

Prenatal Care in Oregon and Washington: Policy and Utilization for Vulnerable Women

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**PRENATAL CARE IN OREGON & WASHINGTON: POLICY AND UTILIZATION
FOR VULNERABLE WOMEN**

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There are no conflicts of interest.

ABSTRACT

Background

In the prenatal period, women can have sustained contact with nurses and other clinicians, forming relationships that are likely to be health enhancing both for the woman and her unborn child. Yet first trimester care use in Oregon dropped noticeably over the past decade. In comparison with Washington State, Oregon has not shown substantial recovery.

Objective

To explore potential reasons for the declining prenatal trend in Oregon

Methods

We collated county level birth data from all Oregon and Washington counties from 2000-2010.

A descriptive, observational, time-series regression analysis for both states assessed the influence of maternal determinants known to impact first trimester care utilization.

Results

In Oregon, two factors were significantly associated with declining first trimester care: Medicaid funding ($P<.01$) and maternal Hispanic ethnicity ($P=.016$). In Washington, there was no significant association between any assessed determinant and first trimester care.

Discussion

In Oregon, over the period of our study, women dependent on Medicaid and women of Hispanic origin were less likely to utilize first trimester care. A similar trend for these variables was not observed in Washington. At the time of our study, both states had different policy approaches which may explain some of the observable patterns. Amid current health care reforms and rising immigration, our findings suggest the need for strong advocacy for those less able to access or utilize care.

Keywords: prenatal care, health disparity, first trimester, ethnicity, Medicaid

Prenatal Care in Oregon and Washington: Policy and Access for Vulnerable Women

The prenatal period is a key stage in women's lives when they seek the support of nurses and other clinicians. This period, the first trimester in particular, provides an important arena for health assessment and public health intervention. Care started in the first trimester maximizes the opportunity for early detection and treatment of life-threatening conditions such as ectopic pregnancy, and for interventions in screening, education and support that have been shown to reduce negative birth outcomes (Coley & Aronson, 2013; Girard & Oluwafunke, 2012). In recognition of the importance of early intervention, the Federal Government established a 2020 target that would see a minimum of 77.9% of pregnant women receiving first trimester care (Department of Health and Human Services, 2010).

In the United States, the process towards attaining national targets is largely driven by state governance. This creates the potential for diverging approaches in the provision of health care at state level. A prenatal example of diverging state policy is presumptive eligibility (PE). PE deems women eligible for prenatal benefits without procedural delays or concerns over payment but the policy has not been adopted in every state (Kaiser Family Foundation, 2012). The neighbouring North American states of Oregon and Washington do not currently have presumptive eligibility policies. Collectively, these states are known as the 'Pacific Northwest' and they share similarities in terms of geographical diversity and population demographics. In 2001 they also shared similar first trimester utilization rates in excess of the 2020 target (Indicators Northwest, 2012). However, since then, Oregon and Washington witnessed a decline in their first trimester utilization rates. Figure 1 displays the percentage of pregnant women receiving first trimester care in both states from 2001-2010 illustrating a gradual decline for both prior to a sharp decline in Oregon around 2008. Figure 2 displays the annual percentage change each year and highlights that while Washington witnessed their largest decline in 2003, Oregon

witnessed declines of 3% and 10% in 2006 and 2008 respectively. There is one known factor that may account for some of this decline in both states: the national change in birth data recording which altered the format for recording first trimester care initiation. Washington altered their recording in 2003 and Oregon made their change in 2008. Prior to the change, the initial date of first trimester utilization was recorded as reported by the mother. Post change, information was obtained from medical records and it has been noted that whenever states introduced this change, there was an associated reduction that year, in *recorded* first trimester prenatal care (March of Dimes Peristats, 2013). As the downward trends in Oregon and Washington appear to precede their respective dates of policy change, and recovery has been variable, it is questionable as to whether this data recording policy change explains the entire trends seen in both Oregon and Washington. Furthermore, as of 2012, first trimester care utilization in Washington again exceeded the 2020 target but in Oregon the rate remained more than 5% below that of 2001 and below that of the 2020 Healthy People target (Oregon Health Authority, 2014; Washington State Department of Health 2012). Overall, the reduction in Oregon *prior* to 2008, the significant and, relative to Washington, large decline in 2008 and the ongoing gap between the two states remains unexplained.

As stated earlier, the prenatal period has been shown to be an effective opportunity for medical and nursing intervention. If sustained progress is to be made towards meeting the 2020 target, it is imperative to explore the factors that may have triggered the initial Oregon decline and of those that may still be slowing recovery. We know from existing literature that several maternal characteristics are known to correlate with reduced prenatal access or utilization of services: these include maternal education of less than 12 years and maternal alcohol, drug, and tobacco use (Yelland, Sutherland & Brown, 2012). Health insurance coverage, or lack of, is also an important factor in the ability to secure first trimester care, particularly for women with low

income (Sunil, Spears, Hook, Castillo & Torres, 2010). There is also evidence that minority race or ethnicity can adversely affect early access to care (Coley & Aronson, 2013). Compounding the issue of ethnicity is that of immigration status: there can be delays associated with confirming citizenship prior to being able to access Medicaid funding. For those unable to secure documentation of citizenship, there is also evidence of further delays or inability to access prenatal care (Bauer et al., 2011; Korineka & Smith, 2011).

The primary aim of our study was to explore whether any of the known maternal variables were associated with the decline of first trimester care utilization in Oregon. Although, the change in birth data recording makes direct comparisons unhelpful, a secondary aim was to look at the prenatal trends in Washington. We considered that the similar geographic diversity, economy and demography of both states, set against a background of diverging prenatal rates, suggested that there may be additional information to be obtained by exploring the factors that influence first trimester care trends within each state.

Methods

Design & Sample

We used a descriptive, observational, time-series design utilizing published data. For the Oregon analysis, we collated birth and county data from all 36 counties between 2000 and 2010; for the Washington analysis we collated birth and county data from all 39 counties between 2000 and 2010. Due to restrictions in available data, discussed below, the final sample for Oregon was 310 county years and the final sample for Washington was 309 county years. The study was reviewed by Oregon Health & Science University Institutional Review Board and, as the data were public domain, was considered exempt from IRB oversight.

Data Analysis

We performed a county fixed effects linear panel regression, with robust standard errors, to examine the variables that may influence utilization of first trimester care. We used robust standard errors because a likelihood ratio test confirmed that the general assumption of the error term possessing a constant variance (homoscedasticity) was violated. Under this violation, also known as heteroskedasticity, reported standard errors would be understated, leading to inflated beta coefficients p-values; the use of robust standard errors adjusts for such optimistic significance levels. To control for spurious trends in some variables we performed the analysis using county percentage change from the previous year rather than proportional levels of variables (Greene, 2003; Kittel & Winner, 2005). As a consequence of using percentage changes rather than levels, our models below did not suffer from serial correlation (i.e. error terms were not temporally correlated with each other, another classic assumption of ordinary least squares regression), which if present would also lead to the understatement of our standard errors and hence overly confident significance reporting. Regression outputs and data graphics were computed using STATA 13. Data and the STATA commands can be found on the second author's website.

