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DEPARTMENT OF
HUMAN SERVICES

Accounting for Social Risk Factors in Minnesota Health Care Program Payments

Legislative report supplement

December 2018

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Three vendors were commissioned to support the requirements of this project. Their reports are available online.

- Health Management Associates (HMA), in partnership with the Disability Policy Consortium (DPC), conducted a quantitative analysis of the relationship between Medicaid enrollees’ social risk factors and health outcomes. Their summary report can be found here: https://www.healthmanagement.com/wp-content/uploads/MN-Summary-Report-to-Legislature_DHS_HMA_DPC_08.01.17_6.11.18.pdf Their technical white paper can be found here: https://www.healthmanagement.com/wp-content/uploads/MN-White-Paper_DHS_HMA_DPC_08.01.17_6.11.18.pdf The core HMA team included Ellen Breslin (Project Lead), Anissa Lambertino, Dennis Heaphy, and Tony Dreyfus.

- Wilder Research Center conducted a literature review and interviewed providers familiar with homelessness, and provided recommendations on ways to improve the health of people experiencing homelessness. Their report can be found here: http://www.wilder.org/Wilder-Research/Publications/Studies/Homelessness%20and%20Health/Improving%20the%20Health%20of%20Those%20Experiencing%20Homelessness.pdf The core team included Stephanie Nelson-Dusek, Sera Kinoglu, and Michelle Decker Gerrard.

- The University of Minnesota, School of Public Health, in partnership with Avivo, conducted a literature review and interviewed providers familiar with substance use disorder, and provided recommendations on ways to improve the health of people with substance use disorder. That report can be found here: https://sites.google.com/a/umn.edu/effective-interventions-for-substance-use-report-to-minnesota-department-of-human-services/home/copy-of-final-report The core team included Donna McAlpine (U of M), Patty Wilder and Carrie Salsness (Avivo).

ADA Advisory

For accessible formats of this information or assistance with additional equal access to human services, write to DHS.info@state.mn.us, call 651-431-2836, or use your preferred relay service. ADA1 (2-18)

Minnesota Statutes, Chapter 3.197, requires the disclosure of the cost to prepare this report. The estimated cost of preparing this report is $270,000.

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Table of Contents

I. Executive summary

This report delivers the Minnesota Department of Human Services' recommendations to reduce health disparities among Medicaid and other DHS program participants. It shows results and progress toward the legislative direction to reduce stark differences in health outcomes among the state's various populations.

Step 1: Community engagement and literature review to identify social risk factors and barriers to health

The DHS research team and contracted vendors began this project with by identifying relevant social risk factors and barriers to health. To do this, the team conducted a literature review, and interviewed community members who were experiencing homelessness, deep poverty, or immigration. These results are reported in the first legislative report.[1]

Step 2: Identify the social risk factors most associated with health disparities in Minnesota's Medicaid population

DHS used existing administrative data to identify people with several social risk factors established as relevant in the first step of the project. These social risk factors, though considered very serious barriers to health in the academic research on social determinants of health, are common among children and adults enrolled in Minnesota's Medicaid program.

Health Management Associates (HMA), a vendor with whom the department collaborated on the report, reviewed Medicaid enrollees' mortality, the prevalence of physical chronic conditions (e.g. diabetes), the prevalence of behavioral health conditions (e.g. post-traumatic stress disorder) and whether enrollees received recommended preventive health care over the course of a year. HMA found that the following groups had significantly worse outcomes than their fellow enrollees, even when controlling for patient demographics, geography and other social risk factors. A more thorough description of these findings is presented in chapter four.

- **Substance Use Disorder (SUD)**: Adults with a recently diagnosed SUD had higher rates of every chronic condition measured. Adults with SUD are 4.5 times as likely to have PTSD, five times as likely to have depression, and twice as likely to have physical conditions such as hypertension, and heart conditions such as a heart attack or heart disease which require hospitalization. Adults with SUD have high medical costs and three times the usual rate of preventable

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[1] https://edocs.dhs.state.mn.us/lfserver/Public/DHS-7764-ENG

hospitalizations. Children living with a parent with a diagnosis of SUD have a higher mortality rate, a higher rate of asthma and a higher rate of their own SUD as teenagers.

- **Serious and Persistent Mental Illness (SPMI)**: Adults diagnosed with SPMI have poor health outcomes for most conditions. They are 50 percent more likely to have asthma and diabetes, and 20 percent more likely to have hypertension or COPD than those without this diagnosis. Adults with SPMI incur the highest medical costs of any group that was examined. Children whose parents have SPMI are more likely to have asthma, ADHD and SUD as teenagers than children whose parents do not have a diagnosis of SPMI.
- **Deep poverty**: Adults whose income is at or below 50 percent of the Federal Poverty Level (FPL) 2 have higher rates of every chronic condition measured in this study, including a mortality rate two times higher than adults who are not as poor. They experience 40 percent more preventable emergency department visits, and 23 percent more preventable hospitalizations than those who are not as poor. Children living in deep poverty have a mortality rate that is two times higher and a PTSD prevalence rate that is higher than children who are not as poor.
- **Homelessness**: Health outcomes for adults experiencing homelessness were worse across varied measures. They experienced higher rates of asthma, hypertension, COPD, depression, PTSD and SUD, with higher rates of preventable emergency department visits and hospitalizations. Controlling for demographic, medical and social conditions, however, adults who are homeless are less expensive to Medicaid than those who are not homeless. This is presumably because their use of health care is lower than expected, given their conditions. Children experiencing homelessness are more likely to have asthma, to have an injury due to accident or violence and are the least likely of any group to receive recommended health and dental care.
- **Previous incarceration**: Adults who have been incarcerated in a Minnesota prison are more likely than others to have health conditions such as COPD, depression, PTSD and SUD, and are more likely to have a preventable emergency department visit. Children of adults who have been incarcerated have a higher mortality rate, and are more likely to develop SUD as teenagers, though both of these associations only approached, but did not fully meet, statistical significance ($p<0.062$).
- **Child protection involvement**: Children who have involvement with the child protection system were more likely to have ADHD, asthma, PTSD, to develop SUD as a teenager and to experience death when compared with children who were not involved with the system. This social risk factor was the strongest predictors of poor health outcomes among children.

Racial/ethnic background. In addition to the above factors, the research team reviewed the health outcomes of people of different racial/ethnic groups. The research team found that American Indians

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[2] In 2014, 50 percent of the Federal Poverty Limit (FPL) was $5,835 per year for a single person and $9,895 per year for three, (a single parent with two children).

experience much worse health outcomes than any other ethnic group. They are more likely to have diabetes, hypertension, heart disease, PTSD and SUD. Children are more likely to have asthma, and newborns are more likely to have conditions requiring a higher level of medical care.

Step 3: Literature review and provider interviews to identify interventions that could improve the health of people with social risks

The third step of this project is to identify evidence-based interventions that can help to reduce health disparities in the identified populations. This work began in 2016 (while the social risk analysis was underway) with the following two populations: people experiencing homelessness and people with a substance use disorder. Research vendors reviewed the evidence on the effectiveness of a variety of interventions at improving the health of people in the respective populations. They reviewed both health care and non-health care interventions. They also interviewed health care and other providers who have expertise in working with each population. These key contributors helped identify promising interventions, and gave input on implementing the strongest-possible interventions in Minnesota. An overview of the evidence-based research and the recommended interventions are described in Chapters 6 and 7 of this report.

Improving the health of people experiencing homelessness

Wilder Research worked with DHS to identify interventions that have been shown to improve health outcomes for people experiencing homelessness. The strongest evidence was found for housing, case management and Assertive Community Treatment (ACT). More detail on each of these areas of intervention can be found below. Combining multiple approaches, such as housing and case management is likely the most effective way to improve health outcomes.

Housing

Multiple rigorous studies find that housing improves health outcomes among those experiencing homelessness. In particular, the “Housing First” model appears to be effective. This approach is guided by the premise that people need housing in order to further pursue other goals such as sobriety, employment, or attending to other mental or physical health issues.

Case management

Case management attempts to address health and social service needs that may hinder positive outcomes, such as finding and keeping housing. While Wilder did not find any studies that looked solely at the effect of case management on those experiencing homelessness, case management is embedded in a variety of interventions. It is often combined with supportive housing and has been shown in multiple studies to improve health outcomes.

Assertive Community Treatment

Assertive Community Treatment (ACT) is an evidence-based, collaborative approach to working with people who have mental health issues. A multidisciplinary team of providers works together to provide holistic care and treatment. There are ACT models which focus on those also experiencing homelessness. Several studies have examined the impact of ACT and illustrated improvements to health outcomes, such as reduced psychiatric symptoms, greater access to housing and reduced substance use relapse.

Overall recommendations

DHS staff is considering the feasibility of developing a methodology to identify a group of Medical Assistance recipients experiencing homelessness whose health care is expensive enough--and that high costs are due, at least in part, to their housing status--that providing them with housing would be a cost-neutral or cost-saving endeavor. This would be a relatively small project DHS can undertake to encourage health care providers and payers to improve housing availability for their highest-cost patients.

However, affordable housing should also be seen from a broader perspective. When asked what they thought Minnesota's priorities should be, in terms of improving the health outcomes of the homeless population, most stakeholders (health care providers and social service provider alike) advocated for more affordable housing, particularly when paired with supportive services. The importance of housing is validated by the literature review, and the research team sees efforts to improve the availability of affordable housing as critically important to reducing health disparities among DHS program participants.

Improving the health of people with Substance Use Disorder

DHS contracted with Donna McAlpine from the University of Minnesota's School of Public Health, and Avivo, a chemical and mental health services provider, to identify interventions that can help improve the health of people with SUD. Many of the vendors' recommendations were proposed in the 2017 legislative session and subsequently passed into law. They are being implemented by the Alcohol and Drug Abuse Division at DHS and are described in Chapter 6. Two further ideas to improve prevention or treatment are described below.

SBIRT

SBIRT, which stands for "Screening, Brief Intervention and Referral to Treatment" takes action early to identify people with risky substance use behaviors and provide assistance to them to prevent a disorder from developing. This approach has a strong evidence-base for preventing alcohol use disorder. It is an allowed service under Minnesota's Medicaid program[3] and all enrollees are eligible to receive it.

DHS does not currently know how widely this intervention is used by Medicaid providers, though we know that these providers seldom bill Medicaid for this service. Representatives from DHS' Health Care Administration and Community Supports Administration are looking into how to make these services and similar effective services more widely available to MA enrollees.

Use of evidence-based practices

The Minnesota Management and Budget (MMB) recently released a cost-benefit analysis of various substance use disorder interventions4. They found that providers are not always using the most effective practices. It is hard to know to what degree this is true for Medicaid providers as DHS does not collect detailed enough procedure code data to know the therapeutic methods practitioners use. There is also no direct oversight of individual SUD practitioners, or their adherence to the treatment models they employ. DHS could review providers' use of evidence-based practices, and their fidelity to the models using claims data to identify providers that seem to have poor treatment outcomes, combined with a clinical review of these providers, who may benefit from updating their models.

Case management redesign

DHS is currently leading a Case Management Redesign Initiative with county and Tribal partners. This multi-stakeholder process is reviewing the many types of Medicaid-funded case management and care coordination services in Minnesota. Many Medicaid enrollees would benefit from expansion of case management and care coordination services that help them understand and engage in their health or behavioral health care, and access services and supports available to them (e.g. housing subsidies, food support, education and training, transportation assistance). By helping people navigate the system of public benefits and community support services, people are able to leverage the resources available to them to create more stability and more opportunity for themselves and their families. Reducing the financial pressures facing people on MA can help to reduce the incidence of crisis lead to improved health outcomes and decrease costs to health care and other systems.

Adjusting Medicaid payment policy to help providers address their patients' social risks

The Integrated Health Partnership (IHP) model allows provider organizations to contract with DHS to care for Medical Assistance and MinnesotaCare enrollees through both fee-for-service and managed care payment approaches. It utilizes a payment and incentive structure that holds provider

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[3] https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNMattersArticles/Downloads/SE1013.pdf

[4] https://mn.gov/mmb/results-first/substance-use-disorder/

organizations accountable for the total cost of care and quality of services provided to their patients. IHP leadership has studied the health impacts of social risk factors for these enrollees and modified their program so providers may innovate to address them.

The IHP alternative payment model is not tied to the prescriptive fee-for-service structures which allows providers to tailor their services to the needs of their particular patient populations, and to innovate in new ways. The payment methodology is therefore very flexible and responsive to the needs of patients in each IHP.

In 2018, DHS introduced the population-based payment as a mechanism for supporting these providers. This is a modest upfront, flexible payment made on a quarterly basis to all IHPs participating in the 2018 IHP model and onward. It can support care coordination services, population health activities, quality improvement, or infrastructure to support the aforementioned efforts. IHP leaders acknowledge that caring for populations with higher medical and social risk may require additional resources, and so the average population-based payment is expected to vary by IHP and over time based on the medical and social risk of the attributed population.

The current PBP payment is risk-adjusted for medical conditions (as is the usual method of risk-adjusting), but also risk-adjusts for some social risk factors. For adults, there is a higher adjustment for adults with substance use disorder *and* serious and persistent mental illness, past incarceration or current homelessness. For children ages 1 to 17, there is a risk-adjustment for parental SPMI or child protection involvement. For infants under the age of 1, there is a risk adjustment for parental substance use, parental mental illness or child protection involvement.

DHS is using the findings and available data about social risk factors not only to adjust payments, but to emphasize the importance of social risk factors as we serve Minnesota individuals and families. DHS hopes to facilitate broader understanding of social risks among IHPs and their participating providers by informing them about the prevalence of such factors in their patient populations and by gathering information about population health strategies developed by IHPs to address these issues in their Medicaid populations. In turn, when relevant, DHS encourages the IHPs to partner with relevant community organizations to jointly address social determinants. As part of the IHP population based payment strategy, IHPs will report on the results of their interventions over the next three years.

Next steps

The work to develop innovative payment methodologies in IHPs continues, as we learn from early efforts and modify our approach. We also continue with our work to identify interventions for improving the health of people with social risk factors. This is being done through workgroups focusing on the social risk factors that were identified as most impactful. For example, a workgroup comprised of DHS staff in health care and economic assistance, as well as staff from the Department of Health are collaborating on work to investigate interactions of health and deep poverty. An additional workgroup is looking into ways to improve the health of people who have been in prison, and is made up of DHS and Department of Corrections staff, representing a variety of service areas in each agency.

II. Legislation

Laws of Minnesota 2015, chapter 71, article 11, section 63

HEALTH DISPARITIES PAYMENT ENHANCEMENT.

a) The commissioner of human services shall develop a methodology to pay a higher payment rate for health care providers and services that takes into consideration the higher cost, complexity, and resources needed to serve patients and populations who experience the greatest health disparities in order to achieve the same health and quality outcomes that are achieved for other patients and populations. In developing the methodology, the commissioner shall take into consideration all existing payment methods and rates, including add-on or enhanced rates paid to providers serving high concentrations of low-income patients or populations or providing access in underserved regions or populations. The new methodology must not result in a net decrease in total payment from all sources for those providers who qualify for additional add-on payments or enhanced payments, including, but not limited to, critical access dental, community clinic add-ons, federally qualified health centers payment rates, and disproportionate share payments. The commissioner shall develop the methodology in consultation with affected stakeholders, including communities impacted by health disparities, using culturally appropriate methods of community engagement. The proposed methodology must include recommendations for how the methodology could be incorporated into payment methods used in both fee-for-service and managed care plans.
b) The commissioner shall submit a report on the analysis and provide options for new payment methodologies that incorporate health disparities to the chairs and ranking minority members of the legislative committees with jurisdiction over health care policy and finance by February 1, 2016. The scope of the report and the development work described in paragraph (a) is limited to data currently available to the Department of Human Services; analyses of the data for reliability and completeness; analyses of how these data relate to health disparities, outcomes, and expenditures; and options for incorporating these data or measures into a payment methodology.

III. Introduction

This report is submitted to the Minnesota Legislature pursuant to Laws of Minnesota 2015, chapter 71, article 11, section 63. It was prepared by the Minnesota Department of Human Services (DHS). It is the second of two reports which will update the legislature as to DHS' progress in investigating and reducing health disparities among Medical Assistance and MinnesotaCare enrollees, and in developing options for incorporating this information into payment methodologies. The first report was submitted in April 2016.

Initiatives at the State of Minnesota to address Health Disparities

The social determinants of health have received extensive attention in the social and health sciences in the last few decades. These can be defined as the range of personal, social, economic and environmental factors that influence the health of individuals and populations (Minnesota Department of Health, 2013). The evidence of the health effects of these risk factors is overwhelming, and interest in the topic extends well beyond health care. However, solutions to these well-established disparities are less clear and forthcoming, for a wide variety of systemic and human reasons.

The Minnesota Department of Human Services (DHS) is experimenting with innovative methods to address these problems. The following are some recent projects initiated by the Health Care Administration:

- The Minnesota Department of Human Services has compiled performance measures for participants of each of the managed care organizations (MCOs) and for participants in fee for service (FFS) for many years. More recently, many of the results have been calculated by region and race/ethnicity.
- In 2015, DHS contracted with the Lewin Group to develop a risk-adjustment methodology which could be applied to the Initial Core Set of Health Care Quality Measures for Medicaid-Eligible Adults. This work adjusted for demographic, language, and clinical indicators. This work can inform the stratification and risk-adjustment of the MCOs and FFS participant performance measures.
- DHS has developed and implemented the Integrated Health Partnership program which rewards providers for improving health care outcomes and controlling health care costs. In 2018, the program incorporated a population-based payment, adjusted for social risk factors, and included additional quality improvement components to the model that address social risk factors impacting health outcomes.
- The CMMI (CMS) State Innovation Model (SIM) award to DHS and MDH provided funding for many community and provider based programs that supported individuals with social risk factors such as substance use disorder, mental health illness, homelessness, food insecurity, poverty and/or incarceration. Minnesota's SIM funds were competitively awarded to organizations that sought to reduce health care costs and improve quality through patient-

centered collaborations between health care and social service organizations. Additional information on Minnesota SIM funded activities can be found at http://mn.gov/sim.

Conceptual Model

The National Academies of Sciences, Engineering, and Medicine (2016) developed a ‘Conceptual framework of social risk factors for health care use, outcomes and cost’ shown on the next page. They use this to exemplify the processes by which social risk factors, such as those that we report on in this study, create problems with access, and clinical and behavioral risk factors, and how these in turn reduce the effectiveness of patients’ ‘health care use’. In their model, all of these processes result in poorer outcomes and higher costs. The Institute of Medicine used this to guide their understanding of how to account for social risk in Medicare payment and performance measures.

The DHS research team working on this project use this model to conceptualize where the various evidence-based interventions are found, and how they might interrelate. The most ‘upstream’ interventions try to address the underlying social risk factors, and in so doing, may prevent downstream problems related to access, clinical and behavioral risk, as well as less-than-optimal health care use. The ‘housing first’ model is one such model which can prevent some of these problems by eliminating the risk factor of homelessness before it results in negative health outcomes.

‘Downstream’ interventions such as having health care providers located in homeless shelters, can make it easier for homeless people to access health care regularly and prevent later high-cost preventable utilization such as hospital stays. These are sometimes paired with upstream services to address the underlying problems.

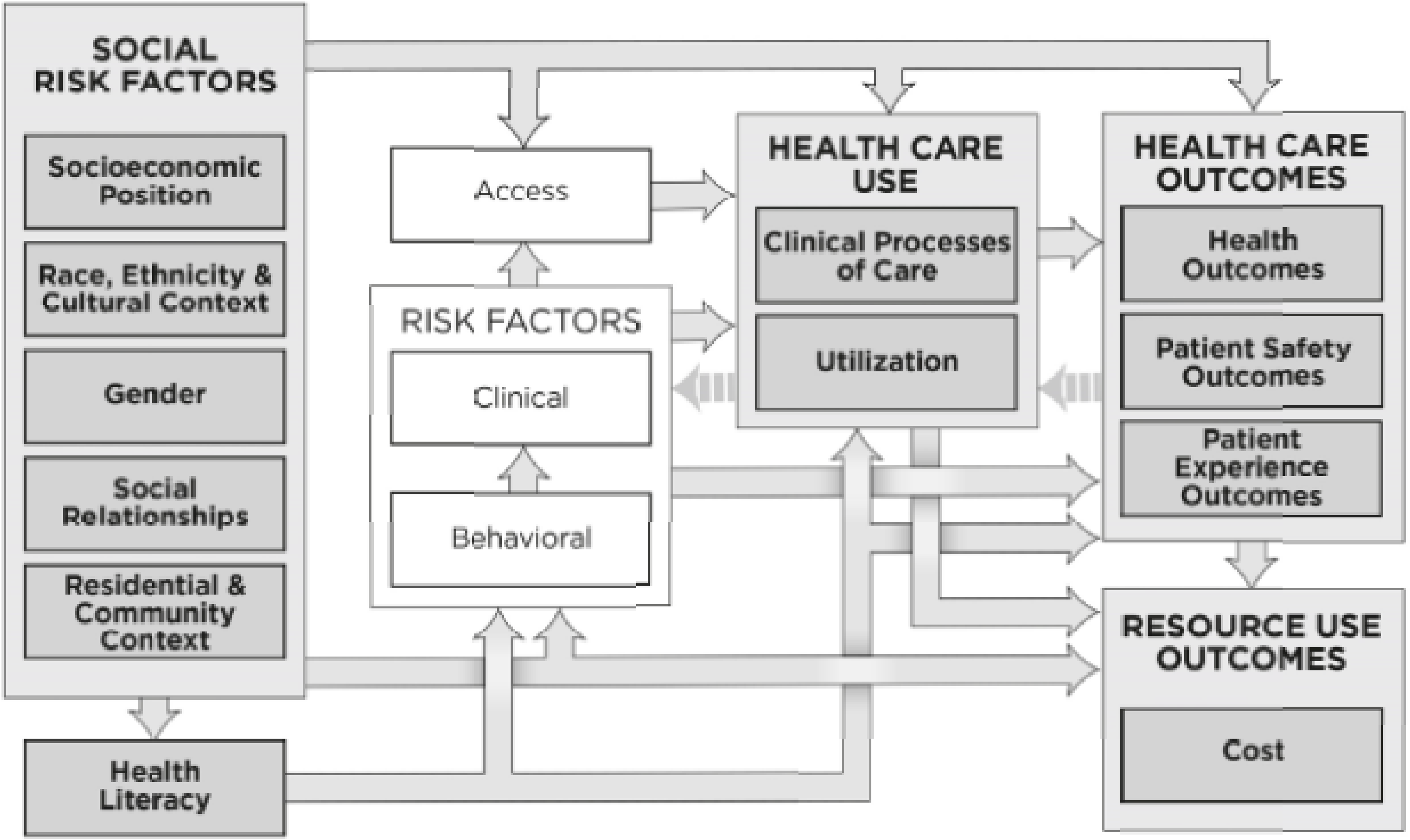

FIGURE 1-1 Conceptual framework of social risk factors for health care use, outcomes, and cost.
NOTE: This conceptual framework illustrates primary hypothesized conceptual relationships.

Research process

The investigation into health disparities described in this report is the result of collaborations between researchers and data analysts, and policy and program experts from program areas across DHS, as well as research vendors with in-depth expertise into the topic area they studied. This project began in 2015, shortly after the legislation was enacted, and will continue as we investigate interventions for each social risk factor. A brief overview of the research steps undertaken to date and still to come, is described below.

Step 1: Community engagement and literature review to identify important social risk factors and barriers to health

The first step of this project was completed in April 2016, and the results were described in the first legislative report[5]. This step included community engagement as well as a literature review.

Community engagement

The Improve Group selected six social service organizations that serve people who have experienced or are currently experiencing homelessness, poverty, and/or immigration. Each organization identified one member of their staff for a key informant interview. The organizations recruited approximately six people each from among their client populations to also do an interview. In addition, the Improve Group interviewed a half dozen medical providers to learn their thoughts on the role providers can play in addressing these barriers. The study is a small convenience sample, based in the metro area. It should provide insights into community members' experiences, but cannot be generalized to the larger MA or Minnesota population. Here were the questions that were asked of respondents:

- What factors make it difficult for people to meet their health care needs (such as being healthy, finding a provider, obtaining needed services, managing health conditions)?
- What factors help or make it easier for people to meet their health care needs?
- Would clinics providing additional services be a substantial value to target populations?

Literature review

The Oregon Health Sciences University identified existing literature reviews and meta-analyses which examined the relationship between social risk factors and health outcomes in adult populations. They identified and quality-assessed broad systematic reviews on the subject. The health outcomes which were included in the analysis were the following: obesity, diabetes, psychiatric disorder, substance use disorder, oral health, and asthma. DHS identified the following social risk factors to be included in the review.

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[5] https://edocs.dhs.state.mn.us/lfserver/Public/DHS-7764-ENG

- Neighborhood poverty
- Homelessness
- Race/ethnicity
- Language other than English spoken most of the time
- Low educational attainment
- Substance use disorder

The literature review was limited to the adult population. DHS had access to a literature review of the relationships between social risk factors and health care outcomes (access and utilization) for the population of children. This was conducted by the Seattle Children's Research Institute in 2012, and was deemed current enough for our purposes.

