OKLAHOMA STATE DEPARTMENT OF HEALTH (OSDH)

Systems Tactical Plan

Version 2.0

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1 EXECUTIVE SUMMARY

This Systems Tactical Plan describes how Oklahoma Health Care Authority (OHCA) integration tools and services could be used by Oklahoma State Department of Health (OSDH) to further agency and system interoperability, and the timeline for implementation. If both agencies indicate a willingness to collaborate on this integration project and desire to move forward, the detailed information in this document, such as the cost analysis and scenarios, will serve as the basis for writing an Advance Planning Document (APD) requesting enhanced funding for the selected option. Leveraging Health Information Technology (HIT) assets is cost-efficient for both organizations and would ensure all technologies are interoperable through the Open Health Information Organization (HIO) operated by OHCA.

1.1 Purpose of Assessment

The OSDH is currently in the process of redesigning its Immunization Registry, scheduled for completion by December 31, 2011. The plan is for eligible providers to submit Stage 1 Meaningful Use public health information to the OSDH new Structured Query Language (SQL) database using OHCA OpenHIO as well as to obtain bi-directional access to the Immunization Registry through OpenHIO. OHCA will implement several tools through its Medicaid Management Information System (MMIS) re-procurement that may be leveraged to enable interoperability between the state agencies. Tools available include: BizTalk, Apleon, and VisionWare. The OHCA will have two additional tools, Initiate and dbMotion, available when OpenHIO is implemented.

Three issues were identified as drivers to this project:

1. The OSDH needs interoperability between its internal systems, an Enterprise Master Patient Index (EMPI), and a syntactic transport mechanism to exchange information in Continuity of Care Document (CCD) format. OSDH also needs the capability for external bi-directional exchange of information for the state's immunization registry as well as other health information registries (e.g., vital statistics, cervical and breast cancer, lead, newborn screening) with providers throughout the State and the OHCA for treatment, payment and health care operations (TPO), including care coordination of SoonerCare participants. These capabilities are necessary to achieve Stage 2 Meaningful Use Public Health requirements at 42 CFR §495.332(b) (2).
2. The OSDH has issued a Request for Information (RFI) for purposes of collecting information on what products and systems are available within the market. The OSDH is also interested in understanding the most efficient or economical way of integrating its systems using emerging technologies such as Service Oriented Architecture (SOA)
3. There is a lack of funding to support necessary changes to enable the OSDH to be fully engaged in the National Strategic Plan for health care transformation and to promote improved population health for all Oklahomans. The CDC funding approach has created independent systems for the same program in many states, and funding is often limited to implementation and for a few post implementation years before the entire cost is shifted back to the state.

The OSDH is currently assessing its internal databases and systems for key characteristics such as data matching elements (e.g., unique identification numbers (IDs), code sets utilized) and system platforms to determine work effort needed to exchange information through shared services between its 18 internal databases and electronic processes.

Working in collaboration, OHCA and OSDH could leverage HIT assets and request federal funding for integration tools through the Centers for Medicare and Medicaid Services (CMS). Currently, CMS is approving 90% federal share for interagency projects that build the infrastructure to support health information exchange (HIE)[1]. This approach would promote interoperability between OHCA and OSDH and assist eligible professionals and hospitals by providing at least one mechanism for aiding providers in achieving Stage 1 Meaningful Use; thereby furthering the pursuit of initiatives that encourage the adoption of certified Electronic Health Record (EHR) technology for the promotion of health care quality and the electronic exchange of health information.

1.2 Process and Methodology for Conducting Assessment

OHCA and OSDH requested that Cognosante conduct an internal assessment of the OSDH HIT environment and develop a Tactical Plan with HIT Roadmap and timeline to move from the current IT state to the future vision. Information gathering was done primarily through in person interviews at OSDH. The Cognosante team interviewed key OSDH personnel associated with each of the systems/data stores of interest, which ultimately covered 18 systems and one process for electronic billing which impacted multiple systems. Several key OSDH personnel, such as the project director and IT support also attended many of the meetings, as did a representative from OHCA Information Services.

