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Supplemental Nutrition Assistance Program Participation is Associated with Lower Health Care Spending among Working Age Adults without Dependents

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Abstract: Prior evidence suggests an association among food insecurity, poor health, and increased health care spending. In this study, we are using a natural experiment to confirm if longer participation in the Supplemental Nutrition Assistance Program (SNAP) is associated with reduced Medicaid spending among a highly impoverished group of adults. In 2013, the mandatory work requirements associated with SNAP benefits were lifted for able-bodied adults without dependents (ABAWDs). Using 2013 to 2015 Medicaid and SNAP data of 24,181 Minnesotans aged 18–49, we examined if changes in SNAP enrollment duration affect health care expenditures. In fully adjusted within-participant regression models, for each additional month of SNAP, average annual health care spending was \$98.8 lower (95% CI: –131.7, –66.0; p<.001) per person. Our data suggests that allowing ABAWDs to receive SNAP even in months they are not working may be critical to their health as well as cost-effective.

Key words: Medicaid, food stamps, SNAP, ABAWD, poverty, food insecurity.

According to the USDA, an estimated 35 million Americans experienced some form of food insufficiency¹ for an average of seven months² in 2019 primarily due to

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lack of money,¹ and recent estimates suggest that the pandemic-induced economic downturn has increased the incidence of food insecurity.³ Worry about the next meal, lack of access to nutritious foods, as well as unmet health care needs due to buying food instead of medications or medical care can have long-term health consequences for individuals living with food insecurity.⁴⁻⁸

Research shows that participation in the federal Supplemental Nutrition Assistance Program (SNAP) reduces food insecurity^{9,10} and improves health outcomes.^{11,12} Recent studies have found health care savings of up to \$1,400 per annum associated with SNAP participation¹³ and a 25% increase in health care expenditures (\$1,739 annually) associated with greater food insecurity.¹⁴ These findings suggest that expansions of SNAP may not only improve population health and reduce food insecurity, but may also be one way to lower our nation's health care spending. More research is needed to confirm the findings from these observational studies. In particular, experimental studies are needed to overcome the empirical challenge of self-selection into SNAP. While evidence suggests that those with the greatest food insecurity have the highest rates of enrolling in SNAP, there is also evidence that individuals with disabilities are the least likely to maintain consistent enrollment in SNAP even while being continuously eligible, due to procedural difficulties.¹⁵ If there is positive selection into SNAP, SNAP participants may have lower health care expenditures because they are healthier than those who do not receive SNAP.

Our study attempts to fill this gap by longitudinally examining the change in health care spending associated with additional SNAP benefits through a SNAP rule change. From 1996 to 2009, able-bodied adults without dependents (ABAWDs)—adults aged 18 to 49 without dependents and without a certified disability—were only allowed to receive SNAP benefits for three months out of every 36 months unless they met special work requirements.¹⁶ In 2009, due to the recession, a rare temporary rule change waived this work requirement and ABAWDs who met all the other eligibility criteria could receive SNAP for all months.¹⁷ The work requirements were reinstated in 2013 and by 2017 more than one-third of ABAWDs (an estimated 600,000 persons) on SNAP lost such benefits nationwide.¹⁸ In Minnesota alone, 45,000 ABAWD SNAP cases were closed between February 2014 and February 2015 (unpublished internal report, 2018). Recently, a similar waiver of work requirements came into effect under the 2020 Families First Coronavirus Response Act. It is important to understand the role of such policies among ABAWDs.

The primary objective of this study was to examine the association between months of SNAP benefits received and medical expenditures among adults enrolled in public health insurance in Minnesota, using the work requirement rule change as a natural experiment. An additional contribution of this study is the use of administrative data as SNAP participation is known to be under-reported in surveys causing uncertain estimates due to measurement error.¹⁹

This study also presents an opportunity to examine characteristics of the ABAWD population and the effects of additional work requirements on ABAWDs in the SNAP program. Thus, the secondary objective of this study was to examine ABAWDs who fall into specific high-risk subgroups that are associated with difficulties in obtaining or maintaining employment: those with chronic physical conditions or mental health

conditions, and those with histories of homelessness. We determine the prevalence of ABAWDs with these issues and estimate the health care cost savings associated with providing them with an additional month of SNAP.

