**Issue Brief: BenchMarking the Results of ACM and IMPAQ Paid Leave Microsimulation Models**

This issue brief 1) compares a new paid leave microsimulation model funded by the US Department of Labor (DOL) to an older version of the model, and 2) compares both models to actual historical paid leave program statistics. The purpose of this exercise is to benchmark the newer model’s performance at modeling state paid leave programs, and to demonstrate the consistency of the model results with both the older model and real world data. The model produces estimates which are mostly consistent with both the original model and real-world benchmarks.

# 1. Project Overview

Access to and use of leave is critical to an individual’s financial security and quality of life (Winston, 2017). Nearly every other developed country provides paid maternity leave, and most advanced industrial countries offer extended paid medical and parental leaves. i There is no federal requirement for paid leave or sick days. Consequently, many individuals, especially low-income workers, face difficult tradeoffs. In 2016, only 14 percent of US workers has access to paid family leave through their employers, and 68 percent had paid sick leave (Bureau of Labor Statistics, 2016).

However, in recent years, paid family and medical leave programs have received considerable bipartisan support, with some states and municipalities already introducing paid family leave programs. California enacted paid family leave legislation in 2002, New Jersey in 2008, Rhode Island in 2013, New York in 2016 (effective January 2018), District of Columbia in 2017 (effective July 2020), Washington in 2017 (effective January 2020), Oregon in 2019 (effective in 2023), and Connecticut in 2019 (effective in 2022).

Several states and municipalities have examined the feasibility of instituting paid leave polices. However, the sophistication and reliability of the methods used to conduct the required analyses are inconsistent. To support different state’s quantitative evaluation of proposed paid leave policy, Randy Albelda and Alan Clayton-Matthews built a microsimulation model (the ACM model) in partnership with the Institute for Women’s Policy Research (IWPR).

The ACM model offered a rigorous way for states and municipalities to test different paid-leave program scenarios and to estimate the implications on costs in benefits paid out. However, it was built in multiple programming languages and requires advanced programming skills to understand and use. To make the model more accessible to a wider audience, DOL contracted with IMPAQ International and IWPR to create a new version of the model (the IMPAQ model). The underlying purpose of the ACM and IMPAQ models are similar – to provide a rigorous model of leave taking behavior for policymakers to quantitatively evaluate proposed leave policy. However, the IMPAQ model is built in open-source programming languages, makes several changes to the model output structure, and has an accessible and easy-to-use graphical user interface. Also included in the IMPAQ model are several alternative simulation and estimation techniques, compared with the ACM model’s sole choice of logit imputation. These changes make the IMPAQ model more accessible, customizable, and usable to a broader audience.

We benchmark both the ACM and the IMPAQ models against actual statistics reported by three states with appreciable historical leave program data – California, New Jersey, and Rhode Island. Corresponding with the timeframe of the 2012-2016 ACS 5-year survey data set used in the simulation models, we compare the 5-year averages of California and New Jersey from 2012-2016. Rhode Island’s *Temporary Caregiver Insurance* (paid family leave added to the United States’ first medical coverage under a temporary disability insurance system) was enacted in 2014, so averages from 2014-2016 years are used for Rhode Island.

# 2. Methodology

[Paragraph describing how the model works at a high level]

We perform two different types of comparisons:

1. ***Comparing simulated and published program costs.*** Predicting total program cost in benefit outlays is one of the primary uses of the models. For each of the three states under consideration (California, New Jersey, Rhode Island), we specified the model parameters to approximate the eligibility rules and benefit payout schedules of the actual programs. After simulation of each individual’s eligibility and leave taking, we compute the population weighted sum of benefits received by each ACS worker to represent total program cost, which we compare with the published program outlays of the same state.
2. ***Comparing simulated and observed population-level statistics.*** Simulated total program cost is constructed from a series of intermediary simulated variables. The robustness of a microsimulation model therefore cannot be fully verified solely by considering program cost. In addition, we need to validate the model’s ability to approximate the real-world mechanisms that determine by examining a series of key intermediate outputs. We consider the following intermediate outputs at the population level:

* Total number of workers eligible for the program
* Total number of leave takers receiving benefits
* Average lengths of program-paid leaves

Both models were run with parameters selected to mirror each state’s program rules, which were drawn from a DC paid leave economic impact report (DC Council, 2016). Other than state-specific rules adjustment, default parameters were used, so that there was no attempt to calibrate the parameters to meet the targeted variables under consideration. The selected parameters for each state are included in an appendix. Full documentation of the model and its parameters are available on request. For testing purposes, numbers generated in this memo are from the R version of the IMPAQ model (both R and Python versions of the model were constructed).

Some of these analyses are categorized by the six major leave types: (1) own sickness leave, (2) maternal disability, (3) new child bonding, (4) care for an ill spouse, (5) care for an ill parent, and (6) care for an ill child. In all three states, the first two leave types are paid by the state temporary disability insurance program. The latter four types are paid by the state paid family leave program.

