Using Linked Administrative Data to Improve Child Well-Being in the Rental Assistance Demonstration

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Abstract

This paper discusses the opportunities and challenges of using linked administrative data to evaluate the effectiveness of the Rental Assistance Demonstration (RAD) on child well-being. The authors draw from a recent study that links public housing resident records with state emergency department and school district records. The authors use that study as an example of how linked administrative data can be used to assess the consequences of RAD and other social programs and to achieve better outcomes for children in low-income families.

The Value of Linked Administrative Data

Administrative data that capture information about social program participants can be a powerful tool in the development, implementation, and evaluation of social programs (Allard et al., 2018; Arteaga, Heflin, and Hodges, 2018; Heflin et al., 2019; Heflin, Hodges, and Mueser, 2017; Johnson, Massey, and O'Hara, 2015; Lavertu, 2016). A growing number of studies have harnessed administrative data to examine the impact of interventions across a range of programs, including universal prekindergarten (Hong, Dragan, and Glied, 2019), subsidized child care (Havnes and Mogstad, 2011), the Supplemental Nutrition Assistance Program (SNAP) (Arteaga, Heflin, and Hodges, 2018; Heflin et al., 2019; Heflin, Hodges, and Mueser, 2017), housing assistance (Fenelon et al., 2018), and housing mobility programs (DeLuca et al., 2010). Linking administrative data from two or more sources provides several advantages compared with longitudinal surveys and randomized controlled trials in terms of efficiency, cost, and data representativeness.

First, the full coverage that administrative data provide makes it subject to less selection bias and sampling error, which are common in survey collection (Groves and Schoeffel, 2018; Smith et al., 2004). Available national surveys often underestimate social program participation due to missing responses (Scherpf, Newman, and Prell, 2015), whereas administrative data capture 100 percent of program participants when data are not missing or incorrect (Connelly et al., 2016; Smith et al., 2004). Second, because administrative data collection is mandated as a part of program reporting and implementation, it is more cost effective and it covers long periods, which are not feasible for survey methods. Third, although randomized experiments are the gold standard for testing causal impact, randomization can be impractical. Randomized experiments also face challenges in producing correct causal inferences (Groves and Schoeffel, 2018; Sobel, 2006), and quasi-experimental designs using linked administrative data can help with drawing causal inferences on interventions that are not possible to randomize. Finally, administrative data include hard-to-reach populations for which samples can be too small in surveys or consent can be too difficult to obtain, such as with young children, homeless families, and individuals with specific health conditions. As a consequence, administrative data enable investigators to examine various subpopulations who might otherwise be inadequately studied.

How Linked Administrative Data Can Address the Limitations of Single-Sourced Administrative Data

Administrative data can pose a number of challenges for research and evaluation purposes; however, these challenges can be addressed when multiple data sources are linked from social programs and agencies. Single-sourced administrative data are limited by the set of characteristics collected for operational purposes, which can lack key covariates of interest such as household income in the case of medical records (Aratani, Nguyen, and Sharma, 2019; Groves and Schoeffel, 2018). For example, parents' educational attainment or marital status is not collected if it is not related to the eligibility or implementation of a specific social program, although a wealth of research shows that these parental characteristics are key predictors of children's well-being. Further, social programs are usually not designed with the intent of collecting outcome variables such as educational or health outcomes of children post-participation (Groves and Schoeffel, 2018). Linked administrative data across agencies can complement information that is lacking in single-sourced administrative data. Also, researchers can have access to more variables for analysis and can continue to observe participants longitudinally even when participants may enter and exit programs, although this is rarely straightforward (Groves and Schoeffel, 2018).

Data quality and the completeness in administrative data are additional concerns, especially when program staff are not well trained in data collection and the quality is hard to control (Allard et al., 2018; Groves and Schoeffel, 2018). Linked administrative data across agencies that share similar demographic information can provide a means for comparison across programs to address missing data and to improve data quality. This paper will use the recent evaluation of a housing demonstration project called Rental Assistance Demonstration (RAD) on child well-being as an example to discuss how linked administrative data can be best used in improving the implementation of demonstration projects that affect the well-being of children in low-income families.

