Volume 43, Issue 2

A model of accrual rates for paid sick leave mandates

Adrienne Ohler
University of Missouri

Adam Thorp
University of Missouri

Abstract

Paid sick leave mandates require employers to provide a minimum amount of sick leave for employees with paid time off. However, studies on paid leave and models of leave-taking behavior have generally not considered a central component of these mandates: the rate of accrual of sick days or hours. Under these mandates hourly and low wage workers are more likely to gain access to paid leave, but it remains unclear how sensitive the typical worker's guaranteed paid leave is to changes in the rate of accrual. In this paper, we propose a method to estimate accrued paid leave hours from a basic national paid leave program using the US. Current Population Survey, and examine to two important questions: a) to what degree do changes in the accrual rate influence the hours of guaranteed paid leave accrued by workers, and b) who are the workers most impacted by the accrual rate. The approach provides a method for economic modelers of paid leave policies to explicitly examine the disparities generated by such policy designs using similar employment data at the state or local level, and more accurately incorporate leave eligibility into simulation models of worker leave.

1. Introduction

Since 2007, paid sick leave mandates have become more common with sixteen states and several U.S. cities passing laws requiring employers to provide paid sick leave. Half of these states passed mandates within the last six years (KFF, 2021). Paid sick leave refers to short periods of leave, typically one to five days, due to illness or medical needs of a worker, or to take care of the needs of their immediate family. Mandates can range between 24-64 hours of time off at full pay. Workers earn paid sick leave hours at a set rate associated with the number of work hours accumulated on the job. For example, employers in Oregon with ten or more employees must allow workers to accrue 1 hour of sick time for every thirty hours of work with the employer required to provide a minimum of forty hours of paid sick time per year once it is accrued. Newly hired workers are allowed to start taking paid leave after ninety days of work (OBLI).

Previous studies have examined the impact of these mandates on absenteeism (Chen et al., 2020; Stearns & White, 2018), labor force participation (Ahn & Yelowitz, 2015), influenza rates and presenteeism (Pichler & Ziebarth, 2019), employment and wages (Pichler & Ziebarth, 2020), healthcare utilization (Chen et al., 2020), reduction of work hours caused by health shocks (Zimmer, 2015), program financing and administration (Schliwen et al., 2011), enforcement of paid sick leave through general practitioners (Markussen & Roed, 2017), and the effects of monitoring on leave-taking behaviors (D'Amuri, 2017). However, attempts to model usage of mandated sick leave generally ignore the rate at which workers earn guaranteed leave, henceforth termed the accrual rate (AR), which is typically based on job tenure and hours worked. Instead, modelers assume that regardless of how much employees have worked or how long they have been employed, all workers acquire the minimum required hours (MRH) the employer is mandated to provide over the course of a year. For instance, if the employer's MRH of guaranteed leave is set at forty hours per year, all workers are treated as if they accumulate forty hours of leave, regardless of whether they have worked enough hours or years to accrue forty hours of paid leave. Yet, some of these workers would not have worked enough hours to take even eight hours of leave (i.e. one day). Variance in accrual rates across state and local program designs suggest that policymakers do believe the accrual rate makes a significant difference to employers and employees.

The accrual rate-minimum required hours (AR-MRH) policy design of a paid leave mandate is important for both those workers impacted by the design, and the employers required to keep track of hours worked, paid leave earned, and paid leave taken. For example, 21% of female workers and 22% of Black workers are excluded from FMLA eligibility because they have less than 1 year of job tenure. These statistics are compared with an exclusion rate of 18.7% for male workers and 19.0% of White workers (Heymann et al., 2021). Additionally, due to racial wealth gaps, Black workers are far less likely to be able to afford even unpaid leave provided by FMLA (Heymann & Sprague, 2022). However, administering such programs is not costless and more complicated policy designs increase the cost of administration (Maclean et al., 2020; Schliwen et al., 2011). Employers and regulators must keep track of whether employees do or do not qualify at any given time. As the size of the affected population grows, the tracking, monitoring, and administration costs will also increase. For employers with few hourly employees or generous and established paid leave programs, this type of mandate is unlikely to impact HR practices or employer costs. Notably, in 2021, 79.2% of full-time employees (employed more than 35 hours per week) in the private sector report having access to paid sick leave, compared to 36.3% of

part-time employees (Flood et. al., 2022). The mandate itself is a policy for employers that do not provide paid leave, are more likely to have hourly employees, and are more likely to be impacted by the AR-MRH design because of the administrative costs. A program without an accrual mechanism might reduce compliance costs for employers, but those savings would have to be weighed against the cost incurred by new employees taking leave that would have been barred by accrual rate rules. Policymakers considering this trade-off need a method to assess how many employees are affected by the AR design, and which socio-economic, industry, and/or occupational groups are more likely to be impacted by this design element.

