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Scaling Up Housing Services Within the Child Welfare System: Policy Insights From Simulation Modeling

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Abstract

Objectives: Housing insecurity and homelessness contribute to risk of maltreatment among one in five of the nearly 3.5 million children annually investigated for maltreatment in the United States. The Family Unification Program (FUP)—a federal initiative—connects inadequately housed families involved in child welfare with long-term rental subsidies to avoid foster placement. However, FUP remains understudied and underutilized with funding levels that serve only a fraction of eligible households. The present study uses system dynamics modeling to inform decision-making by testing policies for scaling FUP. **Method:** Simulations model delivery of FUP within child welfare from a feedback perspective. Calibrated on national data, models replicate trends in child welfare involvement from 2013 through 2016, and analyses forecast rates through 2019. Experiments test policies that enhance FUP. Outcomes track system-wide rates of family separation and returns on investment of expanded housing interventions. **Results:** Dramatic expansions of FUP benefit more families and improve marginal return on investment. Yet, scale-up fails to reduce system-wide rates of family separation or generates substantial cost-savings. **Conclusions:** Simulations demonstrate structural challenges for scaling FUP. Constant demand for affordable housing constrains sustainable improvements in child protection. Child welfare responses to homelessness require innovations that reduce demand for housing services through prevention and earlier intervention.

Keywords

homelessness, child welfare, housing subsidies, scale-up, return on investment, system dynamics

Inadequate housing and homelessness represent enduring challenges for protecting children from abuse and neglect. Each year, the child welfare system investigates more than 3.5 million cases of potential child maltreatment in the United States (U.S. Department of Health and Human Services, 2016). Nationally representative prevalence estimates indicate one in six families whose children remain in home after investigation experience housing problems that threaten child safety (Fowler et al., 2013). Moreover, estimates suggest 30–50% of caregivers working toward reunification with children already placed out-of-home experience inadequate housing (Courtney, McCurty, & Zinn, 2004; Fowler et al., 2013). The child welfare system struggles to meet demand for housing assistance that would protect children and keep families together (Courtney et al., 2004; Fowler et al., 2013; Harburger & White, 2004; White, 2011).

The Family Unification Program (FUP)—a U.S. Department of Housing and Urban Development (U.S. HUD)-funded initiative—represents the largest federal response to the intersection between child maltreatment and homelessness. Established by U.S. Congress in 1992, FUP provides child welfare–involved families whose inadequate housing threatens child out-of-home placement or delays reunification of children already in foster care with Housing Choice (Section 8) Vouchers; vouchers ensure families pay no more than 30% of household income toward rent in accommodations that meet quality standards. Although the program has awarded nearly 50,000 housing vouchers to 386 communities across the United States (National Center for Housing and Child Welfare, 2012; U.S. HUD, 2017), few studies evaluate program impact (Pergamit, Cunningham, & Hanson, 2017; Rog, Gilbert-Mongelli, & Lundy, 1998). The only randomized controlled trial of FUP shows significant but small reductions in child foster care placement compared with families receiving housing services as usual (Fowler, Brown, Schoeny, & Chung, 2018). An embedded economic evaluation estimates FUP saves the child welfare system US$500 per year per family, which fails to

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cover the costs of vouchers that average US$7,600 per year per household (Fowler et al., 2018). Other recent rigorous studies of homeless interventions for families show similarly small effect sizes on child welfare outcomes (Gubits et al., 2016; Pergamit et al., 2017; Rog, Henderson, Lunn, Greer, & Ellis, 2017; Shinn, Brown, & Gubits, 2016).

The smaller-than-expected effects of vouchers on child welfare outcomes raise important policy and practice questions (Fowler, Farrell, Marcal, Chung, & Hovmand, 2017). Housing experts and advocates routinely call for expanded access to FUP (Cunningham, Pergamit, Baum, & Luna, 2015; Harburger & White, 2004; U.S. Department of Health and Human Services, 2017, 2018). Champions assume investments in housing get recouped through avoided foster care placements, and serving more families generates greater savings that can be reinvested into housing. More recently, advocates recommend various strategies for augmenting the effectiveness of FUP (Corporation for Supportive Housing, 2012; U.S. Department of Health and Human Services, 2012; U.S. Interagency Council on Homelessness, 2011). Technical assistance providers increasingly advocate for targeting vouchers to homeless families deemed most vulnerable, as well as endorse integrating supportive housing models with FUP vouchers (Corporation for Supportive Housing, 2012; U.S. Department of Health and Human Services, 2017; One Roof Campaign, 2018). Attempts to serve high-risk and costly families resemble tactics used by child welfare agencies that provide FUP only to households working toward reunification in order to close expensive foster placements. The approaches contradict current policy that allows FUP to address housing insecurity more broadly, instead focusing on chronic homelessness. Furthermore, recent policies encourage child welfare agencies to deliver FUP to prevent families from spiraling into dangerous conditions for children (U.S. Department of Health and Human Services, 2017).

Little evidence guides current policy debate. Although limited in scope, available research questions whether FUP can sustainably cover program costs through avoided foster care placements (Fowler et al., 2018). Likewise, empirical tests show FUP and supportive housing models have relatively similar small effects on child welfare outcomes (Rog et al., 2014; Rog et al., 2017; Shinn, Samuels, Fischer, Thompkins, & Fowler, 2015). Existing screeners administered in child welfare are not designed for sensitivity and specificity necessary for the triage approaches advocated by technical providers (Farrell, Dibble, Randall, & Britner, 2017). The absence of empirical guidance limits decision-making on how best to use resources that protect children in inadequately housed families.