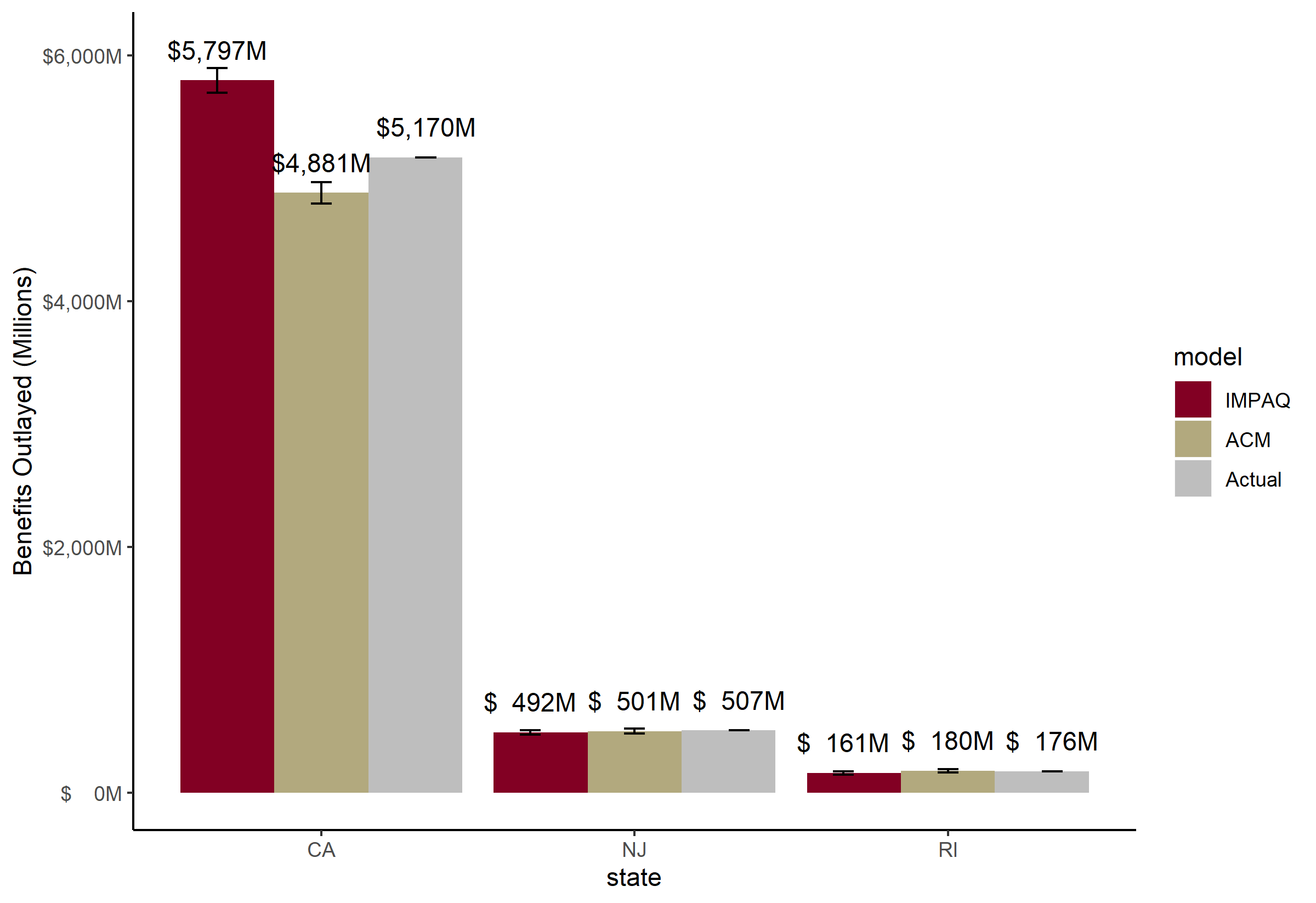
# 3. IMPAQ Model versus Actual Data Results

This section discusses the IMPAQ simulation results with respect to the historical data from actual programs in California, New Jersey, and Rhode Island. All model statistics are reported with the sampling standard error derived from the ACS replicate weights procedure described by the Census Bureau (Census Bureau, 2014).

## 3.1 Total Program Benefit Outlays

Exhibit 1 compares each model’s simulated annual benefit outlays with actual annual average state reported outlays between 2012 and 2016, which were obtained from reports published on their respective state websites.[[1]](#footnote-1) For New Jersey and Rhode Island, both models produced 95 percent confidence intervals that contained actual benefits. For California, the IMPAQ model overestimated benefits by about 11 percent while the ACM model underestimated benefits by 6 percent.