Variables

Our *dependent variable* was first trimester care utilization in Oregon and Washington. Specifically, we looked at the change in the percentage of expectant mothers using first trimester care from the previous year within a given county. The *independent variables* for both states were measured as percentage changes from the previous year unless indicated otherwise. These variables reflected county and maternal characteristics as discussed below.

Independent Variables: Oregon

Oregon county data included: the proportion of the population living below the federal poverty line; population density, which served as a proxy for rurality and as a measure of availability of prenatal care supply (Indicators Northwest, 2012; Oregon REAP Project, 2013; US Census Bureau, 2012); and the number of physicians per 1000 of the population as one proxy for the availability of prenatal care. Oregon maternal variables included: maternal education <12 years, maternal tobacco use during pregnancy; and maternal alcohol and drug use (Oregon Health Authority, 2012a). Alcohol and drug use during pregnancy had low overall values and higher incidences of missing data than other maternal characteristics (for example, in the Oregon sample, there were 111 missing values for maternal drug use, compared to only 11 missing values for maternal tobacco use). As the alcohol and drug variables were not significant in preliminary analysis, they were omitted from our final analysis.

Maternal race and ethnicity data were also as recorded at time of delivery (Oregon Health Authority, 2012a). In Oregon, from 2000-2007, ethnicity was recorded as Hispanic (categorized as White, or other) and Non-Hispanic (categorized as White, African American, Native American, or 'other'). In 2008, the option was given to record multiple race or ethnicity, though the original categories of Hispanic or Non-Hispanic continued to be reported in the data allowing comparison across our time period. Also in 2008, 'other' was replaced with Asian, Native Hawaiian and Pacific Islander though to standardize our data, we continued to group these three races for the period 2009-2010. Non-white, non-Hispanic ethnicities exhibited low levels in some or all counties, and showed highly volatile annual changes; therefore, ethnicity was the only variable where annual proportions (rather than *percentage changes*) were used in the analysis. We incorporated a basic linear time trend in order to control for any underlying trends

within these variables. We selected a linear trend, rather than an exponential one, because the proportion of minority mothers (particularly those in the African American or “other” racial categories) in the majority of Oregon counties was increasing according to a linear trend over time.

Insurance coverage was also collated. First trimester data were unavailable by county, and so we used insurance status at the time of delivery as a rough proxy of coverage at the start of and during pregnancy. We recognize this is not a perfect indicator in gauging insurance status during the first trimester and we discuss the limitations of this later in the paper. In terms of payment at delivery, at the time of analysis data were only available until 2009, further limiting our time span to 2001-2009. The available payment data largely related to private insurance, Medicaid and self-pay (Oregon Health Authority, 2012a). There were categories of ‘other’ or ‘unknown /not stated’ in terms of payment method, however, these often equated to zero or had missing values and were not included in the analysis. There was no category for ‘uninsured’ though this was likely incorporated in either the self-pay or ‘other’ category. In Oregon, the Medicaid insurance program is known as the Oregon Health Plan (OHP) and, at the period under study, provided prenatal care for women with incomes at or below 185% of the federal poverty level (Oregon Department of Human Services, 2012). Specifically, we used the annual change in percentage of mothers utilizing OHP/Medicaid as the primary measure of funding.

Independent Variables: Washington

Washington county and maternal data included: population density, maternal ethnicity, tobacco use, and maternal education (State of Washington, 2013; Washington State Department of Health, 2012 Washington State Department of Social and Health Services, 2010). We also collated data on the use of Medicaid to fund prenatal care, which like Oregon was available for

women with incomes at or below 185% of the federal poverty level (National Conference of State Legislators, 2013). Contrary to Oregon, the Washington State Department of Health only distinguishes between Medicaid and non-Medicaid pregnancy financing, so we were unable to gauge the influence of self-financing (or non-insurance) on first trimester prenatal care utilization. Moreover, at the time of analysis, we were only able to obtain Medicaid insurance data from 2000-2008; thus cross-sectional time series regression analysis for Washington counties was restricted to 2001 to 2008. Like the Oregon analysis, we utilized a linear panel regression of county data from 2001 to 2008 where the dependent variables and independent variables were taken as year-on-year growth rates, except for maternal race and ethnicity which were kept as proportions. The one deviation from the Oregon analysis related to ethnicity. In Oregon, while there is the option to record multiple ethnicities, the data are *also* tabulated in a format that distinguishes between Hispanic (of any additional ethnicity) and Non-Hispanic. In Washington, there is no mutually exclusive recording of Hispanic ethnicity from other races. To counter this, we only controlled for Hispanic ethnicity in the comparative regression analysis between Washington and Oregon and not for the other ethnic categories.

Models:

In our final analysis, four models were estimated for the Oregon data and one for the Washington data:

1. Model I in Table 2 presents our baseline model, which excludes changes in county poverty, for the Oregon data.
2. Model II in Table 2 includes interactions between race/ethnicity and insurance coverage, in order to determine whether use of first trimester prenatal care is magnified or mitigated if non-white mothers have access to Medicaid.

3. Model III in Table 2 is our baseline model with the inclusion of changes in county poverty – county poverty data were only available from 2005, and hence we ran a separate regression for this control variable to preserve our sample size in other models.
4. Models IV and V in Table 2 present comparative regressions for the Oregon and Washington data.

Not presented (though available) are the results for private insurance, self-financing or physicians per 1000 of the population as they failed to emerge as significant predictors of first trimester use.

Results

Descriptive Findings:

During the period 2000-2010, there were 513,682 recorded births in the 36 counties in Oregon and from highest to lowest rates, use of first trimester care fell from 81.6% in 2002 to 70.2% in 2008 (the drop in care utilization was significant $p < .01$). Maternal tobacco use remained almost unchanged from 2000 to 2010; maternal education of <12 years varied little (it was 3.8% in 2000 and 2.2% in 2010); maternal non-white ethnicity rose by 7.3%; and pregnancy deliveries funded by OHP/Medicaid rose by 12.7%. In Washington, during the period 2000-2010 there were 926,129 recorded births in the 39 counties; maternal tobacco use fell from 12% to 9.2%; education of less than 12 years remained almost unchanged (12.6% in 2000 and 11.5% in 2010); Hispanic maternal ethnicity rose by almost 5%; and, between 2000 and 2009, births funded by Medicaid rose by 4.3%. The mean descriptive statistics over the period of review are provided in Table 1: the second column illustrates the average county *levels*; and the third column illustrates the average *yearly rate of change*.