Preference for resource-intensive, voucher-based interventions fails to consider the challenges of scaling up housing services that systematically protect children. Scale-up refers to the extent to which fully implemented interventions sustainably alleviate family separations associated with housing instability (Fowler et al., 2017). Beyond program effectiveness, it considers program costs, potential reach, local capacities for implementation, and fit within broader social services. Currently, FUP provides an estimated 20,000 vouchers for child welfare–involved families across more than 240 communities in the United States, and Congress has inconsistently appropriated additional funds to expand FUP (National Center for Housing and Child Welfare, 2012; U.S. HUD, 2018). Given national estimates that one in five of the approximately 4 million child welfare–involved families experience housing insecurity that threatens out-of-home placement, FUP remains unable to keep up with demand for assistance (Fowler et al., 2013). The complexity inherent to scarce resource provision further threatens the emergence of unintended consequences of policies (Fowler, Hovmand, Marcal, & Das, 2019). In the absence of evidence, simulations as proposed by the present study provide ways to test assumptions and fill knowledge gaps needed for policy decisions.

Present Study

The present study uses system dynamics modeling to test the feasibility of scaling FUP and supportive housing models within child welfare (Hovmand, 2014; Levin & Roberts, 1976; Sterman, 2000). Computer simulations—calibrated on national child welfare trends and the best available evidence on housing interventions—capture the flow of children through the system. Simulations test whether system-wide improvements in reducing family separations and increasing reunifications emerge from a series of policy experiments that expand and enhance FUP. Trends over time track system-wide child welfare outcomes as well as return on investment (ROI). The study provides timely and policy-relevant systems insights for improving housing services delivered through child welfare.

Policy Experiment 1 tests the impact of adding to the supply of vouchers at a rate of 1,000 vouchers per month and then 10,000 vouchers per month. Increases doubled the size of FUP within 2 years, representing a dramatic expansion of the program. Adding 10,000 vouchers per month would fully meet new demand for housing assistance in the child welfare system over 3 years—an extreme change in programming. The experiment tests assumptions that more vouchers would generate greater savings through avoided foster placements.

Policy Experiment 2 evaluates various improvements in the effectiveness of FUP on keeping families together. Improvements assume FUP elicited larger effect sizes operationalized by doubling ($d = .4$) and tripling ($d = .6$) the average small effects of FUP on reunification and preservation. Although the model did not specify particular strategies, effect size improvements reflect expectations from supportive housing advocates. Experiments also improved effectiveness by allocating FUP more quickly as recommended in new FUP policies; the average time for families to receive vouchers is reduced by 50%. Finally, a simulated run explores whether allocating FUP to higher cost families working toward reunification generated additional program savings—another common policy discussion. Simulations ignore the feasibility and potential costs of program improvements to focus on optimizing the efficiency of FUP.

