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# Leveraging the Power of Place:
# Using Pay for Success to Support Housing Mobility

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# Executive Summary

Housing mobility is a strategy to help families living in areas of concentrated poverty use tenant-based housing vouchers to relocate to healthier and better-resourced neighborhoods. Best practices in mobility today include pre- and post-move counseling, along with services that help families navigate the rental housing market with the aim of sustaining access to higher-opportunity areas over time.

Rigorous research has shown that housing mobility is effective for increasing long-term earnings for children, and also for improving health. However, the intervention faces significant barriers to replication and scaling, including scarcity of funds. Pay for Success (PFS) financing—a new tool that leverages private capital to fund upstream social programs that generate impact over time, and which shifts the risk of program innovation away from government agencies—could overcome these barriers and support housing mobility while generating new evidence on its social and fiscal impacts.

To explore PFS's viability as a financing tool for housing mobility, we developed a hypothetical scenario—using evidence from the U.S. Department of Housing and Urban Development's Moving to Opportunity (MTO) experiment and data from a contemporary mobility program in Baltimore—to compare program costs to medical cost savings generated over time from improvements in adult diabetes and extreme obesity. Although this scenario does not capture the full range of social benefits associated with housing mobility, we chose it to help advance understanding of quantifiable public savings that could accrue on a timeline that is attractive to investors and government agencies in one domain where evidence is particularly strong.

Our modeling shows that housing mobility could generate significant medical cost savings from improvements in adult diabetes and extreme obesity, the vast majority of which would accrue to government health programs such as Medicaid given the low incomes of families with housing vouchers. We also conclude that it is possible that housing mobility could pay for itself, along with other legal and evaluation costs associated with PFS financing, based on medical cost savings from adult metabolic health improvements alone.

Finally, we offer considerations for designing and implementing housing mobility PFS initiatives—including, but not limited to those which target health improvements. Depending on the goals and capacity of the end payer, it could make sense to limit participation to voucher-holding families with certain characteristics, such as those with young children or those who are enrolled in a Medicaid health plan. Approaches to evaluation will also vary according to what end payers accept as a basis for repayment to investors. In all cases, fidelity to best practices in mobility program design will increase the probability of success, and attention to place-specific policy and regulatory factors would also enable successful and efficient implementation.

# Part 1: Why Pay for Success Makes Sense for Housing Mobility

## Concentrated Poverty and Neighborhood Effects

Metropolitan America today is a patchwork landscape of risk and opportunity, where neighborhoods broker access to social goods and exposure to environmental harms. Even in regions that are prosperous as a whole, many families struggle to secure stable homes in safe areas with decent quality of life—let alone in places that provide access to key ingredients for economic mobility and health such as high-performing schools and high quality medical care.[1]

Patterns of neighborhood disadvantage have also proven to be durable. High levels of racial segregation persist in many metropolitan areas, and segregation by income has increased over the last several decades at a rate that cannot be explained by rising income inequality alone.[2] The number of people living in areas of *concentrated* poverty has also surged in recent years, and around 12 million Americans today live in areas where more than 40 percent of residents are poor.[3] In the most extreme cases, public policy, racial discrimination, and market forces have combined to trap families in high-poverty

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[1] In the New York-Newark-Jersey City metropolitan statistical area, for example, 58 percent of the poor population lives in census tracts with poverty rates of 20 percent or higher. Source: Kneebone, Elizabeth. 2014. "The Growth and Spread of Concentrated Poverty, 2000 to 2008-2012." Washington, DC: The Brookings Institution, Metropolitan Policy Program. July 31.

[2] Reardon, S. F. and K. Bischoff, "Income Inequality and Income Segregation," *American Journal of Sociology*. 116, No. 4 (2011): 1092–1153.

[3] Kneebone, Elizabeth. 2014.

areas for multiple generations—a cycle that one expert calls the "inherited ghetto," where children are at particular disadvantage as a result of their families having lived for so long in poor neighborhoods.[4]

The social consequences of neighborhood inequality appear to be profound. Living just a few miles away in the same city can mean a difference in life expectancy of more than 20 years.[5] Rates of chronic but preventable diseases are elevated in low-income and minority neighborhoods, and even the acuity of the same disease can vary significantly by an area's level of affluence.[6] Many studies have shown that people living in poor neighborhoods make less money, endure worse health, and have lower educational attainment than those living in better-off neighborhoods.[7]

Over the past few years, researchers have made significant advances in quantifying "neighborhood effects," suggesting that places have powerful independent causal effects on a range of social outcomes. We have learned, for example, that moving out of high-poverty areas can significantly boost metabolic and psychological health,[8] as well as educational attainment and earnings.[9] Living and attending school in economically integrated settings also increases academic performance for poor children.[10] On the other hand, the cognitive effect of growing up in a family that has experienced multiple generations of exposure to poor neighborhoods is estimated to be the equivalent of missing two to four years of school,[11] and there is growing evidence around how toxic stress and exposure to neighborhood violence that is much more common in high-poverty areas inhibits child cognitive and behavioral development.[12]

These findings demonstrate the promise of leveraging the power of *places* to measurably improve the lives of disadvantaged families, especially those living in areas of concentrated poverty. Improving the residential environments of vulnerable families could also have wide-ranging effects and purposes, including addressing major social challenges such as declining population health and rising medical costs, a widening educational achievement gap, and stagnant economic mobility for the poor—each of which has large fiscal implications for government and taxpayers.

## Housing Mobility

One promising approach to confronting neighborhood disadvantage is housing mobility (sometimes called assisted housing mobility), which aims to expand the geographic range of housing choices available to families living in distressed, high-poverty areas. Mobility programs provide a set of services that enable participants to leverage tenant-based housing vouchers to relocate and settle long-term in healthier and better-resourced neighborhoods.

Today, around 2.2 million low-income households have vouchers through the federal Housing Choice Voucher program (formerly known as Section 8), which operates as a mobile subsidy where the government covers the difference between the affordable rent for the family and the asking rent in the private market. In theory, vouchers can be used to rent properties in lower poverty neighborhoods, but in practice families face a range of pressures that funnel them into disadvantaged areas. Around 250,000 children in families with vouchers today are being raised in neighborhoods of "extreme poverty" where more than 40 percent of residents are poor.[13]

[4] Sharkey, Patrick. 2013. *Stuck in Place: Urban Neighborhoods and the End of Progress toward Racial Equality*. Chicago: The University of Chicago Press.

[5] Robert Wood Johnson Foundation. 2013. "City Maps." Website: http://www.rwjf.org/en/library/features/Commission/resources/city-maps .html.

[6] For example, one recent study showed that amputations resulting from diabetes are ten times more likely in California's low-income neighborhoods than in its more affluent enclaves. Stevens, et al. 2014. "Geographic Clustering of Diabetic Lower-Extremity Amputations in Low-Income Regions of California." *Health Affairs.* August. Vol. 33, No. 8.

[7] See, for example: Newburger, Harriet B., Eugenie L. Birch, and Susan M. Wachter, editors. 2011. *Neighborhood and Life Chances; How Place Matters in Modern America.* Philadelphia: University of Pennsylvania Press.

[8] Ludwig, et al. 2011. "Neighborhoods, Obesity, and Diabetes—A Randomized Social Experiment." *New England Journal of Medicine.* 365:1509-1519. October 20.

[9] Chetty, Raj, Nathaniel Hendren, and Lawrence F. Katz. 2015. *The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment.* The Equality of Opportunity Project. May.

[10] Schwartz, Heather. 2010. *Housing Policy is School Policy: Economically Integrative Housing Promotes Academic Success in Montgomery County, Maryland*. Washington, DC: The Century Foundation.

[11] Sharkey, Patrick. 2013. *Stuck in Place: Urban Neighborhoods and the End of Progress toward Racial Equality*. Chicago: The University of Chicago Press.

[12] See, for example: Sharkey, Patrick, Amy Ellen Schwartz, Ingrid Gould Ellen, and Johanna Lacoe. 2014. "High stakes in the classroom, high stakes on the street: The effects of community violence on students' standardized test performance." *Sociological Science*. 1: 199-220.

