

*Original Scholarship*

The Impact of Parental and Medical Leave  
Policies on Socioeconomic and Health  
Outcomes in OECD Countries: A Systematic  
Review of the Empirical Literature

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**Policy Points:**

- Historically, reforms that have increased the duration of job-protected paid parental leave have improved women's economic outcomes.
- By targeting the period around childbirth, access to paid parental leave also appears to reduce rates of infant mortality, with breastfeeding representing one potential mechanism.
- The provision of more generous paid leave entitlements in countries that offer unpaid or short durations of paid leave could help families strike a balance between the competing demands of earning income and attending to personal and family well-being.

**Context:** Policies legislating paid leave from work for new parents, and to attend to individual and family illness, are common across Organisation for Economic Co-operation and Development (OECD) countries. However, there exists no comprehensive review of their potential impacts on economic, social, and health outcomes.

**Methods:** We conducted a systematic review of the peer-reviewed literature on paid leave and socioeconomic and health outcomes. We reviewed 5,538 abstracts and selected 85 published papers on the impact of parental leave policies, 22 papers on the impact of medical leave policies, and 2 papers that evaluated both types of policies. We synthesized the main findings through a narrative description; a meta-analysis was precluded by heterogeneity in policy attributes, policy changes, outcomes, and study designs.

**Findings:** We were able to draw several conclusions about the impact of parental leave policies. First, extensions in the duration of paid parental leave to between 6 and 12 months were accompanied by attendant increases in leave-taking and longer durations of leave. Second, there was little evidence that extending the duration of paid leave had negative employment or economic consequences. Third, unpaid leave does not appear to confer the same benefits as paid leave. Fourth, from a population health perspective, increases in paid parental leave were consistently associated with better infant and child health, particularly in terms of lower mortality rates. Fifth, paid paternal leave policies of adequate length and generosity have induced fathers to take additional time off from work following the birth of a child. How medical leave policies for personal or family illness influence health has not been widely studied.

**Conclusions:** There is substantial quasi-experimental evidence to support expansions in the duration of job-protected paid parental leave as an instrument for supporting women's labor force participation, safeguarding women's incomes and earnings, and improving child survival. This has implications, in particular, for countries that offer shorter durations of job-protected paid leave or lack a national paid leave entitlement altogether.

**Keywords:** child health, employment, policy analysis, parental leave, population health, sick leave, socioeconomic factors, OECD.

**P**ARENTAL AND MEDICAL LEAVE POLICIES ALLOW EMPLOYEES TO take time off work for pregnancy, birth, and adoption, for personal illness, or to care for sick children, parents, and spouses. By 2013, all Organisation for Economic Co-operation and Development (OECD) countries other than the United States offered some form of national paid leave policy. Over the past 2 decades, there have been hundreds of changes to legislation governing paid leave from work. Although recent trends are toward more generous benefits and government-mandated leave, there is still substantial variation in allowances and benefits, both cross-nationally and subnationally. This variation can contribute to paid leave policies having different effects with respect to the various economic

and labor, social, and health outcomes that they plausibly influence. Paid leave might also affect sociodemographic groups differently or vary across contexts depending on the public policy environment. Because decisions to implement or amend paid leave policies should adopt a holistic view that considers the best available evidence, the objective of this review is to evaluate the empirical literature concerning the impact of leave policies, including those that regulate parental and medical leave, on economic and labor, social, and health outcomes in OECD countries. For the purposes of this review, parental leave policies refer to leave associated with pregnancy and birth while medical leave policies refer to leave for personal illness or to care for sick children, parents, and spouses.

Paid parental and medical leave policies, although they might be adopted for a variety of reasons, are typically designed to help reconcile work and family responsibilities and to simultaneously improve both economic and labor market outcomes and health outcomes. Access to paid leave might promote entry into the labor force by caregivers and those with chronic conditions, by allowing workers to take a leave of absence from work without necessarily sacrificing their tenure and career prospects. When these policies provide job protection, they might increase job retention and facilitate the return to work after a period of leave, thereby contributing to household income and savings. However, the impact of paid leave might vary based on the length of leave provided, among other policy attributes, and there may be countervailing effects to consider. For example, employment and earnings might decrease with lengthy and recurrent employment interruptions afforded by more generous paid leave policies. Moreover, employers might be biased in their hiring practices, against women of childbearing age in particular, who they presume are at an increased likelihood of taking leave; these discriminatory hiring practices might concentrate women in lower-paying or part-time positions, contributing to wages and benefit gaps when comparing women to men and mothers to nonmothers.<sup>1</sup> The uptake and impact of paid leave might also vary depending on macro-level factors, including economic and labor market conditions.

From a population health perspective, paid leave policies have the potential to influence health over the life course.<sup>2</sup> Paid leave might facilitate preventive care. For example, parental leave might promote immunizations for and breastfeeding of infants. Similarly, medical leave policies might facilitate caring for family members with chronic

conditions, as well as use of health services for those with covered health conditions. By reducing conflict between work and family responsibilities, job-protected paid leave might reduce stress related to pregnancy, personal illness, and the demands of caregiving for family members.

From a social standpoint, when paid parental and medical leave policies are universal and designed for equal access, they can reduce inequalities in uptake, with potentially beneficial effects for families and children. The availability of paid leave might disproportionately benefit socially disadvantaged groups that lack the resources to take time off work.<sup>3</sup> Paternal leave policies in particular help to promote gender equity by encouraging new fathers to participate in child-rearing and by facilitating mothers' participation in the labor market;<sup>4</sup> nonetheless, fathers may be less likely to utilize paternal leave if they experience workplace stigma associated with asking for leave.<sup>5</sup> Similarly, access to longer-term sick or medical leave might ease the onus of caregiving that is disproportionately placed on women and reduce gender inequalities in labor force participation. To the best of our knowledge, the effects of paternal and medical leave policies have not been systematically reviewed.

While there is a large body of literature on economic outcomes,<sup>1</sup> and a smaller one on social and health outcomes,<sup>2,6,7</sup> there exists no comprehensive review that describes and synthesizes the interdisciplinary evidence concerning the impact of parental and medical leave policies on socioeconomic and health outcomes. This systematic review aims to describe the potential impact of parental and medical leave policies across economic, social, and health outcomes, with the intention of informing further research that places the benefits of paid leave policies in relation to their costs.

## **Methods**

We conducted a systematic review and narrative synthesis of the literature. We searched CINAHL, PsychInfo, Web of Science, and Medline databases for papers investigating the effects of parental and sick leave policies. The keyword searches included the terms "maternity leave," "maternal leave," "paternity leave," "paternal leave," "parental leave," "medical leave," "personal leave," "family leave," "paid leave," "child care leave," "sick leave," "sick pay," "sickness benefits," "sickness insurance," and "FMLA," combined with terms restricting the searches

to articles considering the impact of these policies (ie, “association,” “impact,” “effect,” “correlation,” “increase,” “decrease,” “reduction,” “outcome”) rather than descriptions of the policies themselves. We did not include any search terms that would restrict the outcome, since we were looking for a broad range of economic, health, and social outcomes.