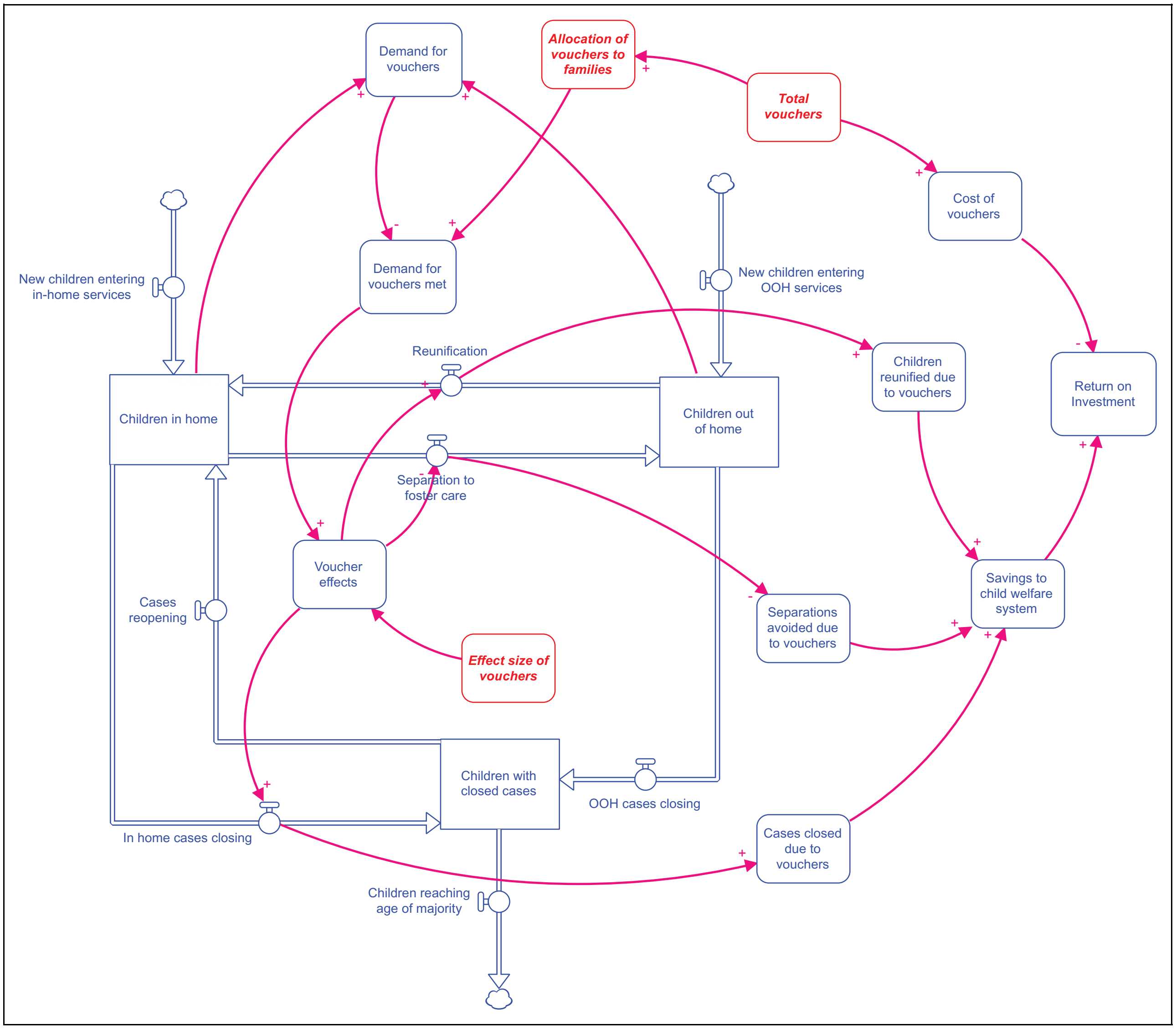

Figure 1. Causal structure of scaling up the Family Unification Program (FUP) in the child welfare system. The system provides housing services as children move from in-home and out-of-home placements. Feedback loops constrain capacities for service delivery. Variables in red line represent policy experiments to improve FUP.

Policy Experiment 3 combined interventions from the first two experiments to test the ROI of making FUP more accessible (Policy Experiment 1) and effective (Policy Experiment 2). Simulations add 1,000 vouchers per month and double effectiveness, as well as unimaginably inject 10,000 vouchers per month and triple current effectiveness. To put this in context, 10,000 vouchers per month would increase the total number of households served by the entire Housing Choice (Section 8) Voucher Program by 22% within 3 years and would require approximately US$30 billion to fund.

Method

Model Formulation

A system dynamics model described the effects of housing vouchers in the child welfare system on rates of foster care placement and reunification. A formal model was developed using Stella Architect (Version 1.6.1) with system dynamic conventions to allow computer simulation of system behavior over time (Sterman, 2006). Simulations used the Euler integration method across a time horizon of 72 months. Delta time was set to 0.25; thus, the model calculated point estimates 4 times per month (weekly) for the duration of the simulation, creating behavior over time curves for each outcome.

The main model structure tracked housing services delivery to children moving through the child welfare system as illustrated in Figure 1. The main structure included three major stocks (Ghaffarzadegan, Lyneis, & Richardson, 2011; Levin & Roberts, 1976; Sterman, 2000, 2006); each stock represented an accumulation of children in a particular setting: in home with open cases, in foster care, and those whose cases have closed. Flows represented children transitioning between stocks. Rates of transitions were determined by the initial number of children in the originating stock, proportion transitioning, and average time to transition (the proportion of children per stock transitioning per unit of time). For example, the population-level flow of children from in-home to foster care settings was calculated from the initial number of children in home, the proportion of children placed in foster care, and the average time children spend in home before being placed out of home. Clouds represented sources or destinations outside the system boundaries.

The conceptual model of FUP delivery within child welfare was overlaid in Figure 1, while supplemental documentation includes the full technical model. Each component of the conceptual model was formally represented by system dynamic structures, with feedback loops linking housing service delivery and child welfare services. A resource allocation structure determined demand for and allocation of vouchers (Sterman, 2000). A single stock represented the total number of initial vouchers, allocated to either families of children remaining in home or those placed in foster care. Demand for vouchers was calculated as the proportion of children in either in-home or out-of-home settings needing housing assistance per year. Supply of vouchers was a function of the total initial vouchers and the rates at which vouchers were allocated to either in-home or out-of-home children's families. Once allocated, vouchers were no longer available for other families to use other than a small annual "turnover rate." FUP availability was also contingent on decisions regarding whether vouchers should be provided to families whose children have already been placed out-of-home versus households with children in home; this structure modeled the probability (0–1) of FUP going to reunification families.

Total monthly costs to the child welfare system summed costs from in-home and out-of-home cases. Total monthly costs of vouchers were calculated as the product of the total accumulation of vouchers and the cost of vouchers per month. Total child welfare system (CWS) costs were monthly CWS costs times the total months of the simulation, and total voucher costs were monthly voucher costs times total months. Total costs overall were a sum of total CWS costs and total voucher costs. ROI divided the accumulated savings to child welfare by total voucher costs.

The main outcomes of interest for the present analysis were the numbers and rates of children reunifying with families, separating from families, and having child welfare case closures due to FUP and ROI. Rates were standardized by dividing the flow by the sum of all outflows from the same stock.

Data Sources and Model Calibration

Multiple data sources and expert consultation were utilized to simulate base and experimental runs. The overall number and flow of children through the child welfare system were derived from the National Child Abuse and Neglect Data System that tracks state investigations and interventions in child maltreatment (Kim, Wildeman, Jonson-Reid, & Drake, 2017; U.S. Department of Health and Human Services, 2018; Wildeman et al., 2014). The number and flow of inadequately housed children were estimated using the second cohort of the National Survey of Child and Adolescent Well-Being—a nationally representative sample of children investigated by Child Protective Services (Dowd et al., 2014). Survey data allowed for estimates of the prevalence of family homelessness and housing insecurity, as well as the transition probabilities between child welfare stocks among inadequately housed families (Fowler et al., 2013; Fowler & Rufa, 2011). Models replicate child welfare trends from 2013 through 2016, and analyses forecast rates through 2019.