Oregon and Washington Models:

Table 2 presents the panel regression analysis for both states (in our use of yearly percentage change, the results from our first differences models should be interpreted as a 1% change in an independent variable within a given county-year yields a corresponding $\beta\%$ change within the dependent variable). In Oregon, the county proportion of Hispanic maternal ethnicity was strongly associated with changes in first-trimester prenatal care use, both in significance and in magnitude (*p-values ranging from 0.016 in Model I to 0.043 in Model IV*). Taking the result from Model I in Table 2, a 1% increase in the proportion of county births from Hispanic mothers, relative to whites, was associated with a 0.35% decrease in county-level first trimester care utilization, keeping all other variables constant. No other racial or ethnic category, relative to whites, was consistently and significantly associated with changes in first trimester care in Oregon. Washington failed to exhibit any significant relationship between Hispanic maternal ethnicity and changes in first trimester care utilization (Table 2, Model V). Of note, the differences between Oregon and Washington are also present when the data are considered in terms of overall percentages rather than yearly rates of change: Figure 3 portrays a ‘best fit line’ that outlines the relationship between Hispanic ethnicity and first trimester care use for all county-years between 2001 and 2010: in Oregon the slope is noticeably downward illustrating the significant negative relationship between Hispanic ethnicity and the percentage of mothers utilizing first trimester care; in Washington, there is an insignificant slope illustrating the lack of significance between maternal Hispanic ethnicity and first trimester care use.

In Oregon, changes in the use of OHP/Medicaid to pay for delivery were also significantly associated with changes in first trimester prenatal care. In Washington there was no significant association between changes in maternal Medicaid funding of pregnancies and

changes in first trimester use (compare Medicaid's insignificant beta coefficient in model V to the significant coefficients in Models I-IV). As with maternal (Hispanic) ethnicity, state differences in the association between Medicaid funding and first trimester care use also emerge when these variables are measured as percentages rather than rates of change: Figure 4 illustrates the best-fit line for both states displaying the more prominent negative relationship between the two variables for Oregon, and the less prominent, insignificant relationship between the two variables for Washington. OHP funding was the second strongest predictor of changes in first trimester use within the Oregon analysis: taking the range of beta coefficients between Models I-IV in Table 2, a 1% increase in county pregnancies financed by OHP was associated with a 0.027-0.072% decline in county-level first trimester care access. While this may not seem large, if the OHP variable's result is expressed as a *standardized* beta coefficient (i.e. taking into account the variation and spread of the variable), the association is much larger: a one standard deviation increase in OHP financing within an Oregon county-year is associated with a 1-2.6% decline in first trimester care utilization, keeping all other variables constant. Of further note, OHP displayed a significant, albeit small, positive interaction with Hispanic maternal ethnicity (Model II, Table 2). An increase in OHP financing partially blunts the negative impact of Hispanic ethnicity on changes in first trimester care utilization relative to white mothers (counties with more mothers in the alternative, largely Asian, race category witnessed a negative interaction with changes in OHP financing). The ethnicity interaction was insignificant in the Washington data (results not shown but available). Finally, changes in maternal tobacco use, population density, and the proportion of mothers with a high school diploma failed to exhibit significant results for both Oregon and Washington.

Discussion

In our study we were able to compile a large volume of birth data across all 36 counties in Oregon and the 39 counties in Washington, strengthening the robustness of our findings. Our results suggest there was an insignificant decline in first trimester care in Washington and evidence of recovery. In Oregon, our results suggest there was a significant decline in first trimester utilization and less recovery over time. While the change in birth data recording may explain some of the reported decline in both states, based on the variables we analyzed, the first trimester reduction in Oregon is significantly associated with two factors: the increased use of Medicaid to fund delivery and increased births to women of maternal Hispanic ethnicity. These factors displayed no significance in Washington.

We do acknowledge some limitations to our study: we were reliant on public domain historical data, which may have been subject to some inaccuracies and the bias of self-reporting; and we lacked data on the full range of prenatal providers based on population levels. We also used birth certificate data and, in addition to the changes in recording, there are some criticisms of the reliability and validity of these data in terms of early prenatal care and the under reporting of certain maternal risk factors (Northam & Knapp, 2006). As it was necessary to review historical data, we considered the birth certificate data to be the most accessible and standardized over this period. A further limitation was the lack of Oregon insurance coverage data at the start of pregnancy. We used payment method at delivery as our measure of insurance coverage and recognize our results must be interpreted with a degree of caution. Our study was descriptive, and thus we are unable to draw any causal inferences. However, in the discussion below, we illustrate the Oregon comparison with Washington, and contextualize our findings alongside current and past policy approaches.

In Oregon, between 2001-2010, there was a significant association between declining county level first trimester care utilization and Hispanic ethnicity. In Washington, maternal Hispanic ethnicity was not significantly associated with changes in first trimester care utilization. Of note, in both Oregon and Washington over the period of our review, the Hispanic population grew at a faster pace than national rates (64% and 71% respectively) (Office of Economic Analysis, 2010). It has already been stated that ethnicity can be a risk factor for utilizing first trimester care (Coley & Aronson, 2013) but the significant association in Oregon between Hispanic ethnicity and prenatal care, alongside the lack of association in Washington, merits further exploration. One focus may be the impact of immigration status: we were unable to determine the immigration status of pregnant women from our data but it may be of relevance to first trimester utilization in light of the differing policy approaches of Washington and Oregon.

In Washington, regardless of immigration status, prenatal care is, and has been, funded statewide for women who would otherwise be eligible for Medicaid (National Immigration Law Center, 2012). In Oregon, there was no *statewide* prenatal funding for undocumented pregnant women during the period of our review. There was funding for labor and delivery under the Citizen Alien Waved Emergent Medical Program (CAWEM), and since 2008, prenatal benefits have also been available through the CAWEM Prenatal Expansion Program (Oregon Department of Human Services, 2012). This initiative started with two participating Oregon counties in 2008 and our data suggest that in the period up to 2010, these two counties had average declines in first trimester care of 1.1%, while non-CAWEM Expansion counties had average declines of 2.5% (Oregon Health Authority, 2012b). By 2012, an additional 13 counties offered the CAWEM prenatal program and, from October 2013 all Oregon counties will offer prenatal care to Medicaid eligible women, irrespective of their immigration status (Dixon-Gray, 2013). The Oregon prenatal expansion may be a clinically important intervention: for example, it has been

noted that women of Hispanic origin may have significantly higher likelihood of infections, postpartum hemorrhage, and gestational diabetes than Whites (Cabacungan, Ngui & McGinley, 2012; Fujimoto, Samoa, & Wotring, 2013). Thus, with immigrant populations rising, there is some urgency to make early prenatal care more accessible. Encouragingly, preliminary evidence from the early CAWEM Expansion counties suggests the new policy initiative may well improve first trimester utilization for Hispanic women. However, we need to monitor the impact of the new policy and, locally and nationally, we need to continue to learn as much as we can about the relationship between maternal Hispanic ethnicity and the provision of prenatal care. Future research should explore barriers to access and the role of immigration status in inhibiting or delaying a woman's prenatal journey.