Step 2: Quantitative analysis to identify the social risk factors most associated with health disparities in the Minnesota Medicaid population

The second step of this project was to conduct an extensive analysis of DHS participant data. This was done by Health Management Associates. To do this, DHS staff compiled administrative social risk data for everyone age 0-64 who was enrolled in Medical Assistance or MinnesotaCare during 2014, with the exception of dually-eligible enrollees for whom DHS has incomplete data. This was nearly a million enrollees. Social risk indicators included financial resources (e.g. homelessness, family poverty), health conditions (e.g. mental illness and substance use disorder), as well as a history of incarceration and child protection involvement. All of these social risk factors were found to be associated with poor health outcomes in the MA population. The analytic findings are described in more detail Chapter 4 of this report.

Step 3: Literature review and provider interviews to identify interventions that could improve the health of people with each social risk factor

The third step of this project is to identify evidence-based interventions which can help to reduce health disparities in the above target populations. This work began in 2016 with the following two target populations: people experiencing homelessness, and people with substance use disorder diagnoses. Steps two and the beginning of step three thus began at the same time. Wilder Research identified interventions which have been shown to improve health outcomes for people experiencing homelessness, and the U of M School of Public Health, in collaboration with RESOURCE Inc., did the same for populations with substance use disorder.

Step three research vendors reviewed the research evidence on how effective a variety of interventions are at improving the health of people in their respective target populations. They reviewed both health care and non-health care interventions. They also conducted interviews with health care and other providers who have expertise with people in their target populations. These key informants helped to identify promising interventions, and gave input on the practical feasibility of implementing the most evidence-based interventions in Minnesota. An overview of the evidence-based research, and the recommended interventions are described in Chapters 5 and 6 of this report.

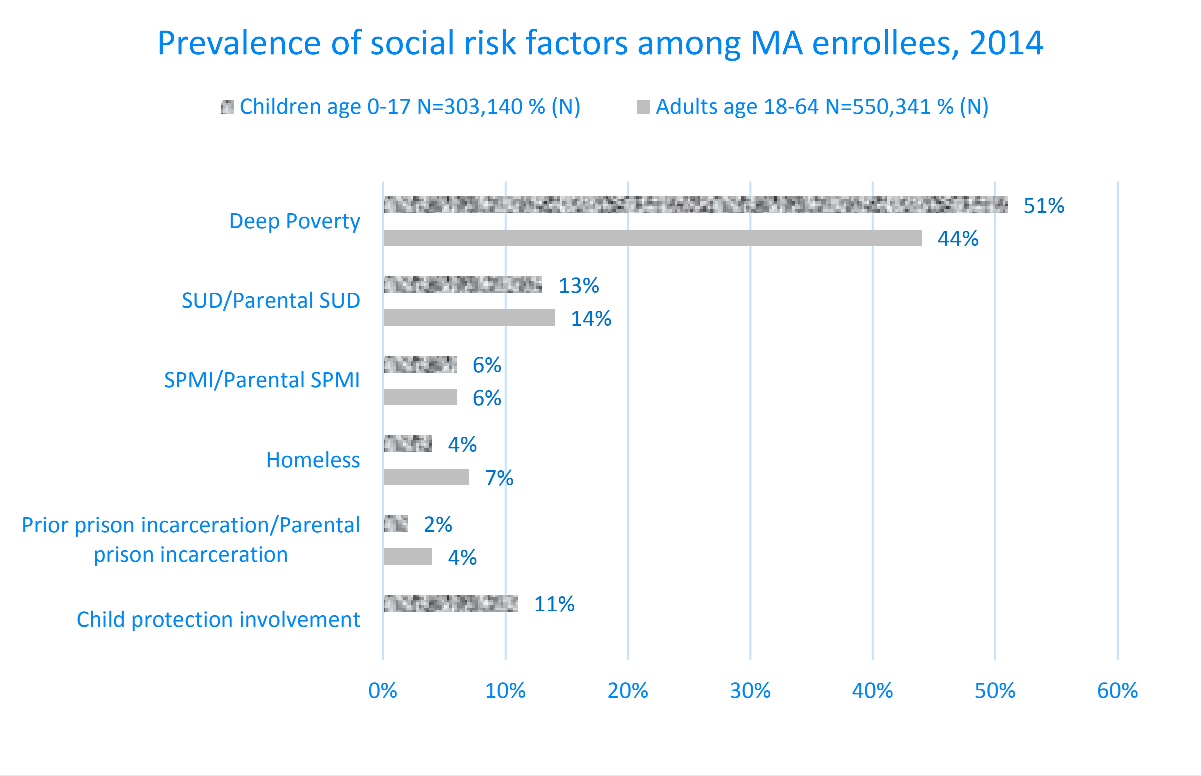
Step three reviewed interventions which could be implemented in a medical or other Medicaid provider setting, in a social service setting, or in any program or policy area. The settings were defined in this broad way in acknowledgement that the best intervention may be found at any place on the Institute of Medicine's conceptual framework (e.g. upstream or downstream). Of course, the research team looked specifically for interventions which could be implemented in a medical setting or through a Medicaid payment adjustment to ensure an effective such intervention was not missed, if the evidence existed for such an intervention. However, the research team was open to the possibility that the best way to improve some health disparities might be through a non-medical or non- behavioral service (e.g. through a social service), and if so, we would focus our recommendations on those interventions.

IV. Which MA enrollees experience the greatest health disparities

This chapter describes the findings of an in-depth analysis into the health disparities experienced by many Medical Assistance enrollees. It begins by describing the prevalence of a half dozen social risk factors, and why we chose to focus on these risk factors. We briefly describe the methodology, and then devote the rest of this chapter to describing the disparate health outcomes of people with these risk factors. Due to data limitations, all descriptions of MA enrollees in this report are limited to people age 0-64, and exclude dual enrollees.

Prevalence of Social risk factors among MA enrollees

Social risk factors are common among children and adults enrolled in Minnesota's Medicaid program. The data in this report are compiled from existing enrollment, medical claims, or other DHS data. Please keep in mind that this report only includes children who had a parent also enrolled in MA, as we relied on parental data to provide insight into the child's environment and social risk. In 2014 there were approximately 400,000 children on MA for at least one month, excluding those also enrolled in another health insurance. In this first year of implementing the MNsure online enrollment system, we were able to link 75 percent of these children with their parents who were also enrolled. In future analyses, the link will be more sophisticated and we will be able to match more children to parents. Results are shown in the chart below and are described next.



Individual and family resources

Most DHS programs focus on increasing the access poor individuals and families have to financial and other necessities such as income, food, housing, and medical care. Cash and food assistance, housing supports, and other programs try to directly address these problems with access to resources. Although this is not their primary intent, they address the social determinants of health 'upstream', before a lack of access has negative health consequences. Other programs such as Medical Assistance try to reduce the negative impact that a lack of financial resources has on people's health downstream, *after* the negative consequences manifest themselves as acute or chronic illness.

DHS tries to address risk factors like deep poverty and homelessness both upstream *and* downstream, and the DHS research and analytic team included the problems with accessing resources as important social risk factors for both children and adults. One of the things we are hoping to do in this report is to more clearly see associations between these upstream social service needs and the downstream costs in medical care.

Deep poverty. As shown in the chart above, nearly half of individuals and families on MA live in deep poverty, meaning that they have annual income less than half of the poverty level. In 2014, this means that their income was below $10,000 for a family of three, and below $6,000 for an individual. In measuring this, the research team included not only income (as is common for this indicator), but also included food support benefits, as this can be an important financial resource for people on MA.

Homelessness. Seven percent of adult and four percent of child enrollees were coded as being homeless sometime during 2014. They were considered homeless if they checked the 'check if homeless' box on an enrollment application in 2014. The research team does not know how people interpreted this question, and people may vary in their interpretations of this question. We also coded people as homeless if the address they gave was a known homeless shelter. Combined, both of these methods are likely to underestimate the rate of homelessness.

Individual and family functioning

Medicaid programs fund treatment for behavioral health conditions such as substance use disorder (SUD) and serious and persistent mental illness (SPMI). Medicaid also funds prevention and early intervention efforts such as screening for risky substance use, and mobile mental health services for people in crisis. Because of the serious impact behavioral health conditions can have on people's lives, and Medicaid's role in preventing and addressing these conditions, we also consider these to be social risk factors relevant to this project.

Many children develop behavioral health conditions, especially in their teens. However, it is the *parents'* substance use disorder or SPMI which we consider to be their social risk factor. We are thus conceptualizing the parent's behavioral health risks as putting children at risk for health problems. In addition, we include children's own SUD or SPMI as poor health outcomes. The research team includes adults' own behavioral health conditions as both social risk factors *and* as poor health outcomes, though for the purposes of this analysis we only include them in one of these roles at a time (depending on our research question).

Substance Use Disorder. Fourteen percent of adult enrollees had a substance use disorder, and 13 percent of children had a parent with this condition. We pulled this information from the diagnosis fields on Medicaid claim forms for the 18 months ending in 2014. This is likely an underestimate of the prevalence of this condition as studies consistently show a delay in diagnosis.

Serious and Persistent Mental Illness (SPMI). Six percent of adult MA enrollees have a SPMI, and six percent of child enrollees have at least one parent with an SPMI. We chose a very narrow definition of SPMI for this project. To meet the criteria for this, they had to have Schizo-affective Disorder, Borderline Personality Disorder, Major Depression Disorder or Bipolar disorder. This also had to have received a high level of mental health care, often inpatient or residential treatment. We initially used a lower threshold of either one of these diagnoses or the high level of utilization, but found that over 20% of adult enrollees met this criteria, and we wanted a narrower definition of those with more severe mental illness.

Child protection involvement. DHS oversees child protective services (CPS) in Minnesota. In work that the research team has done with DHS' Child Safety and Permanency division in the past, we found that CPS involvement is highly correlated with parental SUD, parental serious mental illness (defined differently than SPMI), homelessness and other risk factors measured in this report. We think that this risk factor overlaps with many of these other risk factors in addition to things unique to child maltreatment. Eleven percent of children in the MA sample had some involvement with child protection systems in 2014. A child would have this indicator if they were the subject of a Family Investigation, a Family Assessment, or they had been receiving post-assessment/investigation services to address risk or safety issues in 2014. This is the only social risk factor we focused on that is unique to children. Please see an earlier report[6] for a more thorough description of the social risk factors experienced by children enrolled in Medicaid and other DHS programs.

Past prison incarceration. People who have been in prison have high rates of mental illness (Skeem, Montoya, & Manchak, 2017) and the post-release mortality rates of this population, especially those associated with opioid overdose, makes this a relevant risk factor for the Medicaid program (Binswanger, Blatchford, Mueller, & Stern, 2013). Four percent of adult MA enrollees have been in prison in Minnesota. Two percent of children lived with a parent in 2014 who had been in prison. To create this indicator, we matched a Department of Corrections public dataset that included name and date of birth, with MA enrollee data using conservative methods so as to prevent false positive matches. While past prison incarceration is a social risk factor for adults, past prison incarceration of a *parent* is the social risk factor for children.

Demographic risk factors

Race/ethnicity is an important social risk factor. Being from a diverse racial or ethnic community is associated with poorer access to resources and to worse health outcomes. Federal protections against discrimination prevent us from funding programs exclusively for people of particular racial groups. Instead, we investigate whether any racial/ethnic groups have significant health disparities, and if so, look into whether available, evidence-based interventions are appropriate for these groups. When there is a lack of evidence in the literature, we rely on stakeholder interviews for this information.

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[6] DHS-7079-ENG

What is a social risk factor in the context of a Minnesota Medicaid population?

Research on the social determinants of health serves as a foundation for this report. However, that research generally uses a population-wide focus, where people living in poverty or those with low incomes (often defined as less than 200% of the poverty level) are found to be at higher risk of poor health outcomes than are people with higher incomes.

For the Minnesota Medicaid population, however, almost all enrollees (97% of adults and 98% of children) have an income below 200% FPL and most (75% of adults and 86% of children) have income at or below the poverty line (100% FPL). Poverty and low income are thus the rule, not the exception, and they are therefore not useful indicators for identifying Medicaid enrollees most at risk. Because of this, we chose to use an indicator of *deep poverty* (< 50% FPL), since about half of MA enrollees (52% of adults and 54% of children) have income that is less than half the poverty level. Unstable housing is also an important risk factor in the literature. Homelessness is considered a relatively rare experience in the general research literature. However, homelessness is not a rare experience in the MA population so we chose to use this more serious indicator. This is true for other risk factors too. The research team intentionally chose to focus on very serious social risk factors, so that we could differentiate between the average MA enrollee and those who experience the greatest health disparities.

The research team intentionally chose to focus on very serious social risk factors, so that we could differentiate between the average MA enrollee and those who experience the greatest health disparities.

One of the striking implications of these findings is that they represent a large minority of Minnesotans. The children described in this report represent one in four (24%) children in Minnesota[7]. So, when we see that half of children in our sample are in families with income less than half the poverty level, or that 13% have a parent with a substance use disorder, this raises serious concerns about their health and well-being, and the developmental opportunities for a sizeable minority of Minnesota children. Similarly, adults in this report represent one in six (16%) Minnesota adults age 18-64, a smaller but still substantial proportion of Minnesota adults.

About one in six MA enrollees has multiple social risk factors

Most MA enrollees have zero or one of the social risk factors described above. However, 12 percent of women, 17 percent of children, and 21 percent of men enrolled in MA have at least two risk factors. To get a better sense of what this looks like, the chart below displays the prevalence of social risk factors for people

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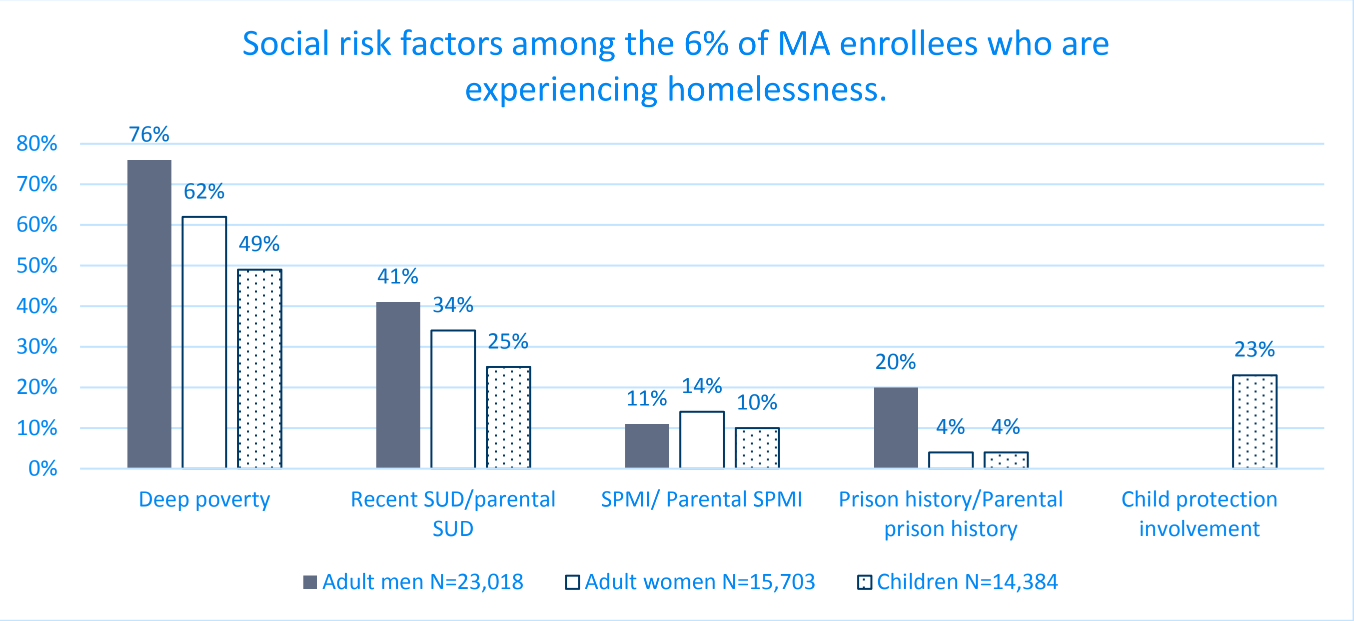
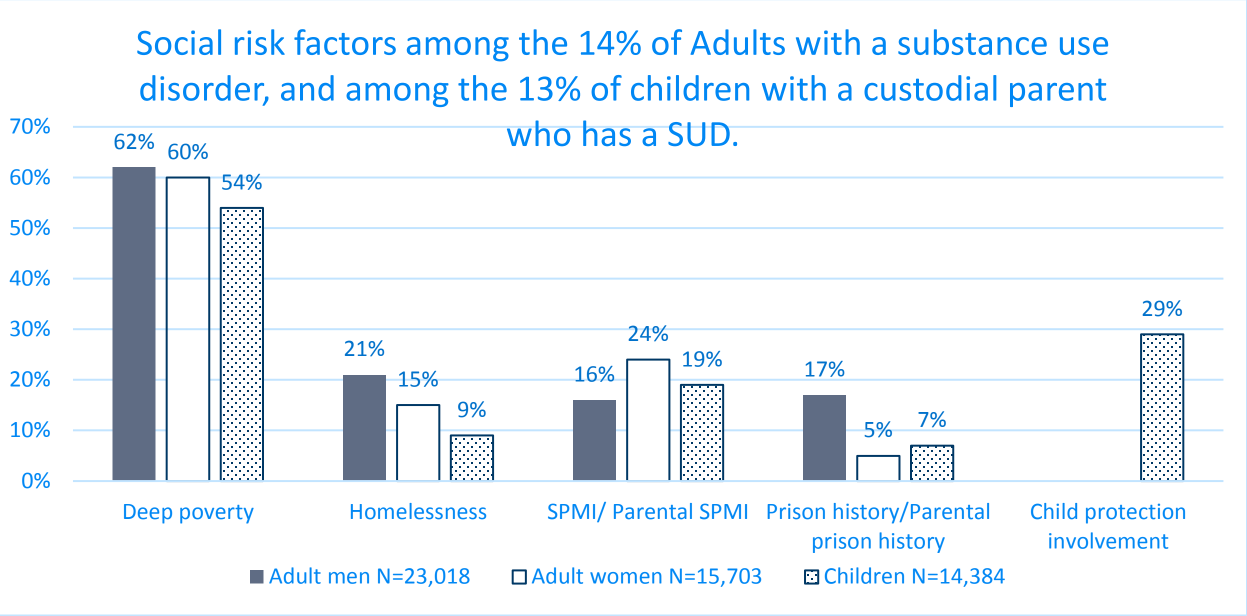
[7] About one in three children in Minnesota was enrolled in MA in 2014. However, only children whose parents were also enrolled were included in analyses in this report.

The 550,341 adults age 18-64 who are not dually enrolled but are covered by MA in 2014 represent 16% (one in six) of Minnesota adults that age[7]. There were 405,539, children age 0-17 enrolled in MA during 2014; 32% of all Minnesota children. This analysis includes only the 303,140 children who have at least one parent who is also covered by MA, and who we matched in that year. These 303,140 children represent 24% of all children in Minnesota.

experiencing homelessness. The multiple risks is most noticeable among adult male enrollees: three-quarters of this population have income less than half of the poverty level, 40% had a diagnosis of substance use disorder in the past 18 months, 20% have been in prison, and 11% have a Serious and Persistent Mental Illness. This overlap in risks will be important in later chapters as we try to identify cost-effective interventions that can improve people's health, and the often multiple, mutually reinforcing, barriers to being healthy.


Social risk factors among the 6% of MA enrollees who are experiencing homelessness.

The chart below shows a similar picture of overlapping social risks, this time among adults who have a substance use disorder. These two charts show the close relationship between homelessness and substance use disorder, which are the risk factors we focus on in this report. The overlap between substance use disorder and Serious and Persistent Mental Illness is also notable in the chart below, especially for women.


Social risk factors among the 14% of Adults with a substance use disorder, and among the 13% of children with a custodial parent who has a SUD.

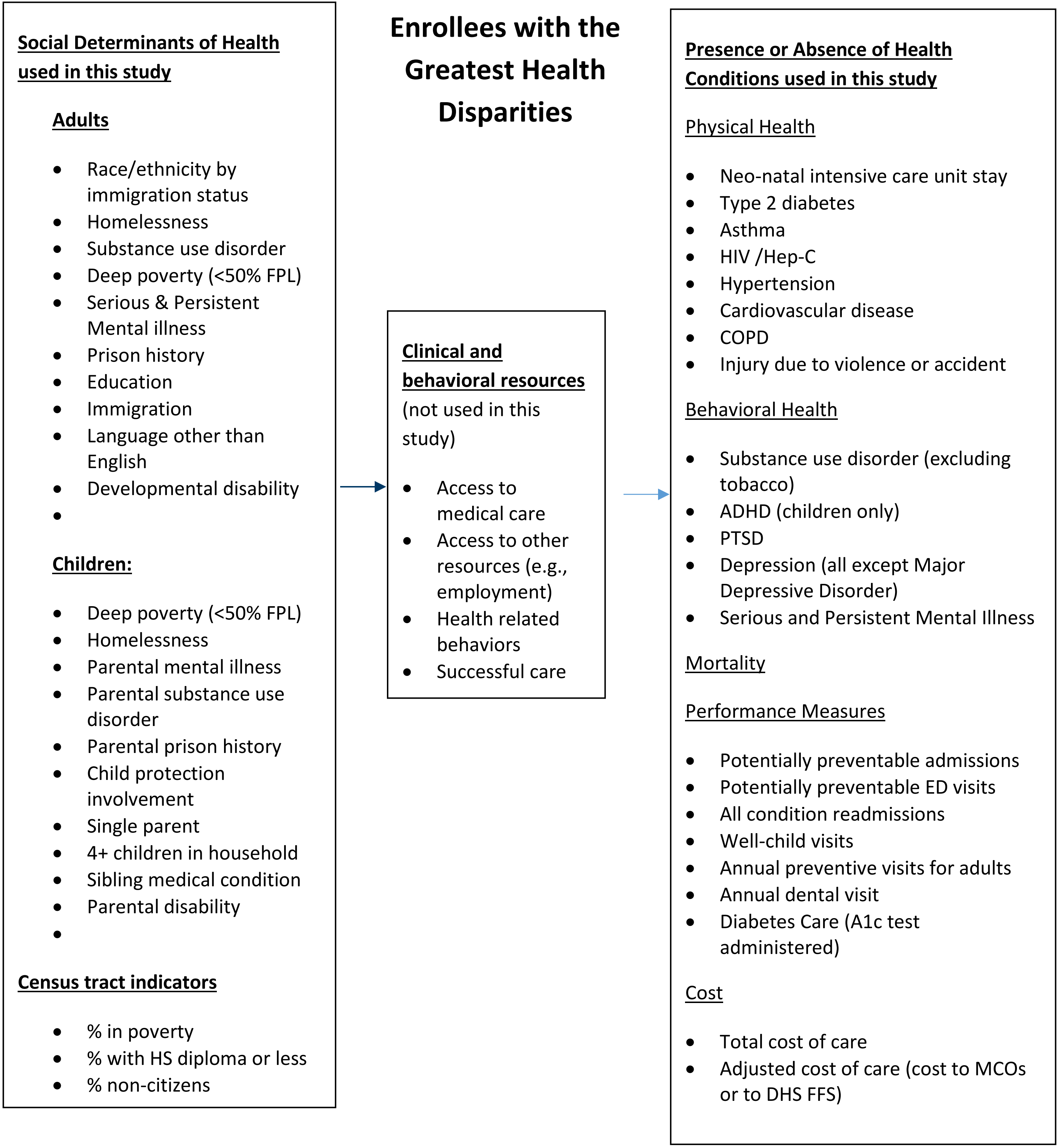
Nearly half (44%) of MA enrollees had none of the social risk factors described here. However, this does not mean that half of the MA population is at low risk for poor health outcomes; in fact we know from the social determinants of health literature that Medicaid enrollees *are* at higher risk than are other populations (National Academies of Sciences, Engineering, and Medicine, 2016). It simply means that they are at lower risk than are other Minnesotans who rely on MA for their health insurance.

Methodology

Extensive data was required for this analysis, and the complex extraction of data, the development of social risk factor indicators, and the development of the cost indicators was conducted by multiple analytic staff in DHS' Healthcare Research and Quality division. This began with a dataset of 2013-2014 Medicaid enrollee data. It included social risk data, medical diagnosis and utilization, cost data, geographic data and demographic information. We included just over 853,000 enrollees age 0-64 who were not dually enrolled, and who had at least one month of enrollment in 2014. To be included, children had to have at least one parent who was also enrolled (in order to have sufficient social risk data). Data sources included enrollment data, medical claims, and other DHS administrative data such as food support benefits and child protection involvement. We also utilized past incarceration data which was available in a public dataset provided by the Minnesota Department of Corrections.

