

As American healthcare expenditures continue to climb, calls for greater healthcare transparency among politicians, business-leaders, and patients are increasing. This effect has been most visible at the state level. Since 2003, more than 30 states have adopted legislation to enhance price transparency in healthcare (Kullgren 2013). Colorado is moving in lockstep with the introduction of HB 18-1009.

However, despite the enthusiasm for these initiatives, there has been insufficient discussion regarding their economic effects. This paper examines the theoretical effects of HB 18-1009. Specifically, the impact of an online price transparency platform on the prices paid for diabetes medication by consumers.

Additionally, this paper discusses potential provider and supplier responses to the transparency mechanisms proposed in HB 18-1009. Most notable are concerns about improved information promoting softer competition and higher prices within the pharmaceutical market. This work also has substantial policy implications. The analysis presented in this paper demonstrates that the price transparency mechanisms proposed in HB 18-1009 are unlikely to result in significant cuts to Colorado's diabetes-related healthcare expenditures.

Proponents of HB18-1009 argue that price transparency mechanisms that operate on the consumer side of the market as promote competition and improve efficiency. This position is consistent with standard economic theory. Theoretical models predict that as a homogeneous market, such as that for prescription drugs, exhibit greater levels of price transparency, consumer demand shifts towards the lowest-cost supplier and the expected profits of firms decline (Davidson 1983). Firms are then likely to lower their prices to capture or maintain market share. In this sense, increasing market transparency intensifies competition and promotes efficiency.

Increasing publicly available price information also reduces consumer search costs. The law of one price states that commodities with the same physical attributes should be offered at the same price by different sellers in the same market. However, as in the case of prescription drugs, this axiom does not always hold (Ohler 2013). While price dispersion often reflects product or seller heterogeneity, it may also occur in a market because consumers lack information about product prices and must incur search costs to obtain that information (Stigler 1961). Considering that basic pricing information for even the most standardized procedures is notoriously difficult to acquire in healthcare markets (Rosenthal et al. 2013), policies that lower these search costs have the potential for increasing informed decision-making and promoting lower, more uniform prices.

However, multiple aspects of this argument in favor of HB 18-1009 appear to hinge on the implicit assumption that healthcare markets respond to transparency initiatives like other industries (Muir 2012). However, the existence of differentiated pricing structures and complex multi-party payment arrangements

within healthcare markets imply that ex-ante price disclosures may not be directly relevant to consumers. Many empirical studies of consumer-directed transparency initiatives have reported little to no effect on healthcare prices (Muir 2012 and referenced studies). Therefore, the assumption that a greater level of information availability will unambiguously drive down prices requires examination.

Asymmetrical information is most commonly found in markets that satisfy three conditions: there is a risk, there is a contract that implicitly or explicitly transfers this risk from one agent to another, and parties to the contract have different information about the relevant states of nature (Louberge, 1991). Insurance is a common market of concern. Following enrollment in insurance plans, insurers and consumers are exposed to asymmetrical information in the form of ex post moral hazard (Arrow 1963; Pauly 1968; Zeckhauser 1970). This phenomenon occurs when the existence of a contract between the consumer and the insurer causes the consumer to change his behavior to alter his expected cost of illness.

Ex post moral hazard is the result of insured individuals facing lower marginal prices for medical care than they would if they lacked coverage and operated inside a free market. Because insurance lowers the marginal cost of care and a consumer's demand curves are downward sloping, the insured consumer increases the quantity of medical care consumed above the level purchased when coverage was absent (Pauly, 1968). When there is ex post moral hazard, full coverage is suboptimal, as the presence of insurance leads the utility-maximizing individual to increase his medical expenditures in the sick state.