**Exhibit 1. Simulated vs. Actual Benefits Outlaid**



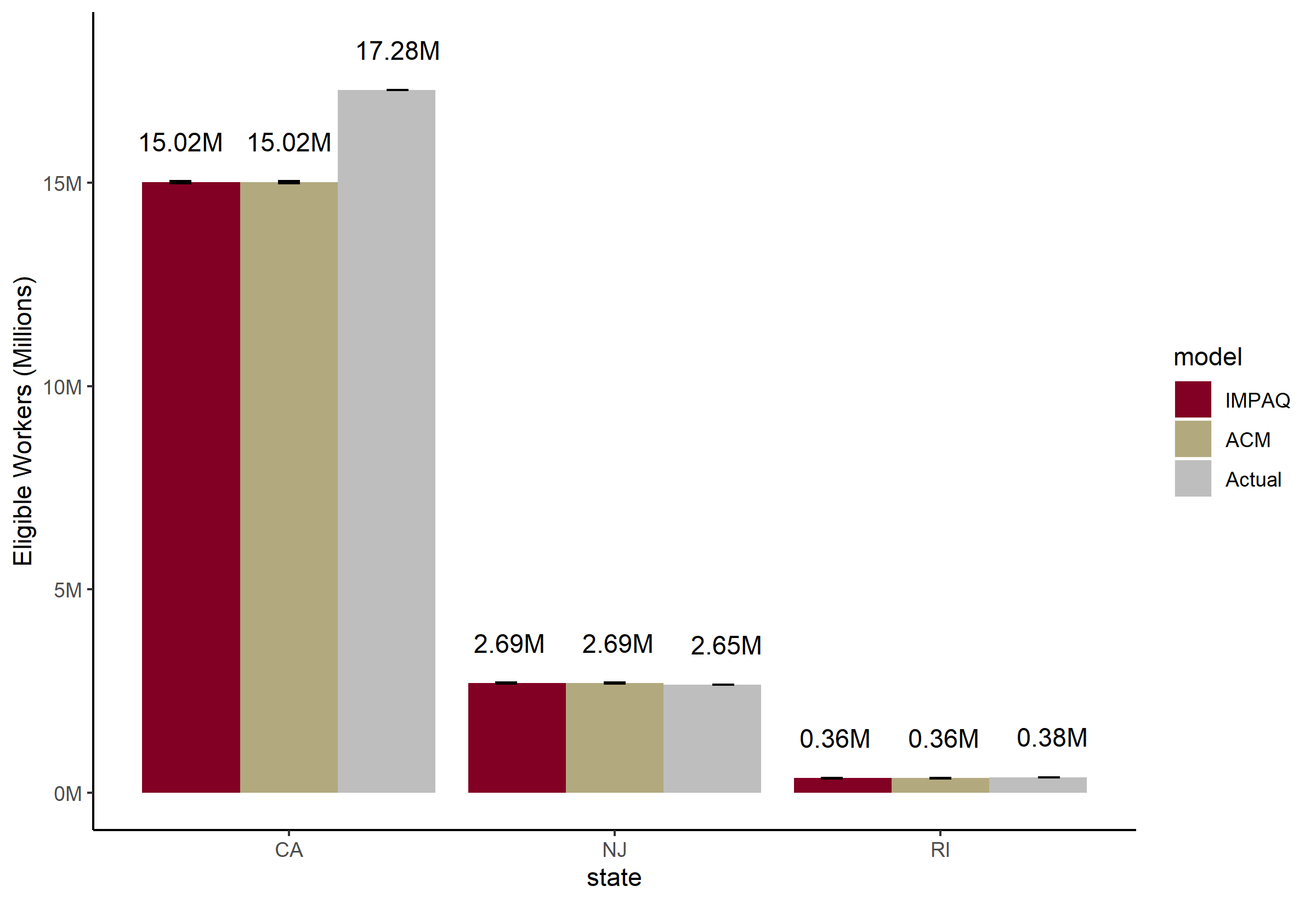
## 3.2 Total Number of Eligible Workers

Exhibit 2 compares the number of eligible workers for each state’s leave program. This quantity does not require any simulation. Eligibility is determined solely through original ACS variables for class of employment and earnings (the main criteria for eligibility in these three programs), which means that both ACM and IMPAQ models have identical estimates for eligible workers.

Each model underestimated the number of eligible workers in California – 15 million versus 17.3 million workers. The ACS indicated approximately 17.1 million individuals working in California. Approximately 1.5 million workers were excluded due to failure to meet earnings requirements, and the remaining ~.5 million were excluded due to self-employment. The earnings requirements are subject to some error because California’s earnings requirement are based on quarterly earnings whereas earnings are only observed in annual aggregates within the ACS,.

The models closely simulate the actual number of New Jersey and Rhode Island eligible workers. In the case of New Jersey, there is some nuance to eligibility. The displayed number is for eligibility for Medical Leave coverage (maternal disability and own illness leaves), which has fewer eligible workers due to an opt-out option for employers with private insurance. Eligibility for Family Leave (ill relative and child bonding) is 30 percent higher at 3.83 million. The eligibility differential is handled by a separate set of user-specified eligibility parameters in the model.

