The Effect of Chronic Illness on Participation in the Supplemental Nutrition Assistance and Medicaid Programs

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Abstract

We examine enrollment in the U.S. Medicaid and Supplemental Nutrition Assistance Programs (SNAP) by health status and find that while SNAP-eligible adults in poor overall health and with multiple chronic conditions are more likely to jointly enroll in SNAP and Medicaid, they are less likely to enroll in SNAP alone. We also find that the conditional probability of SNAP enrollment given Medicaid participation is higher for individuals with multiple chronic conditions, indicating that the Medicaid program facilitates food assistance receipt for these individuals. As a result, both Medicaid expansions and state and federal policies that harmonize eligibility criteria or promote enrollment coordination between SNAP and Medicaid are expected to increase the number of individuals in SNAP with chronic medical conditions. Such a change in the composition of SNAP enrollees would increase the justification for using SNAP as a platform for health promotion initiatives.

Keywords: SNAP, Medicaid, program selection, health and chronic illness

Introduction and Motivation

The Supplemental Nutrition Assistance Program (SNAP) is a cornerstone of the United States' social safety net. In fiscal year 2011 the program served 44.7 million participants at a cost of $75.7 billion, making it one of the largest federally funded public assistance programs in the United States (USDA, 2012). While the eligibility criteria for SNAP are based primarily on poverty status and household composition, the reasons why individuals meet these criteria and enroll in the program are varied. Program participation data suggest that a significant portion of SNAP recipients may be resource constrained due to disability or chronic medical conditions. In particular, 20 percent of SNAP participating households contained a nonelderly disabled adult, and 21 percent concurrently received Supplemental Security Income (SSI), a means-tested public assistance program for the disabled (USDA, 2011).

Given that the prevalence of chronic disease is highest for those below the poverty line, a strong association between SNAP receipt and poor health would not be surprising (Kaiser Family Foundation (KFF), 2009). Indeed, low income individuals are more than twice as likely to rate their health as poor or fair than middle or upper income individuals (Bodenheimer, Chen and Bennett, 2009). Yet, beyond basic information about disability and weight status, little is known about the health profile of those enrolled in SNAP. We seek to fill this gap in the literature by providing the first comprehensive assessment of the health characteristics of SNAP-eligible nonelderly adults using the 2000-2005 Medical Expenditure Panel Survey (MEPS). In doing so, we consider multi-dimensional measures of overall physical and mental health as well as indicators for chronic conditions, diet-sensitive conditions, and measures of physical and cognitive limitation used to determine disability.

We also investigate the association between health conditions and participation in federal social assistance programs through a multinomial probit model of enrollment choice that

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characterizes selection by SNAP-eligible individuals into SNAP, Medicaid, both programs, or neither program. We believe that these estimates will be valuable to researchers and SNAP program administrators concerned with initiatives to improve the health and nutrition of SNAP recipients. An example of one such initiative is USDA's recent Healthy Incentives Pilot in Hampden County, MA, increased food stamp benefit values allocated to the purchase of fruits and vegetables relative to other foods. We expect similar future initiatives to emerge from the 2010 Healthy, Hunger-Free Kids Act, which increased funding for nutrition education and changed nutrition education guidelines to promote food choices consistent with the Dietary Guidelines and improve coordination among various federal and state food assistance programs (Pub.L. 111-296).

Our estimates will also be useful to policy makers who seek to increase the take-up of SNAP benefits among vulnerable populations in poor health through better coordination with the Medicaid program. Until recently some individuals eligible for SNAP were not eligible for Medicaid, but the new federal health care law, the Patient Protection and Affordable Care Act (ACA; Pub.L. 111-148), expands Medicaid eligibility to the full SNAP-eligible population.[1] The ACA also establishes new requirements for eligibility determination and enrollment processes related to Medicaid, and future eligibility determination systems are expected to draw on participant data from other social programs, such as SNAP. As a result, states have the option of expanding the new systems to include SNAP and TANF (KFF, 2010a). Both of these features of the ACA increase the potential to increase take-up of the most vulnerable members of the low income population by both programs through better coordination in enrollment.

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[1] The ACA expands the modified gross income eligibility cutoff for Medicaid to at least 138% of the federal poverty line, whereas the current SNAP gross income cutoff is 130%.

The design and implementation of enrollment coordination initiatives requires a thorough understand of selection patterns into SNAP and Medicaid by those in poor health. One particular challenge, however, is that such patterns are expected to vary considerably from state-to-state. This is because the U.S. Supreme Court ruled on June 28, 2012 that states could opt-out of the Medicaid expansion legislated under ACA. At present, 26 states and the District of Columbia are moving forward with the Medicaid expansion, while 25 states have chosen to opt-in or delay expansion (KFF, 2013). The Supreme Court's ruling has implications not just for enrollment coordination, but also for programs designed to improve the health of SNAP participants through other means. To the extent that the Medicaid program serves as a conduit for individuals with poor health to enroll in SNAP, states participating in the Medicaid expansion will have sicker SNAP populations than those who do not. Our estimates can be used to predict differences in the health characteristics of future SNAP participants among states that expand their Medicaid programs and states that do not, in order to inform all of these programs and initiatives.

Our analysis focuses on nonelderly adults because very few children suffer from chronic medical conditions, and because SNAP enrollment dynamics are different for the elderly. In particular, the fact that the elderly receive universal health care coverage through the Medicare program means that the health characteristics of elderly SNAP enrollees should be relatively unaffected by the ACA. Our findings indicate that the health status of the adult SNAP population is heterogeneous, and highly dependent on whether participants are jointly enrolled in the Medicaid program. As a result, state policies and provisions in the ACA that harmonize eligibility criteria or promote enrollment coordination between SNAP and Medicaid are expected to increase the number of individuals in the SNAP program with chronic medical conditions.

Background

Numerous studies have investigated factors associated with non-participation in SNAP. One consistent finding is that individuals with the lowest expected benefit levels are the least likely to enroll in the program and to seek out program information. In addition, individuals with limited benefits are the most likely to leave the program conditional on enrolling. (Blank and Ruggles, 1996; Haider, Jacknowitz and Schoeni, 2003, Daponte, Sanders and Taylor, 1999; Remler, Rachlin and Glied, 2001; Ribar, Edelhoch and Liu, 2010). Such individuals tend to have incomes near the eligibility threshold, higher levels of education, have fewer children, are more likely to be older, white and nondisabled, and are less likely to be food insecure (Blank and Ruggles, 1996; Huffman and Jensen, 2008). Studies also conclude that the high costs of maintaining eligibility due to frequent recertification requirements increase the probability that individuals leave SNAP, or fail to enroll in the first place (Kabbani and Wilde, 2003; Hanratty, 2006; Ribar, Edelhoch and Liu, 2008; 2010). Finally, researchers have investigated the impact of resource limitations and reporting requirements on enrollment (Ratcliffe, McKernan and Finegold, 2008; Hanratty, 2006;as well as stigma (Moffitt,1983; Levedahl,1995; Remler, Rachlin and Glied,2001;)), but we are not aware of any studies that investigate the impact of chronic medical conditions on the likelihood that individuals enroll in SNAP.

Because the income levels of SNAP recipients are quite low they typically qualify for other public assistance programs, such as Medicaid, which is by far the largest public health directed at poor families. Based on the 2007 MEPS, Medicaid and the State Children's Health Insurance Program (SCHIP) beneficiaries had family incomes that were 121% of the federal poverty line (FPL), on average, which is less than 130% of FPL gross income eligibility cutoff for SNAP. Medicaid provides public insurance to certain categories of low income individuals, such as children, parents, pregnant women, and the disabled. Medicaid recipients pay only a

small amount out-of-pocket for medical services (typically, $1-$3 for a doctor visit or prescription drug fill) and have relatively broad coverage (KFF, 2010b). As a result, the Medicaid program is costly, and accounted for $390 billion in outlays for over 51 million participants in fiscal year 2010 (KFF, 2012; 2011).

