**Executive Summary for “The Effect of Insurance Expansions on Supplier-Induced Demand in Dentistry”**

**Background** Prior to the Affordable Care Act (ACA), only 40% of patients seeing the dentist had any form of dental insurance. Because dental insurance is not like traditional insurance, and is typically compared to pre-payment plans for routine and expected services instead of protecting enrollees from significant financial risk, there was little interest in exploring the effects of dental insurance on dental provider behavior. Though the ACA did not expand dental coverage to the extent initially intended by including pediatric dental as part of the essential health benefits (EHB) package, due to the lack of a mandate on purchasing dental coverage, there has been an increase in dental benefits offered on the health insurance exchanges from 2014 to 2015 (Yarbrough et al. 2015), and Medicaid expansions have also lead to increases in enrollment in dental coverage (Vujicic 2015). With widespread changes in coverage, understanding how dentists alter their treatment behavior in response to financial incentives given through insurance plans becomes increasingly important, which imply consequences for the underlying cost of plans and the long-term health and dental health of patients.

There is large scope for demand inducement among dental providers, with important implications for consumers’ long term health and costs. Though insurers implement utilization management and other supply-side controls to limit provider-initiated over-utilization, dentists are able to overcome these constraints in several situations. Specifically, in regards to dental caries (also known as cavities), even when X-rays are required by insurers, X-rays do not fully capture the extent of tooth damage (Zero et al. 2011) and early stage cavities generally are not symptomatic (Zero et al. 2011). As a result, dentists are able to upgrade the severity of a cavity without the insurer’s or patient’s knowledge, and insurer fee schedules may exacerbate this problem by offering higher fees for some services (Baelum 2008), such as fillings for higher severity cavities and crowns. Furthermore, cavity fillings, or restorations, generally fail over time, and must be cut out and replaced each time, leading to a larger holes and increased weakness in the teeth (Elderton 2003), sometimes necessitating more intensive endodontic treatment (such as root canals, crowns, and bridges) (Elderton 2003). Zero et al. (2011) estimates that “[based] on data from the dental insurance industry, to maintain a single molar restoration placed in a 10-year-old patient reaches $2197 by age 79 years”.

Given the financial costs and potential for detrimental health effects from demand inducement, I ask the following important research question: what is the effect of the private and public insurance expansions through the ACA on demand inducement in dentistry?

Because there are parallels between the dental and medical industries in the scope for provider-initiated over-utilization, this research can also be applied to health care more broadly.

**Literature** The current research on the supply-side effect of insurance expansions has focused on self-reported data by providers (Garthwaite 2011; Buchmueller et al. 2014), which is unable to capture changes in dental treatment choices. Furthermore, the demand inducement literature in economics has suffered from endogeneity problems (Phelps 1986; Dranove and Wehner 1994). A large literature using exogenous variation provided through insurance expansions has discussed the effects on selection and crowd-out (Hackmann, Kolstad, and Kowalski 2012; Gruber and Simon 2007), as well as on access, utilization, and health outcomes (Finkelstein et al. 2012; Mueller and Monheit 1988; Kolstad and Kowalski 2012), but none to date have examined the impact of insurance expansions on provider treatment choices. This is primarily been because the service-specific data rarely exists especially for dental markets (Sintonen and Linnosmaa 2000), and prior insurance expansions have been relatively small in size.

**Theory** By expanding the insured population seeking dental care, dental insurance expansions can be viewed through the lens of the McGuire and Pauly (1991) model, which predicts that an increase in the number of patients in the practice will lead to a decrease in inducement across all groups. In the model, providers receive utility from income, but disutility from inducement.
With an increase in the number of patients seen, there is an increase in the marginal disutility from inducement and a corresponding decrease in the marginal utility from income. As a result, the marginal psychic cost of inducement increases and providers respond by decreasing the amount of inducement per patient. Extensions made to the McGuire and Pauly (1991) model allow for the untangling of moral hazard from inducement behavior, and generates clean predictions of what will occur given high costs of expanding capacity, in order to accommodate the increase in patients in the market. This generates the following hypotheses:

**Hypothesis 1.** Providers faced with larger insurance expansions will choose to decrease inducement for procedures.

**Hypothesis 2.** For providers facing binding capacity constraints or restrictive scope of practice laws for dental hygienists, which increase the cost of expanding practice size, there will be further incentive to decrease in inducement when an insurance expansion occurs.

These hypotheses together imply that insurance expansions not only decrease under-utilization among the uninsured population, but also decreases over-utilization of dental services among those who are insured, particularly over-utilization initiated by dental providers.

**Empirical Strategy** The main source of innovation in the proposed research comes from the use of a novel source of detailed data to measure changes in treatment behavior, which are identified using a source of variation previously unlinked from provider treatment choices. First, we use dental claims data containing information on both publicly and privately insured individuals that contains service-specific information. Second, we leverage exogenous variation in the size and timing of dental expansions across markets to identify changes in provider treatment choices and establish evidence of causation, rather than focusing on correlations. Prior work in measuring the change in supplier-induced demand in dentistry relied on cross-sectional variation in the dentist-to-population ratio (Manning and Phelps 1979; Conrad et al. 1987; Mueller and Monheit 1988), but this ignores the possibility that areas with high levels of dentist density may have more dentists because there was initially more demand there. A strength of our identification then is that we instead use a source of variation that exogenously changes the market size that is uncorrelated with the location choices or treatment decisions of providers. Our working hypothesis is that dentists who are subject to a larger dental expansions will decrease their treatment intensity. I will test this hypothesis by using two econometric designs - difference-in-differences (DiD) and two-stage least squares (2SLS). In both, we mitigate concerns about moral hazard and measurement issues by imposing a number of sample restrictions.

**Reason for Funding** I am requesting funding to cover the payment for the claims data delivery from the private insurer. This data is necessary in order to carry out my dissertation research. The contract for the claims data has arrived and has been revised and negotiated by the Penn Center for Innovation Corporate Contracts Office, and delivery of the data is assured given payment. The cost estimate from the private insurer was received on March 25, 2015, and exceeds departmental funding for data by $4000.

**References Cited**