We applied several exclusion criteria. First, we excluded papers with outcomes that did not fall into the 3 outcome categories of interest (economic, health, and social outcomes) during the abstract review, such as fertility patterns. Second, with respect to the policy exposures, we excluded studies that explicitly examined access to short-term, often employer-funded sick days, instead focusing on the impact of longer-term sick and medical leave policies (hereafter called medical leave policies) that permit longer-term sickness-related absences from work to address personal or family illness.<sup>8</sup> Third, we excluded papers that examined individuals’ access to leave through an employer, because non-legislated workplace or employer policies are not as generalizable as aggregate state- or country-level policies. Fourth, we excluded studies that examined individuals’ utilization of leave, rather than access or reforms to state- or national-level leave policies, because there is a greater risk of confounding of individual-level leave-taking by socioeconomic status and other characteristics. Finally, we excluded papers that described policies outside of OECD countries, as well as articles without original research (review articles) and non-peer-reviewed, gray literature (Table 1).

A title-abstract review was followed by a full-text review to decide on the final included articles. Each title and abstract was reviewed by 1 reviewer (MD, DJ, or JL). We assessed the reliability of the title-abstract search by randomly assigning 150 abstracts to 2 reviewers and assessing the percent agreement concerning which papers should proceed to full-text review, which was determined to be very high (95%). We retrieved and reviewed full-text articles that cleared the title-abstract review. When the result of the full-text review was equivocal, articles were discussed among all authors before a final decision was made to include or exclude the paper. One reviewer extracted information on the years of the study, study context, study design, eligibility criteria, data source and sample, the type of outcome, and policy details from each included paper. Evaluation designs were classified as multivariable regression adjustment, pre-post and interrupted time series (ITS) designs, difference-in-differences (DD) and fixed-effects regression approaches, regression discontinuity (RD), and other model-based

| Table 1. Inclusion and Exclusion Criteria  |  |
|--|--|
| Inclusion Criteria   | Exclusion Criteria   |
| <ul style="list-style-type: none"> <li>• Examined a legislated, aggregate-level parental or medical leave policy</li> <li>• Health, social, or economic outcome</li> <li>• Evaluated the impact of the policy on, or association with, the above outcomes</li> <li>• Study setting in an OECD country</li> </ul> | <ul style="list-style-type: none"> <li>• Exclusively examined employer or workplace leave policies and/or examined individuals' utilization of leave</li> <li>• Evaluated impacts on fertility outcomes</li> <li>• Review articles</li> <li>• Non-peer-reviewed gray literature</li> </ul> |

analyses. Additionally, we extracted information on the methods used for statistical analysis and qualitative conclusions. We synthesized the main findings through a narrative description; heterogeneity in policy attributes, policy changes, outcomes, and study designs precluded quantitative meta-analysis of the study results. We assessed the methodological strengths, limitations, and potential for biases in the literature, which was based mainly on the design of the evaluation. In general, quasi-experimental studies with a clear identification strategy were considered to be of higher quality than standard regression adjustment approaches that lacked a strategy for addressing sources of unmeasured confounding.

## Results

The review process is summarized in Figure 1.<sup>9</sup> This search retrieved 12,106 articles. An additional 7 studies were included from the references of full-text papers, informal web searches (Google Scholar), and reference libraries of authors and colleagues. After removing duplicates we retained 5,538 articles. The abstract and title screening excluded 5,254 articles, leaving 284 articles for full-text screening. After the full-text review, we included 85 parental leave and 22 medical leave studies, as well as 2 papers that investigated both types of policies, which are

**Figure 1. Selection of Articles Related to Parental and Medical Leave**

|                       |   |   |
|-----------------------|---|---|
| <b>Identification</b> | Records identified through database searching<br>( <i>n</i> = 12,106)     | Additional records identified through other sources<br>( <i>n</i> = 7)  |
| <b>Screening</b>      | Records after duplicates removed<br>( <i>n</i> = 5,538)                   | Records screened<br>( <i>n</i> = 5,538)   |
| <b>Eligibility</b>    | Full-text articles assessed for eligibility<br>( <i>n</i> = 284)          | Excluded after title-abstract screen:<br>Non-OECD study setting ( <i>n</i> = 29)<br>Exposure criteria ( <i>n</i> = 4,951)<br>Outcome criteria ( <i>n</i> = 145)<br>Other exclusions ( <i>n</i> = 129) |
| <b>Included</b>       | Studies included in review of parental leave policies<br>( <i>n</i> = 87) | Excluded after full-text review:<br>Non-OECD study setting ( <i>n</i> = 10)<br>Exposure criteria ( <i>n</i> = 81)<br>Outcome criteria ( <i>n</i> = 39)<br>Other exclusions ( <i>n</i> = 45)           |
|                       | Studies included in review of medical leave policies<br>( <i>n</i> = 22)  |   |

classified with the parental leave policies for simplicity. The most common reason for excluding a study was related to the measurement of the exposure, with the review including only studies measuring the impact of a leave policy rather than individual-level leave-taking. Results are presented separately for studies concerning parental leave (Online Appendix Table 1) and studies concerning medical leave for personal or family illness (Online Appendix Table 2).

### *Policy Characteristics*

For the purposes of this review, we have grouped policies affecting leave associated with pregnancy and birth as parental leave policies and policies affecting leave associated with personal or family illness as medical leave policies. These definitions are more in line with the policy framework in European countries, where employees' rights to leave for birth, for personal sickness, and for family sickness are distinct. In the United States the right to take leave, whether paid or unpaid, and for any purpose, often stems from the same policy; hence leave taken for one purpose reduces time available for other purposes.

*Parental Leave Policies.* The paid leave policies available in OECD countries vary in length, benefits, and eligibility, although globally the trend is toward increasing generosity over time. Most of the OECD countries comply with the International Labour Organization's standard of providing at least 14 weeks of paid leave and a wage replacement rate of at least two-thirds of the wage. Aside from the United States, Australia was the only other outlier among OECD countries in terms of whether paid leave was nationally mandated.<sup>10</sup> Before the country enacted a paid parental leave scheme guaranteeing 18 weeks of leave at the national minimum wage rate in 2011, it had taken an approach similar to the United States, based on enterprise-level bargaining for leave.<sup>11</sup>

Today, the United States is the only OECD country lacking a national paid parental leave policy. In lieu of a national paid leave benefit, some US businesses are required by the federal Family Medical Leave Act (FMLA) of 1993 to provide at least 12 weeks of unpaid leave to workers depending on eligibility criteria. Since the FMLA was enacted, California (2004), New Jersey (2009), and Rhode Island (2014) passed legislation and enacted policies providing paid leave for durations of 4–6 weeks at wage replacement rates of 55%–60%.<sup>2,12,13</sup> New York recently joined



this group in 2018, although its policy will not take full effect until 2021, when the duration of paid leave will be extended to 12 weeks. Paid leave was enacted by Washington, DC, and Washington state in 2017, although these policies have not yet gone into effect. Hawaii and Puerto Rico have specific provisions as part of the temporary disability insurance scheme allowing for 6-8 weeks of maternity leave as well.<sup>2</sup>