Much like SNAP, numerous studies have documented the impact of eligibility rules and enrollment processes on Medicaid participation (Ku and Garrett, 2000; Shore-Sheppard, 2008), and have found that stigma limits enrollment (Stuber and Kronebusch, 2004). But in contrast to SNAP, there is a significant empirical evidence of selection into the program based on health status, much of which can be tied directly to how the program is administered. In particular, many Medicaid recipients are enrolled in the program as a direct result of disability or a medical condition. These include persons with disabilities who receive Supplemental Security Income (SSI), certain low income Medicare beneficiaries, and low-income pregnant women. In addition, 39 states and the District of Columbia have provisions that allow "medically needy" individuals with incomes above standard Medicaid eligibility limits to qualify for the program if they spend-down a significant portion of their income on medical care within a budget period (CMS, 2002).

Furthermore, individuals are frequently enrolled in Medicaid as a result of an inpatient hospital stay. Fourteen states have presumptive eligibility provisions that allow certain individuals (often children and pregnant women) to temporarily qualify for services by self-reporting their income to medical providers, and hospital social workers generally help low income patients enroll in Medicaid in all states (KFF, 2010b). Collectively, these enrollment mechanisms generate significant selection into the program by individuals in poor health who suffer from chronic medical conditions. In support of this, Bae and Gardner (2004) find that having a special health care need is the strongest predictor of Medicaid enrollment for children,

while Ettner (1997), Pezzin and Kasper (2002) and Stuber and Kronebusch (2004) find that adults and the elderly in poor health are also more likely to enroll in Medicaid.

Conceptual and Empirical Approach

In order to evaluate the impact of health status on the likelihood that an individual enrolls in SNAP or Medicaid we start by considering the options facing a low income individual that meets the eligibility criteria for SNAP. If this individual also qualifies for Medicaid, she will choose among the following four options based on the perceived costs and benefits of each: 1) Enroll in SNAP; 2) Enroll in Medicaid; 3) Enroll in both SNAP and Medicaid; 4) Do not enroll in either program. More formally, let $U_{ij}=U(H_{ij},C_{ij},L_{ij})$ represent the utility, or well-being, individual i obtains from choosing option j, where j=1,2,3,4 correspond to the four coverage options above. Utility is defined over health status, H, consumption goods C, and leisure L. If this individual does not qualify for Medicaid, then her options are only j=1,4.

Enrolling in SNAP allows individuals to increase their utility through the purchase of additional consumption goods and by increasing their health status, provided these goods facilitate health production. For example, the individual can allocate SNAP benefits to the purchase of nutrient rich food, or reallocate cash income formerly devoted to food to the purchase of medical care, thereby increasing health.[2] However, enrolling in SNAP could lower utility if individuals must reallocate leisure time, or financial resources typically devoted to consumption goods, to the maintenance of eligibility. In addition, stigma may reduce the marginal utility of consumption derived from SNAP benefits. Likewise, enrolling in Medicaid allows individuals to increase their utility by improving access to medical services necessary to maintain health, or by allowing them to reallocate income to consumption goods, but stigma and

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[2] In support of the latter, Meyerhoefer and Pylypchuk (2008) find that upon enrolling in SNAP, low income women allocate some of their higher discretionary income to heath care consumption.

the time and monetary costs of enrollment ultimately lower utility. Ultimately, the extent to which an individual's utility increases from greater access to medical care or food depends on the individual's level of health, and as a result, an individual's health will affect her propensity to enroll in different public assistance programs.

Our empirical specification is based on the assumption that individuals compare their enrollment options and choose the option yielding the highest utility. Formally, suppose that individual i's utility function contains a deterministic component U_{ij} and a idiosyncratic component ε_{ij}, such that $\Psi_{ij} = U_{ij} + \varepsilon_{ij}$. We approximate this utility function as

$$\Psi^*_{ij} = \boldsymbol{\beta_j}\mathbf{H_i} + \boldsymbol{\delta_j}\mathbf{X_i} + \varepsilon_{ij} \tag{1}$$

where $\mathbf{H_i}$ denotes a vector of individual i's health characteristics, $\mathbf{X_i}$ is a vector of sociodemographic and labor market variables, and $\boldsymbol{\beta_j}$ and $\boldsymbol{\delta_j}$ are parameter vectors. Following McFadden's (1981) random utility maximization framework, the individual chooses option j if $\Psi_j - \Psi_h > 0 \ \forall \ h \neq j$. If we assume the idiosyncratic component of utility ε_{ij} is normally distributed, the empirical model of enrollment choice is the Multinomial Probit Model (MNP), and the probability that individual i chooses option j is

$$\Pr(j) = \Pr(\varepsilon_{ij} - \varepsilon_{ih} > (\boldsymbol{\beta_j} - \boldsymbol{\beta_h})\mathbf{H_i} + (\boldsymbol{\delta_j} - \boldsymbol{\delta_h})\mathbf{X_i}, \ \forall \ h \neq j) \tag{2}$$

In addition to determining the impact of the individuals' health characteristics on the likelihood of choosing different enrollment options, we can also use the MNP to determine how these characteristics affect the probability of enrolling in SNAP (S) conditional on Medicaid (M) enrollment: $\Pr(S|M) = \Pr(S,M)/\Pr(M)$.[3]

Data

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[3] Note that Pr(M), the unconditional probability of Medicaid enrollment, is equal to the probability that the individual participates in Medicaid irrespective of whether she is also enrolled in SNAP.

The data source for our empirical application is the 2000-2005 Medical Expenditure Panel Survey (MEPS). The MEPS is a comprehensive, nationally representative survey of the U.S. civilian non-institutionalized population, conducted annually since 1996, using an overlapping panel design. Respondents are interviewed about their medical care use and expenditures over the course of two years through five interview rounds. We use the annualized data files for 2000-2005, which contain five overlapping panels of data and two half panel at the ends of the data sample. We pooled these panels to create a large cross sectional dataset, containing two annualized observations for respondents from the five overlapping panels. Finally, we limited our sample to SNAP-eligible nonelderly adults between ages of 18 and 64 (inclusive).

Eligibility Determinations

The full set of eligibility criteria for SNAP and the Medicaid program considers not only income, but disability status and household composition as well. Whereas SNAP eligibility is relatively uniform and primarily resource-based, the eligibility criteria for the Medicaid program are much more complex and vary to a greater extent across states. Nonetheless, there is a significant amount of overlap between the set of individuals that are eligible for both SNAP and the Medicaid program. While nearly all children eligible for SNAP during the sample period also qualify for Medicaid benefits through SCHIP, some adults that were eligible for SNAP did not meet the income cutoffs or categorical eligibility requirements for the Medicaid program. [4]

In order to determine whether individuals are eligible to receive SNAP we verify that their household resources do not exceed the program limits placed on gross income, net income, and assets. With the exception of households that contain a disabled or elderly member 60 years

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[4] Children with family incomes of 200% FPL or higher are eligible for SCHIP in all but four states. Even for these states, however, the federal government requires children less 6 under 133% FPL and children 6-18 below 100% FPL be offered SCHIP benefits. Undocumented immigrant children are not eligible for either program.

of age or greater, households must have before tax gross income below 130 percent of the federal poverty line (FPL) adjusted for household size and composition. All households must have net income at or below 100 percent of the adjusted FPL after deductions are applied for child support payments, labor market earnings, medical expenses (if disabled), dependent care expenses, shelter costs, and a standard deduction. Finally, households cannot have more than $2,000 in countable assets ($3,000 if they have an elderly or disabled member). Most of the information needed to calculate SNAP eligibility is contained in the MEPS data, but some of it must be imputed. We describe the precise methodology used to determine SNAP eligibility in the appendix.

Among the SNAP-eligible population, pregnant women and disabled individuals who receive Supplemental Security Income (SSI) payments will all qualify for Medicaid. The parents of Medicaid-eligible children qualify in the twelve states that impose a maximum income limit of 133 percent of the FPL, but may not qualify in the remaining thirty nine states with income limits that are less than this amount. The single largest group of individuals that generally do not qualify for Medicaid at any income level are non-disabled childless adults.[5] In order to cover this group states must obtain a waiver or create a fully state-funded program. In 2009 only five states provided coverage to childless adults comparable to Medicaid, and fifteen states provided coverage more limited than Medicaid (KFF, 2010b).