Additionally, the Department of Labor's Worker Paid Leave Usage Simulation (PLUS) model, which is often used by paid leave modelers to predict leave-taking behaviors, is unable to explicitly model the AR (Hartmann and Hayes, 2021). Relying on the Current Population Survey (CPS), American Community Survey, and Family Medical Leave Act survey data, the Worker PLUS model inputs paid leave policy parameters, such as eligibility and benefit caps, and outputs predictions on need for leave, leave length, reasons for leave, and cost to employers. The model's assumptions around eligibility are approximate, relying on a policy design that specify eligibility terms based on annual earnings, number of weeks worked, and/or number of hours worked over a year. These eligibility parameters are unable to explicitly examine changes in the AR, and can only implicitly assess AR designs by making assumptions on the minimum accrual units, (i.e. minimum hours of paid leave a person can accrue), which can vary based on employee/employer factors whether leave must be taken in hourly, half-day, or full-day units. Only if a minimum accrual unit is specified can AR designs be evaluated using Worker PLUS by then basing eligibility on the minimum annual work hours.

In this paper, we propose a method to predict sick leave accrued given varying AR-MRH designs. Then, using data for the Current Population Survey, we estimate the impact of the accrual rate across demographic groups commonly working in low-wage employment fields. The study provides an explicit approach for modelers of paid leave programs to assess the likely impacts of changes in the accrual rate, which can then be factored into microsimulation models such as the Worker PLUS model, which can assess paid leave access and leave-taking behaviors for programs implemented at state or national levels. The results demonstrate that for a basic national paid leave program those cohorts most sensitive to the accrual rate requirement are in service and sales occupations (24.1% of the U.S. workforce); in leisure, hospitality, and wholesale and retail trade industries (20.8% of the U.S. workforce); young workers less than 30 years old (22.8% of the U.S. workforce); and are less educated with at most some college, high school, or less education completed (47.8% of the U.S. workforce).

2. **Data and Methods**

Paid leave programs have existed with various AR-MRH designs across the U.S. for over a decade. Table I reviews state level programs by accrual rate, tenure requirement, and annual minimum required hours of paid leave. The emerging trends among these designs are the following: a) the minimum requirement of paid sick leave hours (MRH) an employer must provide is most commonly forty hours, b) accrual rates (AR) of one guaranteed paid leave hour for every 30-40 hours worked, and c) a waiting period of between 30-120 work hours for new employees before they can use any paid sick leave. States also vary in the reasons for leave beyond one's own health and family care, allowing for the paid leave to also cover domestic violence reasons, public health school closures, and bereavement.

Table I- State Paid Leave Policy Designs as of April 2023

State	Waiting Period (days)	Accrual Rate[*]	Workplace Size Determining Tier	Minimum Required Hours Provided By Employer	Other Work Requirements	Reasons for Leave Beyond Own and Family Health	Start Year
Arizona	90	1/30	Tier 1: <15 employees (paid) Tier 2: 15+ employees (paid)	Tier 1: 24 hours Tier 2: 40 hours		domestic violence; public health school closure	2017
California	90	1/30	Not applicable	3 days or 24 hours		domestic violence	2015
Colorado	0	1/30	Not applicable	48 hours		domestic violence; public health school closure	2021
Conn.	76	1/40	Tier 1: <50 employees (no requirement) Tier 2: 50+ employees (paid)	40 hours	Hourly service workers	domestic violence	2012
Maine	120	1/40	Tier 1: <11 employees (no requirement) Tier 2: 11+ employees (paid)	40 hours	Specified seasonal industries are exempt	any	2021
Maryland	106	1/30	Tier 1: <15 employees (unpaid) Tier 2: 15+ employees (paid)	40 hours	Employed >12 hrs/week	domestic violence; maternity or paternity care	2018
Mass.	90	1/30	Tier 1: <11 (unpaid leave) Tier 2: 11+ employees (paid)	40 hours		domestic violence	2015
Michigan	90	1/35	Tier 1: <50 employees (no requirement) Tier 2: 50+ employees (paid)	40 hours	Employed for >25 weeks	domestic violence; public health school closure	2019
Nevada	90	1/52	Tier 1: <50 (no requirement) Tier 2: 50+ (paid)	40 hours		any	2020
New Jersey	120	1/30	Not applicable	40 hours		domestic violence; public health school closure; school conference	2018

