



CONSORTIUM FOR POLICY RESEARCH IN EDUCATION

# Pennsylvania's Early Childhood Data Systems: History, Uses & Opportunities

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## **Abstract**

This report provides a comprehensive summary of Pennsylvania's efforts to develop and integrate early childhood data systems. There is evidence that Pennsylvania's data systems have created efficiencies and cost savings, and have enabled quality improvements in ways that otherwise would not have been possible. Although progress has been made, PA is still developing strategies for data use and has many opportunities to leverage existing data to further inform strategic investments, drive program integrity, guide supports for early childhood professionals, and support program accountability. This report outlines the history, uses and opportunities for Pennsylvania after ten years of system work.

## **I. Pennsylvania's Early Childhood Data Systems**

Pennsylvania has received national acclaim for the scope and sophistication of its data systems<sup>1</sup>. The prominence of PA's data systems is the product of considerable effort and a culture which values and seeks to use evidence. The result of over ten years of continued system development and maintenance is a secure and highly unified early care and education (ECE) data system which supports management and reporting for PA's early childhood programs.

This report provides a survey of Pennsylvania's ECE data systems and their use by PA's early childhood agency, the Office of Child Development and Early Learning (OCDEL). There is evidence that Pennsylvania's data systems has created efficiencies and cost savings, and has enabled quality improvements in ways that otherwise would not have been possible. However, despite significant progress building data systems, PA is still developing strategies for data use and has many opportunities to leverage existing data to further inform strategic investments, drive program integrity, guide supports for early childhood professionals, and support program accountability.

### **History of System Development**

Efforts made toward the development of ECE data systems over the last ten years have been ambitious and productive, and have benefited from bold vision and good technical design from the outset. Pennsylvania's early childhood data systems are individually and collectively referred to as PELICAN – Pennsylvania's Enterprise to Link Information for

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<sup>1</sup> A 2010 survey of 50 states by the Early Childhood Data Collaborative identified Pennsylvania's PELICAN Early Learning Network (ELN) as the only state early childhood data system to capture all of the Data Quality Campaign's (DQC) 10 essential elements.

Children Across Networks. The initial launch of PELICAN (described in detail below) possessed a larger “enterprise” vision for data systems that is part of its acronymic name. Under the project management of the PA Department of Public Welfare’s Bureau of Information Services (DPW BIS), PELICAN adopted a Service Oriented Architecture (SOA). SOA’s focus on system integration and interoperability allowed the office to build a unified system on an expedited timeline and at a reduced cost. Sharing systems and data also minimized the duplication of data collection and storage. This report will document ways in which PA’s strategy also created challenges, such as the need to devote considerable resources to data integrity as systems were retrofitted for expanded purposes on rapid timelines.

Parallel to the PELICAN effort was a second track of work to develop systems that stored and provided access to the data (i.e. data warehouses, reports, dashboards, etc.). Just as with the PELICAN systems, DPW BIS advanced an enterprise vision and architecture for knowledge management. Over the last five years, OCDEL has made efforts to build according to BIS’s knowledge management strategy, but at a slower pace than the transactional data systems. Development of the enterprise data warehouse (EDW) and reporting tools has been slower and smaller in scope than the PELICAN work. In fact, not all of the PELICAN data are stored in the EDW, and some reside only in the front-end production systems which are difficult and expensive to access (e.g. the PELICAN system that supports PA’s tiered quality rating and improvement system (TQRIS), Keystone STARS, has developed a series of reports but has no data warehouse to provide full access on demand).

There is rising demand, in PA and nationally, for data to demonstrate that early childhood programs are benefiting children and families at a reasonable cost and that public investments are being used well. As the volume and sophistication of demands on early childhood data seems to increase each year, PA has devoted much of its recent system building efforts to modeling and reporting the collected data. Leadership within OCDEL has identified data use as an office priority and seeks advanced analytic tools and strategies to expand the use of PELICAN data for continuous quality improvement (CQI) at many levels of program operation. The goal of OCDEL’s data effort is to maximize the benefit of public programs, especially positive outcomes for children at risk.

## **PELICAN**

PELICAN is comprised of multiple systems which share services and information (i.e. PELICAN Certification, PELICAN Early Intervention, PELICAN Keys to Quality, etc.). Prior to 2007, the name used to identify the data system was Child Care Management Information System (CCMIS). As new systems were added, the office adopted the brand

name PELICAN to give one identity to what was to become multiple linked systems. Many of these systems now share physical infrastructures, common services, a data warehouse, and in terms of governance, one project team.

Established in 2007, OCDEL is jointly overseen by the Departments of Education (PDE) and Public Welfare (DPW). As a member of the executive teams of both the Secretary of Education and Secretary of Public Welfare, OCDEL's Deputy Secretary has provided a bridge between the two departments. Program governance has been a boon to data governance. The position and structure of OCDEL within PA's government not only coordinates policy and program operations, but also enables coordination of data systems.

When system development began in 2002, Pennsylvania's early childhood information systems were decentralized and relied on antiquated information technology (IT) and manual reporting with no real-time updates. The legacy systems had disparate practices which led to autonomous program management, limited controls, and service delivery barriers. The original intent to develop a single integrated system for all early childhood programs was to centralize program data and to allow administrators to effectively and systemically manage programs that serve children and their families. PELICAN is a highly integrated information system, linking data not only within OCDEL but also across governmental agencies within Pennsylvania. PELICAN shares ID services with the PA Departments of Education and Public Welfare to uniquely identify and track children, providers, and the workforce.

The overall PELICAN implementation strategy can be characterized as an incremental approach. The following section of this report provides an overview of each of the PELICAN systems and highlights significant milestones. It should be noted that ongoing system maintenance also corrected system defects, addressed data integrity issues, and made enhancements.

### **Provider Management**

Although at the time it was called CCMIS, PELICAN was born in 2002 with the launch of the Provider Management system. Provider Management is a centralized data management system and repository for child care providers in the commonwealth using a single provider ID. Provider Management began as a Resource and Referral (R&R) initiative, although creating a provider system was part of a strategy for future system development. This system included regulated (family, group and center child care facilities) and non-regulated (relative/neighbor) providers receiving subsidy payments through Child Care Works (CCW). By automating provider and R&R management, PA laid the foundation for a child enrollment data system. The strategy has been successful,

although the execution somewhat flawed, in that the original Provider Management system did not include all regulated providers, but rather only providers that received a subsidy for child care. This created gaps in population data and significant challenges for system integration, both of which have taken some time to resolve.