Evaluation of the Fresno Rental Assistance Demonstration Project

RAD is one of the latest strategies by the U.S. Department of Housing and Urban Development (HUD) to address the capital needs of public housing. Due to many years of underfunding, public housing units are in dire need of rehabilitation, with nearly $26 billion in maintenance and repairs needed across 1.2 million units (Finkel et al., 2010). RAD enables public housing authorities (PHAs) to convert public housing properties in their ownership to long-term, project-based Section 8 contracts with more stable funding streams (Econometrica, 2016). Through RAD, PHAs can draw from a wider range of public and private financing options such as commercial debt and low-income housing tax credits, or LIHTC, to secure stable financing and rehabilitate distressed public housing. The RAD program provides certain protections to public housing residents, such as requiring PHAs to have ongoing communication with tenants during the conversion process and ensuring that tenants retain the rights to their affordable units in case of relocation.

The RAD program has expanded rapidly since its inception in 2012. The original cap at 60,000 public housing units increased to 185,000 units in fiscal year (FY) 2015, 225,000 units in FY 2017, and 455,000 units in FY 2018 (HUD, 2017). As of October 2018, RAD had leveraged $12.6 billion in new funding (both private and public) to complete the conversion of 103,268 units, averaging about $121,747 in improvements per unit (Econometrica, 2019). Ultimately, HUD expects 40 percent of the nation's public housing portfolio to be preserved or redeveloped through RAD and converted to Section 8 contracts (Econometrica, 2019).

HUD commissioned an evaluation of RAD that the Fresno Housing Authority (FH)—one of 409 PHAs that conducted the conversion during the first stage of RAD (Econometrica, 2019)—implemented to better understand how RAD implementation has affected households. The FH-RAD was approved in three cities—Fresno, Mendota, and Orange Cove—covering 10 properties (447 units) and affecting around 1,500 residents (HUD, 2015). The early stages of the FH-RAD planning process called for an environmental assessment to document the conditions of the units and buildings and to inform redevelopment plans. Key items of health concern noted in the FH-RAD environmental assessment were indoor air quality, mold, building ventilation, and pest control.

From 2013 to 2015, FH-RAD properties underwent significant repairs to their physical condition (HUD, 2015). Buildings featured upgrades to their amenities and interior finishes, such as the installment of new dishwashers, washer/dryers, lighting, and air-conditioners/heaters. Structural upgrades were made to the roofs, building envelopes, and landscaping (e.g., new irrigation systems and trees), and existing mechanical, electrical, and plumbing systems were replaced (Aratani et al., 2020). The total construction cost for the 447 units was around $44.8 million.[1] Residents also benefited from onsite management staff and renovated spaces for community development. They received new recreational and common areas to accommodate more services, community organizations and gatherings, and other property management functions. Some examples included the expansion of community buildings and new outdoor play areas (Aratani et al., 2020). FH went beyond what HUD required to engage residents in the planning and decisionmaking process. They communicated with residents and received feedback through community meetings and

[1] Personal communication with FH, May 19, 2016.

smaller group-facilitated discussions on the project design, community engagement, relocation, and construction timelines. FH also arranged nearby housing and access to transportation during temporary relocation (Aratani et al., 2020).

One of the goals of the RAD evaluation study was to examine the impact of FH-RAD implementation on children's health and educational outcomes and to inform future RAD implementation. As the FH-RAD plan included major repairs to public housing units and the addition of amenities such as community centers that housed Boys & Girls Clubs at the selected FH-RAD sites, it was hypothesized that the FH-RAD would have a positive effect on children's health and educational outcomes through improved housing quality and community resources. Another hypothesis, however, was that any housing instability experienced during the FH-RAD implementation—including temporary relocation and resettlement—may mitigate the positive effect (for details, see Aratani et al., 2020).