While it is impossible for us to determine using the MEPS exactly how many individuals in our SNAP-eligible sample fail to qualify for Medicaid, we are able to infer that it is not large proportion of the overall sample. By far the largest non-Medicaid-eligible group is non-disabled childless adults, who comprise only 9.4 percent of our non-Medicaid-enrolled sample (14% of

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[5] SNAP eligibility for this group is also limited in some cases. In particular, non-disabled childless adults less than 50 years old can only receive SNAP benefits for three months if they are not employed or actively seeking employment.

the sample only enrolled in SNAP and 37% of the sample that is not enrolled in either program).

In the absence of sufficient information to accurately determine Medicaid eligibility, we estimate

our model on the SNAP-eligible population because it allows us to establish current patterns of

program enrollments based on health status, and to infer how legislated Medicaid expansions

may shift individuals across enrollment categories.

Health Status Measures and Control Variables

MEPS respondents are asked to report their medical conditions at several points during

the survey. For "priority conditions" that include diabetes, cardiovascular disease, asthma,

hypertension (high blood pressure), hyperlipidemia (high cholesterol), emphysema, joint pain,

and arthritis, respondents are asked whether they have ever been told by a health care

professional that they have the condition. In addition, MEPS respondents are asked whether their

medical visits or other events are related to any specific medical conditions. These responses are

then professionally coded using the *International Classification of Diseases*, Ninth Revision

(ICD-9), and subsequently collapsed to into 259 clinically relevant medical conditions using the

Clinical Classification System developed by the Agency for Healthcare Research and Quality

(AHRQ, 2007). We used the appropriate CCS codes to identify diet-sensitive and non-diet

sensitive chronic conditions among individuals in our data sample. The major diet-sensitive

conditions that we investigate explicitly include diabetes, hyperlipidemia, hypertension,

cardiovascular disease, gastrointestinal disorders, and endocrine, nutritional and immune

disorders. In addition, we categorize pregnant women as having a diet sensitive condition.

We created indicator variables for whether the individual suffers from each of the major

diet-sensitive chronic conditions above, as well as an indicator for whether the respondent suffers

from any of these conditions. To capture the cumulative effect of multiple conditions we also

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created indicators for whether the individual has just one chronic condition, two chronic conditions, or three or more chronic conditions from the list of approximately 150 chronic conditions identified by Hwang et al. (2001). These indicator variables measure specific aspects of the individual's health status, but not necessarily their overall health. In order to characterize the individual's health across all possible reported and un-reported conditions, we used the SF-12 physical and mental health summary scales available in the MEPS (Ware, Kosinski and Kelle, 1996).

SF-12 scores are constructed using the individual's responses to twelve separate questions that measure different dimensions of health. Both the physical and mental component scores are normalized over the full U.S. population to range between 0 and 100, with a mean of 50 and a standard deviation of 10. The SF-12 has been extensively validated and is highly predictive of a number of health outcome measures, such as medical expenditures and mortality (Burdine et al., 2000; Dorr et al., 2006; Fleishman et al., 2006). We created indicator variables for whether the individual's mental or physical health summary score was in the 0-32nd, 33rd-65th, or 66th-100th percentile of distribution of SNAP-eligible adults ages 18-64.

Finally, whether an individual has one or more chronic medical conditions is often strongly correlated with their disability status. Measuring disability level is important not only because it provides an additional indication of the severity of an individual's medical conditions, but also because disability is one of the primary determinants of whether an individual qualifies for Medicaid. Therefore, we created indicator variables for whether the individual received help with one or more activities of daily living (ADL) or instrumental activities of daily living (IADL) due to a physical or mental health impairment. The former include basic functions such as bathing, dressing or getting around the house, while the latter includes more complex social

tasks such as using the telephone, paying bills, taking medications, preparing light meals, doing laundry, or going shopping.

In addition to health status indicators, our regression models control for the following factors: race/ethnicity (white, black, hispanic, other race), age (indicators for whether age was between 35-54, 55-64, or 65 or older), household composition (No. of HH members ages 0-5, 6-17, 18-64, 65 or older), the level and square of household income per capita, education level (no high school diploma, high school graduate, some college, bachelor's degree or higher), respondent marital status (married, divorced, single), immigration status (non-citizen immigrant, citizen immigrant), census region (northeast, midwest, south, or west), whether the respondent lives in an MSA, is employed, and is a union member. We also include indicators for survey year to capture macroeconomic time trends.

Though our conceptual model is based on individual enrollment, participation in public assistance programs such as SNAP often involves consideration of the individual's well-being as well as the well-being of other family members. Household heads may decide to enroll the household in SNAP primarily out of concern for the health status of their spouse or children. Likewise, they may seek to enroll their children in Medicaid or SCHIP, and end up enrolling in Medicaid themselves as a secondary consequence. Alternatively, it may be the household head's concerns about their own health that drive them to enroll in public assistance programs. If one person in the household makes enrollment decisions for everyone, or if all adults in the household pool resources and have the same preferences over medical care and other goods, then the model of individual choice can be used to predict household decisions by conditioning on the characteristics of the household head. This framework is commonly referred to as the unitary model of household decision making (Becker, 1965). However, if adult household members have

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different preferences then household decisions can be viewed as the outcome of a bargaining process in which members with the greatest bargaining power exert relatively more influence (Chen and Woolley, 2001). From an empirical standpoint, modeling the outcomes of non-cooperative bargaining requires information on the individual characteristics and resources that determine bargaining power.

To ensure that we have accurately characterized the impact of health status on SNAP and Medicaid participation we estimate both individual and household-level models of enrollment choice.[6] For the latter, the dependent variable indicates whether the household enrolls in SNAP or any adult member in the household enrolls in Medicaid. The health characteristics in these models indicate whether any household member had a diet-sensitive chronic condition, indicators for the number of chronic conditions, and indicators for the SF-12 mental and physical health summary scores all corresponding to the sickest individual (i.e. the person with the highest score or count). We also included an indicator of whether any child in the household was considered impaired using the Columbia Impairment Scale (CIS, Bird et al., 1996).

Because we are unsure of whether household-level enrollment decisions are cooperative or non-cooperative, we first estimated models that included separate controls for the education and income of the adult male and female heads of household. Next, we estimated models that included only the demographic characteristics of the highest wage earner. Since the estimated effects of the health status variables did not change across the models with gender-specific control variables and those with controls for just the highest wage earner, we chose to present the results of the latter, more parsimonious models. If adults' primary reasons for enrolling in public assistance programs are due to the health status of another adult household member, such as a

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[6] For example, Van Hook, Glick and Bean (1999) have shown that changing the unit of analysis from the individual to the household-level has a significant impact on the measurement of relative levels of welfare receipt between immigrants and natives.

spouse, then we expect to observe stronger selection by health status in household-level models than in the individual-level models. In addition, the coefficient on CIS provides an indication of the impact of child disability on the likelihood that households enroll in public assistance.

Characteristics of the Population Eligible for SNAP

Table 1 contains selected demographic characteristics of the adult population, age 18-64 eligible for SNAP. Those enrolled in SNAP or both SNAP and Medicaid have more children than those enrolled only in Medicaid or not enrolled in either program. In addition, the SNAP-eligible population contains households with more adults and more individuals from rural areas. The population of individuals enrolled in Medicaid or both SNAP and Medicaid contains more women, mothers, single mothers, unmarried men and women, and unemployed. Single mothers, however, who are a common target population of SCHIP eligibility expansions, are the least likely not to enroll in either program. Finally, while we do find a non-trivial number of non-citizen immigrants enrolled in both programs, non-citizens are more likely not to enroll in either program. Given that non-citizen immigrants had to live in the U.S. for five years in order to become eligible for Medicaid and SNAP (after 2002), eligibility restrictions are presumably part of the reason for this.

In Table 2 we report the prevalence of selected chronic conditions and summary measures of health status for each sub-category of the SNAP-eligible adult population as well as the total adult population. The SF-12 composite scores for physical and mental health status suggest that the Medicaid-only population has the poorest health, followed by the population enrolled in both SNAP and Medicaid. The average level of health among the SNAP-only population and those not enrolled in either program is very similar, but still lower than the full adult population. These differences in health status are generally consistent with the indicators

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for the number of each individual's chronic conditions. However, the chronic condition counts suggest that the SNAP-only population is somewhat less healthy than the population on non-enrollees, but similar to the full adult population. Consistent with the fact the Medicaid enrollees are more likely to be unemployed, they are also more likely to require help with an ADL or IADL.