**Exhibit 2. Simulated vs. Actual Eligible Workers**

Note: Actual numbers are estimated 2015 eligible population (DC Council, 2016).

## 3.3 Total Number of Leave Takers

This section discusses the total number of individuals that take leave and claim benefits for each leave type. Exhibit 3 presents the results for California for each of the six leave types. Taffecting ’s overestimatedpresented in Exhibit 1 acrossin

**Exhibit 3. Simulated vs. Actual Participating Leave Takers in California**

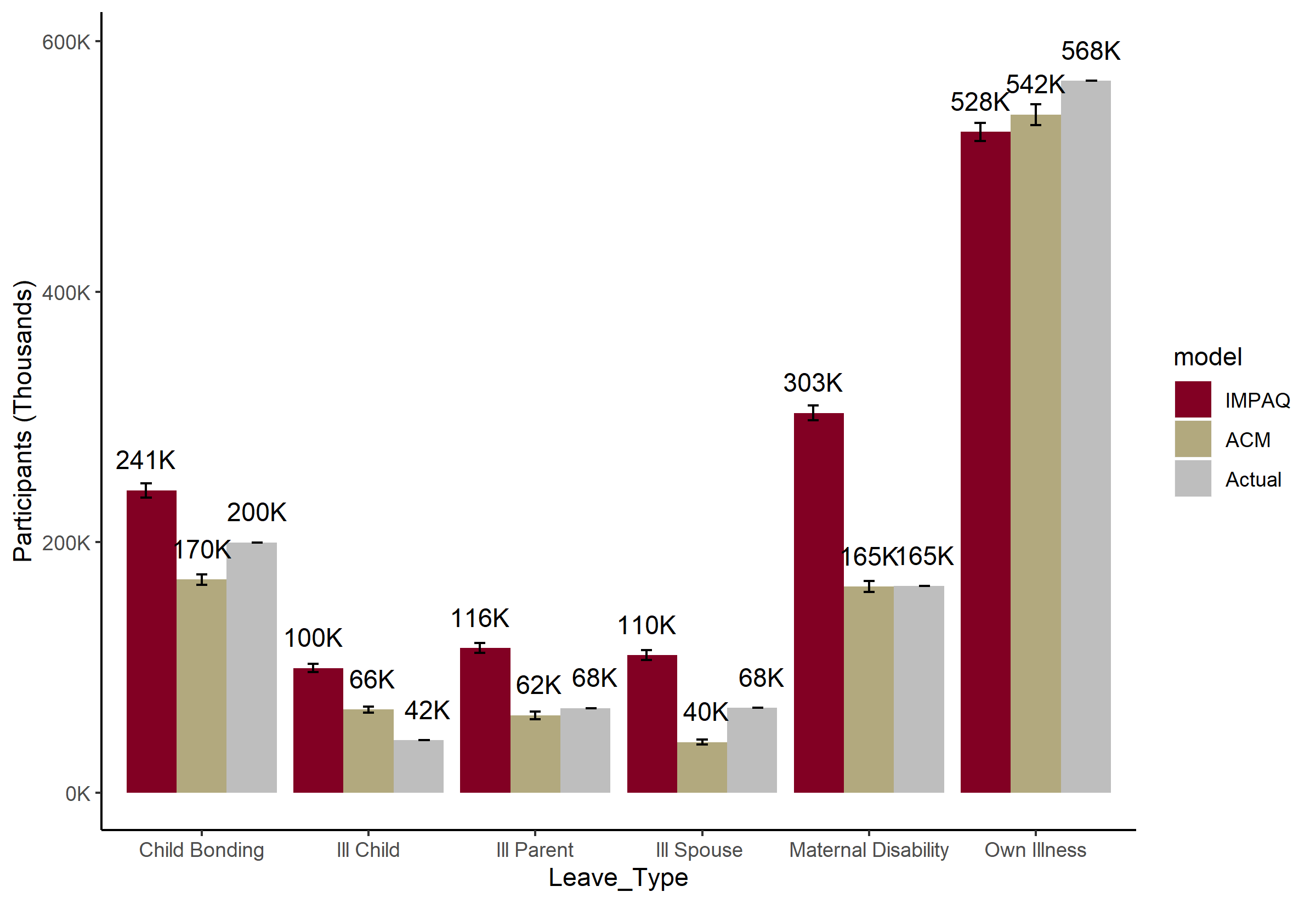
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Exhibit 4 shows participant numbers in New Jersey. closely approximates across, especially