New Mexico	30	1/30	Not applicable	64 hours		domestic violence; public health school closure	2022
New York	0	1/30	Tier 1A: 0-4 employees and less than $1M in net income (unpaid) Tier 1B: 0-4 employees and more than $1M in net income (paid) Tier 2: 5-99 (paid) Tier 3: 100+ (paid)	40 hours		domestic violence	2021
Oregon	90	1/30	Tier 1: <10 employees (unpaid) Tier 2: 10+ employees(paid) Tier 3: 6+ employees with location in Portland	40 hours		domestic violence; public health school closure; donation of sick pay; bereavement; maternity or paternity care	2016
Rhode Island	90	1/30	Tier 1: <18 (unpaid leave) Tier 2: 18+ employees (paid leave)	40 hours		domestic violence; public health school closure	2018
Vermont	365	1/52	Not applicable	40 hours	Employed > 18 hours/week. Seasonal workers, minors, substitute teachers, per diem health care workers exempt.	domestic violence; public health school closure	2017
Wash.	90	1/40	Not applicable	40 hours		domestic violence; public health school closure	2018

*hours accrued of guaranteed paid leave per hours worked

To predict the maximum accrued leave possible under various policy designs, we use the Current Population Survey (CPS) Annual Social and Economic Supplement. The survey administered by the Census Bureau samples approximately 60,000 households per year through personal and telephone interviews. Published data include 16 and over age cohorts, and excludes individuals in the Armed Forces, prisons, long-term care hospitals, and nursing homes. The sampling design of the CPS is based on demographic census data and has an added feature of respondent weights such that population estimates can be derived.

The CPS also conducts a biennial supplement on Displaced Worker, Job Tenure, and Occupational Mobility. The 2022 supplemental asks questions that include average hours worked per week at main job, earnings, and job tenure. Table II presents the socio-economic characteristics of average hours worked, and job tenure across characteristics such as sex, race, age, educational attainment, earnings quintiles, and number of children in the household.

Notable distinctions in job tenure and average hours worked per week exist across demographic characteristics. Average job tenure is highest among White workers compared with Black, Native-American, Asian, and mixed-race workers. Both average job tenure and average hours worked per week increases as earnings increases. Unsurprisingly, average job tenure increases with age. Young workers (<30 years old) have the lowest job tenure, but average hours worked is lower in the retirement age group (65+) compared to those in the prime working years (30-64 years old). Female workers have a lower average job tenure and fewer average hours worked per week compared to male workers. Individuals without children have higher average job tenure but fewer average hours worked compared to individuals with children. Finally, we note that individuals with less education (i.e. HS or less, and some college) have less job tenure and report working fewer hours per week than individuals completing a degree beyond high school (i.e. Associates, Bachelors, Master's +). Socio-economic groups with lower average job tenure and hours worked per week are more likely to be influenced by the AR policy design.

To assess the AR-MRH policy design of paid leave programs using the CPS data, we predict for each employed individual the maximum possible hours of accrued leave under four ARs from 1/56-1/32, and five leave MRH, 24-56 hours of paid leave. From these individual estimates, we calculate two percentages: 1) the percent of workers that fail to accrue eight hours of leave in a year, suggesting they cannot take an eight-hour day off work, and 2) the percent of workers accruing less than the MRH. To examine policy disparities, these percentages are then examined across the industry, occupation, and socio-economic characteristics (e.g. sex, race, age, educational attainment, earnings quintile, and children in household).

Paid sick leave accrued each year is calculated as the minimum of either a) the accrued hours a person would earn in a year based on their hours worked, or b) the maximum hours they could accrue based on the MRH policy design. Accrued paid leave, L_i, for individual i is notated as:

$$L_i = \begin{cases} \min\{H_i \cdot R \cdot 50, \ M\} * I_2(Y_i > T) & Y_i \geq 1 \\ \min\{H_i \cdot R \cdot 50 \cdot Y_i, \ M\} * I_2(Y_i > T) & Y_i < 1 \end{cases} \qquad (1)$$

where H_i is hours worked in the last week, R is the accrual rate design, and 50 reflects the number of weeks worked in a year. The CPS does not contain data on number of weeks worked. We assume all individuals work 50 weeks. $I_2()$ is an indicator taking on the value 1 if the number of years worked in current job, Y_i is greater than the wait period T. We assume a 90 day weight period or T=0.25 years. For workers with more than 1 year of job tenure $Y_i \geq 1$, paid leave accrued L_i is the minimum of either the maximum possible leave employers are required to provide by the mandate, M, or the accrued paid leave hours earned that year, $H_i \cdot R \cdot 50$. For

Table II – Current Population Survey 2022 estimates of average hours worked, and job tenure by socio-economic characteristics.