[13] Center on Budget and Policy Priorities, 2014b. "Housing Vouchers Help Families Live in Better Neighborhoods – But They Can Do More." October 17. Website: http://www.cbpp.org/blog/housing-vouchers-help-families-live-in-better-neighborhoods-but-they-can-do-more.

As a strategy, housing mobility is premised on the assumption that a significant number of families with vouchers living in high-poverty areas are eager to move to safer and higher-opportunity neighborhoods, but they are unable to do so without the help provided by mobility programs—even in places that have mobility-friendly voucher policies such as higher allowable rents in more expensive neighborhoods. Support for this idea has been borne out by field research detailing how a litany of market constraints, administrative barriers, and information gaps—the very challenges that mobility programs aim to overcome—combine to prevent voucher holders from settling in decent neighborhoods, as well as cause destabilizing and involuntary moves.[14] We have learned that mobility program participants are often desperate to escape neighborhood violence, and fight hard to remain in safer, integrated neighborhoods with more opportunities for their children once they arrive.[15] Parents also tend to expect more from their neighborhoods and local schools once they have had a chance to live in low-poverty areas.[16]

Housing mobility programs help families living in areas of concentrated poverty navigate the private housing market and sustain access to better neighborhoods over time. Thanks to research and past experience, much is known today about which design and implementation components are necessary for families to be successful in mobility programs (see Evidence of Impact section of this paper). At minimum, services include a mix of pre- and post-move counseling in either individual or group settings, along with help managing the housing search process. Topics covered during counseling range from learning about possible destination neighborhoods, to financial training to save up for security deposits and other housing expenses, to developing strategies to take advantage of their new environments. Best practices have also emerged around which receiving neighborhood characteristics to target in order to create maximum benefit for participating families. Finally, high-performing mobility programs engage in extensive landlord education and recruitment, and work with local housing authorities (which administer housing vouchers) to overcome potential administrative barriers involved in using vouchers across jurisdictions.

Mobility programs are limited to those who have had the good fortune to obtain rental assistance,[17] and will never be able to serve the majority of families living in high-poverty neighborhoods. Housing mobility thus cannot be the only strategy for addressing entrenched neighborhood disadvantage and its harmful effects, nor should it be. Mobility should be pursued in conjunction with other efforts such as targeted and sustained neighborhood investments aimed at improving the life chances of poor children in high-poverty areas, and changing housing and land use policies that create and perpetuate segregation. Each approach is necessary and complementary.

However, mobility programs are unique in that they explicitly aim to empower the end users of housing subsidy programs to make residential location choices that they already want to make or might otherwise not consider. This aspect is both symbolically important and immediately useful for populations whose "choice sets" have been historically constrained. As such, mobility presents an opportunity for housing policy to recognize and match the urgency of families' desire for better environments.

## Evidence of Impact

Housing mobility is also worthy of support because of high quality evidence demonstrating its effectiveness in breaking multigenerational cycles of poverty that persist in high-poverty neighborhoods, and for improving the lives of both children and their parents.[18] As such, it is way to fulfill housing vouchers' promise as vehicles to help low-income families *get ahead* across multiple domains—health, employment, and education—rather than serving

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[14] See, for example: DeLuca, Stefanie, Philip Garboden and Peter Rosenblatt. 2013. "Segregating Shelter: How Housing Policies Shape the Residential Locations of Low Income Minority Families." *Annals of the American Academy of Political and Social Science.* 647: 268-299.

[15] Briggs, Xavier de Souza, Susan J. Popkin, and John Goering. 2010. *Moving to Opportunity: The Story of an American Experiment to Fight Ghetto Poverty.* New York: Oxford University Press.

[16] Darrah, Jennifer and Stefanie DeLuca. 2014. "'Living Here Has Changed My Whole Perspective': How Escaping Inner-City Poverty Shapes Neighborhood and Housing Choice." *Journal of Policy Analysis and Management.* Vol. 33, No. 2.

[17] Nationally, only one in four families that qualify for rental assistance receives it. However, this ratio is much higher in expensive coastal housing markets where economic growth and inequality is concentrated.

[18] We focus on individual-level outcomes in this paper, but it bears mentioning that no evidence exists that housing mobility programs generate positive or negative changes either in participants' neighborhoods of origin or in their new "receiving" neighborhoods. Mobility programs serve a very small percentage of those living in concentrated poverty, and participants typically disperse across metropolitan areas once they move.

only to help them *get by* as a safety net-style income supplement to help pay for rent.

The original evidence on housing mobility's efficacy in delivering powerful social benefits came from the *Gautreaux* mobility program that emerged in the late 1970s out of the *Dorothy Gautreaux v. Chicago Housing Authority* civil rights lawsuit.[19] A more recent wave of evidence comes from the U.S. Department of Housing and Urban Development's (HUD) Moving to Opportunity for Fair Housing (MTO) experiment—a decade-long randomized control trial beginning in the mid-1990s involving participation of 4,600 families with children.[20]

First, mobility programs are pathways to economic mobility for children whose families move when they are still young. By their mid-20s, MTO participants who moved before age 13 had much higher college attendance rates and earnings than the control group, and they also lived in better neighborhoods and were less likely to be single parents. Moreover, the younger children were when they moved, the larger their gains across each of these outcomes. Incomes are estimated to increase by $300,000 over the lifetime of those who moved at age eight, which would generate enough federal tax revenue to offset MTO's program costs for their families.[21]

Housing mobility can also act as a "vaccine" for the negative physical and mental health effects of living in high-poverty neighborhoods. By the end of the MTO study period, for example, prevalence of diabetes and extreme obesity among adult women[22] who moved to low-poverty neighborhoods was 40 percent lower than the control group, and rates of major depression had also dropped.[23] These results

were striking because they were equivalent to what the most successful clinical interventions have achieved.[24] Each of these conditions also carries significant societal costs, and taxpayers usually shoulder this burden if the patient is low-income.[25] As described more in Part 2 of this paper, it is possible that medical cost savings to public agencies from adult health improvements alone could offset the cost of providing housing mobility services.

Lessons from MTO and on-going mobility programs suggest how to design mobility programs so that they generate even greater impact. For example, the evidence shows that sustaining exposure to low-poverty neighborhoods for longer periods of time—with the help of post-move supports— produces greater health improvements for adults, and economic benefits for children.[26] In addition, targeting families with young children, and those living in the most distressed neighborhoods, yields greater impact. Much more is also known about how to target "receiving" neighborhoods that offer the most to low-income families—for example, those with high-performing schools, and low levels of violent crime.[27] Next-generation mobility efforts today are already incorporating these lessons into their program designs, although none have been formally evaluated to test whether they are achieving better results than MTO.

## Pay for Success Financing

Despite its track record as an effective response to concentrated poverty, housing mobility is underutilized and faces significant barriers to replication and scaling. First, local public housing authorities (PHAs) that administer housing vouchers

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[19] See, for example: Rubinowitz, Leonard, and James Rosenbaum. 2002. *Crossing the Class and Color Lines: From Public Housing to White Suburbia*. Chicago: The University of Chicago Press. And DeLuca, et al. 2010. "*Gautreaux* Mothers and their Children: An Update." *Housing Policy Debate*. Vol. 20, No. 1.

[20] At baseline, all MTO participants lived in distressed public housing in high-poverty neighborhoods in five cities across the country. Around half were offered mobility services and a housing voucher that could only be used in lower-poverty areas (for a minimum of one year) as part of the experimental group, and the rest fell into one of two other groups: a control group with no intervention and a traditional voucher group with no mobility services or location requirements. Although MTO demonstrated powerful benefits for families in the experimental group, many today consider the intervention to have been weak, since—for example—it did not offer post-move support to help families remain in low-poverty areas, nor did it help them access better school districts.

[21] Chetty, Hendren, and Katz. 2015.

[22] The vast majority of MTO adults were women.