Fresno Rental Assistance Demonstration Evaluation Data and Study Design

The evaluation covered the period of FH-RAD planning, which started in July 2012, until the RAD conversion was completed at the end of October 2015. Administrative records from FH contained demographic and program enrollment information (primarily from HUD-50058, Family Report data), along with additional FH-RAD data such as the dates of temporary relocations and moving back into rehabilitated units based on the RAD implementation data. The FH administrative data were linked with California Emergency Department and Patient Discharge (ED/PD) and the Fresno Unified School District (FUSD) data. For the analysis of health outcomes, ED/PD data were obtained from the California Office of Statewide Health Planning and Development (OSHPD), which is responsible for collecting data on every visit from emergency departments (EDs), general acute care hospitals, and ambulatory surgery centers. The ED data capture all outpatient ED visits, covered by both public and private insurance plans, and the PD data capture all patients seen in the ED and then admitted as inpatients. Together, they provide a comprehensive record of ED visits in California. Each patient record contains information on patient demographics, including race/ethnicity, primary language, gender, age, primary and secondary discharge diagnosis, and payment source (e.g., insurance). Authorized staff linked the FH's housing data to ED/PD data at the OSHPD office using a deterministic linkage based on birth date, gender, and the last four digits of Social Security numbers.

For the analysis of educational outcomes at post-RAD sites, children living at FH sites were also linked to FUSD data on the basis of an SQL (Structured Query Language) server fuzzy matching linkage method using birth date, gender, names, and residential addresses. The FUSD did not collect students' Social Security numbers; therefore, they were not used for the linkage. The FUSD team conducted the linkage and worked directly with FH to share data and track the educational outcomes of children living in FH housing; that cooperation was based on a board memorandum of understanding (MOU) between the two agencies prior to RAD implementation. Researchers obtained approval from Columbia University Medical Center's Institutional Review Board (IRB) and the California State Committee for Human Subjects to employ the linked administrative data. Exhibit 1 presents an overview of the data sources for the variables.

Exhibit 1

Summary of Measures and Their Data Sources

Type	Variables	Data Sources
Baseline data (2012)	Demographic characteristics such as race/ethnicity, gender, and age	FH resident records, 2012–2015
	Housing subsidy status from 2012 to 2015	
	Household income	
	Receipt of public assistance	
	Urban/rural	
	Building information	
	ZIP Code-level neighborhood characteristics	(2008-2012) ACS 5-year estimates
Outcome data (2016–2017)	Any ED visit in 2016	2016 ED data from the California OSHPD
	Attended school regularly, GPA	2016–2017 school year data from the FUSD

ACS = American Community Survey. ED = emergency department. FH = Fresno Housing Authority. FUSD = Fresno Unified School District. GPA = grade point average. OSHPD = Office of Statewide Health Planning and Development.

Based on FH resident records, the authors were able to identify 439 children under the age of 18 (born after 1994) in 2015 (when the FH-RAD was completed) out of the 815 children who were living in sites that were selected for the FH-RAD in 2012. FH resident records were linked to ED data for all FH-RAD sites, and FUSD data were used for Fresno FH-RAD properties only. The FUSD is one of the largest school districts in Fresno County; however, the linked data contained the 2016–2017 educational records of 61 children living in pre- and post-RAD sites, which was only one-third (32.4 percent) of the 188 children who remained in RAD properties in 2015. The study team identified an additional 115 children who moved into RAD properties after 2012; however, because these children did not experience a full implementation of the RAD that started in 2012, it was not possible to include them in the study to examine the impact of RAD on educational outcomes.

Three main reasons were determined for why only a small number of original RAD children could be found. First, about 16 percent of RAD children were no longer living in FH housing. Second, three children did not have household identifications, which were used for linking RAD and FUSD data; therefore, it was not possible to link those children to the FUSD data. Third, of the remaining RAD children (n = 154), 54 percent were still living in RAD properties with valid household identifiers; however, they were not enrolled in the FUSD. They were likely attending school in one of the other eight school districts in the city of Fresno and surrounding areas. Due to the small sample size of the linked data, only a descriptive analysis was conducted to compare school attendance and grade point average (GPA) between FUSD children living in post-FH-RAD and other HUD-assisted FH housing. The descriptive results showed that, overall, RAD children were more likely to attend school regularly and to have higher GPAs than children in traditional public housing or Section 8 housing.