A number of sources were leveraged to simulate national implementation and impact of FUP. The total number of vouchers of 20,000 reflects U.S. HUD (2014) reports on FUP. The model assumed a continuous rate of 10% turnover of vouchers in any given month, and that it took 6 months for new families to move in with vouchers after allocation (Cunningham et al., 2015; Fowler & Schoeny, 2017). One third of available vouchers were allocated to inadequately housed families working toward reunification, while two thirds aimed to keep children in home as observed in early evaluation of FUP in 31 communities (Rog et al., 1998).

Effects of FUP on child welfare outcomes were estimated from reviews of experimental and quasi-experimental studies of FUP and voucher programs for homeless families. All studies used comparison groups, and program effects were converted to standardized effect sizes using Cohen's *d*. Effect sizes were pooled across 13 samples, 5 of which were reunification families. Evaluations showed on average small ($d = .20$) effects of vouchers on increases in reunification (Gubits et al., 2016; Pergamit et al., 2017; Rog et al., 2017) and reductions in child separation (Fowler et al., 2018; Gubits et al., 2016; Pergamit et al., 2017; Rog et al., 2017; Shinn et al., 2015). A small effect meant a family provided FUP was 56% less likely to separate or 56% more likely to reunify than other inadequately housed families. A moderate effect ($d = .50$) was found on case closure in two samples (Pergamit et al., 2017), indicating a FUP family's child welfare case was 64% more likely to close.

Costs and savings associated with FUP also came from multiple sources. Voucher costs were based on the national average for the Housing Choice Voucher Program plus an estimated 20% for operating costs, which was calculated as US$7,600 per family per month (Congressional Budget Office, 2017). Savings represented avoided expenditures from in-home child welfare services (US$200 per child per month) and foster placements (US$1,000 per child per month); estimates were based on actuarial records collected from a large Midwestern state (Fowler et al., 2018). It was assumed 2.9 children were served by each voucher provided to a family (Fowler et al., 2013; Fowler & Schoeny, 2017).

Model Validation

A multifaceted process evaluated the conceptual and empirical validity of model. System dynamics models aim to create model structures that produce reliable patterns of behavior—indicated by the shapes of plots of key outcome variables—across a wide range of possible parameter values (Breierova & Choudhari, 2001; Hovmand, 2014; Sterman, 2000). Conceptually, model design and calibration occurred iteratively in partnership with key experts in child welfare services, housing services, and the intersection of housing and child welfare services. Experts reviewed structures for theoretical consistency, advised the inclusion and exclusion of model components, and estimated feasible ranges of model parameters and trends in outcomes that guided expectations for model calibration. Collaboration ensured the model reflected a strong theory of change.

Empirical validation assessed the structural and parameter sensitivity of the model. Structural sensitivity analyses ran a series of simulations that shut off key flows one at a time (Sterman, 2002). By altering key structural elements driving feedback loops, the simulations gauged the extent to which the model was sensitive to assumptions regarding the aggregation of stocks, model time horizon, and feedback loops. A robust model would continue to produce consistent system behaviors regardless of the disruptions. In the present model, the inflows to each of the major stocks ("in home," "out of home," and "closed cases") in the main structure were shut off one at a time to simulate the unrealistic scenarios of no children having cases open while remaining in home, no children being removed from their homes, and no cases closing, respectively. Parameter sensitivity analyses tested model robustness to extreme values (Breierova & Choudhari, 2001; Sterman, 2000). Key variables—those used in experiments and those lacking empirical data for initial values—were simulated across wide ranges. All policy experiments were run using value ranges that included extreme and unrealistic conditions. Simulations provided the potential range of system behaviors, as well as tested for the presence of tipping points or sensitive regions. Again, a robust model would produce similarly shaped trends in system behavior, whereas tipping points would trigger qualitatively different patterns. Standard confidence-building tests also assessed dimensional consistency, structure assessment, and computational verification of different integration methods (Sterman, 2002). Together, the multiphase approach rigorously tested the model structure.

Simulated Policy Experiments

A series of policy experiments investigated the impact of FUP on system behavior. Initial simulations demonstrated the system functioning according to services as usual. Parameters reflected FUP's impact as it currently functions with 20,000 vouchers and small effect sizes on family separation and preservation (Fowler et al., 2018; Gubits et al., 2016; Pergamit et al., 2017; Rog et al., 2017; Shinn et al., 2015). All experiments observed 36 months before and after policy changes. Values for experiments were conceived based on hypotheses about substantially increasing the size and effectiveness of the FUP program above and beyond historical trends. Base runs represent current system functioning, while policy experiments aimed to assess the impact of the program when significantly scaled up as well as made more efficient. Each policy experiment probed both reasonable and extreme FUP improvements to test hypotheses under best-case scenarios. A web-based interface allows readers to run policy experiments and assist in interpreting key model insights. In addition to a dissemination tool, the platform allowed for additional feedback from key experts to assess model validity from diverse perspectives.