The interviews were conducted in 2-4 hour sessions over 4 weeks using a short questionnaire designed to capture essential characteristics of the system, business processes supported by the system, data received by and exchanged from the system, privacy restrictions on the data, and any interfaces with the system. High level data flow/system interface diagrams were also captured as part of the process. Notes and flow charts from each interview were developed and sent to OSDH for review and revision. The information gathered in these interviews (Appendix A) was used to document the current “As Is” OSDH systems environment and develop feasible options to leverage the OHCA tools and software to help achieve electronic exchange and meaningful use capabilities.

Two additional facilitated meetings were held to gather information to build a HIT vision (or “To Be”) for OSDH that would frame the options OSDH might pursue in furthering their capability towards electronic exchange. One meeting was with Julie Cox-Kain, the OSDH Interim Chief Operating Officer; the other was with a group of OSDH staff representing the various systems under review for this project. This included a variety of personnel from program directors to epidemiologists to data managers and program line staff who extensively use the program systems and data. Open ended questions were posed asking the participants to imagine how business might be conducted in an ideal world; these ideas were synthesized to develop a picture of how the business of public health in Oklahoma might look in the future.

[1] SMD# 10-016.

With the vision of the future in hand, Cognosante staff developed the details of three forward-thinking scenarios (listed below) that would take OSDH down the path towards interoperable exchange. These scenarios include new technologies such as SOA and ESB to acquire and disseminate information using highly secure shared services and role-based security models.

1. **Scenario 1:** Fully integrated approach where OSDH will use OHCA HIT tools for processing transactions and shared services.
2. **Scenario 2:** OSDH systems are independently maintained with their own EMPI, Provider Index, and translation capabilities and use OHCA's OpenHIO for information exchange.
3. **Scenario 3:** Optimized hybrid approach is developed using HIT assets from both organizations.

For each scenario, the Cognosante team:

1. Analyzed the pros and cons and developed a logical architecture.
2. Analyzed and discussed use of an EMPI.
3. Developed a cost benefit analysis with a focus on identifying the percentage of HITECH funding that could be obtained under each.

Based on the aforementioned analyses, the Cognosante team developed recommendations to achieve the To Be state as well as a high-level roadmap showing tasks needed for OSDH to migrate from the As Is to the To Be state.. Depending upon the scenario that OSDH selects to move forward, further collaboration and planning will need to occur between OHCA and OSDH. OHCA will then submit an Advance Planning Document (APD) to request funding from CMS to conduct planning activities to implement the scenario approved by OHCA/OSDH executives.

1.3 Cognosante Findings and Recommendations

The Cognosante team recommends OSDH adopt the optimized hybrid architecture outlined in Scenario 3. Scenario 3 is an optimized hybrid solution sharing EMPI services between OSDH and OHCA. The EMPI will provide a unique identifier that spans across and within agencies and systems allowing multiple local identifiers to be mapped to a single unique identifier. The use of a common identifier and/or the ability to map local identifiers to a common identifier is an essential component for data exchange. The key benefits in this approach are the ability to leverage existing software licenses, contractors, and expertise while allowing OSDH to maintain control over their data.

This approach would require OSDH to only send demographic data to the shared EMPI thus minimizing the risk associated with sharing full program data files. This approach enables OSDH to build their internal model for an intra-agency interoperable exchange.

Most importantly though, this scenario enables: 1) OSDH to maintain control of its data and 2) reduces agency and overall State costs. The EMPI is one of the most significant components in an exchange architecture. Also, this approach enables higher accuracy and lowers costs by providing a single, multi-agency accessible source for unique identification.

These efficiencies are highlighted in the cost benefit analysis. The fully integrated option provides maximum economic benefit to the State and OSDH by using the full suite of tools available under OHCA; however, the influence of intangible considerations led the Cognosante team to recommend the Optimized Hybrid. The Optimized Hybrid provides the maximum probability of success and positions the State to realize, in the future, the efficiencies of a Fully Integrated system. A high level breakdown of the cost benefit analysis is shown in Table 1.