JEN and Associates, HMA's subcontractor, cleaned and refined the dataset, and created the health outcome indicators (described below). HMA conducted extensive analysis on the dataset from JEN. This included both simple prevalence of each poor health outcome (displayed in this report as bar graphs) and multivariate regression analyses to help us better understand the relationship between social risk factors and health. We refer to the multivariate regression analyses as 'adjusted analyses' as they are controlled for/adjusted for demographics, geography, and other social risk factors. The prevalence indicators provide a view of the whole person, without any statistical adjustments for other risk factors. Adjusted analyses show the unique statistical contribution of each social risk factor to a person's health, controlling for other social risk factors. The full model for the adjusted analyses is shown in the chart below. Many indicators in the left hand box are considered social risk factors by other researchers. We chose to focus only on indicators that the Department can directly impact (upstream or downstream).

Identifying Medicaid Enrollees with the Greatest Health Disparities



Social Determinants of Health used in this study

Adults

- Race/ethnicity by immigration status
- Homelessness
- Substance use disorder
- Deep poverty (<50% FPL)
- Serious & Persistent Mental illness
- Prison history
- Education
- Immigration
- Language other than English
- Developmental disability
-

Children:

- Deep poverty (<50% FPL)
- Homelessness
- Parental mental illness
- Parental substance use disorder
- Parental prison history
- Child protection involvement
- Single parent
- 4+ children in household
- Sibling medical condition
- Parental disability
-

Census tract indicators

- % in poverty
- % with HS diploma or less
- % non-citizens

Clinical and behavioral resources (not used in this study)

- Access to medical care
- Access to other resources (e.g., employment)
- Health related behaviors
- Successful care

Presence or Absence of Health Conditions used in this study

Physical Health

- Neo-natal intensive care unit stay
- Type 2 diabetes
- Asthma
- HIV /Hep-C
- Hypertension
- Cardiovascular disease
- COPD
- Injury due to violence or accident

Behavioral Health

- Substance use disorder (excluding tobacco)
- ADHD (children only)
- PTSD
- Depression (all except Major Depressive Disorder)
- Serious and Persistent Mental Illness

Mortality

Performance Measures

- Potentially preventable admissions
- Potentially preventable ED visits
- All condition readmissions
- Well-child visits
- Annual preventive visits for adults
- Annual dental visit
- Diabetes Care (A1c test administered)

Cost

- Total cost of care
- Adjusted cost of care (cost to MCOs or to DHS FFS)

Health outcomes

The research team chose a variety of indicators of poor health that we thought might be sensitive to the social determinants of health. They are shown in the right hand box of the chart above. These included health care utilization measures (e.g. Annual preventive care visit), physical health conditions (e.g. asthma), and mortality in a 2.5 year time period. We included a variety of behavioral health conditions (e.g. PTSD) as health outcomes, even though SUD and SPMI are also included as risk factors. Of course, these were never included as a risk factor (a predictor) and a health outcome (an outcome) in the same analysis.

Cost outcomes

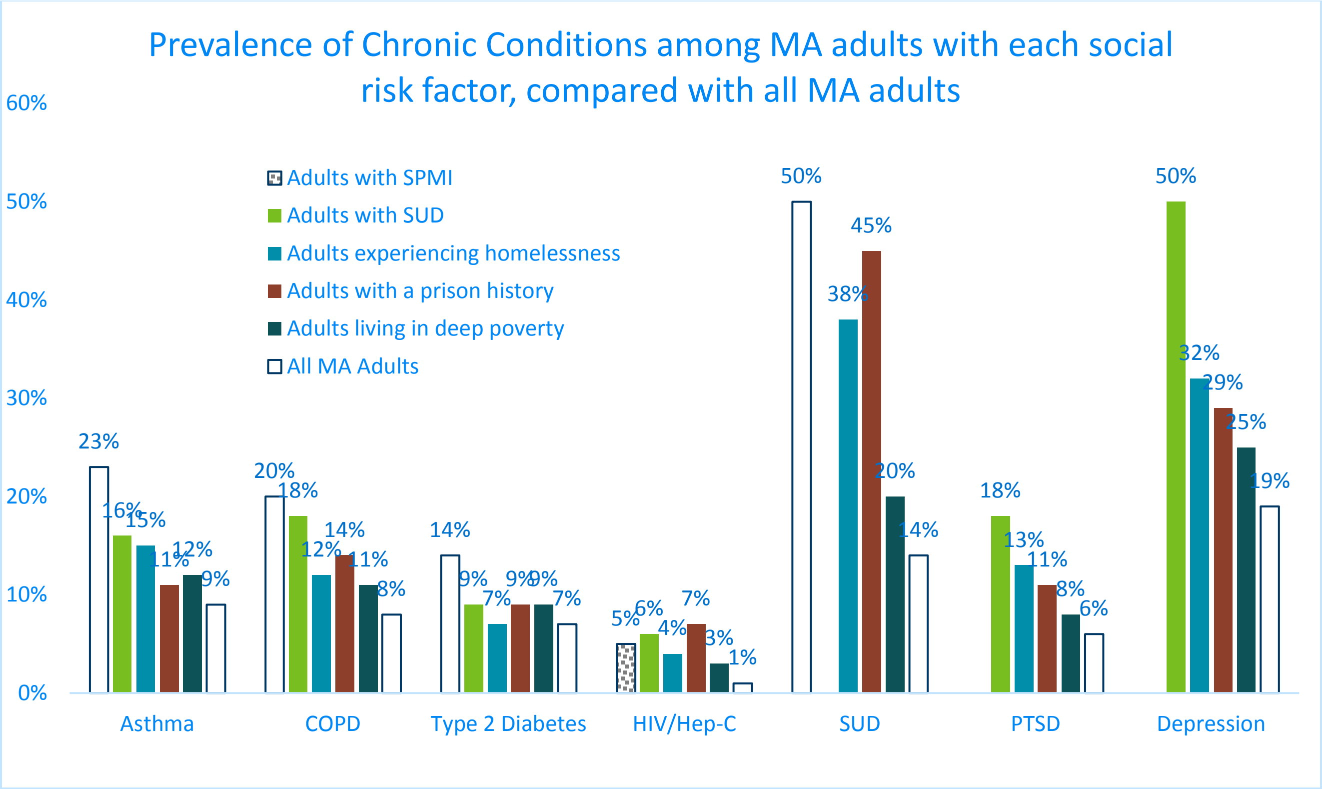
The right hand box of the above chart also shows a few indicators of per-person MA health care reimbursements. We conducted analyses on these to understand the relationship between social risk factors and per-person reimbursements for medical care. In this report, we refer to these fee for service and managed care reimbursements as *costs*. The cost analyses in this chapter include most health care services; however, they exclude services such as dental care, long-term care, and case management services, which primary care is not generally expected to impact. They exclude TPL reimbursements as dual eligible are excluded from all analyses in this report.

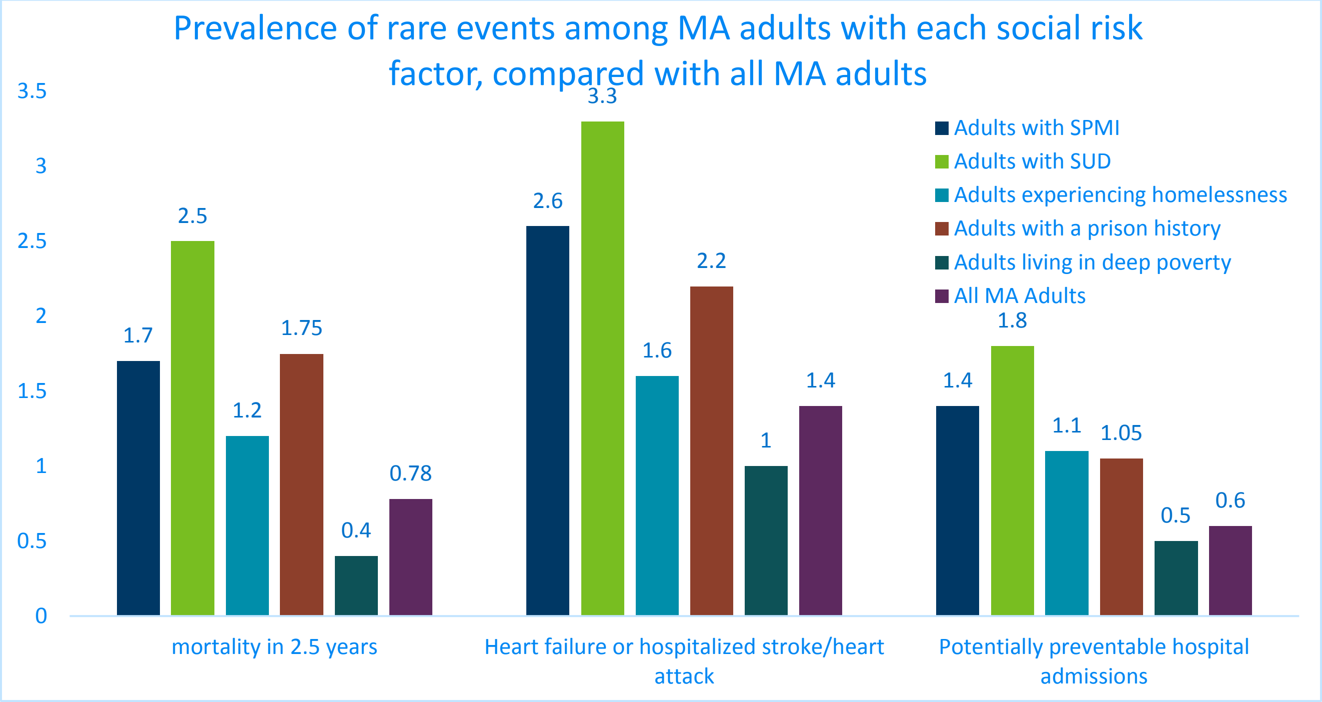
The chart above shows the predictors such as demographics, geography, and social risk factors that were controlled for, for all the adjusted analyses. In addition, the cost analyses also included indicators of each person's medical complexity (using Johns Hopkins' Adjusted Diagnostic Groups), which were also controlled for. Medical conditions are generally the best predictors of health care costs, which is why this was added to the cost models. We hope that these cost models will help us identify opportunities for cost-savings.

Findings: Are these social risk factors associated with poor health outcomes among Minnesota Medicaid enrollees?

Adults with SPMI, SUD, those experiencing homelessness, deep poverty, and those with a prison history have a higher prevalence of chronic conditions than that found in the general adult MA population. The charts below show the prevalence of each condition among these populations. These are simple percentages; they are not adjusted for age, gender, or other factors. These charts best represent the actual health of each population. Later, we will present adjusted analyses, which will better represent the unique contribution of each risk factor to the health outcomes. We will refer back to these charts as we describe the health outcomes among people in various risk groups.

As shown in the bar charts below, people with all five social risk factors had higher rates of poor health outcomes. Each social risk group is described below in more detail, starting with the ones with the worst health outcomes.


Prevalence of Chronic Conditions among MA adults with each social risk factor, compared with all MA adults


Prevalence of rare events among MA adults with each social risk factor, compared with all MA adults

Adults with a Substance Use Disorder (SUD)

How is their health?

Adults with a recently-diagnosed SUD had higher rates of every chronic condition and of negative health outcomes measured. When we looked at the prevalence of health conditions of this population, as compared with those of all MA enrollees, the differences are striking. Of special concern is the 2.5% of this population who died in the 2.5 years that we looked for mortality[8]. However, their mental health conditions and medical conditions were surprisingly prevalent too.

Though not as striking as the prevalence numbers above, when we controlled for demographics (age, gender, race/ethnicity by immigration status), regional geography, and other social risk factors, the health of adults with SUD appears even worse. These results are shown in regression tables in Appendix 1. Controlling for the above factors, and compared with their peers, adults with SUD are:

- 3.5 times as likely to die in the 2.5 years studied
- 4.5 times as likely to have PTSD
- Five times as likely to have depression
- Twice as likely to have hypertension,
- Twice as likely to have heart failure, or a heart attack/heart disease which requires hospitalization

How expensive is their health care?

As we would expect given the high prevalence of medical and mental health conditions among people with SUD, this population also has much higher health care expenditures than most adult MA enrollees. On average, adults with a recent SUD had health care expenditures of $12,798, compared with $4,961 for all adult MA enrollees. These dollar values reflect health care reimbursements (paid by either Fee for Service or by MA managed care organizations) which include only those expected to be impacted by primary care.

We were also interested in whether SUD is associated with higher *health care costs*, controlling for the myriad of medical conditions this population has. Health Management Associates therefore conducted an adjusted analysis where demographics, social risk factors, and medical conditions were controlled for. Even in this analysis, adults with SUD had 28% higher medical costs than other MA enrollees. This additional cost was more than any other social risk group.

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[8] We chose 2.5 years as this was the longest period of time we could capture for this rare event, before we had to stop measurement and begin analysis.

Where is there potential for improvement?

There may be potential to improve the health of this population while at the same time reducing their health care costs. Controlling for other social risk factors, adults with SUD have twice as many preventable ED visits as other MA enrollees, 3.3 times as many ED visits for injuries due to violence or accident, and 3.2 times as many potentially preventable hospitalizations. These indicate that a more effective management of this population's conditions might be able to improve their health and reduce their health care costs.

However, it is not clear that regular preventive care in the doctor's office will be sufficient to improve their health; adults with SUD are already more likely to go for a medical check-up once per year (41% received annual preventive care vs. 32% of those without SUD), and were just as likely as those without SUD to get to the dentist every year (nearly 50% of both groups). This suggests we may need to look elsewhere for solutions to the needs of this population.

How are their children doing?

The children of these MA enrollees have high levels of medical and behavioral conditions, as well as child maltreatment concerns, when compared with their peers whose parents do not have an SUD. Some of these concerns are below, all of which are from the adjusted analyses which control for demographics and other factors.

- Newborns are 47% more likely to require a higher level of medical care in the hospital.
- Children are 49% more likely than their peers to die in the 2.5 years in which this was tracked.
- They are 9% more likely to have asthma than their peers.
- Once they reach the age of 15-17, they are 57% more likely to have a diagnosed SUD themselves.

These kids are 10% less likely to receive the recommended check-ups at the doctor, and 9% less likely to receive an annual dental visit.

There are also indications that parents with SUD have significant parenting difficulties. In an analysis conducted in collaboration with the Child Safety and Permanency division in 2015, we found that parental SUD was far and away the strongest predictor of child protection involvement, more than any other social risk factor.

In fact, kids whose parents had a recent SUD were between 147% and 237% more likely to be involved in child protection (children age 0-3 and age 4-17, respectively). The impact parental SUD has on children makes this risk factor all the more worthy of attention, and suggests that we focus our attention on finding better ways to support families, as well as to help people avoid developing this preventable disorder in the first place.

Adults with Serious and Persistent Mental Illness (SPMI)

How is their health?

The poor health outcomes experienced by adults with SPMI are second only to those experienced by those with SUD. The charts above illustrates the poor health conditions among people with SPMI. One of the most striking findings is that in the 2.5 years it was measured, 1.7% of people with SPMI died, compared with 0.8% of the adult MA population.

Fifty percent of people with an SPMI also have an SUD. The opposite is also common; 20% of people with an SUD have an SPMI. In the bar graphs above, people with SPMI generally have a greater prevalence of chronic conditions than do people with SUD. However, this switches in the adjusted analyses and people with SUD are more likely than those with SPMI to have poor health outcomes. This may indicate that there is something about having both SUD and SPMI which results in especially poor health outcomes. However, when these are statistically unbound in the adjusted analyses, SPMI does not seem to be as tied to poor health as SUD. It may be valuable to investigate the health of people with dual diagnoses.

In adjusted analyses, where SUD and other risk factors are controlled for, people diagnosed with SPMI experience worse health outcomes on most conditions, compared with those without SPMI. Controlling for the above factors, and compared with their peers, adults with SPMI are:

- 50% more likely to have asthma and diabetes
- 20% more likely to have hypertension or COPD

How expensive is their health care?

MA enrollees with SPMI have unusually high medical costs. Their average annual costs were $16,558, compared with the general adult MA population of $4,961.

Where is there potential for improvement?

Similar to the population of people with SUD, people with SPMI have many areas for improving their health. However, unlike those with SUD, their use of health care may already be appropriate, and there may be fewer opportunities to reduce their health care costs. They did not have any more preventable hospitalizations than other MA enrollees, in an adjusted analysis. They had 32% more preventable ED visits, though this was about the same rate as people in other social risk groups. However, they were 246% much more likely to go to the ED for reasons that appeared to be the result of an accident or violence. They are 35% more likely to get an annual check-up and 39% more likely to get to the dentist annually, compared with their MA peers who did not have SPMI.

How are their children doing?

Similar to their parents, children whose parents have SPMI are more likely to have a variety of medical conditions. Children whose parents have a recent diagnosis of SPMI are:

- 22% more likely to need a higher level of nursing care as newborns.
- 84% more likely to be diagnosed with ADHD.
- 22% more likely to have asthma.
- 16% more likely to have an ED visit which appears to be due to an accident or violence.
- 31% more likely to develop SUD at the age of 15-17.

Deep poverty

Adults living at or below 50% of the Federal Poverty Level (FPL)[9] have a mortality rate two times higher than adults who are not as poor, as well as higher rates of every chronic condition measured in this study, in the adjusted analysis. They also have significant preventable high-cost health care utilization, combined with lower than average rates of primary care, which might suggest an opportunity to transfer care to a less costly method.

How is their health?

Poverty is an important social risk factor in the literature, but is difficult to conceptualize in the MA population as it describes most MA recipients. The distribution is below:

- 53% of adult enrollees have income less than half of the poverty level (<= 50% FPL)
- 22% of adult enrollees have income between 51-100 % FPL
- 25% of adult enrollees have income greater than 100% FPL (almost all of whom have income less than 200% FPL)

MA enrollees whose income is between half of the poverty level and the poverty level exhibit a similar, though less strong, prevalence of chronic conditions, than do those living in deep poverty. The bar graphs at the beginning of this section don't show those in deep poverty as having especially poor health because the comparison group is people who are similar, and also at high risk.

The adjusted analyses show a very different picture of the risk experienced by those in deep poverty. For those analyses, we included all three income groups above, plus a group of 88,000 people whose income data was not sufficient to do the analysis and is therefore missing. The people in deep poverty, and the people living between 50% and 100% of poverty are compared to people with slightly higher income. These analyses show a very clear picture of people in poverty having much worse health outcomes than those who have low income but who do not meet the federal definition of being poor. Adjusted for demographic, geographic, and social risk factors, and compared to enrollees whose income is above poverty, those with lower income levels had the following:

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[9] In 2014, 50 percent of the Federal Poverty Limit (FPL) was $5,835 per year for a single person and $9,895 per year for three, (a single parent with two children). See links: for 2014: https://aspe.hhs.gov/2014-poverty-guidelines; and, for 2017: https://aspe.hhs.gov/poverty-guidelines

Income level	Deep poverty (50% FPL)	Poverty (50-100% FPL)	Low income (101% + FPL) *
Mortality in 2.5 years	Two times more likely	64% more likely	Comparison group
Lung or laryngeal cancer	44% more likely	27% more likely	Comparison group
HIV/Hep-C	43% more likely	No difference	Comparison group
Heart failure, or heart attack / heart disease which requires a hospitalization	32% more likely	26% more likely	Comparison group

How expensive is their health care?

Enrollees living in deep poverty have higher average health care costs than those with higher incomes ($6,590 for deep poverty, $4,452 for poverty, and $3,226 for low income people). These differences are not as dramatic as they are for SUD and SPMI, which include (often expensive) behavioral health treatment. In adjusted analysis of health care costs, which control for medical conditions, those living in deep poverty are 5.4% more expensive than those with low incomes. There was no difference between those in poverty and those with low income.

Where is there potential for improvement?

In adjusted analyses, enrollees living in deep poverty and those living between 50% and 100% of poverty are much more likely to receive Emergency Department visits which appear to be preventable (41% more likely and 52% more likely respectively), compared with people with low income. Similarly, they were more likely to have potentially preventable hospital stays (those in deep poverty were 23% more likely and those in poverty were 30% more likely). Both of these algorithms are designed to identify people whose ED and hospital stays could have been prevented with better primary care. People living in deep poverty are 12% less likely to receive preventive medical care and 7% less likely to receive dental care than recipients with low income, so there may be an opportunity to improve their health by helping them to access primary care and prevent more serious conditions which require more expensive care later on.

How are their children doing?

Children living in deep poverty have a mortality rate that is two times higher than those with income above poverty. Those with income between 50% and 100% of poverty are 184% more likely to die in the 2.5 years this was studied. Children living in deep poverty are 10% more likely to have PTSD than those with income above the poverty level. Children in both poverty groups were less likely than those with income above poverty to receive regular preventive medical (13-15% less likely) or dental care (18-22% less likely).

Homelessness

Compared with adults who were not homeless, MA enrollees experiencing homelessness in the past year have a higher prevalence of asthma, hypertension, COPD, depression, PTSD, and SUD, with higher rates of preventable ED visits and hospitalizations. Controlling for demographic, medical and social conditions, however, adults who are homeless are *less* expensive to Medicaid than those who are not homeless, possibly because their use of health care is low, compared with equally ill people who are not homeless. Children experiencing homelessness are more likely to have asthma, to have an injury due to accident or violence, and are the least likely of any group to receive recommended care and dental care.

How is their health?

People experiencing homelessness have higher rates of all chronic conditions in the bar chart at the beginning of this section compared with the average MA enrollee. They have especially high rates of SUD and SPMI, which may underlie their homelessness, as well as make it more difficult to access housing. In the adjusted analysis, compared with people who were not homeless, people experiencing homelessness were:

- 30% more likely to have HIV or Hep-C
- 21% more likely to have asthma
- 16% more likely to have COPD

How expensive is their health care?

People experiencing homelessness have average health care expenses of $7,305, compared with the average MA enrollee of $4,961. However, when their other social risk factors and medical conditions are controlled for, they are 5% less expensive than housed people. Given the prevalence of behavioral health and medical conditions among the homeless population, it is possible that they are not receiving the level of care that they need.

Where is there potential for improvement?

People experiencing homelessness were 52% more likely to have an ED visit due to an accident or violence. They were also 65% more likely to have a preventable ED visit, and 17% more likely to have a potentially preventable hospitalization. They are 11% more likely to have a preventive medical care visit, but 19% less likely to receive dental care (less than any other social risk group).

How are their children doing?

Children experiencing homelessness are

- 13% more likely to have asthma
- 14% more likely to be seen in an ED for an injury due to accident or violence

They are also the least likely of any group to receive recommended health and dental care:

- 23% less likely to receive recommended health care

- 34% less likely to receive an annual dental visit

History of prison incarceration

Adults who have been incarcerated in a Minnesota prison were more likely than others to have health conditions such as COPD, depression, PTSD, and SUD, and are more likely to have a preventable ED visit.

How is their health?

Enrollees who have been in prison appear to be less healthy in the bar graphs than they do in the adjusted analyses where other risk factors are controlled for. Prison history alone might not be the most powerful social risk factor (compared to the others reviewed in this report) without the other risk factors experienced by this population. Their very high rates of SUD (45%), homelessness (25%), deep poverty (69%), and the combination of these risk factors may be at least part of what is driving their poor health outcomes.

Nevertheless, in adjusted analyses where social risk and demographics are controlled for, adults who have been incarcerated in a Minnesota prison were:

- Twice as likely to have HIV/Hep-C
- 38% more likely to have PTSD

Their rates of SUD (45%) and HIV/Hep-C (7%) are especially concerning and may be worth special attention. Research staff at the Department of Corrections report that 90% of people in Minnesota prisons have an SUD. It may be worth looking into this subpopulation of people who have been in prison and have a SUD.

People with a prison history were 14% less likely to die in the 2.5 years this was measured. This is in direct contradiction with research on high mortality rates in this population, especially mortality rates right after they have been released. It is unknown why our findings are contradictory, though it is possible that our data is a poor reflection of mortality in this population as people are not eligible for MA until after they have been released, and it can take time to become enrolled. Thus, people may die due to overdose and other reasons before they are enrolled and are thus not in our Medicaid sample. The research team may need to assess whether the measure needs to adjust for this population's enrollment pattern.

How expensive is their health care?

Annual health care costs paid by MA or managed care organizations were $7,424 compared with the average MA enrollee of $4,961. In adjusted analyses, which controlled for conditions such as SUD, SPMI and homelessness, their costs were still 3% higher than similar MA enrollees who do not have a prison history. This may indicate that this population has a harder time accessing timely, cost-effective care in the community, compared with people with similar conditions but no prison history. Some SUD and mental health providers exclude justice-involved populations from entering their programs, which could be a barrier which results in higher costs.

Where is there potential for improvement?

Adults who have been in prison were 15% more likely to have an ED visit for an injury due to accident or violence. In addition, they were 32% more likely to have an ED visit that was preventable. However, they were less likely to have preventable hospital stays. Their use of preventive medical and dental care is no different than people who have not been in prison.

How are their children doing?

