Paid sick leave policy impacts on health and care utilization in the United States: why policy design matters

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Accepted: 25 September 2022 / Published online: 26 October 2022
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Abstract
The link between policy design choices and health is an important, yet understudied area of public health research. I investigate the impact of the generosity, inclusion, and autonomy of state paid sick leave laws on influenza-like-illness (ILI) rates and its components using data from the Centers for Disease Control and state-level paid sick leave statutes. I found that paid sick leave policies that include small firms and that allow for a larger number of medical uses have lower ILI rates, relative to states with less comprehensive policies. States with policies that had more generous accrual rates and that included a wide variety of worker types (temporary, part-time, students) increased the total number of reported medical cases, relative to states with less comprehensive policies. Policymakers contemplating paid sick leave policies should consider these design choices in their goals to incentivize health care utilization and to reduce contagion.

Keywords Paid sick leave · Influenza · Policy design · Policy generosity

Key messages

• Paid sick leave policy designs are an important, yet underutilized lever in reducing ILI rates in the United States.
• While all state paid sick leave policies reduce ILI rates, paid sick leave policies that had more generous accrual rates reduced ILI rates more than states with less comprehensive policies through an increase in health care utilization.
• Paid sick leave policies that included a wide variety of worker types (temporary, part-time, students) also had lower ILI rates than states with less comprehensive policies, suggesting that providing coverage for a broader group of workers,
including workers who are less likely to have access to health care has the potential to reduce contagion.

**Introduction**

The rapidly evolving coronavirus public health crisis prompted calls from policymakers across the world to mandate paid sick leave. Prior to the coronavirus, 12 states and the District of Columbia in the United States and more than 145 countries had enacted paid sick leave laws [1, 2]. These laws were all passed with the intention of improving public health and job quality, yet the design of these laws varies substantially in terms of the generosity of the policy, who is included in the policy, and how workers are allowed to use their paid sick leave time [2]. This variation may, in turn, impact the take up and health of affected communities.

Evidence from social policy evaluations have found that interventions with higher levels of generosity and lower information gathering costs have had positive effects on policy take up and social benefits among recipients [3, 4], while policies with high administrative barriers or low recipient knowledge reduce take up rates [5, 6]. In identifying relevant components of policy design as it relates to health, scholars have traditionally focused on the generosity of the policy [operationalized through aggregate spending [7, 8], or the wage replacement rate [9], or on particular components of a policy, such as work requirements, or an incentive-based structures [10, 11]. These measures exclude critical components of policy design, such as inclusion or social rights, and comparative scholars have called for a broader framework in public health policy evaluations to incorporate multiple measures of policy design [12, 13].

This study examines the effect of design choices in state-level paid sick leave policies on influenza-like-illness rates in the United States in the period prior to the coronavirus pandemic, 2011 to 2019. Workers without paid sick leave are more likely to work while sick, which can increase contagion and lead to poor health outcomes [14, 15]. Lack of paid sick leave also means workers are less likely to go to the doctor for illness or routine health appointments, which can lead to workers taking more time off in the long run [16, 17]. Paid sick leave policies have the potential to reduce contagion work, but only if workers are able to access and use paid leave. Part-time and temporary workers (workers who work less than full-time or full-year, respectively) are often excluded from paid sick leave policies, as are workers in small firms [2]. Evidence from current paid sick leave evaluations found that state-level paid sick leave policies reduce rates of influenza-like-illness by 11% in the year following the policy passage, suggesting the policy can substantially improve the health of affected communities [18]. Yet, the effect of individual design factors in paid sick leave policies on public health measures remains unknown.

In this study, I contribute a typology of paid sick leave designs using the state paid sick leave laws from 11 states and the District of Columbia between 2011 and 2019. I focus on three policy design domains: (1) the degree to which a policy is generous, (2) the degree to which a policy is inclusive, and (3) the degree to which individuals
can exert autonomy in using a policy. I subsequently exploit the time and policy design variations in state paid sick leave policies to estimate the impact of each policy design factor on influenza-like-illness rates using weekly data from the Centers for Disease Control.

