inmates often have other financial obligations including court fees, victims' rights payments, restitution, as well as child and spousal support, which take precedence.

Co-pays are rarely thought of as a source of revenue but rather as a method of deterrence. Due to the nominal amount of the fee and the significant number of indigent inmates, revenue resulting from co-pays is less than $200,000 per year. However, co-pays do have the ability to deter the misuse and unnecessary use of services, which can contribute to rising costs. Co-pays also hold the potential to deter necessary use and should be approached with caution and acknowledgment of the potential for adverse effects. In an effort to address such concerns, the MDOC has begun a process that will eliminate co-pays for routine preventive care services.

Geriatric Release

In 2009, 15 states and the District of Columbia maintained a formal policy of geriatric or compassionate release.[11] This ultimately means that state parole boards have the ability to release elderly prisoners who are no longer believed to pose a threat to the community and, as stated above, are much costlier to care for than younger inmates. Michigan does not currently maintain a policy of geriatric release but, in recent times, the parole board has been urged to release elderly prisoners who are eligible and believed to pose little or no threat to the community.

While a good number of states have the ability to exercise geriatric release, few have done so effectively. This is likely due to the highly sensitive political nature of geriatric release policies. In an effort to gain acceptance with the public, such policies often place limits on eligibility of inmates, including incarceration for nonviolent or minimally violent offenses, age of inmate, and/or a minimum amount of sentence served. This significantly reduces the ability of parole boards to exercise geriatric release and also may explain why it has not been implemented more throughout the country as states seek cost-savings measures.

While adopting a geriatric release policy could yield measurable savings, depending on the eligibility criteria for inmates, Michigan is not currently exploring such a policy. The MDOC is attempting to better assess the needs of elderly inmates and is exploring options, such as secured wings of nursing homes, to house Michigan's growing elderly inmate population. In addressing the needs of this population, the MDOC has been careful to ensure that any accommodations made would not endanger individuals who are not incarcerated.

University Consortiums

A handful of states take full advantage of the medical schools housed within their public universities, using a university consortium to provide and manage nearly all of their correctional health care. Three such states of note are Arkansas, Ohio, and Texas. For example, the State of Ohio maintains nearly 15 corrections facilities within an 80-mile radius of the Ohio State University Medical School Facility and uses this facility to provide cost-effective health care to inmates. The State of Michigan has not yet been able to forge a similar relationship with the State's public medical schools: Michigan State University, the University of Michigan (U of M), and Wayne State University (the "Big Three").

The MDOC does maintain some working relationships with university health care programs. Currently, the Department uses services provided by U of M's dental school and Ferris State's optometry school. In addition, a number of medical students do a site visit to Michigan's correctional facilities twice a year. In previous years, the MDCH had a psychiatry fellowship program, but the MDOC had chosen not to continue financing it given budgetary constraints. Recently, the MDOC was able to reach an agreement with the MDCH and U of M and the fellowship has been reinstated.

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[11] Chiu, p.5

The MDOC has reached out to the Big Three but has been unable to reach an agreement. Other states using university consortiums have reported that they are better able to contain costs. For this reason, it would seem that the creation of working partnerships between the MDOC and Michigan's public universities is an area ripe for innovation and exploration. The universities, however, have expressed concern with providing on-site doctors and seem more willing to provide offsite services and case management. One hurdle to this policy that should be acknowledged is geographic location. Several of the State's corrections facilities are not located in the vicinity of any university's medical program, creating a logistical problem if this policy is to be pursued.

While the Legislature may desire to encourage a relationship between the MDOC and State universities, the State Constitution prevents the Legislature from compelling one. Michigan's institutions of higher education retain constitutional autonomy as granted by the Michigan Constitution. Therefore, if any partnership is to be forged between a university and the MDOC in an effort to tackle correctional health care costs, it must be voluntarily agreed to by both parties.

Medicaid Eligibility

A small minority of Michigan inmates meet the eligibility requirements for the State's Medicaid program if they were not in prison and have suspended Medicaid eligibility. Federal law bars state Medicaid programs from reimbursing providers for medical services provided to adults in secure facilities, so these inmates are not Medicaid-eligible while in prison or other secure facilities. About 1,000 Michigan inmates have suspended Medicaid eligibility; in other words, they are Medicaid-eligible whenever they are outside of a secure facility. The Department of Corrections estimates that a total of 3,000 inmates could meet the requirements for suspended Medicaid eligibility and is now making efforts to identify Medicaid-eligible prisoners.