There are many poor health outcomes for children of formerly incarcerated parents. Of special note is their high level of mortality (0.24% in 2.5 years), PTSD (3.2%), injuries due to accident or violence (6.4%), and especially SUD among 15-17 year-olds (11%).

However, there were no statistically significantly differences in the health outcomes of children with formerly incarcerated parents in the adjusted analyses. Interpreting the odds ratios for children with a formerly incarcerated parent is more problematic than for children with other risk factors as there were so few children in the parental incarceration group (6,580) compared with the group of children without this risk factor (398,959). The unbalanced size of these two groups probably inflates the confidence intervals in these analyses. As a result, we do not want to draw any conclusions about from the adjusted analyses.

Due to the inconclusiveness of the adjusted analyses, we do not know if it is the parental prison history that should be our focus of attention, or if parental SUD or other factors are the problem to focus on. However, the prevalence of mortality, PTSD, injuries to due to accident or violence, and children's own SUD all suggest that these children are exposed to an unusual level of stress and even trauma, and may benefit from mental health or other support.

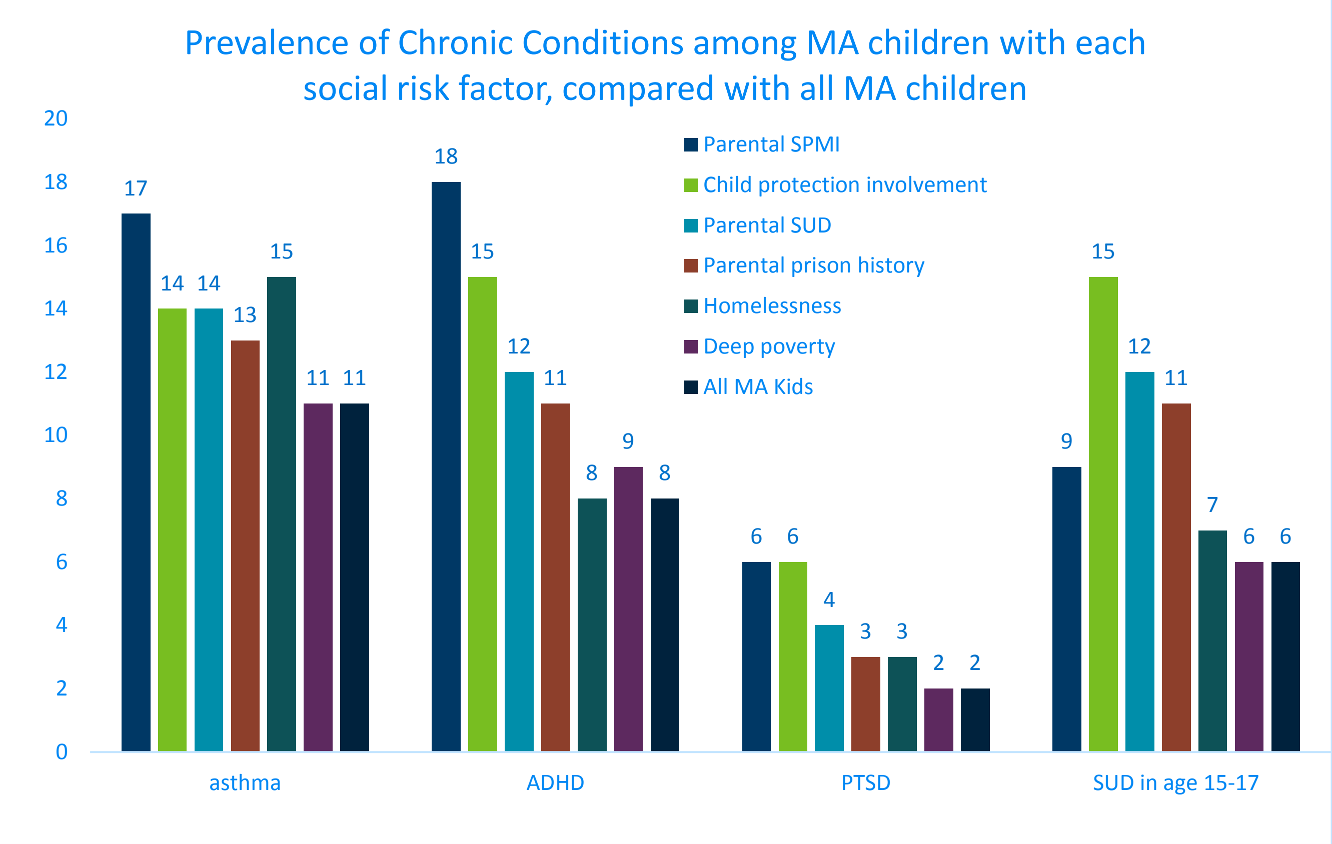
Child social risk factors

This section will focus attention on children with social risk factors. This repeats much of the information above, but focuses on the impact of these stressors on children and on their development. Children with social risk factors have a high prevalence of mortality and chronic behavioral and medical conditions. These are worse for some groups of children than for others, but overall each of the groups are at heightened risk when compared with the average MA enrollee. DHS programs tend to treat the person with the diagnosis (in this case generally adults), and children often do not come to the attention of programs where they could receive support or treatment until they exhibit symptoms themselves. The prevalence of serious conditions among these children suggest that they would benefit from earlier intervention, before their behavior and conditions appear problematic.

Children living in deep poverty do not exhibit worse outcomes in these bar grants when compared with all children on MA, about half of whom have somewhat higher income than they do. However, they are at heightened risk in the adjusted analyses, suggesting that their health is worse than one would expect, given their demographics and other risk factors.

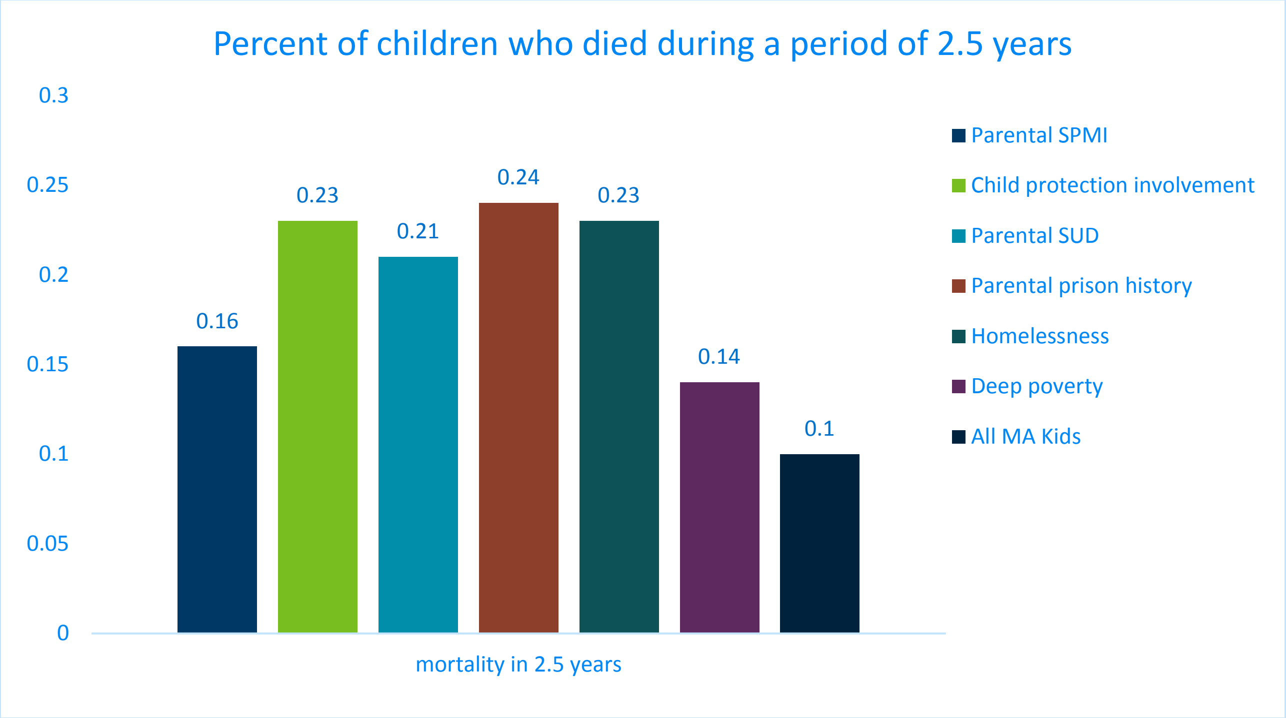
Behavioral and medical conditions

Children with a parent with an SPMI, an SUD, or who have been involved with child protection stand out as having an especially high prevalence of chronic medical and behavioral health conditions. All three of these risk factors tend to be associated with some form of diminished parental functioning, whether it be a lack of emotional responsiveness, a need for the child to take on adult-like responsibilities (thus focusing less on their own development), or child maltreatment. The American Academy of Pediatrics (2014) notes that “when a child experiences strong, frequent or prolonged adversity, such as physical or emotional abuse, chronic neglect, caregiver substance abuse or mental illness…in the absence of adequate adult support” (p. 2), the toxic stress disrupts healthy development and has long-term detrimental effects on the health and well-being of these individuals. The heightened rates of asthma, ADHD, PTSD, and SUD in the children themselves are shown in the first graph below.



Child mortality

The higher prevalence of mortality here is seen for children whose parents have a prison history, are experiencing homelessness, and have been in child protection. These children may be exposed to environments that are less than safe, especially for children. However, children with the other social risk factors also had much higher mortality rates than children in MA overall.



Child protection involvement

Children who have had some involvement with this system were more likely to have ADHD, asthma, PTSD, to develop SUD as a teenager, and to experience death during the study year, than children who did not have some involvement from the system. This social risk factor was the strongest predictor of poor health outcomes among children. This is a more complex indicator, as it is both a risk factor for children's health and well-being and is often the outcome of their parents having many of the risk factors contained within this report.

Racial/Ethnic Background

The literature review conducted in 2015 found substantial evidence of a 'healthy immigrant effect' where people who immigrate to the U.S., Canada, or European countries have better health than people born in the destination country. This effect seems to last for at least ten years, and after that time their health looks similar to that of people born in this country. In Minnesota, because there is a not a large population of people of color, immigrants make up a large proportion of people who self-report their race/ethnicity as Black/African American, Asian, or Hispanic. This is especially true of the MA enrollee population. The U.S. born and immigrant populations that self-identify as Black/African American have different cultural backgrounds, differing exposure to historical trauma, and have different health outcomes. It was not known whether that is also the case for Hispanic, Asian, and White MA recipients. For that reason, the research team reports each race/ethnicity group according to whether they were born in the U.S., or they immigrated. The exception to this was that people who self-identified as American Indian made up a single group as there were only a few hundred immigrants. The table below shows the health outcomes for people in these different groups; dark gray highlights indicate the worst health indicators and light gray indicate the second worst indicators.

Prevalence of mortality, chronic conditions, preventable health care, and annual preventive care, by race/ethnicity and immigration status

Adult MA enrollees, 2014. Highest rates highlighted in dark gray; second highest rates in light gray).

	Enrollees who were born in the U.S.						**Enrollees who immigrated to the U.S.**					
Mortality and Morbidity	American Indians*	Black/African Americans	Whites	Hispanics	Asians	Others/ Unknown	Black/African Americans	Whites	Hispanics	Asians	Other/ Unknown	All MA Enrollees
Mortality over 2.5 years	1.35	0.8	0.95	0.51	0.28	0.49	0.21	0.37	0.31	0.58	0.09	0.78
Type 2 Diabetes	12.37	8.28	6.19	7.6	4.9	5.32	7.66	7.54	10.88	9.71	6.52	6.95
Asthma	12.48	16.47	9.56	9.97	4.55	7.53	4.82	4.61	3.79	4.02	2.86	9.4
HIV/Hep-C	4.52	2.67	1.48	1.66	0.36	0.9	1.09	0.8	0.72	1.02	0.96	1.6
Hypertension	7.69	9.6	3.93	5.55	3	3.61	8.03	5.34	6.74	4.5	5.07	5.14
Heart failure, hospitalized heart conditions	2.05	1.96	1.46	0.65	0.57	1.08	0.64	0.96	0.79	1.27	0.59	1.37
COPD	11.91	8.4	10.17	6.72	2.98	6.33	5.1	5.65	3.92	4.46	2.74	8.53
Lung, Laryngeal Cancel	0.25	0.2	0.27	0.07	0.07	0.17	0.1	0.19	0.05	0.18	0.1	0.22
Behavioral Health												
Substance Use Disorder	35.37	20.09	15.64	14.12	4.33	12.34	2.56	3.75	3.97	2.78	2.37	14.42
PTSD	10.54	8.64	5.62	6.06	2.41	3.58	6.31	6.76	3.09	6.05	2.51	5.9
Depression	30.27	20.58	22.4	19.23	7.53	15.33	6.78	12.36	10.32	9.65	5.39	19.22
SPMI	7.36	7.09	6.19	4.77	2.94	3.68	2.73	4.47	1.59	5.48	1.38	5.55
Costly Utilization												
Injury due to accident, violence	10.45	7	6.02	6.57	2.26	4.85	3.16	2.3	2.1	1.58	2.14	5.59
Preventable hospitalization	1.09	1.02	0.6	0.5	0.23	0.51	0.31	0.31	0.27	0.42	0.2	0.6
Preventive Care												
Annual preventive care (higher is better)	35.02	35.93	33.8	31.4	24.09	29.82	34.49	30.81	40.43	25.39	35.12	33.23
Average Age	35.1	35.0	38.7	31.2	31.3	37.6	35.0	38.7	36.5	38.8	36.0	37.2
Total enrollee population **	23,464	66,093	296,992	16,907	15,466	47,973	34,925	7,007	8,187	20,971	12,356	550,341

* All American Indians were included in this column.

** Some health outcome are only partially populated, so the percentages are often based on smaller groups of people.

Results of this analysis are consistent with the academic literature in finding a very strong healthy immigrant effect. Though the pattern was not always consistent, poor health outcomes were experienced most commonly for people who self-reported their race/ethnicity as American Indian. U.S.-born African Americans had much better outcomes than did American Indian. However, they had the second worst prevalence of poor health outcomes for MA enrollees in general.

American Indians

The dark gray shading in the table above shows the dramatic health disparities of American Indians. American Indians have dramatically worse mortality (over 1% died in the 2.5 years measured), a much higher rate of chronic conditions (often several percentage points higher than the next highest group), and more high-cost potentially preventable health care than any other group.

The chronic conditions we chose to measure are sensitive to the enrollees' age, with chronic conditions being more normative in older populations. The average age of each adult enrollee group is therefore included at the bottom of the table for reference. American Indian adult enrollees are a little younger than the average MA enrollee (35 vs 37 years of age), so we would expect them to have fewer chronic conditions, not more.

When we look at the prevalence of social risk factors, we notice that people with American Indian heritage also had a lot more *social* risk factors than other ethnic groups. An important practical question for DHS is therefore this: If this population's social risk factors were adequately addressed, would their health disparities go away?

To find this out, we look to the adjusted analyses which control for age as well as other demographics, geography, and other social risk factors. In this type of analysis where we include each ethnic group, we have to choose one reference group to compare them to. We compared all racial/ethnic groups to U.S.-born Whites (who make up 54% of adult MA enrollees) as choosing a large group is an important requirement for this statistical technique. However, this is a problematic comparison group as U.S.-born Whites had the third worst health outcomes of the 11 groups. As a result, if we had used a comparison group that more closely mirrored the average MA enrollee, the outcomes of American Indians would have looked significantly worse. However, even in these adjusted analyses, compared with U.S.-born Whites (who did not have particularly good outcomes), American Indians were:

- 1.5 times more likely to have diabetes
- 87% more likely to have HIV or Hep-C
- 36% more likely to have hypertension
- 33% more likely to have heart failure or a hospitalization for a heart condition
- 100% more likely to have an SUD
- 11% more likely to have PTSD
- 16% more likely to have an injury due to accident or violence
- 53% more likely to have a preventable ED visit and 26% more likely to have a preventable hospitalization

The adjusted analyses suggest that if the social risk factors of American Indians were addressed, their health disparities would be a lot less dramatic, but would not go away. They are experiencing health disparities for a variety of reasons, some of which we could not measure with our existing administrative data. This population received the same level of preventive health care as other MA enrollees, so improving access to primary care providers may not be the best solution.

The adjusted analyses suggest that if the social risk factors of American Indians were addressed, their health disparities would be a lot less dramatic, but would not go away.

In adjusted models, American Indian children are also more likely to have chronic conditions (compared with U.S.-born White children). They were:

- 24% more likely to have asthma
- 129% more likely to have SUD at the age of 15-17
- 39% more likely to have PTSD
- Newborns are 56% more likely to need a higher level of care

U.S.-born African Americans

U.S.-born African Americans also experience striking health disparities. They had the highest prevalence of asthma, hypertension, and heart failure/hospitalized heart problems of any group, and they had the second or third highest rates of mortality, HIV/Hep-C, COPD, lung/laryngeal cancer, SUD, PTSD, Depression, and SPMI. U.S.-born African Americans are younger than the average adult MA enrollee (35 vs. 37 years of age), so we would again expect them to have fewer chronic conditions.

We again looked at adjusted analyses to find out if these disparities would be reduced if the higher rates of social risk factors in this population were addressed. In adjusted analyses where we controlled for age and other demographics, geography, and social risk factors, adults who self-reported that they are Black/African American on the enrollment form were still:

- 56% more likely to have Type 2 Diabetes
- 39% more likely to have asthma
- 80% more likely to have hypertension
- 32% more likely to have heart failure or a hospitalization for a heart condition
- 68% more likely to have a preventable ED visit
- 30% more likely to have a preventable hospitalization

Similar to American Indian enrollees, U.S.-born African American enrollees' health disparities may be reduced if their social risks were addressed, but they would not be eliminated. This population was 21% more likely to have an annual preventive medical visit than U.S.-born White enrollees. The solution to these disparities again might not be found in medical clinics.

U.S.-born African American children were also more likely to have some conditions in the adjusted analyses. They were:

- 74% more likely to have asthma (and babies age 0-1 were 57% more likely to have asthma)
- 8% more likely to have an injury due to accident or violence

Like adults, they were more likely to have received the recommended preventive medical care (5% more likely than U.S.-born Whites).

U.S.-born Whites

As mentioned earlier, U.S.-born Whites are the group with the third worst health disparities. They have the highest rates for lung/laryngeal cancer of any group, and have the second or third worst rates for mortality (nearly 1% over 2.5 years), heart failure or hospitalized heart conditions, COPD, SUD, Depression, SPMI, and preventable hospitalizations. They are slightly older than the average MA enrollee (39 vs. 37), which might contribute to their greater level of chronic conditions.

For the adjusted analyses, the research team had to choose a different comparison group than U.S.-born Whites, as they are the population of interest. In order to investigate the health outcomes of this population in an adjusted analysis, we created a comparison group made up of everyone except the three groups with the greatest health disparities. This is unusual and done only for this very specific purpose. In this analysis, American Indians maintain the worst health of the three groups. U.S.-born African Americans and U.S.-born Whites have about the same number of chronic conditions where they are worse than the comparison group (about six of ten health outcomes), though these tend to be different conditions for the two groups. We again come to the conclusion that there are important factors contributing to the poor health of U.S.-born Whites, other than social risk factors.

The research team was unsure of whether or not to include U.S.-born Whites as a group whose poor outcomes were in need of further investigation. Their outcomes are about the same as U.S.-born African Americans in the adjusted analyses, but are much better than the outcomes of African Americans in the simple prevalence table above. U.S.-born Whites also make up a substantial proportion of all adult MA enrollees. The purpose of this report is to identify the enrollees at *highest* risk, and to prioritize our limited staff time and funds on a small number of groups. As a result, the research team has decided to include only American Indians and U.S.-born African Americans as the ethnicity/natality groups for further investigation.

Discussion

This chapter described our finding that all six social risk factors are associated with poor health outcomes. In addition, American Indians and U.S.-born African Americans' outcomes were poor on a consistent basis, so as we identify interventions that are effective at addressing the social risk factors, we will look into whether these interventions are appropriate in serving these two racial/ethnic groups.

The next chapter reviews and recommends interventions that could be effective at helping people with substance use disorder.

V. Interventions for improving the health of people with Substance Use Disorder

About one in ten Minnesotans has a diagnosed Substance Use Disorder (SUD). These disorders have wide-ranging negative effects on a person's health and ability to function in their workplace and community. This chapter reviews the prevalence of these conditions, identifies some underutilized interventions that might improve people's access to and use of services, and offers some ways that DHS might move forward with reducing the prevalence of SUD and improving the outcomes of folks with this disorder.

How common is a substance use disorder (SUD)?

In 2014, 24% of the Minnesota population age 12 and older reported engaging in 'binge drinking'; a type of risky behavior which can lead to alcohol use disorder[10] (SAMHSA, Center for Behavioral Health Statistics, National Survey on Drug Use and Health 2013b). Further, 286,000 Minnesotans (6% of the population this age) met criteria for having alcohol abuse or dependence.

In 2014, 403,000 Minnesotans over the age of 12 (9% of the population) used an illicit drug in the past 30 days, and 107,000 (2% of the population) met criteria for having illicit drug dependence or abuse) (SAMHSA, Center for Behavioral Health Statistics, National Survey on Drug Use and Health 2013b).

Medicaid participants have higher rates of substance-related conditions. A 2010 survey of Minnesotans commissioned by DHS found that while binge drinking is slightly less common among Medicaid enrollees (16% vs. 18% of the population), use of pain relievers and opiates in the past year was more common (5% vs. 2.5%), as was use of methamphetamines (0.9% vs. 0.3%). A combined indicator of alcohol or drug use disorder is somewhat more prevalent among Medicaid enrolled adults than the general adult population of Minnesotans (12% vs. 10%).

DHS tracks the percentage of Medicaid participants with SUD by counting the number of people who had an SUD diagnosis on a medical claim. In 2014, 79,000 adult enrollees age 18-64 had an SUD diagnosis.[11] This is 14%

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[10] Binge drinking is defined as drinking five or more drinks for men or four or more for females on the same occasion on at least one day in the past 30 days.

[11] The definition was not of substance use disorder, but of alcohol abuse or dependency, because the data was taken from claims for services which were provided in 2014. The DSM4 and ICD-9 diagnosis codes were therefore used. DHS' Alcohol and Drug Abuse Division provided the diagnoses used to construct this variable. They include alcohol dependency syndrome (303.X) and drug dependence (304.X). It also includes non-dependent abuse of drugs (305.X except for tobacco use disorder 305.1). This diagnosis suggests that the parent is not dependent on the substance, but there is some problem associated with their use. A few medical diagnoses were also included. They indicated that there has at least historically been a significant abuse of chemicals. These include alcohol or drug induced mental disorders (291.X or 292.X), alcoholic gastritis (535.3) or acute alcoholic hepatitis (571.1).

of the population. This method for identifying people with SUD is the basis of all analyses on Medicaid enrollees with an SUD.[12]

SUD is not equally prevalent across cultural communities in Minnesota. Among Medicaid adult enrollees, it is more prevalent among African American non-immigrants (20%) and much more prevalent among American Indians (35%) than the Medicaid population in general (14%). Opiate use disorder is a crisis within Minnesota, but its impact on American Indian communities is especially devastating. For example, for babies born in 2016 who were enrolled in Medicaid, Asian Pacific Islander babies had the lowest rate of Neonatal Abstinence Syndrome (0.4%), and Whites had the second highest rate with 1.3% of all babies[13]. In contrast, 14.2% of all American Indian babies had NAS (meaning they were born with clinical signs of drugs or alcohol in their system). Their withdrawal symptoms will need medical attention, they may develop chronic conditions as a result of the early exposure, and their parent(s) will need extra parenting support. Over all SUD substances, American Indians accounted for 9.2% of all Minnesota SUD treatment admissions in 2016, despite American Indians comprising only 1.1% of the Minnesota population[14]. Treatment rates were highest among American Indians for alcohol (2.3%), heroin (2.1% of the American Indian population), methamphetamines (2%), and 0.8% for other opiates. Similarly, mortality due to drug overdose is relatively uncommon in Minnesota (compared with other states), but racial disparities are huge. While 1% of White mortality had this type of etiology in 2015, this was true among 2% of Blacks, and 5.3% of American Indians.[15] Given the acute situation in American Indian communities, this review will give special attention to whether evidence-based practices are effective not only with general populations but specifically with American Indian populations.

What health problems are associated with SUD?

> "Adult Medicaid enrollees with SUD experience far and away the worst health of people with any of the social risk factors measured in this study."

As described in section one, adult Medicaid enrollees with SUD experience far and away the worst health of people with any of the social risk factors measured in this study. They are more likely to have every chronic and emergent condition that we measured, and often they are twice and three times as likely to have these conditions, compared with people without SUD, controlling for demographics, geography, and all other social risk factors. Of particular concern is their three-year mortality rate of 2.5% (compared to the rate of 0.5% for all adults enrolled in Medicaid).