Understanding how state paid sick leave policies affect influenza-like-illness rates through the lens of policy design is essential for improving public health and for reducing inequities in the workplace. A disproportionate share of workers who lack paid sick leave work for low-wages, are women, or are workers of color [19], yet these workers also the same groups of workers who experience disparities in take up of social policies [20]. At a time when information on policy tools to improve public health are particularly needed, this study provides policymakers with critical information on an understudied dimension of paid sick leave policy.

Methods

Data

I combine information on weekly state-level health measures from the Centers for Disease Control (CDC) Weekly U.S. Influenza Surveillance Report [21] with information on state paid sick leave policies from the LawAtlas Project Policy Surveillance Program [2] and state statutes for the years 2011 to 2019. I also collect information on state-level unemployment rates, population levels and health insurance rates from the Bureau of Labor Statistics, United States (U.S.) Census and the Kaiser Family Foundation, respectively.

Measures

Outcome variables

The CDC collects weekly information on influenza-like-illness cases and total cases observed among the nearly 2000 participating outpatient providers for each state. The CDC broadly defines influenza-like-illness (ILI) as a disease defined as a fever and cough or sore throat. Providers determine ILI cases and submit their total number of cases and ILI cases to their state health agencies. The latter, in turn, submit them to the CDC. Consistent with prior research, the primary dependent variable is the ratio of the total number of ILI cases to the total number of cases in a week [18]. Normalizing ILI rates by population allows for comparison of ILI rates among states with varying population sizes. Supplementary Material contains additional details for the analysis assessing the impact of paid sick leave policies on weekly ILI cases and total cases.

Policy variables

A Robert Wood Johnson Foundation initiative created the Policy Surveillance Program that provides information on state-level health policies [2]. The LawAtlas
Project provides information on the policy rules of each state-level paid sick leave law. This information allows me to assess whether policies that are designed to be more comprehensive (generous, inclusive, or autonomous) have a distinct effect on health outcomes, relative to policies designed to be less comprehensive.

From this information, I develop a typology of paid sick leave comprehensiveness based on policy generosity, policy inclusion, and autonomy in using a policy. The first domain, Generosity, refers to the monetary and time dimensions of the policy. I operationalize this domain using the number of hours required to accrue one hour of paid sick leave. The second domain, Inclusion, refers to the types of employees and firms explicitly excluded from the policy. I focus on two components: the number of employees a firm must have to provide paid sick leave and the types of workers explicitly excluded from the policy (such as temporary workers, part-time workers, students). The third domain, Autonomy, refers to the ways in which the policies allow for workers to use their paid sick leave time. I operationalize this domain using the number of allowable types of health and medical uses for which individuals can use sick time.

For each of the four factors, I standardize the state policy data across time and space and categorize states into two mutually exclusive indicators: one for states that have more comprehensive policies (“high”) for a given policy factor (1/0 variable) and the other for states that have less comprehensive policies (“low”) for a given policy factor (1/0 variable). Details regarding these categorizations can be found in Supplementary Material: Part A.

Control variables

To capture any confounding relationships between paid sick leave policy variables and ILI rates, I also include several state-level control measures. First, I include state-level seasonally adjusted monthly unemployment rates from the Bureau of Labor Statistics to account for the fact that ILI rates vary throughout the business cycle [22]. Second, I include states’ annual population levels from the U.S. Census and a state’s annual rate of health insurance coverage from the Kaiser Family Foundation. I also adjust for time invariant characteristics of a state by including state fixed effects, and any changes associated with specific years by including year fixed effects.