Variable	Represented Population Size	Mean Job Tenure	Mean Hours Worked
All Workers	155,911,243	7.53	38.57
Race			
White	120,496,097	7.88	38.63
Black	18,586,316	6.46	38.33
Native-American	1,616,303	6.41	38.41
Asian	11,538,152	6.40	38.51
Mixed-Race	3,674,376	5.62	38.15
Earnings			
1st Quintile	7,018,930	4.25	27.79
2nd Quintile	7,344,163	5.74	38.80
3rd Quintile	6,780,151	7.16	40.82
4th Quintile	7,019,492	8.61	41.86
5th Quintile	6,738,997	9.40	43.87
Age			
<30	35,611,146	2.00	34.87
30-64	110,035,682	8.65	40.22
65+	10,264,416	14.71	33.34
Gender			
Male	82,504,062	7.93	40.41
Female	73,407,181	7.09	36.51
Children in Household			
No children	105,562,300	7.75	37.95
Some Children	50,348,944	7.07	39.86
Highest Education			
Less than High School	11,083,494	5.28	33.00
High School and Some College	63,521,945	7.28	38.02
Associate's Degree	16,093,248	7.96	38.73
Bachelor's Degree	40,598,456	7.73	39.59
Master's, Ph.D. or Professional Degree	24,614,103	8.59	40.64

workers with only a partial year of job tenures $Y_i < 1$, L_i is the minimum of the mandate, M, or accrued hours accounting for the portion of year worked, $H_i \cdot R \cdot 50 \cdot Y_i$.

    Consider, for example, three individuals with guaranteed paid leave based on an AR=1/40 and MRH=40 hours their employer is required to provide. Case 1: Amy has been employed for fourteen weeks, Y_A = .27 years, and works 20 hours a week, H_A = 20. Amy has earned L_A=6.75 hours of guaranteed paid leave, is not affected by the cap, but is unable to take an eight-hour day of leave. Case 2: Brian has been employed for half a year, Y_B = .5, and works H_B=42 hours a week, accumulating L_B=26.25 hours of guaranteed paid leave, enough to take three eight-hour days off work but less than the 40 hour MRH. Case 3: Chris has been employed for Y_C=10 years, and works H_C=50 hours a week, earning 625 hours of leave over the course of his career, but is affected by the MRH and his employer is only required to provide 40 hours. Thus, his guaranteed paid leave L_C=40 hours. In the appendix, we provide figures illustrating the impact of policy changes on L_i for each person. The figures show how part-time and shorter-term workers are impacted by the accrual rate, R, but the MRH is less consequential for these workers when they fail to accrue even enough hours to reach the MRH.

    We note two important considerations with this approach. First, L_i represents only the maximum possible hours of guaranteed paid leave an individual could have earned for the year during their employment, representing an upper bound estimate on the number of hours of paid leave workers could have accrued. This approach does not reflect the actual available leave at any point in time, which would incorporate both hours accrued and hours used and carry-over from year-to-year if available. We do not attempt to model leave use, which is beyond the scope of this paper. The analysis below reflects a lower bound estimate on the percent of people impacted by the policy designs. For example, in our hypothetical cases we can say that Amy cannot have earned more than eight hours of guaranteed leave; Brian cannot have earned more than 26 hours of guaranteed leave over the course of their employment; but any one of the three workers might have fewer hours of leave available than their leave, L_i, because they have used the leave they earned. Those people, like Chris, who accrue the maximum possible hours, M, may still be affected by the AR-MRH policy designs as their hours of leave taken approaches this cap. However, because we do not have information on leave-taking behaviors, we focus only on those individuals whose leave accrual is less than M, and again represents a lower bound approach for the population estimates.

    Second, employers can and do offer more paid leave hours than those guaranteed by a mandate and allow for some carry-over between years, but the scope of this paper focuses on the populations that fail to accrue enough paid leave hours to meet the MRH, and are therefore, impacted by the AR design of a paid leave mandate. Thus, the modeled scenarios and results below focus on the populations most likely to be impacted by the AR-MRH policy. This represents approximately 21.8% of full-time employees, and 63.7% of part-time workers without paid sick leave (Flood et. al. 2022).

3. Results

    Using 2022 CPS data on weekly hours worked and job tenure in years, we estimate the population mean accrued hours of paid leave under twenty different policy scenarios, with four ARs and five MRHs. Table III (panel A) presents the estimated population mean of accrued paid leave hours with the AR ranging between 1/56 to 1/32 hours accrued per hour worked, and the MRH ranging between 24-56 paid leave hours. Notably, as the MRH increases (ie. a movement down a column), the average accrued hours increases. On the other hand, as AR becomes more

Table III – Average Accrued Paid Leave, and Percent of Population Accruing Less than the MRH for 20 AR-MRH Policy Scenarios