[23] Researchers have theorized that greater safety in lower-poverty neighborhoods—away from neighborhood violence and other sources of stress and trauma—may have been a key factor in generating these results. Baseline surveys showed that MTO families listed getting away

from drugs or gangs as by far the most common reason why they chose to participate in the program.

[24] Sanbonmatsu, et al. 2011. *Moving to Opportunity for Fair Housing Demonstration Program: Final Impacts Evaluation*. Prepared for: U.S. Department of Housing and Urban Development, Office of Policy Development & Research. November.

[25] Although costs associated with diabetes and extreme obesity are mostly medical costs, major depression's costs are primarily around lower economic output from lost work productivity. See, for example: Wang, et al. 2004. "Effects of Major Depression on Moment-in-Time Work Performance." *American Journal of Psychiatry*. Vol. 161, Issue 10. October.

[26] The MTO population was extremely disadvantaged, so the fact that young children who moved as part of the program experienced such large earnings boosts by early adulthood is significant in light of evidence on how concentrated poverty's impacts on cognitive development and earnings linger from one generation to the next. See: Sharkey, 2013.

[27] The *Gautreaux* program is considered to have helped families move to better-off neighborhoods than did MTO, in part because it targeted receiving areas that did not include a high concentration of racial minorities.

face continual cuts—they collectively lost around 85,000 vouchers due to sequestration in the last year[28]—and they are unable to fund mobility services on top of the traditional voucher program absent changes in federal funding.[29] Second, mobility's costs are mostly up-front, but its social and fiscal benefits accrue over time. Third, it is a classic example of the "wrong pocket problem," where investment in one area—housing-based services—generates impact in other domains, such as government health care spending and income tax revenue. Fourth, mobility could present political risks if it is misconstrued as directing resources away from high-poverty neighborhoods, and knowledge gaps remain about its social and fiscal impacts.

However, these challenges make housing mobility an ideal candidate for Pay for Success (PFS) financing, sometimes called social impact bonds. PFS is a new tool that leverages private capital to fund upstream social programs that generate impact over time, and shifts the risk of innovation from taxpayers and government agencies to investors. As of the writing of this paper, there are seven active PFS initiatives underway in the United States supporting programs in education, social welfare, and criminal justice—but none supporting housing mobility. Under a PFS arrangement for housing mobility, private investors would support the costs of providing mobility services to voucher-holding families, and a public agency "end payer" would agree to repay investors, plus a reasonable return, only if certain outcomes—such as diabetes improvements for adults, or higher academic attainment for children—are achieved over a predetermined time period.

Depending on the end payer, PFS could apply in any of the areas in which there is strong evidence for housing mobility to deliver measurable social benefits. For example, PFS could enable health care agencies to pursue housing mobility as a population health strategy while taking on none of the financial risk. Incentivizing innovation in this way could be attractive to health agencies, insurers,

and health care systems, especially as they are being asked to incur greater responsibility for improving long-term patient health and reducing medical spending. Alternatively, a state education agency seeking to increase attainment and long-term economic mobility among low-income students could use PFS to fund housing mobility services, or multiple agencies across sectors or levels of government could even collaborate as joint end payers if they have shared policy goals (see part 3 of this paper for more on our proposed PFS implementation structure).

There are potential downsides to using PFS to support housing mobility. For example, PFS involves large transaction and evaluation costs, and failure to achieve target outcomes—whether real, or via a false negative—could reduce support for the intervention.

However, in addition to being well suited to address the implementation barriers described above, PFS could offer additional benefits. For example, it could facilitate collaboration across sectors and levels of government, such as between health and housing agencies, and establish a basis for future partnerships. PFS could also serve the dual purpose of supporting new or expanded mobility programs in the short-term, while generating lessons for policy and practice—growing the evidence base around the intervention's social and fiscal impacts, and building the case for future investment and changes in government policy. Finally, a housing mobility PFS initiative could facilitate a regionally scaled housing intervention, which is critical for addressing neighborhood inequality and segregation but extremely rare in practice.

# Part 2: Hypothetical Pay for Success Scenario

To explore PFS's viability as a financing tool for housing mobility, we developed a hypothetical scenario—using data from a contemporary housing mobility program—to compare mobility program costs to medical cost savings generated by improvements in adult diabetes and extreme obesity. This approach does not capture the full range of social benefits associated with housing mobility, and we do not intend to suggest that mobility PFS efforts should focus only on adult health, or define program success only as budgetary savings to public agencies.

Instead, we chose this scenario to help advance understanding of quantifiable public benefits

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[28] Center on Budget and Policy Priorities, 2015. "National and State Housing Data Fact Sheets." Website: http://www.cbpp.org/research/housing/national-and-state-housing-data-factsheets?fa=view&id=3586#table3.

[29] Most of the few mobility programs in operation today are court-ordered remedies as part of civil rights lawsuits against PHAs and HUD from the 1990s. In addition, PHAs typically do not earn administrative fees sufficient to cover the costs of running the voucher program under existing federal funding formulas. See: Abt Associates in partnership with RSG and Phineas Consulting. 2015. *Housing Choice Voucher Program Administrative Fee Study*. Draft Final Report. Prepared for U.S. Department of Housing and Urban Development. April.

to that could accrue on a timeline that is attractive to investors and government agencies in one domain where evidence of impact is particularly strong, but where researchers have not yet been able to quantify public savings due to limitations of the MTO evaluation and other data constraints—in contrast, for example, to other research showing that the federal government will likely recoup the cost of providing mobility services to MTO families who moved when their children were still young, based on tax revenue from their higher earnings as adults. In other words, even if adult metabolic health is just one of several outcome areas of interest, it would be useful to know if a mobility program could pay for itself on a reasonable timeline based on results in this area alone.

## Scenario Development and Rationale

Drawing on the MTO finding that adults who spent more time in lower-poverty areas experienced greater health improvements, we set out to estimate results using data from an existing housing mobility program in Baltimore. The Baltimore Housing Mobility Program (BHMP) emerged out of the partial consent decree and final settlement in the *Thompson v. HUD* civil rights lawsuit. Since 2003, it has helped more than 2,800 families move out of public housing and other high-poverty neighborhoods with high concentrations of African-Americans into racially integrated, low-poverty areas across the Baltimore metropolitan region. Over time, the program has increasingly invested in post-move supports with the aim of helping families settle long-term in healthier and better-resourced areas.[30]

We use data from BHMP to estimate the change in neighborhood environments that we could expect families to experience in a contemporary housing mobility program—not just after the first move out of high-poverty areas, but over the course of a decade.[31] Then, using the MTO dose-response

model[32]—which allows us to estimate changes in health status associated with exposure to different levels of neighborhood poverty over time—we estimate differences in prevalence in diabetes (defined as glycated hemoglobin level of 6.5 percent or more) and class II and III obesity (defined as body mass index at or above 35 and 40, respectively) between participants and a hypothetical control group that remains in high-poverty neighborhoods.

The MTO dose-response model predicts diabetes and extreme obesity impacts after 10 years, but does not say at what points in time changes in prevalence occur.[33] To address this uncertainty, we developed four scenarios to model changes in health status over time—each of which ends at the same point-in-time impact after 10 years, but which takes a different path to get there. Three scenarios assume that changes in prevalence increase at a linear rate, but begin to occur at different points in time (years 1, 3, and 5 after the initial move) to reflect increasingly conservative assumptions. One scenario ("Proximal") places greater weight on near-term poverty exposure using the MTO dose-response model, recalculating prevalence each year after the initial move based on BHMP families' average poverty exposure over time.

Other modeling assumptions are included in Table 1. To estimate medical cost savings associated with changes in prevalence, we rely on the robust literature on the incremental per-person medical costs attributable to diabetes and extreme obesity,[34] and account for the fact that the two conditions frequently co-occur in order not to double-count prevalence and costs. We also assume that medical costs associated with both conditions will increase over time due to inflation and the rising cost of care.

