

Citizenship documentation for Medicaid Eligibility: Effects on Oregon children

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ABSTRACT:

Background: As part of the Deficit Reduction Act (DRA) of 2005, all states became required to verify that Medicaid beneficiaries are U.S. citizens. Since the policy was implemented in 2006, three-quarters of states have reported significant declines in Medicaid enrollment and observational studies have reported increased administrative burdens. Although the magnitude of disenrollment following implementation has been published widely, no study has yet examined the characteristics of affected children, the potential for this type of denial to lead to significant insurance gaps, or the resulting impact of this policy on access to health care. Because public insurance is held by over 30% of American children and because the risks of insurance gaps among this population are well known, a thorough understanding of the impacts of this policy will be essential to inform future policy.

Research Questions: (1) What individual characteristics are associated with children's Medicaid denial for inability to document citizenship? (2) Is denial for this reason associated with a subsequent six-month gap in health insurance? (3) Is denial for inability to document citizenship associated with having poor access to health care? And, can having insurance coverage and/or a usual source of care attenuate the effect of Medicaid denial on access to health care?

Methods: We used data from the 2007 OHP Disenrollment Study, which identified a random cohort of children who applied to Oregon's Medicaid program over a three-month period shortly after implementation of the 2005 DRA. Parents of selected children completed a previously validated mail survey focusing on access and utilization of health care over the previous six months since their child's application. Data were weighted to reflect the population of interest and to account for survey non-response. We performed a complete descriptive analysis as well as multivariable logistic regression modeling to examine each of the three research questions.

Results: 394 children participated in the survey. This number was weighted to reflect a full population of 104,375 children who applied for Medicaid in Oregon during the sampling window. Children denied for inability to document citizenship were more likely than children denied for other reasons to come from a low-income household (OR=p=0.0005), have a chronic disease (p=0.0234), and/or to have previously applied for Medicaid (p<0.0001); but they did not differ from others in their race, ethnicity, preferred language, or birthplace. More than a third of children denied for inability to document citizenship had a six-month gap in health insurance following their denial, making them just as likely to have a gap as children denied for other reasons. Compared to accepted children, both groups of denied children were significantly more likely to have unmet health care needs, an association that was attenuated when both health insurance and usual source of care were accounted for.

Conclusions: Children affected by the new citizenship documentation requirement for Medicaid are medically and socially vulnerable citizen children. Since being denied, these children have suffered significant gaps in health insurance and resulting unmet health care needs. In the interest of child health, we must either reconsider such regressive laws or streamline the process to avoid these enrollment barriers.

I. BACKGROUND:

In the United States, quality health care begins with health insurance. A consensus of studies show that insured Americans are healthier, receive better health care, and are less likely to suffer bad outcomes of both acute and chronic diseases.¹⁻³ They also save money by being less likely to use the emergency department and to require hospitalization.^{4,5} Among American children the effects are profound. Uninsured children are more likely to have no usual source of health care, to have unmet health care needs, and to experience negative health care outcomes due to lack of insurance.^{2,6-11} While health insurance cannot alone ensure access to health care, it remains a necessary constant in the health care equation in the United States.^{12,13} Still, more than 46 million Americans have no health insurance and nearly 9 million of the uninsured are children.^{9,14,15}

Medicaid provides a vital safety net for those who would otherwise be unable to afford private health insurance.^{16,17} In the United States, more than 42 million individuals and 30% of all children receive health insurance through Medicaid programs. Disturbingly, more than two-thirds of uninsured children are eligible but not enrolled in public insurance through Medicaid or the Children's Health Insurance Program (CHIP).¹⁸ In Oregon, 60% of uninsured children are estimated to be eligible but not enrolled in Medicaid alone -- a proportion significantly above the national average.¹⁹ Both poor program retention and poor program admittance significantly contribute to these low levels of enrollment;²⁰ and although the onus of application is on the individual, enrollment levels are directly shaped by state and national policies.

One recent policy, the Deficit Reduction Act (DRA) of 2005, mandated documentation of U.S. citizenship to be eligible for Medicaid coverage. Although citizenship has always been required for Medicaid eligibility, previous law required only a statement of citizenship provided under the penalty of perjury. The DRA of 2005 changed this law to require proof of citizenship with physical documentation in the form of a U.S. passport, certificate of naturalization, certificate of citizenship, or a valid state-issued driver's license from a state that requires proof of US citizenship before issuance. If none of these documents can be provided, there is a complex algorithm of alternative documents that can be accepted only in tandem.²¹ A few individuals are exempt from the citizenship documentation requirement, including applicants who are dually eligible for Medicare and Medicaid, citizens receiving Social Security Income (SSI) and Social Security Disability Insurance (SSDI), and certain foster children, but the vast majority are now tasked with documenting their citizenship to receive insurance.²²

This policy is concerning because it adds complexity to an already burdensome process of enrollment. This concern is only deepened by the masses of people who are already eligible but not enrolled in Medicaid. Children are particularly vulnerable because they are completely reliant on others for their enrollment, their continuity of insurance, and their health care. Children are also predisposed to "churning" on and off of coverage with frequent gaps in their health insurance -- a phenomenon already demonstrated to have significant detrimental effects on

children's health care.^{9, 23-28} One study suggested that as many 40% of children covered with Medicaid experienced one or more gaps in insurance coverage over a three-year period²⁹ and children with gaps as little as 1-4 months are likely to experience delays in needed care and trouble maintaining a usual source of care.⁹ One study even showed that the negative health care effects among children with insurance gaps were similar to or worse than those among children who had never been insured.²³ Even families that are uncertain about the status of their child's insurance tend to have more difficulties accessing needed health care.²⁴ With the majority of states requiring reapplication for public insurance every six to twelve months, the burden of repeated applications makes continued insurance no small feat. The addition of citizenship documentation requirements adds to this burden and may directly contribute increases in insurance gaps among children.

The 2005 DRA has also been controversial because it highlights an ongoing debate about citizenship requirements for public benefits. For health care especially, immigrants face numerous barriers regardless of citizenship status.^{30, 31} Non-citizens and their children are less likely to be insured, less likely to have a usual source of care, and tend to have higher rates of emergency department utilization.³² These barriers are increasingly concerning because the immigrant population continues to grow. About one in five children in the U.S. has first generation immigrant parents. Eighty percent of these children are U.S. citizens and more than half live in mixed citizenship families.³³ Although citizenship has always been required for Medicaid eligibility (despite ongoing controversy³⁴), this new requirement brings to light the perceived discrimination against non-citizens, mixed citizenship families, and immigrants in general. This new policy may increase the barriers to health care experienced by these groups as well as others.²¹

The citizenship documentation requirement of the 2005 Deficit Reduction Act was implemented September 1, 2006 and over the first year of implementation three-quarters of U.S. states experienced significant declines in Medicaid enrollment.³⁵ This strongly suggests that large numbers of uninsured individuals are either being denied coverage at a higher rate than previously, or they are simply choosing not to apply or reapply. While the exact source of this decrease in enrollment cannot be identified retrospectively, enrollment in the Food Stamps Program – a service that does not require citizenship documentation – increased during the same period, which suggests that the decrease in Medicaid enrollment was not due to a decreased need for public assistance, but was instead the result of barriers created by the new citizenship documentation requirements. In fact, several states reported that the new citizenship documentation requirement under the 2005 DRA was “the most significant factor contributing to low or declining growth in Medicaid enrollment for fiscal year 2007.”³⁵ Participation in services also decreased after implementation of the DRA. In Oregon, a more than 30% decrease in utilization of family planning services was attributed directly to the DRA.³⁶

Because of these trends, Oregon Governor Kulongoski requested that the State Department of Medical Assistance Programs (DMAP) undertake a descriptive analysis of the possible impacts of the new citizenship documentation requirements on Oregon Health Plan (OHP) enrollment. In their initial study researchers conducted telephone interviews with affected households and obtained both quantitative and qualitative information about the impacts of the DRA. Preliminary analysis showed that during the first five months after DRA implementation (September 2006 through January 2007), an estimated 1,011 Oregonians disenrolled from the Oregon Health Plan (OHP) or were denied OHP coverage because they were unable to provide sufficient evidence of citizenship status. Based on the demographic characteristics of these individuals, the vast majority of these individuals were thought to be citizens. Ninety percent of households were English-speaking and nearly 60% had at least one person who provided sufficient citizenship documentation for coverage. Among affected households, the most common reported challenges to achieving coverage included insufficient time to provide documentation (applicants are given up to 90 days), insufficient money or transportation to provide documentation, and misunderstandings about what was required – especially the form for proof of identity required for children. Among Hispanics 98% of affected individuals were children. Qualitative analysis showed that many parents of these children did not understand that citizenship documentation for children was required if their child was born in the United States.³⁷ More recent research has continued to support the initial descriptive studies. The concerning trends identified in this preliminary analysis led to the commissioning of the 2007 OHP Disenrollment Study.

This larger study was designed with more power to understand who was affected and why. As a prospective cohort study, the 2007 OHP Disenrollment Study was also able to measure the temporal effects of the 2005 DRA on health and health care among those affected. By pairing administrative data from state application databases with validated surveys, this study also had the ability to more accurately identify the precise reason for a person's disenrollment without relying on self-report. Although the initial descriptive study provided some insight into the characteristics of those affected by this policy, no study has yet performed a comparative analysis to determine whether this population resembles individuals denied Medicaid coverage for other reasons or individuals accepted for coverage. Determining the comparative characteristics of this population will be essential to evaluating both the effectiveness of DRA of 2005 in keeping undocumented immigrants out of the Oregon Medicaid program, and the potential impacts on other vulnerable populations. Our secondary analysis of data from the 2007 OHP Disenrollment Study focuses on the impacts of citizenship documentation requirements on Oregon children because of the susceptibility of this population to gaps in public insurance coverage and resultant negative health outcome. No studies have yet determined how denial specifically for inability to document citizenship affects children's insurance gaps and how these gaps influence access to health care. Comparative analysis is especially important here to determine how children denied for inability to document citizenship fare in relation to children denied for other reasons and children accepted for coverage. Does denial for this reason simply lead to short-term

churning or can it lead to significant longer-term gaps in insurance? How does denial of coverage for this reason impact access to health care?

With the state legislature continuing to discuss options for expanding access to health insurance, it is essential to understand the effects of the 2005 DRA on eligible Oregonians – especially children -- who are disenrolling, and being denied access to OHP for failing to produce the required documents. By identifying which children are most affected by this new policy and how this change influenced their ability to access health insurance and health care, we will not only fill gaps in current research, but we will also inform policy-makers and help them create legislation that is both cost-effective and sensitive to children’s health needs.

II. RESEARCH QUESTIONS & SPECIFIC AIMS:

We used data from the 2007 Oregon Health Plan Disenrollment Study to address the following questions as they relate to Oregon children:

(1) What factors are associated with denial of Medicaid coverage for inability to document citizenship?

We aimed to...

- Describe demographic and health characteristics of children denied Medicaid coverage specifically for inability to document citizenship.
- Compare children denied Medicaid coverage for inability to document citizenship to children with other application outcomes -- those who were accepted for coverage and those who were denied for other reasons.

(2) Is denial of Medicaid for inability to document citizenship associated with a six-month gap in insurance coverage?

We aimed to...

- Describe the likelihood of having a significant insurance gap following application among children denied Medicaid coverage for inability to document citizenship.
- Compare proportions of children with six-month insurance gaps between each application outcome group -- children denied for inability to document citizenship, those denied for other reasons, and those accepted for coverage.

(3) Is denial for inability to document citizenship associated with poor access to health care? Can having some insurance coverage attenuate the negative effects of Medicaid denial on access to health care?

We aimed to...

- Describe the health care utilization behaviors of children who were denied Medicaid for inability to document citizenship.
- Compare the likelihood of having unmet health care needs between each application outcome group -- children denied Medicaid coverage for inability to document citizenship, those denied for other reasons, and those accepted for coverage.
- Determine how insurance coverage and a usual source of care affect the association between Medicaid denial and unmet health care needs.

III. METHODS:

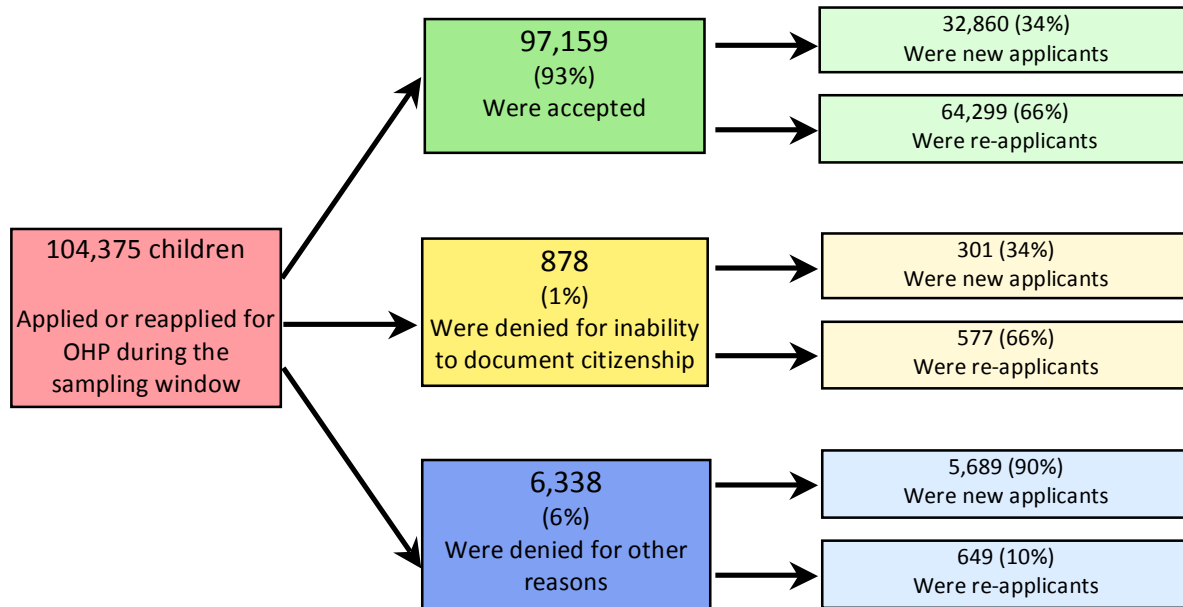
This study utilized data from the 2007 Oregon Health Plan (OHP) Disenrollment Study. A cohort of children was identified from a sample of OHP applicants during a three-month sampling window. This sampling period took place between January and March of 2007, shortly after the new citizenship documentation requirements of the 2005 DRA went into effect in September of 2006. Parents of selected children then received a survey during a three-month survey window approximately six months later (July - September 2007). Surveys collected information regarding insurance status, access and utilization of health care, and perceived health status during the six months following their application for OHP. The survey also assessed the individual characteristics and (among those who were denied coverage) the perceived factors that contributed to their denial of coverage.