Table 2 also contains information on some of the most prevalent chronic conditions (diabetes, hyperlipidemia, hypertension, cardiovascular disease, and pregnancy) as well as two conditions that are diet-sensitive but somewhat less common (gastrointestinal disorders, and endocrine, nutritional, and immune disorders). All of these conditions require specialized diets for proper medical management. Asterisks indicate statistically significant differences from the sample of individuals only enrolled in SNAP. The prevalence of each diet-sensitive chronic condition is highest among the population of individuals jointly enrolled in Medicaid and SNAP. However, this prevalence is very similar to the population enrolled only in Medicaid.

The prevalence of diet-sensitive chronic conditions is lower in the SNAP-only and un-enrolled populations than in the Medicaid population. For example, the prevalence of diabetes and hyperlipidemia is twice as high in the SNAP and Medicaid population as in the SNAP-only population. While the full population is generally healthier than the low income population of adults qualifying for public assistance, we do find that rates of hyperlipidemia and hypertension are highest in the full population. Overall, the unadjusted mean prevalence rates suggest that there are a significant number of individuals, including those already enrolled in Medicaid, with diet-sensitive chronic conditions that are eligible for, but not enrolled in SNAP.

Estimation Results

In order to fully characterize selection into SNAP and Medicaid by health status we use measures intended to capture multiple dimensions of health. However, some measures are highly correlated with others as well as with certain control variables, such as unemployment. Therefore, we estimated step-wise regressions beginning with a parsimonious model that includes indicator variables for whether the individual's physical and mental health SF-12 summary scores are in the top two thirds of the distribution, and all demographic variables except whether the individual is unemployed and is a member of a union. In the second model we add indicator variables for the individual's overall prevalence of chronic conditions, and in the third model we add indicators for whether the individual required help with an ADL or IADL. Our third model additionally controls for unemployment and union membership. We add these variables last to ensure that they do not mask the impact of disability or chronic conditions, which are strongly associated with the ability to work.

Finally, we re-estimated the fourth model after excluding individuals that did not have a visit to a medical provider during the previous year. While this reduces the sample size from 13,485 to 3,300, resulting in a loss of statistical power, it allows us to check whether our results are confounded by differences in access to medical care across the SNAP-eligible population. For conditions that are not priority conditions in the MEPS, we do not know whether respondents suffered from chronic conditions unless they visited a medical provider. SNAP-eligible individuals enrolled in Medicaid may be more likely to have visited providers than those with limited private coverage or no insurance. If this is the case, then including individuals with no prior medical visits in the estimation sample could make it appear that the propensity to enroll in the Medicaid program by those in poor health is stronger than it may actually be. However, if the

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impact of health characteristics is similar when the model is estimated on the original and the limited samples, then access to care through public insurance is unlikely to confound results.

We estimated all of the empirical models using sampling weights and derived the standard errors of the estimates using the method of balanced repeated replications (BRR) to account for the complex survey design of MEPS. The BRR method also adjusts for within-family correlations and within-person correlation across observation year (Williams, 2000). In Tables 3 - 6 we report the marginal effects of key regressors, which are defined as the difference in the predicted mean probability of enrollment between "treated" (e.g., unhealthy) and "untreated" (healthy) groups while holding all other characteristics at their actual values.

Models of Enrollment Choice

Table 3 contains the marginal effects from our individual-level MNP models of enrollment choice, estimated in the step-wise fashion described above. The marginal effects from the most parsimonious model indicate that those in poor health are most likely to enroll in both Medicaid and SNAP and are least likely not to enroll in either program. Those in poor physical and mental health are also more likely to enroll only in Medicaid, than only in SNAP. The difference between the propensity to enroll in both Medicaid and SNAP as opposed to just SNAP is significant. While individuals with a physical health scores in the 33rd-65th percentile and the 66th-100th percentile of the distribution are 1.9 percentage points (11.9%) and 0.9 percentage points (5.6%) *more likely* to enroll in SNAP than individuals with a scores in the 0-32nd percentile, they are 6 percentage points (21.4%) and 9.9 percentage points (35.4%) *less likely* to enroll in SNAP and Medicaid, respectively. Furthermore, individuals with high mental health scores just as likely to enroll only in SNAP as those with low scores, but they are between 2.4 - 5.3 percentage points (8.6 - 18.9%) less likely to enroll in both SNAP and Medicaid. In other

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words, there is positive selection into SNAP by those in good physical health, but strong negative selection into SNAP and Medicaid by those with the poorest physical and mental health.

These conclusions about selection do not fundamentally change when we add other health indicators to the model, though the impact the SF-12 summary score indicators is cut in half when we control for the number of chronic conditions and the existence of at least one diet-sensitive chronic condition. The larger the number of chronic medical conditions an individual suffers from the more likely she is to jointly enroll in Medicaid and SNAP and to a lesser extent in Medicaid only, and the less likely she is to enroll in just SNAP. Having a diet-sensitive condition increases the probability of enrollment in both Medicaid and SNAP and just Medicaid by roughly the same amount (46%). This suggests that selection into SNAP by those with diet sensitive conditions is driven by Medicaid enrollment. Controlling for chronic conditions also reveals a small, but statistically significant propensity by those with poorer mental health to enroll in SNAP. In particular, individuals with the highest SF-12 mental health scores are .7 percentage points (4.4%) less likely to enroll in SNAP alone (5% in the saturated model).

By adding ADL/IADL indicators and employment variables to the model, we find that those having difficulty with an IADL are more likely to enroll in SNAP, but those with ADL difficulties are less likely to enroll in SNAP. These selection effects are stronger for joint enrollment into SNAP and Medicaid. In comparison, individuals with both IADL and ADL difficulties are more likely to enroll in just Medicaid. Given the IADLs are more complex social tasks whereas ADLs are basic functions, these results suggest that those with serious disabilities who cannot function independently are generally less likely to enroll in SNAP, even if they are

enrolled in Medicaid, but those who are independent on a basic level but need help with more complex social functions are in fact more likely to enroll in SNAP.

Incorporating the ADL/IADL and employment indicators to the models also allows us to infer the extent to which lack of eligibility for the Medicaid program may influence the estimates. Given that most non-Medicaid eligible individuals in the sample are non-disabled childless adults, much of the effect of non-eligibility will be captured by the ADL/IADL and employment variables combined with the indicators for children and marital status contained in all models. The fact that the inclusion of these variables reduces the magnitude of the SF-12 indicators suggests some of the differences in selection into both SNAP and Medicaid as opposed to just SNAP observed in the most parsimonious model are driven by lack of Medicaid eligibility. However, the selection effects due to chronic and diet-sensitive conditions are relatively unaffected in this regard.

To test the sensitivity of these results, we estimated the saturated model on only those with a visit to a medical provider within the past year. While some of the selection effects become larger and some decrease in size, the balance of the evidence suggests a strengthening of the results. Most of the effects that are characterized by a loss of statistical precision actually become larger in magnitude. Therefore, the selection we observe is not driven by individuals with greater access to medical care visiting medical providers more frequently.

We also estimated our models on the household-level sample that contains health status variables corresponding to the sickest adult household member to infer whether selection into public programs is more strongly correlated with the health status of other household members rather than individuals themselves. These results, which are reported in Table 4, are very similar to those from the individual-level models. While we do not observe a systematic strengthening of

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the selection effects overall, we do find that our conclusions regarding the selection into SNAP by those of poorer mental health and by those who require help with IADLs are reinforced in the household models. We also note that household with a severely impaired child are 1.4 percentage points (12.7%) less like to enroll in just SNAP and 3.6 percentage points (12.0%) more likely to enroll in SNAP and Medicaid. This result is invariant to the inclusion of variables capturing adult disability and employment.