According to neoclassical economic theory, excessive medical care consumption also results in a net welfare loss (Feldstein, 1973). However, it is unlikely that the extent of this welfare loss is uniform across consumers, as it is a function of individual demand curves and rates of risk aversion (Gemmil 2008). The implication is that the optimal level of insurance is individual-specific, and that responsiveness to cost sharing is likely to differ between broad population groups, like elderly and low-income individuals. Nonetheless, it is often assumed by insurers that groups of individuals share the same risks and risk preferences for insurance, which encourages the distribution of insurance at the group level (Gemmil 2008).

The 2017 Colorado Health Access Survey (CHAS) found that the insurance coverage rate for individuals within the state is 93.5%. Furthermore, 35.4% of Coloradans are covered by full coverage public insurance plans (e.g. Medicare, Medicaid, and Child Health Plans *Plus*), and 49.4% are covered by employer-sponsored private plans, which are likely to be full coverage (CHAS 2017). In light of the aforementioned impacts, the 84.8% of individuals with full coverage in the Colorado market render the assertion that greater levels of price transparency will reduce medical expenditures less convincing.

Additionally, diabetes is a disease that disproportionately affects the poor (American Diabetes Association (ADA) 2012). While not all low-income individuals receive health insurance through Medicaid,

most Coloradans who live below the poverty line obtain coverage through public insurance plans. “The ACA, by expanding Medicaid eligibility, caused the uninsured rate among impoverished Coloradans to fall to 8.1 percent in 2017 from 21.7 percent in 2013” (CHAS 2017). While the Affordable Care Act also offered tax subsidies to make private insurance more affordable, approximately 22% of people with diabetes in the state of Colorado still receive coverage through Medicaid (Colorado Department of Public Health and Environment 2017). Seeing as this program is an example of group-level insurance distribution, it seems questionable that greater price transparency will unequivocally reduce prescription drug prices.

The elderly is another population group strongly impacted by diabetes that parallels the insurance patterns of the poor (CHAS 2017). In 2017, the uninsured rate for Coloradans age 65+ fell to 0.2%. Furthermore, 14.4% of Coloradans are covered by Medicare, the highest rate since 2009, and approximately 25% of Coloradans who are diagnosed with diabetes are covered by this program (Colorado Department of Public Health and Environment 2017).

Given that slightly less than 50% of consumers for diabetes medication are covered by these government programs, the impact of full-coverage insurance on the effectiveness of price transparency initiatives like HB 18-1009 should be considered prior to legislative implementation.

Another important implication of this analysis is to estimate the price elasticity of demand for diabetes medication. The optimal level of insurance differs between individuals, and we expect the responsiveness to price to differ between various groups of the population (Pauly 1968). Furthermore, the theory of insurance highlights factors that influence the demand for prescription drugs, as the demand curve in the moral hazard analysis is dependent upon various individual-level considerations.

Preferences for prescription drugs encompass a variety of influences such as a patient’s perceived need for prescription medications. While type 1 diabetics are likely to perceive themselves as “insulin-dependent” and consequently have relatively inelastic demand, these individuals only account for 5-10% of annual diagnoses nationwide (ADA 2012). The vast majority of diabetics are type 2, and for many of these individuals, insulin and similar medications are not required. Symptoms and risks for these patients can typically be controlled through lifestyle changes like improved diet and exercise (ADA 2012). Therefore, it seems plausible that demand for insulin and related medications is fairly elastic. This viewpoint ignores the impact of physician recommendations on patients’ elasticity of demand.

Whether insulin treatments are necessary, it is a common standard of care by physicians to prescribe them to type 2 diabetics (Woodfield 2017). This is problematic because most patients rely on their physician’s advice when it comes to managing a chronic illness like diabetes (Brown 2017). Many patients may feel they lack the medical knowledge to reasonably and safely go against a clinician’s guidance. Consequently, the

elasticity of demand among patients with type 2 diabetes is likely to decline. Furthermore, diabetes is significantly more prevalent amongst adults with lower levels of education (Colorado Department of Public Health and Environment 2017), which may exacerbate this effect.