Similar to the United States, the Canadian government legislates leave policies nationally, with provinces enacting their own laws. Fifty weeks of maternity/parental leave paid at 55% of average insured earning are available in all provinces other than Quebec, but the eligibility criteria for job-protected leave vary substantially across provinces according to the minimum weeks of continued employment required, among other characteristics. In 2006 Quebec opted out of the federal employment insurance program and established the Quebec Parental Insurance Plan, the most generous program in the country, which provides 50 weeks of maternity/parental leave with benefits covering up to 70% of wages.<sup>14</sup> In other OECD countries, paid leave entitlements as of 2016 vary from 12 weeks (Mexico) to 3 years or more (Czech Republic, Finland, Hungary, and Slovakia), with a wage replacement rate greater than or equal to 85% for at least part of the leave.<sup>15</sup>

Most policies in OECD countries require employees to have demonstrated some labor force attachment prior to taking leave, such as working a certain number of hours or some length of time before they become eligible, although there are exceptions. In the United States, only about half of employees qualify for the 12 weeks of unpaid leave through the FMLA because people working for smaller employers and those who have worked less than 1,250 hours and/or 12 months are not covered.<sup>16</sup> The United States is the only OECD country that has an employer size requirement for leave eligibility. However, these criteria have also been modified by some US state laws, by either extending the duration of unpaid leave or easing the eligibility thresholds.<sup>17</sup> Other labor force attachment criteria are more flexible; Austria, Finland, Germany, Italy, the Netherlands, Poland, and Slovenia do not have tenure requirements.

Beyond maternity leave, parental leave policies can consist of family entitlements used flexibly by either parent, individual entitlements that can be transferred between parents, or nontransferable individual entitlements. In Canada, leave is a family entitlement, whereas in the United States the leave mandate is an individual 12-week entitlement unless spouses work for the same company, in which case the amount of

leave that can be used to take care of a newborn child becomes limited to a combined, 12-week family entitlement. At least a portion of most leave entitlements is transferable between parents, but some countries provide nontransferable entitlements to fathers, which we refer to as paternal leave.

Paid paternal leave shorter than 2 weeks following birth is commonly available among OECD countries, but evaluations of these policies are scarce, with exceptions including an evaluation of Spain's adoption of 13 days of paternal leave in 2007.<sup>18</sup> It may be difficult to detect the impact of short periods of leave available for fathers because the short duration could likely be made up regardless of the policy, by using vacation days or other forms of excused absence, or because it is of insufficient length to have impact. Conversely, a few countries offer longer paternal leave and other incentives to encourage fathers to participate in child care, such as bonus time off or obligatory paternal leave policies. Portugal, Finland, Iceland, Sweden, and Norway offer paternal leaves ranging from 4 weeks to 3 months. In 1993, Norway was the first country to specifically allocate a 4-week leave for fathers,<sup>19</sup> and Sweden similarly implemented a "daddy month" in 1995.<sup>20</sup> More recently, in 2007, Germany adopted a policy where the 12 months of paid parental leave available is extended by 2 months if fathers use at least 2 months of the entire leave.<sup>21</sup> Multiple evaluations of the impact of such longer paternal leaves and incentivizing policies exist.

*Medical Leave Policies.* Across the OECD, countries have changed many aspects of their paid medical leave policies for personal or family illness, including wage replacement rates, durations of leave, and eligibility criteria. However, in comparison to parental leave policy changes, these policies have been evaluated by only a small number of studies, which in most cases examined the impact of restricting benefits, sometimes explicitly to curb rising costs. For example, Sweden amended its sick leave legislation multiple times between 1992 and 2008, including the introduction of a sick pay period paid by the employer (1992), an unpaid qualifying day (1993), modified compensation levels in several years, and assessments of working capacity (2008).<sup>22-24</sup> Sweden also reformed its sickness absence policy in 1995 in order to mitigate rising costs by excluding nonmedical criteria for sick listing, requiring more information on certificates, and requiring that a consultant physician examine all certificates for episodes of more than 28 days.<sup>25</sup> Similarly, in 2009 Estonia cut sickness benefits by reducing compensation levels

from 80% to 70% and having payments start on the fourth day instead of the second.<sup>26,27</sup> Italy also reduced the wage replacement rate for sick leave compensation in the public sector.<sup>28</sup> Not all reforms were intended to limit medical leave benefits. For example, to address poor labor market attachment among youth and early exits from the labor force, Finland introduced a partial sickness benefit that allowed workers to combine part-time sick leave with part-time work.<sup>29,30</sup> In Germany, statutory short-term sick pay for private sector employees was increased from 80% to 100% of forgone gross wages in 1999, after it was reduced from 100% to 80% in the first 6 weeks in 1996.<sup>31,32</sup> To prevent discrimination against young women, Norway removed the employer pay liability for short-term (first 16 days) sick leaves for pregnancy-related absences.<sup>33</sup>

Medical leave benefits in the United States are relatively modest vis-à-vis other OECD countries. Only 5 states—California, Connecticut, Massachusetts, Oregon, and Vermont—and Washington, DC, currently mandate employer-funded, short-term paid sick leave that can be used for personal or family sickness, ranging from 24 to 40 hours of leave available annually. Five states—California, Hawaii, New Jersey, New York, and Rhode Island—provide longer paid medical leave through a state family medical leave policy or temporary disability insurance program that can be used for 1 or more of the following purposes: personal sickness, the sickness of a family member, or bonding with a newborn child. In California workers were allowed to take paid time off to care for an ill family member as part of the state's Paid Family Leave Insurance program, which went into effect in 2004 and provided up to 6 weeks of paid leave with a 55% wage replacement for employees qualifying for state disability insurance;<sup>34</sup> however, it was not until 2015 that the state included provisions in its labor law for paid absences for employees' personal sickness.

### *Impacts of Parental Leave Policies*

In the following section we consider evidence on the impact of unpaid leave policies, paid maternity and parental leave policies, and paternal leave policies.

*Unpaid Leave.* With only a handful of states providing any form of paid leave to new parents, the United States has been the primary setting for investigating whether federally mandated unpaid leave

following childbirth is associated with better economic, socioeconomic, and health outcomes. Our review identified several studies that evaluated the impact of the federal FMLA, which provides 12 weeks of unpaid leave, on various labor market and health outcomes.<sup>35-42</sup> Although the policy may encourage leave-taking<sup>41,43</sup> and return to work with the same employer,<sup>42</sup> most studies did not suggest that the provision of unpaid leave was accompanied by substantial changes in labor market outcomes. For example, using a DD design applied to data from the National Longitudinal Survey of Youth, in 2003 Baum concluded that the FMLA did not affect employment or wages.<sup>35</sup> These results corroborate earlier null findings by Waldfogel,<sup>41</sup> presumably because the leave is unpaid and short in duration, giving new mothers less control over their decisions about whether and when to return to work.<sup>35</sup> Using a similar design, a 2010 study by Goodpaster indicated that the introduction of the FMLA may have increased the probability that women left the labor force 1 year after giving birth,<sup>36</sup> whereas a 2012 study by Schott suggested women were more likely to return to work on a part-time basis.<sup>39</sup> Work from Han and Waldfogel in 2003 showed that the FMLA was associated with a small impact on leave-taking for women, particularly among college-educated and married mothers, and had no impact for men.<sup>37</sup> One DD study assessed the impact on a variety of outcomes of state-level reforms that expanded the coverage or duration of unpaid leave over and above that provided by the FMLA; results showed that these laws decreased the probability that mothers were working in the short term (ie, 2 to 4 months after birth), but increased employment in the longer term (ie, at 9 months and 4 years after birth). There was little evidence, however, for any effect on the mode of child care at 4 years, breastfeeding, maternal depression, maternal parenting scores, household income, cognitive outcomes, or behavioral outcomes.<sup>44</sup>