Methods

Administrative Medicaid and MinnesotaCare health care claims data and SNAP assistance data for calendar years 2013, 2014, and 2015 from the Minnesota's public program data warehouse were used for analyses. Households with incomes below 165% of the federal poverty level (FPL) are generally eligible for SNAP benefits in Minnesota. Minnesota expanded Medicaid to cover all adults with incomes less than 75% FPL in 2011 and then, in 2014, expanded Medicaid to all adults with incomes less than 133% FPL. MinnesotaCare is a state-subsidized public health insurance program for households with incomes up to 200% of the FPL that do not qualify for Medicaid, and has been in place since 1992. The health benefits included in these programs are comparable.^{20,21} Based on the income criteria, all SNAP-eligible households were also eligible for either Medicaid or MinnesotaCare in Minnesota over the entire study period.

Sample. Eligible study participants (n=40,130) included all individuals who were 18–49 years of age, received SNAP benefits in 2013, did not have children under age 18, were not pregnant, did not have a certified disability, and were not residents of four counties (out of Minnesota's 87 counties) or eight reservation areas with waived work requirement over the entire study period because of high unemployment. This sample of ABAWDs was matched to enrollees in Medicaid or MinnesotaCare in 2013 and in at least one of the follow-up years (Figure 1), regardless of whether they used health care benefits or not, resulting in a final sample size of 24,181.

Variables. *Primary outcome: Annual health care spending*. Spending data associated with medical and dental services extracted from administrative claims data were included. Nominal dollars were used (unadjusted for inflation) because the reimbursement rates in Minnesota's public programs did not change over the study period.

Primary exposure: Number of months receiving SNAP benefits per year. Participants in the sample were enrolled in SNAP for 7.1 months in 2013 (SD=3.7), 1.6 months in 2014 (SD=2.1), and 0.4 months in 2015 (SD=1.6). This decline over time is expected given the restriction in SNAP participation beginning in 2014. The small percentage of participants who received SNAP benefits after the rule change did so because they might not have received SNAP for three months before the change, or they might have met work requirements or earned additional months of eligibility through work.

Demographic data. Age in years was calculated using December 31 of each study year as the anchor date. Self-reported gender (male or female) and the number of years of formal education were obtained from the enrollment information. The following six race/ethnicity categories were developed based on the self-reported race and Hispanic ethnicity data: 1) Asian/Pacific Islander, 2) Black, 3) Native American, 4) non-Hispanic White, 5) Hispanic, and 6) Unknown/Missing. Participants were categorized as living in the seven-county Twin Cities Metro area (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington) or the non-Metro area. Homelessness during any time in 2013 was self-reported. Federal poverty level percentage was calculated based on the veri-



Figure 1. Flow chart showing selection process and study participation—2013 to 2015.

fied income and household size of their SNAP household during their last month of SNAP receipt in 2013.

Other health care data. Total number of months enrolled in the health care program was calculated for each study year. The Johns Hopkins' Adjusted Clinical Groups (ACG) software 10.01 (The Johns Hopkins University School of Hygiene and Public Health in Baltimore, Maryland, USA) provided measures of health status based on administrative claims data on health care utilization and diagnoses. Specifically, we adjusted analyses by the rescaled concurrent weights for the year prior to the study year (e.g., 2012 weights for 2013); the ACG algorithm assigned higher weight values to individuals with poorer predicted health. The ACG software also generated indicators for the presence of depression and six physical chronic conditions: diabetes (type 1 or type 2), hypertension, heart disease (ischemic heart disease and congestive heart failure), asthma, chronic pulmonary obstructive disease, and chronic renal failure. Severe mental illness (SMI), defined as a mental, behavioral, or emotional disorder resulting in serious functional impairment, which substantially interferes with or limits one or more major life activities.^{22[p.121]} was separately captured through claims data using either International Classification of Diseases (ICD) or Healthcare Common Procedure Coding System (HCPCS) codes. All conditions were determined using both current (2013-2015) and historic (2008-2012) claims data and vary across time for each individual. For example, a person with a new diabetes diagnosis in 2014 will be classified as having diabetes in 2014 and 2015, and not in 2013.