[30] Author Philip Tegeler is a board member of the Baltimore Regional Housing Partnership, which administers the Baltimore Housing Mobility Program. For additional background on *Thompson v. HUD* and the Baltimore Housing Mobility Program, see websites from the ACLU of Maryland (http://www.aclu-md.org/our_work/fair_housing) and the NAACP Legal Defense and Education Fund (http://www.naacpldf.org/case-issue/thompson-v-hud), which provided co-counsel along with three other firms, the Baltimore Regional Housing Partnership (http://www.brhp.org/), and a 2009 report on the program by Lora Engdahl (http://www.prrac.org/pdf/BaltimoreMobility Report.pdf).
[31] Analysis provided by Stefanie DeLuca and Phil Garboden, Johns Hopkins University. To correspond with the MTO study period, we use the average trajectory of neighborhood poverty exposure for all Baltimore

program participants from 2003 to 2012. Families that have entered the program more recently have fared better in sustaining access to lower-poverty areas thanks to program improvements. However, recent improvements are only reflected in the first few years of this average trajectory. Our assumptions about program performance are thus conservative, and do not reflect the likely trajectory of exposure to poverty for families entering the program today or in recent years.
[32] See Table 9 in the Supplementary Index to Ludwig et al. 2011. Website: http://www.nejm.org/doi/suppl/10.1056/NEJMsa1103216/suppl_file/nejmsa1103216_appendix.pdf.
[33] HUD did not initially conceive of MTO as a way to test the neighborhood effects on health, and only decided to study health outcomes after the interim evaluation. As a result, only the final evaluation included data on diabetes and extreme obesity, obtained through surveys and blood sample analysis.
[34] In this model, we do not account for non-medical economic benefits, such as increased productivity, from diabetes and extreme obesity improvements that are well documented in the literature. We also recognize that the MTO final evaluation did not observe significant differences in indicators of health care utilization.

## Table 1: Scenario Modeling Assumptions[35]

| | |
|---|---:|
| **Participants** | |
| Successful movers (all at end of year 0), assume 1 adult per household | 400 |
| Average drop in duration-weighted neighborhood poverty after 10 years[36] | 19.37% |
| **Health Status**[37] | |
| Percent of those with class II obesity who also have diabetes | 15% |
| Percent of those with class III obesity who also have diabetes | 26% |
| **Direct Annual Medical Costs Attributable to Diabetes and Obesity** (per-person, year 0) | |
| Diabetes[38] | $6,000 |
| Class II Obesity (body mass index of 35 and above)[39] | $2,500 |
| Class III Obesity (body mass index of 40 and above) | $4,500 |
| Annual rate of increase in costs (does not back out inflation)[40] | 7% |
| **Program Costs, Per-Family**[41] | |
| Initial move (incurred in year 0)[42] | $3,235 |
| Subsequent move (incurred over time)[43] | $1,101 |
| Total costs over 10 years per family that makes an initial move (nominal $)[44] | $5,572 |
| Annual rate of increase in costs | 3% |
| **Linear Dose-Response Model from MTO**[45] *(Percentage point drop in prevalence after 10 years associated with a 10 percentage point drop in duration-weighted census tract poverty over this period)* | |
| Diabetes (glycated hemoglobin ($HbA_{1c}$) of 6.5 percent or more) | -3.2 p.p. |
| Class II Obesity (body mass index of 35 and above) | -6.2 p.p. |
| Class III Obesity (body mass index of 40 and above) | -4.3 p.p. |

[35] We ran sensitivity analysis testing different inputs to key cost assumptions. See notes in Table 2.

[36] Analysis provided by Stefanie DeLuca and Phil Garboden, Johns Hopkins University.

[37] Flegal, et al. 2012. "Prevalence of Obesity and Trends in the Distribution of Body Mass Index Among US Adults, 1999-2010." *Journal of the American Medical Association.* February 1. Vol 307, No. 5.

[38] See page 9 and footnote 47 for an explanation of our diabetes cost assumptions.

[39] Tsai, et al. 2011. "Direct medical cost of overweight and obesity in the United States: a quantitative systematic review." *Obesity Review*. Vol 12, Issue 1. 50-61. Figures in this study are in 2008 dollars, which we translate to estimates in 2015 dollars based on an assumed annual increase in medical costs of 6 percent (approximately the annual growth rate from 2008 to 2013 in Medicaid health care expenditures). The figure for class II obesity is based on an estimate for all levels of obesity, including both lower and higher obesity cut points, which may bias the finding. These figures are also not age-adjusted, which may affect costs. A more recent study using an instrumental variables analysis found that per-person medical costs attributable to obesity among obese adults enrolled in Medicaid with children between the ages of 11 and 20—inclusive of all levels of obesity—was $3,674 in 2005 dollars, which translates to nearly $5,000 in 2015 dollars after inflation. As such, the estimates of the medical costs of class II and III obesity that we use in our modeling might be conservative. Source: Cawley, John and Chad Meyerhoefer. 2012. "The medical care costs of obesity: An instrumental variables approach." *Journal of Health Economics*. Vol 31.

[40] Historically, the annual rate of real medical price inflation (backing out inflation) has been about 4 percent. To add inflation back into this rate of increase to reflect nominal dollars, we used a 10-year historical average rate of price inflation from the BLS CPI for Medical Care services for urban consumers, [CUSR0000SAM], which is 3.11 percent. Our estimated nominal rate nominal rate of medical spending growth, assuming a real rate of increase of 4 percent, is thus (1+0.0311)*(1+0.04)-1=7.23 percent, which we round down to 7 percent.

[41] Provided by the Baltimore Regional Housing Partnership. Costs are for mobility program services only—such as counseling, housing search assistance, and landlord recruitment—and are averages of the 2013 and 2014 budgets for BHMP. Costs for administering the housing voucher and providing the rent subsidy associated with the voucher are not included, as they are already covered by the housing authority. We also do not include potential costs to housing authorities for higher rents in low-poverty neighborhoods. Under current regulations, PHAs could end up serving fewer households in their voucher programs if they pursue mobility at a large scale due to these elevated rents. However, HUD is moving toward a new regulatory scheme (Small Area Fair Market Rents) that will allow higher payments in more expensive submarkets, but will potentially be cost-neutral to PHAs.

[42] Costs for initial moves include costs for families who successfully move under the program, as well as costs associated with families that enter the pre-move counseling portion of the program but do not ultimately receive a voucher or who are not able to find a unit to rent with their voucher. We model these costs to appear six months before the initial move, which is an approximate midpoint in time during which they are incurred.

[43] Subsequent moves, for which there is a known cost, are used as a proxy for post-move support for families who make a successful initial move out of high-poverty areas. They are also only included for families who make an initial move. The model for when subsequent moves happen is based on the average pattern for BHMP families who entered the program between 2003 and 2012. Specifically: 23 percent moved one year after the initial move; 21 percent moved after two years; 19 percent moved after three years; 18 percent moved after four years; 17 percent moved after five years; 20 percent moved after six years; 18 percent moved after seven years; 16 percent moved after eight years; nine percent moved after nine years; and zero percent moved after 10 years. Analysis provided by Stefanie DeLuca and Phil Garboden, Johns Hopkins University.

[44] The BHMP cost is higher than the mean MTO counseling cost, which was less than $4,000 in 2015 dollars per family that successfully leased up in a low-poverty neighborhood. Source: Goering, John, Joan Kraft, Judith Feins, Debra McInnis, Mary Joel Hoelin, and Huda Elhassan. 1999. "Moving to Opportunity for Fair Housing Demonstration Program: Current Status and Initial Findings." U.S. Department of Housing and Urban Development.

[45] The data from MTO led Ludwig et al to conclude that the dose-response model is linear. This means, for example, that lowering exposure to neighborhood poverty by 20 percent over a decade would yield twice the drop in diabetes prevalence as lowering exposure by 10 percent. Source: Ludwig et al. 2011.

