INSURANCE INSTABILITY AND PEOPLE WITH DISABILITIES

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A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill
in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of
Health Policy and Management.

Chapel Hill
2018

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ABSTRACT

Elizabeth Geneva Wood: Insurance Instability and People with Disabilities
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Insurance instability (gaps in coverage or changing coverage without a gap) can have negative effects on access to care, including the likelihood of having a usual source of care. Having a usual source of care is particularly important for people with disabilities, who have significant and complex healthcare needs. Limited research is available about how insurance instability affects the likelihood of having a usual source of care for people with disabilities.

The objective of this research was to contribute to the growing body of work on health insurance and healthcare access for people with disabilities. My central hypothesis was that insurance instability has a negative effect on having a usual source of care among people with disabilities, this effect diminishes as time without instability increases, and the effect of instability on usual source of care varies by disability type.

I used the Medical Expenditure Panel Survey dataset from the years 2004-2013 to conduct my analyses. Aim 1 used two-stage least squares and bivariate probit models, Aim 2 used a probit model, and Aim 3 used both two-stage least squares and ordinary least squares. With each model, I controlled for socioeconomic, demographic, health, and environmental factors. Aim 1 determined that while overall insurance instability does not have a negative effect on having a usual source of care, having a gap in coverage does. Aim 2 found that increasing months of insurance stability are associated with increasing likelihood of having a usual source of care. Aim 3 found that the magnitude of the effect of gaps in coverage on usual source of care varies by disability type.

These findings indicate that gaps in coverage pose a threat to the healthcare access of working-age adults with disabilities, while ongoing stability facilitates access. The degree to which gaps in coverage affect usual source of care is different within different disability cohorts. The detrimental effects

of gaps in coverage on usual source of care for working-age adults with disabilities suggests that

stabilizing insurance coverage for this population should be a policy priority.

ACKNOWLEDGMENTS

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CHAPTER 1 – BACKGROUND AND SPECIFIC AIMS

1.1 Background

The role of insurance

To address the high costs and uncertainty associated with healthcare spending, individuals aggregate their risk by purchasing health insurance (Cutler & Zeckhauser, 2000). In exchange for regularly contributing a predictable amount to an insurer, the insurer will reimburse a portion of their healthcare expenses, though the amount of coverage varies by plan. Pooling risk in this way makes healthcare spending reasonably predictable and affordable for insured individuals, and helps shield them from the risk of expensive medical events (Cutler & Zeckhauser, 2000).

In the American healthcare system, health insurance can be hard to hold onto. The different pathways to coverage – employers, individually-purchased coverage, or various government programs with differing eligibilities – mean that life transitions (e.g., gaining or losing a job, gaining or losing a spouse) often are accompanied by changes in health insurance coverage (Czajka & Mabli, 2009). Some coverage changes are compelled by external forces, such as policy changes, employers changing insurance providers, or termination from a job, while some changes are voluntary, such as switching to a plan with better benefits or lower costs. In general, voluntary insurance changes indicate that the market is functioning: consumers are seeking out the right coverage for them, and the market is offering adequate selection. However, voluntary insurance changes are relatively infrequent in the American healthcare system, and there is evidence (reviewed later) that some involuntary insurance coverage changes are associated with healthcare access problems (Czajka & Mabli, 2009). Voluntary and involuntary changes are both encompassed by the term "insurance instability," which refers to any situation when an individual is not continuously covered by the same plan over time, but has a gap in their coverage or changes their source of coverage without a gap (Doty & Holmgren, 2004).

One important advantage of having healthcare coverage is an increased ability to obtain and maintain a usual source of care (Devoe, Tillotson, Lesko, Wallace, & Angier, 2011). "Usual source of

care" can refer to either a specific healthcare location (such as a clinic) or provider where individuals usually go if they are sick or need advice about their health (Agency for Healthcare Research and Quality, 2013). Studies indicate that health insurance and usual source of care work synergistically to promote timely access to care. Controlling for sociodemographic and socioeconomic factors, problems with delaying or not receiving care are most commonly reported among those with no insurance and no usual source of care, less common among those who were uninsured but had a usual source of care, and still less common among those who were insured but lacked a usual source of care (Devoe et al., 2011). Possessing both usual source of care and insurance is optimal.

In the sections below, I review the literature on how usual source of care is affected by the two main forms of insurance instability – having a gap in insurance coverage and switching between different sources of coverage while remaining insured – and how usual source of care responds to differing lengths of time without coverage. The literature review is restricted to studies on working-age (18-64) American adults and only includes studies that have usual source of care as an outcome. This section concludes with a discussion of the limitations of the current research in this area and recommendations for future research.

Gaps in coverage

Although many people lose insurance coverage at some point, this loss is generally not permanent. Estimates of frequency of changes in insurance status vary based on the population under consideration and the definition used, but range from 4-21% of the working-age population to 26% for low-income working-age adults. A national survey by the Kaiser Family Foundation found that people who experienced a gap in their health insurance coverage were nearly twice as likely to report having no regular doctor as those who were continuously insured, and were also less likely to have a regular doctor than those who were continuously uninsured (Hoffman, Schoen, Rowland, & Davis, 2001). Combining two national surveys and one multi-site survey, Schoen & DesRoches found that people with insurance who were recently uninsured were more likely than the continuously insured to report not having a usual source of care – however, they did not control for any covariates (Schoen & Desroches, 2000). In a study of working-age Californian adults, 9% had gone from insured to uninsured or back at least once in the prior year (Lavarreda, Gatchell, Ponce, Brown, & Chia, 2008). These unstably insured adults had lower

odds (OR=0.20) of having a usual source of care than adults who were continuously insured during the same timeframe, controlling for sociodemographic and economic variables.

Using the 2005-2010 Medical Expenditure Panel Survey (MEPS), Abdus (2014) found that gaps in coverage were associated with lower likelihood of having a usual source of care among working-age adults when controlling for sociodemographic, economic, health, and regional factors. One post-Affordable Care Act (ACA) analysis on insurance instability and usual source of care is available: a study of nonelderly low-income adults in Kentucky, Arkansas, and Texas found that post-ACA, nearly 1 out of 4 respondents experienced instability and that coverage gaps were associated with a higher likelihood of having to change doctors (Sommers, Gourevitch, Maylone, Blendon, & Epstein, 2016).

In summary, gaps in coverage are common, persist post-ACA, and are associated with a lower likelihood of having a usual source of care. Although these findings suggest that gaps in insurance may be disruptive to access even after coverage is restored, a causal relationship between gaps in coverage and lacking a usual source of care has not yet been established.

Changing insurance without a gap

Even when there are no gaps in coverage, changes in an individual's source of insurance are associated with decreased likelihood of having a usual source of care. Several studies have examined the effect on usual source of care of changing insurance plans without losing insurance coverage among working-age adults and are reviewed below. One regional study of the overall working-age population reported an 8% switching rate (Lavarreda et al., 2008), while two studies of working-age adults who were continuously privately insured had rates around twice as high (13-17%, Cunningham, 2013; Cunningham & Kohn, 2000). A study of married women aged 62-64 observed switching rates of 16%-26%, with higher rates seen among those whose husbands had transitioned to Medicare (Schumacher, Smith, Liou, & Pandhi, 2009).

Among working-age adults who were continuously insured by employer-sponsored coverage, switching of any type declined over time from 17% in 1996-1997 to 13% in 2010 (Cunningham, 2013; Cunningham & Kohn, 2000). The majority of those who switched coverage in either study reported that it was due to changing jobs or employer plan offerings. A minority (2%) of this population voluntarily initiated a change in coverage in order to find better coverage or lower costs. In the 1996-1997 group,

those who changed their insurance (for any reason) were twice as likely to change their usual source of care as those who did not – 22% vs. 11% (Cunningham & Kohn, 2000). Overall rates and the difference between rates were both smaller in the 2010 group – 14% of switchers changed their usual source of care, compared to 8% of non-switchers (Cunningham, 2013). Of those who changed their usual source of care in 96-97, 53% attributed it to "insurance reasons" (Cunningham & Kohn, 2000).

Eight percent of the Californian working-age adults studied by Lavarreda had switched coverage without a gap. Odds of having a usual source of care were significantly reduced among those who switched their coverage without interruption (OR=0.63) compared to those without a switch, although the reduction associated with switching was not as large as the reduction associated with losing coverage (Lavarreda et al., 2008). These models controlled for sociodemographic, socioeconomic, health, and citizenship variables. The study did not ask respondents whether they changed their usual source of care as the result of their switching.

Among married women ages 62-64, Schumacher and colleagues found that those whose husbands transitioned to Medicare (thereby disrupting their spouse's coverage) were 71% more likely to change their usual source of care (Schumacher et al., 2009). Notably, this was the only one of these studies that methodologically addressed the non-randomness of insurance coverage changes. The authors used the instrumental variable of husband's age to address the endogeneity of insurance switches for this group (Schumacher, 2009).

In summary, although switching plans without losing coverage is not as disruptive as having a gap in coverage, it still is associated with disruptions to usual source of care. Design limitations preclude causal inference from most of the existing literature. When considering the impact of insurance instability on access to care, those who switched types or plans without becoming uninsured should not be overlooked.

Effects of stability

In the general working-age literature, stable coverage is usually used as the reference category to compare against the negative effects of instability. However, not all stability is created equal, and research using non-USC outcomes indicates that after coverage gaps, problems with access to care and the resulting health deficits can take some time to resolve: one study found that it took two years of

coverage before previously-uninsured new Medicare beneficiaries no longer had higher rates of morbidity and mortality compared to their previously-insured counterparts (Baker, Feinglass, Durazo-Arvizu, Witt, Sudano, & Thompson, 2006). Another study found that adults 51-61 years old with gaps in coverage were less likely to use preventive services such as flu vaccines, mammograms, and Pap tests when controlling for other factors and compared to those without gaps; moreover, their rates of preventive service use remained low for those who had experienced instability but had regained coverage – these respondents did not "catch up" to the stably insured immediately after becoming covered (Sudano & Baker, 2003). However, these studies did not include usual source of care as an outcome variable.

Only one study examines the effect of a longitudinal measure of insurance instability on usual source of care for adults. This study compared insured individuals who had recently been uninsured with those who had not and found a lower rate of having a usual source of care among those who had recently been uninsured (Schoen & Desroches, 2000). It is possible that individuals will become more likely to have a usual source of care after having more time to familiarize themselves with their insurance plan's structure and seek out a compatible in-network physician, but there is not much evidence to support this assumption. The field would benefit from additional research on how ongoing stability of coverage after instability affects access to care, including usual source of care.

Insurance coverage, usual source of care, and people with disabilities

Insurance is important for people with disabilities, who tend to have more health needs and fewer resources than people with disabilities. Compared to people without disabilities, this population is much more likely to be in fair or poor health, to experience serious psychological distress, and to report multiple co-morbid health conditions (Iezzoni, 2011; Erickson, Lee, von Shrader, 2011). Their incomes are twice as likely to be below the poverty level, yet their average healthcare expenditures are 4 to 5 times higher (Iezzoni, 2011; Mitra, Findley, & Sambamoorthi, 2009).

Because the US has historically relied on employers to provide health insurance for working-age adults and their families, those who are work-limited or work-disabled are at a disadvantage in obtaining private insurance coverage (Hacker, 1998). Until 2014, purchase of private insurance was not a viable option for this population, due to high costs and structural barriers such as lifetime spending caps, waiting periods, and pre-existing condition exclusions (Sommers, 2006; Pollitz, Sorian, & Thomas, 2001).

Consequently, many working-age adults with disabilities relied on public health insurance from Medicaid, Medicare, or both (Kennedy & Blodgett, 2012). Application to these programs is often a time-consuming and uncertain process, and the benefit structure tends to discourage workforce participation (Kennedy & Tuleu, 2007). Given these options, while people with disabilities have more health insurance options overall than those without, obtaining that health insurance can require major tradeoffs in terms of independence and earnings.

Having a usual source of care is particularly important for people with complex healthcare needs and/or disabilities (Iezzoni & O'Day, 2006). Health shocks that may not substantially affect able-bodied and healthy individuals can have serious consequences for individuals with disabilities. Maintaining continuous and timely healthcare is necessary both to manage the primary disabling condition and to prevent or treat secondary health concerns (Iezzoni, McCarthy, Davis, Harris-David, & O'Day, 2001).

Insured people with disabilities are more likely than their nondisabled insured counterparts to maintain a usual source of care. Across studies, 84-93% of insured people with disabilities have a usual source of care compared to only 80% of insured people without disabilities (Hanson, 2003; Iezzoni, Frakt, & Pizer, 2011). Interestingly, the opposite is true among uninsured people with disabilities: only 31-33% reported having a regular doctor, which is 12-14 percentage points lower than uninsured people without disabilities (Hanson, 2003; Iezzoni et al., 2011). The specific causes of this gap have not been identified, but uninsured disabled adults tend to be older, racial and ethnic minorities, less educated, and of lower income, which are all factors associated with not having a usual source of care (Iezzoni et al., 2011; Liaw, Jetty, Petterson, Bazemore, & Green, 2017).

Published research on insurance instability for people with disabilities is limited, as is research on the effect of insurance instability on usual source of care for this population. The existing literature primarily focuses on transitions for young adults with disabilities, who are at high risk for disruptions in coverage due to aging out of children's programs. Based on 2001-2004 data, 56% of young adults (16-25 years old) with disabilities had a gap in their coverage during a three-year reference period (Callahan & Cooper, 2007). In another, 15-25 year olds with non-severe disability (work-limited or having difficulty with functional activities, but not completely work-disabled or requiring ADL assistance) were less likely to

regain insurance, and tended to have longer spells of uninsurance, relative to those without disabilities (Wang, Grembowski, & Watts, 2011).

Three studies examine how insurance instability affects usual source of care for people with disabilities. One group of researchers found (in two separate studies) that 11.5% of working-age adults with disabilities were uninsured for part of the year, and these partially-insured respondents had much lower odds (OR=0.28) of having a usual source of care than those who were privately insured all year (Dobbertin, Horner-Johnson, Lee, & Andresen, 2015; Horner-Johnson, Dobbertin, Lee, & Andresen, 2014). Both studies used partial-year coverage as their indicator of insurance instability, and compared those with partial-year coverage to those who were continuously insured and those who were continuously uninsured. This approach does not account for an individual's insurance coverage status at the time of the interview, and does not consider those who switched insurers without becoming uninsured. In their analyses, the authors controlled for race, age, gender, self-rated health, presence of several priority chronic conditions, and presence of complex activity limitation. They did not control for income or employment, which are often included in other research on coverage changes and usual source of care.

Working-age adults with disabilities who are enrolled in Medicare can choose between traditional Medicare and Medicare Advantage private plans, and can switch enrollment among the private plans. Booske and colleagues used the 2001 Survey of Involuntary Disenrollees to examine how Part C plan withdrawals affected Medicare recipients (Booske, Lynch, & Riley, 2002). The authors did not detect any notable baseline differences between enrollees in plans that withdrew and enrollees in plans that stayed in the market, making this essentially a randomly-assigned switch. The authors weighted their data to account for non-respondents and separately analyzed beneficiaries who were eligible due to end-stage renal disease. Their analyses determined that, among Medicare enrollees whose managed care plans left the market, 18% had to change their usual source of care. Disability-eligible Medicare recipients were more likely to report having to change their personal healthcare provider in unadjusted analyses (23%, vs. 15-17% of those age 65-74), although they did not have significantly different odds of changing providers after other factors were controlled for (Booske et al., 2002). The generalizability of this study to the disabled population at large is limited by the definition of "disability" as receipt of SSDI benefits, and by

the comparison of these disabled individuals to older, retired Medicare beneficiaries rather than to other working-age adults.

Heterogeneity within the disability population

When studying healthcare access among people with disabilities, it is critical to understand that people with disabilities represent a tremendously heterogeneous population; different disabilities can vary significantly in their associated factors that predispose and enable healthcare utilization (Courtney-Long, 2015; Andersen, 1995). A growing body of health services research examines disparities within the disability population by comparing different disability subgroups. For example, people with cognitive, hearing, and lower-body physical limitations are more likely to report healthcare access barriers than those with vision or upper-body physical limitations (Iezzoni et al., 2011). Likewise, people with visual impairments have higher levels of unmet dental care needs than those with other types of disabilities (Horner-Johnson & Dobbertin, 2016).

The likelihood of having a usual source of care varies across disability types (Hanson, 2003; Horner-Johnson et al., 2014; Iezzoni et al., 2011). For example, individuals with vision problems or with multiple limitations have significantly lower odds of having a usual source of care than those with solely physical, hearing, or cognitive limitations (Horner-Johnson et al., 2014). These differences may reflect different barriers (e.g. transportation for a wheelchair vs. TTY phone access), health needs (e.g., assistive devices vs. home healthcare), and/or types of insurance coverage related to different impairments (Drainoni, Lee-Hood, Tobias, Bachman, Andrew, & Maisels, 2006; Kirschner & Breslin, 2007). Notably, problems with obtaining a usual source of care are especially acute among individuals with multiple types of disabilities (Horner-Johnson et al., 2014). Whatever the sources of these differences, most individuals with disabilities would benefit from having a usual source of care.

Remaining research needs

Gaps remain in our understanding of the relationship between insurance instability and usual source of care for people with disabilities. Only three studies examine the effect of insurance instability on usual source of care for people with disabilities, and there is much that we still do not know. Although switching coverage without a gap affects usual source of care for the general population, we lack evidence of this effect among adults with disabilities. We also lack studies of how time since coverage

change affects likelihood of maintaining a usual source of care, or studies that stratify the population with disabilities by different disability types. Each of these pieces of information is important to understanding how changes in insurance coverage affect access to care for people with disabilities. Given that a usual source of care is important for care coordination, access to preventive care, and patient satisfaction, factors such as insurance instability that decrease the likelihood of having a usual source of care should be evaluated and addressed by policymakers interested in providing high-value equitable care (Ettner, 1999; Fan, Burman, McDonell, & Fihn, 2005; Haggerty et al., 2003). Research is needed that addresses the endogeneity of insurance instability, reflects the heterogeneity of disability, and evaluates the effect of ongoing insurance stability.