Panel A: Average Accrued Paid Leave Hours from Policy Scenarios: AR (1/56 -1/32 hours accrued per hour worked), and MRH (24-56 hours)				
	Accrual Rate (hours accrued per hour worked)			
Minimum Required Hours (MRH)	1/56	1/48	1/40	1/32
24	18.64	18.81	18.96	19.07
32	24.25	24.62	24.93	25.23
40	27.29	30.03	30.66	31.16
48	27.96	31.99	36.04	36.93
56	28.19	32.62	38.21	42.44
Panel B: Percent of Population Below the MRH from Policy Scenarios: AR (1/56 -1/32 hours accrued per hour worked), and MRH (24-56 hours)				
	Accrual Rate (hours accrued per hour worked)			
MRH	1/56	1/48	1/40	1/32
24	18.49%	16.25%	13.67%	11.92%
32	21.23%	19.97%	17.68%	15.81%
40	25.14%	22.02%	20.03%	17.68%
48	27.32%	25.57%	22.02%	19.97%
56	29.58%	27.32%	25.14%	21.23%
Panel C: Percent of the Population Below 8hrs of Accrued Paid Leave from Policy Scenarios: Accrual Rates (1/56 -1/32 hours accrued per hour worked)				
	Accrual Rate (hours accrued per hour worked)			
MRH	1/56	1/48	1/40	1/32
n/a	7.42%	6.76%	5.40%	4.88%

(Panel A) Cell values represent the population average of accrued hours given a worker's job tenure, and average hours worked for 50 weeks. 2022 CPS data are used to calculate the maximum possible accrued paid leave hours for each survey respondent for each of the 20 policy scenarios.

(Panel B) Cell values represent the percent of the population accruing less than the paid leave cap of guaranteed paid leave hours.

(Panel C) Cell values represent the percent of the population accruing less than eight hours of guaranteed paid leave hours.

generous (e.g. a movement across a row) the average accrued hours increases. For example, at an MRH of forty hours of paid leave, the average accrued hours ranges from 27.3 to 31.2 hours earned depending on the accrual rate. At an AR=1/56, an employee working six hours per day would take 374 days to earn the MRH of forty hours, and thus would never accrue enough paid leave hours to reach forty hours in a year.

To illustrate the size of the population affected by the AR-MRH policy design, table III (panel B) presents the same twenty policy design scenarios, and each cell provides the percent of the population failing to reach the MRH. As the employer's MRH requirement increases (e.g. a movement down a column) the policy becomes more generous because of the greater potential to accrue more hours of paid leave, but this increase also results in a higher percent of the population impacted by the AR design. For example, compare two policy designs: 1) an MRH=40 hours and AR=1/56 similar to Nevada's design and 2) an MRH=56 hours and AR=1/40 similar to New Mexico's design. Both designs result in the same percent (25.14%) of people accruing less than the MRH. In design scenario 1, the rate of accrual is so low, hourly workers will commonly fail to work enough to reach the MRH. In design scenario 2, the MRH is more generous and thus, despite the quicker AR the potential to earn paid leave is greater than scenario 1. Thus, scenario 1 workers will be more limited by the MRH design and scenario 2 workers will be more limited by the AR. Taking the symmetry of the table into consideration, policies on the bottom right corner are more limiting in the MRH design compared to symmetric policies on the top left corner which are more limiting in the AR design.

Seasonal or short-term workers are more likely to be impacted by the AR element of this policy design, whereas the MRH design impacts workers with more tenure. For example, employees who have worked enough hours in a year to earn the full MRH of paid sick leave are limited in their ability to take paid leave days, not by the AR but by the MRH itself. For long-tenured full-time workers, the MRH is a more important element in determining how much leave is available to them than the AR. This point is further illustrated by the figures provided in the appendix.

Finally, the bottom panel of table III shows the percent of the population accruing less than eight hours of paid leave under several ARs. As the AR increases (a movement across the row), an employee can work fewer hours to accrue paid leave, resulting in a smaller percent of individuals accruing less than eight hours. For ARs quicker than 1/40, less than 5.4% of the workforce will accrue less than eight hours of paid leave. However, for slow ARs such as those in Nevada and Vermont at 1/52, the percent of the working population accruing less than a day of paid leave is estimated to be greater than 7%.

Using the policy design of MRH=40 hours and AR=1/40, henceforth known as the 40-40 design, we examine accrued leave based on socio-economic characteristics and employment setting, to understand which groups 1) do not accrue enough paid leave to take off a day of work (i.e. <8 hours) and 2) accrue less paid leave than the MRH (i.e. L_i <40), and are thus impacted by the AR design, implying employers must keep track of accrued hours.