Statistical analysis

I estimate the effect of state-level paid sick leave policy rules on ILI rates using a difference-in-differences estimation strategy. For a given policy factor, the difference-in-differences method jointly compares ILI rates of states with high-, and low-comprehensiveness paid sick leave policies to states without the policy (first difference), and ILI rates of states pre-paid sick leave policy to ILI rates post-policy (second difference). For each model, the main policy variables reflect the interaction of the “high” and “low” comprehensiveness indicators with an indicator for the weeks post-paid sick leave policy in states that passed paid sick leave laws. For
example, to operationalize the Generosity factor, state accrual rates would be categorized into two treatment indicators: a (0/1) indicator equal to 1 for states that have more generous policies, and a (0/1) indicator equal to 1 for states that have less generous policies. These indicators would then interact with an indicator variable (0/1) equal to 1 in the post-policy period. I use a general linear model, weighted by state population, and I include state-level control variables, week-fixed effects, and state fixed effects in the main specification. In Supplementary Table S2, I show the results with traditional standard errors, robust standard errors and with standard errors clustered at the state level. Additional information on the statistical analysis, including the regression equation, event study models, and Bacon decomposition, can be found in Supplementary Material: Part A and Part B.

Results

I present summary information of the comprehensiveness of each state paid sick leave policy for each policy factor in Table 1. Among the eleven states and District of Columbia (hereon referred to as a “state”) that enacted paid sick leave policies between 2011 and 2019, policies mandated that employees needed to work 39 h, on average, to accrue one hour of sick time. Put another way, workers had to work five 8-h days to earn 1 h of paid sick leave. On average, states did not mandate very small firms (< 13 employees) to provide paid sick leave. Over half of the states excluded temporary workers from their paid sick leave policies, while only 25% of states

Table 1  Policy design dimensions of state paid sick leave laws. Source The Policy Surveillance Program, Earned Sick Leave Laws, 2021

| Explanation | Average of treated states |
|-------------|---------------------------|
| Generosity  |                           |
| Number of hours worked required to accrue 1 h | 39 h |
| Inclusion   |                           |
| Number of employees a firm must have to provide leave | 13.3 employees |
| Law stipulates exclusion for specific employees | 1.6 exclusions |
| Part-time employees | 16.7% |
| Municipal employees | 16.7% |
| Temporary employees | 66.7% |
| Individuals covered by a collective bargaining agreement | 33.3% |
| Student | 25.0% |
| Autonomy    |                           |
| Law indicates whether paid sick leave can be used for | 3.08 |
| Treatment of one’s own health condition | 100.0% |
| Getting their own medical diagnosis | 91.6% |
| Getting their own preventative care | 100.0% |
| Attending their own routine medical appointment | 16.0% |

The table shows states’ average level of generosity, inclusion, and autonomy for each factor and the proportion of states that adopted each measure across the 11 states and the District of Columbia that passed paid sick leave laws during the 2011–2019 period
excluded students (individuals enrolled in an educational institution). On average, states allowed workers to take leave for 3 different types of health and medical uses.

Table 2 summarizes policy design information for each state policy, as well as their categorization of high or low comprehensiveness for each policy design factor. Overall, Arizona, California, Massachusetts, and Oregon have the most comprehensive policies, scoring “High” in three out of the four policy factors. Connecticut, District of Columbia, Maryland, Michigan, and Rhode Island have the least comprehensive policies, scoring “Low” in three out of four policy factors.

Table 3 shows state-level health and demographic characteristics in the first year of the study, prior to the passage of the twelve paid sick leave laws studied, 2011, weighted by state population. States that enacted paid sick leave laws have higher ILI rates and ILI cases relative to states that did not pass paid sick leave laws but had a similar number of total cases reported in 2011. States that passed paid sick leave laws had higher unemployment rates, larger population levels, and slightly higher health insurance rates, suggesting that these characteristics are important to account for in statistical analysis.

Figure 1 shows the results of the difference-in-differences estimation of the impact of low- and high-comprehensiveness of state paid sick leave policies on influenza-like-illness rates. The figure shows regression coefficients and 95% confidence intervals for the “high” and “low” comprehensiveness of each design factor. Regression results showing robust standard errors and standard