If an inmate with suspended eligibility were treated in a nonsecure facility, such as a nonsecure hospital bed, the treatment costs would be eligible for reimbursement by Medicaid. However, in the past, if the treatment were done in a secure wing of a hospital, such as the secure wing at W.A. Foote Memorial Hospital in Jackson, the services provided would not be Medicaid reimbursable. There have been efforts to obtain Federal permission for Medicaid reimbursement for services in secured inpatient hospital wings. If such permission is obtained, significant savings would occur. A more aggressive approach to identifying prisoners who could have suspended Medicaid eligibility would result in savings to the State. There also could be significant savings on medications provided in such venues, especially HIV/AIDS medications. Providers, especially physicians, pharmaceutical manufacturers, and hospitals, presumably would object as Medicaid rates are lower than the rates paid by private insurers such as Aetna and BCBSM.

The opportunity for savings could become much greater in 2014. Unless it is overturned or repealed, the Federal health reform legislation would expand Medicaid coverage to all those up to 133% of poverty. The vast majority of State inmates would qualify for suspended Medicaid eligibility and most off-site treatment at nonsecure facilities would be Medicaid reimbursable. Over the first few years Medicaid costs for this expansion population would be 100% reimbursed by the Federal government. The potential for savings in the corrections budget is significant.

CONCLUSION

After an examination of national data, it is evident that the bulk of increased spending by the Michigan Department of Corrections on inmate health care is reflective of increased costs. Medical CPI, demographics, and expensive medical advancements are all factors driving the 95.8% increase in correctional health care spending. However, these factors are affecting corrections departments nationwide and should not be viewed as an anomaly.

Most states contacted by the authors are facing the same budgetary constraints as Michigan and are currently seeking innovative cost-savings measures. While it is unlikely that there will be a "silver bullet" solution, there is ample room for collaboration and information-sharing among states. Different states will inevitably require different solutions. The MDOC and Michigan Legislature need to remain cognizant of factors such as Michigan's prisoner demographics and geographic limitations while forging ahead in an effort to find a solution to rising correctional health care costs.

MODELING THE EFFECTS OF DEMOGRAPHIC CHANGES ON PRISON HEALTH CARE COSTS

Factors that Affect Health Care Costs

It is a truism that health care costs for just about any population show a steady increase over time. There are a number of factors contributing to this rise; some are obvious and others are more subtle.

A key factor in changes in health care costs for a population is the change in number of people covered. If a program served 100,000 people in 2000 and served 150,000 people in 2009, one would expect a 50% increase in costs due to population change alone. One can avoid this growth in covered population issue by instead looking at the average cost per covered person.

A second obvious factor is inflation. Over any nontrivial period of time the medical consumer price index (medical CPI) has increased. The medical CPI reflects increased costs for services and, secondarily, reflects changes in technology and medication, which influence costs. The medical CPI for the year 2000 was 260.8; the medical CPI for the year 2009 was 375.6, which represents a 44.0% increase over the period covered in this paper. If all other factors such as population and demographics are held constant, then one would expect that average health care expenditures for a covered population would increase by 44.0% from 2000 to 2009. There is a key caveat in this projection, however, as one must assume that the population covered represents a random sample of the national population. There is little indication that the prison population is at all typical of the national population, so the medical CPI can serve only as a rough proxy of health care inflation for prison health costs.

There is one additional factor that is often overlooked and is critical in examining the growth in prison health care costs: Changes in the age distribution of a population receiving services, in particular health care services, can have a significant effect on average cost. This is because the data show clearly that the average cost of health care increases with age. Health care costs, on average, for a group of 60-year-olds will greatly exceed the average health care costs for a group of 20-year-olds. Health care costs, on average, for a group of 85-year-olds will greatly exceed health care costs for a group of 70-year-olds.

The Effect of Age Demographics: An Example

A simple example is useful to illustrate the effect of changes in age demographics. Assume there are two demographic groups in a population being covered for health care services: those under the age of 40 and those aged 40 and up. Suppose that the average cost of providing health care coverage to someone under the age of 40 is $5,000 per year while the average cost of covering someone aged 40 and up is $8,000 per year.