With respect to the impact of the FMLA on population health and health services, a recent study showed that US state laws providing relatively short periods of unpaid leave of 13 weeks or less were associated with a lower probability of cesarean deliveries compared to states without maternity leave laws in the pre-FMLA period. This is perhaps because these laws eliminated “bonus” time routinely given to mothers delivering by cesarean,<sup>45</sup> although they might also have reduced the risk of cesarean delivery by making leave prior to delivery possible. For birth outcomes, one study showed that the FMLA was associated with minor improvements in birth weight and the prematurity rate, as well as a

decrease in the infant mortality rate, measured in the first year of life, among college-educated white mothers.<sup>38</sup>

Collectively, this research suggests that unpaid leave provided through the FMLA had little, or perhaps even negative, effects on women's labor force participation, employment, and wages, contrary to its intended influence on preserving job tenure. Additionally, the few studies that showed benefits of the program, either in terms of economic or health outcomes, indicated that improvements were concentrated among socioeconomically advantaged groups, leading some authors to conclude that "unpaid maternity leave policy may actually increase disparities because it only benefits those mothers who can afford to take it."<sup>38</sup>

Few studies have evaluated the implications of unpaid leave policies outside of the United States, where they are less common. Cross-national work suggests there was no impact on infant and child health of extending unpaid or non-job-protected leave.<sup>46,47</sup> For example, in a cross-national study using aggregate data from 16 OECD countries spanning the period from 1969 to 1994, unpaid leave was not associated with reductions in rates of infant mortality,<sup>48</sup> a conclusion corroborated by similar analyses of more recent data.<sup>46</sup> An evaluation of a 1992 policy that increased the length of low-paid or unpaid parental leave in West Germany found that the reform decreased the time that fathers spent with their children, by about a half hour on a weekday, 18 to 30 months after childbirth.<sup>49</sup> A Spanish study examined the interaction between a national policy allowing parents to take unpaid leave from work to care for children up to 3 years of age and complementary regional policies with different flat-rate benefits, showing usage rates were higher in the regions that provided the highest economic incentive to use parental leave.<sup>50</sup>

*Paid Maternity and Parental Leave Protections and Economic Outcomes.* The majority of studies included in our review examined the impact of paid parental leave on labor and economic outcomes, including employment decisions in the short and longer term after childbirth, overall participation in the labor force, and wages and earnings. Starting with the question of whether more generous paid leave policies induce mothers to take or extend their time away from work, research consistently showed that expansions in the duration of paid leave were accompanied by attendant increases in leave-taking and longer durations of leave.<sup>3,10,12,14,51-55</sup>

Several studies examined the immediate economic targets of paid leave policies, including employment in the short term, typically among women who were employed prior to childbirth. Because new mothers appear to avail themselves of paid maternity and parental leave benefits, a consequence of longer paid leave entitlements is that women may be less likely to be employed and at work immediately before and in the short term after childbirth and are more likely to be providing direct care.<sup>14,56-58</sup> Access to longer periods of paid leave might help to forestall early returns to work, with research indicating that the timing of a mother's return to work peaks around the time that paid leave benefits expire.<sup>59-61</sup> A comparison of policies in Hungary, where the parental leave mandate was universal, and Poland, where it was means tested, suggests that providing universal coverage might reduce maternal employment in the short term, presumably by increasing eligibility and uptake of program benefits.<sup>62</sup> These findings are substantiated by a study examining the impact of replacing a means-tested child-rearing benefit program with a universal parental leave benefit in Germany that increased payment amounts and decreased the pay period; the 2007 reform increased household income among those with an infant and expedited women's return to work, particularly among mothers with lower prebirth incomes.<sup>57,63-65</sup>

Several studies examined the impact of extending paid leave on women's labor force participation and employment-related outcomes in the medium to long term. Cross-national analyses showed that increasing the duration and benefit level provided by paid leave policies increased rates of women's labor force participation,<sup>66-68</sup> although it is unclear whether this resulted from the reforms prompting labor force entry or, conversely, inhibiting labor force exit. For example, a DD analysis applied to aggregate data from 9 OECD countries, where the mean duration increased from 10 to 33 weeks between 1969 and 1993, showed that an increase in the duration of paid leave was associated with an increase in the female employment-to-population ratio.<sup>69</sup> Examining the effect of country-specific reforms on employment outcomes can help to distinguish the relevance of individual paid leave policy components, including the duration of job protection, the duration of leave, and the wage replacement rate. For example, a study examining 3 policy reforms occurring in Austria between 1990 and 2000 suggested that the time when women returned to work after childbirth was most responsive to changes in the duration of job-protected paid leave;

employment decisions seemed less sensitive to reforms that changed either the duration of cash benefits or the period of job protection, but not both.<sup>70</sup> A policy that held the duration of leave constant but increased the wage replacement rate available to new mothers in Japan, from 25% to 40%, did not affect job continuity.<sup>71</sup> Waldfogel and colleagues looked specifically at job retention, with analyses using data from the United States, Britain, and Japan indicating that maternity leave eligibility increased the probability that women returned to work with the same employer.<sup>72,73</sup> A German reform, though it decreased employment 10 months after childbirth, when mothers were still eligible for paid leave, was associated with increased employment rates a year and a half after birth and had no impact more than 2 years after birth.<sup>74</sup>

Although few studies examined the potentially nonlinear effect of parental leave generosity on women's labor force participation, 3 cross-national analyses showed that more generous parental leave policies increased the probability of working, but with diminishing returns to longer durations of leave.<sup>68,69,75</sup> Using aggregate data from 16 European countries for the period between 1970 and 2010, Akgunduz and Plantenga showed that the duration of weighted leave (the combined length of maternal and parental leave, weighted by the wage replacement rate) had a positive impact on women's labor force participation for durations as high as 45 weeks, although the optimal benefit was achieved at 28 weeks of weighted leave for mothers between 25 and 34 years old.<sup>68</sup>

Concerning the employment impact of US reforms, an evaluation of the 1978 Pregnancy Discrimination Act, which extended temporary disability insurance programs by providing wage replacement benefits to pregnant women directly before and after birth, showed that the policy increased the labor force participation rate of pregnant women, women with children under the age of 1, and women with children ages 1-6 years.<sup>76</sup> The effects of introducing paid family leave in California in 2004 were mixed, with conflicting findings from DD analyses that compared the change in outcomes before and after the reform in California relative to other control states. An analysis of employed men and women from the National Longitudinal Survey of Youth suggested that the reform was associated with an increase in employment among women 12 months after childbirth, probably because the policy increased job continuity.<sup>12</sup> In 2013 Rossin-Slater and colleagues, using data from the Current Population Survey, showed that the reform did not

substantially impact employment.<sup>3</sup> Another study, however, also making use of the Current Population Survey and published in 2015, concluded that California's paid leave policy increased the labor force participation rate, but also the unemployment rate for young women, potentially because of discrimination in hiring.<sup>77</sup>