Elasticity of demand is also impacted by a patient's severity of illness, as it is likely to influence his perceived value of medical care and pharmaceutical treatment. Prediabetics and individuals with type 2 diabetes frequently experience seemingly harmless symptoms, if they experience anything at all (ADA 2012). Consequently, these individuals may feel that their illness is less serious, especially considering its ubiquity, and display more elastic demand.

Contrarily, type 1 diabetics and the elderly are more likely to have inelastic demand. As previously mentioned, people with type 1 diabetes may feel that their illness is more severe, and therefore be willing to pay higher prices for treatment. Age is another likely determinant for whether a patient feels that his illness is pressing enough to merit prescription treatment. Older people are more likely to be risk averse as negative outcomes can be more detrimental to their health (Gemmill 2008). In addition, the elderly may perceive a shorter time horizon within which to improve their health and feel that substitutes for prescription drugs such as lifestyle changes are less appealing.

It is also relevant that individual patient perceptions regarding the risk of foregoing care, the safety profile of prescribed medicines, and general preferences for medical treatment may be important predictors of pharmaceutical demand.

The existence of these factors highlight that demand elasticity for diabetes medication in this market is not easily determined. Indeed, considering that goods in this market are distributed to consumers with vastly different perceptions, preferences, and third-party arrangements, it is likely that the demand curve for prescription drugs is nonlinear. If this is the case, it is no longer self-evident that increased price transparency will drive down market prices.

Regardless of the ambiguous and potentially harmful effects of HB 18-1009 on consumer welfare, one should still examine probable supplier behavior following the implementation of this bill. Specifically, this paper addresses the concern that greater price transparency may facilitate tacit collusion.

According to traditional theory, increasing transparency has two opposing effects on the stability of collusion (Ivaldi 2003). On the one hand, deviation from the collusive outcome becomes more attractive because consumers can more easily learn about the price cuts. On the other hand, there is tougher price competition if collusion breaks down. As a result, it is crucial to examine the characteristics of the market in order to determine which of these effects is mostly likely to dominate, starting with an examination of the number of competitors and how returns to collusion diminish as the number of firms grows.

Firms within a monopolistic pricing agreement are required to share the collusive profit. Therefore, each supplier must receive a smaller share of total profits as the number of firms within the agreement increases. This has two implications. First, the gain from undercutting the collusive price increases for each firm since it can steal market shares from competitors. Second, the long-term benefit of maintaining collusion for each firm is reduced, precisely because it gets a smaller share of the collusive profit. For both of these reasons, collusion is significantly simpler when there are fewer firms.

Furthermore, in any market with negotiated prices, price disclosure grants firms additional bargaining power. This effect is strongest in markets that have a small number of firms (Stigler 1964). Specifically, price transparency increases the applicability of punishment strategies by allowing firms to know when one firm deviates from a collusive strategy. As such, when dealing with a market that has few competitors, minimal informational disclosure is required to incentivize collusion. This point is further emphasized by the fact that inferring deviations from collusive conduct is simpler and requires less market data when a market is stable as compared to when a market is unstable (Ivaldi 2003).

Seeing as the Colorado market for diabetes medication is characterized by a small number of suppliers and is unlikely to suffer from significant demand shocks (Colorado Department of Public Health and Environment 2017), the public availability of pricing information and wholesale acquisition costs may provide a stronger incentive for collusive behavior than was originally predicted. However, this is strictly speculation. Nonetheless, it will hopefully motivate greater levels of research into the Colorado market, alongside increased levels of critical thinking regarding the impact of HB 18-1009.

In the wake of rising medical expenditures, “price transparency” has become the new healthcare mantra, especially with regards to prescription drugs. However, as this analysis demonstrates, greater informational availability is not a panacea for rising market prices and high levels of price dispersion. Indeed, while HB 18-1009 and similar price transparency initiatives are well-intentioned, the realities of insurance practices, complicated consumer demand, and the possibility of collusion are likely to render this bill nothing more than a moral victory.