Addressing the endogeneity of insurance instability

The majority of insurance instability research relies on observational studies to detect associations between coverage changes and a change in usual source of care. However, insurance coverage changes are not random. Studies that do not address this endogeneity may misrepresent the effect of instability. For instance, lower rates of having a usual source of care among those who experienced insurance instability could indicate a negative effect of instability on having a usual source of care; however, it could also indicate the influence of a third unmeasured factor. Only one published study addresses this endogeneity, and that study is restricted to a population with limited generalizability (married Wisconsin women ages 62-64) (Schumacher et al., 2009). Of the studies that consider instability for people with disabilities, the Booske study of Medicare involuntary dis-enrollees is informative but of limited generalizability, and the remaining two studies were not primarily focused on methodologically establishing a causal relationship between instability and usual source of care.

Reflecting the heterogeneity of disability

Recent studies have taken the important step of disaggregating the disabled population into different subgroups –physical limitations, vision limitations, hearing limitations, cognitive limitations, and multiple types of limitations. Distinguishing different types of disability is critical to reflect the heterogeneity of disabilities themselves, as well as the challenges people with different disabilities encounter. These studies found that the likelihood of being partially uninsured during the year varied by disability type, as did the likelihood of having a usual source of care (Dobbertin et al., 2015; Horner-Johnson et al., 2014).

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However, these studies did not evaluate whether the impact of partial-year coverage on having a usual source of care varied across disability types.

Considering the effect of insurance stability

Some research is available on the effects of ongoing stability of coverage for working-age adults, but only one study is available on how increasing time on stable coverage influences usual source of care, and no studies look at this effect for people with disabilities. The field would benefit from additional research on how ongoing stability of coverage after instability affects access to care, including usual source of care.

1.2 Specific Aims

The objective of this research was to contribute to the growing body of work on health insurance and healthcare access for people with disabilities. My central hypothesis was that insurance instability has a negative effect on a having a usual source of care among people with disabilities, this effect diminishes as time without a coverage change increases, and the effect of instability on usual source of care varies by disability type, controlling for important confounders. I tested my central hypothesis by pursuing three specific aims:

Aim 1: To assess the impact of insurance instability on the likelihood of having a usual source of care among working-age adults with disabilities, while controlling for the endogeneity present in the measure of insurance instability. This study answered the following research questions:

Research Question 1: When controlling for other factors, including confounding due to endogeneity in the measure of insurance instability, does insurance instability cause a reduction in the likelihood of having a usual source of care among working-age adults with disabilities? I hypothesized that insurance instability would cause a reduction in the likelihood of having a usual source of care.

Research Question 2: Controlling for other factors, including confounding due to endogeneity in the measure of insurance instability, do both switching coverage and having a break in coverage cause a reduction in the likelihood of having a usual source of care among working-age adults with disabilities? I hypothesized that both types of

instability would cause a reduction in the likelihood of having a usual source of care, but

that the magnitude of the effect of switching would be smaller.

Aim 2: To examine whether additional months of stable healthcare coverage are associated with

increased likelihood of having a usual source of care among working-age adults with disabilities,

controlling for other factors. I hypothesized that longer durations of time since a gap in coverage

would be associated with an increased likelihood of having a usual source of care.

Aim 3: To examine whether the effect of gaps in coverage on usual source of care is different for

those with different disabilities, controlling for other factors and addressing the endogeneity in the

gap variable. I hypothesized that the effect of gaps in coverage on likelihood of having a usual

source of care would vary by disability type, with a smaller effect among those who have sensory

disabilities (hearing and vision) and a larger effect among those who have physical or cognitive

disabilities.

The findings from these three analyses fill a much-needed information gap in the literature about

people with disabilities, insurance, and access to care. Based on these results, we will identify whether

overall insurance instability, switching, or gaps in coverage have a negative effect on usual source of

care, and whether ongoing stability in coverage has a positive effect. We will also establish whether

switching coverage and gaps in coverage should be studied separately or considered under the umbrella

variable of insurance instability, and determine whether studying insurance instability in different disability

subtypes is appropriate. These advances in the field should inform both future policymaking and future

research efforts.

CHAPTER 2 - RESEARCH METHODS

2.1 Data

The Medical Expenditure Panel Survey (MEPS) is an ongoing national survey that collects information about healthcare use, coverage, and spending within the civilian non-institutionalized U.S. population (Agency for Healthcare Research and Quality, 2009). The MEPS provides longitudinal health insurance coverage information for two years, as well as self-reported information about possession of a usual source of care and presence/type of disability. I used the Panels 9-17 longitudinal survey files in order to increase sample size. The surveys represented in this sample were conducted from 2004-2013. Some variables used in the analysis were not available before 2004 (the Kessler index) or after 2013 (rural/urban status). To obtain the full complement of variables needed for the proposed analyses, I also used the Person Round Public Use files. These files provide detailed information for each round on whether the source or name of an individual's employer-sponsored coverage changed.

Sample

The sample included adults with disabilities between the ages of 18 and 64 years for the duration of their survey participation. Specifically, disability refers to *an activity limitation or participation restriction resulting from an individual's physical, mental, or emotional condition interacting with their environment*. Individuals who report an activity limitation or participation restriction of this type were classified as having a disability. MEPS supports this conceptual definition with variables that ask an individual about the presence of activity limitations, hearing and vision limitations, cognitive limitations, and physical limitations. The age criterion is consistent with a working-age population; in addition, health insurance options for those under 18 and those over 64 are significantly different. The sample was also restricted to respondents who were present for all five rounds of their MEPS panel, were not missing data on covariates or instrumental variables, and who were insured for at least part of the reference period (Figure 1). The final sample comprised 7,882 respondents. A large proportion of respondents were lost due to missing data, mainly from the variables related to recent mental distress (7%), household

composition (7%), and whether their employer offered insurance coverage (21%). The implications of these missing observations and potential alternatives to dropping them are discussed in the limitations section.
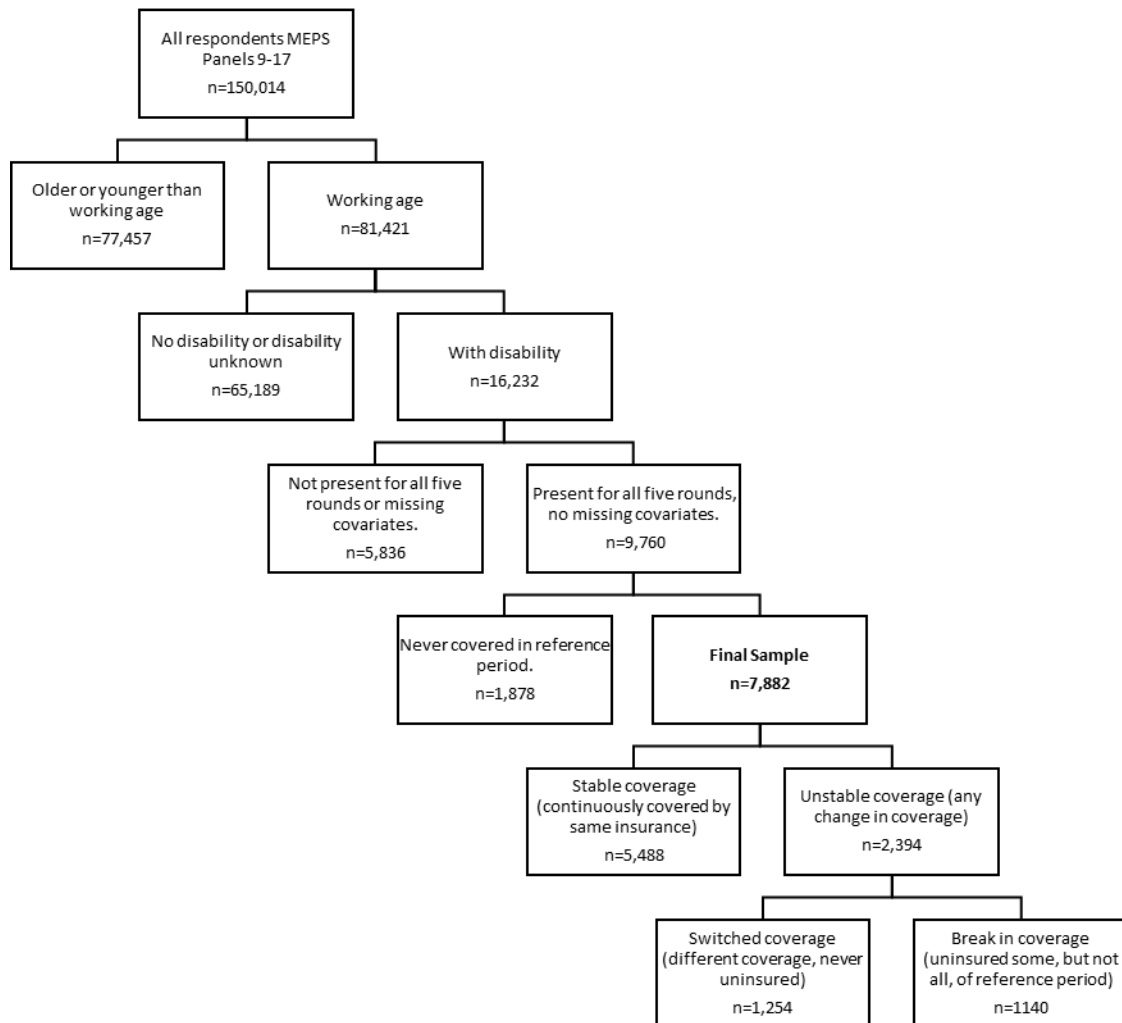
Figure 2.1: Model of excluded variables and final sample.

Disability Type Cohorts

       For Aim 3, I assigned disability types based on respondent self-report to the disability questions included in the household survey. These categories correspond with the body function/structure and

activity limitation concept of disability used by the World Health Organization's International Classification of Functioning, Disability, and Health (World Health Organization, 2002). They are not mutually exclusive.

Disability Type	Definition	Proportion
Physical	Difficulties walking, climbing stairs, grasping objects, reaching overhead, lifting, bending or stooping, or standing for long periods of time	67%
Cognitive	Experience confusion or memory loss, have problems making decisions, or require supervision for their own safety.	33%
Vision	Difficulty seeing even with glasses/contacts.	31%
Hearing	Some, moderate, or major difficulty hearing even with hearing aids.	19%

2.2 Conceptual Model

To frame the research question and hypotheses, this research uses the Gelberg-Andersen Behavioral Model of Health Services Use. The original Andersen Model illustrates how the interaction of an individual with their environment influences their health behavior and outcomes (Andersen, 1995). The Gelberg-Andersen model is a revision that is specifically applicable to vulnerable populations, such as people with disabilities (Gelberg, Andersen, & Leake, 2000). In the adaptation of the model below (Figure 2), I have prioritized the variables that are widely used in studies of healthcare access, measurable using the MEPS, and verified as having an impact on access to care (Babitsch, Gohl, & von Lengerke, 2012; Lambrew, DeFriese, Carey, Ricketts, & Biddle, 1996).
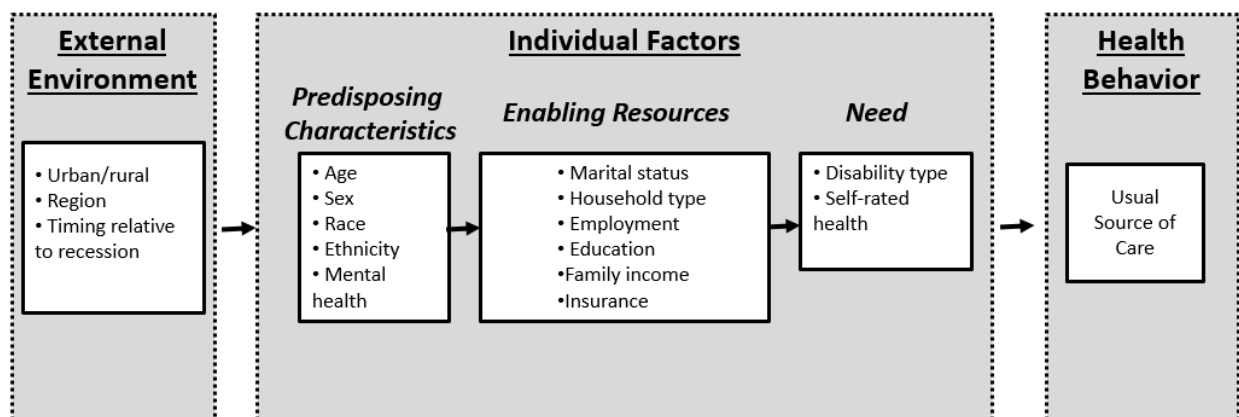
Figure 2.2: Adapted Gelberg-Andersen Behavioral Model of Health Services Use

2.3 Variables

The MEPS surveys respondents five times over two years, and not all questions are asked at every interview. The access questions, which include questions about whether the individual currently has

a usual source of care, are asked at the rounds 2 and 4 interviews. At each interview, respondents provide insurance information month-by-month for the prior period. From the round 4 interview, I used the participant's response to the usual source of care question. Control variable responses were obtained from the earliest round available.

The Medical Expenditure Panel Survey overlaps its two-year panels, with each calendar year containing two panels. For instance, calendar year 2010 contains the later rounds of Panel 14 (who entered the survey in 2009) and the earlier rounds of Panel 15 (who completed their survey in 2011). This allows for cross-sectional estimates as well as longitudinal analyses (see Figure 3).

MEPS Panel Design: Data Reference Periods

N is equal to the number of people with a positive person weight on the file.

Figure 2.3: MEPS-HC sample design and collection process
Agency for Healthcare Research and Quality, Rockville, MD.
http://www.meps.ahrq.gov/survey_comp/hc_data_collection.jsp

Key Independent Variable: Insurance Instability

I used the respondent's insurance coverage in the 12 months prior to their round 4 interview to identify whether their coverage status (insured/uninsured), coverage type (private employer or union-

sponsored, private non-group, private self-employed, Medicaid, Medicare, dually eligible, Tricare, other public), or plan (by name and source of plan) changed during this period. Individuals who did not have the same coverage status, type, and plan for the full 12 months were flagged as having experienced **insurance instability**. If they were uninsured for at least one of those twelve months, they were considered to have experienced a **gap**. If they experienced insurance instability but were never uninsured, they were considered as having a **switch** in their coverage. Gaps in coverage could be either within the same payer (e.g., Medicaid coverage to uninsurance to Medicaid coverage) or to a different payer (e.g., Medicaid coverage to uninsurance to private coverage) as long as a spell of uninsurance was observed. People who switched coverage could have switched between different types of coverage (e.g., Medicaid to private coverage), within different plans offered by the same insurer (e.g., different Blue Cross/Blue Shield Plans), or even between multiple sources of coverage (e.g., Medicaid to private to Medicare to Tricare): as long as no spell of uninsurance was recorded, they were classified as having switched coverage without a gap People with gaps and people with switches were considered mutually exclusive for the purposes of this analysis. For Aim 2, I measured length of time since a coverage change by counting months since their last reported gap in coverage.

I used the longitudinal files rather than the annual files to conduct my analyses, with each individual represented one time in the dataset. To assess an individual's insurance coverage in the 12 months preceding their round 4 interview, I identified the month of their round 4 interview, identified the month 12 months prior to that point, and used STATA code to verify whether there was a change in each of the tracked types of insurance coverage in any of the months contained within that time period.

For instance, for a person whose round 4 interview was in June of their second year, I created an indicator variable of whether they had any difference in their Medicare status (had Medicare/no Medicare) for July, August, September, October, November, or December of year one or January, February, March, April, or May of year two. I repeated this for each of the insurance types recorded by the MEPS (employer-sponsored or union insurance, non-group private insurance, private other group insurance, self-employment insurance, other public A, other public B, Tricare, Medicaid, state insurance coverage) and one insurance type that I constructed (dually covered by Medicare and Medicaid) for all the people whose round 4 interview was in June, and used the same technique to detect a difference in their insured

status (covered, not covered) for those months, which told me whether they experienced a gap in coverage during the reference period. I then repeated this method with different months for each of the groups of respondents with later round 4 interviews (July Y2, August Y2,, etc.). This allowed me to standardize the reference period.

A small proportion of MEPS respondents indicate that they don't know where their private insurance comes from (employer/union, non-group, etc.). This number varies depending on the month, but is consistently under 1% for my sample. Because the original source of their coverage is unknown, I cannot differentiate whether a person who went from "private coverage – unknown" to "private coverage – employer/union sponsored" actually changed their coverage, or simply got more information about where their coverage came from. As a result, I excluded these individuals from analyses. This exclusion removed 196 individuals from my sample.

Dependent Variable: Usual Source of Care

MEPS respondents are asked to indicate whether they currently have a usual source of care, defined as "the particular medical professional, doctor's office, clinic, health center, or other place where a person would usually go if sick or in need of advice about his or her health." (Agency for Healthcare Research and Quality, 2013). I created an indicator variable signifying whether an individual reported having a usual source of care in their round 4 interview. Individuals who report having a usual source of care are also asked to identify the location of this care; those who respond with the emergency room were re-categorized as not having a usual source of care.

Control Variables

Control variables included factors that could contribute to likelihood of having a usual source of care based on the conceptual model and have been used in similar studies, including age, sex, race and ethnicity, insurance coverage status, marital status, household composition, household income, education, self-rated health, region, urban/rural residence, and employment status. Given the economic changes in the time period reflected by a 2004-2013 sample, I also included an indicator variable for whether an individual contributed data before, during, or after the recession of 2008-2009.

The MEPS does not provide emotional functioning variables equivalent to the vision, physical, hearing, and cognitive variables created by asking individuals about their functioning and participation.

However, mental health can be an important predisposing characteristic for healthcare access. The Kessler 6 is a six-item scale where respondents rank their non-specific psychological distress on a scale from 0 (none of the time) to 4 (all of the time) (Kessler et al., 2002). When combined, these form a score from 0-24. This variable is not intended to parallel the disability subtypes, and the data do not permit me to identify people with mental health disabilities in the same way that I can identify those with cognitive, physical, vision, or hearing disabilities.