Statistical analyses. The association between a change in months of SNAP participation and changes in annual health care spending over time was estimated using a within-participant estimation model. This model addresses endogeneity concerns because participants are compared with themselves over time, instead of a separate group of untreated participants who may have important unobservable differences. Simple and multivariable models were estimated; where the simple model only adjusted for the number of months enrolled in health care, the multivariable models additionally adjusted for individual's medical complexity. Specifically, the simple model is represented by equation (1) and the multivariable model is represented by equation (2), where C_{it} are the annual health care costs of individual *i* in year *t* (in dollars), μ_i are year indicators (t=2013, 2014, or 2015), α_t represents the individual fixed effects (which is how the within-participant model was implemented), **SNAP**_{it} is the number of months of SNAP benefits received by individual i in year t, X_{it} is the number of months individual i was covered by Medicaid or MinnesotaCare in year t, and $H_{i(t-1)}$ includes the ACG weights from the previous year, and indicators for the presence of chronic diseases (from the list of six physical health conditions and two mental health conditions).

$$C_{it} = \mu_t + \alpha_i + \beta_1 SNAP_{it} + \beta_2 X_{it} + \varepsilon_{it}$$
(1)

$$C_{it} = \mu_t + \alpha_i + \beta_1 SNAP_{it} + \beta_2 X_{it} + \beta_3 H_{i(t-1)} + \varepsilon_{it}$$

$$\tag{2}$$

Because the within-participant model adjusts for all time-invariant participant characteristics, whether observable (such as race/ethnicity or education) or unobservable (such as health literacy or social support), demographic characteristics were not included in the regression specification. Separate analyses were conducted on the full sample (n=24,181), and for the following subsamples of high-risk participants who may have especially high barriers to employment: those who experienced homelessness in 2013 (n=7,644), participants with physical chronic conditions (n=8,110), and participants with any mental health conditions (n=9,859).

Sensitivity analyses. Because our results may be influenced by participants with very high expenditures, we conducted analyses after excluding the top 1% of spenders (defined as spending above \$42,720.22 annually).

Potential pathways. Additionally, to explain the sources of changes in spending, analyses were conducted where changes in three annual utilization patterns (inpatient admissions, emergency department visits, or outpatient visits) per 1,000 person-years was regressed on changes in the number of SNAP months, after adusting for variables in equation (2). The numbers of inpatient admissions, emergency department visits, and outpatients visits were extracted from the administrative claims data for each year (2013, 2014, and 2015). We also computed the average expenditure per enrollee per month for a comparable group of Minnesota's Medicaid beneficiaries without SNAP benefits (19–49 years old non-pregnant enrollees without a disability) during the same study period to examine whether medical inflation was driving our findings.

All analyses were conducted in SAS 9.4 (SAS Institute Inc.). Rescaled concurrent weights were missing for 22% of the sample. We used non-monotone arbitrary missing pattern multiple imputation to handle missing data with three imputed data sets reaching a relative efficiency of 98%. Statistical significance was defined as a two-sided

p-value<.05 for the full sample and a two-sided p-value<.013 for subsample and sensitivity analyses to account for multiple comparisons.

Results

Study participants. We analyzed data on 24,181 ABAWDs with at least two years of enrollment in Medicaid/MinnesotaCare. On average, participants were enrolled in Medicaid/MinnesotaCare for 24.4 months (SD=8.7) between January 2013 and December 2015. Mean age was 29.6 years old (SD=8.2). The majority of ABAWDs were male (68.3%), residing in metro counties (61.3%), with an average of 11.2 years of education (SD=2.7). The average income of the sample was 26.2% FPL (SD=43.3), and 31.6% experienced homeless in 2013. The majority of participants were non-Hispanic White (44.6%), followed by non-Hispanic Black (28.3%) (Table 1).

The average health care spending for 2013, 2014, and 2015 was \$3,453.9 (SD=9,505.5), \$3,802.2 (SD=10,069.6), and \$4,478.4 (SD=12,631.9), respectively. Additionally, our medical claims indicate that 34% of people deemed to be ABAWDs have one of the six physical conditions reviewed, and over 40% have one of the mental health conditions reviewed (Table 1).