In Table 5 we present results at the individual and household-levels indicating the degree of selection into SNAP and Medicaid by those with specific chronic conditions. These models include all the demographic controls except unemployment and union membership and do not include any summary measures of health status. Selection into the programs by specific diet-sensitive chronic conditions mirrors the general findings from Tables 3 and 4. Specifically, those with such conditions are more likely to enroll in SNAP and Medicaid or just Medicaid and are less likely to enroll in just SNAP. Conditioning the sample on those with a visit to a medical provider during the past year does not alter this conclusion nor does it substantially impact the marginal effects. There are no diet-sensitive conditions associated with selection into SNAP only, but there are some conditions in which selection into SNAP and Medicaid is stronger than into Medicaid alone. Gastrointestinal disease generates the strongest joint selection effect into both programs. Individuals with this condition are 2.6 percentage points (13.7%) more likely to enroll in just Medicaid, but 12.7 percentage points (45.4%) more likely to enroll in both programs. Individuals with hyperlipidemia and hypertension are also relatively more likely to enroll in SNAP and Medicaid, but those with diabetes and pregnant women are more likely to only enroll in Medicaid.

Our earlier results for diet-sensitive conditions suggest that the Medicaid program may serve as a gateway to SNAP by those in poor health. To explore this possibility further, we estimate the impact of our health status measures on the conditional probability of SNAP enrollment given Medicaid enrollment. These estimates are reported in Table 6 for three specifications: (1) the most parsimonious model containing only SF-12 physical and mental health composite scores; (2) the specification including the SF-12 scores and summary level chronic condition indicators; and (3) models with indicators for specific diet-sensitive chronic conditions. The marginal effects of the SF-12 indicators suggest that conditional on enrollment in Medicaid, SNAP-eligible individuals in poor health are indeed more likely to enroll in SNAP. Furthermore, this selection appears to be strongest for those in poor mental health. The marginal effects for the summary-level and specific chronic condition indicators confirm these general trends, with selection into SNAP conditional on Medicaid increasing the most for those with three or more chronic conditions (12.5%) and those with gastrointestinal disorders (11.2%). The only group less likely to enroll in SNAP conditional on Medicaid enrollment is pregnant women, who may have a preference for enrolling in WIC in lieu of SNAP.

Conclusions and Limitations

We examine selection into the Medicaid and SNAP programs by health status and find that while individuals in poor overall health and with multiple chronic conditions are more likely to enroll in SNAP and Medicaid, they are less likely to enroll in SNAP alone. This is true even of SNAP-eligible individuals with diet-sensitive chronic conditions, such as diabetes, heart disease, and gastrointestinal disorders. We also find that households containing an adult member with poor mental health or one who requires help with IADLs are more likely to enroll in SNAP, though such selection is stronger in the population of adults jointly enrolled in SNAP and Medicaid. Furthermore, we find that the conditional probability of SNAP enrollment given

Medicaid enrollment is higher for individuals with multiple chronic conditions. These findings provide evidence that the Medicaid program serves as one mechanism through which individuals in poor health obtain SNAP benefits.

Because selection into SNAP by those with poor health is so strongly tied to Medicaid, states that coordinate enrollment between the two programs likely serve sicker SNAP populations than those that maintain separate enrollment processes. Currently, the degree of enrollment coordination between the programs varies widely across states, with 36 states and the District of Columbia offering a joint application, some of these offering joint enrollment, and 14 states administering completely separate application processes (Center for Budget and Policy Priorities, 2010; 2012). Our findings have important implications for outreach efforts as well as programs designed to improve the health of the low income population. For example, 19 percent of the SNAP-eligible population is enrolled in Medicaid but not SNAP, which suggests that one mechanism to expand SNAP enrollments is to target efforts at current Medicaid beneficiaries. However, previous outreach efforts have not focused on this group (USDA, 2010b).

Even without specifically targeted outreach efforts, legislated changes to Medicaid eligibility under the ACA stand to increase the prevalence of individuals in SNAP that have chronic medical conditions. In states that comply with the federally mandated Medicaid expansion, the entire SNAP-eligible population will become eligible for Medicaid benefits by 2014. States also have the option of extending new Medicaid eligibility and enrollment determination systems to encompass SNAP, and certain states, such as Arizona, California, Indiana, Maryland, and Utah, are already moving in this direction (KFF, 2010a). Recently, there has been interest among policy makers in initiatives designed to encourage SNAP participants to make healthier food choices. The justification for these and similar health

promotion programs targeting SNAP beneficiaries is even greater in light of expectations that the SNAP population will likely contains more individuals with chronic medical conditions. While it is important to keep in mind that SNAP is, by design, an income support program rather than a health program, per se, our results highlight the growing potential to improve the health of low income individuals by coordinating SNAP and Medicaid benefits in a manner that facilitates chronic disease management.

We interpret our findings as resulting from selection into SNAP and Medicaid by individuals with different health characteristics. However, our estimates are associations, not causal effects, and it is possible that there are feedback effects of program participation on health. Numerous studies document a beneficial effect of Medicaid enrollment on health status (Currie and Gruber, 1996; Kutinova and Conway, 2008; Cuellar and Markowitz, 2007; Davidoff et al., 2000), but the health effects of SNAP participation are not as well established. An active area of research is on the relationship between SNAP participation and obesity. While earlier studies found a significant impact of SNAP on obesity in women, more recent analyses using casual methods find relatively small effects that are negligible for certain sub-groups (Kaushal, 2007; Meyerhoefer and Pylypchuk, 2008; Fan, 2010). There is also little evidence that higher rates of obesity induced by SNAP participation lead to higher medical costs (Meyerhoefer and Pylypchuk, 2008). In addition to obesity, researchers have documented relationships between SNAP participation and psychological distress (Heflin and Ziliak, 2008) and poor self-assessed health (Yen, Bruce, and Jahns, 2012).

While we are unable to use causal methods in our analysis due to a lack of suitable instruments for health status, we have attempted to account for potentially confounding factors through the inclusion of numerous demographic control variables, and by estimating our models

at the individual and household-levels and on the sample of individuals that visited medical providers in the previous year. As a result, we believe our estimates provide a reliable indication of the pattern of selection into SNAP and Medicaid by health status.

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Table 1. Selected Characteristics of SNAP-Eligible Individuals.

	SNAP	Medicaid	SNAP and Medicaid	Neither Program
Average values:				
Age	36.42	37.04	36.56	36.22
HH members 0-18	1.77	1.12	1.72	0.96
HH members 19-64	1.89	1.53	1.56	1.63
HH members 65+	0.04	0.06	0.02	0.07
Proportion of individuals:				
Female	0.52	0.64	0.72	0.47
Mother	0.30	0.34	0.49	0.20
Father	0.21	0.10	0.11	0.14
Single Mother	0.15	0.18	0.28	0.08
Married	0.35	0.28	0.26	0.33
Non-citizen immigrant	0.15	0.15	0.09	0.22
Unemployed	0.44	0.55	0.61	0.34
Residence in MSA	0.69	0.80	0.77	0.77

Note: Means are weighted

Table 2. Prevalence of Chronic Conditions among the SNAP-Eligible Households by Enrollment Category (Standard Errors in Parenthesis).