Table 2.1: Operational definitions, all aims and variables

Dependent Variable	
Usual source of care	Whether or not an individual reports having a place they usually go when they are sick or need advice about their health, exclusive of the emergency department.
Main Explanatory Variables	
Aim 1: Instability (y/n), switch (y/n), gap (y/n).	Instability: Changed health insurance type, source, or plan during reference period. Switch: Changed health insurance type, source, or plan during reference period without becoming uninsured at any point. Gap: Became uninsured at some point during reference period.
Aim 2: Months since gap in coverage.	Months since individual obtained the coverage they had in the 4th interview (1-18)
Aim 3: Gap (y/n).	Became uninsured at some point during reference period.
Control Variables		
	Age	Age of individual (18-64).
	Sex	Male, female.
	Race	White; nonwhite.
	Hispanic	Hispanic; non-Hispanic
	Self-rated health	Self-rated health: excellent, very good, good; fair, poor.
	Recent psychological distress	Kessler 6 score, 0-24.
	Education	Highest educational level attained (less than high school, finished high school, more than high school education).
All Aims	Marital status	Married (including separated) or not married (including never married, divorced, and widowed).
	Household type	Lives alone, lives with family, lives with others who are not family.
	Family income category	Family's annual income as related to the federal poverty line for the applicable year: poor/negative income, near poor, low income; middle income, high income.
	Region	Northeast, Midwest, South, West.
	Urban/rural status	Resides in a metropolitan statistical area (MSA); does not reside in an MSA.
	Employment status	At time of first interview, individual works full-time (35+ hours weekly), or does not work full time (works <35 hours weekly or is not employed).
	Timing relative to recession	Contributed data pre-recession (before 2008), during recession (2008-2009), or after recession (after 2009).
Aim 2 Only	Previous experience with current insurance	Whether the respondent had ever previously been covered (during MEPS) by the coverage they had most recently obtained at their round 4 interview.

2.4 The Selection Problem

Data analysis was complicated by the fact that insurance coverage changes are not randomly

assigned. There are factors influencing the likelihood of having an insurance coverage change that are

not in the model and that may also influence the likelihood of having a usual source of care. These factors

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include attitude toward risk, expected utility of health insurance, and availability of insurance coverage. The presence of unmeasured confounders in the error term creates a potential endogeneity problem and must be addressed to estimate the causal effects of insurance coverage changes on usual source of care.

The instrumental variables (IV) technique handles the presence of endogenous regressors by finding exogenous variables (the instruments) that are associated with these endogenous regressors but not with the outcome of interest and using these instruments to eliminate the bias introduced by the endogeneity. Recent methodology research has determined that, when using a binary outcome, binary endogenous treatment, and binary IV, two-stage least squares (2SLS) produces consistent estimates of the local average treatment effect (LATE), while two-stage residual inclusion (2SRI) is biased (Basu, Coe, & Chapman, 2017). Bivariate probit models are less biased than 2SRI, but more biased than 2SLS. Consequently, 2SLS and bivariate probit analyses were conducted and presented for Aim 1. In Aim 3, testing indicated that the gap variable was not endogenous in all models, so both ordinary least squares (OLS) and 2SLS models were presented. Aim 2 was restricted to respondents who already reported a coverage gap. As such, a large component of the non-randomness of their insurance instability was already eliminated and instrumental variables were not used.

The first instrumental variable was whether the respondent's employer newly offered health insurance. An employer newly offering health insurance coverage should be associated with an increase in the availability of insurance coverage, and therefore a change in the likelihood of insurance instability. However, this change should not be associated with an individual's likelihood of having a usual source of care except for its impact on whether the individual experienced insurance instability. Therefore, there should be no direct effect of this change on the likelihood of having a usual source of care.

The second instrumental variable was whether the respondent's spouse's employer newly offered health insurance. As most employer-based plans offer spousal coverage (96% as of 2014, see Claxton, Rae, Panchal, Whitmore, Damico, & Kenward, 2014), a change in whether the respondent's spouse's employer offers coverage could be associated with a change in the availability of coverage, and therefore a change in the likelihood of instability.

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The third instrumental variable was whether the respondent had been self-employed during the reference period. Self-employment has been successfully used as an instrument in a study of the impact of health insurance on medical care utilization (Meer & Rosen, 2004). People who choose to be self-employed do not differ significantly from standard wage-earners in their health or their healthcare utilization (Meer & Rosen, 2004). However, the small bargaining power of sole proprietorships means that, pre-ACA, these individuals lacked access to the same health insurance options as employees of larger firms (Perry & Rosen, 2001, 2004). Self-employed individuals were more likely to be uninsured or to be covered by the non-group market, which was more expensive and volatile than the employer market (Perry & Rosen, 2001, 2004). There should be no association between self-employment and likelihood of having a usual source of care other than through insurance coverage.

I also examined the possibility that employment status might be endogenous. However, tests of endogeneity were not significant, and instrumenting employment (through the instruments of trust income and interest income) resulted in very similar marginal effects for each key independent variable as under the assumption of exogeneity. As employment status was measured before the reference period, was not a primary focus of this research, and did not appear to significantly impact the estimates of the key independent variables, it was treated as exogenous in the final models.

Tests of Endogeneity and Strength

In Aim 1, I verified the strength of the instruments by checking whether the instruments for each model, tested jointly, had an F value above ten (Stock & Yogo, 2005). The F-value for the instruments in the instability model was 38.28, for the switch model was 11.31, and for the gap model was 68.90. I also tested the exogeneity of the instability variables. In the 2SLS models, the Durbin chi-square test did not reject exogeneity in the case of the instability variable (p=0.4087), switch variable (p=0.0605), or gap variable (p=0.3618) (Nakamura & Nakamura, 1981). In the bivariate probit models, the Wald test of rho=0 failed to reject exogeneity in the case of the instability variable (p=0.9596), rejected it in the case of the switching variable (p<0.001), and failed to reject in the case of the gap variable (p=0.3058).

In Aim 3, when the instrumented variable (gaps in coverage) was assessed for endogeneity in the different disability cohorts, the Durbin chi-square test failed to reject the null hypothesis of exogeneity for this variable in the cognitive and physical cohorts, but rejected the null hypothesis of exogeneity for the

this variable in the vision and hearing cohorts. The test results in the subsamples with hearing and vision disabilities suggest that having a gap in coverage is exogenous for these cohorts. The F-value for the instruments in the vision cohort was 30.42, in the hearing cohort was 27.41, in the physical cohort was 28.58, and in the cognitive cohort was 16.74.

CHAPTER 3 - AIM 1 MANUSCRIPT

3.1 Overview

One important advantage of health insurance is the increased ability to establish/maintain a usual source of medical care (USC), but insurance instability (switching between insurance types while staying insured and/or breaks in insurance coverage) diminishes this advantage. Our objective was to assess the impact of insurance instability on the likelihood of having a USC among working-age adults with disabilities, while controlling for endogeneity present in the measure of insurance instability. Using 2008-2013 Medical Expenditure Panel Survey data, we found that, controlling for other factors, overall insurance instability (both switches and breaks) did not have a significant effect on likelihood of having a USC. However, when instability is separated into switching (changing plans, staying insured) and breaks (interruption in coverage), different effects were observed. Counter to prior research, switching was not associated with a reduced likelihood of USC. However, the average marginal effect of a break in coverage was a 13 percentage point reduction in the likelihood of USC. To maximize access to USC, disability advocates should explore opportunities to reduce frequency of gaps in coverage among working-age adults with disabilities.

3.2 Background

Insurance instability occurs when an individual is not continuously covered by the same plan over time, but loses coverage or changes their source of coverage (Doty & Holmgren, 2004). Instability is common: over a three-year period, 35% of non-elderly American adults (19—61 years old) reported being without health insurance coverage for at least one month (Czajka & Mabli, 2009); 26% of those with a period of being uninsured had two or more spells during the three years. Insurance instability tends to be triggered by life events such as changes in employment, income, or marital status (Czajka & Mabli, 2009). It is more common among low-income adults and minorities (Doty & Holmgren, 2004; Reyes & Hardy, 2015).

One important benefit of health insurance is the increased ability to establish and maintain a usual source of medical care, but insurance instability diminishes this benefit (Devoe, Tillotson, Lesko, Wallace, & Angier, 2011). People who experience instability are less likely to report having a regular physician (Duchon, Schoen, Doty, Davis, Strumpf, & Bruegman, 2001; Hoffman, Schoen, Rowland, & Davis, 2001; Schoen & Desroches, 2000; Lavarreda, Gatchell, Ponce, Brown, & Chia, 2008). Even when people do not lose insurance coverage entirely, switching plans decreases the likelihood of obtaining (Cunningham & Kohn, 2000; Schumacher, Smith, Liou, & Pandhi, 2009) or maintaining (Lavarreda et al., 2008) a usual source of care.

The majority of insurance instability research relies on observational studies to detect associations between coverage changes and a change in usual source of care. However, insurance coverage changes are not randomly assigned. Studies that do not address this endogeneity may misrepresent the effect of instability. For instance, lower rates of having a usual source of care among those who experienced insurance instability could indicate a negative effect of insurance instability on having a usual source of care; however, it could also indicate the influence of a third unmeasured factor: for instance, people with low risk tolerance may be more likely to ensure that they maintain both access to a usual source of care and stable insurance coverage. Only one published study methodologically addresses the non-randomness of insurance coverage changes, and that study is restricted to a population with limited generalizability (married Wisconsin women ages 62-64) (Schumacher et al., 2009).

Having a usual source of care is particularly important for people with complex healthcare needs and/or disabilities (Iezzoni & O'Day, 2006). Health shocks that may not substantially affect able-bodied and healthy individuals can have serious consequences for individuals with disabilities. Maintaining continuous and timely healthcare is necessary both to manage the primary disabling condition and to prevent or treat secondary health concerns (Iezzoni, McCarthy, Davis, Harris-David, & O'Day, 2001). Studies indicate that instability is common among some disability subgroups., including the near-elderly (55-64 years) and young adults (15-25 years) (Callahan & Cooper, 2007; Jensen, 1992; Wang, Grembowski, & Watts, 2009).

People with disabilities are more likely than their nondisabled counterparts to maintain a usual source of care – assuming that they have insurance. Across studies, 84-93% of insured people with

disabilities have a usual source of care compared to only 80% of insured people without disabilities (Hanson, 2003; Iezzoni, Frakt, & Pizer, 2011). Interestingly, the opposite is true among uninsured people with disabilities: only 31-33% of uninsured people with disabilities reported having a regular doctor, which is 12-14 percentage points lower than uninsured people without disabilities (Hanson, 2003; Iezzoni et al., 2011). The specific causes of this gap have not been identified, but uninsured disabled adults tend to be older, racial and ethnic minorities, less educated, and of lower income, which are all factors associated with not having a usual source of care (Iezzoni et al., 2011; Liaw, Jetty, Petterson, Bazemore, & Green, 2017).

Despite the importance of usual source of care for adults with disabilities, published research on insurance instability within this population is quite rare. Three studies examine how insurance instability affects usual source of care for people with disabilities. One group of researchers found (in two separate studies) that 11.5% of working-age adults with disabilities were uninsured for part of the year, and these partially-insured respondents had much lower odds (OR=0.28) of having a usual source of care than those who were privately insured all year (Dobbertin, Horner-Johnson, Lee, & Andresen, 2015; Horner-Johnson, Dobbertin, Lee, & Andresen, 2014). Booske and colleagues used the 2001 Survey of Involuntary Disenrollees to examine how Part C plan withdrawals affected Medicare recipients (Booske, Lynch, & Riley, 2002). Their analyses determined that, among Medicare enrollees whose managed care plans left the market, 18% had to change their usual source of care. Disability-eligible Medicare recipients were more likely than age-eligible recipients to report having to change their personal healthcare provider in unadjusted analyses (23%, vs. 15-17% of those age 65-74), although they did not have significantly different odds of changing providers after other factors were controlled for (Booske et al., 2002).

Given that a usual source of care is important for care coordination, access to preventive care, and patient satisfaction, factors that decrease the likelihood of having a usual source of care should be evaluated and addressed by policymakers interested in providing high-value equitable care (Ettner, 1999; Fan, Burman, McDonell, & Fihn, 2005; Haggerty et al., 2003). Reducing insurance instability may provide a way to address the known disparities in access to healthcare for people with disabilities (Diab & Johnston, 2004; Iezzoni et al., 2001; Kroll, Jones, Kehn, & Neri, 2006).

3.3 Research Questions

The objective of this research is to assess the impact of insurance instability on the likelihood of having a usual source of care among working-age adults with disabilities, while controlling for the endogeneity present in the measure of insurance instability. This study answers the following research questions:

Research Question 1: When controlling for other factors, including confounding due to endogeneity in the measure of insurance instability, does insurance instability cause a reduction in the likelihood of having a usual source of care among working-age adults with disabilities?

Research Question 2: Controlling for other factors, including confounding due to endogeneity in the measure of insurance instability, do both switching coverage and having a break in coverage cause a reduction in the likelihood of having a usual source of care among working-age adults with disabilities?

The first question contributes to the growing body of work on health insurance and healthcare access for people with disabilities by adding findings focused on insurance instability, a little-studied area despite the importance of continuity of care. The second question adds nuance to our understanding of how insurance instability affects people with disabilities by separating the broad concept of insurance instability in two different components. One of these, switching coverage without a gap, has never been studied in people with disabilities.

3.4 Methods

Dataset

The Medical Expenditure Panel Survey (MEPS) is an ongoing national survey that collects information about healthcare use, coverage, and spending within the civilian non-institutionalized U.S. population (Agency for Healthcare Research and Quality, 2009). It provides longitudinal health insurance coverage data for two years, as well as self-reported information about possession of a usual source of care and disability status. The files used for this analysis are available for public download at https://meps.ahrq.gov/mepsweb/. Each MEPS participant answers interview questions at five points (rounds) during their survey participation. Missing values are imputed by MEPS staff whenever possible, resulting in minimal loss of data (Agency for Healthcare Research and Quality, 2009). Panels 9-17, which

covered surveys conducted from 2004-2013, were used in this analysis. MEPS Person Round files provided detailed information on whether the source or name of an individual's employer-sponsored coverage changed. A standardized reference period, based on the respondent's insurance coverage in the 12 months preceding their round 4 interview, was used to track insurance coverage within this time period. The round 4 interview is the last time during their MEPS participation when respondents are asked about their usual source of care.

Sample

The sample included adults with disabilities between the ages of 18 and 64 years for the duration of their survey participation. Specifically, disability refers to *an activity limitation or participation restriction resulting from an individual's physical, mental, or emotional condition interacting with their environment*. Individuals who report an activity limitation or participation restriction of this type were classified as having a disability. MEPS supports this conceptual definition with variables that ask an individual about the presence of activity limitations, hearing and vision limitations, cognitive limitations, and physical limitations. The age criterion is consistent with a working-age population; in addition, health insurance options for those under 18 and those over 64 are significantly different. The sample was also restricted to respondents who were present for all five rounds of their MEPS panel, were not missing data on covariates or instrumental variables, and who were insured for at least part of the reference period. The final sample comprised 7,882 respondents.

Measures

Dependent Variable: Usual Source of Care.

At their round 4 interview, MEPS respondents are asked whether they currently have a usual source of care, defined as "the particular medical professional, doctor's office, clinic, health center, or other place where a person would usually go if sick or in need of advice about his or her health." (Agency for Healthcare Research and Quality, 2013). An indicator variable signified whether an individual reported having a usual source of care. Respondents who indicated that the emergency department was their usual source of care (n=71) were categorized as not having a usual source of care.

Key Independent Variables: Coverage Instability, Switching, and Breaks

Respondent's insurance coverage in each of the 12 months prior to reporting on their usual source of care was used to identify whether any of the following changed during this period: coverage status (insured/uninsured), coverage type (private employer or union-sponsored, private non-group, private self-employed, Medicaid, Medicare, dually eligible, Tricare, other public), or plan (by name and/or source of plan). Individuals who did not have the same coverage status, type, and plan for the full 12 months were flagged as having unstable coverage. Two types of instability were identified during this reference period: switching (i.e., changing coverage while remaining insured, including between different private insurance plans) and breaks in coverage (i.e., partially insured and partially uninsured). These changes may be voluntary or involuntary.

Control Variables

The following control variables previously identified in the research literature as contributing to the likelihood of having a usual source of care were included in this analysis: age, sex, race (white or non-white), ethnicity (Hispanic or non-Hispanic), marital status (married/separated or not married which included never married, divorced, and widowed), household composition (lives alone, with family, or with others who are not family), household income (negative income or poor, near poor, low income, middle income, high income), education (did not graduate high school, graduated high school), self-rated health (excellent, very good, good, fair, poor), region (Northeast, Midwest, South, West), urban/rural residence, employment status (employed full-time versus unemployed and working part-time) and mental health. Mental health was measured with the Kessler 6 (K6), a six-item scale where respondents rank their non-specific psychological distress over the past 30 days on a scale from 0 (none of the time) to 4 (all of the time) (Kessler et al., 2002). Also included was a variable to assess the impact of the recession (before, during, or after 2008-2009). To strengthen the assumption of exogeneity for these control variables, the earliest available measure of each variable was utilized – for instance, employment status was measured in round 1 and K6 score was measured in round 2.

Analytical Models: Instrumental Variables (IV) Approach

Recent methodology research has determined that, when using a binary outcome, binary endogenous treatment, and binary IV, the two-stage least squares (2SLS) approach produces the most

consistent estimates of the local average treatment effect (LATE), while 2SRI is biased (Basu, Coe, & Chapman, 2017). Bivariate probit analyses, in contrast, estimate the average treatment effect – their degree of bias depends on the expected value of the outcome as well as the probability of the treatment. In the results, therefore, the marginal effects produced by the 2SLS analyses will tell us the effects of coverage changes on those who changed coverage because of the IVs but who would otherwise not have had a coverage change. These findings do not necessarily apply to the entire population of working-age adults with disabilities, but rather only to the marginal population responsive to the final set of IVs.