The health outcomes of children age 0-17 were also investigated. Children whose parents had SUD were 49% more likely to die in the next three years, were 23% more likely to have PTSD, and were 57% more likely to

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[12] Differing data collection methods and DHS' focus on working-age adults are likely responsible for the difference between DHS' finding that 14% of enrollees have a SUD diagnosis on a claim, while the U of M survey of Minnesotans found 12% of these enrollees' responses indicate that they met criteria for a diagnosis.

[13] SOURCE: Claims data, 2016 Minnesota Health Care Programs

[14] Source: Minnesota Department of Human Services, ADAD, DAANES (9/19/2016)

[15] SOURCE: Minnesota Death Certificates – Minnesota Department of Health Injury and Violence Prevention Section.

develop SUD between the ages of 15 and 17 than were children whose parents did not have SUD. Babies whose parents had SUD were more likely to need higher levels of medical care at birth.

Health care costs

Potential cost savings of SUD prevention and early intervention are substantial, as adults with SUD have dramatically higher health care costs than do other adults on Medicaid. Their average costs in 2014 were $12,798 compared with an average of $4,961 for all Medicaid adults age 18-64. Of course, this includes SUD treatment costs themselves. Much of this difference is likely in hospitalizations as they are 2.2 times more likely to experience a potentially preventable hospitalization, almost twice as likely to have a preventable ED visit. Injuries due to violence or accident are 2.5 times higher than for folks without SUD, which indicate further preventable health care costs.

How does substance use disorder impact a person's health?

Substance use disorders are associated with many negative outcomes. This section focuses on the health outcomes of alcohol, the most commonly used drug in the U.S. The health risks for abuse and dependence on other drugs varies dramatically by drug, and will therefore not be described here.

Drinking too much alcohol, over time or on a single occasion, affects multiple systems in the human body (National Institute on Alcohol Abuse and Alcoholism). It interferes with communication pathways in the brain, moods, behaviors, and makes it more difficult to think. It also impacts the heart, and can result in high blood pressure, stroke, and arrhythmias. It specifically harms the liver and the pancreas. It also weakens the immune system, making people more susceptible to disease. Even drinking a lot on a single occasion will reduce the body's ability to fight infections for the next 24 hours. Luckily, many health problems diminish or even reverse once a person stops using alcohol.

The Centers for Disease Control (CDC) describes a wide variety of health risks associated with excessive alcohol use (defined as binge drinking, heavy driving, or any drinking by pregnant women or people younger than age 21) (CDC: Fact Sheets – Alcohol Use and Your Health). The CDC reports that excessive drinking is responsible for 10% of deaths among adults age 20-64 years. Its short-term health risks include alcohol poisoning, risky sexual behaviors, and adverse pregnancy outcomes. The list of long-term health risks is much longer, and includes high blood pressure, heart disease, stroke, liver disease, various cancers, learning and memory problems, mental health problems, and of course alcohol dependence and alcoholism.

Excessive alcohol use also impacts people's health through injuries and violence including from motor vehicle crashes, falls, drownings and burns. In Minnesota, 88 people died in motor vehicle crashes where alcohol was involved in 2014 (24% of all such fatalities). An additional 2,040 people were injured in alcohol-related vehicle crashes (Minnesota Dept. of Public Safety). Alcohol is also a long-term health risk involving violence such as homicide, suicide, sexual assault, and intimate partner violence (CDC: Fact Sheets – Alcohol Use and Your Health).

What interventions can improve the health of populations with SUD?

Medical Settings

Minnesota Management and Budget summarize the history of substance use treatment well. "Until recently, substance use disorder was often thought of as a morale failing or character flaw to be solved by individuals, families, places of worship, or the criminal justice system, instead of a chronic illness. Historically, professional help for those experiencing substance use was limited. As a result, the development of prevention and treatment practices evolved in isolation from mainstream healthcare and an alternative system of care formed—guided by peers who were also in recovery" (MMB 2017, p. 20). Substance use disorder prevalence, treatment success and recovery are all correlated to social determinants of health.

The incorporation of care for individuals with SUD in the medical system parallels a greater effort (represented partly by this work) to redefine the roles of clinical providers in supporting a more holistic view of health. For these and other reasons, work remains to be done to appropriately integrate medical providers and substance use providers.

Medical providers play a key role in the treatment of substance use disorder. While some health care clinics and other medical settings have experts in substance use and substance use treatment available during office hours or available for consultation, most clinics do not have ready access to this type of resource. Medicaid pays for medical providers to screen and follow-up with people who exhibit risky alcohol and drug use, but these services are sparsely provided. The following are some of McAlpine's recommendations related to a particular screening and intervention service which can be provided in medical settings.

DHS contracted with Associate Professor Donna McAlpine from the University of Minnesota's School of Public Health to identify interventions which can help improve the health of people with SUD. Her report[16] identifies three sectors where care to Medicaid enrollees with could be improved: substance use treatment settings, medical settings, and in the integration between these two important systems. Interventions will be described in sections according to their setting.

Vendor Recommendations:

Monitor and Encourage the Use of Screening, Brief Intervention and Referral to Treatment (SBIRT) for Individuals with Problem Drinking that Does Not Meet Dependency

- Assess the current use of SBIRT among Medicaid beneficiaries
- Evaluate whether reimbursement adequately accounts for the cost of implementation and staffing
- Consider piloting a SBIRT intervention in the emergency department
- Educate providers about the use of SBIRT for reducing problem alcohol use

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[16] https://sites.google.com/a/umn.edu/effective-interventions-for-substance-use-report-to-minnesota-department-of-human-services/home/copy-of-final-report

Suggestions for improving care in medical settings

Increase use of SBIRT

SBIRT, which stands for 'Screening, Brief Intervention and Referral to Treatment' is an early intervention for people without a diagnosed substance use disorder, to identify people with risky substance use behaviors, and provide assistance to them to prevent it from developing into a disorder. It is an allowed service under Minnesota's Medicaid program[17] and all enrollees are eligible to receive it. SBIRT has three components:

- A Screening for risky substance use behaviors, using the standardized assessment tools (including the World Health Organization's 'Alcohol Use Disorders Identification Test', or AUDIT, and the Drug Abuse Screening Test, DAST).
- For patients who screen positive for risky behavior, clinic staff can do up to five 'Brief Interventions' in the format of a brief conversation, where staff provide feedback, motivation, and advice. This is effective for people who screen positive, but do not actually have diagnosed SUD.
- The 'Referral to Treatment' is for patients who need additional services, such as those from a Licensed Alcohol and Drug Counselor (LADC). This makes sense for patients who screen positive for risky behavior, who seem likely to have a SUD.

SBIRT effectiveness related to risky alcohol use

SBIRT has been found to reduce alcohol consumption in general, to increase the percentage of people who drink at a safe level, and the effect appears to persist 6-12 months after the intervention. In a review of the literature, the Minnesota Management and Budget found that for every dollar spent on SBIRT, there was $2.90 in taxpayer benefits in the form of either health care or criminal justice system savings, or in increased tax revenues. If societal benefits are also included, the total benefit rises dramatically to $20 for each $1 spent.

The U.S. Preventive Services Task Force is an independent panel of national prevention experts who review peer-reviewed research evidence and recommend evidence-based practices. They found SBIRT to be most effective in short duration (e.g. up to 15 minutes) and occurring multiple times. Given the relatively high prevalence of people who binge drank at least 5 times in the past 30 days (5.5% of adult Minnesota Medicaid recipients in 2010, McAlpine 2017), and the very serious health consequences if this risky behavior develops into alcohol use disorder, there is definitely a place for this intervention. Forty-one percent of people with an SUD had a preventive care visit with a primary care provider in 2014. This is not impressive but is much higher than among people without an SUD (32%). It means that people with an SUD may have also been accessing primary care before their substance use became a disorder, and there was the potential for some of these cases to have been caught and prevented from developing into a disorder. There is also some evidence that SBIRT may reduce high-cost health care utilization such as long inpatient stays (Paltzes, 2017).

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[17] https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNMattersArticles/Downloads/SE1013.pdf

Fewer studies have been done on use of SBIRT in an Emergency Department (ED), and their findings are not consistent. However, one meta-analysis (a compilation of analyses) indicated that it was more difficult to implement due to transient staff and busy workloads. Some adjustment would probably have to be made to make SBIRT work in an ED setting.

SBIRT and risky opiate or methamphetamine use

There is very little research literature which tests the effectiveness of screening or screening and a brief intervention for drug use in a primary care setting. Of the few studies that have been done, findings are mixed, and it is therefore unknown whether or not this is effective.

SBIRT utilization in Minnesota's Medicaid program

The SBIRT procedure codes are seldom billed to Medicaid (fee for service or managed care organizations). In 2016, providers billed DHS for providing this service to only 159 people, who on average received two units of service. However, we do not know how often SBIRT or a similar screening is provided without a claim being submitted for it.

Expand role of clinic para-professionals to administer SBIRT

One challenge for providers with offering SBIRT is having a staff person who is qualified to administer the service, and who is available when a clinician requests that a patient receive this service.

In Minnesota, a qualified non-licensed professional can conduct the screening as long as they are supervised by a licensed practitioner. The reimbursement rate should therefore be sufficient for a variety of practitioners, under the oversight of the doctor or other licensed practitioner. A nurse could do this work. Another type of professional that may have the capacity to get the training necessary and take on this work is a Community Health Worker (CHW). CHWs are already in many clinics helping patients to understand their medications and other aspects of their care plans. CHWs also have the cultural competency to work with people in the community. However, the current scope of practice for CHWs under DHS' state plan only includes education, so they cannot do any of the three parts of SBIRT as a reimbursable Medicaid service.

The second part of SBIRT, the 'brief intervention' has been shown to be effective with patients with risky alcohol behaviors (those who do not have substance use disorder). CHWs might be able to provide this service if given training in skills such as motivational interviewing, along with a protocol dictating the various processes involved in the intervention, and ongoing support from people experienced in this type of intervention.

Similarly, for patients who probably *do* have an SUD, the patient should be provided with a 'warm' hand-off to a Licensed Alcohol and Drug Counselor (the 'Referral to Treatment' in SBIRT). The DSM-5's new categorization of substance use disorder into mild, moderate, and severe SUD makes people on even the lowest rung of this continuum eligible for SUD services. Patients referred for SUD treatment should also have a conversation with their physician about medication assisted treatment (see later section for more on this). These services may be especially beneficial if the screening, the warm hand-off, and care coordination between the substance use provider and the doctor is conducted by the same clinic staff person. If the CHW or another para-professional worker does this work, protocols could be put in place to ensure consistency in service.

Integration and training between medical and SUD providers

McAlpine recommends increasing the use of the Screening, Brief Intervention, and Referral and Treatment (SBIRT) in medical clinics and emergency departments (EDs). She also recommends increasing integration of medical systems with SUD providers. In past attempts to increase use of SBIRT, medical providers weren't sure who to refer their patients to for SUD treatment, and they didn't know if the referral was followed up on. This was seen as a major reason that SBIRT, when implemented in clinics, was not sustained.

DHS is considering ways to increase the use of SBIRT and integrate medical and SUD providers. It could be beneficial to conduct an investigation into how many health care clinics and systems actually provide SBIRT or other types of screening for risky alcohol use. If there are few clinics that do this, then it might be worthwhile to find out what the barriers to providing this service are, and what processes have been effective at overcoming these barriers for the clinics that are doing this work. The next steps for increasing this screening would depend on what the investigation found. However, DHS staff have proposed some ideas that may support this goal.

One idea is to sponsor SUD-related training for clinicians and para-professionals in medical clinics and emergency departments. DHS could sponsor training and networking for staff in medical settings who are appropriate to conduct the SBIRT services. The trainees might be a CHW with a clinical staff, a nurse, a physician, or another clinician. The *training* would provide information on SUD, and train them in doing all three components of the SBIRT service. The *networking* would provide them with opportunities to meet and develop relationships with SUD providers in their area, or who serve culturally specific populations in their patient caseload. The SUD trainee could provide the following benefits to the clinic or ED:

- They would be prepared to conduct the screening and brief intervention of SBIRT, under the direction of a clinician.
- When a patient is deemed eligible for SUD treatment, the trainee would connect them to an SUD provider, with the Referral and Treatment part of SBIRT. They would do a warm hand-off to the SUD provider, and follow-up to make sure the connection was made.
- They would have connections with SUD providers, and as such, they would offer their clinic/ED a direct link to SUD providers. They might become the 'go-to' person for SUD resources, giving clinicians a quicker way to access the expertise of SUD providers when necessary.
- When a patient receives treatment from an SUD provider, that provider could stay in contact with the trainee to help make follow-up medical appointments and coordinate care.

A few other ideas that could encourage the use of SBIRT in medical practices are the following:

- DHS should continue to encourage models that allow CHWs and other staff to do SBIRT and similar screening and brief intervention work. This can include integrated medical-SUD-mental health models such as Behavioral Health Homes, and other methods of bundling payment structures.
- Medical providers could be encouraged to input SBIRT results into the patient's medical record, and use this to monitor and reinforce progress, as this was found to be effective in successful SBIRT implementations (Williams et al, 2011). An Electronic Medical Record reminder to conduct a brief intervention whenever a person screens positive for risky behavior can dramatically increase the number of brief interventions (Williams et al, 2011).

- Best practices for collaborations between medical and SUD providers could be described and disseminated.
- DHS could hire a vendor to do the SUD and SBIRT training, convene the training for medical providers, and find ways for medical and SUD providers to network and build the relationships necessary to serve the patients they both serve. Existing courses for medical providers could alternatively be utilized to provide this training. ADAD will be holding stakeholder engagement meetings in 2018 to inform providers on the changes which will be taking place in the SUD services that Medicaid pays for. It might be possible to piggy-back on these meetings to promote medical- SUD provider integration.

Encouraging the use of SBIRT might require extra funding. However, SBIRT's effectiveness in preventing risky behaviors from escalating into substance use disorder and the potential cost-savings for payers suggest this will be worth the money and the effort. The task of integrating these two different types of providers is also well worth the effort, as recommended by SAMSHA (2016). The research is not clear on which SUD-medical integration model is most effective, so this type of project would encourage providers to implement the model that makes the most sense for their organizations.

Create a single screening tool

Medical clinics are being encouraged to screen for more than just risky alcohol and drug use; they are asked to screen for tobacco use, depression, anxiety, intimate partner violence and elderly abuse, and diet and exercise, as well as the myriad medical screenings. Organizations recommending these screenings don't generally do so in collaboration, so each screening is a separate tool and a separate service. DHS could consider consolidation of a few screening tools that might be most important for different groups of Medicaid recipients (e.g. women, men, adolescents, and children), and compiling multiple tools into a single format to make it easier for providers to identify patient concerns in a more efficient way.

Despite casting a wide net in looking for research evidence, McAlpine did not find any studies which evaluated the effectiveness of SBIRT on different cultural groups; minority populations in the existing studies were too small to draw conclusions. Manuel et al (2015) recommend adapting SBIRT to cultural populations, though the effectiveness of such adaptations have yet to be tested. In Minnesota, it would make sense to first adapt the screening tool to American Indians and non-immigrant African Americans, due to the prevalence of SUD in these communities. An adapted SBIRT tool may be especially appropriate in the hands of a CHW who belongs to the same cultural community as the patient.

Promote SBIRT within DHS purchasing strategies

As part of value-based purchasing models, DHS is providing integrated health partnerships with information on the prevalence of SUD in their attributed populations. Use of SBIRT to screen the general population for risky alcohol use might be encouraged as a quality measure for IHPs with a large SUD population, to encourage them to move services and costs upstream, and help them to prevent unnecessary high-cost utilization such as residential treatment for SUD once it has developed, and hospital stays for alcohol-related preventable conditions.

Ongoing efforts to improve care in Medical Clinics

Significant efforts are currently underway to address SUD in medical settings. These are described in this section.

Support current efforts to expand use of Medication Assisted Treatment

McAlpine also offers recommendations related to medication assisted treatment. Given the differences in levels of *effectiveness*, DHS is working on dramatically improving access to MAT for opiate use disorder, while maintaining but not promoting MAT for people with alcohol use disorder. There are no medication assisted treatments that are found to be effective in treating methamphetamines addiction.

Vendor Recommendations:

Monitor and Increase Access to Medication Assisted Therapies for Alcohol Dependence and Opioid Use Disorder

- Measure and track the use of MAT for Medicaid beneficiaries with alcohol or opioid use disorders
- Evaluate the use of psychosocial adjunct therapies used with MAT
- Provide education to providers and the public about the effectiveness of MAT
- Considering reimbursing eligible providers for the cost of the educational requirement to obtain a waiver to prescribe buprenorphine, especially in rural areas.
- Identify providers with high rates of MAT use to act as peer educators and champions for the diffusion of MAT
- Evaluate whether reimbursement fully covers the costs of administering MAT

Medication Assisted Treatment for Opiate Use Disorder

The treatment found to be most effective for Opioid Use Disorder (OUD) is medication assisted treatment. In particular, methadone and buprenorphine are effective in reducing opioid consumption. The biggest difference is that methadone must be administered by an Opioid Treatment Program clinic, while buprenorphine can be prescribed either by an opioid treatment program or by a physician with special DEA certification and filled at a pharmacy. In studies with flexible dosing (the more common practice), these drugs generally appear to be effective in reducing consumption for appropriate populations.

DHS health care and alcohol and drug abuse divisions were early to notice the opioid epidemic, and have worked together for the last few years to prevent new opioid addictions as well as to find creative ways to help people with this substance use disorder to get treatment. The Opioid Prescribing Improvement Program is a comprehensive effort to address inappropriate opioid prescribing among Minnesota health care providers.[18] The following are two more of the initiatives at DHS for increasing access to treatment of OUD.

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[18] https://www.mn.gov/dhs/opwg provides an overview of DHS initiatives to change the prescribing behavior of Minnesota doctors.

- ECHO. Minnesota has very few physicians who are addiction medicine specialists, and prescribers in only 38 of the 87 Minnesota counties are licensed to prescribed buprenorphine (MMB, 2017). Of these, only a third are outside the seven county metro area, and the need is especially acute in tribal areas (Substance Abuse and Mental Health Services Administration, 2017). To address the resulting lack in access, DHS is using a federal grant to fund the Extension for Community Healthcare Outcomes (ECHO) project, to increase the capacity of Minnesota primary care providers to care for patients with Opioid Use Disorder, focusing on medication assisted treatment that is well integrated with behavioral health care. The ECHO project includes video-conferencing where providers can ask questions about de-identified OUD cases, give their input on treatment, and then hear from a multi-disciplinary team of experts on OUD cases. It is designed to support primary care providers who are new to OUD medical management and educate them to become experts over time. The federal grant that funds this education ends in 2019. SAMHSA will be conducting an evaluation of the project. If it is found to be effective, DHS will be looking into ways to support this work financially on an ongoing basis.
- ICHiRP. The Integrated Care for High Risk Pregnancies (ICHiRP) grant program directs half of its funding to support community-based care collaborations coordinating supports and services for pregnant and parenting women who are Medicaid enrollees and have opiate use disorder. Local collaborative improve practices around case-finding, needs assessment, and referral coordination. One of the program's goals is to promote the use of para-professionals to be peer mentors for parenting skills and knowledge, support them in sustaining recovery, and advise, support and open doors to access medical, addiction, and social service resources. The collaborations are specific to geographic areas with high rates of maternal opioid use. Community agencies and organizations in these areas are leading the work.

Medication Assisted Treatment for Alcoholism

McAlpine (2017) finds extensive support for the effectiveness of acamprosate and naltrexone for reducing alcohol consumption in general and for reducing heavy drinking in particular. However, the effectiveness (effect size) of these studies is only moderate. For example, in their meta-analysis of 19 double-blind RCT studies comparing acamprosate with a placebo, Rosner et al (2011) found an average of 11% more days of not using alcohol and a 14% lower risk of consuming any alcohol before the end of the evaluation period. People in both the acamprosate and placebo groups consumed alcohol many days during the studies, and the differences in consumption between the two groups were not large. People taking acamprosate did have a noticeably better chance of reducing their use of alcohol and of abstaining altogether when compared with the placebo group. Studies of naltrexone use have similar findings. However, the moderate effect size is concerning in all of these studies given the significant side effects associated with these medications, especially those related to liver disease or depression.

There is almost no evidence about whether MAT is effective for treating alcohol use disorder in people of different cultural groups. The one randomized control trial of naltrexone in an American Indian population showed that the treatment group had better outcomes than the placebo group (Greenfield and Venner, 2012).

There is a relatively low utilization of MAT among people with alcohol dependence on Minnesota Medicaid programs. Nevertheless, DHS sees MAT as only one option for treatment, and given the evidence, does not deem it appropriate to recommend it for everyone with this condition, or to try to increase utilization rates.

Substance Use Treatment Settings

This section addresses how SUD treatment providers can improve the health of people with SUD.

Suggestions for improving care in substance use treatment settings

Use of evidence-based practices

MMB recently released a cost-benefit analysis of the effectiveness of various substance use disorder interventions[19]. Using surveys and interviews of treatment providers, the authors found providers are not always using evidence-based practices. It is hard to know to what degree this is true as payers do not collect detailed enough procedure code data to know the therapeutic methods practitioners use. There is also no direct oversight of individual SUD practitioners and the practices they use, or their *adherence* to the treatment models they employ.

MMB highlights a few ways payers may get a sense for whether practitioners are not using the best methods. For example, by using existing administrative records data (e.g. reviewing the average duration of treatment or the ratio of group to individual therapy use). Although this type of analysis is easy for DHS to do, it would not be sufficient to determine whether DHS is paying for the services delivered consistent with evidence-based models.

DHS could review providers' use of EBPs and their fidelity to the models using a two-step process. First, DHS could review claims and other administrative data that identify treatment providers that seem to have poor retention, poor engagement, poor treatment outcomes, and other indicators, given the social and medical complexity of the populations they serve. Each year, this might identify a few dozen SUD providers that may benefit from a clinical review. This identification of a few providers would be important given the large number of treatment providers in Minnesota (see graphic below). One person could do the clinical review of these sites, looking both at the models they are using (whether or not they are evidence-based), and the degree of fidelity to these models. The cultural backgrounds of their patients would be taken into consideration, so appropriate cultural adaptations would be considered beneficial if it is consistent with the cultural group's values, traditions and experiences. This clinical review position is not currently funded, and would have funding implications.

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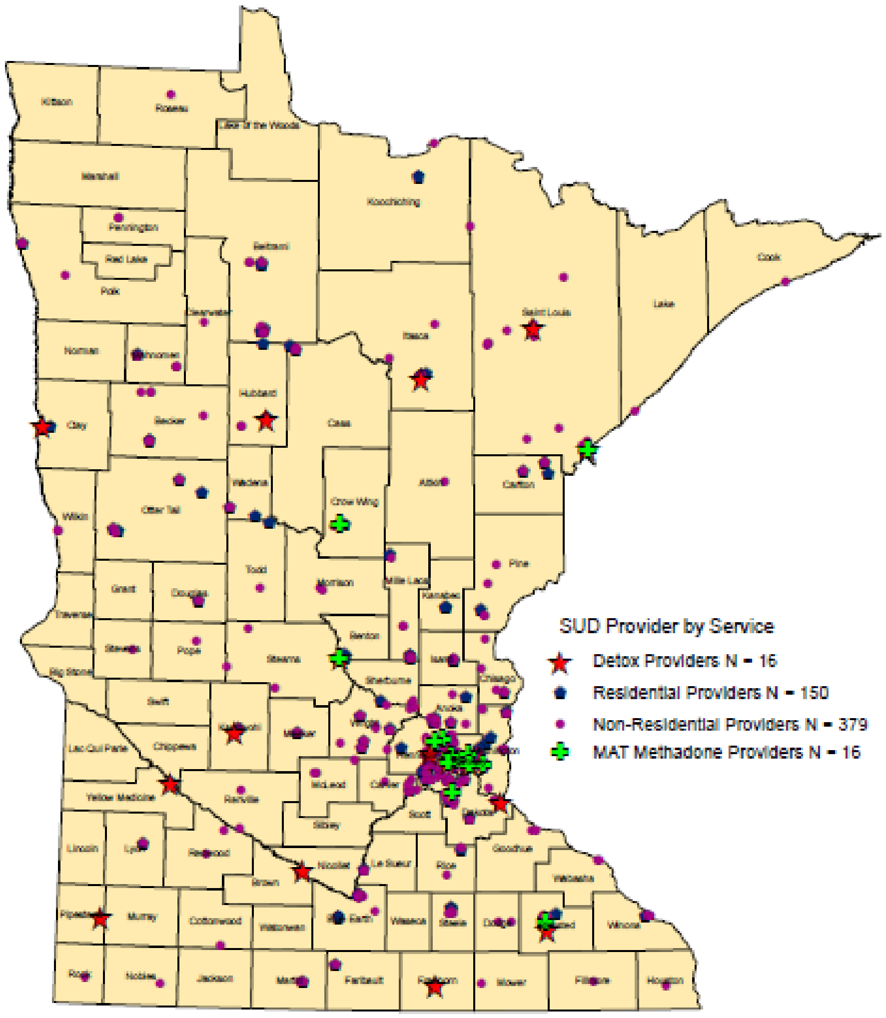
[19] https://mn.gov/mmb/results-first/substance-use-disorder/

Substance Use Disorder Treatment Providers



Source: Minnesota Department of Human Services, BHD (5/30/2018)

Ongoing efforts to improve care

Access to care

An often cited challenge within Minnesota's substance use treatment system has been *access* to care. McAlpine's report highlights access problems and provides recommendations for improving access. She especially focuses on getting care in the time before a person gets into treatment, and after treatment is concluded. This is consistent with DHS' priorities.

