Modeling the Effect of Nutritional Support Programs on Health Outcomes.

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INTRODUCTION

The Elderly Nutrition Program (ENP) was established in 1972 as Title III of the Older Americans Act (OAA) to address the problems of dietary inadequacy and social isolation among the elderly. The ENP provides nutrition services to eligible elderly participants in both congregate (group) meal sites and at home. Eligible participants include persons over 59 years of age and their spouses, disabled persons under 60 who live in housing facilities where congregate meals are served, and disabled people under age 60 who reside in households that include people who are age eligible. Meals are often served in multi-service sites (such as senior centers) where a variety of other support services also are available. Nutrition projects must offer at least one meal per day, five days per week. Historically, lunch was the focal point of the ENP, and in the past most congregate and HDMs served only lunch five days per week. However, more meals are served to those who need them (Balsam and Rogers, 1988). Past studies of the ENP consistently report two findings: a) the receipt of a meal in a 24-hour period is strongly related to increased intake of key nutrients, including energy (Edwards et al., 1993; Coulston, Craig and Voss, 1996; Locher et al., 1997); and b) that program impact on dietary intake is limited to the days when participants receive the program meals. Kirschner Associates (1983) observed that HDM recipients were extremely nutritionally vulnerable on days when no meal was delivered.

Devaney and Moffitt (1991) found Food Stamps programs to be beneficial in increasing nutritional intake for low-income households. However, studies that have examined the impact of food support programs on elderly nutritional status have yielded mixed results, in part due to differences in modeling techniques and assumptions about participant selection into foods programs (Akin et al., 1985; Emmons, 1987; Lopez and Habicht, 1987a, 1987b; Butler and Raymond, 1988; Hama and Chern, 1988; Lee and Frongillo, 2000).

METHODS

Data

Our analyses uses data from the 1994 and 1999 waves of the National Long Term Care Survey linked with Medicare files. The NLTCS is a large nationally representative longitudinal survey of the US population aged 65 years and older, with detailed questions on health and disability. The raw sample sizes for the community based samples in 1994 and 1999 are 5026 and 5147, respectively. The samples in each survey year are drawn from lists of all U.S. Medicare eligible persons aged 65 years and over. The Center for Medicare and Medicaid Studies (CMS, formerly known as the Health Care Finance Administration), provides the list of Medicare enrollees for each of the NLTCS surveys and also updates the Medicare service use files that are annually linked to individual records for all persons in all NLTCS samples. Using the Medicare administrative file as the basis for selection allows for extremely high re-contact and response rates, and provides a complete enumeration of deaths on a real time basis through the continuously maintained Medicare file systems. Once in the sample, a person will continue to be interviewed at each wave of the NLTCS until death. New 'aged-in' persons aged 65 to 69 are drawn with each new survey to ensure that the sample is representative of the entire U.S. population aged 65 years and older.

Participation in the Elderly Nutrition Programs and Food Stamp program

The Elderly Nutrition Programs provide congregate and home-delivered meals (HDMs). ENPs are prohibited from having a means-test, but preference is given to persons with greatest economic or social needs. Social needs are those due to noneconomic factors, such as social isolation, language or other cultural barriers, or physical or mental disabilities. Food Stamps eligibility is means-tested, based upon income, household composition and assets. There has been little research on participation rates in ENP programs, although participation rates are estimated to be quite low (Ponza et al., 1994), implying great unmet need. Food Stamps participation by eligible elderly households is also low; estimates indicate participation rates among the eligible elderly to be around 50 percent (Butler and Raymond, 1996).

There are a number of factors that affect participation: (1) eligibility based upon need, and (2) barriers to participation, such as the availability of ENP programs in the individual's geographical area, and costs to the individual that are associated with program participation. Taking these factors into account, we propose to model the propensity to participate in HDM and congregate meals, and/or Food Stamps programs.

Eligibility. Individuals self select to participate in HDM and congregate meals programs or to receive Food Stamps. Thus, selection biases in modeling program participation must be addressed. The decision to not participate in such programs is related, in part, to barriers to participation and to possible fixed costs associated with program participation. The characteristics of those who participate in nutrition programs are different from the characteristics of those eligible, and such differences are not stochastic. Unfortunately, it is not always possible to have objective measures of such costs or other barriers to participation. Thus, we use observable characteristics to serve as proxy variables for barriers and/or costs to ENP and Food Stamps participation.