### **PELICAN Child Care Works**

PELICAN Child Care Works (CCW) was first launched in 2003 to connect the provider, funding source, and child in order to track enrollments. This was PA's first step in making a child care information system. The impetus for the data system was that the commonwealth was being threatened with legal action because of a decentralized waiting list for subsidized child care. PELICAN CCW provided a centralized system for waiting list management, enrollments, payments, funds management, and reporting. Eligibility was still being determined in a legacy system.

In 2006, PELICAN CCW was expanded to enable subsidized child care case management and eligibility determinations in an automated and standardized process. General correspondence and adverse actions were also added in this release.

Also in 2006, OCDEL began to develop data storage and reporting tools for PELICAN. The data warehouse for PELICAN CCW enabled enrollment, eligibility, provider, fiscal and performance reports. Subsequent maintenance releases added data from PELICAN to the data warehouse and increased the number of reports. The CCW Executive Dashboard containing key data and performance measures was created and implemented in 2007.

The new CCW case management system was enhanced in 2007 to incorporate all subsidized child care cases statewide. This made the local child care information services (CCIS) offices the sole payer for all subsidized child care statewide, which brought savings to the commonwealth (described below as an example of effective data use).

### **Client and Provider Self Service**

In 2008, PA's early childhood data systems became directly accessible to families and providers in a series of initiatives that linked PELICAN to existing statewide online services. Commonwealth of Pennsylvania Access to Social Services (COMPASS) is an online system for Pennsylvanians to access, apply, and renew a range of public services. The application process is much the same as filling out a paper application. Upon completion, the application is electronically submitted to the appropriate state agencies. COMPASS can be used by PA residents learn if they qualify, and then apply for health care coverage, cash assistance, the Supplemental Nutrition Assistance Program (i.e. Food Stamps), and other services.

In 2008, child care services were added to COMPASS by linking the online portal with the PELICAN provider database thus creating the early learning provider online search tool. This initiative expanded citizens' access to information for early learning programs. Regardless of their qualification for child care subsidy, parents could search for and access information about providers offering childcare services in their communities.

The early childhood provider search is an informational tool for parents when selecting quality early learning programs. Parents can search for providers by a wide variety of parameters, some of which include the age of child and geography (by zip code or distance from a given address).

The online search tool was further expanded in subsequent years to include all early learning programs and providers. The early learning program and provider tool allows for searching by a specific provider name, program type (i.e. Head Start, Pennsylvania Pre-K Counts, Keystone STARS, etc.), and quality rating. Upon obtaining search results, additional details are available about each provider or program and, in the instance of regulated child care providers, information about the provider's certificate. During the search tool expansion, Provider Management was enhanced to include many new provider and program types such as licensed nursery schools, Head Start, Early Head Start, and Early Intervention programs.

In 2008, OCDEL also developed Provider Self Service so that all providers could add and update their own information in the provider database. Previously, this data was managed exclusively by the state and the CCIS grantees. Provider attributes that can be self-managed include language(s) spoken, basic physical space, and many other details for which parents might search, such as if the facility was safe for nut allergies.

In 2011, additional detail was added for Online Provider Search, such as hours of operation, types of accommodations, and the availability of transportation. This information could be managed by providers through Provider Self Service. The expansion of Online Provider Search also modified the algorithm for returning search results by prioritizing the list by quality rating.

Also in 2011, Provider Self Service & Child Care Works were expanded to enable providers to manage their monthly subsidized child care attendance invoices electronically and to support regional staff review and approval/rejection of provider invoice updates. Previously, the only option to manage attendance data and subsidized child care provider invoices was through manual preparations and reviews.

### **PELICAN Provider Certification**

Not until 2008, did OCDEL develop the PELICAN Certification system to track child care certificate applications, inspections, certificates, violations and sanctions. This system manages all data collected on regulated child care by the state. Like implementation of other PELICANs, this project had systemic impacts. For one, Provider Management now received records of certified child care from the PELICAN Certification system. Prior to the PELICAN Certification, state staff entered data into PELICAN CCW Provider Management.

This new PELICAN system impacted the Client and Provider Self Service system. Through the Online Provider Search, individuals could view inspections, complaints, and certificates for all regulated providers. And, using Provider Self Service, current and prospective providers could submit renewal and/or new applications for regulated child care.

### **PELICAN Pennsylvania Pre-K Counts**

In 2007, PA implemented its first statewide pre-K program, Pennsylvania Pre-K Counts, and the state office needed a way to monitor fidelity to its rigorous program standards. A PELICAN system was developed to manage the program and respond to accountability standards that were part of the enacting law. This system also established a centralized repository for all 3-4 year-old children participating in the state prekindergarten program. A data warehouse was built for PELICAN Pennsylvania Pre-K Counts (PKC) for reporting a subset of data that was needed for program monitoring and annual reporting.

The development of this data system was significant in that it brought the first PDE program into PELICAN, which is a DPW information system. For the first time, the data systems and governance of PELICAN began to reflect the multi-departmental program governance inherent to OCDEL. PELICAN PKC was a driving force behind the expansion of Provider Management the following year (described above) to include a larger universe of providers, including eligible Head Start State Supplemental Assistance Program (HSSAP) providers, public schools, non-profit entities, and licensed nursery schools, most of which are overseen by PDE.

This system was also significant in that it greatly expanded the number and type of system users. For the first time, PELICAN systems were being accessed directly by service providers. In the past, the user base was limited to state employees and contractors (i.e. CCIS staff, pre-K specialists). PELICAN PKC required outreach, training, and ongoing supports.

System modifications for PELICAN PKC in 2011 have enabled OCDEL to use the same basic functionality for both the Pennsylvania Pre-K Counts program and the HSSAP. The most recent modifications will further expand the volume of data that is available for these programs through PELICAN Ad Hoc Reporting.