Results

Services as Usual

Initial simulations replicated past trends in child welfare outcomes given current levels of FUP vouchers and effectiveness. Results show that the relatively small program (20,000 vouchers) with small effects ($d = .20$) makes little impact on rates of child welfare family separations and reunifications. Most children (83%) in contact with child welfare currently avoid family separation, and the majority placed into foster care return (90%) after 24 months. Models show approximately 111 children per month reunify due to FUP, and 565 children remain in home per month because of vouchers. The relatively small numbers reflect the absence of new vouchers and small effect sizes of FUP demonstrated in prior research; only 10% of vouchers turned over each month. ROI is flat at 0.93, suggesting the program currently costs slightly more to implement than savings yielded through avoided foster care placements. Subsequent policy experiments began with the constant rates of child welfare outcomes under FUP services as usual.

Policy Experiment 1: Increasing FUP Vouchers

Figure 2 displays child welfare outcomes after increases of 1,000 and 10,000 vouchers per month for 36 months. Clearly, adding vouchers allowed FUP to serve more children; trends leveled out over time, suggesting system constraints prevented exponential growth. After 36 months, more than 1,100 children reunified, and nearly 6,000 remained in home with 1,000 more vouchers per month. However, the system-wide rates of reunification (.90) and separation (.17) remained constant after adding 1,000 vouchers, while increasing by 10,000 per month achieved a 4-percentage point decline in the rate of separation (presented in supplemental documentation). ROI remained flat (0.93) for all experiments that increased vouchers. Scaling up FUP failed to make systemic and sustainable improvements in child welfare services.

Policy Experiment 2: Enhancing Effectiveness of FUP

The second experiment doubled and tripled the effectiveness of FUP on child welfare outcomes. These program enhancements failed to change the system-wide rates of reunification (0.90) and separation (0.17) as illustrated in the flat and overlapping trends displayed in Figure 3. However, the program became able to serve double and triple the raw numbers of children with vouchers and thus improved ROI. Simulations suggested that

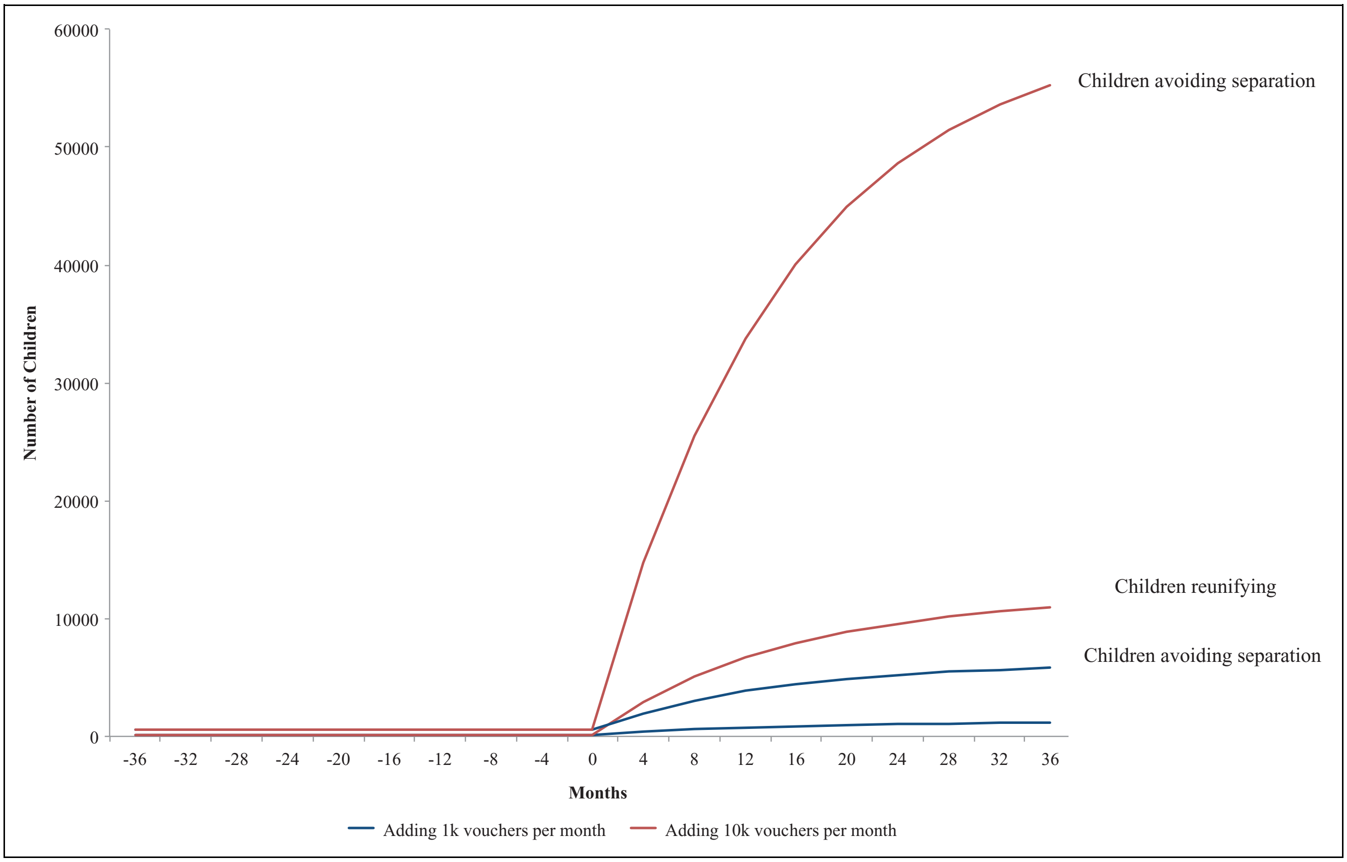

Figure 2. Simulated results from policy experiments that expand the Family Unification Program (FUP; Policy Experiment 1). Outcomes track the raw number of children reunifying with families and avoiding separation associated with adding 1,000 FUP vouchers (blue lines) and 10,000 vouchers (red lines). Scale-up starts at 0 months and forecasts 3 years into the future. Scaling up FUP meets demand for homeless assistance without improving system-wide rates of child welfare outcomes.