Diabetes-related medical costs, which are a significant driver of cost savings in our model, merit explanation. Based on the literature, we estimate a per-person medical cost figure attributable to diagnosed diabetes that is higher ($10,000 per year) than the figure we use in our model ($6,000 per year). The reason we use the lower figure is to account for likely cases of undiagnosed diabetes, which incur fewer medical costs on average than diagnosed cases.[46] We also use this lower figure as an age adjustment to account for the fact that younger people with diabetes incur lower diabetes-related medical costs. Finally, we do not know the length of time MTO or BHMP participants have had diabetes, nor whether they achieved good diabetic control—both of which can impact medical costs. Considering these unknowns, we believe that the $6,000 figure is appropriately conservative.[47]

Finally, costs for administering a housing mobility program are taken directly from BHMP. Incurred costs include those for each successful initial move from concentrated poverty into a higher-opportunity neighborhood (including costs for families who are not successful in moving), as well as costs for post-move support for successful initial movers over the 10-year period. All scenarios assume 400 initial movers, which is a typical yearly caseload for BHMP in recent years.

## Results

Based on data from the Baltimore program on families' exposure to neighborhood poverty over time, each successful mover is modeled to experience a duration-weighted drop in neighborhood poverty of around 19 percent by the end of the decade, compared to a baseline poverty rate of around 32 percent (which we also assume to be the counterfactual rate). Using the MTO dose-response model, we estimate that after 10 years, prevalence of diabetes and extreme obesity will be significantly reduced among program participants when compared to a hypothetical control group that has stayed in high-poverty neighborhoods. The difference of prevalence between the two groups is 6.1 percent for diabetes, 10.2 percent for class II obesity (counting only those without diabetes, in order not to double-count), and 6.1 percent for class III obesity (again, without diabetes). Results are shown in Table 2, and estimated medical cost savings over time for each scenario are shown in Figure 1.

In each scenario, medical cost savings from diabetes and extreme obesity improvements more than cover program costs (in nominal dollars)—in some cases by a significant amount, such as with the Proximal and Linear Y1 scenarios. Return on investment is also substantial in some scenarios, although it diminishes in the more conservative ones.

As shown in Figure 1, benefits are back-loaded, but break-even occurs before the end of the 10-year period in each scenario. Further, although we do not know whether adult metabolic health improvements for the MTO population persisted beyond the time of final evaluation, it is reasonable to assume that they did not immediately disappear, and continued at least in some form for several years. Health impacts could even increase beyond what is detected after 10 years, especially if families sustain exposure to low-poverty areas.

The scenario results also demonstrate that innovations in housing mobility program design—as implemented in BHMP—have improved upon the MTO model by helping families sustain longer access to low-poverty neighborhoods. We estimate health improvements comparable to what MTO families experienced, even though the average baseline neighborhood poverty rate for BHMP families is 32 percent, compared to 52 percent for MTO families—

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[46] At the final MTO evaluation, approximately 16 percent of adults in the control group reported having diabetes or being treated for it, compared to over 20 percent who had an elevated hemoglobin A1c blood test.

[47] American Diabetes Association. 2013. "Economic Costs of Diabetes in the U.S. in 2012." Figure includes hospital inpatient care, prescription medications, anti-diabetic agents and supplies, physician office visits, nursing/residential facility stays. Per-person annual medical costs attributable to diagnosed diabetes for non-Hispanic blacks was estimated at $9,540 in 2012 (this figure is not age-adjusted), and diabetes-related medical costs are higher among women than men. The BHMP population is entirely African-American, and the vast majority (86 percent) adult participants are female. Further, there is growing evidence that diabetes-related costs are higher among low-income people and those who live in poor neighborhoods (see, for example: Stevens, et al. 2014), leading us to think that per-person costs could exceed $10,000 for diagnosed cases among program participants. To account for the fact that around one third of diabetes cases are undiagnosed, and that undiagnosed cases incur around one third the per-person annual costs as diagnosed cases (source: Dall, et al. 2014. "The Economic Burden of Elevated Blood Glucose Levels in 2012: Diagnosed and Undiagnosed Diabetes, Gestational Diabetes Mellitus, and Prediabetes." Diabetes Care. Vol 37. December.), we reduce this figure to $8,000. Then, to account for the fact that adult participants in housing mobility programs are mostly non-elderly, and younger people with diabetes incur lower diabetes-related medical costs, we further reduce the baseline cost figure to $6,000. Finally, we recognize that medical costs of diabetes can vary by the number of years after diagnosis; costs tend to jump immediately after diagnosis, then increase at a slower rate over time during management of the disease, and then can spike after an extended period of time due to complications from with diabetes such as amputations and heart disease. These complications may occur at differing time points in part due to poor diabetic control. However, since the published MTO evaluation does not indicate whether cases were diagnosed, or the number of years after diagnosis, we do not assume a variable cost trajectory—only an annual average.

**Table 2: Scenario Results ($ millions)*** *The scenarios vary the time at which health benefits accrue*

|  | Proximal | Linear Y1 | Linear Y3 | Linear Y5 |
|---|---|---|---|---|
| **Nominal Benefits and Costs** *(constant $, 3% discount rate)* | | | | |
| Medical Cost Savings | $3.8 *($3.1)* | $3.3 *($2.7)* | $2.9 *($2.2)* | $2.3 *($1.8)* |
| Program Costs | $2.2 *($2.1)* | $2.2 *($2.1)* | $2.2 *($2.1)* | $2.2 *($2.1)* |
| Net Benefit *(Net Present Value of Investment)* | $1.6 *($1.0)* | $1.1 *($0.6)* | $0.6 *($0.1)* | $0.1 *(-$0.3)* |
| **Performance Measures** | | | | |
| Benefit/Cost Ratio** | 1.47 | 1.27 | 1.06 | 0.85 |
| Return on Investment** | 47% | 27% | 6% | -15% |
| Internal Rate of Return | 10.5% | 7.7% | 4.0% | 0.5% |
| Break-Even Year*** | 8 | 9 | 10 | 10 |

\* As previously noted, we ran sensitivity analysis testing different inputs to key cost assumptions and in most cases the project was still viable and would break even over a reasonable timeframe. For example, the minimum per-person diabetes cost figure to achieve break-even within ten years for each scenario is as follows, all else held constant: $0 for Proximal; $1,150 for Linear Y1; $2,850 for Linear Y3; and $5,500 for Linear Y5. Alternatively, keeping the per-person annual cost of diabetes at $6,000 per year, per-person annual class II and III obesity costs could be reduced by the following percentages and still achieve break-even after ten years in each scenario: 70 percent for Proximal; 56 percent for Linear Y1; 37 percent for Linear Y3; and 6 percent for Linear Y5. Finally, keeping per-person annual costs for diabetes and class II and III obesity at $6,000, $2,500, and $4,500, respectively (as shown in Table 1), the minimum nominal annual rate of increase in medical costs to achieve break-even within ten years for each scenario is as follows: 0 percent for Proximal; 1.6 percent for Linear Y1; 3.9 percent for Linear Y3; and 6.6 percent for Linear Y5 (recall that we use 7 percent in our model, as shown in Table 1 and described in footnote 40).

\*\* Calculated based on constant, discounted dollars using a 3 percent discount rate.

\*\*\* Defined as the number of years after the initial move when cumulative medical cost savings exceed cumulative program costs in nominal, unadjusted dollars. Note that program costs for the initial move are modeled to appear six months prior to when this move happens, to reflect an estimated midpoint in time for when pre-move costs occur.

and impact in the dose-response model from MTO is driven by change in poverty exposure over time relative to a counterfactual.[48] See Appendix A for each scenario's estimated changes in prevalence over time for diabetes and extreme obesity.

Overall, our scenarios show that housing mobility could generate significant medical cost savings, the vast majority of which would accrue to government health programs such as Medicaid given the low incomes of families with housing vouchers. We also conclude that it is possible that housing mobility could pay for itself—along with interest to investors and other legal and evaluation costs associated with PFS financing—based on medical cost savings from adult metabolic health improvements alone. However, a formal evaluation could establish more certainty around this question.

