URBAN INSTITUTE

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Using Data to Inform Decisionmaking

Pay for Success Early Childhood Education Toolkit Report #2

What Is Pay for Success?

Pay for success (PFS) offers an alternative approach to investing in the future, including early childhood education. This innovative financing mechanism shifts financial risk from a traditional funder—usually government—to a new investor, who provides up-front capital to scale an evidence-based social program to improve outcomes for a vulnerable population. If an independent evaluation shows that the program achieved agreed-upon outcomes, then the investment is repaid by the traditional funder. If not, the investor takes the loss.

For more information on pay for success, please visit **pfs.urban.org**.

About the Early Childhood Education Toolkit

This toolkit is designed to guide jurisdictions and their partners through the core elements of a PFS project in early childhood education: the existing evidence for early childhood interventions, the role of data, the measurement and pricing of outcomes, program funding and financing, implementation, and evaluation design. The toolkit includes a series of helpful features, including checklists, charts, and questions for consideration, to help direct and clarify thinking around the feasibility of pay for success to scale what works in early childhood education. Together, these briefs can help jurisdictions decide if pay for success is the right approach for them—and if so, how to get started.

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Using Data to Inform Decisionmaking

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Data play an integral role in pay for success projects. Knowing the kinds of data needed for a successful project, how to collect them, and how they should be used may seem straightforward. But the complexity of early childhood outcome measures and data systems can create challenges.

This report describes the role of data in early childhood pay for success (PFS) projects, with a focus on early childhood education. As part of a larger toolkit for states, localities, and investors considering early childhood PFS deals, the report provides a roadmap for collecting and using data. It builds on what we know about effective early childhood interventions (see toolkit report #1, The State of the Science of Early Childhood Interventions*), and its content is based on the experiences of stakeholders involved in ongoing PFS projects.*[1]

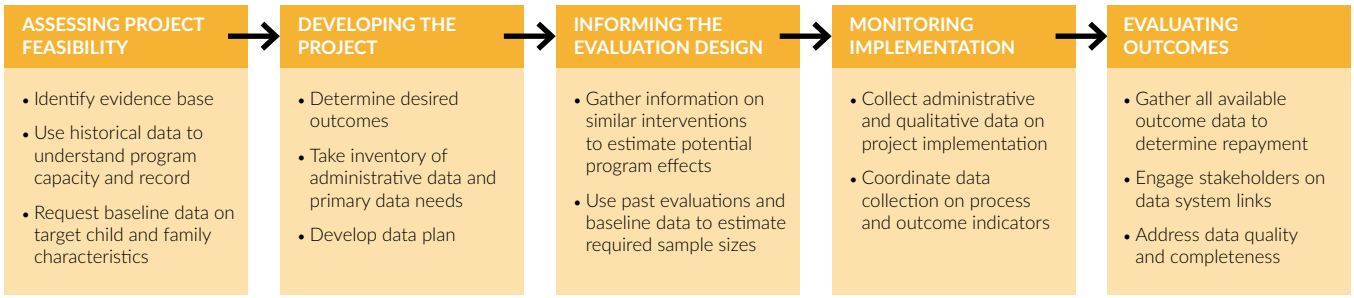
We first discuss the different ways to use data in PFS projects, then present key considerations for collecting and using data. We provide a checklist of the data-related questions that states, localities, and investors should consider. We then describe common data challenges and potential technology solutions to support data integration and analysis. We conclude with lessons shared from ongoing PFS projects, including the importance of engaging data experts from relevant agencies early in the process, maximizing the opportunity to get communities to consider collaborating more wisely around data, and choosing providers with strong data capabilities.

The Purposes of Data in PFS Projects

Data are used for multiple reasons and at every stage of a PFS project. Above all, they determine whether participants achieved the targeted outcome or outcomes—and whether investors will be repaid. But data can inform other decisions. Figure 1 captures the sequence of common data collection steps: assessing project feasibility, developing the project, informing the evaluation design, monitoring implementation, and evaluating outcomes. Data can support project goals at each of these steps.

[1] In hour-long interviews, we asked six stakeholders (including government leaders, evaluators, and intermediaries) from projects at four different sites how data can be used at different stages of PFS. They described how they used data, their experiences developing data-sharing agreements, and potential data challenges to consider. To protect our interviewees' confidentiality, the quotes included in this report are unattributed.