Suppose further that, in the year 2000, there were 12,000 people covered by the program, with 10,000 of these people being under the age of 40 and 2,000 of these people being aged 40 and up. The two groups are commonly referred to by statisticians as "bins", as the people, based on age, are placed into one age bin or the other age bin.

Table 2 below illustrates the costs for the overall population based on average cost and total population in each bin.

Table 2

Two-Bin Model Year 2000			
Age	Average Health Care Cost	Number of People	Total Health Care Cost
<40	$5,000	10,000	$50,000,000
40+	$8,000	2,000	$16,000,000
Total		12,000	$66,000,000
	Average Cost per person:		$5,500

Suppose that, by the year 2009, there is a shift in the population as it ages, so instead of 10,000 under the age of 40 and 2,000 aged 40 and up, there are 8,000 under the age of 40 and 4,000 aged 40 and up (in other words, with two-thirds of the people covered being under 40). This means that there are still 12,000 people covered, so the number of people covered by the program has not changed. Further, assume that there was no health care inflation over this time period, so the average annual cost remains $5,000 for those under the age of 40 and $8,000 for those aged 40 and up.

Table 3 illustrates the situation in 2009, with the only change being a shift in the number of people in each age bin.

Table 3

Two-Bin Model Year 2009			
Age	Average Health Care Cost	Number of People	Total Health Care Cost
<40	$5,000	8,000	$40,000,000
40+	$8,000	4,000	$32,000,000
Total		12,000	$72,000,000
	Average Cost per person:		$6,000

Even though there was no increase in the average health care cost for those under 40 or those aged 40 and up, the average cost of covering the population increased from $5,500 per year to $6,000 per year. In other words, age demographic changes, even without overall population or inflationary changes, led to an increase in costs of $500/$5,500 or 9.1% in costs.

This effect, because it is based on average cost, is not population dependent. If the population grew over the nine-year period from 12,000 people to 15,000 people, still with two-thirds of the people being under 40, the average cost would be the same as in the 12,000 example, $6,000.

A More Complex Model

The two-bin model discussed above is very rudimentary; obviously, there are wide variations in age-based health care costs even within each age-based bin. People in their early 20s have health care costs roughly half of those incurred by people approaching 40. People just over 40 have health care costs roughly a third of those incurred by people in their 70s.

The challenge in creating a model to examine the impact of demographics on prison health care costs is creating a multiple-bin model, with numerous age bins, with an average health care cost assigned to each bin.

The basic model for the costs of those aged 45 and above was based on the Centers for Medicare and Medicaid Services (CMS) National Health Statistics Group data for 2000 through 2004. The CMS collected expenditure data for populations 19-44, 45-54, 55-64, 65-74, 75-84, and 85 and above. The data may be viewed at:

Interpolation was used to create smaller bins for the age ranges 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, and 80 and above. This was done because the age demographic information for Michigan prisons is provided in five-year bins starting with ages 20-24 and going up to 75-79 and 80 and above.

The second challenge was to create separate bins for the six age ranges of under 20, 20-24, 25-29, 30-34, 35-39, and 40-44. This was done by looking at age-based capitation rates for male individuals and adjusting them proportionately so the overall average matched the average provided by CMS for the 19-44 range. Because the prison population is over 95% male and because the ages 19-44 are child-bearing years, where female capitation rates differ significantly from male capitation rates, the male data were used.

This is not a perfect model by any means. Certainly, one could point out, as noted in the body of this paper, that the prison population has underlying health conditions, which make its average health care costs greater than the health care costs faced by the general population. It is important to note, however, that those are separate calculations of specialized health care costs; what is being examined here is the impact of age-based demographic changes on base health care costs.

When looking at a percentage cost increase due to demographics, the nominal value of the costs is not particularly important; it is the ratio of average costs among these age bins that will dictate the demographic changes. For instance, in the two-bin example above, if the costs were $10,000 for those under 40 and $16,000 for those 40 and up, the percentage increase due to demographics would be the same as it was in the original $5,000/$8,000 example. What matters is the ratio between the average costs in each age bin, not the absolute amount.

The average cost figures used for each bin are in Table 4 below.

Table 4

Health Care Cost Proxies	
Age Range	Average Health Care Cost
<20	$2,200
20-24	$2,700
25-29	$3,000
30-34	$4,200
35-39	$4,800
40-44	$6,000
45-49	$8,000
50-54	$9,000
55-59	$11,000
60-64	$14,000
65-69	$16,000
70-74	$19,000
75-79	$25,000
80+	$40,000

Source: Centers for Medicare and Medicaid
Services and mathematical interpolation.