Vendor Recommendations:

Improve Connections to Treatment for Persons with Severe Substance Abuse Problems

- Reimburse for services provided to clients after identification and prior to authorization for funding

- Expand the use of peer support services
- Expand and reimburse for after-care services
- Develop performance measures to track engagement with care for persons identified as having a substance use disorder and referred to treatment.

The DHS Alcohol and Drug Abuse Division (ADAD) has spent the last five years actively investigating ways to improve access, developing concrete policy and program proposals to streamline and expand many aspects of SUD treatment in Minnesota. [20] In June 2017, many of these proposals were passed by the MN Legislature and signed by the Governor. DHS is now working to get federal approval to implement the changes as part of the state Medicaid plan. All of the changes described below must be approved by CMS before they can be implemented, and are effective no earlier than July 1, 2018.

Pay for services to support people while they are waiting for payment authorization or for treatment

Currently, individuals with Medicaid or no insurance are required get a 'Rule 25' before they are authorized to receive SUD treatment through public assistance. This pathway provided by the Placing Authority (a County, Tribe, or Prepaid Health Plan) includes a determination of the level, intensity and duration of treatment, and once the assessment is complete, they have the option to authorize treatment. However, this process often means that a person requesting treatment may waits weeks before they receive authorization and get a placement. Current state regulations require this process take no longer than 30 consecutive days. In the meantime, they are not eligible for any SUD treatment. By the time treatment is authorized, and an opening is available, they may have lost motivation for treatment, and the opportunity for change may have been lost.

Pending CMS approval, individuals will now be able to go directly to an SUD provider to get a comprehensive assessment, with the potential for immediately receiving authorization for treatment. Individuals will be able to select the service provider of their choice, as long as they meet the level of care approved and are within the managed care organization provider network requirements. This expedited assessment and treatment placement is expected to dramatically reduce the wait times for people receiving treatment.

This new process is also expected to help address concerns that people are currently not able to access 'aftercare' services. These are services which support people in recovery after, or even before, they have received the main treatment. People may be authorized for more than just acute treatment, such as in the residential treatment or day treatment center. They may be authorized to receive both this type of intensive treatment, but then also weekly appointments with a Licensed Alcohol and Drug Counselor, or an SUD

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[20] As a result of a 2012 legislative requirement to 'develop a model of care to improve the effectiveness and efficiency of Minnesota's current service continuum for chemically dependent individuals', DHS initiated a planning project to envision a SUD model of care, which brought together representatives from state agencies, professional groups representing medical, SUD, and financial workers, counties, and health plans. Findings of this work can be found in their legislative report Minnesota Model of Care for Substance Use Disorder Report (PDF) . In 2015 they conducted listening sessions to get more information on the model of care, and provided policy recommendations in 2016, and a report on recommendations in 2017 https://mn.gov/dhs/assets/2017-01-substance-use-disorder-system-reform-report_tcm1053-275362.pdf.

treatment coordinator. In this way, what was previously thought of as ‘aftercare’ may simply be part of the treatment plan.

Authorize peer support services

There are more than 400 SUD treatment programs in Minnesota. It is also more cost efficient to have providers with different levels of training, all integrated and operating at the top of their licensure.

Pending federal approval, Medicaid will begin paying for peer support services to be provided before, during and after SUD treatment. Peer support recovery para-professionals have a history of SUD, have been in recovery at least a year, and have some training in supporting others struggling with SUD, and helping them to access resources. They have the credibility of having experienced SUD, and are supervised by qualified SUD professionals. Peers share their personal recovery experience, and often engage quickly with individuals to offer reassurance, reduce fears, answer questions, support motivation and convey hope. SUD programs, withdrawal management programs, and Recovery Community Organizations will be the eligible vendors of these services.

Track initiation and engagement in treatment

DHS tracks treatment initiation and engagement every year using a standardized health care measure. Findings from the indicators confirm stakeholders’ concerns about access to treatment. For example, in 2015, the Initiation and Engagement of Alcohol and other Drug Dependence Treatment (IET) indicator showed that of Medicaid beneficiaries age 18 and older with a new episode of alcohol or other drug (AOD) dependence, 30% *initiated* treatment (received treatment within 14 days of diagnosis), and 13% *engaged* in treatment (initiated treatment and had two or more additional services with a diagnosis of AOD within 30 days of the initiation visit). Given the changes in how SUD treatment will be authorized and accessed as a result of the 2017 legislation, DHS expects both of these measures to improve. ADAD will monitor progress overall and both ADAD and Health Care Administration will investigate whether particular care integration models (e.g. Integrated Health Partnerships, Behavioral Health Homes, Certified Community Behavioral Health Clinics, described in the next section) show superior success in patient engagement.

Culturally-based services for American Indians and African Americans

One-third of adult American Indians and one in five adult African Americans enrolled in Medicaid had an SUD in the past 18 months. Finding the best treatments for these groups is thus especially important. McAlpine (2017) looked for evidence-based practices that are effective with both of these populations. However, studies reviewing the efficacy of SUD treatment models seldom have samples from only one racial/cultural group, and sample sizes of American Indians and African Americans in the heterogeneous studies are too small to generalize effectiveness for their group. The literature therefore does not indicate which models are more effective for these populations.

Nevertheless, there is widespread consensus among leaders in these communities that SUD treatment with American Indian or African American patients must help them to understand historical trauma, and the negative self-images, broken relationships, and loss of hope it engenders. Treatment must occur in an environment which feels safe to the patient and supports their healing process. Providers must have credibility with the patients with regard to historical trauma, and need to come from the communities they are serving. While there is a shortage of LADCs in general, there is an even bigger shortage of American Indian and African American LADCs.

Relationships are key to recovery in all cultural groups. Spiritual leaders in the African American community and elders in the American Indian community often make themselves available to support people in recovery, and may be in a unique position to help them recover not only in their substance use but also their sense of pride, belonging, and hope. Peer recovery specialists, if approved by CMS in DHS' state plan, may assist people of any faith to connect with community and spiritual leaders. However, given the historical trauma of American Indians and African Americans, encouraging these relationships may be even more beneficial for them.

DHS has focused attention in recent years on whether the treatment models used by Minnesota providers are appropriate for American Indians and African Americans. Some models (e.g. 12 step models) emphasize the powerlessness of all patients, and encourage patients to rely on spiritual and interpersonal supports. This model appears to work well with people who have traditionally been in a position of power. However, it has been criticized when applied to populations which have traditionally lacked access to power, as the treatment may remind these populations of traumatizing situations they experienced in the past. That being said, 12-step recovery models also have adherents across cultural populations.

DHS has tried to incent SUD providers to adapt treatment models so they meet the needs of particular cultural communities. SUD services currently are paid enhancement rates if the service model was designed for a specific cultural population, with the relevant cultural community involved in the design, if program governance receives significant input from members of the community being served, and if at least 50% of the staff are members of that cultural group. This is an accepted best practice for program design. However, there is no assessment of the actual cultural appropriateness and no outcomes assessment, so it is impossible to know the degree to which the models are truly community-driven and effective with the particular cultural groups.

Given the high mortality rates due to opioid use disorder in the American Indian community, DHS is administering State Targeted Response to the opioid crisis grants (STR grants) across the state. These grants support the work of tribes' initiatives to address the opioid epidemic in their communities. One such project which is being partially funded through the STR grants is the ICHiRP project (described above), which encourages collaboration between various legal and program entities to treat pregnant women with opioid use disorder.

Interventions for integrating substance use and medical providers

McAlpine emphasized the importance of integration of medical and SUD providers. The section below will describe how DHS could potentially improve this integration by improving the comparability of Electronic Health Records (EHRs) used by SUD and medical providers.

Suggestions for improving care by integrating settings

Support SUD Medicaid providers to gain access to EHRs

SUD providers are not allowed to share patient data with medical providers, even if they are in the same health care system, unless they have received the consent of the patient. Sharing data *across* providers is even more difficult for SUD and medical providers serving the same patients, due to incompatible EHRs. The lack of consistent EHR use also makes collecting quality data difficult. A more robust EHR system that allows for collection of meaningful use measures would be a significant step further in assuring the quality of SUD treatment.

Some SUD providers use a ‘home grown’ system of keeping track of patients and services (e.g. a simple spreadsheet) instead of a robust but much more expensive Electronic Health Record (EHR) product. This does not allow for the detail and sophisticated data tracking that is possible with an EHR. In addition, these providers cannot share their data with their patients’ medical providers, as medical providers use EHRs. DHS could work towards identifying ways to support these providers with accessing more robust EHR tools.

Other SUD providers have robust EHR systems, but their EHRs have a small market share and do not interface with other EHR tools. These providers also experience barriers with sharing their patient records with medical providers. Federal Quality Reporting Document Architecture (QRDA) standards provide clear guidance on the expected capacity of EHR systems to interface with other systems. DHS could find ways to encourage these smaller EHR products to adopt QRDA standards. This work would support the sharing and utilization of meaningful use measures, so it is possible that DHS could make a request to access Health Information Technology for Economic and Clinical Health (HI-TECH) funding to facilitate this process.

SUD providers will soon be able to bill for SUD treatment coordination, including integrating care with medical and mental health providers. A robust EHR which is able to interface with other providers’ EHRs will be a critical need if care coordinators are to effectively work with other providers to improve the health of their patients.

Ongoing efforts to improve care by integrating settings

DHS has several initiatives underway for integrating SUD and medical providers. Some of these also integrate mental health providers, another important component in many people’s care. These are described below.

Treatment support

Pending CMS approval, 2017 legislation authorizes DHS to pay for treatment support provided by SUD providers. Individuals with SUD often experience needs in other life areas (e.g. medical, mental health, family, employment, criminal justice, housing, finances), and this type of support could address these issues to improve treatment outcomes. If approved, it could be provided before, after, or during substance use treatment. Because of these needs, DHS will be requesting that CMS approve paying for coordination not just between SUD and medical services, but also to support other needs that patients have to support their ongoing recovery needs. It is anticipated that SUD programs, withdrawal management programs, counties, and LADCs operating outside of treatment centers will be eligible vendors.

Behavioral Health Homes

As of July, 2016, behavioral health home (BHH) services is a service covered by Minnesota’s Medicaid program. BHH services are available for adults with serious mental illness (SMI) or serious and persistent mental illness (SPMI) as well as children with emotional disturbance (ED) or severe emotional disturbance (SED). BHH services are designed to support the integration of medical, mental health, substance use disorder, and community/social supports to support a person in reaching his or her health and wellness goals. As shown earlier in the report, many people with mental illness also have substance use disorder. At a minimum, BHH service providers are expected to address substance use in the following ways: 1) complete a substance use disorder screening within 60 days of intake as part of the health and wellness assessment process, 2) refer people to resources appropriate to their screening results, 3) know processes for referrals related to substance use disorder and ensure follow-through with referrals, 4) demonstrate capacity to integrate a treatment plan for substance use disorder into comprehensive care planning and 5) support people in recovery and resiliency. Currently, there are 26 certified BHH service providers located within 15 different counties in Minnesota. An extensive evaluation project is underway, which will determine if BHH patients have better outcomes and lower costs than people with similar diagnoses who are not receiving BHH services.

Certified Community Behavioral Health Clinics

The Certified Community Behavioral Health Clinic (CCBHC) model offers people with substance use disorder, mental illness, or dual diagnosis a comprehensive, coordinated and integrated model of care. The CCBHCs are integrated SUD and mental health providers serving all ages and coordinate care with primary care clinics, other MH and SUD providers, social service agencies, veteran's administration medical centers and counties. CCBHC care coordinators are responsible for making sure patients receive primary care services, and are expected to monitor patients' health related to diabetes, high blood pressure, BMI, and other physical functions which are often impacted by mental illness, substance use disorder and the psychotropic medications used to treat them. CCBHCs are required to provide medication-assisted therapy for individuals with opioid use disorder. CCBHC is a federal demonstration project available in just 8 states in the country, beginning in July 2017 and ending in June 2019, and is available in 6 certified clinics serving 18 Minnesota counties. As part of the demonstration, 22 federal outcome measures and 8 state-driven impact measures will be analyzed within the Department of Human Services and reported to the federal government to determine the efficacy of the model.

Discussion

DHS' Alcohol and Drug Abuse Division and Health Care Administration have opportunities for identifying risky substance use and intervening before it becomes a disorder, as well as for more efficiently getting treatment for those with SUD. ADAD is working on implementing new processes which can improve access to treatment, as well as getting wrap-around services needed by those with SUD. This work has the potential to improve people's lives, as well as save money in unnecessary ED visits, hospitalizations, and preventing acute and chronic medical conditions resulting from substance use and ineffective treatment. The services described in this chapter are predominantly 'downstream' services which are addressed once there is a problem.

One factor that arises often in the discussion of SUD, is the connection to the criminal justice system. For example, of people who received SUD treatment services in 2016, 19% had been in jail in the past 30 days, and 2% had been in prison in the past 30 days[21]. These numbers have increased substantially in the past few years. The criminal justice system was the most common source of referral, with 30% referred from that system. SUD and drug offenses are similarly having a big impact on the justice system; in fiscal year 2017, 20% of adult

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[21] Primary Source of Referral to SUD Treatment Services for Minnesota Residents and Jail and Prison Incarceration Past 30 Days CY2012 – CY2016. Source: DHS, ADAD, DAANES.

inmates' most serious offense was a drug offense. The Department of Corrections is one of the state's largest providers of SUD treatment, with over 1,000 treatment beds. In SFY16, 1,522 inmates participated in SUD treatment, 75% of whom successfully completed treatment or participated until they were released (MN Department of Corrections, 2017). The timely provision of SUD services for people in all parts of the criminal justice system is one intervention whose effectiveness will be investigated. DHS will be investigating the health of Medicaid enrollees who have been incarcerated, and the next legislative report will include interventions for this population.

The financial and supportive resources available to people in recovery can make a difference in their success. In its review of cost effectiveness of SUD interventions, MMB describes the importance of child care and transportation. The resource that was mentioned repeatedly by SUD subject matter experts as being scarce and critical for SUD recovery, was housing. This was seen as especially important for the first year of recovery. The need for a stable, safe place to live was seen as critical to a person's success in staying sober. However, the need for housing was outside the scope of this chapter. The importance of housing among people with SUD is addressed in the following section on homelessness. In that section, supportive housing is a powerful intervention which can improve a person's ability to reduce their drug and alcohol use.

VI. Interventions for improving the health of people experiencing homelessness

During the 2014 enrollment period, about seven percent of adult Medicaid enrollees reported that they were either homeless or they gave the address of a known shelter as their place of residence. In addition to the seven percent of homeless adults, about four percent of children enrolled in Medicaid were homeless, as reported by the person filling out their enrollment form. In total, this represents over 50,000 homeless Minnesotans enrolled in Medicaid. The size of the homeless population is especially concerning given the physical deprivations, vulnerability, and other challenges described in this chapter that are often inherent in homelessness.

In this chapter, we describe the known negative effects of homelessness on person's health as well as the prevalence and health status of homeless Minnesotans enrolled in Medicaid. We then summarize evidence-based research on effective interventions including promising new models. Finally, we describe ways in which the Minnesota Department of Human Services (DHS) currently supports and could further promote effective models of interventions.

How does homelessness impact a person's health?

Homelessness is associated with poor physical health (e.g. higher rates of asthma and hypertension), as well as poor behavioral health. The poor health outcomes of Minnesota's Medicaid recipients with various social risk factors, including homelessness, are described in-depth in Chapter 4 of this report.

According to **Health Management Associates** – the research firm that conducted this analysis, homeless adults on Minnesota's Medicaid program have much higher rates of asthma, hypertension, Chronic Obstructive Pulmonary Disease (COPD), depression, Serious and Persistent Mental Illness (SPMI), Posttraumatic Stress Disorder (PTSD), Substance Use Disorder (SUD), Human immunodeficiency virus (HIV)/Hepatitis C, and injuries due to violence or accident, when compared with people who were not homeless. Similarly, children experiencing homelessness have higher rates of asthma and injuries. These conditions were measured during the same time period as the homelessness, so they could be caused by or exacerbated by their homelessness. Conversely, the homelessness could be the result of these conditions. These medical and homelessness conditions may mutually reinforce each other.

According to the **National Health Care for the Homeless Council**, homelessness has a direct negative effect on health. The National Health Care for the Homeless Council (2011) summarizes the research on how homelessness impacts health in this way:

> *Living on the street or in crowded homeless shelters is personally stressful and made worse by being exposed to communicable disease (e.g. TB, respiratory illnesses, etc.), violence, malnutrition, and harmful weather exposure (O'Connell, 2004; Singer, 2003; Wrezel, 2009). Hence, common conditions such as high blood pressure, diabetes, and asthma become worse because there is no safe place to store medications or syringes properly. Maintaining a healthy diet is difficult in soup kitchens and shelters as the meals are usually high in salt,*

> *sugars, and starch (making for cheap, filling meals but lacking nutritional content) (Burt et. al., 1999, Davis et.al., 2008). Behavioral health issues such as depression or alcoholism often develop or are made worse in such difficult situations, especially if there is no solution in sight (Johnson & Chamberlain, 2011). Injuries that result from violence or accidents do not heal properly because bathing, keeping bandages clean, and getting proper rest and recuperation isn't possible on the street or in shelters. Minor issues such as cuts or common colds easily develop into large problems such as infections or pneumonia (O'Connell, 2004; Wrezel, 2009).*
>
> *Conditions among people who are homeless are frequently co-occurring, with a complex mix of severe physical, psychiatric, substance use, and social problems. High stress, unhealthy and dangerous environments, and an inability to control food intake often result in visits to emergency rooms and hospitalization which worsens overall health. Thus, it is not surprising that those experiencing homelessness are three to four times more likely to die prematurely than their housed counterparts, and experience an average life expectancy as low as 41 years (Morrison, 2009; Song et.al., 2007).*[10,11]

Homeless community members reported similar experiences in the 2016 **Improve Group community member interviews** commissioned by the Minnesota DHS. According to the Improve Group report, community members described poor health, a lack of health care, and serious physical dangers and deprivations. Violent crime was a major concern in that sample of interviews.

The **2015 Statewide Homeless Study** conducted by Wilder Research Center confirms that violence is a major concern among homeless Minnesotans. This survey of over 3,500 people experiencing homelessness is conducted tri-annually to understand the prevalence, causes, circumstances, and effects of homelessness. The survey found that 19 percent of homeless adults reported being physically or sexually assaulted while they were homeless, and 12 percent reported that the injury or illness required health care. Rates were higher for women. In fact, about half of homeless women reported that they stayed in an abusive relationship because they had nowhere else to live. Among unaccompanied youth, 33 percent have stayed in an abusive situation because they had no other housing options, and 14 have traded sex for necessities such as shelter or food.

Physical deprivations such as lack of sleep, food, and warm shelter were also described in the **Improve Group community interviews** with Minnesotans experiencing poverty, homelessness, or immigration. There are immediate health concerns such as frostbite as well as serious long-term health issues.

> *I don't have housing now. Slept at Salvation housing once, another place once. Been homeless 4-5 months, it's not that short of a time, but I'm still new to it and spin around a lot: trying to find places to sleep, not having enough sleep, or to eat. It takes a lot to survive while homeless, more effort than living in a house. (Female, 18-25 years old)*

Social service providers reported that getting health care is simply not a priority for people experiencing homelessness. Instead, they think 'minute to minute' about their most immediate needs.

> *Many clients are dealing with specific issues that are more urgent than health, like getting housing. If you tell them 'you need to make an appointment for health,' they tell you 'no, first*

> *thing is I need is a place to sleep.' Much of the time health is not a priority because of other crises. (Social service provider)*

The Wilder study finds that 60 percent of adults experiencing homelessness have been told by a doctor or nurse that they have a serious mental illness such as major depression, bipolar disorder, personality disorder, or schizophrenia. This was also mentioned in the community interviews. One community member mentioned that he avoids shelters because of his PTSD, and this living on the street results in frostbite. The Wilder Statewide Homeless Study finds that 30 percent of homeless adults and 19 percent of unaccompanied youth reported evidence of Traumatic Brain Injury. The health implications of a brain injury can include cognitive impairment, memory loss, inability to manage daily activities, and difficulty following treatment plans.

This section showed the myriad of ways that homelessness exacerbates pre-existing health problems and introduces new health problems among people experiencing homelessness. It also shows the wide-ranging health problems reported by Minnesotans currently experiencing homelessness. The next section will describe equally poor outcomes among the many Medicaid enrollees experiencing homelessness.

What do we know about Minnesota Medicaid enrollees who experience homelessness?

DHS identifies people experiencing homelessness from enrollment forms, where there is a check box which they can 'Check if homeless'. For this study, we only included people as homeless if they had checked that box. This is likely an underestimate as 'homelessness' is not defined for applicants as they're filling out the enrollment form. Further, this does not address housing insecurity, a precursor or successor to homelessness. In the past, DHS has pulled homelessness from the MAXIS application form which asks for the applicant's address, and specifies that the applicant should write 'homeless' if they do not have an address. MinnesotaCare recipients and those enrolling through MNsure have a 'Check if homeless' box which they can check. It is unknown how applicants are interpreting these instructions and in which situations they would consider themselves to be homeless or to not have an address. While one applicant may interpret this to mean that they are 'homeless' if they are living doubled-up at a friend's house, another may simply write in the friend's address. For both enrollment systems, people who gave a known homeless shelter as their address can also be included in the homeless category. Homelessness can be defined using different time spans (e.g. homeless in the past year vs. homeless in past five years). For this project, people will likely be considered homeless if the applicant on the case has indicated that they were homeless during any enrollment span during the past year.[22]

According to our findings, seven percent of adults and four percent of children enrolled in Minnesota Medicaid programs reported being homeless, or gave a shelter address as their place of residence, at some point during the 2014 calendar year. This is likely an underestimate as 'homelessness' is not defined for applicants and thus may not include some living situations such as 'couch-hopping'.

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[22] Starting in 2017, DHS cash assistance and food support programs began asking a much more detailed housing question which should allow DHS to better understand the type of homelessness people are experiencing. It can be found here: https://edocs.dhs.state.mn.us/lfserver/Public/DHS-5223-ENG

Health care applications have not adopted this question.

We then merged homelessness data for Medicaid enrollees with health outcome and performance measure data from our medical claims and managed care encounter databases.

This section provides a somewhat different picture of the health and health care utilization of homeless people, as that provided in section 3. The goal of section 3 was to identify the social risk factors that appeared to have the *greatest* impact on enrollee health. Medicaid enrollees tend to have multiple risk factors, so that section used multivariate analyses, which allows the user to see the *unique* association between the risk factor of interest, while controlling for all other risk factors (and many other characteristics).

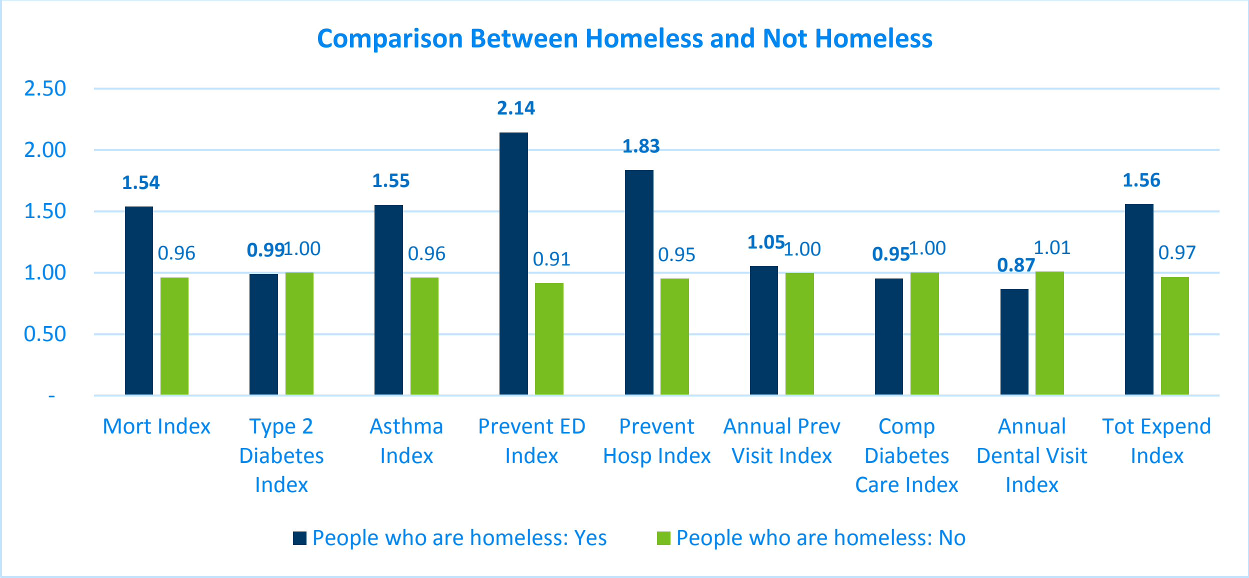
This section's results and methodology are much simpler as the purpose in this section is to understand the holistic health and health care utilization of Medicaid enrollees experiencing homelessness so we can consider how to serve them better. We do not here 'control for' co-occurring risk factors such as mental illness as we do in section 3, as these risk factors need to be considered in considering how DHS might serve these enrollees more effectively. This section therefore reports the percentage of people with different chronic conditions, the average amount Medicaid spends on the health care of homeless enrollees, and other bivariate, descriptive indicators. In both sections, homeless enrollees have poor health outcomes. However, their health care reimbursements are much higher in this section, where their co-occurring conditions are not controlled for.