Figure 1. Using Data in PFS Projects



Assessing project feasibility. When considering a PFS project, historical data from local providers can help investors understand past program performance, local demand for services and expected enrollment, and characteristics of the population being served. Waiting lists can quantify how many people who need the program cannot access it because of limited space or other barriers. Investors may also benefit from seeing community needs assessment data that identify the demographics of the local population and the prevalence of such risk factors as child poverty, grade retention and special education placements, low proficiency on standardized achievement tests, and low high school graduation rates. A reach-by-risk analysis could show the availability (or "reach") of early education programs and rates of unmet need in selected high-risk communities. A feasibility study might also explore the availability and accessibility of data that will be needed during different project phases.

Developing the project. As parties develop a PFS project, they must select the program model, identify the targeted location and population, and define the conditions for repayment—specifically, the measured outcome(s) that will trigger repayment, the time frame for repayment, and the amount. Data from previous early childhood interventions and cost-benefit analyses can help inform the selection of appropriate measures and repayment options (see toolkit report #3, *Outcomes Measurement and Pricing*). Having a clear data plan outlining how data will be collected, integrated, and analyzed can help mitigate the risk inherent in these deals and may attract more investors.

Informing the evaluation design. Designing a strong evaluation is critical to determining the success of a PFS project. Evaluators use data to inform the study design, such as whether program demand is high enough to support randomization, the best recruitment and enrollment procedures, and options for a comparison group given the counterfactual or alternative local programs (i.e., where do children go and what do they experience if they are eligible but do not enroll in this program?). Data on program enrollment, attrition, attendance/program intensity, and later school mobility (if tracking outcomes over time)

can be used to determine the desired sample size and sampling approaches (see toolkit report #6, *Evaluation Design*).

Monitoring implementation. A poorly implemented project may not achieve its desired outcomes, even if its model has a track record of success. Project evaluations often include an implementation study component that gathers data on how the program is being implemented, if it is being implemented as intended, and what factors have facilitated or challenged program implementation (see toolkit report #5, *Project and Performance Management*). In the case of a preschool intervention, if children's learning and development do not improve significantly, data may point to reasons beyond the possible ineffectiveness of the program model. Implementation data include information on program fidelity (i.e., did the program follow specified requirements?), curriculum fidelity (i.e., did teachers implement the classroom curriculum as intended?), program and classroom quality, staff and child attendance and retention, and other contextual factors such as changes in program funding and standards.

Evaluating outcomes. Repayment to PFS investors is tied to the achievement of a selected outcome, such as a reduction in special education placements. Outcome data must be collected with validated and reliable instruments or other standard measures and be appropriately analyzed to determine program impacts and the return on investment.

VIEW FROM THE FIELD

"[It was all part of the] feasibility process…Looking at what the county did, what it's interested in, what populations [were] in need, what outcomes we could feasibly track on what populations, what services currently existed in the community or didn't exist in the community around those populations, and then the county's prioritization of the issues."

Although most data described in these five steps are quantitative, qualitative data on community needs and program implementation provide a more complete picture of what is happening on the ground and the perspectives of program leaders, staff, participants, and other important stakeholders. Data often play an iterative role in research and evaluation and may need to be updated regularly, depending on the length of a project. PFS stakeholders should budget ample time for these activities, as we discuss in more detail below.

☑ Checklist of Guiding Questions

SELECTING THE INTERVENTION AND TARGET POPULATION

- ☐ What are the demographic characteristics and risk factors of potential target communities? What is the level of unmet need in the community? What is the population size? Are there enough people to conduct the planned intervention without introducing undue randomness?
- ☐ Who is the program designed to serve? What are the eligibility criteria for enrollment? Does the program have a universal (e.g., all preschool-age children) or a targeted approach (e.g., low-income preschool-age children)?
- ☐ How has the program recruited and enrolled participants? How many participants have been served? What is the take-up rate in the community? How long do participants stay enrolled? What is the attrition rate?

DETERMINING DATA NEEDS

- ☐ What is the purpose of the data? What questions are you trying to answer?
- ☐ What are the desired outcomes? Based on the evidence, which outcome(s) are most appropriate for a pay for success project? Will funders be receptive to these types of outcomes?
- ☐ What data are needed to measure the targeted outcomes and monitor implementation?