Using the Model to Understand the Impact of Age Demographic Changes on Michigan Prison Health Costs

Table 5 below shows the estimated health care costs, using constant, non-inflation-adjusted average costs for each age group, based on the 2000 and 2009 age distribution of prisoners in

Michigan. Because these are point-in-time data from the MDOC's Statistical Report, the totals differ from the average prison population for the respective years.

Table 5

Projected Effect of Age Demographics on *Michigan* Prison Health Care Costs, 2000 to 2009							
2000				**2009**			
Age	Number	Health Care Cost Proxy	Estimated Costs	Age	Number	Health Care Cost Proxy	Estimated Costs
<20	1,224	$2,200	$2,692,800	<20	1,001	$2,200	$2,202,200
20-24	7,252	$2,700	$19,580,400	20-24	5,461	$2,700	$14,744,700
25-29	8,025	$3,000	$24,075,000	25-29	6,934	$3,000	$20,802,000
30-34	8,182	$4,200	$34,364,400	30-34	6,575	$4,200	$27,615,000
35-39	7,790	$4,800	$37,392,000	35-39	6,119	$4,800	$29,371,200
40-44	6,440	$6,000	$38,640,000	40-44	5,929	$6,000	$35,574,000
45-49	4,255	$8,000	$34,040,000	45-49	5,207	$8,000	$41,656,000
50-54	2,317	$9,000	$20,853,000	50-54	3,595	$9,000	$32,355,000
55-59	1,041	$11,000	$11,451,000	55-59	2,126	$11,000	$23,386,000
60-64	558	$14,000	$7,812,000	60-64	1,150	$14,000	$16,100,000
65-69	247	$16,000	$3,952,000	65-69	576	$16,000	$9,216,000
70-74	153	$19,000	$2,907,000	70-74	238	$19,000	$4,522,000
75-79	79	$25,000	$1,975,000	75-79	90	$25,000	$2,250,000
80+	29	$40,000	$1,160,000	80+	37	$40,000	$1,480,000
Total	47,592		$240,894,600	**Total**	45,038		$261,274,100
Average Cost: $5,062				Average Cost: $5,801			
				% Increase 14.61%			

Source: Age Demographic Data from MDOC 2000 and 2009 Statistical Report.

As one can see from the Table 5, the average health care cost, based on age-based average costs, would have been $5,062 in 2000. With no other changes than a change in the age distribution of the population, the average cost would be $5,801 in 2009. This represents a 14.6% increase in costs merely due to changes in age demographics, with no inflation or total population factors considered.

Again, it must be noted that this does not reflect the *actual* health care costs incurred by the Michigan Department of Corrections. It reflects what would happen to average health care costs for a general population whose age characteristics match those of MDOC inmates in 2000 and 2009. The result is fairly significant. While a medical CPI of 44.0% would be a major factor in cost increases, a demographic factor of 14.6% is one that also must be considered.

Expanding the Model to Other States

The authors collected data from 33 other states that had useful age-based prisoner data from two separate years. The preference was for data from the years 2000 and 2009, but in some cases the data were from years at or between those two endpoints. (It should be noted that since 26 of the 33 states had data from 2009 or 2010, it was necessary to adjust data for the first year to come up with a backwards projection for the year 2000.) In those cases, straight-line interpolation was used to project populations for age groups in 2000 and 2009, with adjustments as needed for projections in the smaller "bins" that resulted in numbers less than zero.

A further complication came from the age bins used by other states, as most did not have as many bins as Michigan. Interpolation was used to adjust these bins to reflect the age bins used in Michigan.

A National Look

The end result of this national examination was fairly similar to the Michigan result. This is based on adjusted data from 34 states, which comprise almost 80% of the nation's state prison population.