Subjects:

The original Oregon Health Plan Disenrollment Study included children and adults who applied, reapplied or missed renewal for the Oregon Health Plan between January and March of 2007, soon after the citizenship documentation requirements established by the Deficit Reduction Act of 2005 took effect. This study, however, was limited to focus on children who applied for OHP during the sampling window. State administrative records were used to identify these children and to determine the outcome of their application, including the reason for application denial if applicable. Children meeting these criteria and were divided into six strata as shown in Figure 1 below.

The scope of the study was limited to children because this group has been studied in depth with regard to the effects of uninsurance. The vulnerability of this group also draws the interest of policy-makers. The study was further limited to children who applied for OHP during the sampling window, because we expected children who missed application renewal to have significantly different motivations and behaviors compared to those who applied. It is likely, however, that citizenship documentation requirements imposed by the DRA of 2005 also contributed to uninsurance among children who missed reapplication deadlines and subsequently lost OHP coverage so this group should be considered for future study.

Figure 1: Applicants to the Oregon Health Plan (January through March, 2007)



Sampling:

Random sampling was strategically performed from the population of 104,375 children to include 550 children from each of the six strata with the exception of new applicants who were denied for inability to document citizenship as there were only 301 total children in the category during the sampling window. Surveys were mailed to the parents or legal guardians of these selected children. Only one subject per household was eligible to participate. For households with multiple children, parents were instructed to respond to questions only as they pertained to the focal child. Complete inclusion criteria are listed in Table 1 below.

Table 1. Inclusion and Exclusion Criteria for the 2007 Oregon Health Plan Disenrollment Study

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> Child under 19 years of age Child applied or reapplied for OHP between January and March of 2007 No child in the same household already selected to participate Valid current address according to state OHP records 	<ul style="list-style-type: none"> Individuals 19 years and over Child did not apply or reapply between January and March 2007 Child in same household was randomly selected to participate Listed current address according to state OHP records is invalid and no forwarding address available.

Recruitment:

In July of 2007, approximately six months after the sampling window, postcard screeners were mailed to identified subjects. The postcard introduced the study and informed subjects that a survey would arrive in the mail shortly. Subjects for whom the postcard screener was returned without a forwarding address were excluded.

Approximately two weeks later, subjects received the survey by mail with a prepaid response envelope, instructions for completing and returning the survey, and promise of five dollars in cash upon receipt of a completed survey. Those who had not responded two weeks later received a reminder postcard. Those who had not responded two weeks after that received a second copy of the survey along with another prepaid return envelope. The survey window concluded at the end of September of 2007. Surveys received after this time were excluded.

Power Analysis:

The sample size for this study was fixed as data collection took place in 2007. To account for equalized sampling of population target strata, varying household size and survey non-response, the total number of participants (n=394) was weighted to represent the full sample population of all children who applied for Medicaid during the sampling window (n~104,375). We used Russ Lenth’s Power Calculation Tool³⁸ to determine the raw level of detectable difference while maintaining a power of 0.80 for a two-sided test of proportions. Since children denied for inability to document citizenship will be compared to two comparison groups, the calculation was performed twice, once with each reference group. Using these values and an alpha level of 0.05, a difference of approximately 20% between groups is needed to achieve statistical significance. This detectable difference is felt to be reasonable based on the individual survey variables, and is expected to be a fair representation of a socially meaningful difference. This calculation does not account for survey weights and stratification, however weighting was not expected to significantly change the statistical power of the study.

Table 2. Evaluation of Detectable Differences

Comparison	Raw N	Power	Alpha	Delta
Denied CID vs. Denied Other	n=85 vs. n=95	0.80	0.05	0.1975
Denied CID vs. Accepted	n=85 vs. n=194	0.80	0.05	0.2020

Measurements:

Administrative data from the Oregon Division of Medical Assistance Programs (DMAP) were used to identify and stratify the sample population. This information included application date, application outcome, and reason for denial (if applicable). After stratification, the survey was the primary measurement tool. Children’s surveys were phrased such that a parent would respond to each question for a single focal child. The survey was modeled after the Oregon Health Care Survey which was pilot tested and then used state-wide to assess coverage, access, utilization, and financial and health outcomes among current and former Medicaid members.⁸ The survey for this study was modified to focus on the specific research questions of interest, but original validated questions were used. Surveys were translated from English to Spanish and language was selected based on the recorded language preference of the parent/guardian according to state administrative records. Spanish language surveys were

independently translated back to English to ensure the fidelity of the translation. A complete English language survey is included in Appendix B.

Data Management:

A database of all selected subjects was created at the initiation of the study. After surveys were collected, data were converted to numeric code and personal identifiers were removed. Numeric code linked subjects to their identifying information, which was stored outside of the databases.

Data were weighted in three rounds to better reflect the full population described by this sample. First, we applied a base weight for inclusion probability so that each stratum reflected the full population stratum from which it came. Second, a weight for number of children in the household was applied to account for the exclusion of children from the same household. Finally, a weight was applied to account for differences between survey responders and non-responders. This weight was calculated using multivariable logistic regression analysis of administrative data including demographic features and primary study outcomes. Analysis was then conducted using the survey data functions in STATA IC 11.0.³⁹

Table 3. Study Weights

Type	Description	Application Type	Planned Sample	Oregon Population	N (responded)	N (weighted)
Study group	Children who were denied OHP coverage for inability to document citizenship	New applicants	550	301	24	275
		Re-applicants	550	577	61	601
Comparison group 1	Children who were denied OHP coverage for other reasons	New applicants	550	5,689	64	6,114
		Re-applicants	550	649	51	571
Comparison group 2	Children who were accepted for OHP coverage	New applicants	550	32,860	92	32,487
		Re-applicants	550	64,299	102	61,867
TOTAL	--	--	3300	104,375	394	101,905

The final weighted total is very similar, though not identical to the true n for the full population. Minor differences are assumed to be the result of imperfections in the regression analysis used to calculate weights for non-response, and they are not expected to have any significant effect on the results of the study.

Variables and Statistical Analysis:

Research Question #1:

For the first specific aim, contingency tables were constructed to compare demographic characteristics to OHP application status (the outcome of an individual's application during the survey window). Application status was treated as a 3-level categorical variable to allow comparisons between groups denied for inability to document citizenship (denied-CID) and both the accepted group and the group denied for other reasons (denied-other). Variables for age and income were dichotomized as reported values were felt to lack sufficient precision to include as continuous variables. Thresholds were selected on the basis of distribution and researcher hypotheses. For age, two separately defined dichotomous thresholds were considered to evaluate the potential for separate effects with each threshold. For income, the median income was used as a dichotomous threshold. Geographic location was measured with RUCA (Rural Urban Commuting Area) codes using a liberal definition of "rural" (codes ≥ 7 , indicating small town < 10,000 people) to ensure adequate sample size for analysis.⁴⁰ Categorical variables were also dichotomized to represent socially important differences while maintaining adequate cell size for statistical analysis. Demographic variables for research question #1 are described in detail in Table 4 below.

Variables were evaluated for collinearity with a series of univariate weighted logistic regressions between each of the independent variables. Variables related with an odds ratio of < 0.50 or > 2.0 were felt to be too similar to include concurrently in the multivariable model. These variables were either combined into new dichotomous or categorical variables or eliminated from consideration. Exceptions to this threshold were considered if variables were felt to represent significantly different, though potentially associated information.

Weighted and unweighted analyses of the contingency tables were performed. Pearson's Chi-squared was applied for the unweighted analysis and a design-based F-test was applied for the weighted analysis. Unweighted analysis was only used as a reference to evaluate differences caused by sample weighting. Only weighted data were used for the primary analysis. Simple logistic regressions were performed using a dichotomous version of the variable for application status as the dependent variable. Using this method, children denied due to inability to document citizenship were compared separately to children who were accepted for coverage and to children who were denied coverage for other reasons. Because independent demographic predictors of application status were not of interest, an adjusted multivariable analysis was not performed for research question #1. Application type (re-applicant/new applicant) was thought to be a potential effect modifier, so a stratified analysis was conducted. Fisher's exact test was applied to unweighted tables to detect significant differences between groups.

Table 4: Categorization of demographic variables for research question #1

Measurement	Survey Question	Potential Responses	Variable Type
Dependent Variable:			
OHP application status	N/A - Determined from state administrative data	- Denied for inability to document citizenship - Denied for other reasons - Accepted	Categorical - Accepted - Denied – CID - Denied – Other
Independent Variables			
Birthplace	Was your child born in United States?	Yes/No	Dichotomous
Race	How would you describe your child's race?	- White - Black or African American - American Indian or Alaska Native - Native Hawaiian or Pacific Islander - Other: _____	Dichotomous - White - Non-white
Ethnicity	Would you describe your child as Spanish, Hispanic, or Latino?	Yes/No	Dichotomous
Preferred Language	N/A - Determined from state administrative data	- English - Spanish	Dichotomous
Sex	Is your child male or female?	- Male - Female	Dichotomous
Age	What year was your child born?	Write in year (2007 - year written)	Dichotomous - ≥10years v. < 10years AND - ≥2years v. <2years
Parent's education level	What is the highest level of education you (the parent) have completed?	- Less than high school - High school diploma or GED - Vocational training or 2-year degree - A 4-year college degree or more	Dichotomous - ≤ High School - >High School
Parent's Employment	Are you (the parent) currently employed or self-employed?	- Yes, employed - Yes, self-employed - Not currently employed - I am retired	Dichotomous - Employed/Self-employed - Unemployed/Retired
Household income	What was your gross household income (before taxes and deductions are taken out) last year (2006)? <i>Your best estimate is fine.</i>	- \$0 - \$1 - \$2,500 - ...(\$2,500 intervals)... - \$4,751 - \$50,000 - \$50,001 or more	Dichotomous - \$15,000 or less - More than \$15,000
Chronic condition	Have you ever been told by a doctor or other health professional that your child has any of the following?	- Asthma - Diabetes or sugar diabetes - Another chronic health condition	Dichotomous - Chronic condition - No chronic condition
Geographic Location	N/A - Determined from zip code using state administrative data	Applied RUCA codes (1-10)	Dichotomous - Urban = RUCA 1-6 - Rural = RUCA 7-10
Application Type	N/A - Determined from state administrative data	- Re-applicant - New Applicant	Dichotomous

Research Question #2:

For the second specific aim, the outcome of interest was the presence of a six-month insurance gap. A gap of this duration would have included the entire study period between application and survey. The comparison group consisted of individuals who had at least one month of health insurance during this period. The primary independent variable of interest was OHP application outcome using a three-level categorical variable to allow for multiple comparisons. Contingency tables were constructed to identify potential confounders or effect modifiers of this relationship. Backward step-wise multivariable logistic regression was performed with variables considered for inclusion if they were associated with the dependent or independent variable with a p-value of <0.25 from the weighted contingency table analysis. Successive eliminations were performed on the basis of statistical significance and hypothesized effect as suggested by Hosmer and Lemishow.⁴¹ After a model was selected, an interaction between application status and application type was considered and evaluated for fit in the model. This model was then tested for goodness-of-fit with an F-adjusted mean residual test⁴² because the complex sampling methods did not permit evaluation with traditional Hosmer-Lemishow goodness-of-fit tests⁴¹.

Table 5: Categorization of variables for research question #2

Measurement	Survey Question	Potential Responses	Variable Type
Primary Dependent Variable			
Health Insurance Gap	For how many of the last six months did your child have health insurance?	- No insurance during the last 6 months - 1 month - 2 months - 3 months - 4 months - 5 months - Insured for all of the last 6 months	Dichotomous - <i>Uninsured for past 6 months</i> - <i>Uninsured for 5 months or less.</i>
Primary Independent Variable			
OHP application status	N/A - Determined from state administrative data	- Denied for inability to document citizenship - Denied for other reasons - Accepted	Categorical - <i>Accepted</i> - <i>Denied – CID</i> - <i>Denied – Other</i>
Confounders/Effect Modifiers			
All variables from Table 4 were considered potential confounders for model inclusion			

Research Question #3:

For the third specific aim, the general outcome of interest was difficulty accessing medical care. Several dimensions of access to health care were preliminarily examined, including: use of the emergency department in the last six months, having a medical visit in the last six months, having unmet health care needs, having current debt because of medical bills, having difficulty paying medical bills, and a change in health over the past six months. Of these outcomes, we were specifically interested in the presence of “unmet health care needs” which we defined as a “no” response to any of three questions regarding receipt of needed care (See Table 6 below). Only those who needed medical, dental, or prescription care over the past six months were considered for this analysis. The majority of the analysis was limited to this dependent variable. Contingency

tables were constructed to identify any potential confounders of this primary relationship of interest. These included demographic variables examined in research question #1. The variable for insurance gap in research question #2 and a variable for usual source of care from research question #3 were considered for potential mediation of the primary relationship of interest. Because insurance status was expected to have a very large influence on access to health care, an interaction term was created between the insurance gap variable and the application status variable. The interaction term between application status and application type (from research question #2) was also considered. Backward step-wise multivariable logistic regression was performed with variables considered for inclusion if they were associated with the dependent or independent variable with a p-value of <0.25 from the weighted contingency table analysis. Successive eliminations were performed on the basis of statistical significance and hypothesized effect as suggested by Hosmer and Lemishow.⁴¹ After a preliminary model was selected, variables for insurance gap and usual source of care were added individually to the model and then in combination to elucidate the nature of there relationships to unmet health care need. Each model was then tested for goodness-of-fit with an F-adjusted mean residual test⁴² because the complex sampling methods did not permit evaluation with traditional Hosmer-Lemishow goodness-of-fit tests⁴¹.