Evidence concerning the impacts of paid leave policies on wages and earnings is mixed. Whether reforms have negative, null, or positive effects might depend on the structure of the program and the point at which wages and earnings were measured. Since many paid leave policies do not fully replace wages, policies that stimulate leave-taking might decrease earnings in the short term, with cross-national work suggesting that longer periods of leave (approximately 9 months) are associated with a reduction in earnings.<sup>69</sup> In Austria, for example, an evaluation of 1990 and 1996 federal policy reforms that changed the length of paid maternity leave suggested an inverse relation between the length of paid maternity leave and earnings in the short term.<sup>78</sup> Programs that provide job flexibility by facilitating part-time returns to work might also be associated with lower earnings. For example, the introduction of a part-time parental leave program in France was associated with a decrease in wages 1-2 years after childbirth, although these results were not consistent across different model specifications with varying controls, but no decrease in employment.<sup>79</sup>

It is important, however, to also consider the medium and longer-term implications of paid leave policies, which could increase wages and earnings by preserving job tenure. A July 2000 Austrian reform that extended the duration that women could receive cash benefits after birth to 30 months did not negatively impact the wages women received from their first job after birth. Additionally, a study evaluating the 1984 national policy change that increased the length of paid parental leave from 14 to 20 weeks in Denmark suggested that the reform was associated with an increase in maternal income 5 years after childbirth.<sup>80</sup> An evaluation of California's 2004 paid leave reform suggested that it increased wage income 1 to 3 years after birth.<sup>3</sup> Additionally, maternity leave eligibility was associated with higher wages approximately 2 years after childbirth in the United States and Britain, although these differences were eliminated by 5 to 8 years after childbirth, suggesting that it took several years for women lacking access to paid leave to make up for lost earnings.<sup>72</sup> Other evidence suggests that the longer-term impact of extending paid leave on earnings is modest or null.<sup>12,52,72,78</sup> A couple of



studies examined the association between paid parental leave and measures of poverty across OECD countries, with results suggesting that more generous policies were associated with lower poverty, particularly among single mothers.<sup>81,82</sup>

Interestingly, several studies have examined impacts on wage differentials and inequalities in wages by gender, as well as gender dynamics within the household. With respect to wages, this research suggests that the proportion of household income earned by women increased with access to longer (more than 24 weeks) durations of leave.<sup>83</sup> Some research evaluated whether longer durations of paid leave might help safeguard women from the “motherhood penalty,” referring specifically to the loss in employment, wages, and annual earnings experienced by women for each subsequent child, relative to men and nonmothers. One cross-national study with a cross-sectional design suggested that the negative association between having young children and employment was larger in countries with longer durations of paid parental leave, whereas another showed that longer durations of paid leave were associated with smaller earnings penalties.<sup>84,85</sup> Looking at employment gaps between mothers and nonmothers, a model-based analysis using data from the European Community Household Panel predicted that an increase in the number of years of leave available to mothers of infants led to small increases in these inequalities.<sup>86</sup> Results from analyses by Pettit and Hook suggest this effect may be nonlinear.<sup>87</sup> Their multilevel analyses of 19 countries included in the Luxembourg Income Study suggested that longer parental leaves were associated with a lower employment gap between mothers and nonmothers; however, benefits diminished with extended leave provisions of 3 years or more.<sup>87</sup>

With respect to household gender dynamics, a cross-sectional study including 32 countries suggested that countries offering longer durations of paid parental leave had more egalitarian gender divisions of housework, not including time spent on child care.<sup>88</sup> Subsequent research, measuring housework using data from the Multinational Time Use Study, suggests that the relation may depend on the nature of paid leave available, and specifically whether leave is available to fathers. One study found that a longer duration of parental leave was associated with less time spent on cooking for men and more time spent on cooking and housework for women, which suggests that longer parental leave may exacerbate gender inequalities in time spent on housework; however, women spent less time on cooking if men had access to parental

leave.<sup>89</sup> Similarly, Hook showed that the duration of parental leave was associated with less time spent on unpaid work among men, whereas having access to parental leave specifically for fathers was associated with more time spent on unpaid work.<sup>90</sup> This evidence suggests that longer periods of parental leave may deepen specialization within the household and reinforce social norms governing housework and child care, whereas having designated leave for fathers may contribute to a more balanced distribution of unpaid work within the household. However, a fixed-effects regression analysis showed that an increase in the duration of parental leave was associated with increased paternal time spent on child care, specifically for fathers with less education; the impact of increasing paternal leave was similar in magnitude, although less precisely estimated.<sup>91</sup>

*Paid Maternity and Parental Leave and Child Health and Development.* Given the potential for paid leave policies to influence caregiving and economic outcomes, there is a growing body of literature that has examined the population health impact of paid leave, with most research investigating the question of whether extending leave benefits reduces mortality within the first year of life. Evidence on outcomes measured in the neonatal period between birth and the first 28 days of age is mixed. For example, a study by Ruhm in 2000 did not provide evidence that increases in paid leave influenced the incidence of low birth weight, unlike a positive 2005 study by Tanaka.<sup>47,48</sup> Recent work by Stearns showed that the US Pregnancy Discrimination Act of 1978 decreased the incidence of low-birth-weight infants, particularly for unmarried mothers, as well as early-term and small-for-gestational-age births.<sup>92</sup> The potential for parental leave policies to influence neonatal outcomes may be limited by the extent to which paid leave can be taken prior to birth, which could facilitate access to prenatal care and other health-promoting interventions.

Several cross-national studies have examined whether national expansions of paid leave influenced rates of infant mortality. This work shows that increases in paid parental and/or maternity leave lowered rates of infant mortality, with benefits largely concentrated in the postneonatal period from 1 to 12 months of age. For example, in separate studies, Ruhm and Tanaka showed that a 10-week extension of paid leave was associated with a roughly 2.5% decrease in the infant mortality rate.<sup>46-48,66</sup> An evaluation of paid maternity leave provided through state temporary disability insurance programs, which was mandated by the 1978

US Pregnancy Discrimination Act in 5 states with existing temporary disability insurance programs, did not reduce infant mortality rates.<sup>92</sup> However, this act was unlikely to affect very early or very low birth weight births due to the short amount of antenatal leave available; thus, the lack of a pronounced impact of the reform is unsurprising. Paid leave also appears to lower child mortality measured in the first 5 years of life. Tanaka indicated that a 10-week extension of paid leave benefits lowered child mortality rates by 3%, estimates similar to those from Ruhm.<sup>47,48</sup>