Standard errors were calculated through bootstrapping (1000 replications) for both the 2SLS and ordinary least squares (OLS) models in order to reduce bias introduced by violations of distributional assumptions. Conceptual pathways and threats to the exclusion restriction are discussed below.

We verified the strength of the instruments by checking whether the instruments for each model, tested jointly, had a F value above ten (Stock & Yogo, 2005). The F-value for the instruments in the instability model was 38.28, for the switch model was 11.31, and for the gap model was 68.90. We also tested the exogeneity of the instability variables. In the 2SLS models, the Durbin chi-square test did not reject exogeneity in the case of the instability variable (p=0.4087), switch variable (p=0.0605), or gap variable (p=0.3618) (Nakamura & Nakamura, 1981). In the bivariate probit models, the Wald test of rho=0 failed to reject exogeneity in the case of the instability variable (p=0.9596), rejected it in the case of the switching variable (p<0.001), and failed to reject in the case of the gap variable (p=0.3058).

The first instrumental variable was whether the respondent's employer newly offered health insurance. An employer newly offering health insurance coverage should be associated with an increase in the availability of insurance coverage, and therefore a change in the likelihood of an insurance coverage change. However, this change should not be associated with an individual's likelihood of having a usual source of care except for its impact on whether the individual had an insurance coverage change. Therefore, there should be no direct effect of this change on the likelihood of having a usual source of care.

The second instrumental variable was whether the respondent's spouse's employer newly offered health insurance. As most employer-based plans offer spousal coverage (96% as of 2014, see Claxton, Rae, Panchal, Whitmore, Damico, & Kenward, 2014), a change in whether the respondent's spouse's

employer offers coverage could be associated with a change in the availability of coverage, and therefore a change in the likelihood of an insurance coverage change.

The third instrumental variable was whether the respondent had been self-employed during the reference period. Self-employment has been successfully used as an instrument in a study of the impact of health insurance on medical care utilization (Meer & Rosen, 2004). People who choose to be self-employed do not differ significantly from standard wage-earners in their health or their healthcare utilization (Meer & Rosen, 2004). However, the small bargaining power of sole proprietorships means that these individuals lack access to the same health insurance options as employees of larger firms (Perry & Rosen, 2001, 2004). Self-employed individuals are more likely to be uninsured or to be covered by the non-group market, which before the Affordable Care Act was more expensive and volatile than the employer market (Perry & Rosen, 2001, 2004). There should be no association between self-employment and likelihood of having a usual source of care other than through insurance instability.

We also examined the possibility that employment status might be endogenous. However, tests of endogeneity were not significant, and instrumenting employment (through the instruments of trust income and interest income, validated by the same methods described above) resulted in very similar marginal effects for each independent variable as under the assumption of exogeneity. As employment status was measured before the reference period, was not a primary focus of this research, and did not appear to significantly impact the estimates of the key independent variables, it was treated as exogenous in the final models.

People with stable coverage (no break, no switch) were used as the reference group. They were first compared to those with unstable coverage to determine whether having any instability had an effect on the likelihood of having a usual source of care. Next, they were compared to each sub-group of coverage changes (switches and breaks) separately to determine whether either or both types of instability (compared to having stable coverage) had an effect on likelihood of usual source of care.

Results

Sample Description

Individuals with and without stable coverage were similar in their sex, race, and ethnicity (Table 1). The unstable coverage group was on average younger (p<.01), more likely to rate their health as

excellent (p<.05) or very good (p<.01), and had a lower average K6 score (measuring recent psychological distress) than those with stable coverage (p<.01). They were also more likely to have graduated high school (p<.01) and work full-time (p<.01). Those with unstable coverage were more likely to be poor (p<.01), low income (p<.01), or middle income (p<.01). Both groups were similarly likely to live in the West or South, but those with unstable coverage were less likely to live in the Northeast (p<.01), more likely to live in the Midwest (p<.05), and more likely to live in urban areas (p<.01). Respondents with unstable coverage were more likely to have contributed data before, and less likely to have contributed data after, the recession.

We also compared the populations reporting each type of insurance stability (switch, break) with those who reported stable coverage. Compared to those with stable coverage, those who switched coverage (instability without a gap) were more likely to be female (p<.05), less likely to be Hispanic (p<.01), and more likely to report being in very good health (p<.01). Switchers were more likely to be high school graduates (p<.01), married (p<.01), and working full time (p<.01). They were also more likely to be middle or high income (p<.01). Relative to those with stable coverage, those who reported a break in coverage tended to be younger (p<.01), were more likely to be Hispanic (p<.05), and were less likely to be in excellent health (p<.05). Those with a break in coverage were less likely to be married (p<.01), more likely to live with non-family others (p<.01), more likely to be low-income (p<.01), and more likely to work full time (p<.01).

Table 3.1 Characteristics of sample by insurance stability

	Stable Coverage (comparison group)	Any Unstable Coverage	Switch	Break
	n=5,488	n=2,394	n=1,254	n=1,140
Age in years (mean)	46.4	43.4**	45.84	40.5**
Female	45.2%	52.9%	52.3%*	53.7%
White	80.1%	79.6%	80.7%	78.2%
Hispanic	10.3%	10.5%	9.0%*	12.3%*
Excellent health	10.3%	10.6%	11.4%	9.6%*
Very good health	18.8%	20.9%**	21.5%**	20.2%
Good health	28.0%	30.5%	31.1%	29.9%
Fair health	26.6%	24.8%*	23.9%*	26.0%
Poor health	16.4%	13.1%**	12.1%**	14.3%
Kessler 6 sum (mean)	6.7	6.4**	6.11**	6.78
High school graduate or beyond	76.7%	81.2%**	83.7%**	78.2%
Married	44.6%	41.0%	47.6%**	32.9%**
Lives alone	20.6%	19.2%	20.2%	18.0%**
Lives with non-family others	6.1%	8.3%**	5.9%	11.3%**
Lives with family	73.3%	72.6%	74.0%	70.8%
Poor	24.8%	19.1%**	12.1%**	27.8%
Near poor	5.9%	6.9%	5.4%	8.7%
Low income	14.8%	17.5%**	14.0%	21.7%**
Middle income	29.4%	34.8%	37.0%**	32.2%
High income	25.1%	21.7%	31.5%**	9.6%**
Northeast US	18.1%	16.5%**	18.1%	14.6%**
Midwest US	23.8%	26.2%*	26.0%	26.5%*
South US	37.2%	37.4%	36.8%	38.3%
West US	20.9%	19.9%	19.2%	20.7%
Urban	77.9%	81.1%	82.4%**	79.5%*
Working full-time	35.1%	43.5%	45.5%**	41.2%**
Pre-recession (before 2008)	34.7%	39.4%**	41.9%**	36.2%
During recession (2008-2009)	21.8%	22.3%	20.4%	24.7%
Post-recession (after 2009)	43.5%	38.3%**	37.7%**	39.1%

X^2 tests used for categorical variables and t-tests used for comparisons of means.
*Difference significant at $p < 0.05$, ** at < 0.01

Research Question 1: Effect of Insurance Instability on Usual Source of Care

The two-stage least squares model estimated that insurance instability had an average marginal effect of -0.13 (BSE=0.08) on having a usual source of care among the subgroup of marginal respondents, but this effect was not statistically significant (Table 2). The bivariate probit model estimated that insurance instability had, on average, a negative marginal effect (-0.07) but was not statistically significant (95% CI -0.25 to 0.10). Consistent with earlier research, this model showed that older respondents ($p<.01$) and female respondents ($p<.01$) were more likely to have a usual source of care. Relative to self-reported excellent health, those with fair ($p<.01$) or poor ($p<.01$) self-rated health were more likely to report a usual source of care, as were those with higher levels of recent psychological distress ($p<.05$). Household composition and race were not significant. Higher income categories were associated with higher likelihood of reporting a usual source of care. Those who lived outside the Northeast and in urban areas ($p<.05$) were less likely to have a usual source of care, as were those who worked full-time ($p<.01$). Timing relative to recession was not significant.

Table 2: Two-stage least squares models of the effects of any change in coverage, break in coverage, and switch in coverage on usual source of care among working-age adults with disabilities.

	Instability Model			Switch Model (n=6742)			Break Model (n=6628)		
	AME (BSE)	p	95% CI	AME (BSE)	P	95% CI	AME (BSE)	p	95% CI
Instability (ref=stable coverage)	-0.13 (0.08)		-0.29 to 0.03	--	-	--	--	--	--
Switch in coverage (ref=stable coverage)	--	--	--	0.25 (0.16)		-0.06 to 0.56	--	--	--
Break in coverage (ref=stable coverage)	--	--	--	--	--	--	-0.20 (0.08)	*	-0.35 to -0.04
Age in years	0.01 (0.00)	**	0.00 to 0.01	0.00 (0.00)	**	0.00 to 0.01	0.01 (0.00)	**	0.00 to 0.01
Female (ref=male)	0.05 (0.01)	**	0.03 to 0.06	0.05 (0.01)	**	0.04 to 0.07	0.04 (0.01)	**	0.03 to 0.06
White (ref=nonwhite)	-0.01 (0.01)		-0.03 to 0.01	-0.01 (0.01)		-0.03 to 0.01	-0.00 (0.01)		-0.02 to 0.02
Hispanic (ref=white, non-Hispanic)	-0.03 (0.01)	*	-0.05 to -0.01	-0.03 (0.01)	*	-0.05 to -0.00	-0.04 (0.01)	**	-0.06 to -0.01
Very good health (ref=Excellent health)	0.01 (0.02)		-0.02 to 0.05	0.02 (0.02)		-0.02 to 0.06	0.02 (0.02)		-0.02 to 0.06
Good health (ref=Excellent health)	0.03 (0.02)		-0.00 to 0.06	0.04 (0.02)	*	0.00 to 0.08	0.03 (0.02)		-0.01 to 0.07
Fair health (ref=Excellent health)	0.06 (0.02)	**	0.03 to 0.09	0.07 (0.02)	**	0.04 to 0.11	0.06 (0.02)	**	0.02 to 0.10
Poor health (ref=Excellent health)	0.08 (0.02)	**	0.04 to 0.12	0.08 (0.02)	**	0.04 to 0.12	0.07 (0.02)	**	0.03 to 0.11
Kessler 6 sum	0.00 (0.00)	*	0.00 to 0.00	0.00 (0.00)	*	0.00 to 0.00	0.00 (0.00)	**	0.00 to 0.00
High school graduate (ref =not HSG)	0.02 (0.01)		-0.00 to 0.04	0.02 (0.01)		-0.00 to 0.04	0.03 (0.01)	**	0.01 to 0.05
Married (ref=not married)	0.00 (0.01)		-0.02 to 0.02	0.00 (0.01)		-0.02 to 0.02	0.01 (0.01)		-0.01 to 0.03
Lives with non-family others (ref=lives alone)	-0.02 (0.02)		-0.05 to 0.02	0.01 (0.02)		-0.03 to 0.05	-0.02 (0.02)		-0.06 to 0.03
Lives with family (ref=lives alone)	0.01 (0.01)		-0.01 to 0.04	0.03 (0.01)	*	0.01 to 0.05	0.02 (0.01)		-0.00 to 0.04
Near poor (ref=poor/negative income)	0.01 (0.02)		-0.02 to 0.05	-0.02 (0.02)		-0.06 to 0.02	0.01 (0.02)		-0.03 to 0.04
Low income (ref=poor/negative income)	0.05 (0.01)	**	0.03 to 0.08	0.02 (0.02)		-0.02 to 0.05	0.04 (0.01)	**	0.02 to 0.07
Middle income (ref=poor/negative income)	0.05 (0.01)	**	0.02 to 0.07	-0.00 (0.02)		-0.05 to 0.04	0.03 (0.01)	*	0.01 to 0.06
High income (ref=poor/negative income)	0.08 (0.01)	**	0.05 to 0.11	0.03 (0.02)		-0.01 to 0.08	0.05 (0.02)	**	0.02 to 0.09
Midwest (ref=Northeast)	-0.05 (0.01)	**	-0.08 to -0.03	-0.05 (0.01)	**	-0.08 to -0.03	-0.04 (0.01)	**	-0.07 to -0.02
South (ref=Northeast)	-0.07 (0.01)	**	-0.09 to -0.04	-0.06 (0.01)	**	-0.08 to -0.03	-0.06 (0.01)	**	-0.09 to -0.04
West (ref=Northeast)	-0.04 (0.01)	**	-0.07 to -0.02	-0.02 (0.01)		-0.05 to 0.00	-0.04 (0.01)	**	-0.07 to -0.02
Urban resident (ref=rural)	-0.02 (0.01)	*	-0.04 to -0.00	-0.03 (0.01)	*	-0.05 to -0.01	-0.02 (0.01)		-0.04 to 0.00
Working full-time (ref=not working full-time)	-0.04 (0.01)	**	-0.06 to -0.02	-0.05 (0.01)	**	-0.07 to -0.03	-0.05 (0.01)	**	-0.07 to -0.02
Before 2008 (ref=after 2009)	-0.01 (0.01)		-0.03 to 0.01	-0.01 (0.01)		-0.03 to 0.02	-0.01 (0.01)		-0.04 to 0.01
2008-2009 (ref=after 2009)	-0.01 (0.01)		-0.03 to 0.01	0.01 (0.01)		-0.01 to 0.03	-0.02 (0.01)		-0.04 to 0.00

AME – average marginal effect, BSE - bootstrapped standard error.
* Difference between comparison groups significant at p < 0.05
** Difference between comparison groups significant at p < 0.01

Research Question 2

Research Question 2 asked: Among working-age adults with disabilities, controlling for other factors, do either insurance instability without a gap in coverage (switching) or insurance instability with a

gap in coverage (break) reduce the likelihood of having a usual source of care compared to stable coverage?

There was no significant local average treatment effect of switching on whether the respondent reported having a usual source of care (Table 2), according to the two-stage least squares model (AME 0.25, 95% CI -0.06 to 0.56). However, the bivariate probit switch model found an overall average marginal effect of 21 percentage points for switching (95% CI 0.07 to 0.36 p<.01). Older (p<.01) and female (p<.01) respondents were more likely to report a usual source of care, as were those in fair (p<.01) or poor (p<.01) self-rated health or those with higher levels of recent psychological distress (p<.05). Compared to those who lived alone, respondents who lived with family members were more likely to report a usual source of care in this model (p<.05). Higher levels of income were associated with greater likelihood of reporting a usual source of care, while living in the Midwest (p<.01), South (p<.01), or in an urban area (p<.05) were associated with a reduced likelihood. Working full-time was also associated with lower likelihood of having a usual source of care (p<.01).

In contrast, there was a significant negative effect of a break in coverage, based on both models (Table 2). Controlling for all other factors in the model, the average marginal effect of a break in coverage for the subgroup of marginal respondents was a 20 percentage point reduction in the likelihood of having a usual source of care among those affected by the instruments (95% CI -0.35 to -0.04, p<.05). Similarly, the bivariate probit break model reported a 19 percentage point reduction in the likelihood of having a usual source of care among those affected by the instruments (95% CI -0.36 to -0.03, p<.05). As in the other models, being older (p<.05) and female (p<.01) were associated with higher rates of having a usual source of care, as were poorer self-rated health (p<.01) and more psychological distress (p<.01). While education was not significant in the other models, in this model a high school degree was predictive of greater likelihood of reporting a usual source of care (p<.01).

3.5 Discussion

Effect of Insurance Instability on Usual Source of Care

For adults with disabilities, a usual source of care is critically important because it can coordinate medical care, facilitate timely access to needed services, and improve patient outcomes (Iezzoni & O'Day, 2006). This study investigated whether insurance instability disrupted usual source of care for

working-age adults with disabilities and whether the effect of different types of instability (with and without coverage gaps) was equivalent.

Our findings indicate that breaks in insurance coverage are disruptive to having a usual source of care for working-age adults with disabilities. Given the importance of a usual source of care in this population, insurance instability should be considered a threat to their healthcare access and, therefore, of interest to people with disabilities and their providers. Because reform efforts to date have primarily focused on remedying uninsurance, rather than addressing insurance instability, there are no current major proposals to stabilize insurance coverage. However, many existing programs and proposals have the potential to both reduce uninsurance rates and increase coverage stability, including programs expediting Medicaid reinstatement for the formerly incarcerated, presumptive Medicaid eligibility enrollment through healthcare providers and schools, and even single-payer.

Effects of Switching Coverage and Breaks in Coverage on Usual Source of Care

An unexpected finding from this study was that switching had no negative effect on the likelihood of having a usual source of care as compared to those with stable coverage. This runs counter to what would be expected based on studies of the general working-age population (e.g., Cunningham & Kohn, 2000; Lavarreda et al., 2008; Schumacher et al., 2009). One possibility is that rather than the presumably involuntary switches of earlier research, people with disabilities enjoy a higher proportion of voluntary switches to better health plans. It is possible that earlier studies using non-causal methods were detecting associations rather than causation. Another potential explanation is that working-age adults with disabilities – or the switches that they experience - vary in important ways from the general working-age population that lead to a more positive effect of switching. For instance, most of the switches in this study were either between private plans or between some combination of public plans (commonly, people transitioning in and out of dual eligibility as their Medicaid ended or restarted). These types of switches are likely to be less disruptive than, for instance, from private coverage to Medicaid – and they are also likely to be more prevalent among people with disabilities. Evaluating whether people with disabilities have more options to voluntarily switch to pursue coverage, fewer involuntary coverage switches, or faster turnaround in obtaining a usual source of care post-switch could all lend insight to this unexpected finding.