It is worth noting that these scenarios do not account for other potential health benefits and

medical cost savings from housing mobility, particularly for children. For example, depending on the region, mobility programs could generate short-term improvements in child asthma—a condition that can require frequent emergency medical care, and which is clustered in low-income neighborhoods with poor housing quality[49]—by reducing exposure to home-based allergens and pollutants. Other research on MTO has suggested that children in "high dosage" families that stayed in lower-poverty areas for longer periods experienced better overall health.[50] A health-focused housing mobility PFS initiative could designate improvement and cost savings in child health where evidence is promising as a basis for "bonus payments" to investors.

Finally, it is possible that reducing exposure to the cumulative risks of concentrated poverty could improve long-term health for children who move while they are still young, and that earning more and living in higher quality neighborhoods as adults could improve intergenerational health.

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[48] Additional differences between MTO and BHMP participants could influence the magnitude of social benefits that families experience in a housing mobility program. For example, not all BHMP families live in public housing at baseline. In addition, while nearly all BHMP participants are African-American, the MTO population was more mixed—around 61 percent African-American, and most of the rest Hispanic. At baseline, MTO adults were also less likely than BHMP adults to be employed, they were more likely to receive welfare income, and they were slightly older. However, household income for the two groups at baseline was similar.

[49] See, for example: Beck, et al. 2014. "Housing Code Violation Density Associated with Emergency Department and Hospital Use by Children with Asthma." *Health Affairs*. Vol 33, No. 11.
[50] Moulton et al. 2014. "Moving to Opportunity's Impact on Health and Well-Being Among High-Dosage Participants." *Housing Policy Debate*. Vol 24, No. 2.

**Figure 1: Medical Cost Savings by Scenario** *(Figures for each year are cumulative and in nominal $)*
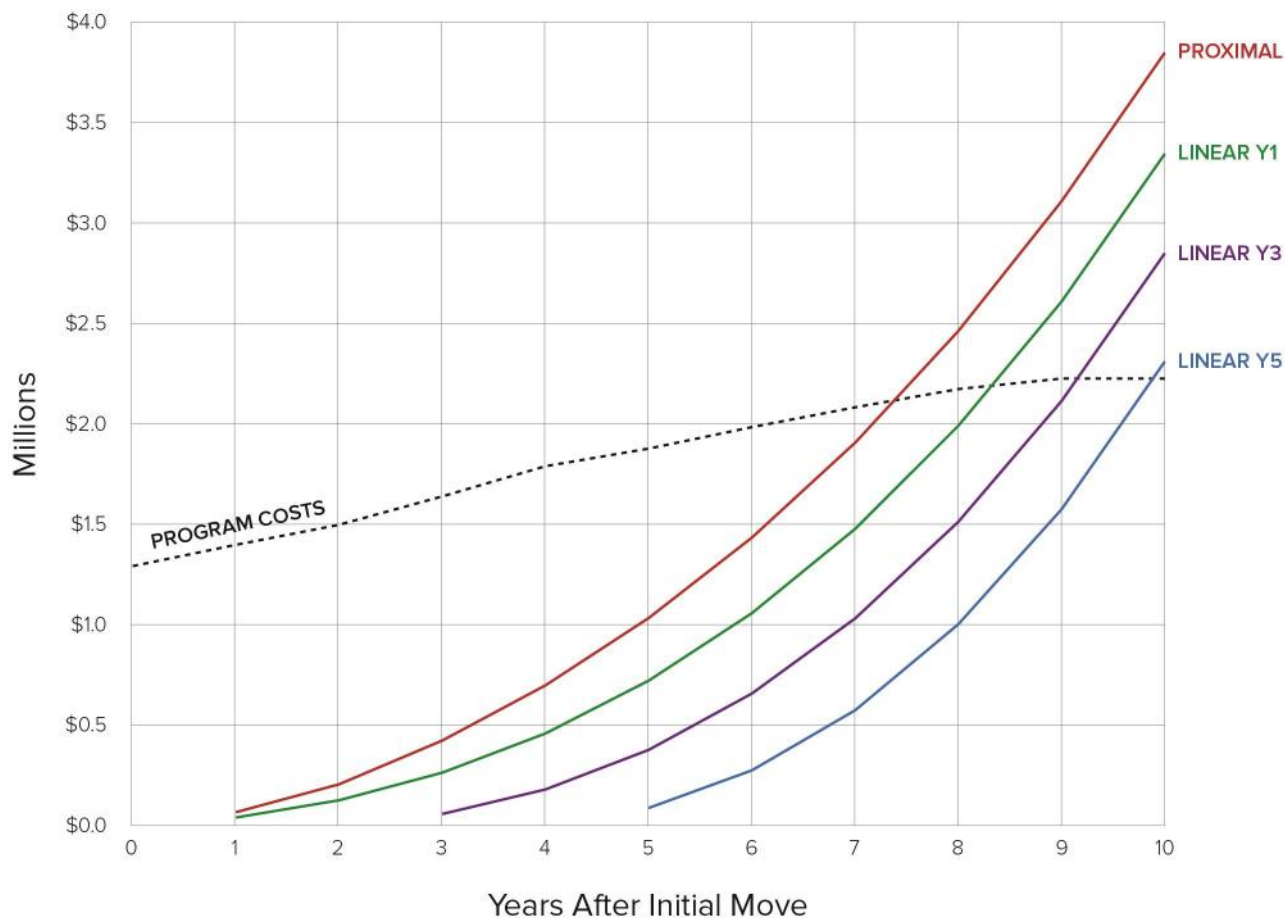


# Part 3: Implementing a Housing Mobility Pay for Success Initiative

As noted earlier, PFS financing could apply in any of the areas in which there is strong evidence for housing mobility to deliver powerful social benefits, depending on the end payer's goals—whether to improve population health and reduce health care spending, increase economic mobility for the poor, or boost educational performance for disadvantaged children living in high-poverty neighborhoods. As such, many government agencies could find value in housing mobility. However, those with jurisdiction over large portions of metropolitan areas would find the smoothest path to implementation, since participating families typically move across municipal boundaries. For this reason, likely end payers could include state and federal agencies in health and education, Medicaid managed

care organizations and accountable care organizations, and state budget agencies with broad oversight over activities in multiple sectors. Foundations could also play the role of an end payer if housing mobility would advance their philanthropic goals, or even private health insurers.

However, any housing mobility PFS initiative will likely involve the same basic structure, which is shown in Figure 2. This structure would be unique among PFS efforts in that one of the key government stakeholders would not necessarily be the end payer, but the controller of a publicly funded resource (housing vouchers) upon which the PFS-financed social services (mobility supports) are layered.[51] As such, housing authorities would need to

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[51] A PFS initiative focused on child welfare in Cuyahoga County, Ohio, also combines services with existing housing supports. For more information, see: http://payforsuccess.org/sites/default/files/141204_cuyahoga_pfs _fact-sheet.pdf.