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**Table 2** State-level policy factor information. *Source* The Policy Surveillance Program, Earned Sick Leave Laws, 2021

| State            | Date enacted | Accrual rate | Firm sizes excluded | Number of exclusions | Number of allowable uses |
|------------------|--------------|--------------|---------------------|----------------------|-------------------------|
| Arizona          | Jul-2017     | 30 High      | 1 High              | 1 High               | 3 Low                   |
| California       | Jul-2015     | 30 High      | 1 High              | 1 High               | 3 Low                   |
| Connecticut      | Jan-2012     | 40 Low       | 50 Low              | 1 High               | 3 Low                   |
| District of Columbia | Feb-2014 | 87 Low       | 1 High              | 2 Low               | 3 Low                   |
| Maryland         | Feb-2018     | 30 High      | 15 Low              | 2 Low               | 2 Low                   |
| Massachusetts    | Jul-2015     | 30 High      | 11 High             | 2 Low               | 4 High                   |
| Michigan         | Mar-2019     | 35 High      | 50 Low              | 2 Low               | 3 Low                   |
| New Jersey       | Oct-2018     | 30 High      | 1 High              | 2 Low               | 3 Low                   |
| Oregon           | Jan-2016     | 30 High      | 10 High             | 1 High               | 3 Low                   |
| Rhode Island     | Jul-2018     | 35 High      | 18 Low              | 2 Low               | 3 Low                   |
| Vermont          | Jan-2017     | 52 Low       | 1 High              | 2 Low               | 4 High                   |
| Washington       | Jan-2017     | 40 Low       | 1 High              | 1 High               | 3 Low                   |

The table shows each state’s paid sick leave policy factors. The accrual rate can be interpreted as the number of hours required to work to accrue 1 h of paid leave. The firm sizes excluded from the policy indicate the firm size at which employers are required to provide paid sick leave. The number of exclusions is the number of worker types excluded from the law. The number of allowable uses captures the number of allowable health and medical uses for which workers may use their paid sick leave hours.
Table 3 State characteristics in 2011, by paid sick leave enactment status. Source Author’s analysis of Bureau of Labor Statistics, U.S. Census Bureau, Kaiser Family Foundation and Center for Disease Control.

|                     | Treated states | Comparison states | t-statistic | p value |
|---------------------|----------------|------------------|-------------|---------|
| ILI rate            | 1.80%          | 1.6%             | 3.18        | < 0.001 |
| ILI cases           | 423            | 374              | 2.05        | 0.04    |
| Total cases         | 18,736         | 18,576           | 0.25        | 0.80    |
| Unemployment rate   | 10.1%          | 8.4%             | 26.95       | < 0.001 |
| Population          | 19,467,647     | 10,634,254       | 19.70       | < 0.001 |
| Health insurance rate | 85.5%        | 85.0%            | 3.01        | < 0.001 |
| Observations        | 572            | 1,976            |             |         |

The table shows outcome and comparison measure averages for the 11 treated states and the District of Columbia and 38 comparison states in 2011. Estimates are weighted by population size. State-level ILI rates, ILI cases, and total cases are estimated weekly. State-level unemployment rates are estimated monthly. State-level population and health insurance rates are estimated annually. The t-statistics and p value are for the difference of means tests between states that passed paid sick leave law and states that did not in the first year of the study, 2011. The analysis excludes Florida due to data limitations.

Fig. 1 Impact of paid sick leave policy rules on the rate of influenza-like-illness (ILI). The figure displays bars corresponding to the coefficient point estimates derived from the difference-in-differences models shown in Eq. 1 (Supplementary Material, Part A). For each policy design factor, the model jointly estimates the interaction of each policy design comprehensiveness indicator (“High” or “Low”) with an indicator for the post-policy period on influenza-like-illness rates. Regressions are weighted by population and contain controls for a state’s monthly unemployment rate, annual insurance rate, state-, and week-fixed effects. 95% confidence intervals are in error bars. Source Author’s calculations using data from the Center for Disease Control, the Law Atlas Policy Surveillance Program, U.S. Census, Bureau of Labor Statistics and Kaiser Family Foundation.
errors adjusted for clustering at the state level are in Supplementary Material, Table S2.

States with more generous accrual rates (in which workers need to work fewer hours to earn 1 h of sick leave) had 0.4 fewer ILI cases per 100 cases, while states with slower accrual rates reduced ILI rates by 0.2 cases per 100 cases ($p < 0.05$; Supplementary Table S2). Relative to pre-policy ILI rates of 1.7 cases per 100 cases, the results suggest that more generous paid sick leave policies reduced ILI rates by 23.5%, whereas states with less generous policies reduced ILI rates by 11.8% (Supplementary Table S2).