Our findings show that homeless enrollees – adults and children alike - had many serious chronic conditions. Compared to Medicaid enrollees who were not homeless, homeless adults were more likely to have asthma, hypertension, chronic obstructive pulmonary disease (COPD), depression, post-traumatic stress disorder (PTSD), and substance use disorder (SUD). One of the most striking outcomes is that 13 percent of people experiencing homelessness visited an Emergency Department for injuries due to violence or accident in 2014, compared with five percent who were not homeless. Children experiencing homelessness were more likely to have asthma and to experience an injury due to accident or violence. Homeless children were also the least likely of any group to receive recommended health care and dental care. See section 3 for more on the methodology and findings of these analyses.

In addition to increased prevalence of chronic conditions among people experiencing homelessness, we also observed that Medicaid spent more on health care for homeless enrollees than for those who were not homeless. The challenges of being homeless also have significant financial implications for the health care system due at least in part to higher rates of preventable emergency department visits and preventable hospitalizations.

The chart below shows the indexed rate of poor health outcomes (the average Medicaid enrollee has a value of 1). Some of the most striking differences are in asthma and mortality rates. Compared with the Medicaid recipients overall, people who were homeless were 55 percent more likely to have asthma and 54 percent more likely to die in the three year period of study than people who were not homeless. Similarly, compared with Medicaid enrollees overall, homeless enrollees' rates of preventable Emergency Department visits were 114 percent higher, and their rates of potentially preventable hospitalizations were 83 percent higher. This use of high-cost health care services are probably a contributing factor to their overall health care costs being 56% higher than Medicaid enrollees in general.

Index of poor health outcomes among people experiencing homelessness and people not experiencing homelessness. Rates are indexed such that the average Medicaid recipient has a score of 1. 2014 data.



In an analysis of Medicaid enrollees with SPMI, Medicaid reimbursed health care providers an average of $19,946 per year for enrollees who were homeless, and reimbursements of $15,945 to pay for the health care of housed people. Similarly, in an analysis of people with Substance Use Disorder, health care providers were reimbursed $14,113 per year for enrollees who were homeless, compared reimbursements of $12,499 for housed people.

The differences in health care reimbursements for housed and homeless recipients cannot, however, be taken to mean that housing will necessarily reduce the health care costs of formerly homeless enrollees. To investigate whether the high level of reimbursements for homeless enrollees might be amenable to change, we looked for indicators that this population is using high-cost health care that may have been unnecessary had they had more stability. One such indicator is 'Potentially Preventable Hospitalizations'[23], an indicator of a relatively rare type of hospitalization that is thought to be preventable if the patient receives timely primary care. Among people with SUD or SPMI, those who were homeless were more likely to have these hospitalizations.

- Among Minnesota Medicaid enrollees with SPMI, 1.8% of those who were homeless and 1.4% of those not homeless had this hospitalization (df=1, p=0.0248).
- Among people with SUD, 2% of homeless people had such a hospitalization, compared with 1.8% of those who were not homeless (df=1, p=0.0508).

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[23] This is the Agency for Healthcare Research and Quality's 'Prevention Quality Overall Composite' (PQI #90). https://www.qualityindicators.ahrq.gov/Downloads/Modules/PQI/V45/TechSpecs/PQI%2090%20Prevention%20Quality%20Overall%20Composite.pdf

A less expensive but more common type of high-cost preventable utilization is preventable Emergency Department (ED) visits[24] (Billings algorithm).

- Among people with SPMI, 33% of those who were homeless and 19% of those not homeless had at least one potentially preventable ED visit.
- Among people with SUD, 30% of homeless people, compared with 19% of those who were not homeless had at least one potentially preventable ED visit.

Some ED visits for injuries due to accident or violence might also be considered preventable. Rates of these ED visits are much higher for homeless people than for their non-housed counterparts (among people with SUD, 24% of homeless people and 16% of housed people had such an injury; among people with SPMI, 37% of homeless people had such an injury compared with 22% of housed people). To the degree that some of these injuries are due to the dangers of living without stable housing, these health care costs may be significantly reduced (and the health problem prevented) if people had housing.

Surprisingly, people experiencing homelessness were slightly *more* likely to access preventive care in the past year than their non-homeless counterparts with either SUD or SPMI. (45% of homeless people with SUD compared with 40% of housed people with SUD had a preventive care visit; 51% of homeless people and 49% of housed people with SPMI had a preventive care visit). However, homeless people were *less* likely to access dental care (53 vs. 58% for people with SPMI and 47% vs. 50% for people with SUD).

What interventions can improve the health of populations experiencing homelessness?

DHS commissioned Wilder Research Center to conduct a **Homelessness Literature Review** to identify interventions that can improve the health of people experiencing homelessness. This included a thorough literature search and review of 27 peer-reviewed articles deemed to be in scope for this project. In better inform the literature review, Wilder Research Center also interviewed eight health care providers and 12 social service providers about effective interventions.[25]

Three interventions were found to be most effective at improving health outcomes among populations experiencing homelessness. These interventions include **Housing First models, case management**, and **Assertive Community Treatment** (ACT). Research showed that these interventions often co-occurred, suggesting that combining multiple approaches, such as housing and case management, is the most effective way to improve health outcomes.

Below is a description of each of the interventions. Since most of the evidence-based studies included a combination of housing with intensive supportive services, most of these would fit into more than one category.

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[24] This algorithm, sometimes referred to as the 'Billings algorithm', is described here: https://wagner.nyu.edu/faculty/billings/nyued-background#

[25] Wilder's full report can be found here:

Housing

Many studies find that housing improves health outcomes among those experiencing homelessness. The two primary approaches to housing discussed in the literature are 1) **Housing First**, which is modeled on the concept that people need a place to live before attending to other needs, such as substance use, mental health, or employment, and 2) **supportive housing**, which offers residents a variety of support services designed to improve health and quality of life. Supportive housing providers must assertively and persistently offer services, but the client is always free to decline. Their housing depends upon on lease compliance, not service acceptance. Housing first *can* include supportive services, but it is not a requirement of that approach.

- In a population with severe alcohol use, a Housing First model was associated with lower alcohol use among residents compared with people on a wait list for the program. The drop in alcohol use continued over six, nine, and twelve months (Larimer et al 2009).
- In a population with mental health and substance use disorder diagnoses, those participating in a Housing First model with supportive services experienced better access to care, better primary care connections, and reduced Emergency Department and hospital stays. Monthly health care costs dropped from $1,600 to $900 (Wright et al 2016).
- In a Minnesota Hearth Connection supportive housing program with case management, adult participants experienced reduced mental health symptom scores, reduced illegal drug use, and they reported improved feelings of safety (National Center on Family Homelessness, 2006). They also found that when single adults in the program were compared to a matched sample of people who were not placed in this program, program participants received more routine and preventive care, such as in a clinic, and less costly inpatient mental health and substance use disorder services, detox, and prison, as compared with the comparison group. (National Center on Family Homelessness, 2009).

Case management

Case management looks at a whole person or family and attempts to address any issues that may hinder positive outcomes, such as finding and keeping housing. While Wilder Research did not find any studies that looked solely at the effect of case management on those experiencing homelessness, case management is embedded in a variety of interventions. It is often combined with supportive housing and has been shown in multiple studies to improve health outcomes (e.g. Stergiopoulos et al., 2015; Sadowski et al., 2009).

Case management is a collaborative process that assesses, plans, implements, coordinates and monitors and evaluates the options and services required to meet a person's health and human service needs (CCMC, 2010, p. 3). Minnesota has a diversity of case management services, from Targeted Case Management which tends to use the less intensive brokerage model, to Long Term Homelessness case management services, which uses an intensive model, where case managers personally do a wide range of work with clients (e.g. helping to negotiate landlord conflicts). The research literature did not specify which model of case management they were studying.

In a supportive housing initiative, people who were 'highly medically vulnerable facing significant medical and psychosocial challenges' showed a drop in Emergency Department visits, hospitalizations, and showed better access to primary care in the year after beginning the program, compared with the year prior (Wright et al, 2016). Monthly Medicaid costs dropped from $1,626 to $899 in that time period.

In an evaluation of a program for people with severe mental illness, those placed in supportive housing with case management had fewer hospitalizations and shorter periods of incarceration than a matched control group without those supports (Culhane et al, 2002). The cost savings from systems such as mental health, Medicaid, Veterans Affairs, and Department of Corrections was $16,281 per year, mostly in mental health services.

Assertive Community Treatment

One of the most prevalent interventions discussed in the literature is the Assertive Community Treatment (ACT) model. The ACT model is an evidence-based, collaborative approach to working with people who have mental illness. In an ACT model, a multidisciplinary team of providers works together to offer clients holistic care and treatment. Some ACT teams provide ACT services, but they do so in a way that works for people experiencing homelessness. Several studies (e.g., Smelson et al., 2013; Cooper et al., 2010) have examined the impact of ACT and illustrated improvements to health outcomes, such as reduced psychiatric symptoms, greater access to housing, and reduced substance use relapse.

- In a randomized control trial, people in a Housing First model with ACT services spent fewer days in psychiatric hospitalizations than people who were offered housing only if they maintained sobriety and psychiatric treatment. Their overall health care costs were also lower, though these were not specified in the article. (Gulcur et al 2003).
- In a population with mental illness, Integrated Assertive Community Treatment (I-ACT) was associated with improved psychiatric symptoms, reduced substance use relapse, and lower illegal drug usage. It was also associated with decreases in inpatient, outpatient, and ED mental health care utilization, as well as inpatient substance use treatment at 6 and 12 months (Cooper at al, 2010).

Wilder's review of evidence and stakeholder interviews suggests that to improve the health of people experiencing homelessness who have chronic conditions, it is important to offer both housing, as well as case management or ACT to those who need it. These were the only interventions which had enough of an evidence base to be considered proven effective.

Promising practices

In the peer-reviewed literature, few studies tested the effectiveness of interventions that did not include housing or case management. However, Wilder found some promising approaches to collaborations between health care and social service organizations which are described by stakeholders and the literature. These promising interventions included **medical respite**, **care coordination**, and **co-located services** (such as those offered by Health Care for the Homeless at emergency shelters and outreach sites).

Some Minnesota health care providers are already experimenting with these promising practices, and with other innovative models. These types of initiatives offer the potential for reducing high-cost health care by helping homeless individuals better manage chronic conditions and thus prevent the need for hospitalizations. However, more research is needed to know if these interventions improve health outcomes.

The research evidence brought together to prepare this report clearly shows the adverse health outcomes among people experiencing homelessness. The Wilder statewide homeless study (2016) shows the prevalence of dangers and deprivations among people experiencing homelessness, and the Improve Group's interviews with homeless people describes ways in which homelessness itself causes health problems. Not surprisingly, the interventions that were found to actually improve people's health were those that addressed the homelessness directly. Housing First and other supportive housing models provide people with access to housing. Case management and ACT address housing as well as people's other basic needs.

For some social risk factors, improving people's access to health care will probably be the most important way to improve their health. For example, the last chapter's interventions for people with substance use disorders identified better access to SUD screening and treatment as the main focus of improving their health. But for the homeless population, improving access to adequate health care without addressing the homelessness itself, will probably not be sufficient to improve health outcomes.

Given the wide-ranging and negative impacts homelessness has on a person's health, and the evidence of the effectiveness of housing and case management models, the authors do not believe that the health disparities experienced by homeless MA enrollees can be significantly reduced without addressing the underlying conditions of homelessness itself. The next section describes some ways this might be done within health care programs, and then in other divisions or agencies.

How can DHS use these findings to improve the health of people experiencing homelessness?

Levers within health care to address homelessness

Minnesota's public health care programs have a few levers with which to assist homeless people to attain housing. This report will describe the ones that may be most feasible from an implementation and cost perspective.

Leverage potential cost savings by identifying and providing services to 'high utilizers'

Several studies found significant drops in health care costs in homeless populations when they were offered housing first, combined with case management. This finding was found most often in mentally ill populations, though it was also found in populations with severe alcohol use, and people with medically complex conditions. Calculated savings varied in these studies based on a variety of methods and populations. One study found a drop of $8724 in annual health care expenditures in a medically complex population with psychosocial challenges (Wright et al., 2016), while another found a $43,000 drop in annual health care expenditures for a population with severe alcohol use (the cost to administer the housing program was $13,000) (Larimer et al., 2009)

MA enrollees who are both homeless and have either Substance Use Disorder or SPMI have high health care expenditures[26], and higher than average preventable health care utilization. The findings below indicate that some of these enrollees may have such high health care expenditures that the cost of providing them with housing (and services) would be entirely offset by savings in the health care system.

The size of the cost savings noted in Wilder's literature review, and the size of the health care costs for Minnesota's Medicaid enrollees experiencing homelessness suggest that for some of the highest-cost enrollees in these groups, housing intervention costs may be offset significantly or entirely by savings in the health care system.

For this reason, DHS could use the algorithms for potentially preventable hospitalizations, preventable ED visits, and total cost data to identify enrollees whose costs are likely to be significantly reduced if they received assistance with housing. DHS could also include incarceration costs in the model, as those are also high-cost state expenditures that may be associated with access to housing.

If DHS was able to identify enrollees whose health care costs could be reduced as a result of housing assistance, it could be shared with managed care organizations (MCOs), Integrated Health Partnerships (IHPs), and other organizations, to support their ability to use innovative methods for improving their highest cost patients' access to housing and other services.

The Integrated Health Partnerships demonstration tests innovative payment and delivery models designed to reduce the total health care costs and improve the quality of care provided to Medicaid enrollees. In the current edition of the IHP demonstration, IHPs can qualify for a per-member per-month population based payment if they offer a specific intervention to address health disparities. With regards to homelessness, IHPs can, for example, partner with housing providers who offer long term homelessness case management or other case management services. This could be paid for through the per-member per-month population based payment. The ability to identify high-utilizer homeless enrollees might empower IHPs' efforts to address homelessness, improve quality of care, and reduce healthcare costs.

Assertive Community Treatment (ACT).

At the time of writing this report, there are 30 ACT teams (inter-disciplinary teams serving individuals with SPMI) in Minnesota and DHS adds around two to four ACT teams per year. DHS has also been working on two initiatives to improve access to, and quality of, ACT services. ACT teams can specialize in populations with mental illness and with additional significant risk factors. Wilder Foundation runs an ACT team for people experiencing homelessness, and that team includes someone on the team who specializes in housing. This is an important service for this high-risk population, and efforts to expand the sites are worthwhile. Given all the work currently going on, DHS does not have any further suggestions for using ACT to improve the health of people experiencing homelessness.

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[26] For these analyses, we used an indicator of costs that excludes long term care costs and other costs which probably cannot be reduced through good use of primary care.

Case management.

DHS is currently leading a Case Management Redesign Initiative with county and Tribal partners. This multi-stakeholder process is reviewing the many types of Medicaid-funded case management and care coordination services in Minnesota. Many Medicaid enrollees would benefit from expansion of case management and care coordination services that help them understand and engage in their health or behavioral health care, and access services and supports available to them (e.g. housing subsidies, food support, education and training, transportation assistance). This is a service that could also benefit homeless populations. Currently, this can be difficult to access until they are diagnosed with a serious medical condition or disability. The long-term homelessness grant (described next) is a unique source of case management as chronic homelessness is the most important eligibility criteria, and does not require that participants have chronic medical conditions to be eligible.

Levers outside of health care to address homelessness

Expand Long Term Homeless (LTH) Supportive Service Fund.

The long-term homeless supportive service fund uses a Housing First model plus intensive case management. It is specifically designed to serve people experiencing homelessness. There are also grants for populations with substance use disorder who are experiencing homelessness (DHS and Minnesota Housing, 2015). Additionally, grants exist for people with mental illness who are experiencing homelessness. No studies on this particular program were found in the literature review, but it has both of the evidence-based practices in its model (housing first and case management), and may therefore be the best bet for improving the health of this population, especially since it already exists and there are people currently doing this work.

Because this case management plus housing service does not require a particular diagnosis, families with children, or healthy adults, could potentially access it. However, there are difficulties with proving that someone is homeless, and limited grant funding makes it less accessible than other case management services.

The diagnosis-based eligibility of Medicaid case management services makes it especially important that the long-term homeless supportive service fund is maintained and potentially increased, as it is the only case management service DHS offers to homeless people that has the potential to prevent healthy people from developing serious and expensive medical conditions *before* they start.

Case management services such as these are important tools to meet the needs of some people. However, they will only be effective if people also have access to adequate income to pay rent, or to programs that provide income support. DHS has had some success with expanding such programs. Minnesota’s Supplemental Aid program, for example, provides income support to pay for housing for people with disabilities on Social Security, and this will have increased resources starting in 2020. On the other hand, programs such as Housing Support, which provides income support to people with disabilities or have disabling conditions and who are chronically homeless, might benefit from more funding.

Expand housing support services.

In the 2017 Minnesota Legislative session DHS succeeded in passing legislation which authorizes DHS to pursue new MA ‘housing support services’ for individuals with a disability, to increase long-term stability in housing and avoid future risk of homelessness or institutionalization. If DHS receives federal approval, this will include services to help people obtain housing (e.g. housing search and application process), and maintain their housing (e.g. coaching on behaviors that may jeopardize their housing).

Cross sector collaboration to increase access to housing

The solutions needed to help people access housing are dependent on the needs and resources of the individual person, but also on the community in which they live. In order to maximize this potential, people from counties, tribes, Continuums of Care, local housing authorities, housing providers, grant-writing and funding organizations, and other organizations need to work together. This happens in a variety of ways in different regions of the state. Hennepin County has been actively pursuing these types of collaborations, including collaborations with health care providers and payers. Some regions have counties that administer IHP’s (e.g. South Country Health Alliance and Prime West). These IHPs are in an especially good position to financially benefit from participating in housing initiatives.

Other counties and regional groups meet to plan housing needs in their regions. This is sometimes convened by the Continuum of Care, or by another existing coalition. However, health care payers and providers are mostly absent from these discussions. Given the high cost of health care utilization among people experiencing homelessness, and the fact that housing solutions are specific to particular regions, health care payers such as Minnesota’s Medicaid program have a significant financial stake in actively participating in these discussions to increase their enrollees’ access to housing.

Heading Home, the State’s Plan to Prevent and End Homelessness[27] advocates for increasing the amount of affordable housing, as well as supporting people experiencing homelessness to boost their success in school, in the workplace, and in the community. Several recommendations of that report are relevant to this report, though we focus here much more narrowly on outcomes related to health. The evidence reviewed here directs us to further collaborate with Minnesota Housing, with non-profits and with our health care systems to assist our enrollees to attain and keep housing.

Healthy adults and children

The focus on improving the health of people experiencing homelessness led the literature review to interventions that serve people with chronic mental, chemical and/or physical illnesses, as this is the population that can show improvement in health. (It is difficult to show improvement in the health of a person who is already healthy.) As a result, Wilder was unable to find studies of interventions that improved the health of healthy adults or children. Interventions that targeted these populations are thus missing from the literature

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[27] http://www.mnhousing.gov/wcs/Satellite?c=Page&cid=1363021705011&pagename=External%2FPage%2FEXTStandardLayout

review. Nevertheless, they were not absent from the interviews with health care and housing providers, who commented on their own experiences and observations. The most common concerns related to the need for affordable housing; addressing the unique needs of youth transitioning out of foster care; offering culturally appropriate services; and the unique needs of justice involved populations. These are briefly described below.

Lack of safe and affordable housing

Wilder makes the following statement in their report conclusion:

> *"When asked what they thought Minnesota's priorities should be, in terms of improving the health outcomes of the homeless population, most stakeholders (health care providers and social service providers alike) called for 'more affordable housing,' particularly when paired with supportive services… (Wilder, 2017, p. 32)"*

Vacancy rates in Minnesota, and in the twin cities in particular, have been extremely low in recent years, with vacancy rates for affordable housing at almost zero. The lack of affordable housing is an important context for people with medical, chemical, or mental health conditions. It may be the primary problem for families whose income simply isn't enough to afford rent in their community.

Homelessness can interfere with a child's ability to fully concentrate in school and to accomplish other age-appropriate developmental tasks. Homeless children also miss significantly more days of school than do other children (Harpaz-Rotem, Rosenheck & Desai, 2006).

A suburban supportive housing provider noted that they always have families waiting to get into their housing program, and the families stay much longer in the program because there is a lack of affordable housing in the community. This is especially true for families with multiple children. An urban health care provider described working with families that move frequently, to help them adapt (e.g. to help children stay in the same school).

A suburban housing provider said:

> *"…the Group Residential Housing (GRH) program, you might get $750 a month for rent. The challenge is to find an apartment for $750. We'd have 60 people in queue with a GRH voucher but you can't find apartments for $750"*

An urban health care provider described how substandard housing can be the only housing a family can afford.

> *"… We had for a very long time a client that lived in a house where there were two really big holes in their floor. And I remember saying to a staff person, ok they have these two big holes, be careful not to fall in! And we kept trying to help the family find affordable housing, and the reality is, that's what they could afford, and they didn't want us to make any reports because that's what they could afford, and it was better than living on the street. So we were trying to honor what they were asking, which is no, please don't report our slumlord to anybody because we kind of need them."*

Unique needs of youth transitioning out of foster care

Some of the interviewed providers also emphasized the need for more support to help former foster youth transition successfully into adulthood. In Minnesota, youth have the option of staying in foster care until the age of 21. DHS has several programs to support youth transitioning out of foster care. For example, the Healthy Transitions and Homeless Prevention program[28] is designed to prevent homelessness and to ease the transition from foster care to self-supporting adulthood. It funds 15 non-profit programs throughout the state to offer independent living classes and financial assistance for youth that were in out of home placement for at least 30 consecutive days after age 14.

However, an urban health care provider noted that youth between the ages of 18-24 fail and fall through the cracks. An urban housing provider described the importance of teaching youth how to be a tenant.

> *"It's their first apartment and they don't understand what it means to have a place, to pay rent. It's so hard for this population not to have friends come stay with them. In their own survival mode, they have stayed with friends. .. We need to do a much better job at developing classes that help our youth to learn about housing."*

Culturally appropriate services

Racial disparities in access to housing are striking in Minnesota's adult Medicaid population. While 7% of adult enrollees overall reported being homeless on an enrollment form, this rate is 17% among American Indians, and 19% among US-born African Americans.

During 2017, 46% of all people receiving DHS supportive housing services were African American, and 6% were American Indian[29]. These numbers are relatively close to the percentage of homeless Minnesotans in each of these groups (the Wilder statewide homeless survey reports that 39% of homeless Minnesotans are African American and 8% are American Indian).

Wilder did not find any evidence-based research which specifically evaluated the effectiveness of interventions for particular racial or ethnic groups. The importance of culturally appropriate services, and the barriers that mainstream triage systems place for these cultural groups were described by stakeholders.

An American Indian urban housing provider emphasized the importance of culturally responsive services for American Indian children.

> *"A lot of parents and grandparents in our communities and raising our young people are struggling significantly with just trying to parent and survive – there's so much poverty in native communities. One of the reasons why we're still seeing such disparities among*

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[28] https://mn.gov/dhs/people-we-serve/children-and-families/services/adolescent-services/programs-services/healthy-transition-and-homeless-prevention-program.jsp

[29] Source: DHS MAXIS eligibility determination system.

> *American Indians who are homeless is because there just isn't enough opportunities for our youth to heal and to have a place to reestablish a renewed sense of identity and who they are as a young native person. Without that they are not going to be as successful as they could be in terms of finishing school and finding a job and all that."*

This provider also noted that the coordinated entry process, which triages homeless people into different services based on their level of need, prohibits consideration of ethnicity in placements. As a result, they cannot direct native youth to get culturally responsive services.

Criminal history

When asked about barriers to implementing the interventions, four of the 20 stakeholders mentioned the difficulties experienced by people with a criminal history. A health care provider described how being unable to find housing puts them into a situation where they are more desperate and more likely to commit a crime. Another health care provider described how a lot of housing programs are in buildings that resemble hospitals or jails, and this can trigger traumatic memories, and thus are not good options for people who are homeless.