IDENTIFYING DATA SOURCES

- ☐ Are desired data available in administrative records or do you need to collect primary data?
- ☐ If administrative data are available, where are they kept, what format are they in, and how reliable are they? When and how often are these data collected? Why are they collected—for compliance, accountability, continuous quality improvement, something else? Are there common identifiers to facilitate links across data systems?
- ☐ If using primary data, how will the data be collected and entered? Who will collect and enter data? When will data be available? How will the quality and completeness of the data collection be assured?
- ☐ What instruments are most commonly used to measure the outcomes? How valid and reliable are those instruments? What are their limitations (e.g., only available in English, require a highly trained assessor)?
- ☐ What external factors (e.g., mobility of population served) or policy decisions could affect the data?

DEVELOPING DATA-SHARING AGREEMENTS

- ☐ Will relevant agencies be able to produce the data required to perform the evaluation? What kind of data-sharing agreement or memorandum of understanding is required?
- ☐ What privacy protections need to be followed? What data security procedures are in place for sharing personally identifiable information with evaluators and program operators?
- ☐ How long does it usually take to gain access to data? How will the timing of data collection and reporting to these systems affect the evaluation timeline?
- ☐ Are there any data restrictions or limitations (e.g., certain fields like Social Security numbers cannot be shared)?
- ☐ Are there negative contractual ramifications if the government fails to produce the agreed-upon data?

IDENTIFYING TECHNOLOGY SOLUTIONS TO FACILITATE DATA SHARING

- ☐ How are evaluators planning to analyze the data (e.g., advanced analytics, predictive modeling)? Will they need to integrate data from multiple data systems or sources?
- ☐ How are privacy assurances implemented for data collection, transfer, and storage? Can data be stored on local servers and/or secured by a cloud-based service (e.g., a data repository or warehouse)?
- ☐ How can the service provider use the data to improve implementation of services? How will stakeholders want to visualize and share the data?

Key Considerations for Collecting and Using Data for PFS

Selecting the Intervention and Target Population

When considering a PFS project, stakeholders must determine what intervention to implement and identify its core components and features. Program characteristics include the location of services, the intensity and duration of the program, the curriculum and services provided, performance standards and quality of service delivery, education and training requirements for program staff, participant eligibility criteria, and recruitment procedures. Though all early childhood interventions seek to improve children's development, individual program goals, needs, and outcomes vary; even publicly funded state preschool programs and Head Start programs can differ from setting to setting. Investors looking at an early childhood education PFS project should be aware of local program variation and use available data to shape their decisions.

Current PFS stakeholders recommend using data to identify and target communities in need—and, within those communities, children at risk for poor developmental and academic outcomes who may benefit from the intervention. One school district uses a checklist to assess family risk indicators among children in Title I schools receiving free and reduced-price lunches (a proxy for family income). This simple checklist of additional indicators allows the school district to target children facing the highest level of risk, where reductions in developmental delays and avoidance of costly remediation will have the largest impact. In another PFS project, local communities were already using the intervention of interest; stakeholders used data to determine where and how to expand it. They also used data to decide between increasing access to a larger number of children enrolled part time versus a smaller number of children enrolled full time.

When making the case for PFS projects, stakeholders use evidence from previous research studies, when available, to choose an intervention, justify that choice to investors, and monetize outcomes. Because longitudinal evaluations of one intervention found that it improved children's school readiness and early school achievement and reduced the need for special education, these outcomes became the targets for repayment. Investors bought into the deal because of the strong body of evidence. In another location, the local government and intermediaries had a more difficult time convincing investors of the long-term payoff of a proposed home-visiting PFS project because of alternative investor priorities, funding limitations, and data issues. While extant evidence supported investing in the new program, the feasibility of obtaining essential outcome data and reproducing expected outcomes was low given contextual constraints.

VIEW FROM THE FIELD

"The program spent years collecting data and tailoring their program and making adjustments to make sure they're providing the highest quality program possible. And when this idea of a [PFS] transaction was developed they were able to say, 'Here's years and years of historical data of how our program has been effective and how it's improved outcomes.' I think that went a long way in being able to say we have a pretty good idea of how these kids will perform in kindergarten, 1st grade, 2nd grade… if the program is implemented with fidelity and if we continue to serve the target population."

Determining Data Needs

Stakeholders should begin developing a data plan by asking what success looks like and what they want children to gain from the program over any alternatives. Stakeholders can then identify underlying data sources and determine whether the desired data to answer these questions exist and, if so, what format they are in, how reliable they are, and what is involved in obtaining them.