Figure 1 also shows that states with more inclusive policies had lower ILI rates. States that included small firms in their paid sick leave mandate had 0.4 fewer ILI cases per 100 cases, while states with less inclusive policies had 0.3 fewer ILI cases per 100 cases ($p < 0.01$; Supplementary Table S2). States that included a wider variety of worker types had 0.4 fewer ILI cases per 100 cases, while states with more worker exemptions had 0.2 fewer ILI cases per 100 cases ($p < 0.01$; Supplementary Table S2).

Finally, Fig. 1 shows that states that allowed workers to use paid sick leave for a greater variety of medical needs had 0.4 fewer ILI cases per 100 cases, while states with less autonomous policies had 0.3 fewer ILI cases per 100 cases ($p < 0.01$; Supplementary Table S2).

**Total cases and ILI cases**

I next examined the impact of state paid sick leave policies on the individual components making up influenza-like-illness (ILI) rates: total state-level ILI cases and total cases. Supplementary Table S3 shows that results for ILI cases and Supplementary Table S4 shows the results for total cases. The results show that states with paid sick leave policies that were more generous, more inclusive with respect to firm size, and more autonomous experienced a modest reduction in ILI cases but an increase in the total number of cases in their states, compared to states without paid sick leave laws. States with less comprehensive policies experienced reductions in both ILI cases and the total number of cases along these dimensions, although with varying degrees of statistical precision, relative to states without paid sick leave laws (Supplementary Tables S3 and S4). The results suggest that for states with more generous accrual rates, that mandate smaller firms to provide leave, and that are more autonomous, the pathway by which these policy factors reduced ILI rates was through increased health care utilization. With respect to worker-type exclusion, the results show that high inclusion states experienced reductions in ILI cases, suggesting that the underlying pathway this policy factor reduced ILI rates was through reductions in contagion. The reductions in ILI cases and total cases in low-inclusion states were not statistically different from zero.
Discussion

Paid sick leave laws have the potential to improve public health for workers and their communities through reductions influenza-like-illness rates. The passage of state-level paid sick leave laws provides a natural experiment to identify which factors of state-level policy design are most effective at improving health. Through the creation of a policy design typology and econometric methods to estimate a causal impact, I generate the first estimates of the effects of policy generosity, inclusion, and autonomy to reduce influenza-like-illness rates. Several key findings emerge from this analysis.

Generosity

I found that paid sick leave policies with more generous accrual rates reduced ILI rates by 0.2 ILI cases per 100 cases more than states with less generous accrual policies. Supplementary Table S6 shows results for a post-estimation test of equality between the high and low comprehensiveness categories within each policy factor to assess whether the differences between the two groups are statistically different from each other. The results show that the difference between high and low comprehensiveness for this factor is statistically significant, suggesting that Generosity is an important dimension in reducing ILI rates. I also find that state with more generous accrual policies experienced an increase in total medical cases, suggesting that accrual rates may reduce ILI rates through increased health care utilization. Evidence shows that workers without paid sick leave are more likely to forgo medical treatment which can lead to more severe illnesses in the medium-long term [14]. The increase in the total number of medical cases among states with more generous accrual policies (Supplementary Table S4) suggests these policies may give workers the time to access preventative or acute medical care.

Inclusion

I found that state policies that mandate small firms to provide paid sick leave reduce ILI rates by about 0.4 cases per 100 cases, while state policies that do not include small firms only reduce ILI rates by 0.3 cases per 100 cases. While Supplementary Table S6 shows that the differences between “High” and “Low” comprehensive states are not statistically significant along this dimension, the precision of the point estimate suggests that including small firms is an important design factor to consider in the design of paid sick leave policies. Small firms are also less likely to provide paid sick leave absent regulation, which only furthers the importance of considering them during legislation [23].