Table 6: Categorization of variables for research question #3

Measurement	Survey Question	Potential Responses	Variable Type
Primary Dependent Variable			
Health Care Access (combined variable)	1. If your child needed medical care in the last six months, did he or she get ALL the medical care that was needed?	-Yes -No	Dichotomous - Unmet needs (Yes, to one or more of the 3 questions) - No unmet needs (No to at least 1 of the 3 questions with the remaining indicating care was not needed)**
	2. If your child needed prescription medications in the last six months, did he or she get ALL the needed medications?	-Yes -No	
	3. If your child needed dental care in the last six months, did he or she get ALL needed care?	-Yes -No	
Independent Variables			
OHP application status	N/A - Determined from state administrative data	- Denied for inability to document citizenship -Denied for other reasons -Accepted	Categorical - <i>Accepted</i> - <i>Denied – CID</i> - <i>Denied – Other</i>
Confounders/Effect Modifiers			
All variables from Table 4 were considered potential confounders for model inclusion.			
Insurance Gap was presumed to be a mediator and was individually to the preliminary selected model. It was also evaluated for possible effect modification			
Usual source of care was presumed to be a mediator and was added individually to the preliminary selected model.			

** Children with no reported medical, dental, or prescription care over the past six months were excluded from the analysis.

Combined Variables:

From the analysis of independent variables, strong associations were observed between race and ethnicity (OR=5.8) and between employment and income (OR=3.2). Weaker associations were seen between education and income (OR=1.7), and between education and employment (OR=1.6). Because of these findings we created two combined variables – one linking race and ethnicity, and one linking poverty, income and education. The newly created race/ethnicity variable was defined as black and/or Hispanic compared to white and non-Hispanic. An ordinal variable for social vulnerability was created with a scale of 0-3 with one point for each of the following – household income < \$15,000/year, parent's education ≤ high school, and parent currently unemployed. Significant associations were also observed between birthplace and race, birthplace and employment, and birthplace and income. Despite these associations, it was felt that birthplace was conceptually different than both social vulnerability and race, so it was kept separately.

Missing Data:

Surveys with missing data were excluded from the analysis only if missing data pertained directly to the research question being addressed. For the multivariable models selected, this included survey questions pertaining to sex, age, race, ethnicity, income, education, employment, health insurance, usual source of care, unmet healthcare needs, and presence of chronic health conditions. We conducted an analysis of respondents with missing data compared to those without missing data to evaluate for systematic differences among those who were excluded. There were 56 respondents (14%) who were excluded from further analysis because of missing pertinent data. Imputations were not used due to the unreliability of these estimates when used with a complex weighted analysis of survey data. Those who did not complete the selected questions were more likely to have less than or equal to a high school education and were more likely to be responding to the survey for a non-white child over the age of 10 (see table 5A in the appendix). Although these differences were statistically significant, they were not expected to substantially alter the study results because this group made up a relatively small proportion (14%) of survey respondents and respondents with missing data did not differ from others with regard to the dependent variables (health insurance and unmet healthcare need).

IV. RESULTS:

During the three-month sampling window 104,375 children applied for the Oregon Health Plan. From this group, a target number of 3300 were selected to participate. Because not all strata had the desired 550 children, only 3051 children could be sampled. Sampling is described in Figure 1 of the Methods. Of those selected, 611 were eliminated because the screening mailer was returned without a forwarding address. Of these children, only 2065 were eligible to participate based on selection criteria described in Table 1 of the Methods. Finally, 394 children participated in the study by returning a completed survey. The response rate was 19%. This response rate is slightly lower than other surveys of the Medicaid population,^{8, 43, 44} but this was expected due to the particular vulnerability and predicted instability of this target population. The scope of this study also did not permit telephone follow-up that was possible in other studies. The incremental selection of participants is described in Table 7 below and shows that study exclusion and survey non-response affected each stratum of children approximately equally. Overall, accepted children were slightly more likely to participate and children denied for reasons other than citizenship documentation were slightly less likely to participate. Most of this effect however was due to disproportionate survey inclusion/exclusion based on presence of a valid address in these groups. The response rates were actually approximately equal within each stratum. The non-response weights account for these differences and approximately weight each stratum back to its population level as shown with the weighted percentages in Table 7 below.

Table 7. Survey Respondents - Weighted and Unweighted (column percentages)

Strata	Identified Population	Sample	Valid Address	Eligible	Responded	Weighted
New Applicant: Accepted	32,860 (31.4%)	550 (18%)	539 (22%)	461 (22%)	92 (23%)	31.88%
Re-Applicant: Accepted	64,299 (61.6%)	550 (18%)	538 (22%)	473 (22%)	102 (26%)	60.71%
New Applicant: Denied CID	301 (0.28%)	301 (10%)	184 (8%)	147 (7%)	24 (6%)	0.27%
Re-Applicant: Denied CID	577 (0.55%)	550 (18%)	371 (15%)	322 (16%)	61 (16%)	0.59%
New Applicant: Denied Other	5,689 (5.4%)	550 (18%)	489 (20%)	395 (19%)	64 (16%)	6%
Re-Applicant: Denied Other	649 (0.62%)	550 (18%)	319 (13%)	267 (13%)	51 (13%)	0.65%
TOTAL	104,375 (100%)	3051 (100%)	2440 (100%)	2065 (100%)	394 (100%)	100%

Survey participants ranged in age from 1 month to 18 years with a median age of 8 years. They were 69% white, 32% Hispanic, and 92% born in the United States. Approximately 24% of children had a chronic health condition such as asthma or diabetes. Households from which the children came had a median income of \$12,500-\$15,000 per year. Of the parents or guardians filling out the survey, 68% had less than or equal to a high school education and 43% were currently unemployed. Approximately 20% of the surveys were conducted in Spanish based on the

preferred language of the parent or guardian who filed the Medicaid application. As a whole, the surveyed population was more likely to be non-white and Hispanic compared to the general population of Oregon,⁴⁵ but reflected the population of children on the Oregon Health Plan at the time.⁴⁶

Research Question #1: What factors are associated with Medicaid denial for inability to document citizenship?

From our weighted sample, children who were denied for inability to document citizenship were generally white (69%), non-Hispanic (66%), under the age of ten (70%), and from English-speaking households (83%). The vast majority (97%) were born in the United States and were therefore US citizens based on their report.

Approximately 20% reported having chronic health conditions such as asthma or diabetes. These kids typically came from poor households with 51% having income less than \$15,000 per year. The federal poverty level for a two-person household is \$14,570⁴⁷ so this proportion of children almost certainly fell at or beneath the federal poverty level although precise information regarding household size was not available. Parents or guardians of these children tended to have no education beyond high school (72%). According to zip code based RUCA (rural-urban commuting area) codes from the 2000 census about 92% of kids denied for inability to document citizenship came from urban areas. We applied a conservative definition of “urban” (RUCA<7, or town >10,000) to allow adequate sample size for analysis so this may be a slight underestimate.

Contingency table analysis compared the weighted characteristics of children from each application status group (see Table 8 below). The unweighted analysis was highly similar and is included for reference in the appendix. Groups differed in application type ($p<0.0001$), income ($p=0.0005$), and presence of a chronic health condition ($p=0.0231$). Trends were also seen for employment ($p=0.0675$), geographic location ($p=0.1091$), preferred language ($p=0.1449$), and child’s sex ($p=0.2341$). Although these p-values only indicate significant global differences between the three groups, we can make some generalizations using these in combination with proportions in Table 8. Generally, kids denied for inability to document citizenship were more likely than kids denied for other reasons to have a chronic health condition and come from English-speaking households making less than \$15,000 per year. At the same time, they were slightly less likely than kids who were accepted for coverage to come from households earning less than \$15,000 per year. The group denied for inability to document citizenship also had a greater proportion of kids under the age of ten than either reference group, but this finding was not statistically significant. The distribution of race, ethnicity, and education were similar among all three application status groups.

Table 8: Weighted Characteristics of children who applied for Medicaid (column percentages)

Independent Characteristics	Application Status			Design Based F Test p-value
	Accepted	Denied-CID	Denied-Other	
Application Type				p<0.0001**
New Applicant	34.43%	31.31%	91.47%	
Re-applicant	65.57%	68.69%	8.53%	
Child's Sex				0.2341*
Male	49.52%	52.77%	59.09%	
Female	50.48%	47.23%	40.91%	
Child's Age				0.5411
<10 years	56.25%	70.12%	54.96%	
≥10 years	43.75%	29.88%	45.04%	
				0.696
≤2 years	85.61%	79.94%	83.79%	
>2 years	14.39%	20.06%	16.21%	
Language †				0.1449*
English	79.92%	82.96%	70.32%	
Spanish	20.08%	17.04%	29.68%	
Child's Ethnicity				0.9203
Non-Hispanic	65.07%	65.56%	63.92%	
Hispanic	34.93%	34.44%	36.08%	
Child's Race				0.3288
White	70.45%	69.16%	63.00%	
Non-white	29.55%	30.84%	37.00%	
Race/Ethnicity†				0.8122
White, Non-Hispanic	55.02%	57.05%	52.65%	
Non-white or Hispanic	44.98%	42.95%	47.35%	
Child Born in the US				0.4330
No	7.43%	2.92%	10.19%	
Yes	92.57%	97.08%	89.81%	
Household Income				0.00054**
>\$15,000/year	37.73%	48.71%	58.76%	
<\$15,000/year	62.27%	51.29%	41.24%	
Parent's Employment				0.0675*
Unemployed	45.99%	39.83%	31.55%	
Employment	54.01%	60.17%	68.45%	
Parent's Education				0.9762
>High School	28.11%	28.27%	27.72%	
≤High School	71.89%	71.73%	72.28%	
Social vulnerability scale (0-3) ††				0.0746*
0	9.47%	12.87%	11.18%	
1	31.69%	30.72%	47.7%	
2	30.31%	35.3%	28.92%	
3	28.53%	21.1%	12.21%	
Child has Chronic Disease				0.0231**
No	75.47%	78.46%	87.98%	
Yes	24.53%	21.54%	12.02%	
Location				0.1091*
Urban (RUCA 1-6)	89.97%	91.67%	91.89%	
Rural/Small Town (RUCA 7-10)	10.03%	8.33%	8.11%	

*denotes p<0.25;

**denotes p<0.05;

† Combined variable for Race and Ethnicity

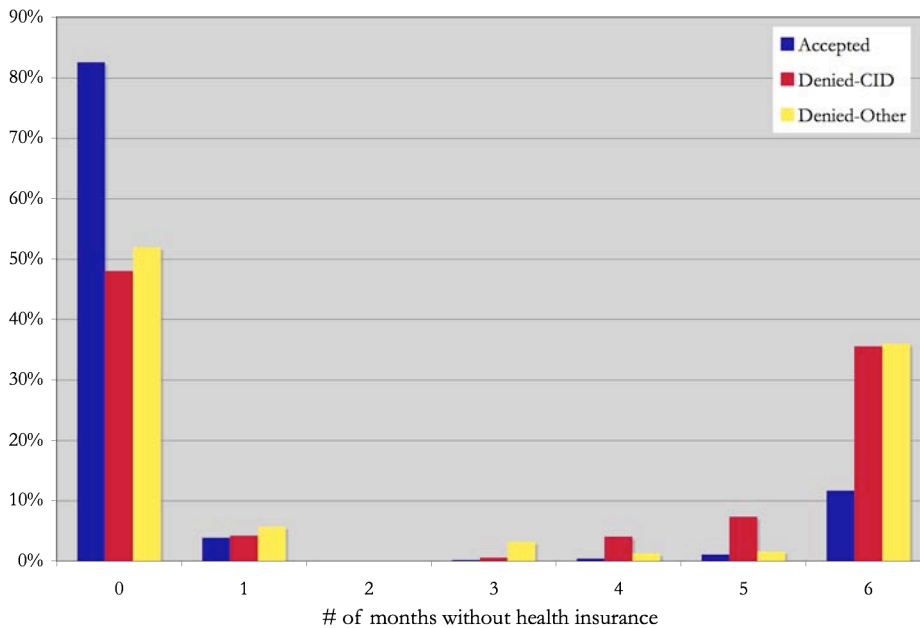
†† Combined variable for Employment, Education, and Income

Contingency tables were also stratified to evaluate for differences based on application type. Significant differences were not observed, so we concluded that application type is not a significant effect modifier of the association between individual characteristics and application status. The stratified analysis can be found in the appendix. Simple logistic regressions were then used to make these individual comparisons between each application status group. The application status variable was dichotomized to compare kids denied for inability to document citizenship to (1), accepted kids, and (2) kids denied for other reasons. The same trends described above were appreciated, but none of the associations achieved statistical significance at the level of $p < 0.05$. This was expected because the sample size and thus the statistical power decreased with dichotomizing the dependent variable. Unweighted and weighted simple regressions are shown in the appendix.

Research Question #2: Is Medicaid denial for inability to document citizenship associated with six-month insurance gaps?