### **PELICAN Early Learning Network**

Beginning in 2009, data system development reflected a subtle but fundamental shift in the vision and purpose of PELICAN. Evident in PELICAN Keys to Quality (described below) and the PELICAN Early Learning Network (ELN) systems, these initiatives did more than enable operational efficiency, but possessed a greater ambition for quality improvement and accountability. PELICAN ELN is PA's early childhood accountability system. It was a significant PELICAN initiative because it provided the framework to look across all early childhood programs and services, and it focused on child outcomes.

The PELICAN ELN enables Pennsylvania to better understand the children served by providing a platform for collecting, tracking, and analyzing information about children, classrooms, staff, and providers across all program types (including state Pre-K, HSSAP, state infant/toddler programs, school-based Pre-K, Early Intervention, and child care providers that participate in the top tiers of the state TQRIS). PELICAN ELN reinforced consistency in data capturing across all PELICANs, and provided a common lens through a standard set of metrics with which to view a picture of the unduplicated population of children receiving services.

PELICAN ELN was developed as a modification and expansion of PELICAN PKC with new data, functionality, and system linkages. The implementation of PELICAN ELN made five significant changes: 1) expanded PELICAN PKC to track many new types of enrollments; 2) added new screens and data elements to PELICAN PKC; 3) assigned PA's K-12 student identification number (ID) (the unique student identifier used by PDE) to all children in the new system (i.e. made PELICAN part of the state longitudinal data system); 4) assigned PA's educator ID (the unique identifier for all individuals with or working towards PDE certification) to all early learning professionals in the new system in order to track workforce quality; and 5) created a tight link with an external child outcomes reported system (where child assessments were entered and then sent to PELICAN ELN). The PELICAN ELN implementation greatly expanded the population of PELICAN system users and required training and support for both the data system and child assessment. For more information about the PELICAN ELN goals and data elements please see the DQC report: ([http://www.dataqualitycampaign.org/resources/field\\_profiles/PA\\_Data\\_System](http://www.dataqualitycampaign.org/resources/field_profiles/PA_Data_System)).

In 2011, ELN was modified to greatly enhance data structures. In this release OCDEL strengthened the provider grant structure so PELICAN ELN could accurately model complex organizational structures in which a provider is responsible for all or some of the enrollments across multiple service locations based on separate or overlapping funding streams. This enhancement improved data integrity and enabled PELICAN users to access all of their relevant data with a single account.

The 2011 ELN modification release also enhanced the way that child enrollments were defined and entered into the system. This modification to enrollment structure allowed OCDEL to fully disaggregate enrollments and was designed so that OCDEL could at any time add, change, or remove enrollment parameters. A combination of modifications to the data structure of provider grants and child enrollments enabled OCDEL to tailor PELICAN ELN screens and drop-down menus based on a user's role and level of access.

The 2011 ELN modifications release included several other fixes and enhancements. A final noteworthy modification pertained to classroom structure. This modification was useful not only to more accurately identify classrooms and track enrollments, but also to link ELN classroom data with PA's QRIS PELICAN data system (described below) and with quality assessment data such as Environment Rating Scale (ERS) scores. Enhancements to PELICAN's data model were significant because they were necessary to establish a true relationship between quality and outcomes. The following year, in 2012, ELN was again enhanced to provide a mechanism to track enrollments in federal Head Start and Early Head Start. While ELN access was already available to Head Start grantees, few federal or early Head Start providers participated in the state data system because they maintained their data in various proprietary systems designed to help them meet federal reporting requirements. This initiative provided a mechanism for ELN to receive and manage basic child enrollment information from any external data systems (not limited to Head Start). This project paved the way to include all children served in Head Start programs to be assigned a unique identifier and be included in early childhood data systems and the State Longitudinal Data System. As a result of this successful project, federal Head Start data is uploaded to state systems, validated, cleared through ID assignment mechanisms, modeled, stored in the master repository, and reported alongside child data from other state data systems. Head Start grantees can voluntarily choose to use the upload feature.

Most recently, ELN was redesigned in 2012 to change the policies and technology around child assessment and reporting. The Early Learning Outcomes Reporting initiative was OCDEL's strategy to improve the process of capturing, managing, and reporting early childhood assessment information. OCDEL first developed a standards-

based reporting framework and worked with multiple assessment companies to map their child assessments to this common reporting tool. Significant effort was made to align and calibrate each of the assessments to a common metric. A one-way upload process was developed in PELICAN ELN to receive child outcomes in a standard data template from multiple approved assessment systems. Once processed, the outcome data is linked to the appropriate child enrollment. This initiative removed many of the technical challenges of the previous child reporting system and gave providers more choice in their selection of assessment tools.

### **PELICAN Enterprise Data Warehouse and State Longitudinal Data System**

Just as ELN was a new breed of PELICAN system, so was its strategy for knowledge management. Previously, PELICAN reporting solutions were developed to meet predefined requirements. Canned reports (SQL Server Management Studio), data cubes (Online Analytical Processing), and dashboards were developed based on known data needs. As OCDEL considered the use of PELICAN ELN, it was not possible to anticipate all of the information demands. OCDEL wanted a reporting solution that enabled full, dynamic, and secure access to data across systems in a way that could support office planning and evaluation with timely and actionable information. In 2010, OCDEL built real-time ad-hoc reporting and analytic tools for PELICAN ELN data. The ad hoc tool supported increased efficiency, flexibility, and capacity for responding to departmental, legislative, or right-to-know requests. No child names or personally identifiable information can be accessed with the tool.

In 2012, the ad hoc tool was linked to the PDE K-12 data warehouse, creating a functional state longitudinal data system (SLDS) for reporting. Using existing common student identifiers, the PA Departments of Education and Public Welfare built a virtual link between the PDE and DPW data warehouses. As part of this initiative, a new PELICAN report was created for individual early childhood providers. All providers who use PELICAN ELN were given access to an aggregate report of the average Grade 3 outcomes on state assessment for children whom they enrolled. Through the SLDS, it became possible to share with individual providers the long-term child outcomes, as compared to other children in their local district, county, and state. Additional information is included such as the rates of IEP by grade cohort. No individual children are identified and statistics for groups of fewer than ten children are masked. This initiative leverages the SLDS to provide specific longitudinal outcomes data to early childhood professionals, and with it the potential to drive local quality improvement toward the goal of school readiness.

Incrementally since 2010, additional data elements from the PELICAN systems have been added to the ad hoc reporting tool. At least several data elements from each PELICAN system are available for real-time analytics and reporting – including CCW, PKC/HS and Certification. Planning is underway to further expand the data elements to include Keys to Quality.