Stakeholders may find existing data systems insufficient to inform their efforts. Compared with PFS recidivism projects where the outcomes are clearer—reduce the rate of rearrests and incarceration—and data on those outcomes are collected regularly, early childhood measures may differ across programs, and some administrative data are not easily accessible given federal privacy laws. PFS partners need to consider both the availability of existing data and the need to collect new data to adequately measure the desired outcomes. Ultimately, being clear on what outcomes are measured and what each outcome means in the context of the program and population served is key. PFS projects are harder to implement when outcomes are difficult to assess and administrative data are either unavailable, incomplete for a population, poor quality, or not easily accessible.

Best practice is to begin with research questions that then inform data needs and the selection of measures, rather than forming research questions based on the data a program already collects. Available measures may have poor reliability or validity, and that can leave the evaluation open to a critique of the methodology used. Yet, collecting new primary data is generally more costly than using existing administrative data. Research evidence might point to a particular outcome, but if that outcome is not well measured and available in administrative records, and funds are not sufficient to collect new data, stakeholders may need to reconsider the outcomes to include. In ongoing PFS projects, outcomes selection has been informed by

the availability of administrative data and the ability to attach a defined dollar amount to the outcome.

In more than half of US states, schools test incoming kindergarteners using a standardized assessment. This instrument could be used as an indicator of school readiness, and evaluators could compare the scores for children who participated in public preschool to children who did not participate in public preschool (or, potentially, any other early education program), controlling for differences between the two groups. In states without a kindergarten entry assessment, an evaluation either needs another measure of school readiness or cannot include school readiness as an outcome.

VIEW FROM THE FIELD

"We kept winnowing down outcomes [that] folks were interested in over course of project. [We focused on] the county's considerations on what they considered successful, but since PFS projects are ultimately a contract negotiation it's also, 'Well, can we measure that in the data? Well, if not then we just can't do it.' But the provider can say, 'No, I don't think that's an indicator of success,' or 'I don't feel comfortable being held accountable for that. What's your evidence for being able to hit that outcome?'... So it was kind of a negotiation process... getting it to a manageable list, pulling relevant data, and continuing to narrow it down from there."

EXAMPLE 1

CONSIDERATIONS FOR MEASURE SELECTION: AVAILABILITY, RELIABILITY, VALIDITY, AND RISK MITIGATION

Availability: *Instruments are developed for specific populations and may only be available in certain languages or for a limited age range. Instruments may not exist for certain desired outcomes.*

Reliability: *A highly reliable instrument consistently produces the same result if administered multiple times within a short time frame (test-retest reliability) or if administered by a different assessor (inter-rater reliability). Individual items in the measure produce consistent patterns of results (internal consistency).*

Continued on page 10

EXAMPLE 1

Continued from page 9

Validity: *A valid instrument accurately captures the construct it is supposed to measure (construct validity), correlates with validated instruments designed to measure the same construct (concurrent validity), and is associated with outcomes theoretically related to the measured construct (predictive validity). When results can be generalized to other populations and contexts, the measure has strong external validity.*

Risk mitigation: *Certain measures may place undue burden or stress on program participants. To reduce potential risks, measure selection should carefully consider the protection of human subjects.*

Identifying Data Sources

Data used for project development, implementation monitoring, and evaluation may come from one or more sources. Primary sources include those generated by evaluators or program staff to inform a PFS project. Secondary sources include administrative data collected and maintained by the program operator for compliance, accountability, and continuous quality improvement. Administrative data can be used fluidly to inform program management and decisionmaking beyond the PFS project. Census and national survey data, as well as state and local data, can also be useful during project development to understand the local context and population.

Primary and secondary sources can offer valuable information to stakeholders at all stages of planning and implementation—not just when measuring outcomes for repayment. Primary data come at additional cost because of collection efforts, but extracting and integrating administrative data across systems can also be burdensome and require some form of payment to the agency staff who pull the data and the contractors responsible for data integration. Mapping out the various data systems, what they contain, and how they connect becomes incredibly important in the early planning stages. Any jurisdiction thinking about these processes should consider the project timeline and how long it takes to access data. Potential data sources for early childhood PFS projects vary by jurisdiction, but may include those listed in table 1.