	SNAP	Medicaid	SNAP and Medicaid	Neither Program	Total Population
SF-12 scores and activity limitations					
Physical components	42.172	38.234***	40.027***	42.451	46.037***
	(0.589)	(0.560)	(0.444)	(0.438)	(0.118)
Mental component	41.296	38.561***	39.889**	41.492	45.626***
	(0.565)	(0.566)	(0.499)	(0.445)	(0.115)
Required help with IADL	0.083	0.165***	0.158***	0.050***	0.033***
	(0.009)	(0.011)	(0.009)	(0.005)	(0.001)
Required help with ADL	0.032	0.083***	0.063***	0.023	0.016***
	(0.005)	(0.007)	(0.006)	(0.003)	(0.001)
Detailed conditions					
Diabetes	0.042	0.102***	0.104***	0.042***	0.048***
	(0.006)	(0.086)	(0.007)	(0.004)	(0.001)
Hyperlipidemia	0.022	0.069***	0.078***	0.034**	0.074***
	(0.004)	(0.004)	(0.006)	(0.004)	(0.002)
Hypertension	0.099	0.162***	0.179***	0.081**	0.127
	(0.009)	(0.009)	(0.009)	(0.071)	(0.002)
Cardiovascular disease	0.055	0.098***	0.107***	0.045	0.055***
	(0.008)	(0.008)	(0.007)	(0.004)	(0.001)
Gastrointestinal disease	0.098	0.155***	0.194***	0.069**	0.107***
	(0.010)	(0.010)	(0.010)	(0.005)	(0.001)
Endocrine, nutritional and immune disorders	0.051	0.104***	0.117***	0.059	0.085
	(0.007)	(0.008)	(0.008)	(0.005)	(0.001)
Pregnant	0.046	0.139***	0.148***	0.032*	0.042***
	(0.008)	(0.009)	(0.008)	(0.003)	(0.001)
Summary indicators					
No chronic conditions	0.543	0.344***	0.311***	0.615***	0.499***
	(0.013)	(0.013)	(0.010)	(0.010)	(0.003)
One chronic condition	0.190	0.226**	0.212	0.179	0.219***
	(0.013)	(0.013)	(0.009)	(0.008)	(0.002)
Two chronic conditions	0.081	0.122***	0.128***	0.005***	0.081***
	(0.008)	(0.009)	(0.008)	(0.005)	(0.001)
Three or more chronic conditions	0.051	0.099***	0.133***	0.041	0.046***
	(0.007)	(0.009)	(0.008)	(0.005)	(0.001)
Diet-sensitive conditions	0.276	0.496***	0.540***	0.236**	0.345***
	(0.014)	(0.013)	(0.011)	(0.008)	(0.002)
No. of individuals	2,112	2,550	3,751	5,073	118,302
No. of households	1,086	2,133	3,030	3,935	65,782

Notes: *,**,*** denote statistically significant differences from SNAP (col. 1) at the .10, .05, .01 levels, respectively. Gastrointestinal disease includes disorders of the upper GI, stomach & intestinal disorders, and other GI disorders. Endocrine, nutritional and immune disorders also include anemia and thyroid diseases. Diet sensitive conditions include all of the listed detailed conditions. Means are weighted and standard errors are adjusted for the complex design of the MEPS.

Table 3. Impact of Health Characteristics on Probability of Enrollment in SNAP and Medicaid. Individual-level Results (Standard Errors in Parenthesis).

	SF-12	+ Chronic	+IADL/ADL	+Emply	Those w/ past yr visit
Medicaid program					
Physical component score 33-66	-0.035***	-0.017***	-0.009*	-0.007	-0.013
	(0.005)	(0.005)	(0.005)	(0.005)	(0.011)
Physical component score 66-100	-0.055***	-0.026***	-0.017***	-0.014***	-0.022*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.012)
Mental component score 33-66	-0.001	0.003	0.005	0.004	-0.004
	(0.006)	(0.006)	(0.006)	(0.006)	(0.011)
Mental component score 66-100	-0.011*	-0.001	0.001	0.001	-0.015
	(0.006)	(0.006)	(0.006)	(0.006)	(0.010)
One chronic condition	-----	0.040***	0.034***	0.034***	0.007
		(0.005)	(0.005)	(0.005)	(0.011)
Two chronic conditions	-----	0.068***	0.052***	0.048***	0.038**
		(0.009)	(0.009)	(0.009)	(0.015)
Three or more chronic conditions	-----	0.043***	0.021**	0.017*	-0.006
		(0.010)	(0.010)	(0.010)	(0.013)
Diet-sensitive conditions	-----	0.089***	0.084***	0.080***	0.065***
		(0.007)	(0.007)	(0.006)	(0.011)
Required help with IADL	-----	-----	0.060***	0.049***	0.002
			(0.010)	(0.009)	(0.013)
Required help with ADL	-----	-----	0.067***	0.067***	0.116***
			(0.010)	(0.011)	(0.027)
SNAP					
Physical component score 33-66	0.019***	0.009*	0.008	0.007	-0.002
	(0.001)	(0.006)	(0.006)	(0.005)	(0.009)
Physical component score 66-100	0.009**	-0.003	-0.004	-0.005	-0.000
	(0.004)	(0.004)	(0.004)	(0.004)	(0.008)
Mental component score 33-66	0.003	0.001	0.001	0.001	-0.007
	(0.004)	(0.004)	(0.004)	(0.004)	(0.008)
Mental component score 66-100	-0.002	-0.007*	-0.007	-0.008*	-0.010
	(0.004)	(0.005)	(0.005)	(0.005)	(0.008)
One chronic condition	-----	-0.011***	-0.011***	-0.010***	-0.002
		(0.004)	(0.004)	(0.003)	(0.006)
Two chronic conditions	-----	-0.014**	-0.013*	-0.008	-0.022*
		(0.006)	(0.007)	(0.007)	(0.012)
Three or more chronic conditions	-----	-0.027***	-0.025***	-0.021**	-0.040***
		(0.008)	(0.008)	(0.008)	(0.014)
Diet-sensitive conditions	-----	-0.047***	-0.047***	-0.045***	-0.027***
		(0.003)	(0.003)	(0.003)	(0.007)
Required help with IADL	-----	-----	0.006	0.011*	0.015
			(0.007)	(0.008)	(0.013)
Required help with ADL	-----	-----	-0.020	-0.019	-0.027*
			(0.013)	(0.013)	(0.016)

SNAP and Medicaid					
Physical component score 33-66	-0.060***	-0.026***	-0.020***	-0.006	-0.006
	(0.005)	(0.006)	(0.006)	(0.005)	(0.013)
Physical component score 66-100	-0.099***	-0.051***	-0.045***	-0.027***	-0.041***
	(0.005)	(0.005)	(0.006)	(0.005)	(0.015)
Mental component score 33-66	-0.024***	-0.012*	-0.012*	-0.010	-0.024**
	(0.007)	(0.007)	(0.007)	(0.006)	(0.012)
Mental component score 66-100	-0.053***	-0.030***	-0.028***	-0.020***	-0.046***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.012)
One chronic condition	-----	0.048***	0.044***	0.035***	0.057***
		(0.006)	(0.006)	(0.006)	(0.010)
Two chronic conditions	-----	0.104***	0.094***	0.067***	0.089***
		(0.010)	(0.010)	(0.010)	(0.019)
Three or more chronic conditions	-----	0.166***	0.148***	0.112***	0.094***
		(0.012)	(0.012)	(0.012)	(0.019)
Diet-sensitive conditions	-----	0.129***	0.127***	0.110***	0.085***
		(0.006)	(0.006)	(0.005)	(0.010)
Required help with IADL	-----	-----	0.078***	0.039***	0.018
			(0.012)	(0.010)	(0.014)
Required help with ADL	-----	-----	-0.025**	-0.030**	-0.054**
			(0.012)	(0.011)	(0.021)
Neither Program					
Physical component score 33-66	0.077***	0.034***	0.021***	0.005	0.021
	(0.007)	(0.006)	(0.006)	(0.007)	(0.015)
Physical component score 66-100	0.145***	0.080***	0.066***	0.047***	0.063***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.016)
Mental component score 33-66	0.022***	0.008	0.006	0.004	0.034***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.013)
Mental component score 66-100	0.067***	0.038***	0.035***	0.027***	0.071***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.011)
One chronic condition	-----	-0.077***	-0.067***	-0.059***	-0.063***
		(0.006)	(0.006)	(0.006)	(0.011)
Two chronic conditions	-----	-0.157***	-0.134***	-0.108***	-0.105***
		(0.010)	(0.011)	(0.010)	(0.014)
Three or more chronic conditions	-----	-0.181***	-0.144***	-0.109***	-0.048***
		(0.009)	(0.009)	(0.010)	(0.016)
Diet-sensitive conditions	-----	-0.170***	-0.163***	-0.145***	-0.123***
		(0.006)	(0.005)	(0.005)	(0.009)
Required help with IADL	-----	-----	-0.144***	-0.099***	-0.035**
			(0.009)	(0.010)	(0.014)
Required help with ADL	-----	-----	-0.022	-0.018	-0.035
			(0.015)	(0.015)	(0.023)

Notes: *,**,*** denote statistical significance at the .10, .05, .01 levels, respectively. Estimates are weighted and standard errors are adjusted for the complex design of the MEPS.