### **PELICAN Keys to Quality**

PELICAN Keys to Quality (KTQ) is OCDEL's data system for management of Pennsylvania's provider quality rating and improvement information. PELICAN KTQ enables OCDEL and its business partners to tracking information such as quality rating improvement system (QRIS) applications, STARS designations, renewals, use of grant funds, and provision of technical assistance. Prior to PELICAN KTQ, provider quality ratings were designated and tracked in a stand-alone database. PELICAN KTQ was implemented in a two-phase approach.

Phase One of the KTQ initiative in 2009 brought Keystone STARS ratings data into PELICAN. PELICAN KTQ was linked with PELICAN CCW, PELICAN Certification, and PELICAN PA PKC to ensure that the PELICAN application and its users always have the most up-to-date data on provider Keystone STARS ratings. The system also helped to standardize disparate practices among the regional contractors that managed QRIS operations.

Phase Two, in 2011, expanded PELICAN KTQ to include Technical Assistance (TA). Action plans tracked performance standards that were being targeted for improvement and additional TA that was received. No data warehouse has been developed for this PELICAN system.

### **PELICAN Early Intervention**

PELICAN Early Intervention (EI) is another example of PA bridging disparate systems. Prior to PELICAN EI, the early intervention (EI) data system was built on a platform used by PA DPW's Office of Developmental Programs (ODP). As PELICAN expanded, it became necessary to link data from EI. In 2009, the legacy EI system was overhauled to bring it into the PELICAN fleet for children birth to school age. The system includes automating the assessment, service plan, and financial management. It is a single system for infant/toddler & preschool, Part B 619 and Part C. As part of subsequent modifications, system links were built for the Infant/Toddler population, thus tying PELICAN EI to the Provider Reimbursement and Operations Management Information System (PROMISE) to automate payment processing.

A PELICAN EI data warehouse was created along with the system implementation – as was PELICAN EI Ad Hoc Reporting. PELICAN EI Ad Hoc reporting is separate and distinct from PELICAN Ad Hoc Reporting in that the EI user population includes OCDEL headquarters staff as well as contracted EI program staff. In addition, PELICAN EI Ad Hoc Reporting is linked with PELICAN Ad Hoc Reporting – of which only OCDEL headquarters staff are users.

### **PELICAN data security**

Personally identifiable information contained in PELICAN is delinked from service and outcome data so it remains confidential. Information in the data warehouse (DW) cannot be used to identify an individual child or family, and is not shared with outside entities. Data in the early childhood systems is protected by the same security protocols as other programs in the commonwealth such as Medical Assistance and Income Maintenance. These protocols require secure and encrypted servers that are tested for vulnerabilities, unique user names with strong passwords, and different user roles that are assigned specific security levels and access. In addition, publicly released data is only reported at an aggregate level, with masked counts below 10, so that families and children can never be recognized.

PELICAN provides user access through a federated security model in which users access is based on role and location. User provisioning limits the viewable data (records and fields of a record) to only that which is appropriate. For example, in PELICAN PKC/HS and PELICAN ELN, teachers see classes, directors see classes in location, and grantees see only children across multiple locations funded through a specific grant. Security is built into the account request process, which requires signed user request forms and signed a management directive explaining the terms of system access and use.

State employees are restricted from having access to personally identifiable information in the EDW. For example, the identities (child name, core child demographics, parent name, address) of ELN children are not visible in DW or reports. This ensures that data cannot be accessed by anyone involved with program management or operations. OCDEL manages back-end services using third party contactors who access individual data under contracts that specify usage agreements.

### **Other state data systems**

Although much of Pennsylvania's early childhood data systems are highly integrated, there remain some stand-alone data systems as well as off-line data collection efforts.

### **Pennsylvania Quality Assurance System**

Pennsylvania maintains a separate data system to manage workforce quality and training

data for its QRIS and Pre-K programs. The Pennsylvania Quality Assurance System (PQAS) is PA's early childhood workforce data system and is comprised of three registries: an instructor registry, a professional development registry, and a workforce registry. The instructor registry is a listing of PQAS-approved instructors. This system allows PA to assure that training opportunities are high-quality and aligned with Pennsylvania's *Early Childhood Core Body of Knowledge*. The professional development (PD) registry tracks training opportunities offered by instructors approved through the PQAS. Individual educators use the PD registry to identify and register for training events in a searchable calendar while instructors use it to verify attendance and award credit to early learning staff. The third, workforce registry, enables early learning staff to create a user profile and maintain a personal PD history. Pennsylvania's workforce registry is currently voluntary and accessible to anyone, including early childhood staff at all early learning and child care providers, early intervention, state and regional partners, and school districts. The workforce registry receives regular data extracts containing a list of providers from PELICAN. Provider data is linked to staff records and directors are able to monitor the PD credits of their staff. Currently the biggest limitation to PQAS is the voluntary nature of the workforce registry. As a result, PA does not have real-time information about the size and quality of the ECE workforce.

Pennsylvania is currently enhancing the PQAS system to improve accountability, offer online training opportunities, and provide enhanced reporting features. With these modifications, PA's goal is to implement policy changes requiring all staff at regulated child-care facilities to participate in the registry. The system will enhance accountability by highlighting required trainings for child care staff. Through a new online learning management system (LMS), staff can access a suite of online trainings. New reporting from PQAS and real-time LMS access for OCDEL staff and business partners will also streamline verification of training for child care licensing and QRIS designations.

### **Environment Rating Scale**

Comprehensive assessment of quality is an important component of Pennsylvania's QRIS and Pre-K programs. PA uses the Environment Rating Scale (ERS) outcome data to regularly assess the quality of early learning and care environments. Bi-annual assessments by reliable raters are conducted in all facilities that are participating in Pennsylvania Pre-K Counts, and the top two levels of the state QRIS. ERS data management is provided by the Branagh Information Group (BIG). The BIG system provides a paperless portal for assessors to enter data and automatically produce scores that are reported to providers and the state. The BIG system has given PA flexibility and control over the ERS data, however, it is not linked to PELICAN. The 2011 ELN modification enhanced classroom structures so that the underlying data model could

support direct linkage of ERS data to classrooms in PELICAN ELN and KTQ. Maximizing use of ERS data for operational efficiency and quality improvement remains an opportunity (see below).