TABLE 1

Potential Data Elements and Sources for Early Childhood Pay for Success Projects

DATA TYPE	POTENTIAL DATA ELEMENTS	SOURCES
Local census data	Community demographics, such as the number of 4-year-olds, the share of 3- to 5-year-olds enrolled in preschool, the child poverty rate, and the share of low-income households with limited English proficiency	US Census Bureau, http://factfinder.census.govt
Local early care and education aggregate reports	State preschool program enrollment, funding, and quality State child care licensing and regulations Local enrollment in Head Start and Early Head Start programs Program participation in state child care quality rating and improvement systems (QRIS)	National Institute for Early Education Research State of Preschool Yearbook, http://nieer.org/research/state-preschool-2015 National Association for Regulatory Administration licensing studies, http://www.naralicensing.org/resources Head Start Program Information Report available through federal Office of Head Start QRIS National Learning Network, http://qrisnetwork.org/ State-based data systems containing program quality ratings and other quality indicators National Center on Early Childhood Quality Assurance, overseen by the US Department of Health and Human Services, Office of Early Childhood Development
Local school district aggregate reports	School-level and school district–level statistics on student population, such as rates of special education, free and reduced-price meals, English as a second language placements, school suspensions, and proficiency on state standardized assessments	State departments of education and local school districts Common Core of Data from the US Department of Education, National Center for Education Statistics, http://nces.ed.gov/datatools/
Program-level administrative data	Demographic characteristics of children and families served (e.g., race/ethnicity, child gender and age, home language, income, parental education level, family size); public benefits receipt (e.g., child care assistance, temporary cash assistance, nutrition assistance, Medicaid/Children's Health Insurance Program); and involvement in child welfare system	Early childhood service providers State and local agencies focused on early learning State and county departments of health and human services
Child-level administrative data from early childhood PFS programs	Dates of enrollment, transfers, and withdrawals; daily attendance; reasons for absenteeism; disciplinary actions (i.e., suspensions and expulsions); child developmental screenings and referrals; and other formative or summative assessment data collected for student monitoring, instructional purposes, and continuous quality improvement	Early childhood service providers
Child-level administrative data from schools and school districts	Grade retention; individualized education plans that qualify students for special education, specifically the type of disability and necessary accommodations; designation as English as a second or other language (ESOL) and the ESOL placement; student attendance and mobility; disciplinary action (i.e., suspensions and expulsions); receipt of free and reduced-price meals (a proxy for low family income); kindergarten-entry assessments of school readiness (where administered); and standardized test scores	State departments of education and local school districts

The federal government recently supported three separate efforts to expand early childhood data systems: the Statewide Longitudinal Data Systems Grants program (beginning in 2005); the Improving Head Start for School Readiness Act (2007), which prioritized state advisory councils that oversee data system creation and expansion; and Race to the Top—Early Learning Challenge grants (beginning in 2013), which help states design and implement integrated systems of high-quality early learning programs and services. These efforts, along with others initiated by states, have led to advanced data integration and use, but they also have created an uneven landscape across states. Table 2 lists states' current data capacity and data system linkages.

According to the Early Childhood Data Collaborative, state early childhood education (ECE) data systems are much more likely to include state prekindergarten and preschool special education information than federal Head Start or child care subsidy data. However, administrators in many states are planning to create additional data systems capacity and links across systems—specifically, across ECE programs, between ECE and K–12 systems, between ECE and health systems, and between ECE and social services. PFS stakeholders should consult the relevant state agencies, as well as local partners, to assess available data sources during the initial feasibility study.

In all data sharing and linking, PFS stakeholders should comply with privacy and confidentiality requirements in federal and state laws. Education records are governed by the Family Educational Rights and Privacy Act (FERPA), while health records and other identifiable information are subject to the Health Insurance Portability and Accountability Act (HIPAA). Participants in biomedical and behavioral research are further protected by Title 45 of the Code of Federal Regulations Part 46, which requires institutions engaged in government-funded research to establish institutional review boards (IRBs) regulated by the Office for Human Research Protections within the US Department of Health and Human Services. IRBs, FERPA, and HIPAA aim to protect children and families, but complying with them can extend project timelines. PFS projects should keep data security in mind at all stages of project development. To obtain more sensitive data, evaluators may need to request individual-level data stripped of personally identifiable information and rely on data-owning agencies to link files to avoid risk of disclosure.