Table 4. Impact of Health Characteristics on Probability of Enrollment in SNAP and Medicaid. Household-level Results (Standard Errors in Parenthesis).

	SF-12	+ Chronic	+IADL/ADL	+Emply	Those w/ past yr visit
Medicaid program					
Physical component score 33-66	-0.091***	-0.067***	-0.059***	-0.054***	-0.081***
	(0.007)	(0.006)	(0.006)	(0.007)	(0.014)
Physical component score 66-100	-0.053***	-0.036**	-0.024	-0.017	-0.048**
	(0.016)	(0.015)	(0.015)	(0.015)	(0.020)
Mental component score 33-66	-0.006	0.001	0.003	0.003	0.006
	(0.007)	(0.007)	(0.007)	(0.007)	(0.012)
Mental component score 66-100	0.006	0.003	-0.004	-0.008	-0.018
	(0.012)	(0.012)	(0.012)	(0.012)	(0.020)
CIS	0.005	0.001	0.007	0.001	-0.001
	(0.012)	(0.001)	(0.012)	(0.011)	(0.019)
One chronic condition	-----	0.039***	0.034***	0.034***	0.005
		(0.009)	(0.009)	(0.009)	(0.015)
Two chronic conditions	-----	0.028***	0.019***	0.017***	0.016
		(0.007)	(0.007)	(0.007)	(0.013)
Three or more chronic conditions	-----	0.040***	0.021***	0.016**	0.009
		(0.008)	(0.008)	(0.008)	(0.011)
Diet-sensitive conditions	-----	0.071***	0.065***	0.058***	0.066***
		(0.007)	(0.007)	(0.006)	(0.009)
Required help with IADL	-----	-----	0.055***	0.048***	0.010
			(0.011)	(0.011)	(0.016)
Required help with ADL	-----	-----	0.064***	0.066***	0.097***
			(0.014)	(0.014)	(0.028)
SNAP					
Physical component score 33-66	0.011**	0.006	0.008*	0.008	-0.014**
	(0.004)	(0.005)	(0.005)	(0.005)	(0.007)
Physical component score 66-100	-0.003	-0.008	-0.006	-0.006	-0.013
	(0.005)	(0.005)	(0.005)	(0.005)	(0.009)
Mental component score 33-66	-0.012***	-0.011***	-0.011***	-0.011***	-0.023***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.009)
Mental component score 66-100	-0.004	-0.002	-0.003	-0.004	-0.010
	(0.007)	(0.007)	(0.007)	(0.007)	(0.010)
CIS	-0.014***	-0.014***	-0.013***	-0.014***	-0.010
	(0.004)	(0.005)	(0.005)	(0.004)	(0.009)
One chronic condition	-----	0.002	0.001	0.001	0.004
		(0.006)	(0.006)	(0.006)	(0.438)
Two chronic conditions	-----	0.006	0.003	0.004	0.012**
		(0.004)	(0.004)	(0.004)	(0.006)
Three or more chronic conditions	-----	0.009	0.003	0.005	-0.012
		(0.006)	(0.006)	(0.006)	(0.010)
Diet-sensitive conditions	-----	-0.024***	-0.026***	-0.026***	-0.028***
		(0.004)	(0.004)	(0.004)	(0.006)

Required help with IADL	-----	-----	0.035*** (0.007)	0.038*** (0.001)	0.049*** (0.013)
Required help with ADL	-----	-----	-0.015* (0.008)	-0.014* (0.008)	-0.007 (0.012)
SNAP and Medicaid					
Physical component score 33-66	-0.107*** (0.006)	-0.054*** (0.007)	-0.046*** (0.007)	-0.014** (0.007)	0.016 (0.014)
Physical component score 66-100	-0.110*** (0.013)	-0.066*** (0.012)	-0.058*** (0.013)	-0.023* (0.013)	-0.029 (0.019)
Mental component score 33-66	-0.057*** (0.008)	-0.039*** (0.008)	-0.038*** (0.008)	-0.031*** (0.008)	0.046*** (0.014)
Mental component score 66-100	0.021 (0.012)	0.014 (0.012)	0.010 (0.012)	0.004 (0.012)	0.028 (0.020)
CIS	0.045*** (0.010)	0.033*** (0.011)	0.034*** (0.011)	0.036*** (0.011)	0.099*** (0.019)
One chronic condition	-----	0.042*** (0.009)	0.038*** (0.009)	0.034*** (0.009)	0.060*** (0.018)
Two chronic conditions	-----	0.060*** (0.007)	0.053*** (0.007)	0.034*** (0.007)	0.034*** (0.012)
Three or more chronic conditions	-----	0.134*** (0.010)	0.118*** (0.011)	0.082*** (0.011)	0.082*** (0.016)
Diet-sensitive conditions	-----	0.121*** (0.008)	0.115*** (0.007)	0.095*** (0.008)	0.074*** (0.013)
Required help with IADL	-----	-----	0.084*** (0.012)	0.041*** (0.010)	0.024* (0.014)
Required help with ADL	-----	-----	-0.023* (0.012)	-0.019* (0.011)	-0.017 (0.020)
Neither Program					
Physical component score 33-66	0.187*** (0.007)	0.115*** (0.007)	0.096*** (0.007)	0.061*** (0.008)	0.079*** (0.014)
Physical component score 66-100	0.166*** (0.015)	0.110*** (0.015)	0.088*** (0.015)	0.047*** (0.015)	0.087*** (0.022)
Mental component score 33-66	0.074*** (0.009)	0.049*** (0.009)	0.046*** (0.009)	0.039*** (0.009)	0.064*** (0.015)
Mental component score 66-100	-0.022 (0.015)	-0.015 (0.015)	-0.003 (0.014)	0.007 (0.014)	-0.001 (0.023)
CIS	-0.036** (0.013)	-0.019* (0.012)	-0.022* (0.012)	-0.024** (0.012)	-0.089*** (0.023)
One chronic condition	-----	-0.082*** (0.010)	-0.073*** (0.010)	-0.069*** (0.009)	-0.069*** (0.018)
Two chronic conditions	-----	-0.094*** (0.007)	-0.076*** (0.007)	-0.055*** (0.006)	-0.063*** (0.012)
Three or more chronic conditions	-----	-0.183*** (0.008)	-0.156*** (0.008)	-0.103*** (0.007)	-0.079*** (0.005)
Diet-sensitive conditions	-----	-0.168*** (0.008)	-0.154*** (0.008)	-0.127*** (0.007)	-0.112*** (0.011)

Required help with IADL	-----	-----	-0.174***	-0.126***	-0.083***
			(0.011)	(0.010)	(0.017)
Required help with ADL	-----	-----	-0.027	-0.033**	-0.073***
			(0.017)	(0.016)	(0.024)

Notes: *,**,*** denote statistical significance at the .10, .05, .01 levels, respectively. Estimates are weighted and standard errors are adjusted for the complex design of the MEPS.

Table 5. Impact of Specific Chronic Conditions of Enrollment in SNAP and Medicaid (Standard Errors in Parenthesis).