Overall, an estimated 5.40% of the working population would fail to earn at least eight hours of paid leave under this 40-40 policy design (table IV). Groups with a percent higher than 5.4% are disproportionately affected by the policy design. For these workers, the accrual policy is either too restrictive or they do not work regularly enough to acquire even a day of paid leave. These groups include Black, and mixed-race workers. Younger workers compared to older workers are impacted by the policy design at a greater rate. Females and those workers without a college degree are also impacted at a greater rate. Unsurprisingly, the policy design effects the

Table IV – Socio-economic characteristics of the workforce sensitive to the accrual rate

Demographic	Percent of Workforce	Percent with < 8 Hours of Paid Leave	Represented Population Size (<8)	Percent with < 40 Hours of Paid Leave	Represented Population Size (<40)
All	100%	5.40%	8,005,060	20.03%	29,679,510
Race					
White	77.29%	5.23%	5,981,008	19.35%	22,121,628
Black	11.92%	6.46%	1,144,788	23.87%	4,226,801
Native-American	1.04%	4.65%	71,695	19.57%	301,734
Asian	7.40%	4.70%	523,470	17.83%	1,985,766
Mixed-Race	2.36%	8.19%	284,099	30.07%	1,043,581
Earnings					
1st Quintile	20.11%	15.64%	1,011,228	43.29%	2,799,139
2nd Quintile	21.04%	5.23%	373,933	21.57%	1,541,070
3rd Quintile	19.43%	2.40%	157,146	16.37%	1,073,389
4th Quintile	20.11%	2.00%	135,576	10.70%	726,084
5th Quintile	19.31%	1.61%	104,516	10.18%	662,746
Age					
<30	22.84%	12.69%	4,297,969	43.73%	14,810,155
30-64	70.58%	3.30%	304,617	10.47%	965,797
65+	6.58%	3.24%	3,402,474	13.23%	13,903,558
Gender					
Male	52.92%	4.72%	3,689,050	17.46%	13,661,728
Female	47.08%	6.17%	4,316,010	22.89%	16,017,782
Children in Household					
No children	67.71%	6.22%	6,217,625	22.36%	22,372,161
Some Children	32.29%	3.71%	1,787,434	15.18%	7,307,349
Highest Education					
Less than High School	7.11%	16.57%	1,724,596	37.64%	3,918,464
High School and Some College	40.74%	5.97%	3,587,311	22.53%	13,544,036
Associate's Degree	10.32%	4.20%	639,770	17.11%	2,606,147
Bachelor's Degree	26.04%	3.71%	1,439,709	16.36%	6,347,245
Master's, Ph.D. or Professional Degree	15.79%	2.60%	613,674	13.81%	3,263,618

lowest earning individuals at a greater rate because hours worked impacts both the amount of paid leave accrued and total earnings.

An estimated 20.03% of workers will fail to accrue enough hours to meet the MRH=40 hours, so groups with a percent higher than 20.3% are disproportionately affected by the AR policy design. Table IV column 5 shows the percent of workers accruing under forty hours of paid leave. Similar to the analysis above, the groups likely to be impacted by the AR design include Black, and mixed-race workers; younger workers; females; and workers without a college degree. Notably 43.7% of workers age less than 30 will not earn enough paid sick leave to meet the 40 hour guaranteed threshold employers are required to provide, and this age group represents 22.8% of the workforce. Females compared to males are impacted at a greater rate (22.9% versus 17.5%). Those workers without a college degree will be disproportionately affected by the AR design, and represent 47.9% of the workforce.

Finally, we examine accrued hours of paid leave by industry and occupation (table V). While 44.1% of the U.S. workforce is in management, professional, and related occupations, those occupations are less sensitive to the AR policy design compared to those in service, and sales and office occupations (24.11% of the workforce). Under a 40-40 policy design, 9.2% of workers in service occupations will accrue less than eight hours of paid leave, and 30.7% will accrue less than forty hours. This result corresponds with the finding that workers in the leisure and hospitality industry, and the wholesale and retail trade industry (20.8% of the U.S. workforce) will be more sensitive to the AR policy design, with 40.2% and 27.0% accruing less than the MRH of forty hours, respectively.

To assess the limitations of these estimates, first consider again that 36.3% of part-time workers report having paid sick leave (Flood et. al. 2022). Because the reported percentages in tables III, IV, and V are mostly due to part-time workers, these statistics may be up to one-third lower if their employers currently provide voluntary sick leave, or are working in a state with a more generous mandate. However, these leave estimates do not take into consideration leave-taking behavior. For a sense of how much leave-taking will affect leave availability, we reviewed data from the 2017-2018 Leave and Job Flexibilities Module of the American Time Use Survey, which reports that in an average week, 20.7% of workers report taking leave from their jobs in 2018 (Bureau of Labor Statistics, 2019). Higher rates of leave-taking were observed for workers with higher education, full-time workers, higher earners, women, and employees having a flexible work schedule. Thus, those most likely to be impacted by the accrual rate design are already taking fewer days off and the difference between leave accrued and leave available will be smaller than their full-time counterparts.