Developing Data-Sharing Agreements

The requirements for sharing data across systems vary widely from state to state and agency to agency. Because every process will differ, it is important to start discussing data sharing early in the development of a PFS project. Some agencies will require written consent from the program's participants to share their data with other agencies; some will waive consent from the

participants but require a data-sharing agreement or memorandum of understanding with the other agency and the evaluator. This decisionmaking depends partly on what consent participants give when entering the program and how the PFS project is constructed. Some agencies already obtain consent from their clients to share their data with other agencies and evaluators, while others may state that they will never share client data without explicit permission. Data on children are particularly sensitive because their parents must consent for them. Consent procedures for data sharing also will differ depending on whether the data are from administrative data systems or from new data collections.

TABLE 2

Primary Features of State Early Childhood Data Systems

FEATURE	TOTAL STATES	STATES
Collects child development data from early childhood education (ECE) programs	36	AL, AK, AZ, AR, CA, CO, CT, DE, DC, GA, HI, IL, IA, KS, KY, LA, ME, MA, MN, MS, NE, NV, NH, NJ, NM, OH, OK, PA, RI, SC, SD, TN, UT, VA, WA, WI
Has an ECE data governance entity	32	AL, AK, AR, CA, CO, CT, DC, GA, HI, IL, IN, KY, LA, ME, MD, MA, MN, MS, MO, NE, NV, NM, NY, OH, OK, OR, PA, SC, UT, VT, WA, WV
Collects kindergarten entry assessment data	29	AL, AK, AR, CO, CT, DE, FL, ID, IL, IN, IA, KY, LA, MD, MI, MN, MS, NC, NM, OH, OR, PA, SD, TX, VT, VA, WA, WV, WY
Links some ECE and social services data	20	AK, AR, CT, DE, DC, FL, GA, IL, IN, MA, MS, MO, NV, NH, PA, RI, SC, SD, VT, WA
Links some ECE and health data	12	AK, AR, DE, DC, IL, IN, IA, LA, NV, OH, RI, SC
Links some ECE and K–12 data	30	AK, AR, CT, DE, DC, FL, GA, HI, IL, IN, IA, KS, KY, LA, MD, MA, MN, MS, MO, NE, NV, NJ, NM, OH, PA, RI, SC, VA, WA, WI
Links all ECE and K–12 data	1	PA

Source: Early Childhood Data Collaborative, *2013 State of States' Early Childhood Data Systems* (Bethesda, MD: Early Childhood Data Collaborative, 2014), http://www.ecedata.org/files/2013%20State%20of%20States'%20Early%20Childhood%20Data%20Systems.pdf.

Notes: Washington, DC, is counted as a state in this table. Stakeholders planning a PFS project should confirm the status of data systems integration with officials in their state; systems may have changed since 2014.

In one current PFS project, parents sign a consent form at program registration that gives the evaluator permission to assess children in preschool and obtain their records from the State Office of Education through the sixth grade. Per legislative mandate, the State Office of Education is required to be involved and to share deidentified information with the evaluator. The state collects data from all school districts and provides these data to the evaluator, who tracks children's outcomes. Local providers apply to be involved in the project, and as part of their grant agreement they are required to provide the data the evaluator needs.

Establishing a data-sharing agreement can be a lengthy process. Generally, it is less challenging to set up an agreement when using deidentified data or less sensitive data, and when data owners (typically state and local government agencies) are responsible for the required data matches and merges. Understanding early on which agencies require data-sharing agreements and which do not, and outlining the timing and frequency of data pulls over a project, is important.

Knowing what data elements are necessary and how data will be used, and being judicious and realistic about how many data requests are necessary, is important to avoid straining relationships with agency staff. Instead of making extensive requests during the feasibility stage, stakeholders should consider accessing data that are more generally available through ongoing research or other local initiatives, or through internal dashboards and performance metrics. Once the project goals become better defined, stakeholders can make a targeted request for the historical data most pertinent to the PFS project.

The timing of data requests matters, both for the sake of efficiency and reporting outcomes to investors and for data validity. For example, a "special education placement" measure may change throughout the school year as more children are screened and identified with disabilities. Depending on when an evaluator asks for a data export, the rate of special education placement could vary.

VIEW FROM THE FIELD

"It served us well to not make really intensive data requests earlier in the project and squander our goodwill by focusing on it later in process when we knew we needed more requests that would underpin the economics of the project… There have definitely been times when we made a data request only to be told, 'Oh, the legislature is in session, you're in the back of the queue.'…Or there have been times when it all piled up and evaluators had to do a lot at once. Sequencing and managing the process is something you can always do better."