When investigating the impact of FH-RAD on children's ED visits, selection biases posed a problem because RAD sites were selected on the basis of their building and demographic characteristics, and residents could decide to leave during redevelopment for reasons that were not random

(Econometrica, 2019). Thus, a quasi-experimental design was employed to compare the ED visits of children living in FH-RAD housing with those of non-RAD public housing residents. To account for differential selection in RAD, the authors used two methods: propensity score matching (PSM) and inverse probability of treatment weighting (IPTW). The goal of each of these techniques is to mimic a randomized experiment so that the treatment and control groups have similar distributions with respect to measured confounders, as they would have if they had been randomly assigned (Stuart et al., 2009). Thus, PSM methods helped ensure that children in post-FH-RAD housing were comparable to children in public housing across observable covariates, such as income, race/ethnicity, and health status in 2012; those covariates were available through linked administrative data. Because matching can result in a loss of sample size, IPTW was conducted to retain the full sample and further evaluate the robustness of the findings from PSM.

Children in post-FH-RAD housing were found to have a lower probability of having ED visits in 2016 than children in public housing; however, this difference was not statistically significant. The estimated probability of one or more ED visits among children in post-FH-RAD housing was 14 percent, based on PSM results, whereas the estimated probability among children in public housing was closer to 18 percent. The overall findings suggest that FH-RAD implementation did not negatively affect the health outcomes of children, as measured by ED visits, when compared with children living in comparable public housing who did not experience RAD implementation.

Advantages of Linked Administrative Data

Linking records of public housing residents in Fresno County to state health and school district data provided a number of methodological advantages. Given the nature of the RAD implementation design, conducting a randomized experiment was not feasible. PHAs cannot practically randomly assign residents to RAD and non-RAD sites because the intervention is done at the property level, and HUD has to approve the selection and planning of RAD sites in advance. By linking FH resident records to state health data and using quasi-experimental designs, the authors were able to examine how FH-RAD implementation affected the health outcomes of children, as measured by ED visits.

By linking FH resident records to one school district's student records, the authors could descriptively compare the school attendance of children living in FH-RAD housing with those living in other HUD-assisted housing properties, although causal inference was not possible. As PHA records do not contain the variables to measure the well-being of residents, linking to data such as health and school records increased the value of administrative data for evaluating the implementation of social programs and their effectiveness. Such linkages have been done before between SNAP and Medicaid data to examine how SNAP affects the health outcomes of program participants (Arteaga, Heflin, and Hodges, 2018; Heflin et al., 2019; and Heflin, Hodges, and Mueser, 2017) and between SNAP and educational outcomes (Gassman-Pines and Bellows, 2015; Gennetian et al., 2016). In the case of the RAD evaluation, linking multiple datasets from the FH data helped verify the linkage between pre-RAD and post-RAD resident records as the study team was able to compare residents' demographic information. Triangulating across PHA resident records, ED data, and school records had the benefit of validating data linkage across gender, race/ethnicity, and age covariates.

Finally, the RAD evaluation used a mixed-method design that included interviews with 30 parents of children who experienced RAD implementation and with 25 housing authority staff who were involved in the RAD implementation (Aratani et al., 2020). Complementing administrative data analysis with qualitative data was an effective way to contextualize the findings and fill any gaps in the documentation. Interviews with FH staff helped develop a data dictionary for their resident data in the context of RAD implementation. The learning perspectives of residents on RAD implementation and its potential effects on children helped interpret the health impacts of RAD. For example, although the evaluation did not find a significant impact of RAD on ED visit, a handful of parents of asthmatic children who were interviewed in the qualitative study did notice immediate improvements in their children's health after moving back into the renovated units (Aratani et al., 2020), and such qualitative observations can also provide a texture and context to the administrative data, highlighting the need for more mixed-methods research to understand the effects of RAD over time.