**Exhibit 4. Simulated vs. Actual Participating Leave Takers in New Jersey**

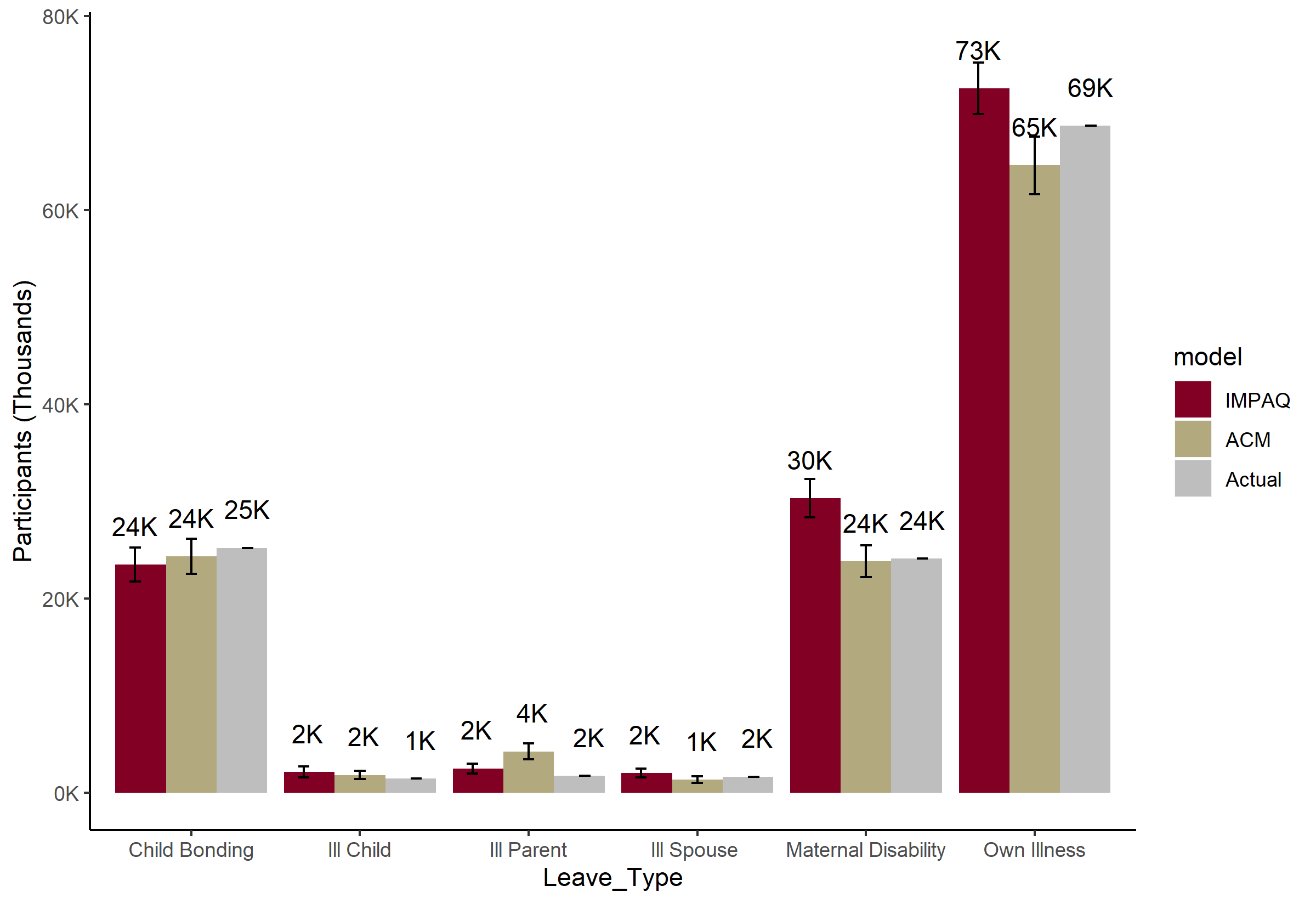
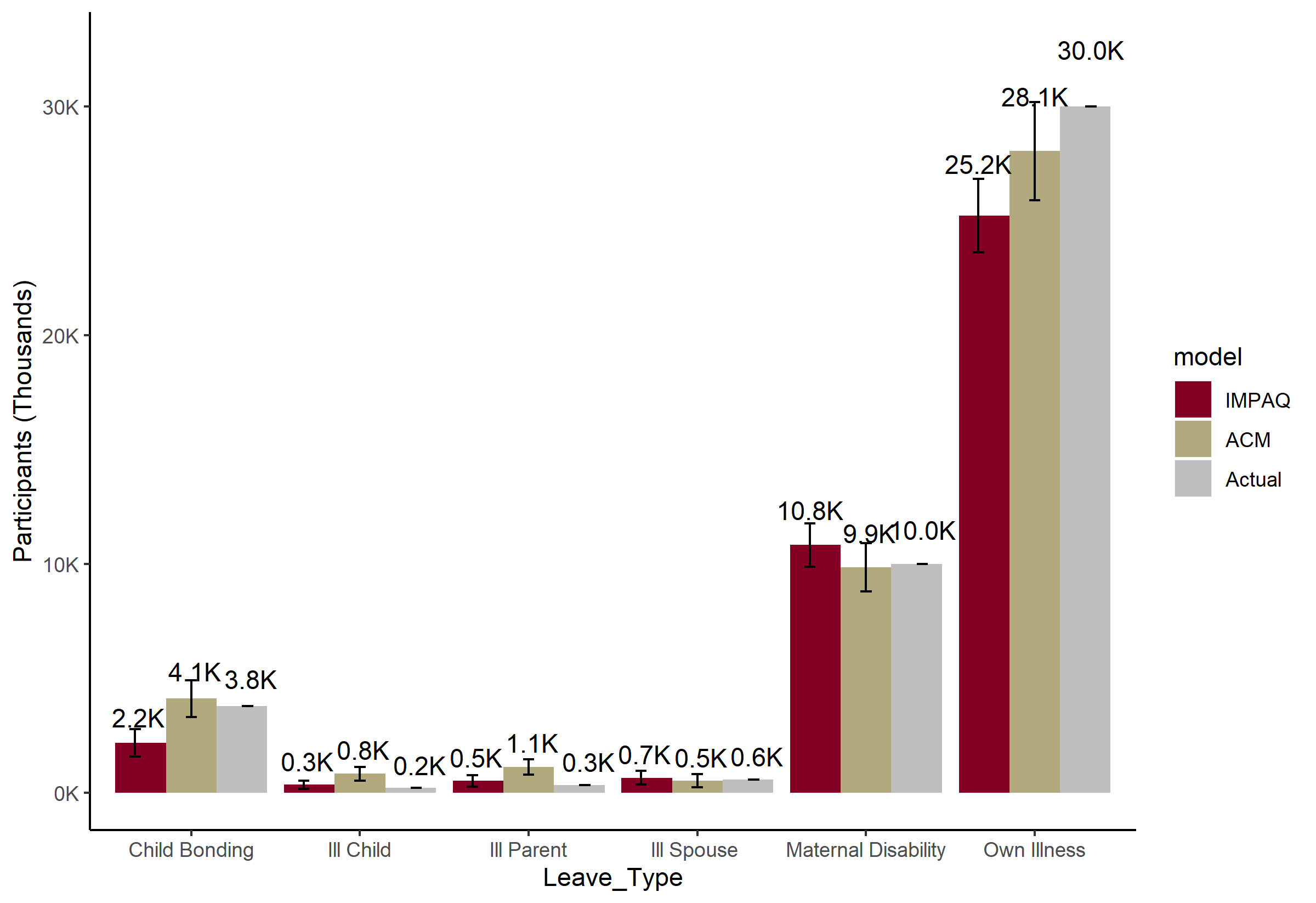
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Exhibit 5 shows the participation results for Rhode Island. ,estimatingA,es, whichfor morely approximated