In contrast, breaks in coverage caused significant reductions in the likelihood of having a usual source of care. While the negative effect of ongoing uninsurance on access is well-established, it appears that even time-limited uninsurance can reduce access to usual source of care. This effect is consistent with findings from the general working-age adult population (e.g. Schoen & DesRoches, 2000 and Abdus, 2014), although the different methodologies and samples used in these studies do not permit us to directly compare the magnitude of the effect of instability among working-age adults with disabilities vs. those without. Decomposing the instability variable into two subtypes – switches and breaks – proved meaningful in accurately assessing the effects of instability. Given the null effect of switching coverage and the negative effect of breaks in coverage, future studies should differentiate these two kinds of instability – especially when considering the population of working-age adults with disabilities. Including both types in one measure may obscure the sub-effects.

In all three models, working full-time (compared to being unemployed or working part-time) was associated with lower likelihood of having a usual source of care when controlling for other factors. Given that access to Medicaid and Medicare (before age 65) is generally conditioned on inability to engage in substantial gainful activity, it is possible that that this association reflects the effect of enrollment in Medicare, by design a very stable form of coverage for people with disabilities, rather than a protective effect of unemployment itself on usual source of care. It could also reflect that those who work full-time are healthier than those who cannot (in ways that are not captured by the model), that the opportunity cost of finding and maintaining a usual source of care is higher for those working full-time, and/or that full-time workers are less interested in obtaining a usual source of care. Additional research on the interaction of different types of insurance coverage, work, and insurance instability would be warranted.

Study Limitations

There are several limitations of this study. First, MEPS surveys civilian, non-institutionalized adults. As a result, this research does not generalize to individuals who were in institutions (such as long-term care facilities, psychiatric hospitals, or prison), even though many people with disabilities obtain healthcare through these facilities. Second, by including only those who were present for all five rounds of their MEPS participation, we eliminated individuals who were institutionalized or died while a part of MEPS (around 2% of working-age people with disabilities in our sample). Thus, our sample may be

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healthier and have less severe disabilities than the overall population of working-age adults with disabilities. There are also limitations to the definition of disability in this study, which is relatively broad and may capture individuals who do not consider themselves disabled or who would not be considered disabled by, for instance, the Social Security Administration. The findings may be different using a more strictly-defined disability sample. Finally, usual source of care is a measure of potential, rather than realized, access; thus lacking a usual source of care may not be an involuntary, negative outcome. In fact, some of the most common reasons identified in MEPS for not having a usual source of care are "seldom or never sick" and "goes different places for different reasons." It may also reflect respondents who act as their own care coordinators and/or have their health well-managed without the guidance of a single provider or clinic.

Conclusion and Future Directions

Ideally, working-age Americans with disabilities should not experience involuntary breaks in insurance coverage that disrupts their usual source of care. To maximize access to a usual source of care, legislators should ensure that proposed legislation is not likely to increase breaks in coverage among the high-cost, high-need population of working-age adults with disabilities.

Future research should explore whether the relationship between breaks in coverage and usual source of care varies by coverage type, disability type, or length of time on current coverage. It will also be important to determine the effect of instability on important access measures for working-age adults with disabilities, such as delaying or skipping needed medical care. Finally, health services researchers and policymakers should measure how instability and its effects in this vulnerable population changed after implementation of the ACA's major coverage expansions in 2014; such research is needed to establish whether further policy changes are needed to stabilize coverage for working-age adults with disabilities.

Acknowledgements

CHAPTER 4 - AIM 2 MANUSCRIPT

4.1 Background

In the American healthcare system, health insurance can be hard to hold onto. Life transitions - e.g., gaining or losing a job, gaining or losing a spouse - often are accompanied by changes in health insurance coverage (Czajka & Mabli, 2009). This instability of health insurance means that more people may experience being uninsured over a period of time than at a specific point in time. Estimates from the 1996 Survey of Income and Program Participation panel determined that 38% of working-age adults were uninsured at some point during a four-year reference period (Short, Graefe, & Schoen, 2003). Of those who were uninsured at any point during that period, more than half of them were uninsured for over 12 months (not necessarily consecutively) during that time period. A later study found that 36% of Americans aged 4-64 had been uninsured for at least a month from 2004-2007 (Short, Graefe, Swartz, & Uberoi, 2012).

To assess the prevalence and impact of insurance instability, a growing body of literature examines insurance from a dynamic rather than a static perspective (Swartz, Marcotte, & McBride, 1993). Instability over time has been conceptualized as number of gaps during a reference period, number of total months without coverage in a reference period, or duration of last uninsurance spell. For instance, using the 2005-2010 Medical Expenditure Panel Survey (MEPS), Abdus (2014) determined that during a 12-month period, short-term (1-5 months) and intermediate-term uninsurance (6-11 months) were associated with higher rates of having a usual source of care than long-term uninsurance (all 12 months) among working-age adults. Each of these different approaches to conceptualizing the dynamic nature of health insurance answers a slightly different question about the negative impacts of coverage gaps in terms of their frequency, duration, or recency.

In the general literature, stable coverage is usually used as the reference category to compare against the negative effects of instability. However, not all stability is created equal, and research using non-USC outcomes indicates that after coverage gaps, problems with access to care and the resulting

health deficits can take some time to resolve: one study found that it took two years of coverage before previously-uninsured new Medicare beneficiaries no longer had higher rates of morbidity and mortality compared to their previously-insured counterparts (Baker, Feinglass, Durazo-Arvizu, Witt, Sudano, & Thompson, 2006). Another study found that adults 51-61 years old with gaps in coverage were less likely to use preventive services such as flu vaccines, mammograms, and Pap tests when controlling for other factors and compared to those without gaps; moreover, their rates of preventive service use remained low for those who had experienced instability but had regained coverage – these respondents did not "catch up" to the stably insured immediately after becoming covered (Sudano & Baker, 2003). Average monthly expenditures tend to drop for adults as the length of time on current coverage increases after a gap in coverage (Ku & Cohen Ross, 2002). This is for several reasons, including that newly-insured persons: (1) can address pent-up demand for care in the first few months of their coverage; (2) have better access to cost-saving services like preventive care, and (3) may actually have been enrolled in coverage presumptively during a hospitalization (Ku & Cohen-Ross, 2002).

Only one study examines the effect of a longitudinal measure of insurance instability on usual source of care for adults. This study compared insured individuals who had recently been uninsured with those who had not and found a lower rate of having a usual source of care among those who had recently been uninsured (Schoen & Desroches, 2000). It is possible that individuals will become more likely to have a usual source of care after having more time to familiarize themselves with their insurance plan's structure and seek out a compatible in-network physician, but there is not much evidence to support this assumption. The field would benefit from additional research on how ongoing stability of coverage after instability affects access to care, including usual source of care.

As defined in Healthy People 2020, healthcare access requires that individuals "[gain] entry into the healthcare system, [access] a healthcare location where needed services are provided, and [find] a healthcare provider with whom the patient can communicate and trust."(Healthy People 2020, 2018) Building trust and communicating well with a provider are critical to high-quality continuous care; that is, receiving person-focused, comprehensive, and coordinated care over time from the same source (Haggerty et al., 2012; Starfield & Shi, 2004). Continuity of care is considered an important part of healthcare access, and is associated with lower medical expenditures, fewer hospital stays, more

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preventive services, and better health outcomes (Starfield & Shi, 2004; Weber, Showstack, Hunt, Colby, & Callaham, 2005). For point-in-time analyses, continuity of care is generally measured by asking whether the individual has a usual source of care - a specific healthcare location (such as a clinic) or provider where an individual usually goes if they are sick or need advice about their health (Agency for Healthcare Research and Quality, 2013).

Studies indicate that health insurance and usual source of care work synergistically to promote timely access to care. Specifically, controlling for sociodemographic and socioeconomic factors, problems with delaying or not receiving care are most commonly reported among those with no insurance and no usual source of care, less common among those who were uninsured but had a usual source of care, and still less common among those who were insured but lacked a usual source of care (Devoe, Tillotson, Lesko, Wallace, & Angier, 2011). Possessing both usual source of care and insurance is the optimal combination.

Some research on the effects of gaps in coverage on usual source of care in working-age adults with disabilities is available. In one study using MEPS, 11.5% of a nationally-representative working-age disabled sample experienced partial-year coverage, which was associated with lower rates of reporting a usual source of care (Dobbertin, Horner-Johnson, Lee, & Andresen, 2015). However, no studies have examined how ongoing stability of coverage after a spell of uninsurance affects healthcare utilization and access for working-age adults with disabilities. To address this deficit, the current study examines whether additional months of continuous healthcare coverage are associated with increased likelihood of having a usual source of care among working-age adults with disabilities. We hypothesize that longer durations of time since the gap in coverage will be associated with an increased likelihood of having a usual source of care.

4.2 Methods

Data

The Medical Expenditure Panel Survey interviews a nationally-representative longitudinal study of American adults about their health insurance coverage, demographic, socioeconomic, and regional characteristics over a two-year period (Agency for Healthcare Research and Quality, 2009). We used the

Panels 9-17 longitudinal survey files (2004-2013); some critical variables for our analysis were not available before 2004 and after 2013.

Sample

The sample consisted of working-age (18-64) MEPS respondents with disabilities who reported an insurance gap in the 18 months before their round 4 interview (where their usual source of care is assessed). MEPS respondents were classified as having a disability if they indicated that they had an activity, hearing, vision, cognitive, or physical limitation.

Dependent Variable: Usual Source of Care.

Respondents who said they had a "particular medical professional, doctor's office, clinic, health center, or other place where a person would usually go if sick or in need of advice about his or her health" were considered to have a usual source of care, unless they indicated that it was the emergency department (Agency for Healthcare Research and Quality, 2013).

Independent Variable: Months Since Gap

We examined the 18 months prior to the respondent's round 4 interview (wherein they were asked about their usual source of care) and identified how long ago (1 to 17 months) they obtained the type of health insurance (private insurance, Medicaid, Medicare, Tricare, state coverage, or other public coverage) that they held at their round 4 interview.

Control Variables

Control variables included age, sex, race, ethnicity, marital status, household composition, household income, education, employment status, self-rated health, recent psychological distress, urban/rural residence, region, and timing relative to recession (before, during, or after). Recent psychological distress was measured with the Kessler 6, with higher scores indicating greater recent psychological distress (Kessler, 2002). We additionally controlled for whether the respondent reported ever having their current type of coverage before the gap that they experienced: for instance, for persons on Medicaid at the round 4 interview who had only had been on Medicaid for three months at that point, we checked to see if they ever had Medicaid at any other point in their two-year survey participation.

Analytic Strategy

We regressed usual source of care (yes/no) on months since the gap occurred (1-18) and the control variables listed above, using a probit model. Standard errors were calculated through bootstrapping (1000 replications). Marginal effects were reported for the average of months since gap in coverage and for each additional month. Analyses were conducted using STATA-MP 15 (64-bit).

4.3 Results

Sample Composition

The final sample consisted of 1072 working-age adults with disabilities who had experienced a gap in coverage in the past 18 months. This sample tended to be female (61%), white (69%), non-Hispanic (79%), and the mean age was 42 years (Table 1). Around one in three (30%) had held the type of coverage they held at round 4 before that spell of coverage, and most had moderate psychological distress (mean Kessler 6 = 7.4). Fully one out of three (33%) were poor or negative income, and only 9% were high income. Most did not work full-time (36%).

Table 4.1: Sample composition

Age	42
Gender	
Male	39.4%
Female	60.6%
Ever had current type of coverage before	29.6%
White	69.1%
Hispanic	21.2%
Self-Rated Health	
Excellent	7.8%
Very Good	19.2%
Good	31.2%
Fair	27.7%
Poor	14.1%
Kessler 6 Sum	7.4
High School Graduate	69.2%
Married	43.8%
Household	
Lives alone	15.0%
Lives with non-family others	8.6%
Lives with family	76.4%
Family Income Category	
Poor/Negative Income	33.3%
Near Poor	8.3%
Low Income	20.3%
Middle Income	29.0%
High Income	9.1%
Region	
Northeast	14.4%
Midwest	23.3%
South	41.4%
West	20.9%
Working full-time	35.7%
Urban	80.9%
Timing relative to recession	
Before	38.3%
During	20.2%
After	41.4%

Model Results

Controlling for other factors, each additional month since having a gap in coverage was associated with an average 1 percentage point increase in likelihood of having a usual source of care among working-age adults with disabilities who had experienced a gap in coverage in the past 18 months (Table 2). Being older, in poor health (compared to excellent health), or high income (compared to being poor) were associated with higher likelihood of having a usual source of care. Living in the South, living in urban areas, and working full-time were associated with lower likelihood of having a usual source of care. When the marginal effect of each additional month of coverage was calculated, each incremental month was associated with a statistically significant increase in the likelihood of having a usual source of care (Figure 1).
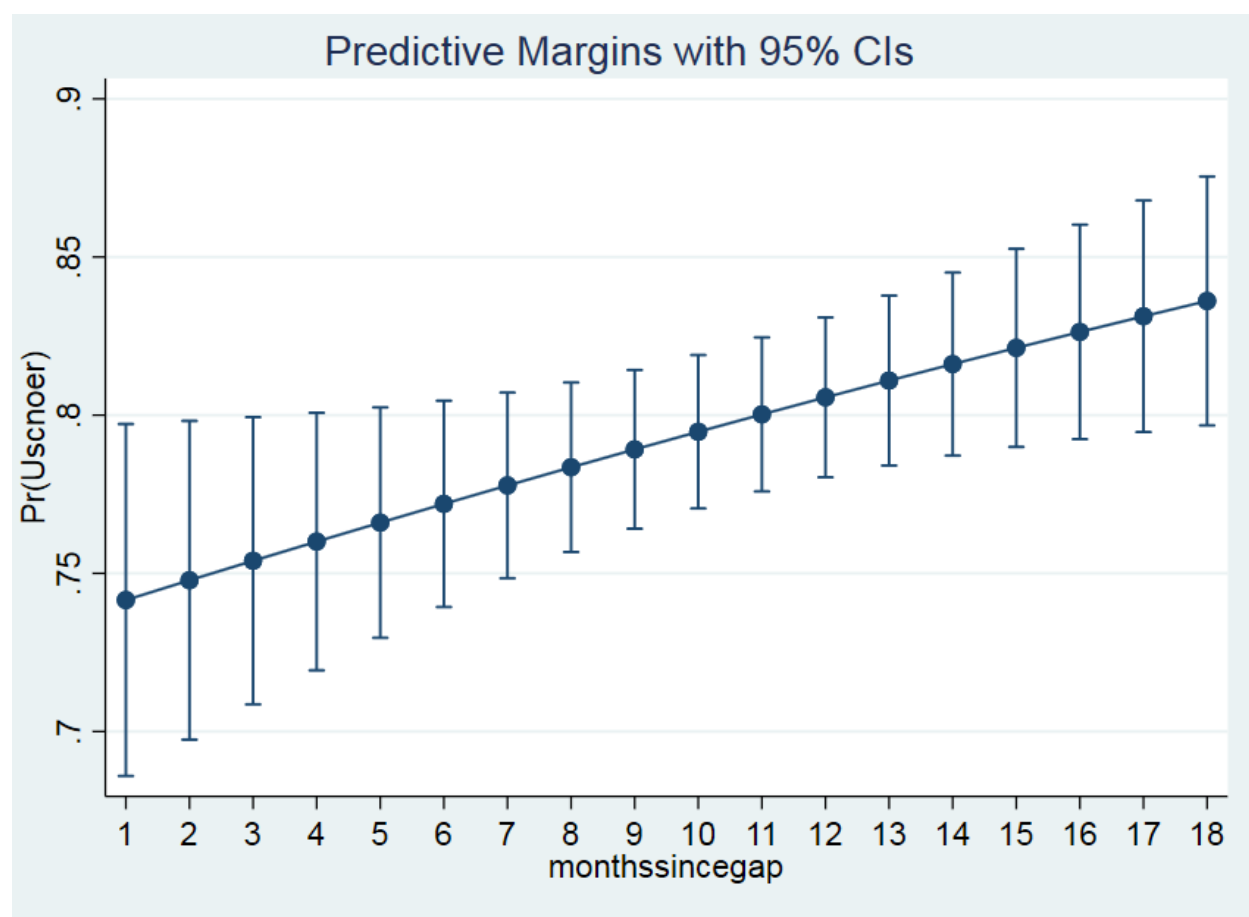

Figure 1: Predictive margins of each additional month since gap in coverage.

Table 4.2: Model of the effect of months since gap in coverage on usual source of care.

	ME (BSE)	95% CI
Months since gap in coverage	0.01* (0.00)	0.00 to 0.01
Ever had this coverage before (ref=never had this coverage before)	0.04 (0.03)	-0.01 to 0.10
Age	0.01** (0.00)	0.00 to 0.01
Female (ref=male)	0.03 (0.03)	-0.02 to 0.08
White (ref=nonwhite)	-0.00 (0.03)	-0.06 to 0.05
Hispanic (ref=non-Hispanic)	-0.05 (0.03)	-0.11 to 0.02
Self-rated health (ref=excellent)		
Very good	0.06 (0.06)	-0.05 to 0.17
Good	0.05 (0.05)	-0.06 to 0.15
Fair	0.10 (0.06)	-0.01 to 0.21
Poor	0.14* (0.06)	0.02 to 0.26
Kessler 6 Sum	0.00 (0.00)	-0.00 to 0.01
High school (ref= not high school graduate)	-0.01 (0.03)	-0.07 to 0.05
Married (ref=not married)	0.02 (0.03)	-0.04 to 0.07
Household (ref=lives alone)		
Lives with non-family others	-0.05 (0.05)	-0.16 to 0.05
Lives with family	-0.01 (0.04)	-0.08 to 0.07
Income Category (ref=poor/negative income)		
Near poor	0.07 (0.04)	-0.02 to 0.15
Low income	0.04 (0.04)	-0.03 to 0.11
Middle income	0.03 (0.04)	-0.04 to 0.10
High income	0.10* (0.05)	0.01 to 0.19
Region (ref=Northeast)		
Midwest	-0.05 (0.04)	-0.12 to 0.02
South	-0.07* (0.04)	-0.14 to -0.01
West	-0.05 (0.04)	-0.13 to 0.02
Working full time (ref=not working full time)	-0.06* (0.03)	-0.11 to -0.00
Urban	-0.09* (0.04)	-0.16 to -0.02
Timing relative to recession (ref=before recession)		
During recession	-0.04 (0.03)	-0.11 to 0.02
After recession	-0.04 (0.03)	-0.10 to 0.01

* = p<.05, ** = p<.01.