doubling effectiveness of FUP increased ROI to 1.1, while tripling effects provided an ROI of 1.2. Improving FUP would serve fewer children than adding vouchers (Policy Experiment 1) but provide a more cost-efficient program.

Policy Experiment 2 also tested whether allocating housing vouchers earlier in child welfare cases impacted outcomes. Reducing the average time to receive vouchers by 50% led to initial spikes in both raw numbers of reunifications and avoided separations (values increased by 100% from baseline), but these eventually dropped and leveled off. ROI increased in a slight, linear fashion, such that the program nearly broke even at the end of 36 months (ROI = 0.99). No effects were seen on overall rates of separations and reunifications, which remained constant at 0.17 and 0.90, respectively.

Finally, a simulated run also explored targeting FUP to more expensive families whose children had already been placed out of home. The experiment assigned all available vouchers to families working toward reunification; the model tested whether serving the highest cost families yielded greater ROI. Results showed FUP could service more reunification families per month but no families with children in home. Allocation shifts to reunification did not affect ROI.

Policy Experiment 3: Combining Scale and Effectiveness

Figure 4 shows results from expanding access and effectiveness of FUP on rates of child welfare involvement. Increasing program size while doubling and tripling effectiveness provided no meaningful improvements in rates of reunification or separation. Adding 10,000 vouchers per month with triple the current effects reunified 93% of children placed in foster care, with only 16% of families separating. ROI showed the unimaginable expansion of FUP returned US$1.70 per dollar invested. A near-perfect child welfare housing services program appeared sustainable; however, it remains unclear how FUP could achieve this type of performance.

Validation and Sensitivity Analyses

Results of extensive sensitivity analyses are presented in the supplemental documentation. Structural sensitivity was evaluated for the services as usual model. In a series of simulations, inflows to each of the three major stocks of children (in home, out of home, and closed cases) were turned off to create unrealistic circumstances that attempted to disrupt the dynamic equilibrium (flat trends) observed in the reference mode. As