I further found that state policies that include a wider variety of worker groups reduced ILI rates by about 0.4 cases per 100 cases, while states with less inclusive policies reduced ILI rates by 0.2 cases per 100 cases, relative to states without paid sick leave policies. The observed reductions in ILI rates for the states with high inclusion suggest that providing coverage for a broader group of workers, including
workers who are less likely to have access to health care, such as temporary and part-time workers, has the potential to reduce contagion. Supplementary Table S6 shows that this difference between high and low inclusive states along this dimension is statistically significant, as well.

**Autonomy**

Finally, I explored whether the number of allowable health and medical uses affected ILI rates. While the point estimates show that states with more autonomous policies have 0.1 ILI cases per 100 cases fewer than states with less autonomous policies, Supplementary Table S6 shows that difference between these two groups is not statistically significant. The results suggest that, while state law distinguishes between a variety of medical and health care uses, these differences may be indistinguishable in practice. In this study, an appointment to get a flu shot (a preventative measure) would be categorized as a distinct use from an annual wellness check (routine medical appointment); however, it is very likely that the patient would get the flu shot at the wellness visit, which would conflate the two uses in practice. While the results clearly show that being able to use paid sick leave for medical uses reduces ILI rates, the distinction between states high- and low-autonomous policies appears to be less important in its reduction on ILI rates.

**Overall**

Supplementary Table S6 also displays results from the difference-in-differences model that estimates the impact of an overall measure of high and low paid sick leave policy comprehensiveness. States categorized as overall high comprehensive scored “High” in at least two for the four policy factors (see Table 2). States categorized as overall low comprehensive scored “High” in two or fewer policy factors. The results suggest that overall high comprehensive policies reduce ILI rates by 0.4 cases to 100 cases, relative to states without paid sick leave, while overall low comprehensive policies reduced ILI cases by 0.2 cases per 100 cases, relative to states without paid sick leave ($p < 0.001$; Supplementary Table S6). Table S6 also shows that the difference between the highly comprehensive states and less comprehensive states is statistically significant, suggesting that while all paid sick leave policies reduce ILI rates, policies that are more generous, inclusive, and autonomous reduce ILI rates to a greater degree.

**Limitations**

There are several limitations to this analysis. First, the CDC does not collect ILI or case information from Florida. Second, there were also 24 state-weeks in which I could not calculate influenza-like-illness rates because no medical cases for a state were reported by the state to the Centers for Disease Control. Third, there has been a wave of municipal paid sick leave legislation enacted during the period 2011 to 2019. Including states in the control group with municipal paid sick leave policies
has the potential to bias the treatment effects toward zero. As a robustness check, I drop control states with municipal paid sick leave policies. The results, shown in Supplementary Material Table S5, have point estimates that are slightly larger in magnitude than those in the main analysis (Supplementary Material Table S2) and remain statistically significant. The results suggest that the inclusion of control states with local policies may slightly attenuate the treatment effects shown in the main analysis. Finally, the analysis ends prior to the coronavirus pandemic. While paid sick leave coverage has increased in some states in response to the pandemic, many of these policies were temporary policies or written with a short-term use in mind. The implications of this study can inform legislation for states looking to enact more permanent public health measures.

**Conclusion**

The design of paid sick leave laws is an important, yet understudied component of public health policy evaluation. I show that policies that alter the generosity, inclusion, or autonomy of state paid sick leave laws have distinct effects on a state’s ILI rates and medical cases in the years following policy enactment. As the coronavirus pandemic continues, comprehensive paid sick leave policies are a critical tool at policymakers’ disposal to protect the health of their citizens. These considerations are particularly important for workers in low-wage jobs, women, and workers of color because these workers have disproportionately less access to paid sick leave prior to policy enactment and stand the most to gain from new access to care [19, 20]. The health benefits from well-designed paid sick leave policies would improve not just the material conditions of today’s workers, but of workers and citizens in the future, as well.

**Supplementary Information** The online version contains supplementary material available at https://doi.org/10.1057/s41271-022-00371-9.

**Declarations**

**Conflict of interest** On behalf of all authors, the corresponding author states that there is no conflict of interest.

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