Health care expenditures and SNAP months. In the multivariable within-participant models, participants' annual health care spending was \$98.8 lower (95% CI: –131.7, –66.0; p<.001) on average for each additional month of SNAP they received compared with years with fewer months. Among individuals with a history of homelessness or physical or mental health conditions, higher mean changes in spending were observed compared with overall samples (Table 2).

Sensitivity analyses. After the exclusion of high (top 1%) spenders, each additional month of SNAP was associated with \$60.7 less in health care spending (95% CI: –78.3, –43.0; p<.001) (Table 2).

Potential pathways. We observed significantly lower hospital admissions (-2.4 (-3.7, -1.1); p <.001) and outpatient visits (-131.1 (-201.0, -61.3); p<.001) per 1,000 person-years during the year when beneficiaries had more SNAP benefits. The change in emergency department visits per 1,000 person-years was not statistically significant (4.4 (-0.2, 9.0); p=.061). Additional pathway analyses among the comparable group of Minnesota adults suggested that the average per member per month reimbursements were lower in 2014 and 2015 than in 2013 (329.6 in 2013; 275.8 in 2014; 289.8 in 2015).

Discussion

This study strongly suggests an association between SNAP participation and reduced health care spending for ABAWDs. Each additional month of SNAP benefits is associated with a reduction of \$98.8 in health care spending. Excluding the top 1% in expenditures, the estimated reductions in health care spending are still significant at around \$60.7. These savings come from significantly fewer inpatient admissions and outpatient visits. These findings are not surprising given the existing evidence on the health consequences of food insecurity. Population-based studies among U.S. adults suggest a significant positive association between food insecurity and chronic disease

Table 1.

DEMOGRAPHIC CHARACTERISTICS OF ABAWDS IN MINNESOTA PUBLIC ASSISTANCE PROGRAM IN 2013, N=24,181

Description	Ν	Mean (SD) or Percentage	
Age in Years	24,181	29.6 (8.2)	
Females	7,665	31.7%	
Race/Ethnicity			
Asian-Pacific Islander	925	3.8%	
Non-Hispanic Black	6,840	28.3%	
Hispanic	955	4.0%	
Native American	1,196	5.0%	
Unknown	3,481	14.4%	
Non-Hispanic White	10,784	44.6%	
Federal Poverty Level	24,179	26.2% (43.3)	
Education in Years	24,120	11.2 (2.7)	
Metro Residence, Yes	14,820	61.3%	
Homeless, Yes	7,644	31.6%	
Chronic Diseases			
Mental Health	9,859	40.8%	
Depression	9,333	38.6%	
Severe Mental Illness	3,639	15.1%	
Physical	8,110	33.5%	
Diabetes	1,060	4.4%	
Heart Disease	318	1.3%	
Hypertension	3,476	14.4%	
Asthma	5,421	22.4%	
Chronic Obstructive Pulmonary Disease	105	.4%	
Chronic Renal Failure	101	.4%	
Concurrent Rescaled ACG Weight	22,084	.6 (1.2)	
Number of Months in health care program	24,181	8.3 (3.6)	
Medicaid Spending in US Dollars	24,181	3453.9 (9505.5)	
Number of Months in SNAP	24,181	7.1 (3.7)	

Note:

ABAWD = Able-Bodied Adults Without Dependents; ACG = Adjusted Clinical Groups^{*} (The Johns Hopkins University School of Hygiene and Public Health in Baltimore, Maryland, U.S.A.); SD = Standard Deviation; SNAP: Supplemental Nutrition Assistance Program

prevalence, including hypertension, hyperlipidemia,⁴ obesity, and diabetes,²³ as well as chronic stress, dissatisfaction with life, and mood disorders.⁶ Food insecurity is also associated with indicators of unmet health care needs such as postponed medical care²⁴ and poor disease management²⁵ such as low medication adherence,^{8,24,25} which can lead to expensive medical care in the emergency and hospital setting.^{26–29} Consistent with

Table 2.