Barriers. There is great diversity in the availability and distribution of ENPs across the U.S. due to the great variance in the organizational structures of ENP programs, and the ability to serve those in need. We have access to location identifiers (ZIP codes) for the survey respondents for each interview, and thus, can collect information on local foods programs for the elderly. Additionally, we are able to link U.S. Census data area characteristics to the respondent ZIP codes to measure population-based factors, such as the total density of older persons, those living alone, and those living in poverty, to create indirect measure of local ENP need (see Ellis and Roe, 1993). Using the available information we model a proxy measure of the local availability of ENP programs for each respondent. We also obtain measures of the presence and occupancy rates of local long-term care institutions as a proxy for local supply for institutionalization. It is possible that the absence or scarcity of nursing home beds may act as a positive factor regarding the propensity to participate in ENP programs.

Participation in Food Stamps programs may be influenced by the generosity of states in the provision of Food Stamps benefits (McGarry, 1996). Thus, we use state level data to calculate average expected payment based upon state regulations as described by the U.S. Department of Health and Human Services. It is expected that the propensity to participate will be greater in states with more generous Food Stamps benefits.

Costs. In modeling participation in government programs based upon need, such as Food Stamps or Supplemental Security Income (SSI), researchers have hypothesized that persons may not participate based on concerns about "welfare stigma" (Moffitt, 1983; McGarry, 1996). Although there is no "means-test" to be eligible for ENPs, there is an effort to serve those who have economic needs. Indeed, the Mathematica Policy Research evaluation of ENPs reported

that 48 percent of the ENP participants were living below the official poverty line and 90 percent had incomes below 200 percent of the official poverty line (Ponza et al., 1994). Persons may perceive ENPs, and particularly HDMs, to be a welfare-type program and choose not to participate. In a study of elderly participation in SSI, McGarry found evidence that eligible persons already participating in other governmental needs-based programs (e.g., Medicaid or Food Stamps) were more likely to participate in SSI. Thus**,** participation in any government program may indicate willingness to accept assistance from other government programs. We create a proxy variable to indicate receipt of other government assistance to model a reduction in welfare stigma costs. We expect that the "welfare stigma" will have a stronger influence to participate in Food Stamps programs as opposed to ENPs, since Food Stamps is a means-tested program.

We estimate probit models to determine the propensity to participate in home delivered meals, congregate meals, and Food Stamps programs among the eligible respondents. The models include the instrumental variable to indicate local ENP availability, or state level Food Stamps benefit generosity, and a measure of respondent welfare use to indicate participation costs due to "welfare stigma." We also include, as controls, measures of known usage patterns of food program participants (e.g., age, gender, race, living arrangement, mobility and eating disabilities) based on previous studies (e.g., Ponce et al., 1996; Wang et al., 1999). Following the Heckman (1979) model, inverse Mills ratios (λs) is estimated from the results of the probit estimations, and is used in subsequent models.

Modeling the effect of nutritional support programs on health outcomes.

Our goal is to assess the impact of ENP participation, Food Stamps receipt, and other aspects of nutritional support reported in 1994 on subsequent institutionalization and mortality. For the risk of institutionalization, we identify those community-based persons in 1994 that are placed in long-term care institutions at any time during the period between the 1994 and 1999 interviews. We hypothesize that participation in ENP and possibly Food Stamps programs will be most effective in reducing the risk of institutionalization. Participation in such programs may have little preventive effect on mortality risks. The expectation of little association is due, in part, to data limitations.

Separate hazard models are used to model the risk of institutionalization and of mortality for the different types of nutritional support. We include as controls, measures of levels and types of disability, types and severity of chronic disease, physical activity, weight or body mass index, sociodemographic characteristics (including age, gender, and race), and other important factors. We plan to explore a number of different modeling strategies to estimate the effects of nutritional support programs on the health outcomes. We are aware that there are potential problems in using techniques to adjust for sample selection biases if the assumptions on the way selection occurs are invalid or inadequate (Stolzenberg and Relles, 1990, 1997; Winship and Mare, 1992). Thus, we are exploring a number of methodological options to adjust for program participation in contrast to using the traditional Heckman (1979) technique.

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