4.4 Discussion

We examined whether time since a gap in insurance coverage was associated with change in likelihood of having a usual source of care among working-age adults with disabilities. We found that each additional month of coverage (from 1 to 18) was associated with a one percentage point increase in the likelihood of having a usual source of care, when controlling for other factors. The positive association between coverage and usual source of care is clear even from the first to the second month of coverage; however, the likelihood of having a usual source of care improves even between months 17 and 18. This suggest that when it comes to finding a usual source of care, while obtaining coverage is good, maintaining coverage is even better.

The major limitation of this analysis is that it does not establish a causal relationship. It is possible that the observed association represents an overall positive effect of additional time since a disruptive event that resulted in a loss of insurance coverage (such as job loss or a divorce), rather than specifically the effect of ongoing insurance stability. Despite this limitation, our findings contribute to the growing body of research suggesting that the problems associated with being insured do not resolve immediately upon gaining insurance. Continuity of coverage has received increased attention relative to the coverage expansions implemented by the Affordable Care Act and corresponding concerns about insurance churning. Interventions to address churning have thus far been rare, but simulations suggest that for the working-age population, extending twelve-month continuous eligibility for Medicaid would reduce Medicaid churning and gaps (Swartz, Short, Graefe, & Uberoi, 2015). Additional policy evaluations and research analyses are needed to pinpoint particularly acute and/or policy-amenable sources of coverage gaps for working-age adults with disabilities, who have a broader set of insurance coverage options than the general population thanks to their potential eligibility for Medicare or non-expansion Medicaid. As the current study shows, full recovery from coverage gaps can take significant amounts of time for people with disabilities. Our results highlight the need for an increased focus on long-term stability of coverage for the high-cost, high-need population of working-age adults with disabilities in order to support their healthcare access.

CHAPTER 5 - AIM 3 MANUSCRIPT

5.1 Overview

One factor consistently associated with a reduced likelihood of having a usual source of care is gaps in insurance coverage. While this effect has been observed among working-age people with disabilities, no studies to date have examined whether the effect of gaps in coverage on usual source of care varies between different disability types. We used data from the 2003-2012 Medical Expenditure Panel Survey to examine whether the effect of gaps in coverage on usual source of care was different for those with different disabilities, when controlling for other factors and addressing endogeneity. We ran ordinary least squares and two-stage least squares models in each of four non-mutually exclusive cohorts: people with physical disabilities, cognitive disabilities, vision disabilities, and hearing disabilities. The findings from each cohort's preferred models were largely consistent, showing negative effects of gaps in coverage on whether working-age adults with disabilities have a usual source of care. However, the magnitude of the effects and the other factors which contributed to likelihood of a usual source of care (e.g. region, sex, self-rated health) differed across cohorts. These findings remind us that disability is not only important, but complex. Differences and disparities within the disability population mean that policies meant to improve healthcare access and quality may have inconsistent effects across persons with different types of impairments. Further research is needed to determine the sources of these differences and identify appropriate targets for interventions to improve access to a usual source of care.

5.2 Background

When studying healthcare access among persons with disabilities, it is critical to understand that people with disabilities represent a tremendously heterogeneous population; different disabilities can vary significantly in how they shape the factors that predispose and enable healthcare utilization (Courtney-Long, 2015; Andersen, 1995). A growing body of health services research examines disparities within the disability population by comparing different disability subgroups. For example, people with cognitive, hearing, and lower-body physical limitations are more likely to report healthcare access barriers than

those with vision or upper-body physical limitations (Iezzoni, Frakt, & Pizer, 2011). Likewise, people with visual impairments have higher levels of unmet dental care needs than those with other types of disabilities (Horner-Johnson & Dobbertin, 2016).

The likelihood of receiving needed health services also varies by disability type. For instance, women with mobility limitations aged 21-75 had lower odds of receiving a pap test than women with other disabilities (Steele, Townsend, Courtney-Long, & Young, 2017). North Carolinian adults 18 years or older with developmental disabilities had significantly lower rates of cancer screening than those with other types of disabilities: 11.5% of women with developmental disabilities reported never having had a pap test, compared to 4.7% of those with other disabilities (Havercamp, Scandlin, & Roth, 2004). Similarly, individuals with intellectual or developmental disability were less likely than those with other disabilities to have received recommended flu shots, physical exams, or dental visits (Havercamp & Scott, 2015). A recent study using the Medical Expenditure Panel Survey (MEPS) from 2003-2012 found that adults with physical limitations were more likely to receive a flu shot or blood pressure check than those with non-physical limitations (Gimm, Wood, & Zanwar, 2017).

A usual source of care is particularly important for people with disabilities to manage their disabling condition, coordinate care, and prevent or treat secondary health concerns (Iezzoni & O'Day, 2006; Iezzoni, McCarthy, Davis, Harris-David, & O'Day, 2001). The likelihood of having a usual source of care – a provider or clinic other than the emergency room where a patient usually goes for healthcare or health information – is generally higher for persons with disabilities than for those without disabilities, but varies by disability type. For example, among adults with disabilities who receive both Medicare and Medicaid, the rates of having a usual source of care ranged from 89% for those with cognitive limitations to 97% of those with both physical and cognitive disability (Reichard & Fox, 2013). A broader sample of working-age adults with disabilities showed similar differences in reporting a usual source of care for people with vision (72%), cognitive (76%), hearing (81%), and physical (84%) disabilities; 85% of persons with multiple disabilities reported having a usual source of care (Horner-Johnson, Dobbertin, Lee, & Andresen, 2014). A recent MEPS study also found similar disparities: those with vision impairment had the lowest rates of having a usual source of care (77%), with higher rates among those with hearing

limitations (82%), cognitive limitations (88%), physical limitations (89%), and multiple limitations (91%) (Reichard, Stransky, Phillips, McClain, & Drum, 2017).

One factor consistently associated with a reduced likelihood of having a usual source of care is gaps in insurance coverage. In the general population, people who experience gaps in coverage are less likely to report having a regular physician (Duchon, Schoen, Doty, Davis, Strumpf, & Bruegman, 2001; Hoffman, Schoen, Rowland, & Davis, 2001; Schoen & Desroches, 2000; Lavarreda, Gatchell, Ponce, Brown, & Chia, 2008). To date, the effects of gaps in coverage on usual source of care among people with disabilities have not received much research or policy attention. One MEPS study found that 11.5%- of working-age disabled adults had gaps in coverage, with the highest rates among those with multiple (16%), cognitive (16%), or vision (13%) disabilities and somewhat lower rates among those with physical (11%) and hearing (9%) disabilities (Horner-Johnson et al., 2014). However, no study to date has examined the effect of gaps in coverage on usual source of care by disability type.

The objective of this paper is to examine whether the effect of gaps in coverage on usual source of care is different for those with different disabilities. These findings will contribute to a better understanding of the relationship between health insurance and usual source of care in this important health disparity population, thereby informing future research and policy efforts.

5.3 Methods

Data

The MEPS surveys a nationally representative sample of the civilian non-institutionalized population of the United States about healthcare use and health insurance coverage. MEPS participants are interviewed five times over two years. We used the Panels 9-17 (2004-2013) longitudinal survey files; we did not include data before 2004 or after 2013 because some critical variables for our analysis were not available.

Sample

Respondents who indicated that they had an activity, hearing, vision, cognitive, or physical limitation were classified as having a disability. The sample included only those who were working-age (18-64 years) during the entirety of their survey participation and who participated in all five rounds of their MEPS participation; this is intended to eliminate those with insufficient duration of participation or

those who had immigrated, emigrated, been institutionalized, or died. Those who were uninsured for the entirety of their reference period were not included as the effect of uninsurance is a different question than the effect of gaps in coverage.

Measures

Dependent Variable: Usual Source of Care.

Individuals who reported having a "particular medical professional, doctor's office, clinic, health center, or other place where a person would usually go if sick or in need of advice about his or her health" were coded as having a usual source of care; those who identified their usual source of care as the emergency room were categorized as not having a usual source of care (Agency for Healthcare Research and Quality, 2013).

Independent Variable: Gaps in Coverage

We used the respondent's insurance coverage in the 12 months prior to answering the usual source of care question to measure whether they were uninsured for a period of time. Those who were insured for all 12 months were coded as having stable coverage, and all others were coded as having experienced a gap. Switching between different kinds of coverage without any period of uninsurance was coded as stable coverage.

Control Variables

Control variables included factors that we specified a priori as potentially contributing to the likelihood of having a usual source of care. These included demographic (age, sex, race, ethnicity), socioeconomic (marital status, household composition, household income, education, employment status), health-related (self-rated health, recent psychological distress), geographic (urban/rural residence, region), and temporal (before recession, during recession, after recession) factors. The Kessler 6 is a 6-item scale that asks respondents to rank their recent (past 30 days) non-specific psychological distress on a scale of 0-4. These items are summed so that the overall score ranges from 0 to 24, with higher scores indicating greater recent psychological distress (Kessler et al., 2002).

Analysis

In order to estimate heterogeneous treatment effects by disability type, the sample was divided into disability type subsamples: cognitive, physical, hearing, and vision. However, comorbidity among

disability types was extremely common, meaning that to isolate, for instance, those with only cognitive

disabilities (of whom 85% reported at least one other disability type) would both result in very small

sample sizes and results of limited external generalizability. Consequently, we ran separate models on all

those with each type of disability and included an indicator as to whether the individual also reported

another disability type. These cohorts are not mutually exclusive (Table 1).

Table 5.1: Disability types, definitions, proportions, and comorbidity

Disability Type	Definition	What proportion of the sample reported this disability type?	What proportion of respondents with this disability type reported an additional comorbid disability type?
Physical	Difficulties walking, climbing stairs, grasping objects, reaching overhead, lifting, bending or stooping, or standing for long periods of time	67%	57%
Cognitive	Experience confusion or memory loss, have problems making decisions, or require supervision for their own safety.	33%	85%
Vision	Difficulty seeing even with glasses/contacts.	31%	66%
Hearing	Some, moderate, or major difficulty hearing even with hearing aids.	19%	59%

Addressing Endogeneity

There are factors influencing the likelihood of having a gap in coverage that are difficult to

measure and may also influence the likelihood of having a usual source of care, for example, attitude

toward risk, expected utility of health insurance, and availability of coverage. Analysis of the effect of gaps

that does not account for this endogeneity may be biased, attributing effects to the coverage gaps that

are in fact the result of other unmeasured factors.

For the models in this analysis, two-stage least squares (2SLS) should produce the most

consistent estimates of the local average treatment effect (LATE) (Basu, Coe, & Chapman, 2017).

Standard errors were calculated through bootstrapping (1000 replications) for both the 2SLS and ordinary

least squares (OLS) models in order to reduce bias introduced by violations of distributional assumptions.

All analyses were conducted using StataMP 15.0. We instrumented for gaps in coverage using an over-

identified model with three instruments. The first instrumental variable was whether the respondent's

employer increased the availability of health insurance by beginning to offer coverage to employees. This

change should not be associated with an individual's likelihood of having a usual source of care except for its impact on whether the individual had an insurance coverage change. The second, similar instrumental variable was whether the respondent's *spouse's* employer newly offered health insurance – most employer-based plans offer at least some spousal coverage, making it likely that new availability of coverage for the respondent's spouse would also mean new availability of coverage for the respondent (Claxton, Rae, Panchal, Whitmore, Damico, & Kenward, 2014). The third instrumental variable was self-employment. Self-employed workers are similar to standard wage-earners in their health and their healthcare utilization, but they are more likely to be uninsured or covered by the more volatile (pre-ACA), expensive non-group market (Meer & Rosen, 2004). There should be no association between self-employment and likelihood of having a usual source of care other than through insurance coverage.

Tests of Endogeneity

When the instrumented variable (gaps in coverage) for these samples was assessed for endogeneity, the Durbin and Wu-Hausman tests failed to reject the null hypothesis of exogeneity for this variable in the cognitive and physical cohorts, but rejected the null hypothesis of exogeneity for the this variable in the vision and hearing cohorts (Nakamura & Nakamura, 1981). The test results in the subsamples with hearing and vision disabilities samples suggest that having a gap in coverage is exogenous for these samples. In the results section, both OLS and 2SLS results are presented for each cohort, with the preferred model indicated.

The underlying assumptions of this analysis suggest that the local average treatment effect recovered by the 2SLS models is more useful to discuss and interpret than the average treatment effect recovered by OLS. Specifically, it seems safe to assume that only some proportion of working-age adults with disabilities are subject to insurance instability, and only some proportion of that subsample is responsive to the instruments used in this analysis – particularly given that they all involve employment, which is completely off the table for a certain segment of the disability population. As a result, we will present and discuss the LATEs recovered by the 2SLS models – however, they should be understood as products of the specific context and methodology of this analysis, and LATEs derived from different instrumental variables are likely to be different.

In each cohort, when all three instruments were included, Sargan's and Basman's overidentification tests did not indicate incorrect specification/invalid instruments, nor did Stock and Yogo's first-stage test indicate the presence of weak instruments (Nakamura & Nakamura, 1981; Stock & Yogo, 2005). All three instruments were used in the 2SLS models for each cohort.

5.4 Results

Sample Description

Sixty-seven percent of respondents had a physical disability, 33% had a cognitive disability, 31% had a vision disability, and 19% had a hearing disability (Table 2). The mean age was 45.5 years, and members of this cohort tended to be female (58%), white (71%), and non-Hispanic (82%) (Table 2). Most rated their health as good (28%), fair (28%), or poor (18%). The majority had graduated from high school (71%), were married (60%) and lived with a family member (75%). They were more likely to live in the South than other regions (40%), and more likely to live in urban areas (80%). Only 32% worked full-time.

Cohort with Physical Disabilities

For respondents with physical disabilities, a gap in coverage was associated with a 42 percentage point reduction in likelihood of having a usual source of care among those affected by the instruments (Table 3). Those with physical disabilities were more likely to have a usual source of care if they were female, older, or high-income. Being in fair or poor health and being low-income were associated with decreases in reporting a usual source of care. People with physical disabilities showed significant regional effects, with decreased rates of having a usual source of care for all regions outside the Northeast.

Cohort with Cognitive Disabilities

For respondents with cognitive disabilities, gaps in coverage were associated with a 53 percentage point reduction in the likelihood of having a usual source of care among those who were affected by the instruments (Table 4). While being older and having higher levels of income were associated with a higher rate of having a USC, sex was not significant in this model. Those who had graduated high school or who were living in regions outside the Northeast were also more likely to have a USC.

Cohort with Vision Disabilities

For those with vision disabilities, holding other factors constant, there was no significant local average treatment effect of a gap in coverage (Table 5). Higher age, being female, and having graduated high school were all associated with a higher likelihood of having a usual source of care. Respondents with at least one comorbid disability (in addition to their vision disability) were 6 percentage points more likely to report a usual source of care. Marital status, household composition, region of residence, urban/rural status, and timing relative to recession were not significant.

Cohort with Hearing Disabilities

In the cohort of those with hearing disabilities, holding other factors constant, there was no significant local average treatment effect of a gap in coverage (Table 6). Older respondents, women, and higher-income respondents were more likely to have a usual source of care, while those working full-time were less likely.

Table 5.2: Sample composition

Age in years (mean)	45.5
Female	58%
White	71%
Hispanic	18%
Excellent health	9%
Very good health	17%
Good health	28%
Fair health	28%
Poor health	18%
Kessler 6 sum (mean)	6.1
High school graduate or beyond	71%
Married	60%
Lives alone	19%
Lives with non-family others	7%
Lives with family	75%
Poor	30%
Near poor	8%
Low income	17%
Middle income	28%
High income	17%
Northeast US	16%
Midwest US	23%
South US	40%
West US	22%
Urban	80%
Working full-time	32%
Pre-recession (before 2008)	38%
During recession (2008-2009)	20%
Post-recession (after 2009)	42%

Overall Findings

While no local average treatment effects of gaps in coverage was observed for the vision or hearing cohorts, large negative LATEs were observed in the cognitive and physical cohorts. (Effect sizes for gaps in coverage should not be compared between the OLS models and the 2SLS models, as OLS estimates represent an overall population effect and 2SLS estimates represent the local average treatment effect.) Being older was associated with a small but significant increase in having a usual source of care in every cohort, as was being female in all but the cognitive cohort. Among those with vision or physical disabilities, being in fair or poor health was associated with higher rates of having a

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usual source of care, while the hearing and cognitive cohorts did not show this association. The effect of region varied between cohorts, with living outside the Northeast associated with small (-0.04 to -0.06) reductions in usual source of care for those in the cognitive cohort and physical cohort but no effect of region among those in the hearing or vision cohort. The effects of timing relative to recession were not significant in any model.

5.5 Discussion

We examined whether the relationship between gaps in coverage and the likelihood of having a usual source of care varied by disability type among working-age adults with disabilities. We found that gaps in coverage are not consistently detrimental for each type of disability, and those with physical and cognitive disabilities seem to be much more strongly affected by gaps. Other factors which contributed to likelihood of a usual source of care (e.g. region, sex, self-rated health) also differed across cohorts. This finding confirms earlier research on the unfavorable effect of gaps in coverage on usual source of care for working-age adults with disabilities, while adding the important step of stratifying by disability subtype and addressing endogeneity of gaps in coverage.

Our findings suggest that an appropriate next step would be exploring the underlying mechanisms of why gaps in coverage reduced the likelihood of having a usual source of care, and whether these mechanisms vary across disability cohorts. From a sociopolitical perspective, the barriers to healthcare experienced by people with different disability types are informed not just by their specific impairments, but by cultural perceptions and economic, legal, and policy considerations. The context of health policy decision making has often resulted in different policies and programs for different disability types: for instance, government-funded vocational and rehabilitative services for those with hearing and vision disabilities predate services for other disability groups by decades. Programs and services that facilitate having a usual source of care can vary widely in their availability, including by region, family composition, income, work history, and type of disability. Having established that gaps in coverage negatively affect usual source of care across disability cohorts, further research in this area could contribute to a better evidence base for policy development by focusing on subpopulations enrolled in specific programs (such as a state Medicaid program) and identifying policy-amenable factors that contribute to gaps in coverage.