Of the children denied Medicaid coverage for inability to document citizenship, approximately 36% reported receiving no health insurance over the course of the six months following their denial. Similarly, approximately 36% of children denied Medicaid for other reasons reported having no health insurance coverage over that period. The distribution of months without insurance is shown graphically in Figure 2 below.

Figure 2. Prevalence of insurance gap by application outcome



Several trends are notable from this chart. First, the vast majority of children in all three “application status” groups were likely to be either insured continuously or continuously uninsured. Because of this distribution, our analysis was primarily limited to dichotomous comparisons between children with six full months without

insurance to children with any insurance coverage during that time. Second, both denied groups have small proportions (~10%) that report an insurance gap of only three to five of the previous six months. This likely represents the “churning” effect of children on and off Medicaid and on and off of health insurance in general. Grossly, it appears that children denied for inability to document citizenship status were more likely to acquire insurance after four to five months while children denied for other reasons were more likely to have a gap of only three months. This slight lag might represent a longer duration required to obtain a birth certificate compared to other missing documentation. Unfortunately, the sample size did not permit in depth analysis of children who obtained some insurance during the six-month study period. Finally, the group of children denied for inability to document citizenship behaves very similarly to children denied for other reasons. As such, they are equally likely to remain continuously uninsured, which refutes the hypothesis that citizenship documentation requirements only increased churning without contributing to significant gaps in health insurance.

Contingency tables were used to assess the relationship between application status and presence of a six-month insurance gap as well as to identify potential confounders of this relationship. Findings are described in Table 9 below. Factors significantly associated with the presence of a six-month insurance gap included application status ($p < 0.001$), female sex (0.0009), being non-white and/or Hispanic ($p = 0.0049$), and being born outside the US ($p = 0.0144$). Being a new applicant to OHP and the absence of a chronic disease showed trends toward association with $p < 0.25$, but did not achieve statistical significance at the $p < 0.05$ level.

Table 9: Potential confounders of the relationship between application status and presence of a 6-month insurance gap (row percentages)

Characteristic	Health insurance over the six months following OHP application		Design Based F-Test p-value
	At least 1 month with insurance	No insurance	
Application Status			p<0.0001**
Accepted	88.32%	11.68%	
Denied - CID	64.42%	35.58%	
Denied - Other	63.96%	36.04%	
Potential Confounders:			
Application Type			0.0609*
New Application	80.66%	19.34%	
ReApplication	90.22%	9.78%	
Child's Age			0.4217
<10 years	86.35%	13.65%	
≥10 years	89.99%	10.01%	
Sex			0.0009**
Male	94.37%	8.16%	
Female	81.6%	18.4%	
Race/Ethnicity†			0.0049**
White/Non-Hispanic	92.97%	7.01%	
Non-white or Hispanic	80.04%	19.96%	
Born in the US			0.0144**
Yes	89.23%	10.77%	
No	69.52%	30.48%	
Social vulnerability scale††			0.4701
0	95.09%	4.91%	
1	89.08%	10.92%	
2	87.00%	13.00%	
3	83.19%	16.81%	
Child has a chronic disease			0.2265*
Yes	91.47%	8.53%	
No	85.06%	14.94%	
Location			0.9522
Urban	86.52%	13.48%	
Rural	86.92%	13.08%	

*denotes p<0.25, included in main effects model

**denotes p<0.05

† Combined variable for Race and Ethnicity

†† Combined variable for Employment, Education, and Income

As we built a multivariable model, the preliminary main effects model included sex, age, race/ethnicity, birthplace, social vulnerability, geographic location, and presence of a chronic condition as initial potential confounders. Eight models were considered and variables excluded in a backward stepwise fashion. The sixth model was selected to be the final model. This model building process is described in depth in Table 6A in the appendix and the final adjusted model is shown in Table 10 below.

Table 10. Adjusted odds ratios for six-month insurance gap

Independent Variable	OR	95% CI	p-value
Application Status:			
Accepted	1.0	--	--
Denied-CID	8.32	2.97 - 23.26	<0.001
Denied-Other	7.97	3.13 - 20.26	<0.001
Child's sex			
Male	1.0	--	--
Female	6.23	2.43 - 16.03	<0.001
Race/Ethnicity			
White, non-Hispanic	1.0	--	--
Non-white or Hispanic	2.66	0.98 - 7.22	0.054
Socioeconomic Status			
0	1.0	--	--
1	2.28	0.36 - 14.31	
2	2.77	0.42 - 18.30	0.264
3	5.66	0.86 - 37.48	

Not all variables in the final model achieved statistical significance (race/ethnicity and social vulnerability in particular). These variables were included in the final model because they were felt to have significant theoretical contribution to a child's ability to attain insurance coverage. In fact, when social vulnerability was eliminated, the odds ratios of the other variables changed significantly (see Table 6A in the appendix), suggesting that social vulnerability was contributing positively to the model despite its lack of statistical significance. Application type (new vs. re-application) was also considered to be theoretically significant and was similarly considered for model inclusion despite lack of statistical significance. Application status, however, was not included in the final model. Comparison of models with and without reapplication status showed that, while it did confound the relationship between application status and insurance gap, it primarily affected the point estimate for the odds ratio among kids denied for CID versus kids denied for other reasons. Stratified contingency table analysis was performed to further evaluate this relationship and revealed that application type acted as an effect modifier of the relationship between application status and six-month insurance gap (See Table 11, below).

Table 11. Application Status versus six-month Insurance Gap, stratified by application type – unweighted (row %)

Independent Variables	Health insurance over the six months following OHP application		Odds of 6-month insurance gap	Odds Ratio
	0-5 month gap	6-month gap		
Accepted:				
New Applicant	78 (84.3%)	14 (15.7%)	0.18	1.0
Re-Applicant	92 (90.2%)	10 (9.8%)	0.11	0.61
Denied-CID				
New Applicant	13 (54.2%)	11 (45.8%)	0.85	1.0
Re-Applicant	41 (67.9%)	20 (32.1%)	0.49	0.58
Denied - Other				
New Applicant	37 (58.3%)	27 (41.7%)	0.73	1.0
Re-Applicant	44 (85.7%)	7 (14.3%)	0.16	0.22

For all groups, new applicants were more susceptible to a six-month insurance gap, but this difference is much more pronounced among children denied for other reasons. Because of this, an interaction term for application type was considered, but there was not adequate cell size to develop a reliable model including the interaction term. Consequently, application type was not included in the final model (Table 10 above). The remaining effect modification by application type is considered a limitation of this analysis and is explained further in the discussion. A Hosmer-Lemishow F-adjusted mean residual test was performed to assess the goodness of fit of the final model. It produced a test statistic of 0.19 with a p-value of 0.99. This indicated no evidence for lack of fit in this model and encouraged us that the final selected model was appropriate for evaluating the relationship between application status and insurance gap.

Based on this adjusted model, we conclude that when other factors are held constant, children denied Medicaid coverage for inability to document citizenship are approximately eight times more likely than kids accepted for coverage to have a six-month insurance gap. This finding is self-evident in their application status and is not exceedingly informative. More interestingly, children denied for inability to document citizenship and children denied for other reasons are approximately equally likely to have a six-month gap in insurance. Comparing these two groups, children denied for inability to document citizenship are actually slightly more likely to have a six-month insurance gap though this difference is not statistically significant. These data are thus sufficient to refute the hypothesis that children denied for this inability to document citizenship suffer only small, insignificant gaps in health insurance. Based on these data, they are as likely or possibly more likely, to suffer prolonged gaps in health insurance than children denied for other reasons.

The confounding factors identified were mostly anticipated. Previous studies have identified race/ethnicity and social vulnerability as risk factors for insurance gaps and our study confirms this.^{48, 49} The relationship of the child’s sex and subsequent gap in health insurance was unexpected and is difficult to explain. Because children were sampled at random and data were weighted to account for demographic differences between responders

and non-responders, it is unlikely that this represents an error in sampling. Since male children are at slightly higher risk for medical problems in childhood including both special health care needs and injuries, it was considered that the difference represented a greater need for health insurance among male children. Proportions of children with chronic health conditions and children requiring medical, prescription, and/or dental care during the study period did not differ based on the sex of the child, which refuted that hypothesis. A retrospective analysis of covariance with other demographic variables was also conducted. Male and female children were similar in terms of race/ethnicity, household income, and parent’s education and employment. They differed, however, in their likelihood of being born outside the US and having Spanish as a preferred language in the household ($p<0.05$), though they did not differ in their likelihood of being denied Medicaid for inability to document citizenship. Female children were nearly eight times more likely to have been born outside the US and approximately twice as likely to have parents whose preferred language is Spanish. Although language was not considered in the multivariable analysis (due to high correlation with race/ethnicity), and birthplace did not achieve statistical significance -- likely due to small cell size -- the gender-based differences in presence of an insurance gap may be largely attributable differences in nation of birth and degree cultural assimilation. The underlying association between female children in our sample and birth outside the US could represent cultural differences in priorities for enrollment for Medicaid and merits further examination.

Research Question #3: Is denial for inability to document citizenship associated with poor access to health care?

Of the 394 survey respondents, 328 (83%) reported that in the past 6 months their child needed medical, dental and/or prescription care. Of those who needed any type of care, 267 (81%) reported that they received all needed care. Children were generally more likely to receive needed medical and prescription care, 80% and 82% respectively, than they were to receive needed dental care, which only 58% of children received.

Table 12: Access to Healthcare (unweighted):

Type:	# Needed Care out of 394	# Received Care (%)
Medical care	257	206 (80%)
Dental care	207	121 (58%)
Prescription care	212	173 (82%)

Children who were denied coverage with Medicaid were more likely than children who were accepted for coverage to unmet healthcare needs of any kind ($p<0.0001$). This finding applied to both children who were denied for the inability to document citizenship and those denied for other reasons. This finding continued to be significant when healthcare needs were divided into medical ($p=0.0082$), prescription ($p<0.0000$), and dental ($p=0.0002$) needs. For each of these categories of healthcare, children denied coverage for inability to document citizenship were significantly more likely to have unmet needs than children accepted for coverage with the exception of unmet prescription need where the association did not achieve statistical significance. Based on the

contingency table analysis shown in Table 13 below, children denied for inability to document citizenship appear to be slightly less likely to have unmet healthcare needs in each category than children denied for other reasons. None of these differences were statistically significant when evaluated dichotomously with simple logistic regression.

Although unmet healthcare need was the primary outcome of interest, several other dimensions of access to care were also evaluated. These additional aspects and their association with application status are listed in Table 13 below. Of particular note, children denied for inability to document citizenship, similar to those denied for other reasons, are more likely to have had no medical visit in the past six months, to have trouble paying medical bills and to report having significant medical debt. However, they are more likely than kids denied for other reasons to have a usual source of care. Despite this, they are more likely than all other children to have had an emergency department visit in the past six months and to report that their health has declined over the past six months. These findings did not uniformly achieve statistical significance and a more in depth analysis was beyond the scope of this study, but they do indicate that the group of children denied for inability to document citizenship is unique to both other groups.

Table 13: Measures of access associated with application status (weighted)

Dependent	Application Status			Design based F test p-value
	Accepted	Denied CID	Denied Other	
Any unmet health care needs (1-3 below)				P<0.00**
Yes	11.02%	26.47%	36.47%	
No	88.98%	73.53%	63.53%	
1. Skipped needed medical care				0.0082**
Yes	12.37%	25.39%	31.87%	
No	87.63%	74.61%	68.13%	
2. Skipped needed prescription care				P<0.001**
Yes	16.24%	22.57%	10.78%	
No	83.76%	77.43%	89.22%	
3. Skipped needed dental care				0.0002
Yes	26.31%	53.12%	59.87%	
No	72.69%	46.88%	40.13%	
Medical Visit in past 6 months				0.0353**
Yes	79.17%	69.5%	65.27%	
No	20.83%	30.5%	34.73%	
ED Visit in the past 6 months				0.3047
Yes	18.41%	21.42%	12.59%	
No	81.59%	78.78%	87.41%	
Child has a usual source of care				0.0264**
Yes	88.67%	87.68%	76.3%	
No	11.33%	12.32%	23.7%	
Change in child's health in past 6 month				0.3484
Same/Better	96.33%	89.09%	96.0%	
Worse	3.67%	10.91%	4.0%	
Trouble paying medical bills				0.0013**
No	86.39%	70.22%	69.79%	
Yes	13.61%	29.78%	30.21%	
Current Medical Debt				P<0.001**
No	82.68%	62.86%	57.51%	
Yes	17.32%	37.14%	42.49%	

*denotes p<0.25
**denotes p<0.05

Potential confounders of the relationship between application status and unmet healthcare need were evaluated and are described in Table 14 below. Factors significantly associated with the presence of unmet healthcare need included application status (p<0.0001) and presence of a six-month insurance gap (p<0.0001). Being a new applicant to OHP showed trend toward significance with p=00609. The variables associated with unmet healthcare need, along with those associated with application status at the p<0.25 level, were added to a preliminary main effects model for multivariable logistic regression. This model included application type, social vulnerability, geographic location, and presence of a chronic condition as potential confounders of the underlying relationship between application status and unmet healthcare need.