Discussion

The myriad of ways that homelessness harms a person's health, along with the higher costs associated with their resulting health care utilization, make a financial argument for collaborations between health care and housing payers/providers. These systems tend to have very different service and funding mechanisms, so there needs to be a very tangible benefit for both systems to find mechanisms that work for both. DHS could contribute to work already underway in some regions of Minnesota by identifying the homeless Medicaid enrollees with the greatest health care costs. This population may offer the greatest potential for cost neutrality or even cost savings for collaborations that strive to develop innovative housing, case management, or other interventions.

Unfortunately, health care/housing collaborations such as these will only address the housing needs of people who have significant medical or behavioral health conditions, and thus have the potential for reduced health care costs. Further, DHS housing programs and Medicaid-funded case management services have diagnosis-based eligibility, and require that recipients have serious medical or mental health conditions before they are eligible. There are some case management services which can be accessed without a serious diagnosis (e.g. child protection case management) but these are for narrowly defined populations.

An alternative strategy for providing case management, described in the next section, is to offer a scaled-down version of these services to a much wider population of Medicaid recipients, based on serious non-medical needs like impending homelessness.

VII. Case management and Care Coordination: Interventions that could support people with any social risk factor

This section describes how case management and care coordination services currently serve people with Medical Assistance (MA) coverage. In Minnesota, case management services are generally reserved for people with serious medical or mental health conditions, people with disabilities, or people at risk for child/adult protection involvement. There are a variety of care coordination services available to people on MA. Some coordination services require specific diagnoses for eligibility. Other care coordination services are available for the general population.

Case management and care coordination may be effective at improving the health of Medicaid recipients with *any* social risk factor

This report reviewed interventions that are effective at improving the health of people with Substance Use Disorder (SUD), and it reviewed those effective for people experiencing homelessness. These were done separately, for simplicity sake, even though many people have both of these risk factors. However, a striking commonality between them, is that the vendors doing the literature reviews, the DHS staff, and the community stakeholders working with either the homeless or the SUD populations identified case management or care coordination as important interventions to help their populations to become healthier.

Case management and care coordination services in Minnesota

The terms “case management” and “care coordination” are often used interchangeably. Under federal law [42 U.S.C> 1396n(g)], case management services must consist of the following core activities: (1) assessment; (2) care plan development; (3) referral; and (4) monitoring. Care coordination services often include some or all of these activities, but there is no federal requirement that care coordination services contain the components required for case management services. Another difference between case management services and care coordination relates to how the services are delivered. Some care coordination services are delivered by a team of staff in a clinical setting including physicians, nurses, social workers, and community health workers and other para-professionals. Whereas case management services are usually delivered by a single case manager. Both case management and care coordination services rely on the development of trust between the provider and the person receiving services. People receiving services are expected to utilize their case manager or care coordination team as a central point of contact and as a source of assistance in navigating the often complex eligibility requirements for social services and supports.

Case management services are available to several different populations in Minnesota **1) people with disabilities who receive home and community based waiver services; (2) adults with serious and persistent mental illness and children with severe emotional disturbance (3) children at risk-of out of home placement or maltreatment; (4) vulnerable adults; and (5) people moving out of an institutional setting into the community**. For these populations, case managers have the resources necessary to effectively connect people to supports and services tailored to the person’s individual needs. This includes medical and behavioral health services, as well as social service and other needed assistance.

There is currently no federal definition of care coordination services. There is significant variation among care coordination models and eligible recipients. Care coordination services provided through a Health Care Home or through any of the six certified community behavioral health clinics are available to **any person** receiving care through these clinics, regardless of diagnosis.   Behavioral health home services are available to **adults who meet the diagnosis of serious mental illness or children with emotional impairment.** The diagnostic criteria for Behavioral Health Home services is less restrictive than the diagnostic criteria for targeted mental health case management.

DHS was successful in the 2017 legislative session with getting authorization to pay for SUD treatment coordination services provided by SUD providers for **individuals with SUD**. The Alcohol and Drug Abuse Division will be asking CMS to authorize these services which supports all of patients' ongoing recovery needs, including finding housing, employment, and other things critical to their success in staying sober. This is again a diagnosis-specific eligibility.

Care coordination is also available through covered services, hospital discharge planning, and nursing home services. These tend to be more time limited and to address episodic medical needs. Care coordination services are available to recipients served via managed care based on criteria developed by the managed care organization and consistent with their contracted duties. Finally, as discussed below, Minnesota's Integrated Health Partnership 2.0 plans receive funds to structure care coordination activities.

Case management redesign

DHS is currently leading a Case Management Redesign Initiative with county and Tribal partners. This multi-stakeholder process is reviewing the many types of Medicaid-funded case management and care coordination services in Minnesota. These include waivered case management services, and all targeted case management services which includes adult mental health, children's mental health, relocation services, child welfare, and vulnerable adult targeted case management services. In the coming year, this redesign initiative will:

- Create a planning infrastructure to support a long-term, collective approach to case management redesign.
- Document the current county, state, and Tribal fiscal infrastructure involved in delivering case management services;
- Build upon past work to solidify a universal definition of case management and a core set of activities to include in a base case management benefit; and
- Ensure community involvement and civic engagement in the development of these policies.

This work is a continuation of and is informed by earlier DHS and stakeholder efforts. The 2014 legislative report on case management recommended two key steps to making this happen, and these are a focus of ongoing work. These steps are to 1) adopt a common definition across all case management service types and 2) to establish transparent and consistent case management rates.

Benefits of making case management and care coordination services more available to people on Medical Assistance

Many Medicaid enrollees would benefit from expansion of case management and care coordination services that help them understand and engage in their health or behavioral health care, and access services and supports available to them (e.g. housing subsidies, food support, education and training, transportation assistance). By helping people navigate the system of public benefits and community support services, people are able to leverage the resources available to them to create more stability and more opportunity for themselves and their families. Reducing the financial pressures facing people on MA can help to reduce the incidence of crisis lead to improved health outcomes and decrease costs to health care and other systems. This could help enrollees to 'meet their basic needs so they can live in dignity and achieve their highest potential', as is DHS' mission. Key components of a model could be links in the community, evidence based protocols, and a documentation of reduction in level of need.

As DHS and health care providers continue to look for ways to address the upstream *and* downstream effects of the social determinants of health, we need to consider how to help people to address their non-medical risk factors that are associated with poor health outcomes. Case management and care coordination can help people to access the resources they need to prevent negative health consequences *before* they begin.

The next chapter describes an innovative DHS payment model which can support health care providers who want to experiment with innovative services and partnerships for patients with a variety of social risk factors.

VIII. Adjusting Medicaid payment policy to help providers address patients' social risks

Like many states, Minnesota's Medicaid program has been experimenting with innovative payment models designed to improve the quality and value of the care received by Medicaid enrollees. One of these, the Integrated Health Partnership (IHP) program allows provider organizations to voluntarily contract with the Minnesota Department of Human Services (DHS) to care for Minnesota Health Care Programs (MHCP) recipients in both fee-for-service (FFS) and managed care under a payment model that holds these organizations accountable for the total cost of care (TCOC) and quality of services provided to this population. The new iteration of the program includes both resources and expectations for these provider organizations to begin to address social determinants of health.

IHPs are in a unique position to address social risks in their patient populations. Key aspects of the model include: IHPs are 1) able to retain a portion of the savings when their patient population is less expensive than expected, 2) encourage strategies to improve quality and patient experience while reducing unnecessary utilization of care, for example developing plans for improving care for patients with particular social risk factors, and 3) measure progress for patients using data aggregated by DHS. IHPs are offered a modest upfront, flexible population based payment, which includes both medical and social risk adjustment to build capacity and begin to do this work.

As the findings of the social risk analysis in the previous chapter began to unfold, IHP leadership modified their programs in ways that could better support providers who wanted to experiment with innovative services and partnerships for patients with these risks. This chapter describes how IHPs have integrated social risk factors into their model.

Background on Integrated Health Partnerships

The IHP program allows DHS to engage in alternative payment arrangements directly with provider organizations that serve an attributed population. The first IHP RFP was issued in late 2011 following input from many providers, health plans, consumers, community agencies and professional associations. Trailblazing IHPs signed contracts for their first performance year starting in 2013, and new participants have been added each subsequent year.

By 2017, Minnesota's twenty-one (21) IHPs provided care to over 462,000 Minnesotans enrolled in MHCPs, and achieved an estimated savings of $156 million dollars. A portion of these savings are used by provider systems to achieve the Triple Aim of health care (reduce the cost of care, improve health outcomes, and improve patient experience), through strategies such as expanding use of care coordinators, extending available hours for primary care clinics, and developing partnerships with community supports that impact the health of members.

IHP 2.0: Adding social risk to the model

In 2016, DHS began to examine ways to evolve the IHP model, including how to more formally incorporate support for addressing social risk factors. A Request for Information (RFI) sought feedback from stakeholders on the next iteration of the IHP program, **IHP 2.0**. DHS synthesized the feedback from stakeholders, resulting in a set of core principles that drove development of the program for contracts beginning in 2018.[30] The population-based payment, which is risk adjusted by both medical and social risk, emerged as a key aspect of the 2.0 model.

IHP 2.0 contracts provide the option for IHPs to participate as either as a Track 1 or Track 2 IHP. All Track 1 and Track 2 IHPs that are accepted into the IHP program can be eligible for **a quarterly population-based payment (PBP)** for the purposes of care coordination or related investments (see the next section for more information.

A subset of these IHPs were approved as Track 2 IHPs, having demonstrated more experience with value-based payment models and managing Medicaid enrollee costs and quality. Track 2 IHPs will also receive a portion of the shared savings or pay the State a portion of the shared losses as a result of yearly performance against a cost target. This aspect of the 2.0 model makes Track 2 IHPs similar to the "Integrated" model of the IHP contracts that began prior to 2018. The population based payment is included in IHPs' cost targets and is considered a pre-payment of their potential shared savings.

In 2017, DHS signed contracts with 13 IHPs entering into the 2.0 model, and renewed contracts with 11 IHPs remaining in the Legacy model. The program now has 24 IHP partnerships, which span across the state and delivery system types.

Population-Based Payment

Overview

In 2017, the Minnesota Legislature passed Chapter 6, Article 4, Section 42, which added the population-based payment to the IHP authorizing legislation (MN Statutes 256B.0755). To this end, the IHP program staff

CORE PRINCIPLES THAT DROVE THE DEVELOPMENT OF THE PBP

- Promoting IHP sustainability and innovation through flexible, consistent payments to encourage IHP responsibility for patient care coordination and health outcomes.

- Addressing non-medical health factors by incentivizing community partnerships between medical and non-medical providers; both recognizing the additional risk and investment required to establish and incorporate non-medical community partnerships into the health system, and rewarding non-medical providers appropriately for contribution to patient and population health.

- Expanding participation in value-based payments to a variety of providers by offering two different payment models that correspond to the entities' ability to bear financial risk and take on full responsibility for patients.

- Actuarially sound benchmarks, cost estimations, and payment mechanisms, for the benefit of the payer as well the provider participating in the value-based payment arrangement.

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worked with an actuary, and the Research Team evaluating social risk factors and barriers to health, to develop a payment methodology that might appropriately support providers and health systems that serve individuals experiencing these social risk factors.

The population-based payment (PBP) is an **upfront, flexible payment made on a quarterly basis** to all IHPs participating in IHP 2.0. Its flexible investment in care delivery and payment reform gives providers service opportunities that a traditional fee-for-service model cannot provide. It recognizes that providers need support that allow them to tailor interventions to the specific needs and health barriers of the people they serve. It can support care coordination services, population health activities, quality improvement, or infrastructure to support the aforementioned efforts. An IHP's ability to continue participating in the IHP program and receive the PBP after the initial three contract years may be contingent on engagement in and performance on quality measures related to population health.[31]

The methodology developed to calculate the PBP reflects its intended purpose. Each quarterly payment is assists an IHP in **addressing the unique needs of the each IHP's patient population**, as opposed to paying for prescribed services for specific individuals or segments, or specific disease states. However, based on the general expectation that populations with higher risk may require additional care management resources, the average PBP is expected to vary by IHP and over time based on the observed risk of the attributed population.

The total amount paid to each IHP will be based on the number of attributed members and an average base rate for each individual attributed to the IHP. The base rate will vary by the medical **and social risk of each IHP's attributed population**. Each quarter, the amount of the PBP will be adjusted to reflect changes to the medical **and social risk** of the population attributed to the IHP. The amount of the PBP captures the medical risk of the population through the ACG (Adjusted Clinical Grouper) © risk adjustment tool normalized to the IHP attributable population, and captures a portion of the costs associated with the social determinants of health experienced by attributed patients.

Although the overall average PBP is based on member-specific indicators, the PBP should be understood to be a population-based payment; in other words, an average per-member per-month payment across the entire population can change based on increases or decreases to the population's average risk. The individual member-level detail is utilized to adjust the average PBP, and should not be interpreted as an indicator of anticipated or required care management investment for an individual participant.

Incorporating Social Factors into Risk-Adjustment

Risk adjusting a healthcare payment to account for social risk is relatively uncharted territory. While literature to support the impact of social risk factors on health outcomes is expanding, applications to payment methodology are more limited. As such DHS needed a methodology that can be adapted to future learnings. In the process of developing the social risk adjustment to the PBP, DHS considered some of the following questions:

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[31] See IHP RFP Appendix X

- For which social risks do we have data, and can these indicators be linked to IHP attributed Medicaid beneficiaries in a timely and relevant manner?
- What criteria should be used to determine whether a social risk factor warrants an adjustment to payment?
- How can we adjust appropriately so as to capture the potential interactions between clinical and social risk factors?

As the social risk findings described in Chapter 2 began to emerge, the IHP team reviewed them to determine if they could be used to adjust the PBP. After the results were finalized, the same five risk factors for adults and six risk factors for children were chosen to be included in the risk-adjustment methodology for the PBP.

In developing the risk-adjusted PBP, DHS started with individual payment levels for each Adjusted Clinical Group (ACG) risk score, with higher PBP levels assigned to higher medical risk scores. To operationalize the integration of adjustments to account for social risk factors, DHS, with the support of FORMA Actuarial Services, looked at the aggregate differential risk associated with the portion of members having the identified social risk factors from each incremental risk group.[32]

To determine which social risk factors and combinations of multiple factors could be indicators of "higher than expected" expenses, we summarized the members by broad risk segments (10th - 100th risk percentiles, infants, pregnancies, non-users) for each social risk factor. To develop our preliminary adjustments, we reviewed the relative cost for combinations of social risks, the impact of members with multiple social risks, the impact of removing sub-segments of the population, and other analyses to determine the relative impact of the social risks. This resulted in groupings where there was an adjustment for adults with Substance Use Disorder (SUD) & Severe Mental Illness (SMI), and another adjustment for adults with either SUD, or SMI, or past incarceration (PI), or homelessness.

Average costs per adult member per month for social risk factors

Recommended Approach

Group	Members	PMPM	Risk	Expected PMPM	Relative Cost	10th-50th	60-100th	Infants/Preg
Adult SUD or SMI or Homeless or PI	162,826	$713.11	2.32	$687.71	103.7%	139.5%	102.8%	107.9%
SUD and SMI	41,105	$1,139.61	3.41	$1,007.78	113.1%	**184.5%**	**111.7%**	**130.7%**
SUD or SMI (just one) or PI or Homeless	121,721	$565.36	1.95	$576.84	98.0%	**134.9%**	116.8%	99.9%

* An adjustment would likely be applied to the members in the 60th and 70th percentiles, as well. In aggregate, the 10th to 70th percentile segments included in a PBP adjustment have a differential relative cost of 121.2%

In general, the child-specific social risks impact fewer members and demonstrate lower impacts to the risk-adjusted relative cost impacts than the adult-specific social risks.[33] For children, DHS adjusted for children with

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[33] Because parent social risk data can be lacking if a child's parent is not also enrolled, it is reasonable to expect that the child-specific social risk factors that are tied to the presence of a parental risk factor (e.g. Parental SUD) may not fully represent the full group of children impacted by the risk factor. For this reason, only children who

Child Protection or Parental SPMI across all risk levels, and then adjusted for Parental SUD or SMI for Infants and Pregnancies. We recognize that these relatively lower cost impacts occur because children are in general healthier, with less cost impact; however we recognize that these same risk factors are associated with poorer long term health and hence markedly increased next generation expenditures.

Average costs per child member per month for social risk factors

Recommended Approach

Group	Members	PMPM	Risk	Expected PMPM	Relative Cost	0-50th	60-100th	Infants/Preg
Parental SUD or Parental SMI or CPI	63,552	$214.43	0.68	$200.70	106.8%	103.2%	107.1%	110.9%
Child Protection Involvement or Parental SPMI	34,894	$242.78	0.73	$215.15	**112.8%**	**108.0%**	**114.5%**	**110.7%**
Parental SUD or SMI (non CPI or Parental SPMI)	28,658	$179.96	0.62	$183.15	98.3%	97.5%	95.0%	**111.1%**

Ultimately, the PBP is adjusted according to the combination of risk factors weighted according to their relative contribution to unexpected variance in costs based on medical risk alone. The approach combined the research around factors that are most impactful to health outcomes, with industry standard methods to address high-risk populations based on cost.

This also presented the opportunity for DHS to encourage IHPs in the development of, and accountability for, interventions targeting these high risk groups in ways that support the triple aim of improving care and improving satisfaction while simultaneously reducing costs.

Opportunities to improve the PBP methodology

The population based payment is DHS' response to recognized needs and feedback from Minnesota's provider systems and Integrated Health Partnerships. However, this is a first iteration of the population based payment and there is more work to be done especially in areas where there is limited research or evidence. DHS is continuing to tackle these issues in 2018 and beyond.

For example, the medical and social risk adjustments made to the PBP amount were based on cost-related outcomes, which are reliant on the claims and cost information that DHS has in its data warehouse on attributed Medicaid patients. DHS understands, from the literature and anecdotally, that care for individuals often contains "hidden", non-billable costs to the healthcare system that cannot be captured in these claims. This is especially true for individuals who experience many social risk factors in addition to specific diseases. Many of the social risk factors that impact "care intensity" of a patient for a healthcare provider are already partially captured in DHS' research, such as homelessness, past incarceration, mental and behavioral health, etc. However, others are not, such as shortage of transportation, food insecurity and Limited English Proficiency (LEP). Additional work on multiple fronts is needed to understand the "care intensity" required when these factors are present for different groups of individuals, as well as more consistent methods for collecting and incorporating indicators of these factors in order to refine a payment methodology.

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also had a parent enrolled were included in the analysis. However, the findings were extrapolated to the population of all children (whether or not they had a parent enrolled).

DHS is using the findings and available data about social risk factors not just to adjust payment, but to emphasize the importance of social risk factors as we serve Minnesota individuals and families. DHS hopes to facilitate broader understanding of social risks amongst IHPs and IHP participating providers by informing them about the prevalence of social risk factors in their patient populations, and gathering information about population health strategies developed by IHPs to address these issues in their Medicaid population. As a requirement for receiving the PBP, IHPs must document an intervention or strategy that addresses a social risk factor and report the results of process and/or outcome measures every year. Already, IHPs have generated new partnerships with community-based organizations, and some have begun implementing processes for screening for social risks, and finding ways to refer these patients to community partners who can help address the identified needs.

IX. Next Steps

The research team is continuing to investigate the most promising interventions identified in this report related to homelessness and substance use disorder. Those are described next. The last part of this chapter will describe the interventions that may improve the health of people with two additional risk factors (living in deep poverty and having a history of prison incarceration).

Addressing disparities for people experiencing homelessness

In 2017 the Minnesota Legislature authorized the Department of Human Services to pursue a new MA benefit to cover Housing Support services. The intent with this new benefit was to improve housing stability, but also to decrease homelessness and institutionalization. The targeted population for this benefit are adults on Medicaid who are over the age of 18, and who are experiencing disabling conditions as well as housing instability and a need for services. There are three overarching goals of the proposed services: 1. Support an individual's transition to housing in the community; 2. Increase long-term stability in housing; and 3. Avoid future periods of homelessness or institutionalization.

The services fall in to two categories:

- Housing Transition Services: Housing Transition Services help people plan for, find and move to homes of their own in the community;
- Housing Sustaining Services: Housing Sustaining Services support a person to maintain living in their own home in the community.

These services are contingent on DHS receiving approval from the Center for Medicaid and Medicare Services (CMS). The current timeline is to submit an application to CMS by the end of 2018.

Homeless algorithm

DHS staff are discussing the feasibility of conducting an analysis of the health care costs of people experiencing homelessness. This type of analysis would leverage existing data to develop an algorithm for identifying homeless MA enrollees whose health care costs are distinctive in these ways: 1) costs are consistently high over several years, and 2) at least some of the costs appear to be preventable if they had had stable housing. This might include a review of methodologies used by other researchers who have done this type of work. A collaboration with the Department of Corrections to include costs associated with recidivism could also be beneficial. This analysis is one strategy adopted by the Statewide Plan to Prevent and End Homelessness.

We expect that this analysis would provide a sample of people who could be served much more cost-effectively by providing housing up front. If we moved forward with this type of analysis, we would seek the advice of IHPs, MCOs and other health care organizations and payers who may have a financial incentive to assist with facilitating and funding housing providers to serve this population. This work would not have a noticeable impact on the approximately 50,000 MA enrollees experiencing homelessness *without* high health care costs. However, we hope that identifying a few hundred people in this category could help us to leverage cost-neutral mechanisms for addressing homelessness and related social risks upstream.

Addressing disparities for people with Substance Use Disorder

DHS' Alcohol and Drug Abuse Division is also continuing work on the many legislative changes from the 2017 session which are designed to increase access to SUD services.

SBIRT

DHS staff are looking into the possibility of investigating to what degree Medicaid providers screen for risky alcohol use, and their use of SBIRT in particular. SBIRT is an effective method for preventing people with risky alcohol use from developing a substance use disorder. However, DHS does not currently know how widely this is used by primary care providers, though we know that these providers seldom bill Medicaid for this service.

Representatives from the Health Care Administration and from the Community Supports Administration could work together to develop recommendations for how this and similar effective screening services could be more widely available to MA enrollees. If we found that SBIRT is seldom provided, then we could look into strategies other states have successfully used to promote this service, and into strategies used by health care providers in Minnesota that do this effectively. We could also ask providers how we can support them in doing this work. We hope to develop recommendations that will remove barriers and increase utilization of SBIRT and similar services.

Next social risk factors to investigate

In the fall of 2017, two new working groups were convened to identify interventions that could improve the health of people who 1) were living in deep poverty or 2) have a history of prison incarceration.

Deep poverty

Research and policy staff from the following DHS divisions: the Office of the Medical Director, the Healthcare Research and Quality Division, and the Economic Assistance and Employment Stability Division are working closely to identify interventions that can improve the health of people living in deep poverty. Staff from the Department of Health are also working on this. Some of the interventions which been reviewed to date are food support programs (SNAP), nutritional education programs, income support programs (e.g. Earned Income Tax Credit) and care coordination programs.

History of prison incarceration

Research and policy staff primarily from DHS' Health Care Administration (Office of the Medical Director, Health Care Eligibility and Access, Community and Care Integration Reform) and Community Supports Administration (ADAD, Mental Health, Housing), are working closely with research and policy staff from the Department of Corrections (health, re-entry, housing, probation services) to identify interventions which can improve the health of people who have been in prison. So far, we have reviewed the evidence regarding the following types of interventions for people with behavioral health or medical conditions: re-entry services, care coordination services, and housing support services.

Acronyms

ACG: Johns Hopkins Adjusted Clinical Grouper risk adjustment tool

ACT: Assertive Community Treatment

ADAD: DHS Alcohol and Drug Abuse Division

BHH: behavioral health home

CCBHC: Certified Community Behavioral Health Clinic

CMS: Centers for Medicare and Medicaid Services

COPD: Chronic Obstructive Pulmonary Disease

DHS: Minnesota Department of Human Services (author of this report)

ECHO: Extension for Community Healthcare Outcomes

ED: Emergency Department (also called the ER)

EHR: Electronic health records

FPL: Federal poverty line

Hep-C: Hepatitis C

HI-TECH: Health Information Technology for Economic and Clinical Health

HMA: Health Management Associates (analytic vendor on this project)

HIV: Human immunodeficiency virus

ICHiRP: Integrated Care for High Risk Pregnancies

IHP: Integrated Health Partnerships

LTH: Long Term Homeless (LTH) Supportive Service Fund

MAT: Medication Assisted Treatment

MCO: Managed care organization (e.g. Blue Cross Blue Shield)

MMB: Minnesota Management and Budget

MinnesotaCare: Minnesota's public health insurance program for people who do not qualify for Medical Assistance

MNsure: Minnesota’s online enrollment system for people enrolling in MA and for individual health insurance plans

NAS: Neonatal abstinence syndrome

PBP: Population based payment

PI: Prior incarceration

PTSD: Post Traumatic Stress Disorder

QDRA: Quality Reporting Document Architecture data standards

SBIRT: Screening, Brief Intervention, Referral to Treatment

SMI: Serious mental illness

SUD: Substance Use Disorder

TPL: Third party liability reimbursement

OUD: Opioid Use Disorder

STR: State Targeted Response to the opioid crisis grants

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