It is important to note that the Oregon prenatal expansion is still a Medicaid related intervention and our results also suggest that, in Oregon, even women already eligible for Medicaid are not necessarily entering prenatal care in the first trimester. Between 2001-2010, there was a significant association between declining county level first trimester care utilization and Medicaid/ OHP funded delivery. This association was not noted in Washington and, again, differing policy approaches may offer some explanation. Both Washington and Oregon experienced gains in Medicaid enrollees from 2000-2010 (with the greatest gains being evident from 2008 to 2010). However, between 2000 and 2007 (covering the period when first trimester care began to decline) there was more year-on-year enrollment volatility in Oregon: Washington Medicaid enrollment rates never dropped by more than 1.6% in any one year but OHP enrollment in Oregon dropped by 6.6% in 2003, 1.9% in 2005, and 5.3% in 2006 (Kaiser Family Foundation, 2011). Economic forces may have triggered this volatility and enrollment decline. The original OHP, enacted in 1994, expanded Medicaid coverage in Oregon to 100% of the federal poverty level and prioritized the rationing of health services (of which first trimester

prenatal care was considered an essential universal service). However, since 2000, rising coverage requirements, coupled with a considerable rise in medical care inflation, made the system fiscally unsustainable for the state treasury. This prompted an alteration of the Oregon Health Plan in 2003 to a two-tiered system: OHP Standard and OHP Plus. OHP Plus was most true to the original OHP in terms of benefits but, unlike before, eligibility was restricted to certain groups such as pregnant women, those with disability or those receiving supplemental security income. Those not eligible for OHP Plus could enroll in OHP Standard if they had incomes higher than 100% of the federal poverty level. However, OHP Standard required monthly premiums and offered reduced benefits and higher copayments. The outcome was that, across Oregon after 2003, the number of OHP enrollees, including women of childbearing age, dropped considerably (Fruits, Hillard, & Lewis, 2010).

The value of OHP funding is not in question. It is clearly contributing to coverage for a large number of deliveries as witnessed by the number of Oregon counties who have shown OHP coverage expansion. However, these same counties also witnessed decreases in first trimester care and this presents an interesting dichotomy: there may be a Medicaid/OHP related delay in a woman's ability to secure first trimester care. Two factors may be explanatory: the first, suggested in the literature, is the possible provider reluctance to provide services to OHP funded patients (Kenney, Coyer & Anderson, 2013). One reason may be the perceived inadequacy of Medicaid reimbursement rates; as reimbursements fall behind costs, medical providers may be incentivized to restrict provision of care for OHP patients in favor of those with commercial insurers who provide more generous repayment rates. Nationally, in terms of Medicaid, there is some evidence this risk is real (Hahn, 2013).

A second possibility is the length of time taken to transition onto OHP Plus coverage *during* pregnancy among women who are not insured at the *start* of pregnancy. The volatile

enrollment pattern in Oregon suggests that pregnancy insurance transitions are likely and this is supported nationally: in a nine-state study it was shown that more than one-third of all pregnant women underwent coverage changes in pregnancy. The majority who transitioned were women moving from being uninsured to Medicaid coverage (Adams, Gavin, Handler, Manning & Raskind-Hood, 2003). The need for, and support during, insurance transition has been recognized in Oregon through a state funded program known as Oregon MothersCare (OMC). OMC has the specified goal of streamlining access to prenatal care with a target of increasing the percentage of first trimester care recipients to 90% or higher. The program commenced operation in 2000 with five counties and, to date, has 29 sites across 24 counties in Oregon (Oregon Health Authority, 2012b). This leaves 12 counties lacking a dedicated service aimed at securing early prenatal care for Medicaid recipients including the largest county by population and the largest by area. It is possible that a fully funded initiative such as OMC has the potential to reverse the prenatal trend in Oregon, but more data are required in relation to how early women actually come into contact with this service. If women lack knowledge about the program, or access OMC after a certain stage of pregnancy, then they may secure OHP funding to pay for their later care and delivery but they forfeit the opportunity to secure first trimester prenatal care. This may be what is reflected in our results although without further data that more accurately reflects women's prenatal journeys, it is difficult to determine exactly how many women may be experiencing delayed benefits and thus delayed care.

In Oregon, there is one factor uniting our two main findings: the small, but *positive* interaction between OHP funding at delivery and Hispanic maternal ethnicity. Separately these two variables are associated with a decline in first trimester care but in combination, there appears to be a slight increase in first trimester care use among Hispanic women using OHP. This suggests, with caution, that targeted programs such as Oregon MothersCare and the

CAWEM Prenatal Expansion may have the potential to reverse the Oregon prenatal trends over time. A point to note, though, is the *negative* interaction between OHP and women of other ethnic categories suggesting that much work remains to be done in terms of securing early prenatal access for vulnerable women.

Now is the time, though, for increased policy advocacy, outreach and education by nurses and other clinicians. At the time of writing, Oregon has just embarked on a new health reform initiative that will be funded by OHP/Medicaid. The new reform aims to provide care to Medicaid recipients through Coordinated Care Organizations (CCOs). Each CCO will be responsible for providing health care that is more ‘patient-centered’ and ‘team focused’ than the current system (Oregon Health Authority, 2012c). The ‘Triple Aim’ of these CCOs is to promote better health, better care, and lower OHP costs. One of the metrics by which the CCOs will be measured is ‘timeliness to prenatal care’. As the health reform commences, the benchmark metric stands at 69.4% of OHP/Medicaid funded pregnancies to receive first trimester care (or within 42 days of OHP enrollment). This would be from a 2011 baseline of 65% (Oregon Health Authority, 2013). But questions remain about OHP and its ability to quickly respond to women who are pregnant. As with rising immigrant populations, there may also be a national imperative here: the Medicaid insurance expansion inherent in the Patient Protection and Affordable Care Act will bring many more individuals into the Medicaid system (Patient Protection and Affordable Care Act, 2010). From January 2014, individuals with an income at 138% of the federal poverty level will be eligible for Medicaid coverage. In Oregon, this expansion could bring over 200,000 new patients into the health care system. However our study suggests that, even before this planned expansion, the health care system may not be meeting the needs of those most in need. CCO governance organizations, medical providers and nurses need to ensure

they have a full understanding of the seen and unseen barriers that may be inhibiting access or use of first trimester care.