### **SMART data system for designator reliability**

QRIS ratings (i.e. STAR levels) are designated by regional state contractors. In an effort to standardize and ensure the reliability of the STAR designations, OCDEL developed a reliability protocol, and in 2011, built a stand-alone database to manage the project. (See *Demonstrating Quality: 2011 Keystone STARS Evaluation Report* for a description of the Keystone STARS designator reliability project.) The data system allows multiple independent STAR designations to be entered and tracks detailed information for each performance standard, such as the extent to which the provider demonstrates good, better, or best practice. In 2012, the designator reliability database was renamed SMART when was expanded to capture additional data such as pre-designation assessment. OCDEL intends to use this system to track all QRIS quality pre-designations and designations. This system will allow OCDEL to better assess providers' experience of preparing for a quality designation and understand the challenges to quality improvement.

### **Home visiting data system**

States that received home visiting grants through the Affordable Care Act's Maternal Infant and Early Childhood Home Visiting (MIECHV) initiative are required to annually report progress toward certain benchmarks. Federal reporting requirements under this program have necessitated Pennsylvania to discontinue plans for tracking basic enrollment data in PELICAN and develop a separate data system.

In the past, home visiting data under various models (i.e. Nurse Family Partnership (NFP), Parent Child Home Program (PCHP), and Early Head Start) was managed separately by each program across fragmented systems, resulting in nonstandard data definitions. Each of the systems had quality concerns and often relied on intense manual data collection processes. Pennsylvania had planned to continue using the multiple proprietary data systems and annually bring basic child and enrollment information into PELICAN using the Head Start upload mechanism (described above). Federal reporting requirements under ACA MIECHV required a more robust data collection and management strategy. OCDEL is currently working with a vendor to develop a stand-alone home visiting case management data system.

### **Offline data collections**

OCDEL also maintains several ongoing large data collection efforts, such as the child care market rate survey and an annual family survey, both of which are maintained as stand-

alone data files. For example, PA offers Early Childhood Mental Health (ECMH) services to child-care and early learning providers upon request. ECMH activities are recorded in spreadsheets, including the quantity and type of assistance provided. OCDEL also conducts a system-wide annual family survey which is mailed to all parents/guardians of children enrolled in Pennsylvania Pre-K Counts, State Head Start, a STARS 3 or 4 facility, early intervention infant/toddler, early intervention preschool, Home Visiting programs (NFP, PCHP), and a sample of Child Care Works. Surveys are confidential but not anonymous; survey responses are linked to enrollment records. The survey is used to track parent satisfaction for state programs and feedback to local agencies. OCDEL has identified these offline data collections as potential candidates for future PELICAN system development.

### **The data systems runway**

Currently, no major PELICAN initiatives are planned. As part of OCDEL's long-term sustainability strategy, effort will focus on system stability and data quality. The hiatus in data system development is due in part to a new DPW IT vendor for PELICAN project management, business requirements, user acceptance testing, and implementation support. Development inaction is also due in part to passage of Act 24 (HB No. 1411 Session of 2011) which was signed into law on June 30, 2011. The law establishes a moratorium on the collection of certain data in PELICAN and the Pennsylvania Information Management System (PIMS) for the school years 2011-2012 and 2012-2013. By law, no data can be collected by these systems unless it is required by federal or state law, or is necessary for payments by the commonwealth. The HB passed with amendment to provide additional allowance for data collection necessary to meet eligibility requirements for federal funds. Act 24 illustrates a significant lesson to be learned from Pennsylvania's experience. Legislative oversight is needed and will strengthen the state's development and use of data systems by giving direction and a mandate for collection efforts. Ultimately, FERPA was not the issue which limited data system development and use, but direction from the legislature which has shifted PELICAN systems away from extensive data collection.

OCDEL has identified several new initiatives it would like to accomplish over the next three to five years. OCDEL has proposed expanding PELICAN to include scheduling and mobile productivity tools for mobile service providers. Since many direct service providers spend the majority of their time providing home and community based services away from their office, the ability to easily access information while away from their computer will greatly improve their ability to respond to changing demands and improve their utilization of hours spent serving children. Other projects include enhanced usability changes for PELICAN Provider Self Service, usability and quality

improvements for PELICAN EI as well as a coding upgrade for PELICAN CCW that will include enhancements for provider self-reporting of private pay (market) rates and annual closures.

In the interest of greater transparency and accountability, OCDEL has also proposed a series of data reporting tools for providers and the public. A provider scorecard and community dashboard would provide secure dynamic access to detailed information about the inputs and outcomes that associated with local facilities and geographies.

## **II. Survey of OCDEL's current data use**

Currently, OCDEL is using data for many purposes. Opportunities remain for the office to improve its management of information and the integration of data into daily operations. Pennsylvania is, in many ways, uniquely positioned to leverage existing data in the state early childhood and longitudinal data systems to answer a broad range of exploratory and evaluative questions about state programs that serve children ages zero to five. Given the progress that PA has made in developing data systems, there are several notable examples of highly effective data use which OCDEL has employed.

### **Cost saving through system automation and unification**

In 2007, OCDEL integrated and automated child care subsidy eligibility in an initiative referred to as *unification*. The Office of Income Maintenance (OIM) is the DPW office that determines eligibility for SNAP and TANF. Eligibility for either of these two programs is a potential determinant of eligibility for child care subsidy. Links were built to PELICAN and OIM's Client Information System (CIS) that facilitated the automatic bidirectional data transfer between OCDEL and OIM systems. This created operational efficiency and cost savings as local CCIS offices began receiving real time notification from County Assistance Offices of client eligibility for child care from OIM. CCIS offices (the local R&R agencies) then worked with the eligible family from OIM to locate subsidized child care services. The CCISs then created the subsidized child care enrollments and process monthly payments to providers. Payment details are then shared with CIS. This "unification" of services allowed for a single, fully-coordinated, child care subsidy and resource and referral system. Unification increased accountability for public dollars due to payments being processed to the provider rather than the parent, and the creation of a more integrated, computerized system to better manage funds and waiting lists.