Table 6

Projected Effect of Age Demographics on National Prison Health Care Costs, 2000 to 2009							
2000				**2009**			
Age	Number	Health Care Cost Proxy	Estimated Costs	Age	Number	Health Care Cost Proxy	Estimated Costs
<20	33,368	$2,200	$73,408,563	<20	34,287	$2,200	$75,432,333
20-24	147,998	$2,700	$399,593,630	20-24	138,083	$2,700	$372,824,495
25-29	169,038	$3,000	$507,112,614	25-29	177,270	$3,000	$531,810,536
30-34	161,029	$4,200	$676,323,228	30-34	163,495	$4,200	$686,678,057
35-39	159,305	$4,800	$764,665,322	35-39	146,496	$4,800	$703,183,123
40-44	136,071	$6,000	$816,426,929	40-44	135,102	$6,000	$810,611,929
45-49	89,061	$8,000	$712,485,877	45-49	119,731	$8,000	$957,845,153
50-54	34,168	$9,000	$307,509,445	50-54	70,614	$9,000	$635,527,867
55-59	20,634	$11,000	$226,972,704	55-59	47,347	$11,000	$520,816,291
60-64	7,920	$14,000	$110,886,296	60-64	19,107	$14,000	$267,498,198
65-69	3,641	$16,000	$58,252,190	65-69	9,487	$16,000	$151,791,942
70-74	1,738	$19,000	$33,019,806	70-74	3,876	$19,000	$73,644,434
75-79	643	$25,000	$16,071,413	75-79	1,513	$25,000	$37,836,603
80+	281	$40,000	$11,224,030	80+	602	$40,000	$24,075,587
Total	964,893		$4,713,952,049	**Total**	1,067,011		$5,849,576,547
Average Cost $4,885				Average Cost $5,482			
				% Increase 12.21%			

Source: Age Demographic data from various states' correctional departments.

The cost increase due to age demographics from this adjusted sample is 12.2%, very much in line with the Michigan result noted above.

As another check, the authors looked at national data on total Federal prison, state prison, and jail population. This is a slightly different population as it includes Federal prison and jail inmates, but application of the same model resulted in an increase in average costs due to demographic changes of 11.7%, in line with the 12.2% found above.

Growth in Prison Population Aged 55 and Above

As noted in this paper, the most commonly used benchmark for the aging of the prison population is the percentage of prisoners aged 55 and above. In Michigan, the percentage of prisoners aged 55 and above grew from 2,107 or 4.4% in 2000 to 4,217 or 9.4% in 2009. Among the 33 other states with good demographic data, the model indicates that the percentage grew from 3.6% in 2000 to 7.7% in 2009. Both in Michigan and nationally, the percentage of prisoners aged 55 and above more than doubled over the past decade.

Summary

The data and model used above indicate that a major factor in the increase in prison health care costs in Michigan has been the aging of the prison population. The largest factor in this has been the increase in the prison population aged 55 and above, which has more than doubled. The data also indicate that the 40-54 age bracket grew from 27% of Michigan's prison population in 2000 to 33% in 2009. This demographic shift has had a major impact on prison health care costs. Based on this model, it is estimated that prison health care costs in Michigan increased by 14.6% from 2000 to 2009 due to changes in the age demographics of the prison population. Further confirmation of this assessment is evident given that available data from other states imply a national prison health care cost increase of 11.7% to 12.2% due to shifts in age demographics, which is similar to the results for Michigan.

GROWTH IN PRISON HEALTH CARE COSTS

The authors obtained useful prison health care cost data for 34 states. While the focus of this paper is the 2000 through 2009 time period, however, for many states the available health care cost data were from a different time period. There were 15 states for which there were useful health data for 2000 and 2009. Those states saw an increase in prison health care costs between 2000 and 2009 from $1.45 billion to $4.20 billion while the number of inmates increased by only 16.5%. It must be noted that California's explosive increase in prison health care costs was the largest factor in this growth, as California's costs more than quadrupled and made up more than half of the $4.2 billion spent in 2009 for prison health care costs in these states.

When one looks at the 22 states that had at least an eight-year gap between data points (2000 to 2008 or 2009 and 2001 to 2009), one sees a growth in health care costs per prisoner of 141.8%. Another way to look at the data is to adjust out the one high-end outlier, California, and two low-end outliers whose combined total population almost equals California's, Florida and Pennsylvania. In that case, the growth in health care cost per prisoner is 77.6%.

The raw prison health costs are of some interest, but of more interest is the growth rate for health costs, especially once one controls for changes in age demographics.

Michigan's prison health costs grew from $133.4 million in 2000 to $261.2 million in 2009. The cost per prisoner grew from $2,839 in 2000 to $5,392 in 2009; thus, the cost per prisoner almost doubled, growing 89.9%.