Nurses, clinicians and all providers have a role to play in ensuring their clinical services are responsive and adaptive. Further qualitative research may be important in this endeavor and the findings should feed into a strategic planning process designed to enhance prenatal utilization early in pregnancy. Without this collective effort, it is possible that many women will continue to be disenfranchised from the health care system. On this point of disenfranchisement, there is one final point to note: even at the highest rate in 2000, the data indicate that not all women in Oregon received first trimester care. From the current data, we are unable to determine if the issue is one of cost, one of access, or one of choice. Therefore, research may need to focus on the ability of the current prenatal system to meet the needs of differing groups within society. For as we become increasingly aware of the long-term public health implications of healthy fetal development, the full ramifications of diminished care may become apparent over time. For example, the National Business Group on Health reviewed the evidence related to the business case for prenatal care and concluded that for high risk populations, which may well include Medicaid/OHP clients and those from ethnic backgrounds, intensive prenatal care offers significant cost-savings in terms of hospital admission rates among neonates (Campbell, 2007). Benefits have also been noted in relation to providing culturally competent care and for teen pregnancies where, depending on when care is initiated, there may be costs savings of over \$3000 per pregnancy (Hueston, Quattelbaum & Benich, 2008; Tandon, Colon, Vega, Murphy & Alonso, 2012). Additional neonatal and long term benefits from early prenatal care may also be evident in terms of higher smoking cessation rates and exclusive breastfeeding (Brodsky, Viner-Brown & Handler, 2009; Tenfelde, Finnegan & Hill, 2011).

Conclusion

First trimester prenatal care provision in Oregon has fallen significantly over the past ten years. From a rate in excess of the current Healthy People 2020 target in 2000, Oregon now has a rate below the 2020 target (a fall of more than 10%). Our results suggest that at least some of this decline may be associated with maternal Hispanic ethnicity as well as the OHP financing of prenatal care. It is unlikely that maternal ethnicity and OHP funding explains the entire prenatal presentation in Oregon but a lack of similar trends in Washington suggests they may be intensifying factors. More robust data and research are needed to help outline reasons for delay in utilizing early care and we suggest now is the time for this exploration. Oregon is undergoing a health transformation in terms of the delivery of care and Medicaid funding. The establishment of Coordinated Care Organizations, as well as the national Medicaid expansion through the Affordable Care Act, could give new impetus to the prioritization of culturally competent and early prenatal care. Our findings suggest that strategic policy approaches will be of particular importance if states hope to provide important basic services to vulnerable populations. Nurses and other health professionals need to be at the forefront of a concerted effort to enhance access and use of first trimester care. Without this concerted effort, the outcome of diminished care is likely to be disproportionately felt by women who need care most. Unless we address it now, any potential savings in the short term may be offset by the long-term public health impact of reduced prenatal care uptake among the most vulnerable women.

References

- Adams, E. K., Gavin, N.I., Handler, A., Manning, W., & Raskind-Hood, C. (2003) Transitions in insurance coverage from before pregnancy through delivery in nine states 1996–1999. *Health Affairs*. 22, 219-229.
- Bauer, J., Angus, L., Fischler, N., Rosenberg, K. D., Gipson, T .F., & DeVoe, J. (2011). The impact of citizenship documentation requirements on access to Medicaid for pregnant women in Oregon. *Maternal Child Health*. 15, 753–758. doi: 10.1007/s10995-010-0632-5
- Brodsky, J., Viner-Brown, S., & Handler, A. S. (2009). Changes in maternal cigarette smoking among pregnant WIC participants in Rhode Island. *Maternal Child Health*. 13, 822–831. doi: 10.1007/s10995-008-0415-4
- Cabacungan, E.T., Ngui, E.M., McGinley, E.L. (2012). Racial/ethnic disparities in maternal morbidities: A statewide study of labor and delivery hospitalizations in Wisconsin. *J Maternal and Child Health*. 16(7): 1455-1467. doi: 10.1007/s10995-011-0914-6
- Campbell, K. P. (Ed.) (2007). *Investing in maternal and child health: An employer’s toolkit*. Washington, DC: Center for Prevention and Health Services, National Business Group on Health.

Coley, S.L., Aronson, R.E. (2013). Exploring birth outcome disparities and the impact of prenatal care utilization among North Carolina teen mothers. *Women's Health Issues*.

23(5): 287-294. doi: 10.1016/j.whi.2013.06.004

Department of Health & Human Services. (2010). *Healthy people 2020*. Washington: Author.

Dixon-Gray, L. (2013). *Oregon's prenatal expansion program; quick facts*. Portland: Oregon Health Authority.

Fruits, E., Hillard, A., & Lewis, L. (2010). *The Oregon Health Plan: A bold experiment that failed*. Portland, OR: Cascade Policy Institute.

Fujimoto, W., Samoa, R., Wotring, A. (2013). Gestational Diabetes in High-Risk Populations. *Clinical Diabetes*, 31, 2. doi: 10.2337/diaclin.31.2.90

Girard, A., Oluwafunke, O. (2012). Nutrition education and counselling provided during pregnancy: effects on maternal, neonatal and child health outcomes. *Pediatric and Perinatal Epidemiology*. 26(Suppl.1): 191-204. doi:10.1111/j.1365-3016.2012.01278.x

Greene, W. (2003). *Econometric Analysis*, 5th edition. New Jersey: Pearson Education.

Hahn, Y. (2013) The effect of Medicaid physician fees on take-up of public health insurance among children in poverty. *Journal of Health Economics*. 32(2): 452-462. doi:

10.1016/j.jhealeco.2013.01.003

Hueston, W. J., Quattlebaum, R. G., & Benich, J. J. (2008) How much money can early prenatal care for teen pregnancies save?: A cost-benefit analysis. *Journal of the American Board of Family Medicine*. 21, 184-190. doi: 10.3122/jabfm.2008.03.070215

Indicators Northwest. (2012). *State Highlights*. Retrieved from <http://www.indicatorsnorthwest.org/>.

Kaiser Family Foundation. (2011). *Medicaid enrollment: December 2010 snapshot*. Washington, DC: Kaiser Family Foundation.

Kaiser Family Foundation. (2012). *State Health Facts*. Retrieved from <http://www.statehealthfacts.org/profileind.jsp?rgn=39&ind=225&cat=4>

Kenney, G.M., Coyer, C., Anderson, N. (2013). *Racial and ethnic differences in access to care and service use for children with coverage through Medicaid and the Children's Health Insurance Program*. Washington, DC: The Urban Institute.