The unification initiative made the CCIS offices the sole payer to all child care providers, which brought savings to the commonwealth and one-stop shopping for parents seeking child care. In the first year of unification, \$42 million of subsidized child care was saved

because TANF recipients did not show up for the child care benefit redetermination. Unification also resulted in more children attending high-quality child care programs due to the high-quality referral system. System integration and real time use of data brought immediate and continued cost savings.

### **Making strategic investments using the Reach and Risk Report**

Funding for early childhood programming in PA (e.g. Pennsylvania Pre-K Counts, state-run Early Head Start, and Pennsylvania's pilot infant-toddler program) is allocated through an open and competitive grant process. Without accurate geographic data, PA runs the risk of saturating certain communities with early childhood programs and leaving others underserved. It is also difficult to target program improvement investments without the ability to assess how multiple quality services are distributed throughout the commonwealth. Since 2008, OCDEL has analyzed and reported community risk factors and children served across all commonwealth programs for children up to age five. This has allowed PA to monitor and reallocate service dollars to equitably maximize the number of eligible children served in high quality settings. Indeed, PELICAN was originally developed out of the recognition that in order to maximize the impact of public resources on outcomes for children, families, and communities, OCDEL must continue to evaluate the needs of communities, monitor program quality and child outcomes, and have the necessary information to plan for future investments, while ensuring that current investments are used properly.

Pennsylvania has developed a data report used to inform strategic investments, the Office of Child Development and Early Learning Program Reach and Risk Assessment (a.k.a Reach and Risk), to understand where children with multiple risk factors reside and how the commonwealth can allocate new and existing resources to better reach those communities. PA relies on this data tool to consider communities' needs and existing supply of programs when evaluating grant proposals for Pre-K and other early childhood programs. For example, when expanding Early Head Start programs, this report helped PA target program funds to high-risk and underserved communities. Because the report also includes the number and percent of children served by age group (I/T, preschool, school-age), only grant applications which proposed services in communities that were high-needs, low-reach for children zero to three were considered for the roll-out of the program.

Data is also disaggregated to show Risk Profiles at the community level. The ability to apply a different lens to the data enables local and regional partners to work together and make more effective program and policy decisions, such as where to target program funds.

### **Local use of the Longitudinal Data System**

PELICAN was the first project data reporting tool to bridge multiple Departments. As has been described above, using clearance and validation services to assign unique identifiers to children in multiple systems, a virtual bridge was developed in 2011 to link early childhood education (Department of Public Welfare) and K-12 (Department of Education) data warehouses. In the first two years of operation, over 250,000 children ages birth to five were made part of the longitudinal data system.

Several reporting solutions were built using the SLDS bridge including state and provider reports. A longitudinal child outcomes report was developed in PELICAN so that all ECE providers that enter child enrollments would have secure on-demand access to an aggregate report containing K-3 outcomes for children who they served. Without revealing child names, the report presents the child outcomes by year cohort (i.e. children entering K in 2012), as well as the same outcomes of the other children in their local school district, county, and the state. Providers are able to see how their own children are doing when they enter Kindergarten through third grade in terms of academic performance by domain as well as IEP rates, compared to their peers (Kindergarten assessment data is not yet available). The outcomes for comparing children are further broken out by those children who are eligible for lunch assistance. This initiative leverages the SLDS to provide longitudinal outcomes that are useful for individual technical assistance to early learning providers.

### **Driving program integrity through data audits**

Pennsylvania is continuously striving to maintain the integrity of ECE programs and fidelity to program standards. A major component of assuring program integrity is the consistent application of policies and business practices. PELICAN systems are being used to track certain program operations through standardized data collection protocols. For example, OCDEL monitors the state residency and income eligibility requirements, for all children enrolled in Pennsylvania Pre-K Counts. OCDEL also monitors classrooms to ensure that the primary staff person has the requisite qualifications and safety clearances at all times. Also, child care facilities participating Pennsylvania Pre-K Counts must be rated STAR 3 or higher. If at any time requirements such as these or others are not met, the state office receives an alert.

Another way in which OCDEL has used data to drive program integrity is through reduction or elimination of waste. Through audits to the PELICAN data warehouses, OCDEL is able to identify patterns of data that warrant further inquiry, such as potential improper payments for subsidized child care. Scheduled data queries also alert the state to improper duplication of services such as full-time participation in both child care

subsidy and Pennsylvania Pre-K Counts programs. OCDEL reports that several cases of improper duplication of services are identified regularly and the state has acted quickly to eliminate and recoup duplicate payments. Using both proprietary auditing systems, and simple in-house data queries, OCDEL is using administrative data to accomplish a range of audits to monitor compliance and reduce waste.

Finally, data audits support program integrity by improving the accuracy of information. OCDEL conducts regular system checks for invalid data (e.g. child location association without enrollment record, illogical order of enrollment start/end dates, etc.), missing data (e.g. child enrollments with no associated primary staff or classroom, etc.), and inaccurate data (e.g. incorrect STARS level and effective date). Findings of these data hygiene audits often require troubleshooting with end users and system managers.

By monitoring adherence to program requirements, searching for waste and abuse, and auditing for data quality, PA is using data in a variety of ways to drive program integrity.

### **Reliability of quality designations**

Pennsylvania has implemented a data collection protocol to track reliability of the state TQRIS quality ratings. Designator Reliability Visits are conducted regularly to ensure consistency when determining whether providers are meeting TQRIS Performance Standards. Two designators independently complete the designation of a provider and submit detailed findings to the state. The results are compared to determine reliability and assist in determining if there are standards that need to be better clarified, if any component of the designation process needs to be better defined, or if additional training or support is required for designators. By attending to the reliability of quality ratings, PA has used data to greatly strengthen the integrity of the quality rating program, and provide evidence of the reliability of quality ratings.

### **Guiding supports for technical assistance**

OCDEL data systems were principally developed to effectively and efficiently manage program operations and complete mandatory reporting. OCDEL's interest in using data for continuous quality improvement (CQI) has been limited at times because the systems' elements and protocols for data collection were not always designed for that purpose. In practice, state supports to early care and education programs, such as training and technical assistance, is often generic and not aligned with specific program needs. While local providers are encouraged to engage in CQI, OCDEL itself struggles with generating timely information to guide supports. In one example of an effective strategy to leverage existing data to guide TA, OCDEL regularly analyzes violations for regulated child care. Trends are disaggregated by type of inspection and region. These reports are used to make revisions to the orientation sessions for prospective child care

operators. From this annual report, violations that are of greatest concern are targeted in professional development and training for the upcoming year. In 2012, OCDEL's targeted training focused on safety-related items including minimum health and safety standards and further detail on the process for verifying staff clearances.