CHANGE IN ANNUAL HEALTH CARE SPENDING PER MEMBER FOR EACH ADDITIONAL MONTH OF SNAP BENEFITS—ABAWD BENEFICIARIES IN MINNESOTA IN MINNESOTA PUBLIC ASSISTANCE PROGRAM (2013, 2014 AND 2015)^a

Within-Participant Model	Simple ^b	Multivariable ^c
Full Sample	\$-92.3 (-125.3, -59.3)***	\$-98.8 (-131.7, -66.0)***
Homeless Subsample	\$-145.4 (-205.6, -85.2)***	\$-151.0 (-210.8, -91.2)***
Mental Health ^d Condition	\$-200.8 (-267.0, -134.7)***	\$-207.8 (-273.7, -141.8)***
Physical Disease ^e	\$-188.5 (-262.8, -114.2)***	\$-194.3 (-268.4, -120.1)***
Excluding Top Spenders	\$-55.8 (-73.6, -38.1)***	\$-60.7 (-78.3, -43.0)***

Note:

SNAP = Supplemental Nutrition Assistance Program; ABAWD = Able-Bodied Adults Without Dependents

^aMean change in spending with 95% Confidence Intervals is reported.

^bSimple Within Participant Model—Adjusted for year and number of months in Medicaid or MinnesotaCare.

^cMultivariable Within Participant Model—Adjusted for year, number of months in Medicaid or MinnesotaCare, concurrent Rescaled ACG weights, physical disease and mental health chronic condition flags.

^dMental Health Condition subsample—Participants with depression or severe mental illness

^ePhysical Disease subsample—Participants with one or more of the following chronic conditions: diabetes, hypertension, heart disease, asthma, chronic pulmonary obstructive disease and chronic renal failure.

***Significance noted at p<.001

these findings, other studies have documented decreased inpatient hospital spending²⁷ among SNAP recipients.

The current study findings are consistent with the prior finding that the annual health care spending among adults who received SNAP for at least one month in the prior year was \$1,400 lower than low-income adults (<200% of the FPL) without SNAP.¹³ Our study suggests that a participant with SNAP benefits would have had an average annual health care spending reductions ranging between \$98.6 and \$1,183 (if they received 1 and 12 months of SNAP, respectively). The higher estimates in Berkowitz et al. could be due to the wide scope of their sample which was designed to represent all noninstitutionalized adults in the U.S. Our paper focused more specifically on a sample of adult Medicaid enrollees in Minnesota under the age of 50 who had been categorized as not disabled. The Berkowitz sample was thus older, could have a disability, and could have any health insurance status, including private insurance, Medicare, or no insurance. All of these factors would push their estimates to be higher than our own. Higher health care costs in Minnesota (compared with the national average) may also be a factor in the different cost savings magnitudes.^{30,31} In addition, their estimates may include inherent differences between the treatment and control groups above and beyond the

benefits from SNAP.¹³ That is, individuals who enroll in SNAP may be healthier than non-enrollees. Our study compares SNAP enrollees with themselves in different years where their SNAP participation duration was different, thereby minimizing selection bias. Additionally, we were able to account for differences in expenditures related to the duration of SNAP benefits (dosage effects) and medical complexity.

This study also highlights an alarmingly high burden of various chronic diseases and homelessness in people categorized as ABAWDs in Minnesota. Factors such as increased absenteeism³² and decreased work productivity³³ may negatively affect the employability of ABAWDs with chronic diseases,³⁴ which can exacerbate poverty and food insecurity in a mutually reinforcing cycle. A recent systematic review confirms that the challenge of gaining and maintaining employment for this population is much more daunting than can be addressed by employment programs alone.³⁵ Examination of American Community Survey data suggests an association between work requirements and decreased SNAP participation among childless adults with a disability, especially if they were not receiving Social Security Income (SSI) benefits. Applicants for SNAP may have a disability but have difficulty demonstrating that they meet the exemption.¹⁸ For example, we found that 42% of SNAP ABAWDs whose SNAP case closed in 2018 due to work requirements had been treated for SMI sometime in the past seven years (based on Minnesota Medicaid recipients, data not shown). Notably, such medical information is not accessible to financial assistance program offices. This raises significant doubts about the appropriateness of asking County workers to assess who is able-bodied, especially since the stakes are high for this population which is so financially vulnerable and in need of financial assistance.