This information is useful, but does not take into account inflation, cost changes for treatment of diseases more prevalent among the prison population than the general population, or age demographic shifts.

Adjusting Out the Impact of Age Demographics

In Appendix 1, it was estimated that changes in age demographics resulted in an average increase in Michigan per-prisoner health care costs of 14.6% between 2000 and 2009. It should be noted that the percentages are not additive; one cannot take 89.9%, subtract 14.6%, and obtain 75.3% and assume that is the amount explained by nondemographic cost increases. Due to compounding, one has to divide rather than subtract. For instance, if a $100 investment increases by 40% and then increases by another 50%, the net increase is not 90%. The 40% increase raises the investment to $140, and then the additional 50% increase raises the investment to $210, for a $110 increase on the original $100 or 110%. If one wants to back out the 50% increase to determine the initial increase, one must divide (1 + 110%) by (1 + 50%), that is, divide 2.10 by 1.50, which results in 1.40, or the original 40% increase.

Adjusting out the effect of age demographics requires one to divide (1 + the percent cost increase) by (1 + the age demographic factor). This calculation is (1 + 89.9%) divided by (1 + 14.6%), which results in 1.657, or a 65.7% increase in per-prisoner costs once the effects of age demographics are removed.

The next step is to determine an annual average increase in cost over the nine-year period. In this case, one must take (1 + 65.7%) and raise it to the $1/9^{th}$ power. This results in 1.0577, for an annual average increase in costs of 5.77%. One can verify this result by taking 1.0577 and raising it to the 9th power, that is, compounding 5.77% each year for nine years. The result will be 1.657 for the 65.7% increase over nine years.

The end result is that prison health care costs in Michigan, once age demographics are adjusted out, increased by an average of 5.77% per year over the last decade.

Comparisons to Other States

While the time range varied, the authors obtained prison health care cost data for 24 states, that also had demographic data. Even in states with shorter time ranges the calculation is fairly straightforward: Determine the per-prisoner increase in health care costs over the period in question, adjust out the demographic factor, and then calculate the average annual increase over that period.

The data showed that the weighted average annual increase for these 24 states was 7.01% per year. It is fair to note that California, a high-end outlier, is among these states. Removing California as well as two low-end outliers, Florida and Pennsylvania (whose combined prison population is well less than California's), leads to a weighted average annual increase of 5.81% per year.

In either case, Michigan's average annual increase of 5.77% is within reasonable range of the multistate averages of 5.81% and 7.01%.

Table 7 shows the results for states that had useful data.

Table 7

	Estimated Impact of Age Demographics On Prison Health Costs 2000-2009	Average Annual Increase in Prison Health Costs Once Demographics Are Removed
	State by State Data on Demographics Shifts and Average Annual Cost Increases	
Alabama	11.17%	*
Alaska	5.22%	5.21%
Arkansas	17.17%	10.56%
California	11.61%	15.93%
Colorado	12.44%	3.81%
Connecticut	12.28%	3.66%
Florida	11.96%	0.75%
Hawaii	(8.63)%	9.55%
Idaho	6.00%	4.45%
Illinois	16.20%	*
Indiana	8.01%	6.42%
Iowa	18.09%	*
Kansas	10.58%	7.75%
Maryland	9.47%	*
Massachusetts	6.67%	*
Michigan	14.61%	5.77%
Mississippi	13.79%	4.71%
Missouri	14.12%	6.51%
Montana	17.93%	*
Nebraska	11.67%	8.29%
Nevada	6.68%	11.61%
New Hampshire	18.15%	10.14%
New Jersey	13.67%	3.18%
New York	14.24%	*
North Carolina	13.96%	2.63%
Oregon	11.43%	*
Pennsylvania	10.42%	1.14%
South Carolina	13.66%	*
Tennessee	12.92%	*
Texas	11.28%	5.44%
Vermont	7.30%	13.17%
Virginia	14.49%	6.45%
West Virginia	11.09%	7.63%
Wisconsin	16.10%	10.22%
Weighted Average	12.20%	7.01%

*Useful demographic data were not available for Arizona, Delaware, Georgia, Kentucky, Louisiana, Maine, Minnesota, New Mexico, North Dakota, Ohio, Oklahoma, Rhode Island, South Carolina, Utah, Washington, and Wyoming.