There are several limitations in our study. First, MEPS lacks a direct measure of mental health limitations. As a result, mental health status was measured using the Kessler 6, which is a short-term measure of psychological distress that overlaps with, but does not entirely capture, psychological disability. Thus, the impact of gaps in coverage on access to care for those with mental health limitations should be explored further. Second, the MEPS only surveys civilian, non-institutionalized adults. As a result, our findings are not generalizable to residents of long-term care facilities, psychiatric hospitals, or prison. Finally, use of instrumental variables and the local average treatment effect (LATE) means that these findings are specific to a population that is responsive to the instrumental variables chosen for this analysis. Further validation using different instruments is necessary.

Conclusion

With the increased emphasis on population health, healthcare systems will need to ensure that their patients, including high-need users, receive accessible, high-value care in a coordinated and timely fashion. As a result, policymakers should pay particular attention to adults with disabilities, who are among the highest healthcare users in the US. However, our findings remind us that disability is not only important, but complex. Differences and disparities within the disability population mean that policies meant to improve healthcare access and quality may have inconsistent effects across persons with different types of impairments. Further research is needed to determine the sources of these differences and identify appropriate targets for interventions to improve access to a usual source of care.

Acknowledgments

contents of this article do not necessarily represent the policy of NIDILRR, ACL, or HHS, and you should

not assume endorsement by the Federal Government.

Table 5.3: Physical cohort models of the effect of a gap in coverage on usual source of care

	OLS Model (Not Preferred)		2SLS Model (Preferred)	
	Coefficient (Std. Err)	95% CI	Coefficient (Std. Err)	95% CI
Gap in coverage (ref=no gap)	-0.13** (0.02)	-0.16, -0.10	-0.42** (0.12)	-0.65, -0.18
Age in years	0.01** (0.00)	0.00, 0.01	0.00** (0.00)	0.00, 0.01
Female (ref=male)	0.04** (0.01)	0.02, 0.05	0.03** (0.01)	0.02, 0.05
White (ref=nonwhite)	0.00 (0.01)	-0.02, 0.02	0.00 (0.01)	-0.02, 0.03
Hispanic (ref=non-Hispanic)	-0.03 (0.01)	-0.05, 0.00	-0.02 (0.01)	-0.05, 0.01
Self-rated health (ref=excellent)				
Very good	0.02 (0.03)	-0.04, 0.07	0.02 (0.03)	-0.04, 0.07
Good	0.03 (0.03)	-0.02, 0.08	0.03 (0.03)	-0.02, 0.08
Fair	0.06*(0.03)	0.01, 0.11	0.06* (0.03)	0.01, 0.11
Poor	0.06* (0.03)	0.01, 0.12	0.06* (0.03)	0.01, 0.11
Comorbid disability type (ref=only one disability type)	0.01 (0.01)	-0.01, 0.03	0.00 (0.01)	-0.02, 0.02
Kessler 6 sum (recent mental distress)	0.00 (0.00)	0.00, 0.00	0.00 (0.00)	0.00, 0.00
Graduated high school (ref=did not graduate)	0.02* (0.01)	0.00, 0.05	0.03* (0.01)	0.01, 0.05
Married (Ref=not married)	0.00 (0.01)	-0.03, 0.02	0.00 (0.01)	-0.02, 0.02
Household composition (ref=lives alone)				
Lives with non-family others	0.00 (0.02)	-0.04, 0.04	0.00 (0.02)	-0.04, 0.04
Lives with family	0.03* (0.01)	0.00, 0.05	0.03* (0.01)	0.00, 0.06
Family income category (ref=negative income/poor)				
Near poor	0.00 (0.02)	-0.03, 0.03	0.00 (0.02)	-0.03, 0.04
Low income	0.03* (0.01)	0.00, 0.05	0.02 (0.01)	0.00, 0.05
Middle income	0.01 (0.01)	-0.02, 0.03	-0.01 (0.01)	-0.03, 0.02
High income	0.04* (0.01)	0.01, 0.07	0.01 (0.02)	-0.04, 0.05
Region (Ref=Northeast)				
Midwest	-0.06** (0.01)	-0.08, -0.03	-0.05** (0.01)	-0.08, -0.02
South	-0.07** (0.01)	-0.09, -0.04	-0.06** (0.01)	-0.08, -0.03
West	-0.05** (0.01)	-0.07, -0.02	-0.05** (0.01)	-0.08, -0.02
Working full-time (ref=not working full-time)	-0.02 (0.01)	-0.04, 0.01	0.00 (0.01)	-0.03, 0.02
Urban (ref=rural)	-0.02 (0.01)	-0.04, 0.00	-0.02 (0.01)	-0.04, 0.01
Recession (ref=before recession)				
During recession	0.00 (0.01)	-0.02, 0.03	0.00 (0.01)	-0.02, 0.03
After recession	-0.01 (0.01)	-0.03, 0.01	-0.01 (0.01)	-0.03, 0.01

* = p<.05, **=p<.01

Table 5.4: Cognitive cohort models of the effect of a gap in coverage on usual source of care

	OLS Model (Not Preferred)		2SLS Model (Preferred)	
	Coefficient (Std. Err)	95% CI	Coefficient (Std. Err)	95% CI
Gap in coverage (ref=no gap)	-0.12** (0.02)	-0.17, -0.07	-0.53** (0.19)	-0.90, -0.17
Age in years	0.00** (0.00)	0.00, 0.00	0.00* (0.00)	0.00, 0.00
Female (ref=male)	0.02 (0.01)	-0.01, 0.04	0.01 (0.01)	-0.01, 0.04
White (ref=nonwhite)	-0.01 (0.01)	-0.03, 0.02	-0.01 (0.01)	-0.04, 0.02
Hispanic (ref=non-Hispanic)	0.00 (0.02)	-0.03, 0.04	0.00 (0.02)	-0.04, 0.04
Self-rated health (ref=excellent)				
Very good	-0.05 (0.04)	-0.13, 0.03	-0.04 (0.04)	-0.13, 0.05
Good	-0.02 (0.04)	-0.09, 0.06	-0.01 (0.04)	-0.09, 0.06
Fair	0.02 (0.04)	-0.05, 0.10	0.03 (0.04)	-0.04, 0.11
Poor	0.04 (0.04)	-0.03, 0.11	0.05 (0.04)	-0.03, 0.13
Comorbid disability type (ref=only one disability type)	0.01 (0.02)	-0.03, 0.05	0.01 (0.02)	-0.03, 0.06
Kessler 6 sum (recent mental distress)	0.00 (0.00)	0.00, 0.00	0.00 (0.00)	0.00, 0.00
Graduated high school (ref=did not graduate)	0.04** (0.01)	0.01, 0.06	0.05** (0.02)	0.02, 0.07
Married (Ref=not married)	0.01 (0.01)	-0.01, 0.04	0.02 (0.02)	-0.01, 0.05
Household composition (ref=lives alone)				
Lives with non-family others	0.00 (0.02)	-0.05, 0.04	-0.01 (0.03)	-0.06, 0.05
Lives with family	0.00 (0.02)	-0.04, 0.03	0.00 (0.02)	-0.04, 0.03
Family income category (ref=negative income/poor)				
Near poor	0.01 (0.02)	-0.04, 0.05	0.00 (0.02)	-0.05, 0.04
Low income	0.03 (0.02)	0.00, 0.07	0.03 (0.02)	-0.01, 0.06
Middle income	0.04 (0.02)	0.00, 0.07	0.03 (0.02)	-0.01, 0.07
High income	0.08** (0.02)	0.04, 0.13	0.04 (0.03)	-0.01, 0.10
Region (Ref=Northeast)				
Midwest	-0.06** (0.02)	-0.09, -0.02	-0.04* (0.02)	-0.08, 0.00
South	-0.07** (0.02)	-0.10, -0.04	-0.06** (0.02)	-0.09, -0.02
West	-0.05** (0.02)	-0.09, -0.02	-0.05* (0.02)	-0.08, -0.01
Working full-time (ref=not working full-time)	-0.05* (0.03)	-0.10, 0.00	-0.01 (0.03)	-0.08, 0.06
Urban (ref=rural)	-0.02 (0.02)	-0.05, 0.01	-0.01 (0.02)	-0.05, 0.02
Recession (ref=before recession)				
During recession	-0.01 (0.02)	-0.04, 0.03	-0.01 (0.02)	-0.05, 0.02
After recession	0.00 (0.01)	-0.03, 0.02	0.00 (0.01)	-0.03, 0.03

* = $p < .05$, **=$p < .01$

Table 5.5: Vision cohort models of the effect of a gap in coverage on usual source of care

	OLS Model (Preferred)		2SLS Model (Not Preferred)	
	Coefficient (Std. Err)	95% CI	Coefficient (Std. Err)	95% CI
Gap in coverage (ref=no gap)	-0.14** (0.02)	-0.19, -0.10	-0.10 (0.13)	-0.35, 0.15
Age in years	0.01** (0.00)	0.00, 0.01	0.01** (0.00)	0.00, 0.01
Female (ref=male)	0.07** (0.02)	0.04, 0.10	0.07** (0.02)	0.04, 0.10
White (ref=nonwhite)	0.00 (0.02)	-0.04, 0.03	0.00 (0.02)	-0.04, 0.03
Hispanic (ref=non-Hispanic)	0.00 (0.02)	-0.04, 0.04	0.00 (0.02)	-0.04, 0.04
Self-rated health (ref=excellent)				
Very good	0.00 (0.04)	-0.07, 0.07	0.00 (0.03)	-0.07, 0.07
Good	0.02 (0.03)	-0.05, 0.08	0.01 (0.03)	-0.05, 0.08
Fair	0.08* (0.03)	0.01, 0.14	0.07* (0.03)	0.01, 0.14
Poor	0.07* (0.04)	0.00, 0.14	0.07* (0.03)	0.00, 0.14
Comorbid disability type (ref=only one disability type)	0.06** (0.02)	0.02, 0.10	0.06** (0.02)	0.02, 0.10
Kessler 6 sum (recent mental distress)	0.00* (0.00)	0.00, 0.01	0.00* (0.00)	0.00, 0.00
Graduated high school (ref=did not graduate)	0.06** (0.02)	0.02, 0.09	0.06** (0.02)	0.02, 0.09
Married (Ref=not married)	0.02 (0.02)	-0.01, 0.05	0.02 (0.02)	-0.01, 0.05
Household composition (ref=lives alone)				
Lives with non-family others	0.00 (0.03)	-0.06, 0.06	-0.01 (0.03)	-0.07, 0.06
Lives with family	0.01 (0.02)	-0.03, 0.05	0.01 (0.02)	-0.03, 0.05
Family income category (ref=negative income/poor)				
Near poor	-0.01 (0.03)	-0.06, 0.05	-0.01 (0.03)	-0.06, 0.05
Low income	0.03 (0.02)	-0.01, 0.08	0.04 (0.02)	-0.01, 0.08
Middle income	0.02 (0.02)	-0.02, 0.07	0.03 (0.02)	-0.02, 0.07
High income	0.03 (0.03)	-0.02, 0.08	0.04 (0.03)	-0.03, 0.11
Region (Ref=Northeast)				
Midwest	-0.03 (0.02)	-0.07, 0.02	-0.03 (0.03)	-0.08, 0.02
South	-0.04 (0.02)	-0.08, 0.00	-0.04 (0.02)	-0.09, 0.00
West	0.00 (0.02)	-0.04, 0.05	0.00 (0.02)	-0.04, 0.05
Working full-time (ref=not working full-time)	0.01 (0.02)	-0.02, 0.05	0.01 (0.02)	-0.03, 0.05
Urban (ref=rural)	-0.03 (0.02)	-0.06, 0.00	-0.03 (0.02)	-0.07, 0.01
Recession (ref=Before recession)				
During recession	0.00 (0.20)	-0.04, 0.04	0.00 (0.02)	-0.04, 0.04
After recession	0.00 (0.02)	-0.04, 0.03	0.00 (0.02)	-0.04, 0.03

* = p<.05, **=p<.01

Table 5.6: Hearing cohort models of the effect of a gap in coverage on usual source of care

	OLS Model (Preferred)		2SLS Model (Not Preferred)	
	Coefficient (Std. Err)	95% CI	Coefficient (Std. Err)	95% CI
Gap in coverage (ref=no gap)	-0.13** (0.03)	-0.19, -0.06	0.08 (0.14)	-0.18, 0.35
Age in years	0.01** (0.00)	0.00, 0.01	0.01** (0.00)	0.01, 0.01
Female (ref=male)	0.07** (0.02)	0.03, 0.10	0.06** (0.02)	0.03, 0.10
White (ref=nonwhite)	-0.01 (0.03)	-0.06, 0.04	-0.01 (0.02)	-0.06, 0.03
Hispanic (ref=non-Hispanic)	-0.03 (0.03)	-0.08, 0.03	-0.04 (0.03)	-0.10, 0.02
Self-rated health (ref=excellent)				
Very good	0.03 (0.03)	-0.03, 0.09	0.03 (0.03)	-0.04, 0.10
Good	0.01 (0.03)	-0.06, 0.07	0.00 (0.03)	-0.07, 0.07
Fair	0.07 (0.04)	0.00, 0.14	0.07 (0.04)	0.00, 0.14
Poor	0.05 (0.04)	-0.03, 0.13	0.05 (0.04)	-0.03, 0.13
Comorbid disability type (ref=only one disability type)	0.03 (0.02)	-0.01, 0.07	0.03 (0.02)	-0.02, 0.07
Kessler 6 sum (recent mental distress)	0.00 (0.00)	0.00, 0.01	0.00 (0.00)	0.00, 0.01
Graduated high school (ref=did not graduate)	0.01 (0.02)	-0.04, 0.05	0.00 (0.02)	-0.05, 0.05
Married (Ref=not married)	0.03 (0.03)	-0.02, 0.08	0.04 (0.03)	-0.01, 0.09
Household composition (ref=lives alone)				
Lives with non-family others	0.00 (0.04)	-0.08, 0.09	-0.01 (0.05)	-0.10, 0.08
Lives with family	0.02 (0.03)	-0.04, 0.08	0.01 (0.03)	-0.06, 0.07
Family income category (ref=negative income/poor)				
Near poor	0.01 (0.05)	-0.08, 0.10	-0.01 (0.04)	-0.09, 0.08
Low income	0.10** (0.03)	0.04, 0.17	0.10** (0.03)	0.04, 0.17
Middle income	0.07* (0.03)	0.01, 0.13	0.08** (0.03)	0.02, 0.14
High income	0.10** (0.03)	0.03, 0.17	0.13** (0.04)	0.06, 0.21
Region (Ref=Northeast)				
Midwest	-0.03 (0.03)	-0.08, 0.03	-0.04 (0.03)	-0.10, 0.02
South	-0.02 (0.03)	-0.07, 0.03	-0.02 (0.03)	-0.07, 0.03
West	-0.04 (0.03)	-0.09, 0.02	-0.04 (0.03)	-0.10, 0.03
Working full-time (ref=not working full-time)	-0.04 (0.02)	-0.08, 0.00	-0.05* (0.02)	-0.09, 0.00
Urban (ref=rural)	0.00 (0.02)	-0.04, 0.04	0.00 (0.02)	-0.04, 0.05
Recession (ref=before recession)				
During recession	0.03 (0.02)	-0.02, 0.07	0.02 (0.02)	-0.02, 0.07
After recession	0.02 (0.02)	-0.02, 0.06	0.02 (0.02)	-0.02, 0.06

* = p<.05, **=p<.01

CHAPTER 6 - SUMMARY, LIMITATIONS, IMPLICATIONS, AND CONCLUSIONS

6.1 Summary of Findings

Aim 1 establishes that gaps in coverage have a detrimental effect on usual source of care for working-age adults with disabilities, but that switching coverage had no negative effect on usual source of care relative to stable coverage. In contrast, breaks in coverage caused significant reductions in the likelihood of having a usual source of care. While the negative effect of uninsurance on access is well-established, it appears that even time-limited, uninsurance in the form of coverage gaps can reduce access to usual source of care. This is consistent with findings from the general working-age adult population (e.g. Schoen & DesRoches, 2000, and Abdus, 2014), although the different methodologies and samples used in these studies do not permit us to directly compare the magnitude of the effect of gaps among working-age adults with disabilities vs. those without.

The results of Aim 2 show that not only are gaps in coverage detrimental to usual source of care, but stability of coverage post-gap is important. Each additional month was associated with an increased likelihood of having a usual source of care, even more than a year after the gap in coverage occurred. This suggests that when it comes to finding a usual source of care, while obtaining coverage is good, maintaining coverage is even better.

The findings from Aim 3 determined that gaps in coverage are not consistently detrimental for each type of disability, and those with physical and cognitive disabilities seem to be much more strongly affected by gaps. Other factors which contributed to likelihood of a usual source of care (e.g. region, sex, self-rated health) also differed across cohorts. This finding confirms earlier research on the unfavorable effect of gaps in coverage on usual source of care for working-age adults with disabilities, while adding the important step of stratifying by disability subtype and addressing endogeneity of gaps in coverage.

6.2 Limitations

Usual Source of Care Measure

I defined usual source of care with the MEPS question about "the particular medical professional, doctor's office, clinic, health center, or other place where a person would usually go if sick or in need of advice about his or her health." Although not a direct measure of coordinated care through the patient-centered medical home (Healthy People 2020, 2014; Starfield & Shi, 2004), it is a reasonable approximation that allows me to eliminate from the definition patients who report using the emergency department as a usual source of care. Using this MEPS question to measure usual source of care is a common approach (Devoe et al., 2011; Liaw et al., 2014), with many researchers also adjusting this question to exclude individuals using the emergency department as their usual source of care (Abdus, 2014; Dobbertin et al., 2015; Horner-Johnson & Dobbertin, 2014; Horner-Johnson et al., 2014; Lambrew, DeFriese, Carey, Ricketts, & Biddle, 1996).