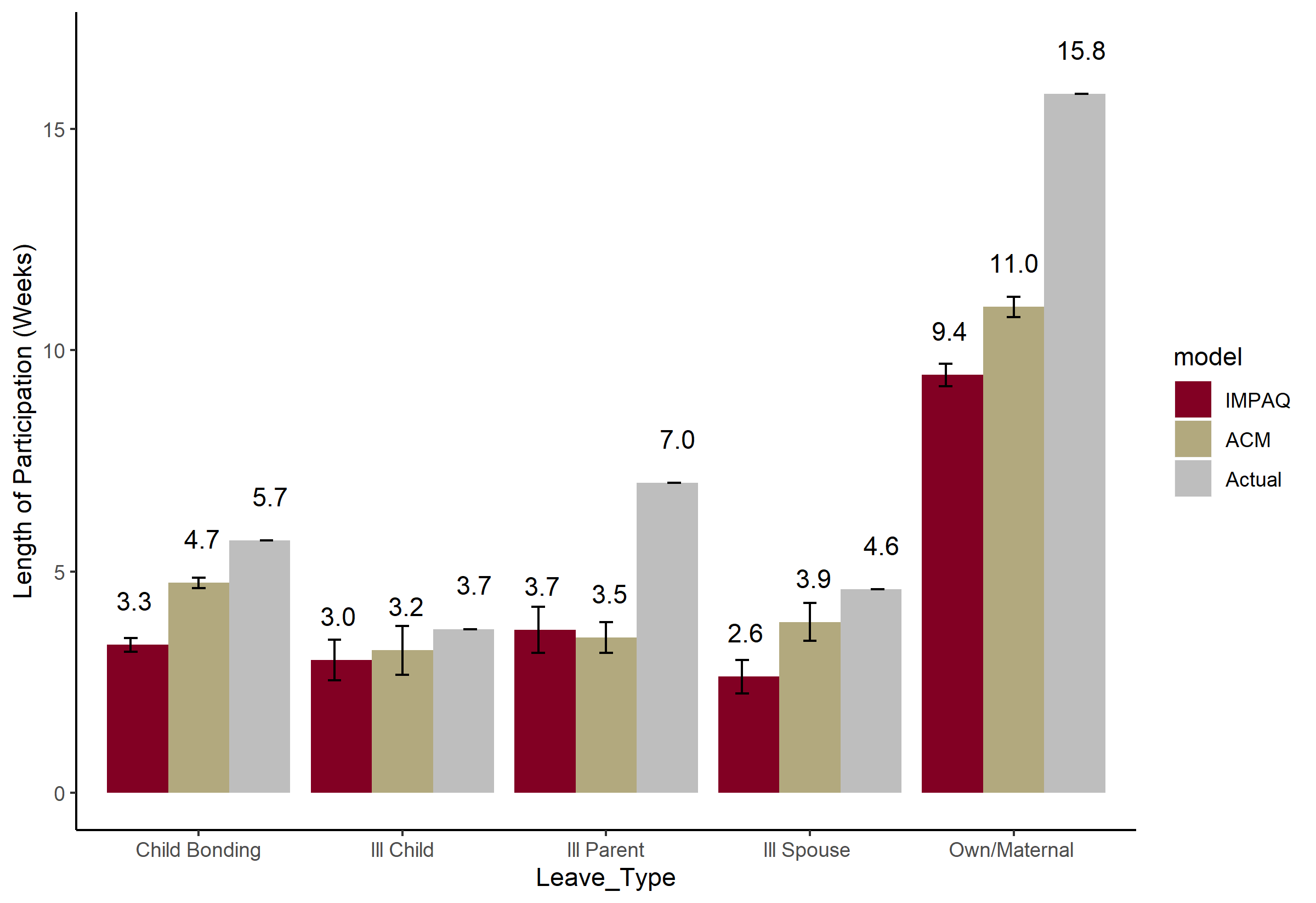
**Exhibit 5. Simulated vs. Actual Participating Leave Takers in Rhode Island**