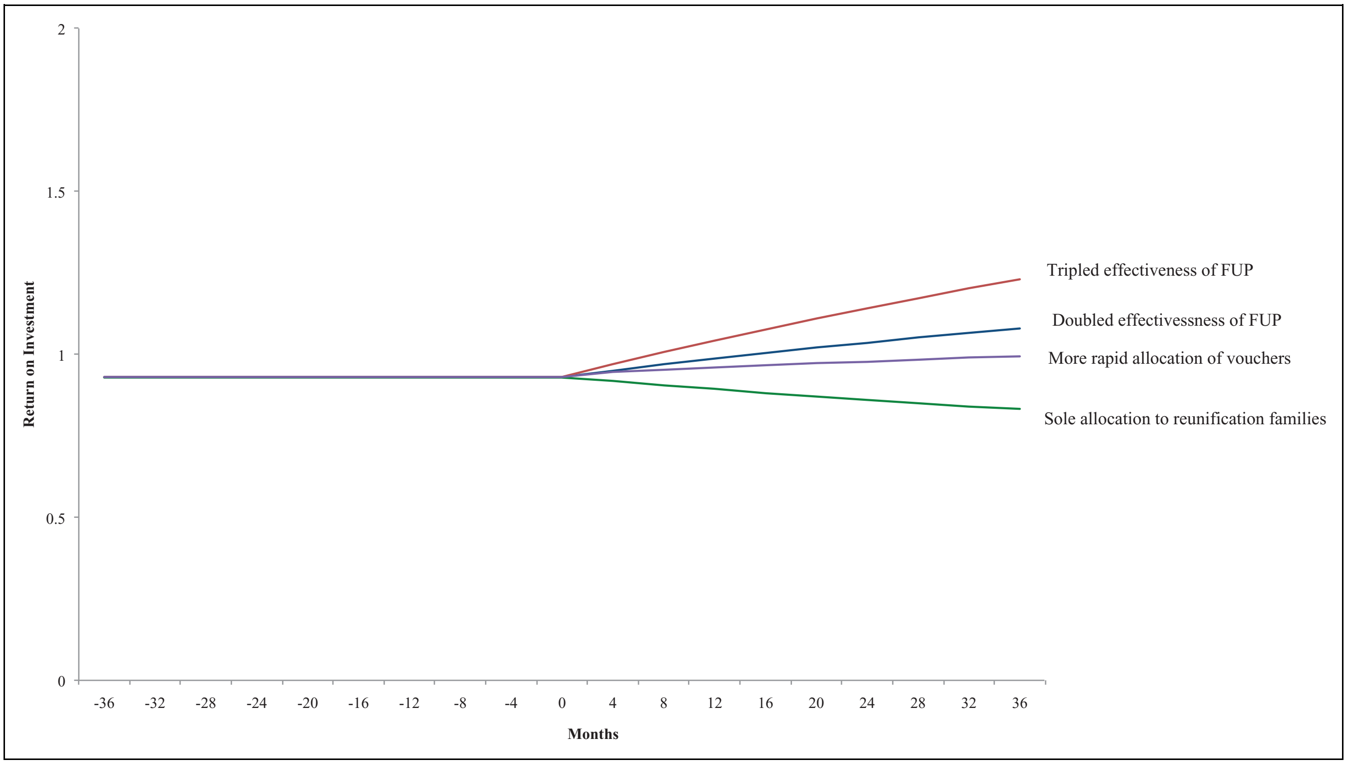

Figure 3. Simulated results on return on investment (ROI) of increasing the effectiveness of the Family Unification Program (FUP) delivered to inadequately housed families involved in the child welfare system (Policy Experiment 2). Experiments double (blue line) and triple (red line) program effect sizes, as well as shift allocation of FUP solely to families working toward reunification (green line) and reduce the time to allocate vouchers (purple line). The flat line through Month 0 replicate the current ROI of FUP at 0.93. Experiments suggest improvements in FUP yield better returns, while efforts to target for more costly reunification families worsen program efficiency.

illustrated across plots of simulation results in the supplemental documentation, the absence of qualitative shifts in system behaviors across tests and outcomes suggested model robustness. The model structure reliably reproduced system behaviors under all structural disruptions.

All policy experiments were tested for parameter sensitivity. Key parameters and combinations of variables (added vouchers per month, effect size of vouchers, probability of allocating vouchers to out-of-home families, and efficiency of allocation) were tested incrementally across a wide range of values in a series of simulation runs in order to assess whether results on key outcomes were sensitive to extreme or implausible conditions. For example, while experiments only tested the effects of adding up to 10,000 new vouchers per month, sensitivity analyses testing the effects of increasing this addition by 150% (adding up to 25,000 new vouchers per month)—a highly unrealistic possibility. Similarly, effect sizes ranged from 1 to 3 in study experiments but were allowed to vary from 0.5 (a reduction in effectiveness) to 5.0 in sensitivity analyses. Parameter tests indicated system behavior on key outcomes remained consistent across a wide range of values, suggesting the model structure was largely insensitive to parameter values. Further, this provided confidence that model behavior was largely driven by the feedback processes derived from prior literature and built into the structure.

Analyses also altered key parameters within the model. Dramatic shifts in investigations per month and proportions led to initial changes in qualitative system behavior that returned to expected patterns over time, suggesting that feedback loops built into the model were robust to parameter values. Key assumptions about rates of foster care placement and reunification were tested in attempts to create qualitative changes in system behavior; despite drastic changes on known parameters, behavior over time remained consistent. These along with basic confidence-building tests indicated the model was a validated representation of the problem addressed.

Discussion

Simulation modeling illuminates structural challenges to scaling up FUP for inadequately housed families in contact with child welfare services. Adding FUP vouchers allows more families to be served, while enhancing program effectiveness improves cost efficiency. More and better services help more families. However, constant demand for affordable housing among child welfare–involved families impedes sustainable improvements in protecting children in homeless families. The dynamic reflects a balancing feedback loop where the inflow of families with housing needs exceeds the outflow of families helped. Simulations inform current policies and provide