### **Financial modeling gives confidence to major improvements**

In 2012 OCDEL launched Rising STARS, a new funding structure for tiered reimbursements to Keystone STARS providers. This initiative directed more resources to higher-level providers and gave those providers more flexibility in spending those resources by channeling money into subsidized child care reimbursements instead of targeted grants. OCDEL sees this as a major structural improvement to the program with long-term political and programmatic benefits.

Data was critical in launching Rising STARS because OCDEL could not have moved forward without confidence that changes to the reimbursement schedule would be neutral to total cost and waiting list volume. Using real data, OCDEL built a financial model that was used as a rate-setting tool to explore the impacts of variable- or fixed-base rates, various tiered rates, and eligibility requirements on the number of children served, projected cost, and waiting lists. The planning team then predicted annual encumbrances of various scenarios based on the number of current providers at each level and the number of subsidized children that each provider location. Within a fixed payout pool, either the volume of children must be flexible, the amounts of subsidies at various tiers, or both. OCDEL was able to carefully consider the impacts of various options as it set base and tiered rates.

### **III. Opportunities to use and improve data systems**

OCDEL has demonstrated progress in building state data systems and effectively using data for state and local decision-making. Without PELICAN, OCDEL could not maintain the strong program management, accountability, and monitoring that occurs today. Yet, PA is still developing strategies for data use. Based on overview of OCDEL data systems and data sources, this report next identifies several opportunities for data use and several recommendations for data system development and/or modifications.

#### **Pennsylvania's kindergarten entry inventory**

In 2011, Pennsylvania developed a kindergarten entry inventory (hereafter referred to as PA-KEI) and has since completed two rounds of piloting. PA-KEI is a standards-based outcomes reporting framework which allows teachers to use structured observations over several weeks as a means of discerning the developmental stage of each student in key learning areas. Each indicator is defined by a set of observable skills and behaviors and aligned with Common Core State Standards (CCSS) in English Language Arts (ELA) and mathematics. Preliminary analysis of pilot data suggests that PA-KEI is an internally reliable tool for collecting a snapshot of children's skills and abilities across a range of cognitive and non-cognitive domains. OCDEL is planning a necessary final pilot to finalize a scalable teacher-training model that yields reliable outcome data.

Central to the mission of PA's ECE data system is the desire to assess whether children are on track to succeed when they enter school and beyond. There are many state and local uses for measuring kindergarten readiness; OCDEL should report this information statewide by district. However, PA is currently unable to provide this information to policymakers, districts, and the public because a) the tool is not fully implemented, and b) there is no process to compile and analyze PA-KEI data. OCDEL should prioritize the development of data systems to securely collect, manage, and report this data. Once linked to PELICAN, this data could be incorporated into existing reports for ECE providers. OCDEL should also consider using PA-KEI as a key outcome to be used in evaluating early childhood programs and services.

#### **Program evaluation using the SLDS**

Although child outcomes at Kindergarten entry provide an ideal opportunity to examine the effectiveness of state programs, OCDEL already has many opportunities to conduct program evaluation using the SLDS. PELICAN ELN captures detailed data about enrollments and classroom and is linked with K-3 student records. OCDEL can utilize existing longitudinal datasets for descriptive analysis and quasi-experimental evaluation research. Specifically, OCDEL has rich data on indicators of provider and classroom

quality that are thought to moderate variation in the impacts of early learning experiences, and findings might suggest under what circumstances effective programs show the greatest impacts.

One important consideration in the use of longitudinal data for the evaluation of early childhood programs is the timeline for rollout of programs and their accompanying data systems. The following table provides the school year of first data collection for OCDEL programs, and the year in which children in the first cohort will reach Grade 3.

Table 1: OCDEL Program data collection by School year

	Program	Child Outcomes	First/All first cohort reach Gr 3
02-03	Child Care Subsidy	No	N/A
07-08	Pennsylvania Pre-K Counts	Yes	2014/2015
09-10	State Head Start	Yes	2014/2015
09-10	School-based Pre-K	Yes	2014/2015
09-10	High Quality Child Care	Yes	2013/2018
09-10	EI Part B	Yes	2015/2018
09-10	EI Part C	Yes	2013/2018
11-12	Federal Head Start	No	2014/2015
11-12	Home Visiting	No	2015/2018

Note: Based on the age of the children served, the dates provided in the right column display the years the oldest/youngest children served in each program reach Grade 3 and take the first end-of-year state assessment. Child Care Subsidy children are not routinely assigned the school ID used to link student records in the longitudinal system.

PELICAN systems will continue to track child enrollments and outcomes providing OCDEL the ability to understand how financial resource levels relate to child outcomes and to evaluate the components of effective early education programs in relation to school readiness and long-term academic achievement.

### **Assign PASID to all OCDEL program enrollments**

The PA Secure ID (PASID) is a ten-digit number generated by the PA Department of Education for each student. The PASID is unique to each student and protects the confidentiality of individual students. The PASID is used by OCDEL to produce an unduplicated count of children served through early childhood programs and services. The SLDS also uses the PASID to link student records across DPW and PDE systems. This important ID is assigned by the PDE system through a link with PELICAN ELN. Because not all program enrollments are captured in PELICAN ELN (e.g. home visiting and child care subsidy recipients), there is a gap in OCDEL's ability to use this ID to longitudinally count and track all children enrolled in early care and education programs.

In 2011, OCDEL developed a system upload into ELN that can receive child record data including basic child demographics and enrollment data from external systems. Although the project was focused initially on federal Head Start providers, this project paved the way to include all children served by any external programs in OCDEL reporting tools, such as the SLDS. As a result of this project, OCDEL can receive records of child enrollments, assign PASIDs, and use this data in statewide reporting alongside other PELICAN data. OCDEL should prioritize the assignment of the PASID to all children served, including historic records of child care subsidy recipients. These data will then be available for unduplicated counting and longitudinal analysis.