**Figure 2: Implementation Structure for a Housing Mobility Pay for Success Initiative**
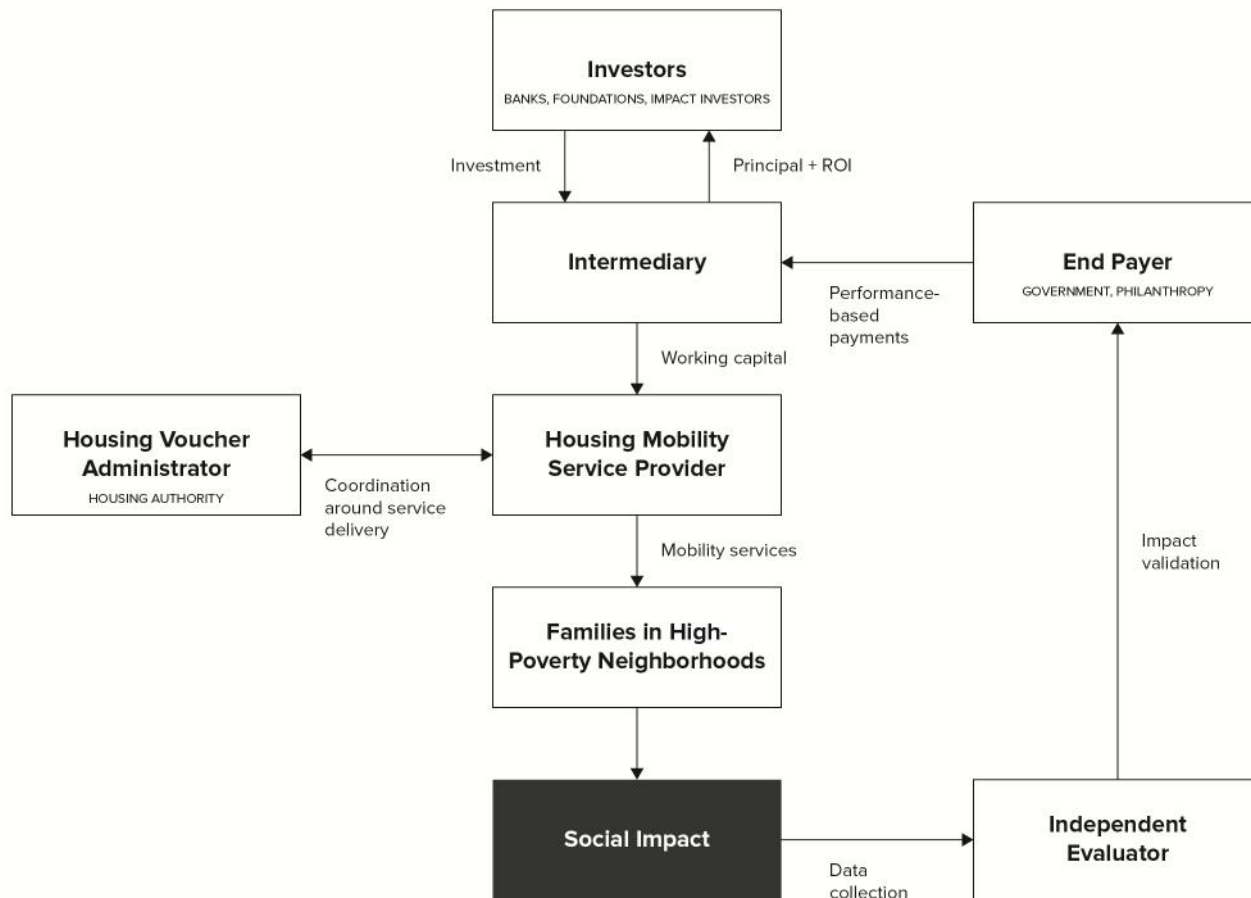


be at the table during the planning stage, and would be important partners in service delivery and program operation during implementation. For example, they could help recruit families within their voucher programs who live in high-poverty neighborhoods to participate, as well as obtain families' consent to use their administrative data for program evaluation purposes. A housing authority could also play the role of end payer if, for example, it has sufficient working capital for mobility services[52] and is interested in improving locational outcomes for families in its voucher program. In this case, PFS could be an attractive tool to reduce the financial risk of programmatic innovation.

Otherwise, the PFS structure for housing mobility would include the same essential components as other PFS efforts. An intermediary organization would facilitate contract negotiation and transaction structuring, raise capital from investors, and help select a service provider to provide housing mobility services to participating families (although the intermediary could also be the service provider). Investors could include banks and other mission-oriented investors as senior lenders, with foundations or other funders providing risk-absorbing capital. After launch, an intermediary would oversee implementation and authorize the performance-based payments from the end payer to investors based on validation of impact from an independent evaluator. End payers are only required to repay investors if certain outcomes are achieved, such as health improvements.

However, given potential variability in the goals and stakeholders involved in a housing mobility PFS initiative, we offer the following considerations around initiative design and evaluation.

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[52] Typically, this would mean the agency is among the small fraction of housing authorities with Moving to Work status, which allows programmatic flexibility and accumulation of working capital for special initiatives.

## Initiative Design and Evaluation

Initiative design would largely depend on the goals and capacity of the end payer. The simplest approach would be for an end payer to accept successful moves out of concentrated poverty and into safer and higher-opportunity areas—perhaps sustained for a minimum period of time—as a proxy for social impact and as a basis for repayment to investors (or partial basis, corroborated by other outcome data). Other PFS efforts have used short-term outcomes as proxies for longer-term impacts and cost savings around foster care, recidivism, and early childhood education, so long as the evidence base is strong. Using proxies would be the cheapest and most straightforward approach to evaluating program performance.

However, it is likely that some end payers would not accept short-term outcomes or changes in neighborhood environment as proxies for their target outcomes. For example, health care agencies and insurers would likely demand a more rigorous evaluation that either demonstrates improved health status over time—lower diabetes prevalence, for example—or medical cost savings validated by insurance claims data. Although more costly and complex, an evaluation that tracks participant social outcomes rather than assuming impact could yield important lessons for policy and practice, and help build the case for housing mobility's effectiveness in generating social impact.

Some end payers may also push for targeting participation of sub-groups within the voucher population in order to orient the intervention around achieving certain kinds of impact. For example, a health-focused housing mobility PFS initiative could limit participation to those enrolled in Medicaid in order to capture savings to a single government program, or perhaps even prioritize those at risk of developing diabetes.[53] Another approach could be to target families with young children, based on the finding that those in MTO who moved before age 13 experienced large educational and economic gains by early adulthood. Limiting participation to voucher-holding families living in the most distressed and highest poverty neighborhoods would likely generate the greatest return for end payers and investors across multiple outcome areas, given evidence that these families stand the most to gain from a change in residential environment.

Fidelity to best practices in mobility program design would also increase the probability of success—such as BHMP's sophisticated and individually tailored approach to targeting receiving neighborhoods, and post-move supports designed to help participants convert their new locations into gains in education and health.[54] Favorable place-specific policy and regulatory factors such as mobility-friendly voucher payment standards to cover higher rents in low-poverty neighborhoods,[55] regional voucher jurisdiction or porting agreements,[56] and laws prohibiting discrimination against voucher holders would also enable successful and efficient program implementation.

# Conclusion

Housing mobility is an effective but underutilized response to concentrated poverty that faces multiple barriers to implementation, and PFS financing offers an opportunity to support and scale this work. However, launching housing mobility PFS initiatives will require leadership, coordination, and willingness to learn on the part of many stakeholders—most of all from potential end payers. Advocates and housing mobility experts will play a critical role in educating government agencies and foundations interested in supporting housing mobility. We hope this paper helps potential early adopters decide whether and how a housing mobility PFS initiative could be implemented in their region.

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[53] Limiting mobility program participants to the Medicaid population would result in screening out a small percentage of voucher holders, who are by definition low-income.

[54] Although some design elements from the *Thompson* program are derived from requirements in the *Thompson v. HUD* settlement—such as living in high-opportunity areas for a minimum period of time—they can be replicated in existing housing voucher programs.

[55] As noted in footnote 41, HUD's planned expansion of using Small Area Fair Market Rents in the Housing Choice Voucher program will enable higher payment standards in low-poverty neighborhoods in metropolitan areas across the country.

[56] Portability in the Housing Choice Voucher program refers to when families rent units outside the jurisdiction of the PHA that initially issued the voucher, and within the jurisdiction of another PHA.

# Appendix A: Changes in Health Status by Scenario

We developed four scenarios to model health changes over time—each of which ends at the same point after 10 years—because we do not know at what points in time changes in diabetes and extreme obesity occurred over the study period for MTO participants. Three scenarios assume changes in prevalence that increase at a linear rate, but begin to occur at different points in time (years 1, 3, and 5 after the initial move). One scenario ("Proximal") places greater weight on near-term poverty exposure using the MTO dose-response model, recalculating prevalence each year after the initial move based on BHMP families' average poverty exposure over time. Year-by-year estimated percentage point differences in prevalence for diabetes and class II and III obesity between adult program participants who move to low-poverty neighborhoods and a hypothetical control group that remains in high-poverty areas are shown below.