Table 14: Potential confounders of the relationship between application status & unmet healthcare need (row %)

Characteristic	Healthcare need over the six months following OHP application		Design Based F-Test p-value
	No unmet needs	Unmet needs	
Application Status			<0.0001**
Accepted	88.98%	11.02%	
Denied - CID	73.53%	26.47%	
Denied - Other	36.47%	63.53%	
Potential Confounders:			
Application Type			0.0609*
New Application	80.66%	19.34%	
ReApplication	90.22%	9.78%	
Child's Age			0.9342
<10 years	87.49%	12.51%	
≥10 years	87.08%	12.92%	
Sex			0.6185
Male	88.69%	11.31%	
Female	86.25%	13.75%	
Race/Ethnicity			0.6891
White/Non-Hispanic	87.72%	85.63%	
Non-white or Hispanic	12.28%	14.37%	
Born in the US			0.3330
Yes	87.23%	12.77%	
No	92.66%	7.34%	
Social vulnerability scale			0.5331
0	78.35%	21.65%	
1	86.67%	13.33%	
2	86.85%	13.15%	
3	92.24%	7.76%	
Child has a chronic disease			0.6704
Yes	85.42%	14.58%	
No	87.95%	12.05%	
Location			0.8734
Urban	87.42%	12.58%	
Rural	86.17%	13.83%	
Insurance Gap			<0.0001**
Continuously uninsured	56.03%	43.97%	
At least 1 month of insurance	92.44%	7.56%	

*denotes p<0.25

**denotes p<0.05

A total of five main effects models were considered. The preliminary model selection process is shown in Table 8A in the appendix. The selected preliminary model (Model 4) included social vulnerability, which did not achieve statistical significance, but was left in the model because it was felt to have sufficient theoretical potential for confounding. As with research question #2, application type was also considered to have theoretical potential for confounding, but was not included in the final model because its moderate covariance with application status and insurance gap led to instability in the model and there was not adequate cell size to pursue control for potential interaction. After selecting a preliminary model, we added the variable for presence of an insurance gap to see if any relationship would persist between application status and unmet healthcare need after controlling for the effects of continuous lack of insurance over the six-month study period. Because having a source of usual care was also highly associated with application status and unmet health care needs, we also added this variable independently to the preliminary model. These additions and the joint addition of both variables for insurance gap and usual source of care (USOC) are shown in Tables 15 and 16 below.

Table 15. Comparison of models for presence of any unmet healthcare needs – Odds Ratio (95% CI)

Independent Variable	Preliminary Model:	Prelim Model + InsGap:	Prelim Model + USOC:	Prelim Model + InsGap & USOC:
Application Status:				
Accepted	1.0	1.0	1.0	1.0
Denied-CID	2.47 (1.01 - 6.01)	1.65 (0.53 - 5.18)	2.41 (0.92 - 6.33)	1.90 (0.56 - 6.46)
Denied-Other	4.12 (1.64 - 10.35)	3.03 (1.01 - 9.03)	3.53 (1.49 - 8.32)	2.71 (0.93 - 7.84)
Socioeconomic Status				
0	1.0	1.0	1.0	1.0
1 risk factor	0.06 (0.11 - 2.66)	0.34 (0.06 - 1.88)	0.41 (0.09 - 1.99)	0.20 (0.05 - 1.40)
2	0.56 (0.11 - 2.83)	0.40 (0.06 - 2.59)	0.44 (0.08 - 2.32)	0.33 (0.05 - 2.22)
3	0.33 (0.06 - 1.86)	0.14 (0.02 - 1.20)	0.26 (0.04 - 0.64)	0.13 (0.02 - 1.07)
Six-month Insurance Gap				
< 6 month gap or no gap	--	1.0	--	1.0
6+ month insurance gap	--	12.32 (3.85 - 39.47)	--	10.48 (3.03 - 36.19)
Usual Source of Care				
No	--	--	1.0	1.0
Yes	--	--	0.20 (0.06 - 0.64)	0.25 (0.06 - 0.98)

Table 16. Comparison of models for presence of any unmet healthcare needs – p-values for independent variables

Independent Variable	Preliminary Model:	Prelim Model + InsGap:	Prelim Model + USOC:	Prelim Model + InsGap & USOC:
Application Status	0.007	0.133	0.012	0.165
Social vulnerability	0.659	0.341	0.524	0.274
Insurance Gap	----	0.000	----	0.000
Usual Source of Care	----	----	0.007	0.046

Each of these models contributes significantly to our understanding of the complex relationships between application status, insurance status, access to a usual source of care, and the ability of a child to fulfill their health care needs. Most importantly, these models agree that being denied Medicaid for inability to document

citizenship and being denied for other reasons both lead to unmet health care needs in Oregon children. They also indicate that the presence of insurance and the presence of a usual source of care can, both individually and jointly, attenuate the negative effects of having a denied Medicaid application; although only the addition of health insurance makes the relationship between application status and unmet health care needs insignificant.

Because health insurance and access to a usual source of care are highly collinear ($p < 0.001$), a model containing both variables is highly unstable with an F-adjusted mean residual p-value < 0.001 , and is thus not a desirable predictive model even though both variables are independently associated with unmet healthcare needs. Consequently, we chose to continue the model building process with only the variable for health insurance in the model. To this model, we added an interaction term for insurance gap and application status because we hypothesized that presence of an insurance gap could modify the effect of application status on unmet health care needs. This term did not achieve statistical significance and was therefore ultimately left out of the selected model. The final selected model therefore is the model labeled "Preliminary model + Insurance Gap" shown in Tables 15 and 16. An F-adjusted mean residual test was performed to assess the goodness of fit of the final model and produced a test statistic of 0.30 with a p-value of 0.975. This indicates no evidence for lack of fit in this model and reassures us that this is an acceptable model from which to evaluate the relationship between application status and unmet healthcare need.

From this model we can conclude that, adjusting for social vulnerability, children denied Medicaid for inability to document citizenship have approximately twice the odds ($OR = 2.47$) of having unmet health care needs as children accepted for coverage. They are approximately equally as likely as children denied for other reasons to have unmet healthcare needs. The point estimate of the odds ratio of unmet health care need is slightly lower for children denied for CID ($OR = 2.47$) compared to those denied for other reasons ($OR = 4.12$); however, the confidence intervals overlap and a comparison between these two groups shows that any small differences in unmet health care needs were insignificant. Although it is possible that this observation is simply due to chance, the persistence of the trend throughout the modeling process and magnitude of the difference in odds ratios suggests that an underlying association might exist. First, it is important to notice that children denied for inability to document citizenship were more likely to have a source of primary care than children denied for other reasons. In fact, when usual source of care is controlled for in the model (shown in Tables 15 and 16 above) the point estimates of the odds ratios for having unmet health care need among kids denied for CID and kids denied for other reasons move significantly closer together ($OR = 2.41$ and $OR = 3.53$, respectively). The residual differences might be explained if children who are denied for inability to document citizenship were simply more connected to health care resources that do not require health insurance. It is also possible that this group was simply less likely to need health care and therefore did not have the opportunity to demonstrate a lack of needed care. Interestingly, based on contingency table analysis (Table 13), children denied Medicaid for inability to document citizenship were more

likely that children denied for other reasons to have utilized the emergency department in the past six months. It is possible that because children were able to obtain needed care at the ED, there was not a perceived “lack of needed care.” Regardless, this relationship deserves further study, especially as it regards the nature of health care received after Medicaid denial.

As expected, the presence of an insurance gap accounts for the majority of the observed association between application status and unmet health care needs. When the model is adjusted for presence of a six-month gap, the relationship between application status (as a whole) and unmet health care needs loses statistical significance. The point estimates for the odds ratios remained elevated though, indicating that some residual effect may be present even though it was not statistically detectable. Quite possibly, this residual effect is due to the influence of children who lost insurance for less than six-months, since they are combined with children having continuous insurance in this dichotomous analysis. Previous studies have observed significantly greater unmet health care needs among children with as little as a 1-4 month gap in insurance.⁹ Although a complete analysis of gap length and health care access was beyond the scope of this study, a cursory analysis showed that changing the variable for insurance gap to separate out children with intermediate lengths of insurance between 1 and 5 months led to a significant decrease in this observed residual effect as shown in Table 17 below.

Table 17. The effects of intermediate length insurance gaps

Independent Variable	Final Selected Model	p-value	Model controlling for intermediate insurance gaps	p-value
Application Status:				
Accepted	1.0		1.0	
Denied-CID	1.66 (0.53 - 5.19)	0.133	0.99 (0.27 – 3.66)	0.454
Denied-Other	7.97 (1.02 - 9.03)		2.08 (0.63 – 6.91)	
Socioeconomic Status				
0	1.0		1.0	
1 risk factor	0.34 (0.06 - 1.88)	0.341	0.32 (0.05 – 2.05)	0.340
2	0.40 (0.06 - 2.59)		0.43 (0.05 – 3.44)	
3	0.14 (0.02 - 1.20)		0.13 (0.01 – 1.33)	
Six-month Insurance Gap				
Continuous insurance	1.0		1.0	
1-5 month insurance gap		<0.001	15.24 (3.3 – 70.11)	<0.001
6+ month insurance gap	12.32 (3.85 - 39.47)		17.38 (4.99 – 60.52)	

Small sample size limited the stability of the model adjusting for intermediate gap lengths shown above, but the results, interpreted as preliminary findings, are still powerful. They suggest that even small gaps of 1-5 months are independently associated with about 15 times the odds of having unmet health care needs. This finding certainly merits further evaluation because of both its magnitude and its great utility to policy makers.

V. DISCUSSION:

Our study supports Oregon's previous descriptive study in the conclusion that children affected by this policy are likely to be primarily U.S. citizens. Compared to children who were accepted for coverage (who are definitely U.S. citizens) children denied for inability to document citizenship were no more likely to be racial or ethnic minorities, no more likely to be born outside the U.S., and no more likely to have parents who prefer Spanish language. While further determination of citizenship was beyond the scope of this study, these characteristics, and the consistency of similarities with accepted children, strongly suggest that affected children are in fact U.S. citizens. Demographically, children denied for inability to document citizenship also resemble children who were accepted for coverage. Both groups are more likely than children denied for other reasons to have an annual household income under \$15,000, to have parents who are unemployed, and to have a chronic health condition such as asthma, diabetes, or other special health care needs. This means that not only are the affected children individuals that would have likely been otherwise accepted, they are also both socially and medically vulnerable, making their denial of benefits all the more significant. Children denied for inability to document citizenship were also much more likely to be re-applicants to the OHP system. This indicates that they come from families that had previously been successful navigating the complex application process, which speaks strongly to the burden of this particular requirement.

As expected, children denied for inability to document citizenship tend to experience gaps in insurance. More importantly, at least one-third of these children have insurance gaps of at least six months, a duration already shown to lead to significant detrimental effects on access to health care in children.^{8,9,23} In fact, children denied for inability to document citizenship are at least as likely as children denied for other reasons to be continuously uninsured over the six months following their denial. This effectively refutes the hypothesis that citizenship documentation requirements only contribute to short-term churning off of insurance. Some children, however, are able to attain coverage during the six months following their denial. Although our study was underpowered to draw conclusions from these shorter gaps, children denied for inability to document citizenship appeared to be as likely to have short gaps as children denied for other reasons. Both types of gaps are significant to children's health and should be significant to policy makers seeking to maintain both efficiency in the administrative process and optimal health for Oregon children.

Numerous studies have demonstrated that as little as a six-month gap in insurance can lead to detrimental effects of health care including the presence of unmet health needs.^{8,9,23,50} Our study supports this finding from a new perspective. First, we showed that being denied Medicaid significantly increases a child's risk of having unmet health care needs in the following six months. We also showed that this is true for both kids denied for inability to document citizenship and children denied for other reasons. The presence of some insurance as well as a usual source of care over the six-month study period can greatly attenuate this risk. Presence of some health insurance

over this period leads to loss of statistical significance of application status, but a residual relationship remains. Our exploratory research shows that this may be due to a persistent association between intermediate-length insurance gaps of 1-5 months with unmet health care needs. This finding is supported by the study by Cummings that demonstrated that shorter gaps of 1-4 months can still have detrimental effects of access to health care.⁹

Limitations and Bias

This study has a few important limitations. First, the scope of this study was limited to include individuals who applied for the Oregon Health Plan during a three-month period shortly after citizenship documentation requirements were implemented. Our study is therefore not generalizable to other states, and trends may have changed over the three years since data collection. Because surveys were limited to Spanish and English languages, many non-Latino immigrants were also likely to have been missed. It is also important to remember that this study may have had effect on the choice not to re-apply for coverage, but this group was not studied here. Because of this, any generalizations we make do not apply to these populations.

Being a mail survey also leads to the selection of a more socially stable sample – likely more so than the general Medicaid population. Self-selection for participation is likely to further contribute to this bias. Self-selected individuals demonstrate their ability to navigate and return a mail survey in a way that non-respondents may not be able to do. This may make them more facile at navigating the system of social services and more prone to follow through with the application process. If anything, these attributes of survey respondents could make them less susceptible to having insurance gaps and less likely to suffer the negative consequences of Medicaid denial, thereby leading us to underestimate these effects in our study.

Looking back to the proportions for participation in Table 7, we also note that some groups were more likely to have valid addresses and therefore more likely to participate. Specifically, individuals denied for inability to document citizenship, and re-applicants who were denied for other reasons were less likely to have a valid address than others in the study. Any demographic differences between individuals excluded for this reason and individuals who participated were adjusted for with the survey weights for “non-response,” but the differences in availability of these groups suggests that we may be missing a specific population – possibly a more mobile community such as the families of migrant farm workers who might ultimately be less likely to be citizens. Because survey weights adjusted for differences in demographic characteristics, this possibility does not change our conclusion, but simply supports the theory that some specific groups were likely missed with this study methodology and deserve further study via other methods.