Kittel, B., & Winner, H. (2005). How reliable is pooled analysis in political economy? The globalization-welfare state nexus revisited. *European Journal of Political Research*. 44, 269-293. doi:10.1111/j.1475-6765.2005.00228.x

Korineka, K., Smith, K.R. (2011). Prenatal care among immigrant and racial-ethnic minority women in a new immigrant destination: Exploring the impact of immigrant legal status. *Social Science & Medicine*, 72, 11 1695-1703 doi: 10.1016/j.socscimed.2011.02.046

March of Dimes. (2013). *Peristats*. Retrieved from <http://www.marchofdimes.com/peristats/calculations.aspx?reg=&top=&id=62013>

National Conference of State Legislators. (2013). *Medicaid eligibility table*. Retrieved from <http://www.ncsl.org/research/health/medicaid-eligibility-table-by-state-state-activit.aspx>.

National Immigration Law Center. (2012). *Medical assistance programs for immigrants in various states*. Los Angeles, CA: National Immigration Law Center.

Northam, S., & Knapp, T. R. (2006). The reliability and validity of birth certificates. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*. 35(1): 3-12. doi: 10.1111/j.1552-6909.2006.00016.x

Office of Economic Analysis. (2010). *Oregon's demographic trends*. Salem, OR: Department of Administrative Services.

Oregon Department of Human Services. (2012). *Citizen alien waived emergent medical*. Retrieved from <http://www.dhs.state.or.us/spd/tools/program/cawem.htm>.

Oregon Health Authority. (2012a). *Oregon vital statistics county data book (2000-2010)*.

Retrieved from

<http://public.health.oregon.gov/BirthDeathCertificates/VitalStatistics/annualreports/CountyDataBook/Pages/cdb.aspx>.

Oregon Health Authority. (2012b). *Oregon MothersCare*. Retrieved from

<http://public.health.oregon.gov/HealthyPeopleFamilies/Women/Pregnancy/OregonMothersCare/Pages/index.aspx>

Oregon Health Authority. (2012c). *Coordinated care organizations implementation proposal*.

Retrieved from <http://health.oregon.gov/OHA/OHPB/health-reform/docs/cco-implementation-proposal.pdf>.

Oregon Health Authority. (2013). *Timeliness of prenatal care guidance document*. Portland:

Oregon Health Authority.

Oregon Health Authority. (2014). *Oregon birth data*. Retrieved from

<http://public.health.oregon.gov/BirthDeathCertificates/VitalStatistics/birth/Documents/birthpc08.pdf>

Oregon REAP Project. (2013). *Comparative Economic Indicators*. Retrieved from

http://oregon.reaproject.org/analysis/comparative-indicators/year_vs_year/population/

Patient Protection and Affordable Care Act. (2010). Pub. L. No. 111-148, §2702, 124 Stat. 119, 318-319. 2010.

State of Washington. (2013). *County population density by year*. Retrieved from <https://data.wa.gov/Demographics/WAOFM-County-Population-Density-by-Year-2000-to-Pr/hynh-y29e>.

Sunil, T.S., Spears, W.D., Hook, L., Castillo, J., Torres, C. (2010). Initiation of and Barriers to Prenatal Care Use Among Low-Income Women in San Antonio, Texas. *Journal Maternal and Child Health*. 14(1): 133-140. doi:10.1007/s10995-008-0419-0

Tandon, S.,D., Colon, L., Vega, P., Murphy, J., Alonso, A. (2012). Birth Outcomes Associated with Receipt of Group Prenatal Care Among Low-Income Hispanic Women. *Journal of Midwifery & Women's Health*. 57(5): 476–481. doi:10.1111/j.1542-2011.2012.00184.x

Tenfelde, S., Finnegan, F., & Hill, P. D. (2011). Predictors of breastfeeding exclusivity in a WIC sample. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*. 40: 179-189. doi: 10.1111/j.1552-6909.2011.01224.x

U.S. Census Bureau. (2012). *Small area income & poverty estimates 2005-2010*. Retrieved from <https://www.census.gov/did/www/saipe/data/statecounty/index.html>

Washington State Department of Social and Health Services. (2010). *County profiles*. Olympia: Washington State, Research & Data Analysis Division.

Washington State Department of Health. (2012). *All birth tables by year*. Retrieved from
<http://www.doh.wa.gov/DataandStatisticalReports/VitalStatisticsData/BirthData/BirthTablesbyYear.aspx>

Yelland, J. S., Sutherland, G. A., & Brown, S. J. (2012). Women's experience of discrimination in Australian perinatal care: The double disadvantage of social adversity and unequal care. *Birth*, 39, 3 211-220. doi: 10.1111/j.1523-536X.2012.00550.x

Table 1: Descriptive Statistics of Maternal and Oregon and Washington County Data, 2000-2010

Oregon Data		
	<i>County Data^a Mean (SD), n=396^b</i>	<i>% Change from previous year Mean (SD), n=360^b</i>
<i>Dependent variable</i>		
Utilization of First-Trimester Prenatal Care	77.4 (8.76)	-0.95 (6.84)
<i>Independent variables</i>		
OHP Payment at Delivery	44.13 (11.3)	5.54 (36.61)
White racial category	77.25 (14.39)	NA
Hispanic/Latino ethnic category	16.45 (12.68)	NA
African American racial category	0.58 (1.20)	NA
Native American racial category	2.56 (4.38)	NA
Other racial category	2.87 (2.85)	NA
Mothers without a High School Degree	20.59 (8.46)	2.63 (30.05)
Maternal Tobacco Use	16.46 (6.18)	3.09 (28.14)
County Poverty	15.03 (3.29)	2.16 (11.45)
Population Density (number of people per square mile)	99.78 (262.13)	0.64 (1.29)
Washington Data		
	<i>County Data^a Mean (SD), n=429^b</i>	<i>% Change from previous year Mean (SD), n=390^b</i>
<i>Dependent variable</i>		
Utilization of First-Trimester Prenatal Care	74.49 (7.65)	0.63 (11.41)
<i>Independent variables</i>		
Medicaid Payment at Delivery	57.04 (13.2)	-2.30 (15.35)
White racial category	NA	NA
Hispanic/Latino ethnic category	18.71 (18.37)	NA
African American racial category	NA	NA
Native American racial category	NA	NA
Other racial category	NA	NA
Mothers without a High School Degree	21.60 (11.49)	2.22 (34.94)
Maternal Tobacco Use	15.11 (7.91)	3.74 (34.45)
Population Density (number of people per square mile)	122.86 (201.01)	1.16 (1.05)

^a County data are expressed as levels/proportions of the total relevant population.