	Conditions	Those w/ visit in past yr	Conditions	Those w/ visit in past yr
	Individual-level		Household-level	
Medicaid program				
Diabetes	0.047***	0.052***	0.013	0.024
	(0.010)	(0.017)	(0.009)	(0.016)
Hyperlipidemia	0.004	-0.005	-0.005	-0.055***
	(0.013)	(0.017)	(0.012)	(0.013)
Hypertension	0.031***	0.040**	0.008	0.019
	(0.009)	(0.016)	(0.008)	(0.014)
Cardiovascular disease	0.043***	0.003	0.028***	0.019
	(0.009)	(0.015)	(0.010)	(0.017)
Gastrointestinal disease	0.026***	0.044***	-0.014**	0.004
	(0.008)	(0.014)	(0.007)	(0.013)
Endocrine, nutritional and immune disorders	0.003	0.009	-0.025**	-0.028*
	(0.009)	(0.013)	(0.009)	(0.015)
Pregnant	0.158***	0.117***	0.089***	0.007
	(0.012)	(0.021)	(0.013)	(0.002)
SNAP				
Diabetes	-0.035***	-0.039***	-0.013**	0.002
	(0.006)	(0.008)	(0.06)	(0.009)
Hyperlipidemia	-0.060***	-0.010	-0.032***	0.005
	(0.06)	(0.012)	(0.005)	(0.010)
Hypertension	-0.011**	-0.016*	0.004	-0.031***
	(0.005)	(0.010)	(0.006)	(0.006)
Cardiovascular disease	-0.013	-0.005	-0.002	-0.008
	(0.009)	(0.010)	(0.007)	(0.009)
Gastrointestinal disease	-0.005	0.004	0.014*	0.018
	(0.006)	(0.012)	(0.007)	(0.011)
Endocrine, nutritional and immune disorders	-0.027***	-0.014*	-0.013**	-0.002
	(0.006)	(0.008)	(0.010)	(0.009)
Pregnant	-0.055***	-0.065***	-0.017**	-0.013
	(0.006)	(0.011)	(0.007)	(0.013)
SNAP and Medicaid				
Diabetes	0.040***	0.050***	0.028***	0.041***
	(0.009)	(0.013)	(0.008)	(0.014)
Hyperlipidemia	0.029**	0.007	-0.002	-0.002
	(0.015)	(0.021)	(0.012)	(0.019)
Hypertension	0.077***	0.077***	0.017*	0.046***
	(0.011)	(0.016)	(0.010)	(0.016)
Cardiovascular disease	0.063***	0.051***	0.039***	0.043**
	(0.011)	(0.017)	(0.010)	(0.019)
Gastrointestinal disease	0.127***	0.090***	0.064***	0.046***
	(0.009)	(0.012)	(0.008)	(0.012)

Endocrine, nutritional and immune disorders	0.016* (0.009)	0.021 (0.015)	-0.006 (0.010)	-0.001 (0.014)
Pregnant	0.117*** (0.010)	0.136*** (0.019)	0.080*** (0.011)	0.152*** (0.027)
Neither Program				
Diabetes	-0.053*** (0.012)	-0.063*** (0.016)	-0.029*** (0.010)	-0.067*** (0.017)
Hyperlipidemia	0.026* (0.014)	0.009 (0.019)	0.039*** (0.013)	0.052*** (0.016)
Hypertension	-0.097*** (0.010)	-0.100*** (0.014)	-0.028*** (0.009)	-0.034* (0.019)
Cardiovascular disease	-0.092*** (0.011)	-0.049*** (0.015)	-0.065*** (0.010)	-0.054*** (0.016)
Gastrointestinal disease	-0.148*** (0.009)	-0.138*** (0.013)	-0.064*** (0.009)	-0.069*** (0.013)
Endocrine, nutritional and immune disorders	0.016 (0.013)	-0.015 (0.018)	0.044*** (0.013)	0.031* (0.018)
Pregnant	-0.219*** (0.011)	-0.188*** (0.014)	-0.152*** (0.016)	-0.146*** (0.021)

Notes: *,**,*** denote statistical significance at the .10, .05, .01 levels, respectively. Estimates are weighted and standard errors are adjusted for the complex design of the MEPS.

Table 6. Impact of Health Conditions on the Probability of Enrolling in SNAP Conditional on Enrolling in Medicaid (Standard Errors in Parenthesis).

	SF-12	SF-12 and Chronic	Detailed Chronic	SF-12	SF-12 and Chronic	Detailed Chronic
	Individual-level			Household-level		
Physical component score 33-66	-0.009 (0.009)	-0.001 (0.009)	-----	0.019* (0.010)	0.036*** (0.011)	-----
Physical component score 66-100	-0.023** (0.009)	-0.015 (0.009)	-----	-0.038 (0.027)	-0.020 (0.025)	-----
Mental component score 33-66	-0.021* (0.011)	-0.015 (0.011)	-----	-0.049*** (0.013)	-0.039*** (0.013)	-----
Mental component score 66-100	-0.035*** (0.012)	-0.027** (0.013)	-----	0.010 (0.021)	0.008 (0.021)	-----
CIS	-----	-----	-----	0.032** (0.019)	0.027 (0.019)	-----
One chronic condition	-----	-0.004 (0.010)	-----	-----	-0.006 (0.016)	-----
Two chronic conditions	-----	0.011 (0.014)	-----	-----	0.024** (0.011)	-----
Three or more chronic conditions	-----	0.075*** (0.016)	-----	-----	0.067*** (0.013)	-----
Diet-sensitive conditions	-----	0.008 (0.011)	-----	-----	0.025** (0.013)	-----
Diabetes	-----	-----	-0.020 (0.013)	-----	-----	0.009 (0.015)
Hyperlipidemia	-----	-----	0.020 (0.024)		-----	0.005 (0.022)
Hypertension	-----	-----	0.027* (0.016)	-----	-----	0.006 (0.016)
Cardiovascular disease	-----	-----	0.003 (0.015)	-----	-----	0.001 (0.017)
Gastrointestinal disease	-----	-----	0.067*** (0.012)	-----	-----	0.071*** (0.015)
Endocrine, nutritional and immune disorders	-----	-----	0.010 (0.014)	-----	-----	0.026 (0.018)
Pregnant	-----	-----	-0.061*** (0.014)	-----	-----	-0.027* (0.015)

Notes: *,**,*** denote statistical significance at the .10, .05, .01 levels, respectively. Estimates are weighted and standard errors are adjusted for the complex design of the MEPS.

Appendix: SNAP Eligibility Determination

Gross Income Test

To be eligible for the SNAP, a household's before tax gross income must be lower than 130 percent of the federal poverty line adjusted for household size and composition. We obtained the SNAP monthly gross income limits for 2000 – 2005 for each category of household size and composition (# adults vs. # children) and applied these to total reported annual household income in the MEPS divided by twelve to determine gross income-based eligibility. In accordance with program rules, we exempted households from this test if they contained someone over age sixty or a disabled household member.

Net Income Test

To pass the net income test, a household's monthly net income must be at or below 100 percent of the federal poverty line adjusted for household size and composition. Monthly net income is calculated by applying a number of exemptions to monthly gross income, beginning with a standard deduction of $134 for households of 4 or fewer persons, $157 for households with 5 persons, or $179 for households greater than 5 persons. Twenty percent of labor market earnings and any child support payments were deducted from gross income, and medical expenses greater than $35 were deducted for disabled adults.

Households are also able to deduct dependent care expenses under the net income test. MEPS respondents are asked whether their children go to daycare facilities or receive childcare services in the home of a third-party caretaker or the child's own home. They are not, however, asked to report the amount paid for child care to third-party caretakers. Therefore, we subtract the average reported dependent care deduction of $119 in 2001 for children of 2 or more years

old that receive care by a third- party, and $134 for children less than 2 years old. These average deductions were obtained from the USDA Food and Nutrition Service (2003).

The final deduction under the net income test allows households to deduct shelter costs that are greater than half of income after other deductions. Unfortunately, the MEPS does not contain information on rental payments or housing costs, so we obtained data from the Center for Budgetary and Policy Priorities (Rosenbaum, Tenny and Elkin, 2002) on the average monthly shelter expenses for each state and the share of households in each state that received the shelter deduction in 2000. We multiplied the share of households in the state benefiting from the deduction by the average shelter cost (adjusted for inflation in 2001 – 2005) and applied this predicted deduction to gross income for every household.

Asset Test

Households are permitted to have $2,000 in countable assets or $3,000 if they contain and an elderly (age > 60) or disabled household member. The MEPS collects information on a person's interest and dividend income, which we used to impute total countable household assets. In particular we estimated the invested principle corresponding to reported interest income using the 6 month CD rate for all persons in the household. Note that this calculation excludes asset income in non-interest bearing accounts.

Appendix References

Rosenbaum, D., D. Tenny, and S. Elkin. 2002. "The Food Stamp Shelter Deduction: Helping Households with High Housing Burdens Meet Their Food Needs." Washington D.C.: Center for Budget and Policy Priorities, June.

U.S. Department of Agriculture, Food and Nutrition Service. 2003. "Characteristics of Food Stamp Household: Fiscal Year 2001." FSP-03-CHAR. Alexandria, VA, January.