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## 3.4 Average Leave Length

Of the three states, only New Jersey reported weeks of participation in sufficient detail. Exhibit 6 shows the simulated versus actual mean leave lengths in New Jersey. BlengthsHowever, t may not be directly comparable to the simulated quantities.For example, although state regulations only permit up to 6 weeks of paid ill parent leave, the data contains leaves of 7 weeks, which suggests that may recordin a different way to that reported in the models. that (, aggregatingandesNevertheless, it

**Exhibit 6. New Jersey Simulated vs. Actual Mean Participation Length (in Weeks)**



Note: Leave length statistics not available for California and Rhode Island

# 5. Conclusion

The IMPAQ model replicates the real-world state leave programs and participation statistics well, and produces results comparable to the original ACM model. There are, however, some model-specific peculiarities that slightly overestimate maternal disability leave taking in all three states, whereas the ACM model does not. Both models also deviated from actual statistics at times. Primarily in New Jersey, the model underestimated participation lengths. But there are some doubts as to whether the comparison data is appropriate in this instance.

It is important to note that the IMPAQ model can produce many more estimates than those presented here. Finally, the estimates in this issue brief result from a “conservative” parameter specification designed simply to match leave program rules and default values obtained from the academic literature. These baseline values can be calibrated further to more closely match leave actual statistics, so that the accuracy reported in this issue brief should be interpreted as worst case scenarios.

# Bibliography

Winston, P. (2017). Exploring the Relationship between Paid Family Leave and the Well-being of Low-Income Families: Lessons from California. Washington, DC: U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation, Office of Human Services Policy.

Bureau of Labor Statistics (2016). Table 32. Leave benefits: Access, Civilian Workers, National Compensation Survey, March 2016. Retrieved from https://www.bls.gov/ncs/ebs/benefits/2016/ownership/civilian/table32a.htm.

Census Bureau (2014). American Community Survey Design and Methodology. Chapter 12: Variance Estimation. Retrieved from <https://www2.census.gov/programs-surveys/acs/methodology/design_and_methodology/acs_design_methodology_report_2014.pdf>

# Office of the Budget Director, Council of the District of Columbia (2016). Economic and Policy Impact Statement: Universal Paid Leave Amendment Act of 2016. (B21-415). Retrieved from <http://lims.dccouncil.us/Download/34613/B21-0415-Economic-and-Policy-Impact-Statement-UPLAA3.pdf>