Of the people that needed to take leave but did not, 58% reported reasons that suggest leave was inaccessible either explicitly or implicitly (explicit: 6.5% did not have enough leave, 8.9% did not have access to leave; implicit: 20.7% feared negative consequences, 15.2% could not afford it, 6.7% no one available to cover shift). Those reporting not taking leave because of too much work (22.9%) tend to be higher educated, could work from home, had a flexible schedule, and were above the median weekly earnings. Thus, those most likely to be rolling-over accumulated leave and have reasonable access are not likely to be in the cohort of those impacted by accrual rates. Only 4.8% of workers reported not taking leave because they wanted to save it, and 6.0% reported making alternate arrangements (Bureau of Labor Statistics, 2019).

Table V – Employment characteristics of the workforce sensitive to the accrual rate.

Industry	Percent of Workforce	Percent with < 8 Hours of Paid Leave	Represented Population Size (<8)	Percent with < 40 Hours of Paid Leave	Represented Population Size (<40)
Public administration	5.11%	2.37%	183,467	9.91%	767,487
Mining	0.32%	2.58%	12,493	12.47%	60,478
Construction	6.99%	3.01%	306,755	13.47%	1,372,823
Financial activities	7.00%	3.07%	320,499	14.17%	1,478,507
Manufacturing	9.90%	3.47%	514,071	14.27%	2,112,211
Agriculture, forestry, fishing, and hunting	1.38%	3.82%	70,763	13.16%	243,571
Educational and health services	22.83%	4.14%	1,421,269	18.26%	6,261,107
Transportation and utilities	6.30%	4.71%	437,239	19.85%	1,843,943
Professional and business services	12.99%	4.99%	957,839	20.63%	3,962,212
Information	1.79%	5.11%	134,869	18.12%	478,410
Other services	4.57%	5.76%	382,323	19.57%	1,300,234
Wholesale and retail trade	12.63%	8.48%	1,597,724	26.95%	5,078,284
Leisure and hospitality	8.19%	14.17%	1,665,748	40.15%	4,720,245
Occupations					
Management, business, and financial	18.78%	2.78%	769,321	12.07%	3,336,403
Construction and extraction	4.99%	3.40%	250,910	14.57%	1,073,951
Installation, maintenance, and repair	3.05%	3.53%	162,453	15.05%	691,536
Professional and related occupations	25.33%	3.73%	1,412,305	16.73%	6,343,278
Production	5.05%	4.78%	359,718	18.51%	1,391,847
Farming, fishing, and forestry	0.58%	5.12%	40,746	21.34%	169,758
Transportation and material moving	7.41%	7.12%	772,077	25.03%	2,712,851
Office and administrative support	10.69%	7.17%	1,159,715	24.38%	3,944,457
Sales and related occupations	9.10%	7.92%	1,069,894	24.52%	3,311,398
Service occupations	15.01%	9.20%	2,007,919	30.71%	6,704,030

4. Discussion

This study highlights the groups most likely to be impacted by the accrual rate and paid leave policy designs at a national level, and thus of interest to industries which hire these workers at higher rates. The cost of administering a paid sick leave policy is likely to be more costly for these industries, because of the need to keep track of hours accrued, hours used, average hours worked per year, and years of employment.

In any paid leave design program, the accrual rate and the employer's minimum required hours of guaranteed paid leave are important policy design considerations for US policy makers as these elements impact the cost and likelihood of employer compliance. Our results highlight that short-term workers are more sensitive to the AR, whereas employees with more than one year of job tenure are more sensitive to the MRH. The potential administrative cost for employers associated with tracking accrual can be costly particularly in industries with hourly employees, intermittent or irregular work hours, and/or a seasonal workforce. The program design of hourly accrual rates impacts the cost of program administration by increasing the need to track hours worked and hours absent alongside documenting the reason for those absences.

This analysis focuses only on the maximum possible hours accrued each year and does not take into consideration leave taking behaviors. Our estimates of paid leave fail to account for workers who are ill unusually often, or frequently take leave because they are caregivers. Additionally, our method is unable to account for people outside of the labor force due to illness or family care-taking who enter the labor force because they are now guaranteed paid leave for such purposes. Assessments on the employment characteristic of any program induced labor force additions is beyond the scope of this paper, but the analysis reveals the type of occupations, and industries best suited for employment if paid leave is the primary factor in keeping people out of the labor force. Additionally, one reason for not accruing enough hours to quality for paid leave could also be due to the same reasons a worker needs leave (i.e. one's own ill-ness or family care-taking). Future research should take into consideration which groups are likely to need leave beyond what a paid leave requirement provides, and how leave taking behaviors vary based upon economic factors, family characteristics, individual health, occupation, and industry using simulation methods such as the Department of Labor's Worker PLUS model.