The mechanisms that potentially connect paid parental leave to improvements in infant and child mortality might include health-promoting behaviors such as breastfeeding and immunization, parenting behaviors, and utilization of health services, as well as increased income. Longer leave durations were associated with improvements in the prevalence and duration of breastfeeding in the United States and Canada.<sup>17,93</sup> For example, the 2004 introduction of California's paid leave program was associated with increases in rates of exclusive and overall breastfeeding through the first 3, 6, and 9 months following birth.<sup>17</sup> A 2007 German policy that, among other components, increased financial support to new parents was associated with longer durations of breastfeeding, although there was no impact on the probability of initiating breastfeeding.<sup>94</sup> With respect to parenting behaviors, a recent evaluation of California's paid leave program suggested the reform reduced the incidence of abusive head trauma admissions among children less than 2 years of age, with the proposed mechanism being lower levels of stress and abusive behavior.<sup>95</sup> Research on the use of health services is sparse. An ecological study using cross-sectional data from 185 countries found a positive relation between the length of paid maternity leave and vaccination coverage, although the study design precludes causal inference.<sup>96</sup> Immunization coverage was not influenced by paid leave in the study by Tanaka. However, the duration of job-protected paid leave was already relatively high in many of the OECD countries included.<sup>47</sup> The extension of parental leave in Sweden from 12 to 15 months did not affect the probability that the child was admitted to the hospital within the first 16 years after birth.<sup>97</sup>

The effects of leave policy on child development and health over the life course are less clear and, given the lack of evidence, challenging to synthesize. There was little evidence that increased parental leave benefits in Canada influenced children's temperament or motor and social development.<sup>98</sup> Paid leave policies might influence educational

outcomes. For example, an evaluation of a 1977 Norwegian reform that introduced 4 months of paid maternity leave and extended the duration of unpaid leave measured longer-term educational impacts, with results supporting a substantial reduction in high school dropout rates at age 30.<sup>99</sup> The 1998 policy in Sweden that extended paid parental leave from 12 to 15 months was associated with better scholastic performance at age 16 years, but only for children of more highly educated mothers.<sup>97</sup> However, most of the literature examining school performance suggests null effects of longer parental leaves. A 1992 Norwegian reform that extended the duration of paid parental leave from 32 to 35 weeks did not influence children's school performance.<sup>19</sup> Similarly, educational attainment did not improve after several reforms extending paid maternity leave benefits in Germany between 1979 and 1992, or after a 1984 reform in Denmark, which extended parental leave benefits from 14 to 20 weeks.<sup>52,80</sup> A cross-national analysis of 20 OECD countries did not provide evidence for a positive association between longer parental leave and school performance.<sup>100</sup>

*Paid Maternity and Parental Leave and Maternal Health.* Research evaluating the impact of parental leave on maternal health is limited. A few studies have examined women's mental health. The expansion of unpaid and paid leave in the United States and Canada, respectively, was not associated with postpartum depression.<sup>44,93</sup> There was no evidence for an impact of the Canadian reform on women's self-reported health in Canada.<sup>93</sup> Looking at life course effects, a study using data from the Survey of Health, Ageing, and Retirement in Europe showed that women who were exposed to more generous federal maternity leave policies at the time of first childbirth reported fewer symptoms of depression after the age of 50 years.<sup>101</sup> This life course effect of parental leave policies on women's mental health warrants further research.

*Paternal Leave Policies.* Historically, the expansion of gender-neutral leave policies, whether paid or unpaid, has not coincided with a marked increase in uptake by fathers, who unlike mothers tend to take few days off from work following childbirth. The duration of unpaid leave in the United States, for example, was not associated with leave-taking among men.<sup>37</sup> In West Germany, the expansion of unpaid leave in 1992 actually decreased paternal child care time in the longer term, 18 to 30 months after childbirth.<sup>49</sup> However, targeted policies have increased fathers' leave-taking following childbirth. In Norway, for example, descriptive evidence suggests that the 1993 federal policy change that added 4 weeks

of parental leave for fathers was associated with an increase in leave-taking.<sup>53</sup> In Sweden, 1995 and 2002 reforms that reserved 1 month of paid paternal leave led to substantial increases in paternal leave-taking, although the 2008 introduction of a gender equality bonus did not.<sup>20,102</sup> Additionally, the introduction of 13 days of paid paternal leave in 2007 in Spain appeared to increase leave-taking among fathers.<sup>18</sup>

In terms of economic implications, a study by Cools and colleagues suggested that the 1993 reform in Norway did not influence fathers' work hours and earnings when children were 2 to 5 years old,<sup>19</sup> whereas another study implied earnings may have declined in the medium term, 5 years after birth,<sup>53</sup> although effects on earnings from these 2 studies were similar in magnitude. Cross-national analyses of 24 European countries showed that father-friendly parental leave policies were associated with fewer working hours among less educated fathers.<sup>103</sup> However, a German reform adding 2 additional "partner months" in 2007 was not associated with a change in fathers' labor force participation rate.<sup>74</sup> Only 1 study—Cools and colleagues' study of Norway's 1993 reforms—evaluated the impact of a paternal leave policy on outcomes for children; that analysis indicated that paid paternal leave improved children's school performance, but only in families where the father was more educated than the mother.<sup>19</sup>

Several studies have examined the implications of paternal leave policies on social outcomes and gender dynamics, including the distribution of care responsibilities within the family. The 1993 Norwegian reform was associated with a reduced frequency of conflicts over housework and a greater division of washing clothes, although there was no impact on views on gender equality or views on public responsibility of child care;<sup>104</sup> the greater division of housework among new parents may have also influenced patterns of household work among their children, with some evidence that household work declined among children born after the 1993 Norwegian reform, particularly among girls.<sup>105</sup> Other research indicates that expanding paternal leave quotas in Norway between 1996 and 2010, from 4 to 10 weeks, caused women to return to work faster, potentially by encouraging a more equitable division of paid and unpaid work among parents.<sup>106</sup> The 1995 Swedish "daddy month" reform did not increase shared responsibilities for child care, including taking leave to care for sick children.<sup>20</sup> The 2007 reform in Germany that provided an additional 2 months of parental leave conditional upon fathers' uptake increased paternal child care time at 1 year and 18 to 30 months after

birth, although it did not influence paternal housework.<sup>49</sup> The latter study also showed that paternal child care time only increased when the wage replacement rate, rather than just the duration of leave, increased.<sup>49</sup>

### *Impacts of Longer-Term Sick and Medical Leave Policies for Personal or Family Illness*

As shown in Online Appendix Table 2, most studies evaluated the immediate impact of sick leave and medical leave policies on policy uptake and personal absences from work. This research generally showed that personal sick leave was responsive to changes in policy, with laws that restricted eligibility or benefits typically associated with reductions in mostly short-term leave-taking behavior,<sup>22,25-27,107-111</sup> and vice versa.<sup>28,31,112</sup>

Just as generous parental leave policies might have the perverse effects of discouraging labor force attachment and reducing earnings,<sup>69</sup> from the policymakers' perspective, medical leave policies should be optimally designed to achieve the right balance between work absence and presence. In other words, policies need to be sufficiently supportive to facilitate time away from work to address personal or family illness and promote health, but restrictive enough to discourage unnecessary sick leaves, or the "shirking" of work responsibilities.