A typical data-sharing agreement will include critical pieces of information, such as

- the parties or organizations involved in data sharing;
- the reasons for the data sharing and the uses of the data;
- the data security requirements, including conditions under which data may (or may not) be released to third parties;
- requirements on the citation of the data source in dissemination products; and
- other contractual issues such as the time span of the data-sharing agreement.

Typically the provider submits the requested data using a secure delivery method. Those receiving the data must protect the data according to the specifications of the contract. Setting up data-sharing agreements is much easier when evaluators and agencies already have a relationship. Building relationships with data owners early on is particularly beneficial when the data request is large or potentially complicated and may involve a significant amount of time from agency staff, who might need to be compensated for their effort.

EXAMPLE 2

BUILDING RELATIONSHIPS WITH DATA OWNERS

In a county-led PFS project on homelessness, the county could seek access to the state database for the data it needed, but it could not share those data with other parties, including project partners. Because the data contained sensitive information, such as the duration of stays in shelters and receipt of mental health treatment, the project intermediary had to build a direct relationship with the state department. The two parties discussed how to protect health and personally identifying information, and the state staff consulted with lawyers to ensure the data-sharing agreement conformed to regulations.

Challenges Obtaining and Using Data

PFS partners should be aware of potential data challenges, especially when using data from multiple unintegrated systems.

- Data dictionaries and data constructs may not align. Often, different agencies and data systems assign their own identification numbers to participants, making it difficult to match and merge data across systems. Social Security numbers, which are often used to match data on public benefit receipt, are not available in public school records and can be misreported

in the systems where they are collected. Probabilistic matching on child name, date of birth, gender, address, and other common fields may be effective, but it will likely produce some unmatched or falsely matched cases.

- Data systems may change over time. When tracking children's outcomes over time, evaluators should also be aware of planned changes with data systems. As a result of those changes, certain data elements may be available at one time but not another. Changes in data systems can also generate periodic barriers to data access or even loss of data. In addition to inquiring about any planned upgrades or changes at the start of a PFS project, evaluators should request that administrators back up data systems regularly so information is not lost during overwrites.

- Missing or unavailable data are common in administrative datasets. If certain information is not required to be collected or reported, evaluators may find large amounts of missing or unavailable data. When identifying data needs and sources, it is important to consider the quality and completeness of the data. Even the best measure on the surface may turn out to be unusable because of too much missing data. Also, data available for the intervention group may not be available for the comparison group. While an agency may be required to collect or report certain data, there is no assurance that the data collected are complete or accurate. Data entry and coding errors are also problematic; data cleaning will likely identify some errors, but others may be overlooked by data users unfamiliar with the system. Statistical corrections such as multiple imputation, which estimates values for missing data, may be necessary. Evaluators should be familiar with possible analytic solutions for handling missing data and checking for data errors.

- The quality of data collected depends on high response rates and participant retention. Parents must consent to their child's participation in the evaluation, either when applying for or enrolling in the program or before the child is assessed. A low response rate might suggest the sample is biased and families who consented differ somehow from those who declined (e.g., more stable, responsive, or involved). If the evaluation design requires a control group that does not receive the intervention, obtaining parental consent from families not connected to the program may prove challenging. Building rapport with families, getting them to see the benefits of their participation, and offering incentives can help increase response rates.

- Children may move and withdraw from the community or school district. Participant attrition is another common challenge in longitudinal studies. Following children across administrative boundaries may necessitate collaboration between neighboring school districts or adjoining states that may have very different approaches to data collection.

EXAMPLE 3

ACCOUNTING FOR PRESCHOOL ABSENTEEISM AND STUDENT MOBILITY

Children who are frequently absent during program implementation may benefit less from the program. Yet absenteeism in preschool is common because attendance is voluntary. In one PFS project, children had to attend the preschool program for a certain number of days to be included in the evaluation cohort. The financial model for the transaction also accounted for a 3 percent student mobility rate in elementary school, based on historical data. The evaluator was able to work with the state department of education to track children over time and obtain administrative data on student outcomes. As long as students were enrolled in a school somewhere in the state, they were included in the state's database. If they moved out of state, the evaluator had no way to locate them.