The use of weights for survey non-response was a clear strength of this study. Weights aptly accounted for demographic and application status differences between responders and non-responders. The utility of weights is

limited though. Because administrative records did not include information about insurance gaps or unmet health care needs, we cannot make generalizations about these characteristics in non-responders. There may have also been systematic tendencies toward non-response based on unmeasured characteristics such as citizenship itself. If this were the case, we may have underestimated the proportion of non-citizen children affected by the 2005 DRA. Demographic characteristics suggest that this was not the case, but without measures to verify citizenship, this is difficult to rule out. The previous qualitative study in Oregon, which concluded that affected children were largely citizens, also suggests that this was not the case.³⁷

Information bias also plays a significant role in any study based on self-reports. The validity of this study is strengthened from the pairing of administrative data – which is subject to stricter standards of verification – with these self-reports. The survey questions were also subject to thorough validation. They were first pilot tested in focus groups, translated and re-translated to ensure fidelity, and then used in a previous published study of a similar population in Oregon.⁸ Still, misclassification is bound to occur. The most likely place for this to occur is with the report of insurance status. A recent study showed that about 13% of children had parents who misreported or were unsure of their public insurance status. About one-third of these children were administratively enrolled but reported no enrollment (type II error), while the other two-thirds reported enrollment while records showed that they were not enrolled (type I error).²⁴ This phenomenon could at least partially explain the 11% of children who were accepted for Medicaid coverage but who reported continuous lack of insurance throughout the study period – an otherwise impossible feat. Similarly, approximately 50% of children in both of the denied groups reported being continuously insured despite administrative data suggesting the contrary. Although a small portion of denied children might be expected to maintain continuous coverage through outside sources, this proportion is surprisingly large. These otherwise inconsistent findings support the same phenomenon of uncertain insurance status described by Devoe.²⁴

If we apply the same percent misclassification as found by Devoe, 36 children in our study would have been misclassified. Two-thirds, or 24 children, would have inaccurately reported having insurance and one-third, or 12 children, would have inaccurately reported having no insurance. Assuming that this shift occurs equally among each application status group, this creates a general shift toward more children with no insurance during the entire six-month study period. This would lead to a very subtle strengthening of the observed association between Medicaid denial and presence of an insurance gap. (See Table 10A in the appendix for calculations)

It is also possible that there could have been systematic misclassification of race, ethnicity, and birthplace to conceal a child's true citizenship status. Although the surveys were completely confidential and did not affect receipt of benefits or future naturalization, the sensitive nature of citizenship and the high stakes involved with disclosure of such information make this type of misclassification important to consider. Because we did not ask

about citizenship itself, we hoped to avoid such deliberate misrepresentation, but it is possible that parents seeking to protect their family from deportation would be guarded with many of their responses. While this is more conceivable for questions pertaining to birthplace, it is difficult to think that a significant proportion of parents would misrepresent their child's race or ethnicity to conceal their true citizenship. Preferred language would have also been very difficult misrepresent since the surveys were conducted in the language of their administratively listed preference. Because none of these factors differed between groups we feel confident in the conclusion that the vast majority of children denied for inability to document citizenship who responded to our survey are truly U.S. citizens.

Finally, we know that although administrative data is considered the gold standard, these state-level databases can also be vulnerable to misclassification bias. This could be especially true of the reason for denial because this information is subjectively input by social workers based on a complex set of standards. This variable could certainly suffer from non-differential misclassification, but it is difficult to imagine a situation in which the bias would be differential. As such, any misclassification would only serve to subtly dilute the observed results. Furthermore, while the administrative records may be imperfect, there is no better measurement, aside from independent review of all the Medicaid applications, which might provide better information regarding the reason for Medicaid denial. Because of this, it is reasonable to accept the available data despite their potential for these minor flaws.

Policy Implications:

Policies, such as the 2005 DRA and the citizenship documentation requirement that it imposed, work directly against recommendations from the American Association of Pediatrics (AAP), which advocate for, "Streamlin[ing] the eligibility determination process to simplify child enrollment and retention and to decrease administrative costs."¹⁷ It also works against an increasing effort on the part of many states to improve and maintain Medicaid enrollment.^{27, 51} Preliminary studies have suggested that implementation of citizenship documentation requirements have caused an increase in administrative costs as well as a decrease in enrollment.⁵² Our study strongly supports the latter conclusion, and preliminary data from Oregon suggest that the former is also true.³⁷ Not only has this policy led to the denial of thousands of Oregon children who are almost certainly U.S. citizens, but these kids have now suffered large gaps in their health insurance and have suffered the negative consequences associated with these gaps. In the interest of promoting child health and reducing gaps in insurance, we must consider ways to either challenge such regressive laws or streamline the process in a ways that avoid such significant barriers to enrollment.

Currently, about half of all states have either adopted or are testing electronic citizenship matching through the SSA database. Early studies report 94% success in the matching process. As on January 1, 2010, all states are eligible to utilize data matching technology.⁵³ Based on these preliminary data, this type of program certainly

merits broader implementation. As more states adopt such policies further study will certainly follow.

Conclusions and Areas for future research:

This study provides a thorough description of the state-level consequences of a recent change in national policy. Despite its limited scope and some potential loss in precision due to self-report, this study clearly demonstrates that children whose Medicaid enrollment has been affected by this policy are both medically and socially vulnerable. Further, those denied for inability to document citizenship are almost indisputably citizen children, who were not the intended beneficiaries of this policy. Although it is possible that a minority of children surveyed (or perhaps missed by our survey) were in fact undocumented immigrants, this study definitively shows that the majority of children affected are most likely U.S. citizens. The affected children have now experienced significant gaps in health insurance and have suffered high levels of unmet health care need as a result.

The results of this study support a clear call to action opposing the DRA and the negative effects that have resulted. Despite the immediate need for policy action, this study also generates several important questions that will help to further understand the effects of the 2005 DRA as well as the effects of public insurance on health care.

- *How were adults affected by citizenship documentation requirements and how do they compare to children?*
The 2007 OHP disenrollment study collected information on both adults and children, so this natural follow-up question should be a high priority for future research.
- *Individuals who do not reapply for coverage also affect enrollment in Medicaid. How did citizenship documentation requirements impact this group?* During the three-month sampling period of the 2007 OHP disenrollment study over 12,000 children missed OHP application renewal.²² Because this group was expected to behave differently than children who applied for coverage, they were not included in this study, but their numbers alone certainly deserve further consideration.
- *How accurate were self-reports regarding insurance status?* A recent study by Devoe showed that individuals who had uncertain health insurance status were susceptible to the same problems with health care access as individuals who had no coverage.²⁴ A small percentage of individuals in this study had nonsensical reports of insurance status (for example, six-months of continuous uninsurance after being accepted for Medicaid) which suggests that a group of study participants were likely uncertain or misinformed their current insurance status. It would be helpful to understand how prevalent this type of misunderstanding is and if and how it influenced care in this population.

- *How long do children remain uninsured after being denied for inability to document citizenship?* We demonstrated that the vast majority are uninsured for at least the following six-months, as is true for children denied for other reasons. It would be interesting to determine if and when these children regain insurance and how they compare to children denied for other reasons. This would require a cohort study with longer follow-up, or more realistically, a review of administrative data to see if and when they re-enrolled for Medicaid.
- *What other health care outcomes are associated with presence of an insurance gap?* Controlled analysis in this study was limited to unmet health care needs, but descriptive data suggest correlations between insurance gaps and emergency department utilization, change in health status, having a medical visit in the past six-months, and having significant medical debt. Each of these outcomes deserves further controlled analysis.
- *How do insurance gaps of various lengths affect health care access and utilization?* The most recent study suggests that children with gaps of 1-4 months have significant negative effects, but that this effect is generally less severe than that among children with gaps of 5-11 months duration. Because data from the OHP disenrollment study are reported in # of months without insurance this is a good opportunity to analyze this question at higher resolution. Because the current waiting period for children's insurance is 2 months, this may also help to inform future policies.

Although there are certainly more questions to be answered, this study provides convincing evidence of a causal relationship between citizenship documentation requirements, significant insurance gaps, and unmet health care needs among Oregon children. While specific effects may differ between states, the harm to children in Oregon is clear, and alone warrants a reconsideration of this new federal policy. In the absence of policy change, state-level innovations are beginning to provide promising strategies to reduce the barriers imposed by citizenship documentation. These strategies deserve urgent priority for pilot testing and implementation because they hold promise for a future system with fewer barriers to obtaining health insurance and health care.

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Appendix A: Additional Tables & Calculations

Figures 1A and 2A – Histograms for the distributions of Age and Income (respectively)

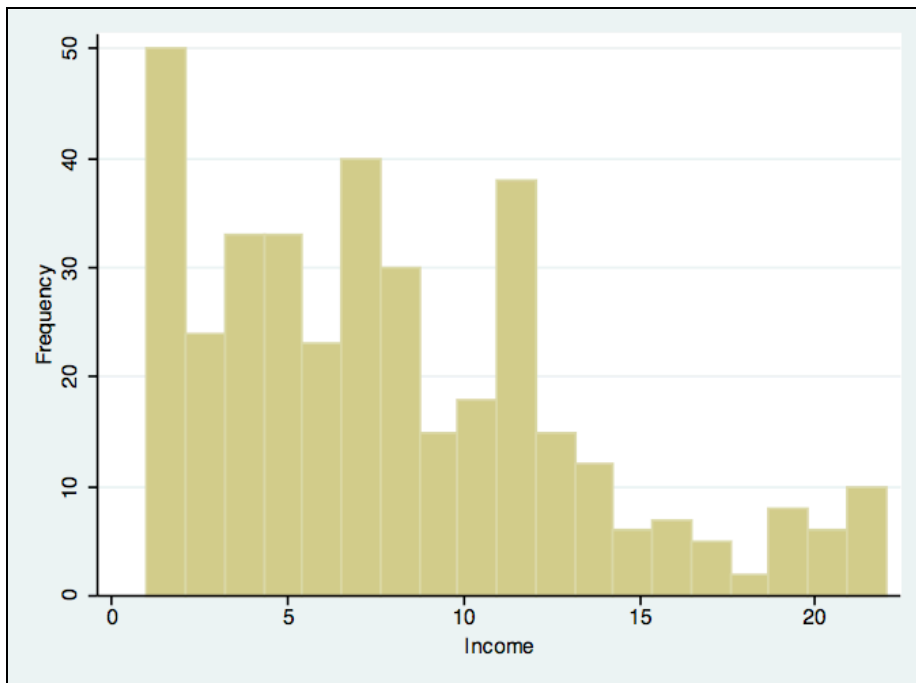
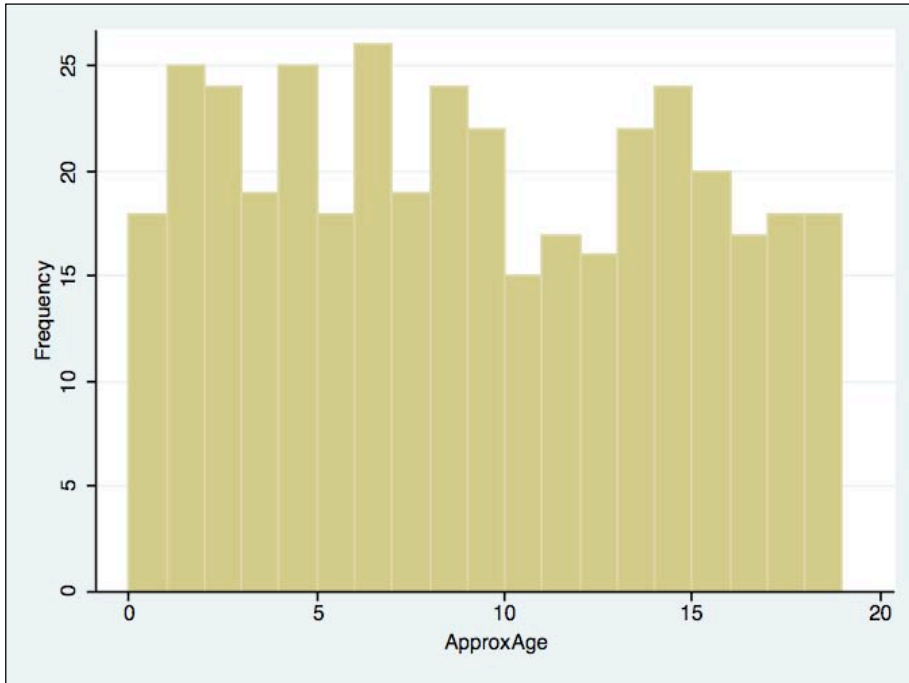


Table 1A. Unweighted data - Characteristics of children who applied for Medicaid stratified by application status

Independent Characteristics	Application Status			N	Pearson's χ^2 p-value
	Accepted	Denied CID	Denied Other		
Child's Sex				391	0.465
	Male	91 (47.96%)	47 (55.29%)	60 (52.17%)	
	Female	100 (52.36%)	85 (44.71%)	115 (47.83%)	
Child's Age				387	0.150
	<10 years	56.08%	65.48%	51.75%	
	≥10 years	43.92%	34.52%	48.25%	
				387	0.268
	≤2 years	83.60%	77.38%	85.96%	
	>2 years	16.40%	22.62%	14.04%	
Child's Ethnicity				384	0.896
	Non-Hispanic	124 (66.31%)	58 (68.24%)	77 (68.75%)	
	Hispanic	63 (33.69%)	27 (31.76%)	35 (31.25%)	
Child's Race				392	0.084*
	White	138 (71.50%)	62 (72.94%)	69 (60.53%)	
	Non-white	55 (28.50%)	23 (27.06%)	45 (39.47%)	
Child's Race/Ethnicity					0.556
	White, Non-Hispanic	57.75%	61.18%	53.57%	
	Non-white or Hispanic	42.25%	38.82%	46.43%	
Child Born in the US				392	0.131
	No	15 (7.81%)	3 (3.53%)	13 (11.30%)	
	Yes	177 (92.19%)	82 (96.47%)	102 (88.70%)	
Household Income				375	0.119
	<\$15,000/year	75 (41.21%)	39 (45.88%)	58 (53.70%)	
	>\$15,000/year	107 (58.79%)	46 (54.12%)	50 (46.30%)	
Parent's Employment				381	0.418
	Unemployed	87 (45.79%)	32 (40.51%)	43 (38.39%)	
	Employment	103 (54.21%)	47 (59.49%)	69 (61.61%)	
Parent's Education				387	0.851
	< High School	30.21%	33.33%	32.43%	
	≥High School	49.61%	66.67%	67.57%	
Social vulnerability scale				362	0.139
	0	11.7%	14.10%	13.33%	
	1	32.40%	26.92%	38.10%	
	2	29.05%	39.74%	34.29%	
	3	27.37%	19.23%	14.29%	
Child has Chronic Disease				394	0.852
	No	147 (75.77%)	64 (21.26%)	90 (78.26%)	
	Yes	47 (24.23%)	21 (24.71%)	25 (21.74%)	
Location				394	0.589
	Urban (RUCA 1-6)	174 (89.69%)	78 (91.76%)	107 (93.04%)	
	Rural/Small Town (RUCA 7-10)	20 (10.31%)	7 (8.24%)	8 (6.96%)	
Application Type				394	p<0.0001**
	New Applicant	92 (47.42%)	24 (28.24%)	64 (55.65%)	
	Re-Applicant	102 (52.58%)	61 (71.76%)	51 (44.35%)	