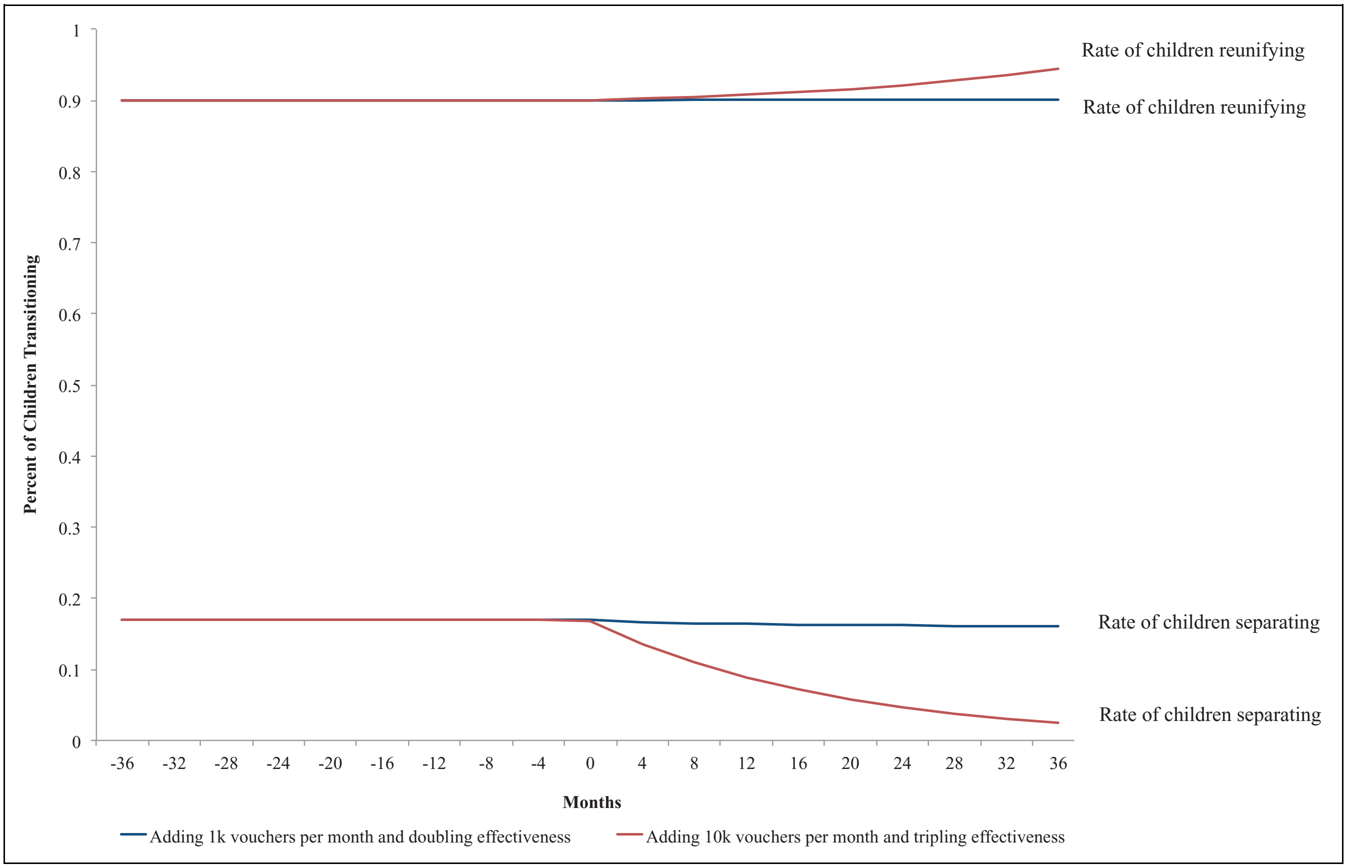

Figure 4. Simulated child welfare system-wide rates of child reunification and separation of expanding and improving the Family Unification Program (FUP; Policy Experiment 3). Policy experiments double effectiveness plus add 1,000 FUP vouchers per month (blue line), as well as triple effectiveness and add 10,000 vouchers per month (red line). Scaling efficient FUP services fails to make dramatic improvements in child welfare outcomes.

insights for designing coordinated responses that systematically promote child safety, stability, and well-being.

Several policy-relevant implications emerge from simulation modeling. Although evidence suggests expansion of FUP yields limited ROI, the program remains important as one of the few effective interventions addressing homelessness in child welfare (Gubits et al., 2016; Pergamit et al., 2017; Shinn et al., 2016). Returns on foster care spending nearly break even without consideration of savings across other social services; thus, FUP provides a better alternative than child welfare services as usual. Findings also illuminate reasonable expectations for program enhancements. FUP requires considerable resources that generate smaller-than-expected effects (Pergamit et al., 2017; U.S. Department of Health and Human Services, 2018; White, 2011). Enhancing program effectiveness saves money without systematically reducing child welfare involvement. Moreover, simulations warn against recent policy initiatives that assume program efficiencies by targeting FUP for high-risk families (U.S. Interagency Council on Homelessness, 2011). This approach ignores structural deficits in affordable housing that voucher programs struggle to address.

Simulations demonstrate need for innovations in child welfare services to address broad demand for housing assistance. Housing vouchers represent an important component for protecting children, and efforts should continue to test ways that improve FUP efficiencies. However, relying solely on vouchers promises only incremental reductions in child welfare involvement. Qualitative shifts in protecting inadequately housed children from maltreatment require novel approaches. Policies that expand access to affordable housing for all low-income families would promote child safety, while experimentation is needed with upstream approaches that aim to prevent homelessness and promote family stability (Fowler et al., 2017). A continuum of services that ranges from homelessness prevention policies and services to intensive supportive housing for vulnerable child welfare-involved families would provide greater flexibility for a coordinated response to housing insecurity.

Adaptive designs offer promise for rapid improvements of housing services that protect children. The approach simultaneously tests multiple interventions that address different levels of need (Lei, Nahum-Shani, Lynch, Oslin, & Murphy, 2012). Housing services available through child welfare or in collaboration with community partners would offer various housing interventions (e.g., prevention, vouchers, vouchers plus intensive case management). Systems would routinely monitor household-level responses to interventions, and procedures would adjust services based on predetermined thresholds that indicate need for more or less intensive supports. The structure allows evaluation of the impact and efficiency of a continuum of housing services—a key gap in current understanding.

Findings must be considered in the context of study limitations. As mentioned, ROI fails to incorporate potential savings outside of child welfare; future research should quantify costs and benefits of housing vouchers for child welfare–involved families. Models aim to forecast child welfare trends that inform system-wide perspectives but are not designed to generate point estimates used for policy and program evaluations. In addition, simulations investigate national impacts of FUP without considering local dynamics that promote program effects. Tailoring models with local information may improve utility for decision-making on resource allocation, and ongoing research uses web-based platforms that allow policy makers to experiment with strategies that improve the child welfare response to homelessness (https://socialsystemdesignlab.wustl.edu/items/housing-services-in-child-welfare/). Despite limitations, simulations offer key insights into current policies as well as offer opportunities to engage stakeholders in the redesign of housing services that ensure child safety, stability, and well-being.

Authors' Note

The content is solely the responsibility of the authors and does not necessarily represent the official views of the Eunice Kennedy Shriver National Institute of Child Health and Human Development or the National Institutes of Health.

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Supplemental Material

Supplemental material for this article is available online.

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