Technology Solutions to Facilitate Data Sharing

In addition to clarifying the kind of data required and where those data reside, it is important to determine the kind of data infrastructure needed to support the project. Data technologies are evolving rapidly and can now provide states, localities, and service providers with easy-to-use, easy-to-access, and cost-effective tools to access data across multiple systems. Many technology solutions provide an array of options, including data storage, data integration, visualization, and data analytics. Because the capabilities of these technologies vary, stakeholders should think broadly about what technology solution is a right fit their project.

States and counties considering a PFS project could assess their technology needs based on deal complexity, which comprises several factors (table 3).

TABLE 3

Characteristics of Pay for Success Deals That Can Inform Technology Needs

	DATA REQUIREMENTS	NUMBER OF JURISDICTIONS	NUMBER OF SYSTEMS	NUMBER OF SERVICE PROVIDERS
Low-complexity deal	Minimal (e.g., limited fields with quality data available)	One or two jurisdictions (e.g., a single county partner)	Limited (e.g., one county system and one state system)	One or two
High-complexity deal	Significant (e.g., many data fields required, and quality and integrity of data need to be addressed)	Multiple jurisdictions (e.g., statewide)	High (e.g., multiple county systems, multiple state agency systems, multiple service provider data systems, publicly available datasets)	Three or more

Along with deal complexity, stakeholders should determine how the data are going to be used. PFS projects give service providers and other stakeholders the opportunity to improve case management, enhance service delivery, estimate the impact of particular interventions, and evaluate interim outcomes throughout the life of the deal. The project's larger goals and complexity will shape the selection of technology.

Data technology needs change over the life of a PFS project. In the feasibility stage, the needs may be more oriented toward data storage infrastructure and a data integration capability that allows for the processing of multiple unique datasets. In some cases, data integration capabilities may provide a deduplication function. As the PFS deal progresses to project structuring, data needs will evolve to focus on measuring and tracking against the agreed outcomes. In that stage of the process, the data infrastructure will require additional functionality focused on real-time data analysis (advanced analytics) and visualization (such as dashboards or reports). All these functionalities are available in the business intelligence marketplace. Companies like Palantir, Tableau, Qlik, SAS, and Accenture offer capabilities that can be leveraged across the life cycle of a PFS project.

Lessons from the Field

Local governments, intermediaries, and evaluators engaging in PFS projects offered their accounts of how data are collected and used, and they made several recommendations to others considering similar transactions. Here we summarize three central points.

- Early on, bring together information technology professionals across agencies to figure out how data systems will be connected and to identify data limitations and security concerns and possible solutions. Data sharing goes significantly smoother and faster if everyone is at the table from the start. Engage technical staff who will need to fulfill data requests.

- Embrace the opportunity to get communities thinking about better collaboration around data. PFS projects encourage both governments and providers to be more data-driven and evidence-based. Although that process is complex, time consuming, and potentially costly, the long-term advantages of being able to track services delivered and participant outcomes over time may be well worth the up-front investment. Providers collect and use data for their internal purposes (planning, tracking performance, etc.) but they may not have access to government agencies' administrative data. Having access to outcome data can significantly improve program management (see toolkit report #5, *Project and Performance Management*).

- Choose providers that are willing to meet the vision of data-driven services and have the capacity to maintain data systems. Providers should use data for continuous quality improvement and adherence to program fidelity. A PFS project evaluation may be time-limited, but as long as the program continues to be implemented, the collection of program implementation data is valuable. In one project, providers submit certain data to evaluators (e.g., enrollment data to verify child eligibility), but these data do not document whether the program is adhering to high-quality standards, such as using an evidence-based curriculum and providing ongoing staff training and professional development. Stakeholders assume that if a program falls below required standards, then investors would pull out. However, if providers are not collecting data to monitor their own quality, there is no guarantee they are implementing the program as intended.

VIEW FROM THE FIELD

"What's been helpful, although it slows down the process, is [that] any time we're trying to access data to be able to loop in day-to-day data folks who work with databases and are administrators as well as their bosses who are reporting out data and thinking about [the] big picture. Having both of them in conversations helps you understand the process better than trying to do one at a time. It also helps you understand limitations of data requests a lot faster than you would have otherwise."

Conclusion

Data are used for multiple purposes throughout the development and implementation of a PFS project. The key considerations identified in this report and the checklist of questions can guide stakeholders in their efforts to obtain and use data. Subsequent toolkit reports will provide more detailed information on determining measures and costs, monitoring program implementation, and developing an evaluation design.