#### **Fully implement and analyze SMART database**

The SMART database was previously described as one of OCDEL's stand-alone systems. OCDEL should immediately make use of this data to understand how long it takes a provider to successfully complete a designation and the barriers encountered along the way. It is also important to emphasize the quality and completeness of this data. STARS designators are required to enter all designations and complete reliability visits every twenty designations. Although the system was unavailable during months of system maintenance in the beginning of 2013, the SMART is again online and designators should comply with data entry requirements. Additionally, this database will be critical to validating the TQRIS system and evaluating its effectiveness in improving provider quality and child outcomes.

#### **Maximize use of quality assessment data**

PA has made the collection and review of Environment Rating Scale (ERS) scores an important performance standard when designating quality. Direct assessment of classroom quality is useful to designate TQRIS levels and to validate other quality performance standards. Locally, ERS scores are analyzed by providers and specialists to identify areas for additional support and TA as part of their continuous quality improvement efforts. The state has yet to leverage this rich data source to explore trends and correlates of classroom quality. Moreover, ERS assessors collect much of the same location and classroom data that providers must submit through PELICAN. Because BIG and PELICAN are not linked, ERS assessors spend much of the directors' and their own time in duplicative data collection. OCDEL should explore opportunities to eliminate redundant data collection by providing ERS assessors with ad hoc PELICAN reports of relevant location and classroom data to verify during on-site visits. This will reduce the workload of field assessors and potentially improve data quality by reviewing its accuracy and completeness on-site. OCDEL should also explore opportunities to maximize the use of ERS data to explore trends and correlates of classroom quality to

better understand how environmental factors mediate the relationship between services and child outcomes.

### **PELICAN ad hoc**

OCDEL has diligently sought opportunities to utilize data and evidence for policy and decision-making. Opportunities are created through the development of advanced data reporting and analysis tools to support increased efficiency, flexibility, and capacity for responding to departmental, legislative, or right-to-know questions and requests. State administrators and program directors must be able to access data reports for the classroom, provider location, and legal entity, all of which document child performance.

In 2010, OCDEL developed an ad hoc reporting tool to enhance its capacity and flexibility to access data. This initiative transitioned the office from relying exclusively on canned SQL Server Management Studio (SSMS) reports and Online Analytical Processing (OLAP) cubes to making use of more advanced reporting solutions. The ad hoc approach OCDEL initially focused on PELICAN ELN; however, OCDEL has incrementally integrated data from other PELICAN systems. As has been discussed, it has already been a useful tool to assure data quality, explore emergent data trends, and yield timely and actionable information.

Flexible reporting solutions are critical because it is not possible to anticipate all of the demands for data. Reporting and data requirements often change or evolve. Targets shift and are frequently redefined as priorities change and new information is brought to light. To align data solutions with this reality, OCDEL should continue to shift from the practice of pre-defined reports based on static requirements, and embrace reporting models that enable dynamic analysis across systems, such as through ad hoc tools.

PELICAN ad hoc expansion should ultimately include the majority of PELICAN data but priority for expansion should be key outputs from the PELICAN Keys to Quality and Child Care Works systems. Eventually, the solution should also incorporate the family survey, which could be used to create provider scorecards for parents when selecting a provider.

### **Data on ECE Workforce**

As previously discussed, PELICAN ELN captures some information about educator/caregiver (hereafter referred to as staff) qualifications. Qualifications include educational attainment, certifications, licenses and years of experience. Professional development credits are also tracked annually. Unfortunately, OCDEL has observed that staff qualifications are typically entered once into PELICAN ELN and are not maintained. One reason for this is that PELICAN ELN users are typically provider administrators and

staff cannot access their profiles. Also, most data elements are self-reported and not currently verified within the registry. ECE workforce data remains the largest and most pressing gap in PA's data collection.

Several additional modifications and enhancements are recommended for PQAS with system links to PELICAN. Current gaps in the professional development registry include an assessment of early educators' learning in both online and face-to-face professional development, a comprehensive evaluation of PD instructors, and the ability to aggregate and analyze comprehensive data to make informed decisions about future PD offerings that focus on high-need populations. OCDEL needs to enhance the workforce registry to track all qualifications and PD in a way that is portable and offers staff direct access to their own records. Also, OCDEL should link to other existing early learning data systems in which child assessment and program level data is collected including STARS level, ERS scores, and amount and type of TA received.

Finally, OCDEL needs to prioritize development of an online learning management system to consolidate PD initiatives on a scalable web-based platform. By adding an LMS for all early childhood staff, OCDEL will be better positioned to examine early educator workforce data, including assessment of early educators' learning, movement along the Career Lattice, retention in the field, and core body of knowledge (CBK) self-assessments. Ultimately, this proposed initiative is intended to guide PD planning and continuous program improvement at individual, program, regional, and state levels, and to drive staff quality and improved child outcomes for high need populations.

### **Data quality assurance**

Assignment and maintenance of unique identifiers is a tent post of PELICAN systems. Without strong child, staff, and provider identifiers, OCDEL cannot accurately report core metrics such as the volumes of providers, workforce, and children served. OCDEL has, for many years, devoted considerable effort to establishing the integrity of these unique identifiers. Because it utilizes services within DPW and PDE, OCDEL is not able to modify the algorithms and processes used for assigning the unique identifiers. While there remain some lingering quality issues with PPID (staff ID assigned by PDE) and MPI (provider ID assigned by DPW), the most significant concern for ID integrity is for DPW's Master Client Index (MCI). Duplicate and incorrect data have caused quality issues in PELICAN systems. OCDEL should continue to push DPW BIS for a MCI merge tool that would facilitate cleanup. This initiative has been put on hold and MCI duplicates increase.

Currently there are a few hundred staff with discrepant name or core demographic data in the PPID system. MCI data problems, however, are on a scale that is much larger. As

the state collects more enrollment data and continues to invest in system integration, it will become increasingly difficult to address duplicate MCIs. Moreover, as PA builds new data reporting solutions, missing and erroneous data will lead to inaccurate reporting which undermines the usefulness of any data tool.

#### **Data systems and road forward**

States have common goals but different starting positions. There is no single road map nor set of MOUs that will lead states to implement expansive, integrated, and longitudinal data systems that are useful for program management and quality improvement. States know their strengths and weaknesses; PA has thoughtfully developed their data systems in a way that built on its strengths.