Three evaluations of the German Employment Promotion Act of 1996, which reduced sick pay from 100% to 80% of gross wages in the first 6 weeks for private sector employees, and was subsequently repealed in 1999, showed a positive relation between sick pay and sickness absences.<sup>32,111,113</sup> One study suggested that the 1996 act that limited sick pay did not affect self-rated health;<sup>111</sup> another showed that revoking the act increased the average number of absence days among private sector employees, including employees in partnerships and men, as well as workers with a disability certificate, who anticipated job loss, or who reported low health satisfaction, but did not influence health or well-being.<sup>31</sup> These results suggest that the reform may have discouraged unnecessary leave-taking without adversely affecting health. A few studies have evaluated whether more flexible medical leave policies might help strike the right balance. For example, the 2014 study by Kausto and colleagues demonstrated that the introduction of partial medical leave allowing employees to work part-time while recovering from sickness had a strong effect on workforce participation, especially for people

suffering from mental disorders.<sup>29</sup> Nonetheless, whether medical leave policies influence health, particularly for those who modify their behavior in response to changes in eligibility conditions or compensation, remains largely unknown.

Few studies have evaluated the impact of sick leave policies to care for family members. One study of parents with chronically ill children found that California's introduction of paid family leave did not have a substantial impact on the probability of taking any leave, the duration of leave, or the frequency of unmet need, presumably because few parents were aware of the policy.<sup>34</sup>

### *Bias Assessment*

The extent to which individual studies were subject to bias was based primarily on the study design used to evaluate the impacts of leave policies. The majority of studies appeared to be at low to moderate risk of bias.<sup>114</sup> This was partly determined by the selection of studies according to the design of our review. Specifically, with respect to the definition of the treatment, we focused on the impact of population-level leave policies or access to a leave policy. We explicitly excluded studies that aimed to assess whether individuals' utilization of leave influenced outcomes. Our rationale was that those who take advantage of social programs are likely to differ from those who do not for a variety of reasons that might influence their subsequent socioeconomic and health status; this "selection" into the treatment makes evaluations of individual-level leave-taking more susceptible to confounding. By contrast, changes in an employer, state, or national-level leave policy are arguably more exogenous. Furthermore, study designs based on institutional changes do not measure the impact of individual-level leave-taking; they are analogous to an intention-to-treat (ITT) effect. The ITT effect, although it evaluates the impact of "assignment" to a particular policy reform irrespective of whether individuals actually avail themselves of the benefits, might be more policy relevant.

Evaluations of population-level interventions affecting access to leave are not, however, immune to confounding. Studies that used standard regression adjustment to control for measured confounders were, in general, at greater risk of bias. This includes, for example, a study that used data from the US National Longitudinal Survey of Youth to compare rates of job retention for mothers with and without employer-based

access to maternity leave.<sup>73</sup> Similarly, Stier and Mandel in 2009 used multilevel regression to estimate the association between living in a country with longer vs shorter paid parental leave and women's share of household income, using data from 21 countries included in the Luxembourg Income Survey.<sup>83</sup> Common to these approaches is the strong and unverifiable assumption that all common causes of the treatment and outcomes of interest are measured and appropriately controlled. It is plausible, for example, that countries with more generous paid leave policies are more economically developed and also offer other entitlements that might affect outcomes, including levels of wage inequality. Other analyses (see, for example, Hanel<sup>57</sup>) utilized matching methods, including propensity score matching. Although these techniques might offer other benefits (eg, limiting extrapolation beyond regions of "common support"), they follow a similar philosophy to the standard multivariable regression approach and assume that information on measured characteristics is sufficient to create exchangeable treatment and control groups.

Most studies applied quasi-experimental techniques to identify the causal effect of a paid leave reform; these approaches are distinguished from standard regression approaches by their potential to address unmeasured confounding. The simplest strategy for addressing unmeasured differences between countries that might affect whether or not a country adopts a particular policy, as well as the outcome of interest, is to compare outcomes before and after the implementation of a policy within a treated country. This before-and-after or pre-post design was commonly used to evaluate leave policies.<sup>10,20,22,25-27,59,66,104,115</sup> The validity of the pre-post comparison depends on the assumption that pre-reform outcome trends are a valid substitute for trends in the post-policy period had the policy not been implemented. To the extent that other factors may have changed coincidentally with the policy itself, this strategy might not yield rigorous evidence of a policy effect. For example, the 2009 Estonian reform to sickness benefits was implemented in response to a recession, which may have had an independent effect on the primary outcome, sickness absence, potentially confounding effects estimates.<sup>26,27</sup> When longer time series were available, studies sometimes incorporated more sophisticated interrupted time series methods to model the counterfactual trend for what would have happened after the implementation of a policy had it not been implemented. For example, Ziefle and Gangl applied ITS to data from the German Socio-Economic Panel between



1984 and 2010 to evaluate the impact of 7 changes in the length and/or benefits of federal parental leave policies.<sup>59</sup> Similar to pre-post comparisons, however, identification of a causal effect relies on the ability to accurately model trends in the outcome before the policy intervention, as well as the assumption that these trends would have continued had the policy not been adopted.

The most frequently applied quasi-experimental technique, particularly among parental leave evaluations, was the difference-in-differences design. Rather than using the pre-policy trends in the treatment group to account for secular changes, as with ITS, these studies used a comparison group that did not experience a policy change to infer what would have occurred in the treatment group had it not enacted the policy. An essential condition for drawing causal inference is the “parallel trends” assumption that the change in the outcome in the control group represents what would have happened in the treatment group had it not enacted a particular reform. Changes in other social, political, and economic conditions that coincide with the policy change of interest and also affect the outcome lead to biased estimates. Among the many applications of the DD design were subnational studies that capitalized on state or provincial variations, such as US studies examining the impact of state FMLA and paid leave policies;<sup>3,12,17,35,36,38,77</sup> studies that examined federal policy changes to leave policies, sometimes exploiting variations across age cohorts;<sup>18,19,52,53,61,93</sup> and cross-national studies leveraging variations in leave policies across countries and time periods.<sup>46-48,69</sup> Studies tested the robustness of their DD analyses through a variety of approaches, including the use of propensity score matched and synthetic control groups;<sup>79,92</sup> difference-in-difference-in-differences (DDD);<sup>35,92</sup> multiple control groups;<sup>3,52,116</sup> and negative control and other placebo tests.<sup>38</sup> These sensitivity analyses can help rule out bias as an explanation for observed estimates of policy impact.