Conclusion

Challenges to Linking Administrative Data

Although some states such as Washington and Wisconsin already have integrated data systems across multiple agencies (Carlson et al., 2011; Mancuso, 2014; Patton et al., 2019), in most places, there are significant challenges to linking across administrative data. Each social program often has data systems for different purposes, such as one for eligibility determination and another to record monthly benefit transfer amounts and dates. To link these data, unique individual identifiers are needed; however, not all agencies use the same identifiers. Thus, case management across different timeframes and identifying appropriate data to link becomes difficult, especially in light of the fact that complete data dictionaries often do not exist. In the case of the RAD evaluation study, FH received multiple requests to create the datasets needed to appropriately link the data, which was a tedious process. This tedium was partly due to a limited understanding of FH data and their structure to make an appropriate data request, and after the study team received the data, they realized that additional data were needed for the proposed study design. Furthermore, because FH staff were not involved in the data analysis, the staff lacked a full understanding of the research design and what data were needed for the study. A more collaborative approach in which PHA staff are more actively involved with researchers in the study design and data analysis may help smooth the process of data linkage.

As data requests may involve sensitive information, approvals from potentially multiple Institutional Review Boards are often required, although this depends on the state/locality. Furthermore, a data agreement or MOU between sharing agencies is usually required. As such, the time from project approval to the delivery of linked data can be lengthy. For the RAD evaluation study, the entire process of obtaining approvals from IRBs, setting up data agreements, and completing data linkages took close to 4 years. Localized data such as school district data were particularly challenging to link because these required an MOU between each district and the PHAs. The RAD evaluation study originally planned to obtain data from other school districts, but it was not practically possible to go through MOU and IRB approvals for each data linkage for the grant period (which was originally for 3 years and received two 12-month extensions). The linkage

between FUSD and FH data was possible only because there was already a board MOU between these two agencies prior to the RAD evaluation study in addition to the FUSD team's capability and resources to conduct such linkages. Furthermore, FH data had the unique advantage of covering the entirety of Fresno County, as FH consists of both a city-level and county-level PHA and has operated under a single executive director since 2012 (FH, 2017). Future researchers seeking linked administrative data should estimate extra time and build on existing collaboration or relationships among public agencies for successful and timely data linkages.

An additional issue related to linking administrative data is that different agencies organize the data according to different temporal periods. For example, when working with education data, the school year is often the relevant time period, whereas social service data tends to be structured according to the fiscal year. When social program participation is available at the monthly level, it is possible to link school year and social program participation with some certainty to determine, for example, if a student was receiving SNAP in the month that achievement tests were administered. When social program participation is only available at the annual level, however, it is impossible to know the grade level of the student when receiving benefits. Furthermore, given that participants often cycle on and off programs due to administrative churn (Mills et al., 2014) and because fields such as "end of participation" in HUD data are not accurately captured, expertise in the programs being studied is required to guide the judgment calls necessary to work with the data. As a result, researchers should ensure that they understand the temporal data structure and integrity of the data fields when embarking on a linked administrative data study.

Opportunities for Linked Administrative Data

Administrative data are valuable for improving social safety net policies and programs such as RAD, which can promote the well-being of low-income children. In particular, there is enormous potential to linking administrative data from social safety net programs to health and educational records and to creating longitudinal data. PHA resident records have rich information on family income, socioeconomic characteristics, or household composition, whereas outcome data from health records or school districts often do not contain income or family characteristics—known determinants of child well-being. Further, linking across child and parent data can identify family risk factors and inform design prevention and early intervention services for children and families (Lucenko et al., 2015; Patton et al., 2019). Creating longitudinal data of residents in HUD-assisted housing by linking data across years through individual identifiers could also allow researchers to track residents over time, potentially even after program participation has ended. In particular, the RAD could potentially increase residential mobility among residents in HUD-assisted housing (Aratani et al., 2020), which would require tracking the residents over time. Thus, linked administrative data from multiple sources could become the most reliable and powerful tool to evaluate the impact of RAD on the health and well-being of residents in the long term.

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