# Appendix

**ACM Model Parameters Used**

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | CA | NJ | RI |
| DEPENDENTALLOWANCE | 10 | 10 | 10 |
| ELIGIBILITYRULES | a\_earnings=300 | a\_earnings=8400 | a\_earnings=3840 |
| EXTENDLEAVES | Yes | Yes | Tes |
| GOVERNMENT | Yes | No | No |
| MAXWEEKS | OH=52, MD=52, NC=6, IC=6, IS=6, IP=6 | OH=26, MD=26, NC=6, IC=6, IS=6, IP=6 | OH=30, MD=30, NC=4, IC=4, IS=4, IP=4 |
| extendproportion | OH = 0.7 MD = 1.0 NC = 0.7 IC = .25 IS = .25 IP = .25; | OH = 0.7 MD = 1.0 NC = 0.7 IC = .25 IS = .5 IP = .5; | OH = 0.7 MD = .7 NC = 0.7 IC = .25 IS = .25 IP = .25; |
| extenddays | OH = 50 MD = 50 NC = 30 IC = 10 IS = 10 IP = 10; | OH = 40 MD = 40 NC = 20 IC = 10 IS = 20 IP = 10; | OH = 30 MD = 30 NC = 15 IC = 10 IS = 10 IP = 10; |
| extendprob | OH = 0.7 MD = 1.0 NC = 0.7 IC = .25 IS = .25 IP = .25; | OH = 0.7 MD = 1.0 NC = 0.7 IC = .25 IS = .5 IP = .5; | OH = 0.7 MD = .7 NC = 0.7 IC = .25 IS = .25 IP = .25; |
| topoff\_min\_length | 20 | 20 | 20 |
| topoff\_rate | .06 | .06 | .06 |
| REPLACEMENTRATIO | 0.55 | 0.66 | 0.6 |
| STATEOFWORK | CA | NJ | RI |
| TAKEUPRATES | OH=.40 MD=1.0 NC=1.0 IC = .50 IS = 0.85 IP =.22 | OH=0.33 MD=0.85 NC=0.85 IC = 0.06 IS = 0.08 IP =.0005 | OH=.75 MD=1.0 NC=0.90 IC = .005 IS = 0.4 IP =.005 |
| WAITINGPERIOD | 1 | 1 | 1 |

**IMPAQ Model Parameters Used**

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | California | New Jersey | Rhode Island |
| ann\_hours | NULL | NULL | NULL |
| bene\_effect | FALSE | FALSE | FALSE |
| bene\_level | 0.55 | 0.66 | 0.6 |
| bond\_uptake | .02 | .01 | .01 |
| dependent\_allow | 10 | 10 | 10 |
| dual\_receiver | 0 | 0 | 0 |
| Earnings | 300 | 8400 | 3840 |
| ext\_base\_effect | TRUE | TRUE | TRUE |
| extend\_days | 0 | 0 | 0 |
| extend\_prob | 0 | 0 | 0 |
| extend\_prop | 0 | 0 | 0 |
| fmla\_protect | FALSE | FALSE | FALSE |
| full\_particip\_needer | FALSE | FALSE | FALSE |
| GOVERNMENT | TRUE | FALSE | FALSE |
| illchild\_uptake | .01 | .001 | .001 |
| illparent\_uptake | .01 | .001 | .001 |
| illspouse\_uptake | .01 | .001 | .002 |
| impute\_method | logit | logit | logit |
| matdis\_uptake | .02 | .01 | .2 |
| maxlen\_bond | 30 | 30 | 20 |
| maxlen\_DI | 260 | 130 | 150 |
| maxlen\_illchild | 30 | 30 | 20 |
| maxlen\_illparent | 30 | 30 | 20 |
| maxlen\_illspouse | 30 | 30 | 20 |
| maxlen\_matdis | 260 | 130 | 150 |
| maxlen\_own | 260 | 130 | 150 |
| maxlen\_PFL | 30 | 30 | 20 |
| maxlen\_total | 260 | 130 | 150 |
| minsize | NULL | NULL | NULL |
| own\_uptake | .04 | .03 | .08 |
| SELFEMP | FALSE | FALSE | FALSE |
| topoff\_min\_length | 20 | 20 | 20 |
| topoff\_rate | .06 | .06 | .06 |
| waiting\_period | 5 | 5 | 5 |
| week\_bene\_cap | 1216 | 594 | 795 |
| week\_bene\_cap\_prop | NULL | NULL | NULL |
| week\_bene\_min | 50 | 0 | 89 |
| weeks | NULL | NULL | NULL |

1. California:

   |  |
   | --- |
   | <https://www.edd.ca.gov/about_edd/pdf/qsdi_DI_Program_Statistics.pdf> |
   | <https://www.edd.ca.gov/about_edd/pdf/qspfl_PFL_Program_Statistics.pdf>  New Jersey: |
   | <https://www.nj.gov/labor/forms_pdfs/tdi/FLI%20Summary%20Report%20for%202016.pdf> |
   | <https://www.nj.gov/labor/forms_pdfs/tdi/TDI%20Report%20for%202016.pdf>  Rhode Island: |
   | <http://www.dlt.ri.gov/lmi/uiadmin.htm> |

   [↑](#footnote-ref-1)