A few evaluation studies used the regression discontinuity approach to take advantage of situations where eligibility for a new policy was determined by the value of an observed continuous characteristic, such as a child's birthdate. The intuition for the RD method is that the administrative thresholds that determine eligibility for a particular benefit are arbitrary and, therefore, individuals who fall just above the eligibility cutoff should be similar to those who fall just below it with respect to all measured and unmeasured characteristics. Assuming families are not manipulating the timing of their births to take advantage of new

policies offering more generous benefits, individuals on either side of the threshold are essentially randomized to the treatment or control condition; thus, the RD design is one of the most rigorous methods for estimating the causal effect of a policy reform on those very close to the cutoff. As such, the 3 studies that exploited discontinuities in eligibility criteria to evaluate the effects of leave policies were judged to be at low risk of bias. This includes an evaluation of the 1977 introduction of paid maternity leave in Norway,<sup>99</sup> a 1984 reform that increased the length of paid parental leave in Denmark,<sup>80</sup> and a 1990 policy change that increased the length of paid maternity leave in Austria.<sup>78</sup>

## Discussion

Our ability to take leave from work to care for a newborn, a sick family member, or even our own health depends on family leave policies, mandated by our employers or governments, which provide job protection and wage replacement for a fixed duration of time. There have been hundreds of reforms to these policies over the past few decades, particularly as rates of labor force participation by women, who were more frequently caregivers, have increased across OECD countries. We identified 109 peer-reviewed studies that have evaluated the impact of leave policies in OECD countries, with the bulk of the literature focusing on parental leave after the birth of a child. Most studies assessed the impact of leave policies on the proximal economic and labor market targets they were primarily intended to influence, such as leave-taking, employment, wages, and labor force participation, with fewer studies assessing social or health impacts, particularly those occurring years after the initial episode of leave-taking. The literature on medical leave policies, particularly leave to care for family members, was sparse, and only provisional conclusions can be drawn regarding the impact of these policies. Thus, most of our discussion focuses on the impact of parental leave policies.

Conceptually, the optimal design of leave policies should strike a balance between the competing demands of earning income and attending to personal and family well-being, including child-rearing. If leave policies are too restrictive, they might discourage labor force entry or sustained participation. For instance, new mothers living in US states that had not extended the federally mandated 12 weeks of unpaid leave

provided by the FMLA were less likely to continue working after giving birth, possibly due to the relatively short duration of leave provided.<sup>36</sup> For others, restrictive policies and those with low wage replacement might precipitate a premature return to work. Evidence suggests that when longer, job-protected leave is an option at a low or unpaid rate, people may opt for shorter leaves regardless of policy, reflecting the need for income and labor force attachment.<sup>117</sup> For example, Burtle and Bezruchka describe how the average Californian mother takes only 40% to 50% of the paid leave available, because the wage replacement rate is low and leave is not job protected unless covered by the FMLA.<sup>2</sup> Similarly, mothers in Australia often did not avail themselves of the full 52 weeks of unpaid leave they were entitled to,<sup>11</sup> perhaps because the unaffordability of remaining out of the workforce outweighed the desire to care for newborns longer. Conversely, there is an economic argument that overly lengthy leave available at full pay might encourage extensive interruptions from work, which might depress long-term wages.<sup>69</sup> By treating reforms to leave policies as natural experiments and comparing their impacts, we can try to identify which types of policy designs facilitate leave-taking without having harmful effects on job retention and other outcomes.

In practice, our comparison of the impact of leave policies allows us to draw several conclusions. First, legislated, paid parental leave policies are well accessed by mothers, with consistent evidence that expansions in the duration of paid leave up to 12 to 18 months were accompanied by attendant increases in leave-taking and longer durations of leave. Second, there was little evidence that extending the duration of paid leave had negative employment or economic consequences. To the contrary, research indicates that more generous paid leave policies have the potential to increase women's labor force participation, employment, and job retention; some studies suggest these positive effects might diminish after roughly 28 full-time equivalent weeks of paid leave. Several studies showed that longer durations of paid leave could increase wages and income in the longer term; a multiyear positive effect on income may play a critical role in healthy development of children when it comes in the first 3 years of life. Third, unpaid leave does not appear to confer the same benefits as paid leave. Evaluations of unpaid leave provided in different US states or OECD countries demonstrate that unpaid leave has little impact, or in some cases even a negative effect, on women's labor force participation, employment, and wages.

Fourth, from a population health perspective, increases in paid parental leave were consistently associated with better infant and child health, at least in terms of lower mortality rates. Fifth, whereas gender-neutral paid leave policies have not increased leave-taking on the part of new fathers, paid paternal leave policies of adequate length and generosity have induced fathers to take additional time off from work following the birth of a child.

Our assessment of the literature also underscores several research gaps that might warrant further attention. With respect to the main effects of leave policies, the majority of the literature has focused on the economic and labor market consequences of parental leave reforms. Far less attention has been paid to other policies or outcomes. Accordingly, we highlight several specific areas for future work. First, future research is needed to inform strategies to encourage partners to take leave after the birth of a child and to share care responsibilities more equitably. Second, although the effects of sick and parental leave policies are difficult to disentangle in some contexts, including the United States, where medical and parental leave policies are combined, rigorous evaluations of sick leave policies are needed. Third, comparatively fewer studies have evaluated other outcomes plausibly affected by leave policies, including child health, maternal or paternal health, or social outcomes, particularly as they are experienced over the life course. As a few studies included in our review illustrated, it is challenging but feasible to evaluate the longer-term effects of leave policies on these outcomes. Fourth, with respect to heterogeneity, it is largely unclear if certain population subgroups are more likely to benefit from leave policies than others because extant work has rarely assessed effect measure modification by sociodemographic or other characteristics. Restrictive leave policies might exacerbate social inequalities in the use or duration of paid leave taken, as well as downstream outcomes, as illustrated by the 2011 study by Rossin showing that the FMLA was associated with improvements in child health, but only among college-educated white mothers.<sup>38</sup> Understanding how leave policies affect social groups who struggle the most with the dual demands of work and care is a fruitful area for future work. Whether contextual factors—including other public policies such as those affecting the nature, quality, and affordability of child care and health care—moderate the impact of leave policies is also unknown. Fifth, with some exceptions,<sup>118</sup> few studies have quantified the costs and benefits of paid leave policies from the perspective of

employers. Finally, the pathways explaining observed effects, including the impact of leave policies on infant and child mortality, have not been adequately explored.

There were limitations to our review. In particular, our review did not evaluate the systematic underrepresentation of null or negative findings in the literature (ie, publication bias). Additionally, although we did not impose any restrictions on language and translated the non-English-language studies identified through the databases searched, we likely identified a selected sample, and relevant evaluations may not have been captured.

In conclusion, the economic, social, and health effects of parental leave depend on the duration, the wage replacement rate, and the baseline scenario against which the policy is implemented. Hands-off approaches that rely on individual employees' negotiations, as in the United States, may improve outcomes unevenly because of inaccessibility to a large portion of the population. Mothers are more likely to take up legislated leave with moderate duration and a high wage replacement rate to care for newborns while remaining in the labor force. Work on related health benefits is limited; however, there are clear benefits of mothers' adequate paid leave for infant and child health. Fathers are more likely to take up leave when they are incentivized through their own, nontransferable paid leave and high wage replacement rates. Finally, more generous baseline scenarios in terms of social benefits may influence the impact of leave policies on maternal-child health and social outcomes, pointing to the need for studies in low-welfare contexts such as the United States.

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## **Supplementary Material**

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Online Appendix Table 1. Evaluations of Parental Leave Policies

Online Appendix Table 2. Evaluations of Medical Leave Policies