^b Not all counties have complete data for the relevant time period for certain variables (hence, the number of county-years is smaller for variables where missing values exist)

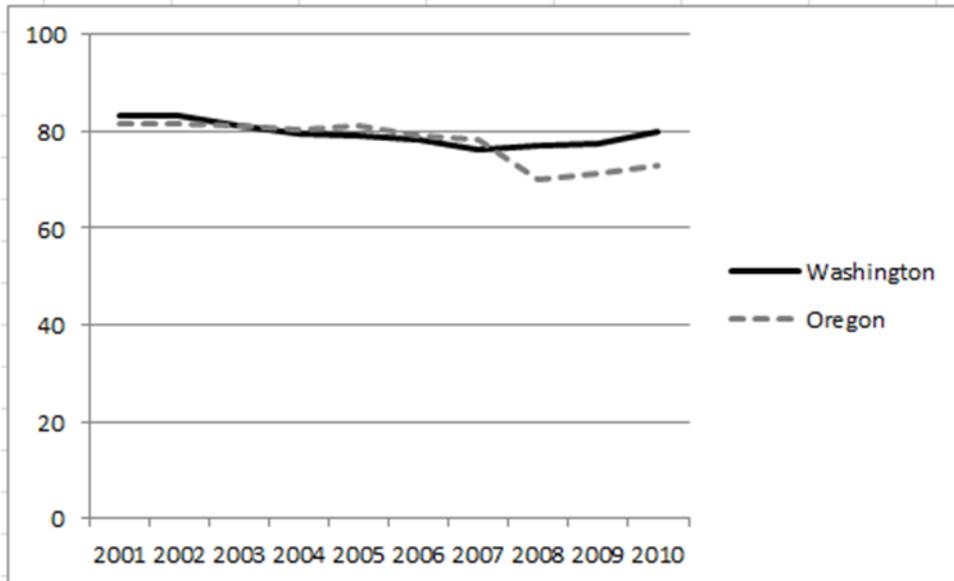
Table 2: The Influence of Hispanic Ethnicity on Annual Changes in First Trimester Care Utilization - A Comparison of Washington and Oregon ^c

	Model I	Model II	Model III	Model IV	Model V
	OR (310 county-years)	OR (310 county-years)	OR (140 county-years)	OR (310 county-years)	WA (309 county-years)
Proportion of county births by Hispanic mothers	-0.348** (0.016)	-0.338** (0.024)	-0.642*** (0.004)	-0.289** (0.043)	-0.958 (0.192)
Proportion of county births by African American mothers	-0.351 (0.597)	-0.153 (0.860)	0.059 (0.966)		
Proportion of county births by Native American mothers	-0.54 (0.099)	-0.492 (0.134)	-0.949** (0.030)		
Proportion of county births by mothers in the alternative race cat.	-0.491 (0.181)	-0.479 (0.156)	-0.578 (0.432)		
Δ Medicaid Payment at Delivery	-0.030*** (0.009)	-0.072*** (0.000)	-0.043*** (0.003)	-0.027** (0.016)	0.146 (0.110)
Interaction between Δ Medicaid and Hispanic Ethnicity		0.004*** (0.000)			
Interaction between Δ Medicaid and African American race cat.		0.045 (0.238)			
Interaction between Δ Medicaid and Native American race cat.		0.000 (0.922)			
Interaction between Δ Medicaid and mothers in alternative race cat.		-0.012** (0.048)			
Δ Maternal Tobacco Use	-0.001 (0.956)	0.001 (0.954)	-0.025 (0.377)	-0.001 (0.952)	0.015 (0.699)
Δ Mothers without a high school degree	-0.009 (0.621)	-0.01 (0.596)	0.028 (0.233)	-0.012 (0.551)	0.071 (0.298)
Δ County Population Density (proxy for availability of care)	-0.378 (0.451)	-0.394 (0.425)	0.46 (0.504)	-0.427 (0.345)	0.527 (0.359)
Δ County Poverty			-0.041 (0.505)		
Constant	9.707*** (0.001)	8.830*** (0.003)	7.433 (0.135)	6.606*** (0.002)	11.29 (0.258)
R ² (within county panels)	0.128	0.171	0.159	0.111	0.094
F-statistic	8.63***	23.75***	5.66***	12.78***	2.12

^c Unstandardized beta coefficients presented and robust p-values, (standard errors clustered by county) provided in parenthesis. OLS fixed effects estimator is the model used. Δ indicates the variable is differenced (percentage change from the previous year). (N-1) county dummies and linear time trend included but not shown. **, and *** indicate beta significance on a 95% and 99% confidence level, respectively.

Figure 1

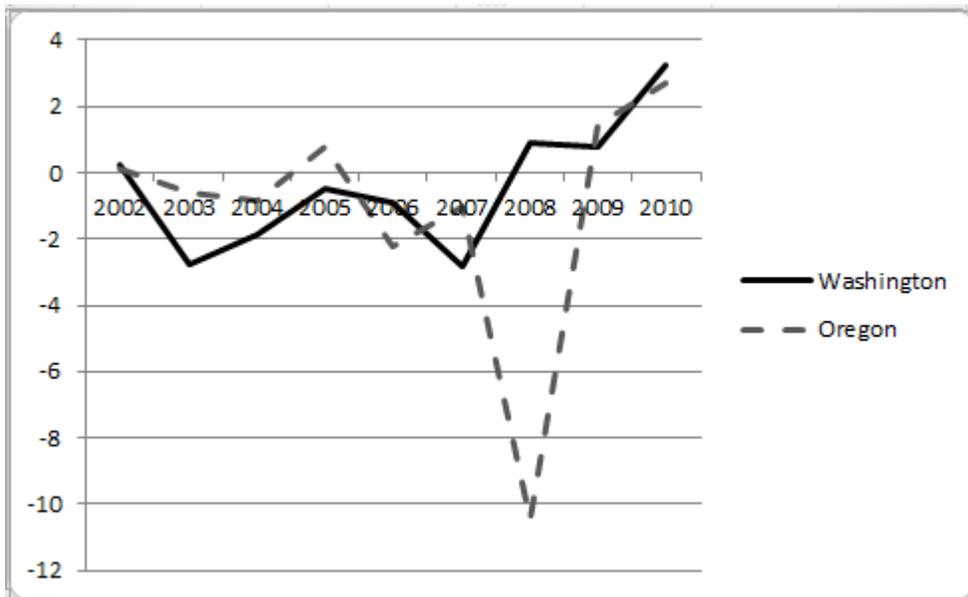
Percentage of Pregnant Women Receiving First Trimester Care