Not every individual who lacks a usual source of care sees this as a problem (Viera et al., 2006). In fact, some of the most common reasons identified in MEPS for not having a usual source of care are "seldom or never sick" and "goes different places for different reasons." It is possible that this reflects a lack of awareness in this population of the prevention and health maintenance benefits of a usual source of care, but it may also reflect that these respondents are acting as their own care coordinators and/or have their health well-managed without the guidance of a single provider or clinic. Usual source of care is a measure of potential access, rather than realized access: reporting a usual source of care cannot be interpreted as receiving coordinated care, and lacking a usual source of care cannot necessarily be interpreted as an involuntary and/or negative outcome. Additional analyses using realized access MEPS variables (such as "did you ever delay or not receive needed medical care in the past year?") would clarify and strengthen the implications of these findings.

The relationship between self-rated health (included as a covariate) and usual source of care could potentially run in either direction. Are sicker people more likely to seek a usual source of care or are

they sicker because they lack a usual source of care? Research on individual preference for usual source of care shows that people who don't want a usual source of care tend to be healthier than those who do want a usual source of care (Viera, Pathman, & Garrett, 2006). This pattern is indirectly supported by my sample: patients with higher self-rated health more commonly reported not wanting a usual source of care (such as "go different places for different needs," "don't like/don't trust doctors," and "don't use doctors"). I was unable to find any longitudinal studies that supported an effect of usual source of care on self-rated health as a distinct concept from other measures of wellbeing.

Disability Measure

Defining and measuring disability is an ongoing, complicated issue for individuals, policymakers and researchers (Iezzoni & Freedman, 2008). In addition to evolving over time, the definition of disability is sensitive to context: the Social Security Administration (SSA), Americans with Disabilities Act, World Health Organization, and American Medical Association all use different definitions of disability (Iezzoni & Freedman, 2008). For instance, the SSA uses a binary definition in which it determines whether or not an individual is eligible for disability benefits (Social Security Administration, 2012). Alternatively, the Veterans Administration defines disability from 0% to 100% to calculate benefit levels (Wadsworth, 2014).

This dissertation uses a binary definition in which disability refers to an activity limitation or participation restriction resulting from an individual's physical, mental, or emotional condition interacting with their environment. Activity limitations are defined as difficulties that an individual encounters in "performing a task or action," while participation restrictions are difficulties that an individual encounters in "involvement in life situations."(World Health Organization, 2002). This dissertation did not use condition codes or diagnoses to identify people with disabilities, since these medical indicators more precisely identify *impairments.* Activity limitations and participation restrictions derive from impairment, but not every person with impairment has a disability. For example, a person who has a spinal cord injury who has difficulty moving from one place to another (activity limitation) and as a result cannot stay at their pre-injury job (participation restriction), would be considered to have a disability. However, consider a person with an astigmatism that is adequately corrected with glasses. If this person does not have difficulty performing tasks or actions because of this impairment and can participate in life activities, he or she would not be considered to have a disability even though they have a diagnosable impairment.

This definition has several advantages for my research. It is sensitive to the nature of disability as a "difference that makes a difference," an individual-specific condition that often confers inequality or disadvantage. Focusing on the disabled individual's experience, rather than their medical diagnosis, acknowledges the social and environmental aspects of disablement and helps avoid framing disability solely as a medical problem with medical solutions. As a political constituency, people with disabilities prefer that policymakers focus on promoting independence, participation, and opportunities for people with disabilities (American Association of People with Disabilities, 2012). Therefore, my definition of disability for this study is responsive to the preferences of the disability community.

The indicator variable for disability is based on an individual's responses to questions in the first two round interviews. If someone became disabled after these interviews, their outcomes and characteristics would still "belong" to a non-disabled person as the model understands it. These findings may not apply to recently disabled individuals. An assessment of insurance coverage and access issues for individuals immediately before and after onset of disability would be useful, but is beyond the capacity of this dataset.

Insurance Coverage Changes

There are several limitations to the insurance coverage change variables (switching and gaps) as constructed in this research. First, insurance coverage information is not complete for all respondents. 3.9% of working-age adults with disabilities were missing coverage information for at least one of the 12 months before the Round 4 interview; thus, it was not possible to determine whether they changed coverage. (Those with missing data before or after the twelve month period before the round 4 interview could be included.) I cannot safely assume that this data is missing completely at random. However, the theoretical model does not suggest a direct link between having a usual source of care and the potential absence of health insurance information. As a result, I assumed that this data is missing at random and ignorable, and only flagged those with complete cases as having coverage changes. Additionally, the Person Round Public Use File provides information on whether the respondent was enrolled in a private plan with a different name than before, but cannot distinguish whether this represented a change to a different plan, or the same plan having changed its name. Some small proportion of switches may actually be plan name changes.

Disability Type

Differences in rates of usual source of care within disability type and in the effects of coverage changes on usual source of care should not be necessarily interpreted as disparities, although they may suggest areas for further disparity research. Given that not everyone wants a usual source of care, lower rates of usual source of care after gaps in coverage for a given group may reflect that this group tends to have less of a preference for having a usual source of care and are less interested in finding a new one after a disruption, rather than reflecting that they face more barriers to doing so. These findings could be supplemented by qualitative research examining attitudes toward usual source of care by disability type. If the difference does represent barriers, then qualitative research could also explore what factors are facilitating or preventing obtaining a usual source of care after a coverage change.

Non-Institutionalized Sample.

The MEPS only surveys civilian, non-institutionalized adults. As a result, this research does not include individuals who were in institutions (such as long-term care facilities, psychiatric hospitals, or prison). However, insurance coverage patterns and usual source of care are still important for these individuals, especially since many of these institutions have "in-house" providers that may not be available to patients after they are discharged. Future research could use primary data collection to explore how transitions into and out of various institutions relate to coverage changes and usual source of care. However, the findings from this study cannot be generalized to institutionalized individuals.

Missing Cases due to Missing Data

A large proportion of respondents were lost due to missing data, mainly from the variables related to recent mental distress (7%), household composition (7%), and whether their employer offered insurance coverage (21%). An additional 1% of responses were missing for each of the self-employment, hours worked, insurance coverage, and usual source of care variables. Dropping these cases could potentially lead to a sample that is less representative than desired. For instance, people with disabilities may be disproportionately likely to skip the mental distress questions due to fatigue or cognitive limitations, and people with more unstable employment may be less likely to know whether their employer offers health insurance. In future analyses, researchers should consider whether using broader categories (e.g.,

reported severe psychological distress/did not report severe psychological distress) or removing

covariates would facilitate a better sample size and more generalizable results.

6.3 Implications for Policy

The findings from these three analyses fill an important gap in the literature about people with

disabilities, insurance instability, and access to care. Based on these results, we know that gaps in

coverage have a negative effect on usual source of care, and that ongoing stability in coverage has a

positive effect. We have established that switching coverage and gaps in coverage cannot be combined

into one measure of insurance instability and that, when possible, disability subtypes should be studied

rather than treating all people with disabilities as one homogenous group. These advances in the field

should inform both future policymaking and future research efforts.

Our findings indicate that breaks in insurance coverage are disruptive to having a usual source of

care for working-age adults with disabilities. Given the importance of a usual source of care in this

population, insurance instability should be considered a threat to their healthcare. During the past five

years, active reform proposals included components that were likely to increase the risks of breaks in

coverage for people with disabilities by eliminating their current sources of coverage and/or restricting

their access to certain types of coverage by creating state high-risk pools, reinstating pre-existing

condition exclusions in the self-pay market, and withdrawing Medicaid expansion. Our findings suggest

that such policy changes are likely to reduce rates of having a usual source of care among working-age

adults with disabilities, which could have negative results both for individuals (less preventive care, lower

satisfaction) and the system (uncoordinated care leading to waste).

If the ACA remains the law of the land, insurance instability is a key indicator that should be

tracked, and if necessary, addressed with modifications to policy. The implementation of the ACA

generally reduced insurance instability for the general working-age population. Between 2013 and 2014,

insurance transitions overall occurred more frequently due to an increased number of uninsured people

gaining coverage (primarily through non-group marketplace coverage) (Graves & Nikpay, 2017).

However, among people who already had insurance, the first year of the ACA's coverage expansions did

not increase instability for most groups. The greatest instability was seen among those who were in non-

group coverage, who were much more likely to change to employer-sponsored insurance between 2013

and 2014 than they were from 2012-2013. However, no studies are currently available on whether and how insurance instability changed post-ACA for people with disabilities.

One major area of concern before implementation of the ACA was the potential for "churn" between the health insurance marketplaces and Medicaid as the earnings of low-income people fluctuated over the Medicaid eligibility threshold. There is no firm methodological distinction between expected levels of instability and excessive churn, but it appears that instability does persist post-ACA. Initial findings indicate that post-ACA instability for low-income Americans is no worse, but no better, than it was pre-ACA: results from Arkansas, Texas, and Kentucky in 2015 indicate that one out of four low-income respondents experienced insurance instability during the previous 12 months, a rate similar to that observed pre-ACA (Sommers, Gourevitch, Maylone, Blendon, & Epstein, 2016). More than half reported a gap in coverage. Nearly 20% reported changing doctors because of their coverage change, and this rate was higher among those with coverage gaps. It remains to be seen whether instability persists as an issue in 2016 and beyond. If so, it will be imperative to design policies that are sensitive to the healthcare financing maze experienced by low-income people with disabilities.

These findings may be relevant to an evergreen policy issue for people with disabilities: the Medicare waiting period. In 1972, seven years after it added disability benefits to its program, Social Security extended Medicare benefits to its disability insurance recipients (Kollman, 1996). From the onset of this benefit, SSDI recipients were subject to a waiting period: they do not instantly receive Medicare benefits, but must wait until their 25th month of entitlement. This waiting period is intended to ensure that benefits are distributed to individuals with serious, ongoing conditions and to avoid overlapping with existing coverage (Dale & Verdier, 2003). Rates of uninsurance are significantly higher in the waiting period population than in the population at large, with estimates ranging from 24-33% pre-ACA (Riley, 2004; Williams, Dulio, Claypool, Perry, & Cooper, 2004). Rates of insurance instability have not been reported for this population, but are likely to be high given that the waiting period is intended to exhaust private coverage prior to Medicare enrollment. In addition, for a significant portion of participants, the increase in income from SSDI benefits will push them out of Medicaid eligibility, further disrupting their healthcare coverage (Williams et al., 2004). Uninsured beneficiaries in the waiting period report cost-related prescription nonadherence, delaying or forgoing care, anxiety and depression, and a feeling of

lack of control over their own lives (Williams et al., 2004). They report that they deteriorate physically and mentally during the waiting period, because they are unable to receive rehabilitation services, visit their doctor for care and diagnosis, or adhere to their prescription schedule. More than 30 years after it was implemented, Dale and Verdier described the waiting period as having persisted "with little change and little examination" since its inception, a state of affairs which has continued during the high-profile passage and implementation of the ACA (Dale & Verdier, 2003). Greater research attention to the detrimental effects of gaps in coverage for people with disabilities may help bring the waiting period back into focus as a policy topic.

Because reform efforts to date have primarily focused on remedying uninsurance rather than addressing insurance instability, there are no current major proposals to stabilize insurance coverage. Insurance instability is likely to remain a part of the American health insurance landscape as long as people obtain coverage from a diversity of sources, and as long as uninsurance persists in some form. However, many existing programs and proposals have the potential to both reduce uninsurance rates and increase coverage stability, including programs expediting Medicaid reinstatement for the formerly incarcerated, presumptive Medicaid eligibility enrollment through healthcare providers and schools, and even single-payer. As one of the most unstable forms of coverage, and as one that serves a very high-need population Medicaid should be a particular focus of policy efforts to stabilize coverage. In contrast, current active proposals such as the Kentucky Medicaid work requirement are likely to exacerbate gaps in coverage rather than resolve them. Similarly, loosening of restrictions on pre-existing condition exclusions and state decisions to allow substitution of essential health benefits are likely to disproportionately affect access to insurance for people with disabilities. Careful monitoring of the effects of these policies is needed in order to identify potentially harmful unintended consequences such as exacerbated churn. Regardless of how the United States chooses to modify and improve its health insurance system, we should ensure that proposed policies do not worsen gaps in coverage or affect access to care more than is necessary, especially for the high-need population of working-age adults with disabilities.

6.4 Implications for Research

Aim 1's findings have several implications for future research, including the clear recommendation that future studies decompose any measure of insurance instability to account for the

difference between switching and gaps in coverage. It also raises questions about why switching

coverage, which is detrimental to likelihood of having a usual source of care in most studies of the

general working-age population, does not appear to have a similar effect in this study. It is possible that

this is a simple difference in methodology, as our analysis used instrumental variables while most of the

extant literature did not. Another potential explanation is that working-age adults with disabilities - or the

switches that they experience - vary in important ways from the general working-age population.

Evaluating whether people with disabilities have more options to voluntarily switch to pursue coverage,

fewer involuntary switches, or faster turnaround in obtaining a usual source of care post-switch could all

lend insight to this unexpected finding.

In all three models of Aim 1, working full-time (compared to being unemployed or working part-

time) was associated with lower likelihood of having a usual source of care when controlling for other

factors. Given that access to Medicaid and Medicare (before age 65) is generally conditioned on inability

to engage in substantial gainful activity, it is possible that that this association reflects the effect of

enrollment in Medicare, by design a very stable form of coverage for people with disabilities, rather than a

protective effect of unemployment itself on usual source of care. It could also reflect that those who work

full-time are healthier than those who cannot (in ways that are not captured by the model), that the

opportunity cost of finding and maintaining a usual source of care is higher for those working full-time,

and/or that full-time workers are less interested in obtaining a usual source of care. Additional research

on the interaction of different types of insurance coverage, work, and insurance instability would be

warranted.

Aim 2's finding that stability of coverage continues to benefit usual source of care even 18 months

after a gap raises questions about how far this effect extends. Additional policy evaluations and research

analyses are needed to pinpoint particularly acute and/or policy-amenable sources of coverage gaps for

working-age adults with disabilities, who have a broader set of insurance coverage options than the

general population thanks to their potential eligibility for Medicare or non-expansion Medicaid. Full

recovery from coverage gaps can take significant time for people with disabilities. Our results highlight the

need for an increased focus on long-term stability of coverage for the high-cost, high-need population of

working-age adults with disabilities in order to support their healthcare access. Future research should

also consider how the different types of providers available to people with different types of coverage may influence the time needed to find usual source of care. For instance, people who are uninsured for long periods of time may become quite skilled at navigating the free and low-cost options in their community, but be unsure where to find care after they obtain insurance. In this situation, a person who is continuously uninsured might be more likely to have a usual source of care than a person who is newly insured after a long period of uninsurance. A comparison of continuously insured, continuously uninsured, and newly insured people with disabilities over time would provide useful insight into how stability of coverage and stability of lack of coverage relate to instability.

The findings from Aim 3 suggest that an appropriate next step would be exploring the underlying mechanisms of why gaps in coverage reduced the likelihood of having a usual source of care, and whether these mechanisms vary across disability cohorts. They also suggest that, when possible, disaggregating the disability population into different disability types will provide more informative and precise estimates. From a sociopolitical perspective, the barriers to healthcare experienced by people with different disability types are informed not just by their specific impairments, but by cultural perceptions and economic, legal, and policy considerations. The context of health policy decision-making has often resulted in different policies and programs for different disability types: for instance, government-funded vocational and rehabilitative services for those with hearing and vision disabilities pre-date services for other disability groups by decades. Programs and services that facilitate having a usual source of care can vary widely in their availability, including by region, family composition, income, work history, and type of disability. Having established that gaps in coverage negatively affect usual source of care across disability cohorts, further research in this area could contribute to a better evidence base for policy development by focusing on subpopulations enrolled in specific programs (such as a state Medicaid program) and identifying policy-amenable factors that contribute to gaps in coverage.

These analyses focused on a pre-ACA sample, but many interesting research questions emerge when considering the potential impact of the ACA on instability and access to care. While the extension of dependent coverage to age 26 has increased insurance rates and decreased instability among young adults, the effect of this provision on young adults with disabilities is not yet known (Han, Zhu, & Jamal, 2016; Chen, 2018). To date, the Medicaid expansion appears to be associated with greater insurance

coverage rates and employment rates among working age adults with disabilities, but its influence on insurance instability has not been measured (Hall, Shartzer, Kurth, & Thomas, 2017; Kennedy, Wood, & Frieden, 2017). To validate the results of the current studies and verify that their findings hold true in the wake of the ACA's coverage expansions, further research is needed.

Once the basic prevalence and effects of insurance instability are better understood for people with disabilities, researchers will need to move on to a more nuanced understanding of how this phenomenon plays out for people with disabilities. There are different pathways of instability that vary tremendously in how they influence the overall well-being of a person with a disability. For instance, transitioning from traditional Medicaid, to Medicaid buy-in, and eventually to employer-sponsored coverage, should be considered a positive pathway – it will necessarily involve some instability of coverage, but the overall pathway is beneficial and is worth the potential disruption caused by the instability. In contrast, it is unlikely that rapid cycling between Medicaid and uninsurance is a helpful pathway for the finances or health of a person with a disability. In order to optimize the use of insurance instability as a system indicator, and to evaluate how policies are shaping trends in insurance instability, researchers must account for the differences between positive and negative pathways of instability.

6.5 Conclusions

Insurance instability should be considered an important aspect of health coverage when assessing policy proposals and tracking policy implementation. Working-age adults with disabilities should be considered a crucial subpopulation for tracking and addressing instability. Their higher levels of healthcare need are well-documented, and the current analyses provide evidence that gaps in coverage are detrimental to their ability to maintain a usual source of care. The potential effects of any proposed health policy changes on insurance instability for people with disabilities should not be overlooked. Taking steps to reduce the likelihood of gaps in coverage and to mitigate potential downstream effects of instability would help minimize the negative impact of these policy changes on people with disabilities.

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