Important strengths of this study are 1) the use of longitudinal SNAP and health care claims data, and 2) the use of a SNAP rule change, which caused a dramatic decline in the SNAP participation rate of ABAWDs, 3) administrative data on SNAP participation, and 4) the use of within-participant methods that adjust for unobservable time-invariant characteristics that differ across participants. In addition, to our knowledge, this is the first longitudinal study of the association between an exogenous restriction in SNAP participation and health care spending, and the first study to examine this association among ABAWDs who have limited access to SNAP assistance.

Limitations. Limitations of this study include lack of randomization and lack of a non-treated control group. Our pathway analyses that explored general expenditure trends among a comparable group of Medicaid beneficiaries in Minnesota during the same study period demonstrated a declining trend in per member per month spending suggesting that inflation was not driving the study results. However, we acknowledge that until randomized controlled trials are conducted, we will not definitively know the causal effect of a SNAP expansion or restriction on health care spending. In particular, we cannot rule out selecton entirely, i.e., SNAP participants who were healthier may have been able to maintain their SNAP benefits by meeting work requirements. However, we argue selection is likely not driving the results given that additional analyses indicated that participants who received SNAP benefits after the rule change were more likely to have a mental health condition and a physical health condition than those who received no SNAP benefits after the rule change (data not shown).

This study focused on ABAWDs, a subset of SNAP participants who were subject

to a SNAP rule change, and we cannot be sure that the results found here are generalizable to all SNAP participants or a general expansion of SNAP. The SNAP rule change may have had additional effects on participants besides reducing the months of SNAP benefits received (e.g., work requirements could have induced additional stress). However, we argue that this population and work requirements are interesting in themselves. In 2016, 11 million people were estimated to be eligible for SNAP as ABAWDs; of those, 4.7 million SNAP recipients were characterized as ABAWDs and subject to work requirements.³⁶

A final limitation of this study is that the sample of ABAWDs studied here may not be representative of all ABAWDs. They may be a relatively advantaged sample of ABAWDs who had resources and lower barriers to enroll in SNAP compared with other eligible ABAWDs. On the other hand, the studied sample of ABAWDs may have negatively selected into our sample by our requirement that they be eligible for public programs in multiple years, suggesting that our data are missing individuals who were ABAWDs in 2013, but escaped poverty in future years. Additional analysis on the participants (n=9,142; see Figure 1) who were excluded due to lack of Medicaid/MinnesotaCare enrollment during either follow-up year indicates that most of these individuals also did not receive SNAP benefits during the follow-up period suggesting these individuals may have moved out of the public benefit systems due to improvements in job or income status, or an out-of-state move. This underlines that ABAWDs as a group are not well understood or studied, and ABAWDs who became subject to the time limit in 2013 do not fit a single profile. With improving economic conditions, it is likely that some achieved employment that allowed them access to private insurance or raised their income beyond eligibility for public health care. However, our data suggest that this is a very vulnerable population with many barriers to employment including limited work history, high rates of homelessness and mental health diseases. These barriers may have limited the job prospects of those ending SNAP participation, even during the economic upturn. Thus, it is difficult to predict how the spending estimates would differ for all ABAWDs if they gained access to continuous SNAP benefits.

Conclusions. This study presents evidence suggesting that the average spending of a month of SNAP, which is \$119/month in Minnesota,³⁷ is partially offset by reduced health care expenditures in the Medicaid or MinnesotaCare programs. This study also finds that over half of the ABAWDs in the sample had significant physical and mental health burden, and one in four was homeless, which may be substantial barriers to employment. These findings highlight the significant gap between the intent of the policy to promote work among able bodied adults while exempting those with disabilities from these requirements and the requirement that SNAP recipients who are most vulnerable demonstrate and verify their eligibility for exemptions specifically designed for them. Together, this suggests that allowing people who are categorized as ABAWDs to receive SNAP even in months when they are not working could provide benefits on three levels: ABAWDs would receive much-needed food to support their health and ability to find employment, it would reduce this population's public health expenditures, and it would reduce the administrative burden of demonstrating disability among a highly vulnerable population.

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