**Proximal.** Greater weight is placed on near-term poverty exposure and prevalence is recalculated each year based on exposure over time until the final prevalence in year 10.
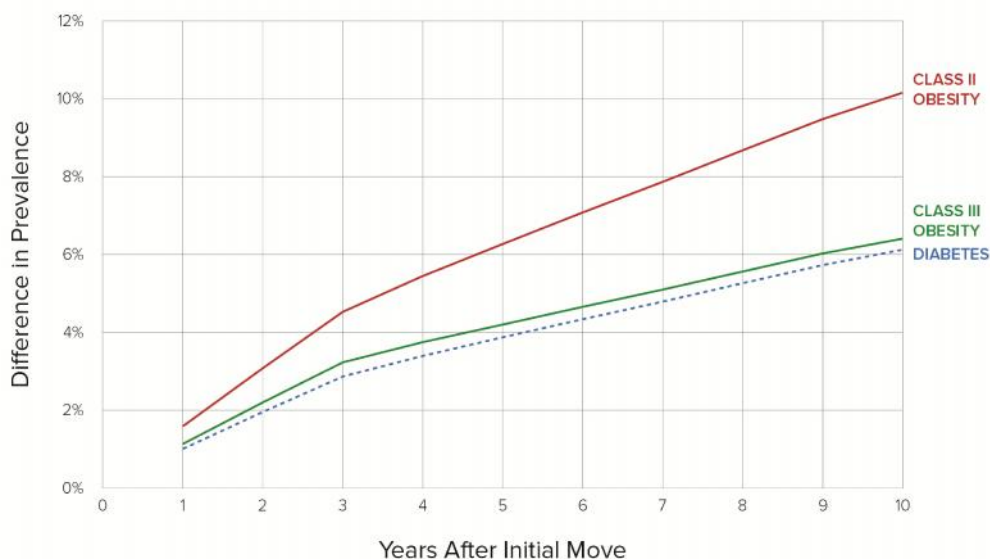


**Linear Y1.** Linear change in the prevalence of diabetes and extreme obesity starting in year 1 and increasing until the final prevalence in year 10.
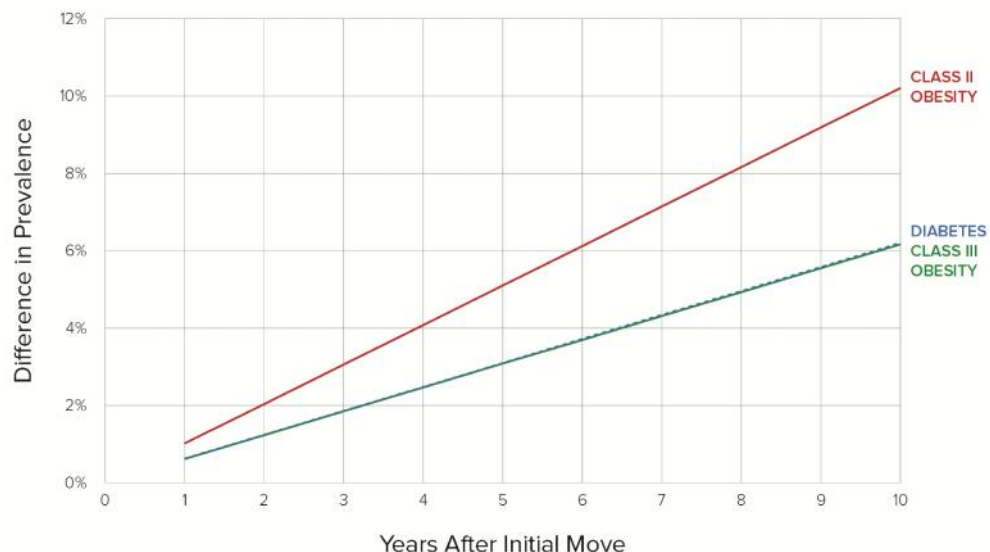
**Linear Y3.** Linear change in the prevalence of diabetes and extreme obesity starting in year 3 and increasing until the final prevalence in year 10.
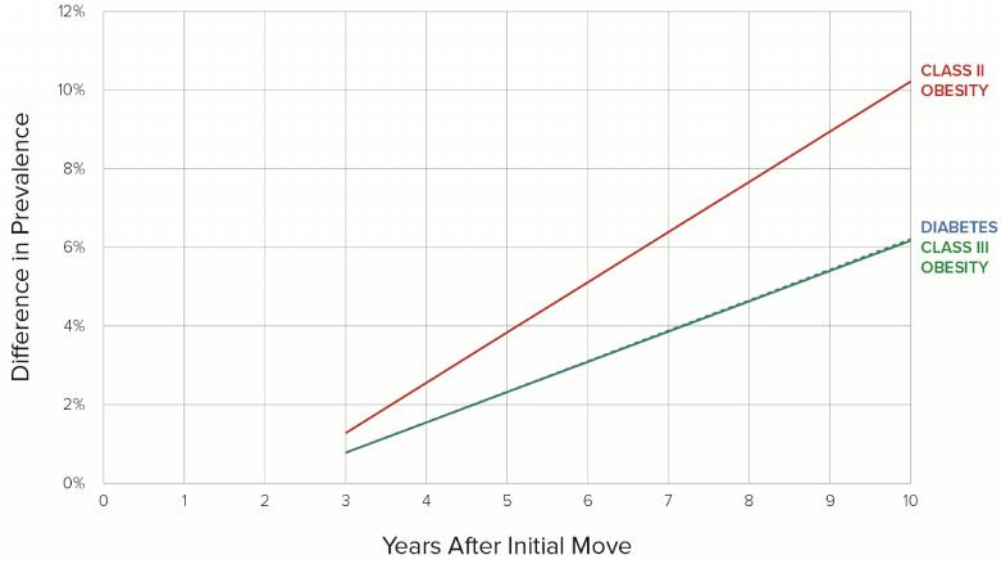


**Linear Y5.** Linear change in the prevalence of diabetes and extreme obesity starting in year 5 and increasing until the final prevalence in year 10.
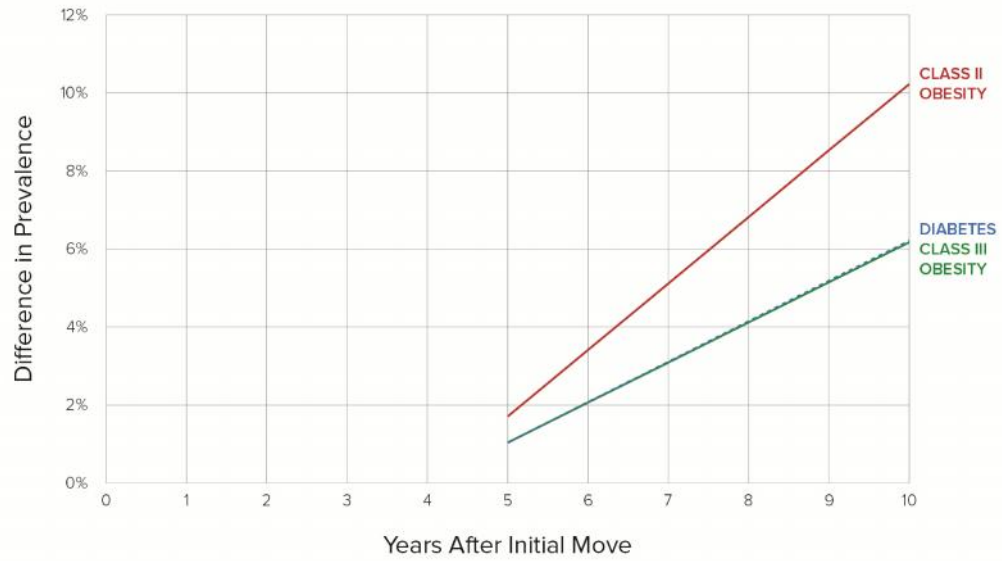
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