Finally, the Worker PLUS model does incorporate a wait period in its simulations, and future research can consider the trade-off between the accrual rate and the wait period by using the model provided in this paper. If wait periods are long enough, short-term and seasonal workers may never be affected by the AR or MRH because they never exit the wait period. This administrative point is highlighted by the fact that states with longer wait periods tend to provide exemptions for seasonal and short-term workers from paid leave programs. Employee leave-taking increased during the COVID-19 pandemic, due to illnesses and family-care taking responsibilities, and highlighted the need for paid leave. The Families First Coronavirus Response Act provided assistance to small and medium-sized business to allow workers time off with paid leave for reasons related to COVID-19. Those benefits were extended but ultimately expired on September 30, 2021, and companies that rolled out COVID-19 expanded paid leave policies in 2020 began rolling them back in 2022 including Amazon, Walmart, and Starbucks. In 2022, the Bureau of Labor Statistics reported that only 77% of private-sector workers had access to paid sick leave, a small increase from 73% in 2019.

References

Ahn, T., & Yelowitz, A. (2015). The short-run impacts of Connecticut's paid sick leave legislation. *Applied Economics Letters*, *22*(15), 1267-1272. https://doi.org/10.1080/13504851.2015.1023934

Bureau of Labor Statistics (2019) "Access to and use of leave - 2017-2018 data from the American Time Use Survey" U.S. Department of Labor USDL-19-1542

Chen, J., Meyerhoefer, C. D., & Peng, L. (2020). The effects of paid sick leave on worker absenteeism and health care utilization. *Health Econ*, *29*(9), 1062-1070. https://doi.org/10.1002/hec.4118

D'Amuri, F. (2017). Monitoring and disincentives in containing paid sick leave. *Labour Economics*, *49*, 74-83. https://doi.org/10.1016/j.labeco.2017.09.004

Flood, Sarah, Miriam King, Renae Rodgers, Steven Ruggles, J. Robert Warren and Michael Westberry. Integrated Public Use Microdata Series, Current Population Survey: Version 10.0 [dataset]. Minneapolis, MN: IPUMS, 2022. https://doi.org/10.18128/D030.V10.0

Hartmann, H. I., & Hayes, J. (2021). Estimating benefits: Proposed national paid family and medical leave programs. Contemporary Economic Policy, 39(3), 537-556.

Heymann, J., & Sprague, A. (2022). Paid Leave and Beyond: The Urgency and Feasibility of Addressing Structural Inequalities Across Race, Gender, and Class. In (Vol. 112, pp. 959-961): American Public Health Association.

Heymann, J., Sprague, A., Earle, A., McCormack, M., Waisath, W., & Raub, A. (2021). US Sick Leave In Global Context: US Eligibility Rules Widen Inequalities Despite Readily Available Solutions. *Health Aff (Millwood)*, *40*(9), 1501-1509. https://doi.org/10.1377/hlthaff.2021.00731

KFF. (2021). *Paid Leave in the U.S.* (Women's Health Policy, Issue. https://www.kff.org/womens-health-policy/fact-sheet/paid-leave-in-u-s/

Maclean, J. C., Pichler, S., & Ziebarth, N. R. (2020). *Mandated sick pay: Coverage, utilization, and welfare effects*.

Markussen, S., & Roed, K. (2017). The market for paid sick leave. *J Health Econ*, *55*, 244-261. https://doi.org/10.1016/j.jhealeco.2017.07.008

OBLI. *Oregon law gives all workers sick time.* Oregon Bureau of Labor and Industries. Retrieved September 14, 2022 from https://www.oregon.gov/boli/workers/Pages/sick-time.aspx

Pichler, S., & Ziebarth, N. R. (2019). Reprint of: The pros and cons of sick pay schemes: Testing for contagious presenteeism and noncontagious absenteeism behavior. *Journal of Public Economics*, *171*, 86-104. https://doi.org/10.1016/j.jpubeco.2019.03.005

Pichler, S., & Ziebarth, N. R. (2020). Labor Market Effects of U.S. Sick Pay Mandates. *Journal of Human Resources*, *55*(2), 611-659. https://doi.org/10.3368/jhr.55.3.0117-8514R2

Schliwen, A., Earle, A., Hayes, J., & Heymann, S. J. (2011). The administration and financing of paid sick leave. *International Labour Review*, *150*(1-2), 43-62.

Stearns, J., & White, C. (2018). Can paid sick leave mandates reduce leave-taking? *Labour Economics*, *51*, 227-246. https://doi.org/10.1016/j.labeco.2018.01.002

Zimmer, D. M. (2015). Employment Effects of Health Shocks: The Role of Fringe Benefits. *Bulletin of Economic Research*, *67*(4), 346-358. https://doi.org/10.1111/boer.12010