*denotes p<0.10;

**denotes p<0.05

Table 2A: Unweighted data - Characteristics of children who applied to Medicaid - Stratified by application status and application type

Independent Characteristics	New Applicants:			Fisher's Exact p-value	Re-Applicants:			Fisher's Exact p-value
	Accepted	Denied CID	Denied Other		Accepted	Denied CID	Denied Other	
Child's Sex				0.570				0.126
Male	45 (49%)	9 (38%)	32 (50%)		46 (46%)	38 (62%)	28 (55%)	
Female	46 (51%)	15 (62%)	32 (50%)		54 (54%)	23 (38%)	23 (45%)	
Child's Age				0.128				0.030**
<10 years	59 (66%)	13 (57%)	31 (49%)		47 (47%)	42 (69%)	28 (55%)	
≥10 years	31 (34%)	10 (43%)	32 (50%)		52 (52%)	19 (31%)	23 (45%)	
				0.102				0.044**
≤2 years	22 (24%)	5 (22%)	7 (11%)		9 (9%)	14 (23%)	9 (15%)	
>2 years	68 (76%)	18 (78%)	56 (89%)		90 (91%)	47 (77%)	42 (85%)	
Child's Ethnicity				0.346				0.607
Non-Hispanic	54 (59%)	18 (75%)	42 (67%)		70 (73%)	40 (66%)	35 (71%)	
Hispanic	37 (41%)	6 (25%)	21 (33%)		26 (27%)	21 (34%)	14 (29%)	
Child's Race				0.481				0.068*
White	59 (64%)	18 (75%)	39 (61%)		79 (78%)	44 (72%)	30 (60%)	
Non-white	33 (36%)	6 (25%)	25 (39%)		22 (22%)	17 (28%)	20 (40%)	
Race/Ethnicity				0.650				0.599
White, Non-Hsp	47 (52%)	15 (63%)	33 (52%)		61 (64%)	37 (61%)	27 (55%)	
Non-white, or Hsp	44 (48%)	9 (38%)	30 (48%)		35 (36%)	24 (39%)	22 (45%)	
Child Born in the US				0.410				0.593
No	9 (10%)	1 (4%)	9 (14%)		6 (6%)	2 (3%)	4 (8%)	
Yes	83 (90%)	23 (96%)	55 (86%)		94 (94%)	59 (97%)	47 (92%)	
Household Income				0.723				0.139
<\$15,000/year	43 (50%)	11 (46%)	26 (43%)		64 (67%)	35 (57%)	24 (50%)	
>\$15,000/year	43 (50%)	13 (54%)	34 (57%)		32 (33%)	26 (42%)	24 (50%)	
Parent's Employment				0.282				0.829
Unemployed	41 (46%)	9 (41%)	20 (33%)		46 (46%)	23 (40%)	23 (45%)	
Employment	48 (54%)	13 (59%)	41 (67%)		55 (54%)	34 (60%)	28 (55%)	
Parent's Education				0.491				0.277
≤ High School	62 (67%)	19 (79%)	45 (73%)		72 (72%)	37 (62%)	30 (61%)	
>High School	30 (33%)	5 (21%)	17 (27%)		28 (28%)	23 (38%)	19 (39%)	
Social vulnerability scale				0.536				0.289
0	13 (15%)	2 (9%)	7 (12%)		7 (7%)	9 (16%)	7 (15%)	
1	29 (35%)	7 (32%)	25 (44%)		29 (30%)	14 (25%)	15 (31%)	
2	20 (24%)	8 (36%)	17 (30%)		32 (33%)	23 (41%)	19 (40%)	
3	22 (26%)	5 (23%)	8 (14%)		27 (28%)	10 (18%)	7 (15%)	
Child has Chronic Disease				0.325				0.659
No	70 (76%)	19 (79%)	55 (86%)		77 (75%)	45 (74%)	35 (69%)	
Yes	22 (24%)	5 (21%)	9 (14%)		25 (25%)	16 (26%)	16 (31%)	
Location				0.506				0.140
Urban (RUCA 1-6)	84 (91%)	20 (83%)	58 (91%)		90 (88%)	58 (95%)	49 (96%)	
Rural/Small Town (RUCA 7-10)	8 (9%)	4 (16%)	6 (9%)		12 (12%)	3 (5%)	2 (4%)	

*denotes p<0.10
**denotes p<0.05

Table 3A. Unweighted data - Simple logistic regressions using dichotomous outcome for research question #1

Characteristic	Odds Ratio (CID vs. Accepted)	95% Confidence Interval	p-value	Odds Ratio (CID vs. Denied Other)	95% Confidence Interval	p-value
Sex (female)	0.736	0.440-1.230	0.241	0.882	0.502-1.548	0.662
Age (≥10 years)	0.673	0.395-1.148	0.146	0.566	0.316-1.011	0.054*
Age (≤2 years)	1.489	0.786-2.825	0.222	1.790	0.850-3.735	0.121
Race (non-white)	0.931	0.526-1.648	0.806	0.569	0.310-1.045	0.069*
Ethnicity (Hispanic)	0.916	0.530-1.585	0.754	1.024	0.558-1.879	0.939
Race/Ethnicity (NW or H)	0.868	0.513-1.465	0.595	0.732	0.413-1.298	0.286
Born in the US	2.316	0.653-8.223	0.194	3.484	0.960-12.637	0.058*
Education ≤ High school	0.866	0.500-1.498	0.606	0.960	0.525-1.754	0.894
Household income <\$15,000/year	0.8267	0.492-1.389	0.472	1.368	0.502-1.548	0.281
Parent is unemployed	1.028	0.973-1.086	0.330	1.093	0.606-1.969	0.768
Social vulnerability scale						
1	0.658	0.271-1.602	0.357	0.668	0.258-1.728	0.496
2	1.084	0.459-2.561	0.854	1.096	0.434-2.672	0.846
3	0.557	0.218-1.412	0.220	1.273	0.438-3.695	0.657
Location (Rural/Small town)	0.781	0.317-1.923	0.590	1.200	0.418-3.449	0.735
Child diagnosed w/chronic disease	1.026	0.568-1.856	0.932	1.181	0.609-2.292	0.622

Table 4A. Weighted data - Simple logistic regressions using dichotomous outcome for research question #1

Characteristic	Odds Ratio (CID vs. Accepted)	95% Confidence Interval	p-value	Odds Ratio (CID vs. Denied Other)	95% Confidence Interval	p-value
Sex (female)	0.878	0.486-1.584	0.664	1.293	0.629-2.656	0.483
Age (≥10 years)	0.548	0.296-1.015	0.056*	0.520	0.247-1.095	0.085*
Age (≤2 years)	1.491	0.737-3.022	0.265	1.296	0.492-3.414	0.597
Language (Spanish)	0.818	0.394-1.700	0.588	0.467	0.208-1.136	0.095*
Race (non-white)	1.063	0.557-2.028	0.853	0.759	0.357-1.612	0.471
Ethnicity (Hispanic)	0.979	0.529-1.811	0.945	0.930	0.438-1.974	0.850
Race/Ethnicity (NW or H)	0.921	0.501-1.671	0.785	0.837	0.404-1.732	0.630
Born in the US	2.670	0.652-10.93	0.171*	3.776	0.87-16.306	0.075*
Education ≤ High school	0.992	0.535-1.838	0.979	0.973	0.450-2.105	0.944
Household income <\$15,000/year	0.638	0.353-1.153	0.136*	1.500	0.719-3.133	0.278
Parent is unemployed	0.777	0.417-1.451	0.428	1.436	0.651-3.169	0.368
Social vulnerability scale			0.6770			0.3434
1	0.712	0.260-1.955	0.509	0.559	0.173-1.802	0.328
2	0.857	0.321-2.288	0.757	1.060	0.332-3.386	0.921
3	0.544	0.179-1.653	0.282	1.501	0.347-6.491	0.585
Location (Rural/Small town)	0.815	0.306-2.173	0.682	1.030	0.260-4.080	0.966
Child diagnosed w/chronic disease	0.845	0.428-1.666	0.625	2.010	0.828-4.880	0.122*

*denotes p<0.25;

**denotes p<0.0

Table 5A: Characteristics of respondents with incomplete vs. complete survey responses

Independent Characteristic	Incomplete	Complete	Weighted Design-based F test p-value
Child's Sex			0.159
Male	36.59%	52.29%	
Female	63.41%	47.71%	
Child's Age			0.0545*
<10 years	43.24%	58.29%	
≥10 years	56.76%	41.71%	
Child's Ethnicity			0.2338
Non-Hispanic	58.82%	68.29%	
Hispanic	41.18%	31.71%	
Child's Race			0.0014**
White	52.38%	70.57%	
Non-white	47.62%	29.43%	
Child Born in the US			0.4683
No	14.29%	7.14%	
Yes	85.71%	92.86%	
Household Income			0.181
>\$15,000/year	60%	53.71%	
<\$15,000/year	40%	46.29%	
Parent's Employment			0.8499
Unemployed	48.39%	42%	
Employment	51.61%	58%	
Parent's Education			0.000**
≤ High School	78.38%	67.43%	
>High School	21.62%	32.57%	
Child has Chronic Disease			0.112
No	75.47%	78.46%	
Yes	24.53%	21.54%	
Application type			0.5363
New Applicant	54.55%	44.57%	
Re-applicant	45.45%	55.43%	
Application status			0.7082
Accepted	52.27%	48.86%	
Denied - CID	18.18%	22%	
Denied - Other	29.19%	29.14%	
Insurance Gap			0.1576
6-Month Gap	23.32%	12.12%	
<6-Month Gap	76.68%	87.88%	
Unmet Healthcare Need			0.3564
Needs unmet	18.11%	11.94%	
Needs met	81.89%	88.06%	

* Denotes p<0.10;

**Denotes p<0.05

Table 6A: Model Building - Factors associated with 6-month Insurance Gap

Variable	Model 1 OR (95% CI) p-value	Model 2 OR (95% CI) p-value	Model 3 OR (95% CI) p-value	Model 4 OR (95% CI) p-value	Model 5 OR (95% CI) p-value	Model 6 OR (95% CI) p-value	Model 7 OR (95% CI) p-value	Model 8 OR (95% CI) p-value
Application Status (Denied-CID, when Accepted=1.0)	8.24 (2.8- 24.0) 0.000	8.28 (2.9- 24.1) 0.000	8.28 (2.9- 24.0) 0.000	8.21 (2.9- 23.5) 0.000	8.39 (2.9- 23.9) 0.000	8.32 (3.0-23.3) 0.000	7.57 (3.0- 18.8) 0.000	7.20 (3.1-16.9) 0.000
Application Status (Denied CID when Denied-Other=1.0)	1.51 (0.4- 5.6) 0.537	1.51 (0.4- 5.5) 0.533	1.49 (0.4- 5.4) 0.548	1.46 (0.4- 5.3) 0.562	1.51 (0.4- 5.3) 0.517	1.04 (0.3-3..2) 0.939	1.75 (0.6- 5.3) 0.318	1.14 (0.5-2.9) 0.785
Sex (Male=1.0)	6.63 (2.3- 19.4) 0.001	6.44 (2.4- 17.3) 0.000	6.49 (2.5- 17.3) 0.000	6.41 (2.5- 16.7) 0.000	6.34 (2.4- 16.4) 0.000	6.23 (2.4-16.0) 0.000	5.07 (2.0- 12.8) 0.001	4.65 (2.7-14.7) 0.001
Race/Ethnicity (White, Non- Hispanic=1.0)	2.87 (0.1- 9.0) 0.070	2.77 (1.0- 7.8) 0.054	2.77 (1.0- 7.8) 0.054	2.71 (1.0- 7.45) 0.054	2.67 (1.0- 7.4) 0.058	2.66 (1.0-7.2) 0.054	3.19 (1.2- 8.5) 0.021	3.2 (1.2-8.5) 0.016
Social vulnerability (1)	2.29 (0.4- 14.5)	2.26 (0.4- 14.1)	2.35 (0.4- 14.2)	2.38 (0.4- 14.3)	2.30 (0.4- 13.8)	2.28 (0.4-14.3)		
(2)	3.02 (0.5- 19.8)	3.04 (0.5- 19.9)	3.10 (0.5- 19.6)	3.10 (0.5- 19.6)	2.83 (0.5- 17.6)	2.28 (0.4-18.3)		
(3)	5.33 (0.9- 33.5)	5.36 (0.9- 33.7)	5.49 (0.9- 34.6)	5.54 (0.9- 35.2)	5.48 (0.9- 35.0)	5.66 (0.9-37.5)	--	--
(0) = 1.0	0.2875	0.2875	0.2851	0.2861	0.2882	0.2638		
Application Type (Reapp=1.0)	2.04 (0.8- 5.8) 0.178	2.03 (0.7- 5.8) 0.187	2.00 (0.7- 5.7) 0.193	1.98 (0.7- 5.5) 0.189	1.92 (0.7- 5.3) 0.206	--	2.19 (0.8- 5.9) 0.120	--
Age (≤10 =1.0)	0.81 (0.3- 2.2) 0.679	0.79 (0.3- 2.2) 0.658	0.79 (0.3- 2.2) 0.647	0.77 (0.3- 2.2) 0.624	--	--	--	--
Location (Urban=1.0)	1.23 (0.3- 5.4) 0.785	1.22 (0.3- 5.3) 0.787	1.21 (0.3- 5.3) 0.797	--	--	--	--	--
Chronic Condition (None=1.0)	0.85 (0.3- 2.8) 0.785	0.86 (0.3- 2.8) 0.804	--	--	--	--	--	--
Birthplace (US born=1.0)	1.23 (0.3- 5.4) 0.788	--	--	--	--	--	--	--

