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Abstract:
Gadolinium enhanced Magnetic Resonance Imaging (MRI) is a staple of contemporary diagnostic medicine (Leyba & Wagner 2019). Despite the uncertainty associated with their use, gadolinium-based contrast agents (GBCAs) are used extensively in MRI for a host of conditions. While GBCAs increase diagnostic efficiency, it is also known that gadolinium deposition is dangerous and therefore costly. There should be a careful consideration between the benefits and the costs associated with this practice to optimize patient health outcomes.

One known adverse effect of gadolinium deposition is nephrogenic systemic fibrosis (NSF). Although the mechanism by which patients are affected by gadolinium deposition are not well understood, we can examine differences in health outcomes among different groups of patients. By utilizing Truven Health MarketScan insurance data, we will retrospectively create “treatment” and “control” groups of patients that share similar characteristics but differ in their exposure to GBCAs. We can use the differences in health outcomes over time to estimate the marginal cost associated with GBCA exposure.

The benefits associated with increased diagnostic efficiency are usually information-based and associated with reducing uncertainty for the patient. When there is uncertainty, information or knowledge becomes a commodity. Like other commodities, it has a cost of production and a cost of transmission (Arrow, 1964). Traditional economic theory tells us that most patients have a preference for certainty (risk-aversion). We use this idea in the valuation of benefits associated with increased diagnostic efficiency of GBCAs. Ideally, we hope to create a tool by ordering physicians to target conditions for which the benefits associated with the use of GBCA outweigh the costs.

References: