TRAP laws and abortion rates: Do restrictions matter?
Nichole Austin, Sam Harper (McGill University, Department of Epidemiology)

Background
US abortion rates have reached historic lows (1), but the cause of the decline is contentious, coinciding with both improved access to contraception (2) and an unprecedented increase in state-level abortion restrictions (3). Over 200 new state-level abortion restrictions were enacted from 2011-2013 – more than in the entire preceding decade (3). However, despite the apparent popularity of these policies, evidence on their effect on abortion rates is unclear and often conflicting (1, 4-6).

Abortion restrictions can be loosely partitioned into two categories: those that operate predominantly at the individual level (i.e., mandatory ultrasounds, waiting periods), and those that operate at the provider/organizational level (i.e., provider and/or clinic certification requirements). Much existing work suggests that policies operating at the individual level may be largely ineffective in deterring women from obtaining abortions (1, 6, 7). In contrast, provider-level restrictions such as Targeted Regulation of Abortion Provider (TRAP) laws may affect state abortion rates by reducing service availability and/or prompting clinic closures (8, 9). TRAP laws impose non-essential, costly requirements on providers and facilities that simultaneously dissuade the establishment of new providers and impede the functioning of existing providers. These laws began to gain traction with policy-makers in 1990, and their popularity has surged since 2010 (10): as of 2015, nearly half of all US states had implemented some form of TRAP law. The impact of these laws on facility availability is clear: recent enforcement of TRAP laws in Texas prompted 19 abortion clinics to close by the end of 2013 (a loss of nearly half of the state’s facilities) (8).

Research on the impact of TRAP laws is very limited, and high-quality evidence on the causal effect of these laws on abortion rates is lacking. One study (11) examined data on TRAP law enactment from 1982-2005, ultimately concluding that TRAP laws were not associated with a decrease in abortion demand. This study grouped TRAP laws into two broad categories (annual licensing fees and physical plant/personnel requirements); this strategy obscures important policy variability and may bias effect estimates as TRAP laws range from relatively innocuous (such as grass length and room temperature requirements) to potentially insurmountable (such as requiring facilities to function as ambulatory surgical centers). Furthermore, although this study aimed to conduct a natural experiment capitalizing on state-to-state variation in TRAP implementation, it did not provide compelling evidence that pre-policy trends and demographic characteristics were similar between states. Finally, confidence intervals surrounding the reported TRAP parameters suggested a negative effect on abortion rates, even if the intervals included the null. We argue that 1) different TRAP laws may have different effects on abortion rates, and 2) including data from 2005 onward (capturing upward trends in policy implementation) is both important and timely. Our aim is therefore to update and build upon this analysis using a well-described difference in differences (DD) approach to quantify the causal effect of TRAP law enforcement on abortion rates.

Methods
Data
Data on state abortion rates (tabulated by state of occurrence and state of residence) were obtained from the CDC and the Guttmacher Institute, respectively. As abortion data are currently only available through 2011, the present analysis will examine the effect of TRAP law enforcement on abortion rates over a 20-year period (1991 to 2011); TRAP legislation gained momentum throughout this period, but had not yet reached its current peak (10). Abortion policy data collection is currently underway: data on state-level TRAP implementation is being compiled from legal/policy documents
TRAP laws and abortion rates: Do restrictions matter?
Nichole Austin, Sam Harper (McGill University, Department of Epidemiology)

and NARAL, and data on other abortion restrictions will be obtained from the Guttmacher Institute (all sources are publicly available). Socio-demographic data will be obtained from the US Census.

**Analyses**

We will 1) illustrate national and state-level abortion trends and demographic characteristics over the observation period, 2) conduct a DD analysis of the effect of TRAP implementation on abortion rates, and 3) conduct DD robustness checks (particularly the assumption of parallel pre-intervention trends, and lead and lagged policy effects). State-level abortion trends from 1991-2011 are illustrated in **Figure 1**, which shows considerable state-to-state variation as well as a general decline in abortion rates over the observation period. This plot provides encouraging (if very preliminary) graphical support for our proposed DD strategy. A simple regression model confirmed the downward trend in rates from 1991 to 2011: conditional on state fixed effects, each 1-year progression corresponded with an average rate decrease of .42 (95% CI: -.48, -.34). Accounting for both state and year fixed effects yielded an $r^2$ value of .79, suggesting that 1) fixed characteristics of states and state-invariant trends (i.e., general secular shifts or shared factors in all states) make important contributions to explaining temporal variation in abortion rates, and 2) there is still important residual variation in abortion rates that may be plausibly explained by TRAP laws. Since unmeasured state and common characteristics are likely to be important confounders for any analysis of TRAP laws, the DD approach is a credible strategy for identifying the causal effect as it can control for these unobservable factors.

For the purposes of this analysis, a state will be considered “exposed” if any TRAP laws had been enforced in a given year. TRAP laws tend to remain in effect once they have been formally enforced, but special attention will be paid to the rare instances where enforced laws are rescinded or modified. Although we are primarily interested in capturing states’ shifts from zero to at least one TRAP law, we will collect data on both the type and accumulation of multiple laws over time to assess possible effect modification by quantity/severity. We will also conduct sub-analyses to 1) differentiate between TRAP laws impacting clinicians vs. facilities, as some laws may have a larger impact on costs and service availability than others, and 2) assess possibly differential effects of TRAP enforcement on abortion rates in low-income women, for whom the impact of decreased service availability is likely exacerbated.
TRAP laws and abortion rates: Do restrictions matter?
Nichole Austin, Sam Harper (McGill University, Department of Epidemiology)

A key assumption of DD is that pre-policy trends are parallel, which we will assess once the policy data are complete; if we are not convinced that this assumption is reasonable, we will instead employ synthetic controls. We will compare demographic attributes of exposed and unexposed states using census data to ensure that states are similar on measured characteristics. Finally, following the construction of our main DD models, we will model leads and lags to ensure that TRAP implementation was exogenous and test for reverse causality (pre-intervention abortion rate changes should not trigger policy shifts). Existing evidence suggests that individual level restrictions do not substantially affect abortion rates; this lends conceptual support to the appropriateness of the DD approach.

**Anticipated impact**
TRAP laws are on the rise, but very little is known about their causal effect on abortion rates. This analysis will offer important and timely evidence on the effects of TRAP legislation.
TRAP laws and abortion rates: Do restrictions matter?
Nichole Austin, Sam Harper (McGill University, Department of Epidemiology)

References