Yellow highlighting denotes the final selected model

Table 7A: Parameters of the Final Model for research question #2

Variable	β_{hat}	Std. Error	Wald Test p-value
Application Status (Denied CID)	2.12	0.52	0.000
Application Status (Denied Other)	0.04	0.57	0.001
Sex (female)	1.83	0.47	0.000
Race/Ethnicity (NW/H)	0.98	0.51	0.054
Social vulnerability			
(1)	0.82	0.88	0.38
(2)	1.01	1.06	0.29
(3)	1.73	1.80	0.07
Intercept	-5.04	1.08	0.000

Research Question #2 - Final Model:

$$g(x) = -5.04 + 2.12(x_{11}) + 0.04(x_{12}) + 1.83(x_2) + 0.98(x_3) + 0.82(x_{41}) + 1.01(x_{42}) + 1.73(x_{43})$$

$$g(\text{6-month Insurance Gap}) = -5.04 + 2.12(\text{Denied-CID}) + 0.04(\text{Denied-Other}) + 1.83(\text{Sex}) + 0.98(\text{Race/Eth}) + 0.82(\text{SV-1}) + 1.01(\text{SV-2}) + 1.73(\text{SV-3})$$

Table 8A: Model Building for research question #3 - Factors associated with unmet healthcare need

Variable	Model 1 OR (95% CI) p-value	Model 2 OR (95% CI) p-value	Model 3 OR (95% CI) p-value	Model 4 OR (95% CI) p-value	Model 5 OR (95% CI) p-value	Model 6 OR (95% CI) p-value	Model 7 OR (95% CI) p-value
Interaction: Insurance Gap * Application Status	--	--	--	--	--	--	0.069
6-month Insurance Gap	--	--	--	--	--	12.32 (3.8-39.5) 0.000	14.20 (3.8-52.8) 0.000
Application Status (ref = Accepted)	2.53 (1.0-6.2) 0.041	2.51 (1.0-6.1) 0.042	2.48 (1.0-6.1) 0.046	2.5 (1.0-6.0) 0.047	2.9 (1.3-6.6) 0.010	1.66 (0.5-5.2) 0.385	2.31 (0.6-9.4) 0.240
Application Status (ref = Denied- Other)	0.49 (0.2-1.5) 0.220	0.49 (0.2-1.5) 0.220	0.51 (0.2-1.6) 0.251	0.60 (0.2-1.7) 0.323	0.63 (0.3-1.5) 0.303	0.55 (0.1-2.0) 0.368	0.55 (0.1-2.7) 0.463
Social vulnerab. (1)	0.58 (0.1-2.6)	0.57 (0.1-2.6)	0.54 (0.1-2.6)	0.55 (0.1-2.7)		0.34 (0.1-1.9)	0.33 (0.1-1.9)
(2)	0.54 (0.1-2.7)	0.54 (0.1-2.7)	0.53 (0.1-2.8)	0.56 (0.1-2.8)		0.40 (0.1-2.6)	0.40 (0.1-2.7)
(3)	0.34 (0.1-2.0)	0.34 (0.1-1.9)	0.32 (0.1-1.9)	0.33 (0.1-1.9)	--	0.1 (0.0-1.2)	0.14 (0.0-1.2)
	0.6895	0.6798	0.6592	0.6586		0.3407	0.3510
Application Type (New)	0.75 (0.3-2.1) 0.583	0.75 (0.3-2.1) 0.576	0.75 (0.3-2.1) 0.587	--	--	--	--
Chronic Condition	1.31 (0.1-2.0) 0.228	1.29 (0.4-3.8) 0.642	--	--	--	--	--
Location (Rural)	1.18 (0.3-4.6) 0.810	--	--	--	--	--	--

Yellow highlighting denotes the final preliminary selected model and the final overall model

Table 9A. Parameters of the final model for research question #3

Variable	β_i	Std. Error	Wald Test p-value	95% CI
Application Status - Denied CID (ref=accepted)	0.50	1.08	0.092	-0.64-1.65
Application Status - Denied Other (ref=accepted)	1.11	1.96	0.006	0.02-2.20
Social vulnerab. (1)	-1.08	0.87	0.22	-2.80-0.63
(2)	-0.91	0.94	0.34	-2.77-0.95
(3)	-1.94	1.08	0.73	-4.08-0.18
Overall	--	--	0.340	--
Insurance Gap (ref=some insurance)	2.12	4.56	0.000	1.35-3.68
Intercept	-1.59	0.81	0.050	-3.19-0.00

Research Question #3 - Final Model:

$$g(x) = -1.59 + 0.05(x_{11}) + 1.11(x_{12}) - 1.08(x_{21}) - 0.91(x_{21}) - 1.94(x_{22}) + 2.12(x_3)$$

$$g(\text{Unmet healthcare needs}) = -1.59 + 0.50 * (\text{Denied-CID}) + 1.11 * (\text{Denied-Other}) - 1.08 * (\text{SV 1}) - 0.91 * (\text{SV 2}) - 1.94 * (\text{SV 3}) + 2.12 * (\text{InsuranceGap})$$

Table 10A - Misclassification of reported insurance gaps

	Reported any insurance	Reported NO insurance	% 6mo gap	→	Projected – any insurance	Projected – NO insurance	% 6mo gap
Accepted	164 (56%)	23 (27%)	12%	→	0.56 * 280 = 157	0.27 * 96 = 26	14%
Denied – CID	51 (17%)	29 (35%)	36%	→	0.17 * 280 = 48	0.35 * 96 = 34	41%
Denied – Other	77 (26%)	32 (38%)	31%	→	0.26 * 280 = 73	0.38 * 96 = 36	33%
Total	292	84	22%	→	292 - 24 = 268 268 + 12 = 280	84 + 24 = 108 108 - 12 = 96	25%

Appendix B: OHP Disenrollment Study Survey

Oregon Health Plan Survey

For Parents of Children Who Applied for New or Renewed Coverage

Thank you for helping us better understand health insurance and health care for children in Oregon. All questions on this survey refer to health care for your child. If you have more than one child, please answer for the child named in the letter you received with this survey. When finished, please put the survey in the postage-paid envelope and mail it. If you have questions about this survey, please call 1-800-647-0907.

Survey Instructions

1. Answer all the questions by checking the box to the left of the answer.
2. You are sometimes told to skip over questions in this survey. When this happens, you will see an arrow with a note that tells you what question to answer next, like this:
 Yes → [GO TO QUESTION 1]
 No

START HERE ↓

Your Child's Health Coverage

1. Our records show that you applied or re-applied for your child to receive the Oregon Health Plan (OHP) between September 2006 and May 2007. Was your child's application approved?
 Yes → (Skip to Question 3)
 No, it was denied
 No, I was told it was pending or that I had to send more paperwork
 I'm not sure
 I didn't apply or reapply to OHP for my child → (Skip to Question 3)
2. If the application was denied, what was the main reason? *Check all that apply.*
 Our income or assets were too high
 I was told my child hadn't been uninsured long enough to qualify
 I was late turning the application in
 I could not send paperwork to prove my child's citizenship (birth certificate, naturalization papers, etc.)
 Some other reason: _____
 I don't know why
3. Does your child **currently** have health insurance through any of the following? *Check all that apply.*
 Oregon Health Plan or Medicaid
 Medicare
 Yours or a family member's employer.
 A private plan I pay for myself.
 Other coverage: _____
 My child has no insurance now.
 I don't know
4. For how many of the last six months did your child have some kind of health insurance?
 No insurance during last 6 months
 1 Month
 2 Months
 3 Months
 4 Months
 5 Months
 Insured for all of the last 6 months



Your Child's Health Care

5. Is there a place your child usually goes to receive medical care?
- Yes
- No → (Skip to Question 7)
6. Where does your child usually go to receive medical care? *Mark only one.*
- A private doctor's office or clinic
- A public health clinic, community health center, or tribal clinic
- A hospital-based clinic
- A hospital emergency room
- An urgent care clinic
- Some other place not listed here
- I don't have a usual place
- I don't know
7. Was there a time in the last 6 months when your child needed medical care?
- Yes
- No → (Skip to Question 10)
8. If your child needed medical care in the last six months, did he or she get ALL the medical care that was needed?
- Yes
- No
- My child didn't need care in the last six months
9. The *most recent time* your child went without needed medical care, what were the main reasons? *Check all that apply.*
- It cost too much
- My child doesn't have insurance
- The doctor wouldn't take our insurance
- I owed money to the care provider
- I couldn't get an appointment quickly enough
- The office wasn't open when I could get there with my child
- My child has no doctor
- Some other reason: _____
- I don't know
10. In the last 6 months, has your child needed any prescription medications?
- Yes
- No → (Skip to Question 13)
11. If your child needed prescription medications in the last six months, did he or she get ALL the needed medications?
- Yes
- No
- My child didn't need medications in the last six months
12. The *most recent time* your child went without prescription medications he or she needed, what were the main reasons? *Check all that apply.*
- They cost too much
- My child has no insurance
- My child has no doctor
- I couldn't get a prescription
- I couldn't get to the pharmacy
- Some other reason: _____
- I don't know
13. In the last 6 months, has your child needed any dental care?
- Yes
- No → (Skip to Question 15)
14. If your child needed dental care in the last six months, did he or she get all needed care?
- Yes
- No
- My child didn't need dental care in the last six months
15. In the last 6 months, how many times did your child go to a doctor's office, clinic, or other health care provider to get care? *Don't include emergency room or hospital visits. Your best estimate is fine.*
- None
- 1 time
- 2 times
- 3 or more times



16. In the last 6 months, how many times did your child go to an emergency room to get care? *Your best estimate is fine.*

- None
- 1 time
- 2 times
- 3 or more times

17. What was the reason your child went to the emergency room instead of somewhere else for health care? *Mark all that apply.*

- My child needed emergency care
- Doctors' offices/clinics were closed
- I couldn't get an appointment to see a regular doctor soon enough
- My child has no regular doctor
- I couldn't afford the copay for my child to see a doctor
- My child needed a prescription drug
- I don't know where else to take my child
- Some other reason: _____
- I don't know


Your Child's Health Care Costs

18. In the last 6 months, have you had to borrow money, skip paying other bills, or pay other bills late to pay your child's health bills?

- No
- Yes

19. Do you currently owe money to a health care provider, credit card company, or anyone else for your child's medical expenses?

- No
- Yes

 If yes, about how much do you owe? _____

Your Child's Health

20. In general, would you say your child's health is:

- Excellent
- Very Good
- Good
- Fair
- Poor

21. How has your child's health changed in the last six months?

- His or her health has gotten better
- His or her health is about the same
- His or her health has gotten worse

22. In the past six months, have problems with your child's health interfered with any of the following? *Check all that apply.*

- School
- Social activities with friends
- Family activities

23. Have you ever been told by a doctor or other health professional that your child has any of the following? *Check all that apply.*

- Diabetes or sugar diabetes
- Asthma
- Another chronic health condition (tell us): _____

About Your Family

24. Is your child male or female?

- Male
- Female

25. What YEAR was your child born? _____

26. Was your child born in the United States?

- Yes
- No



27. If your child was born in the U.S., in what city and State was he or she born?

City _____
State _____

28. Are you (the parent) currently employed or self employed? *Mark only one.*

- Yes, employed
- Yes, self-employed
- Not currently employed
- I am retired

29. About how many hours per week, on average, do you work at your current job?

- Less than 20 hours per week
- 20-29 hours per week
- 30 or more hours per week

30. What was your gross household income (before taxes and deductions are taken out) for last year (2006?) *Your best estimate is fine.*

- \$0
- \$1 to \$2,500
- \$2,501 to \$5,000
- \$5,001 to \$7,500
- \$7,501 to \$10,000
- \$10,001 to \$12,500
- \$12,501 to \$15,000
- \$15,001 to \$17,500
- \$17,501 to \$20,000
- \$20,001 to \$22,500
- \$22,501 to \$25,000
- \$25,001 to \$27,500
- \$27,501 to \$30,000
- \$30,001 to \$32,500
- \$32,501 to \$35,000
- \$35,501 to \$37,500
- \$37,501 to \$40,000
- \$40,001 to \$42,500
- \$42,500 to \$45,000
- \$45,001 to \$47,500
- \$47,500 to \$50,000
- \$50,001 or more

31. Would you describe your child as Spanish, Hispanic, or Latino?

- Yes
- No

32. How would you describe your child's race?

- White
- Black or African-American
- American Indian or Alaska Native
- Asian
- Native Hawaiian or Pacific Islander
- Other: _____

33. What is the highest level of education you (the parent) have completed?

- Less than high school
- High school diploma or GED
- Vocational training or 2-year degree
- A 4-year college degree or more

34. How many family members, including yourself, counting all adults and children, are living in your home? _____

35. Of the family members living in your house, how many are under 19? _____

36. Thinking about the family members in your house under 19 years of age, how many are currently covered by some kind of health insurance?

Thank you very much for taking the time to complete this survey. Please place it in the postage-paid envelope and mail it.