Source: Indicators Northwest, 2012

Figure 2

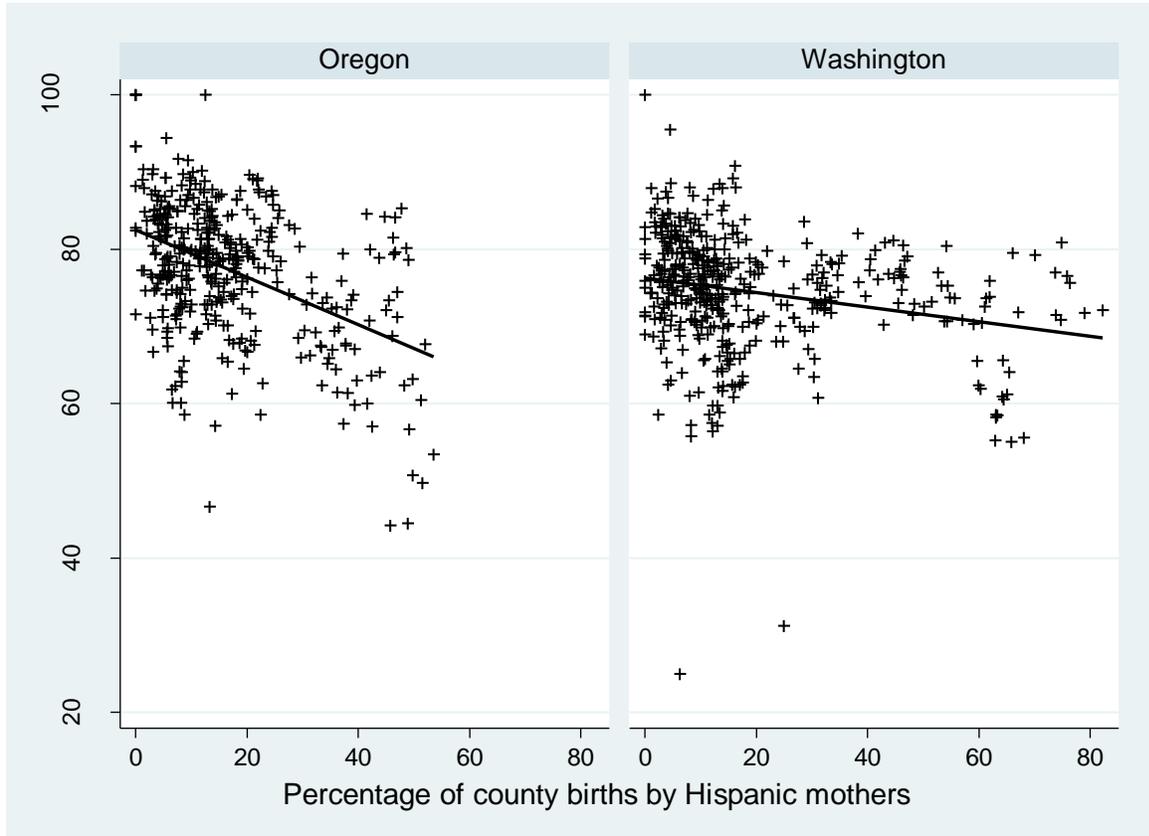
Annual Percentage Changes in First Trimester Care Use



Source: Indicators Northwest, 2012

Figure 3

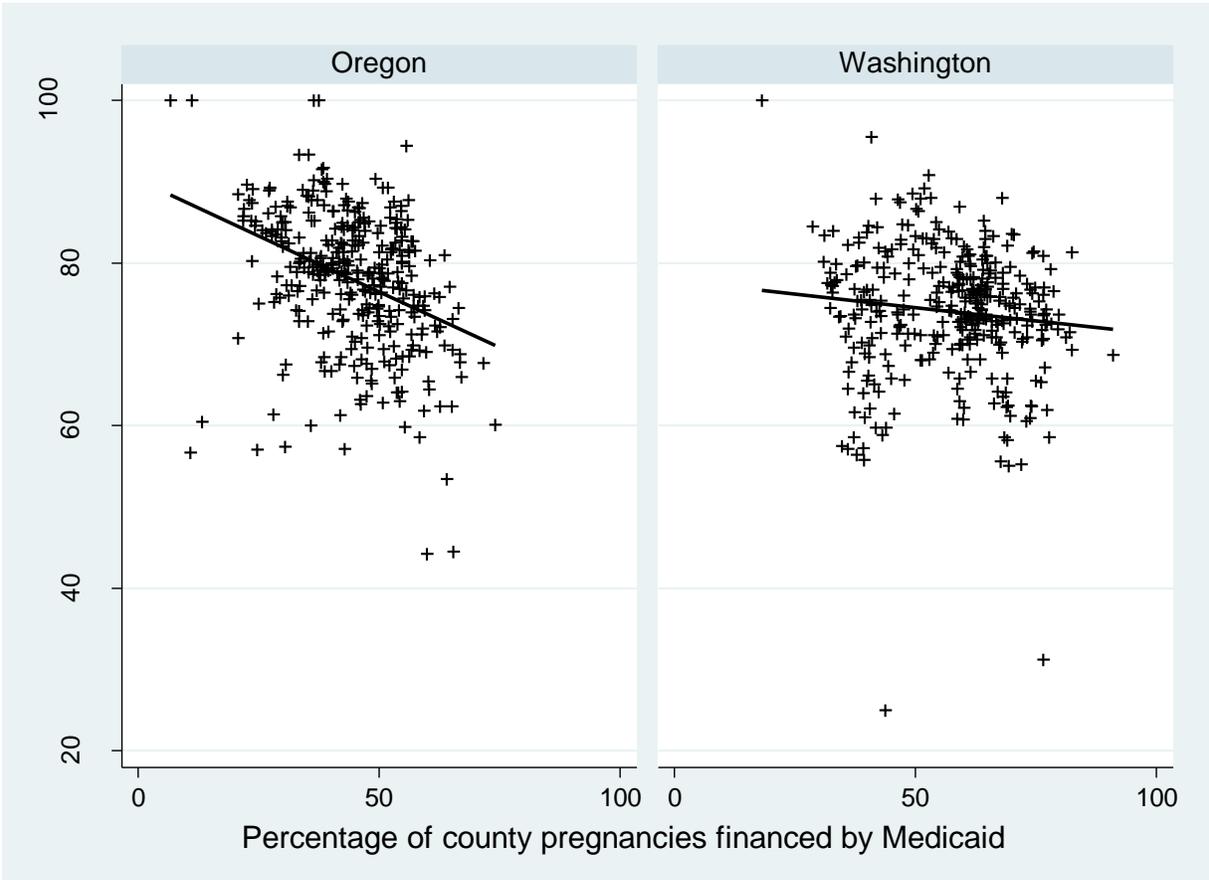
Percentage of Mothers Utilizing First Trimester Use and Hispanic Ethnicity: Oregon and Washington Counties, 2000-2010



Note: Observations are county-years from 2000 to 2010

Figure 4

Relationship between Medicaid Financing at Delivery and Percentage of Mothers Utilizing First Trimester Care: Oregon and Washington Counties, 2000-2008/2009



Note: Observations are county-years from 2000-2009 (for Oregon) or 2000-2008 (for Washington)