Table 1: Cost Benefit Analysis Results

	Alternatives		
Federal Fund Participation	**Fully Integrated**	**OSDH Standalone**	**Optimized Hybrid**
Federal Fund Participation (90%)	$4,576,475.52	$73,180.80	$4,946,980.56
Federal Fund Participation (75%)	$2,206,583.40	$0.00	$2,058,843.58
State Funds Participation	$1,398,025.08	$9,614,617.68	$2,107,646.39
Total Estimated Project Cost	**$8,181,084.00**	**$9,687,798.48**	**$9,113,470.54**
OSDH	$559,210.03	$9,570,709.20	$1,363,772.82
OHCA	$838,815.05	$43,908.48	$743,873.57
State Funds Participation	$1,398,025.08	$9,614,617.68	$2,107,646.39

In the cost benefit analysis, Optimized Hybrid is the best fit to maximize results in the short-term, while waiting for the OpenHIO to be fully and successfully implemented. The Optimized Hybrid is the second least expensive option and will not cost substantially more than the Fully Integrated option. The overall State Funds participation difference between Fully Integrated and the Optimized Hybrid is only $709,621 and the overall project estimated funds would only increase by $932,387. The State portion of the OSDH Standalone ($9,614,617), with federal funding available for building the interfaces only, would appear to be cost prohibitive.

2 OVERVIEW OF OSDH SYSTEMS

2.1 Background

The OSDH is an independent government agency that is responsible for public health programs and services in the State of Oklahoma and federal reporting to the CDC. OSDH is ultimately responsible for protecting and improving the public's health status through strategies that focus on preventing disease. Three major service branches, 1) Community and Family Health Services, 2) Disease & Prevention Services, and 3) Protective Health Services, provide technical support and guidance to 68 county health departments as well as guidance and consultation to the two independent city-county health departments in Oklahoma City and Tulsa.

OSDH contains programs that provide surveillance, intervention, monitoring, screening, education, and prevention services. OSDH also provides direct services as it operates most of the county health departments in the State. Oklahoma currently has 68 county health departments and two independent city-county health departments serving 77 counties. Each

department offers a variety of services, such as immunizations, family planning, maternity education, well-baby clinics, adolescent health clinics, hearing and speech services, child developmental services, environmental health, and the SoonerStart program.

In order to best serve its client-base, OSDH must improve interoperability between its departmental systems as well as externally with other agencies and entities. OSDH must have an EMPI that will allow clients to be linked across OSDH systems as well as the external agencies and entities, and a syntactic transport mechanism to exchange information externally in Continuity of Care Document (CCD) format. Additionally, OSDH needs capability for external bi-directional exchange of information for the state's immunization registry as well as other health information registries (e.g., vital statistics, cervical and breast cancer, lead, newborn screening (includes hearing and metabolic panel laboratory) data) with providers throughout the State and the Oklahoma Health Care Authority (OHCA). These capabilities are necessary to achieve Meaningful Use public health objectives of the Health Information Technology for Economic and Clinical Health (HITECH) Act at §495.332(b) (2) that are required for participants in the Oklahoma Medicaid Electronic Health Record (EHR) Incentive Program.

In order to meet these interoperability goals significant funding would be needed; a difficult task in today's economic climate. OSDH's willingness to collaborate with OHCA would enable both agencies to leverage available federal funding opportunities and technical assets. Working in collaboration, these agencies would leverage health information technology (HIT) existing assets and request federal funding for integration tools and project staff (state and contractors) needed for DDI through the Centers for Medicare and Medicaid Services (CMS). Currently CMS is approving 90-percent federal share for interagency projects that build the infrastructure to support health information exchange, promote adoption of certified EHR technology or aid providers in meeting meaningful use requirements. Operational costs would be based on cost allocation. This approach would promote interoperability between OHCA and OSDH and assist all eligible professionals and hospitals by providing at least one mechanism for achieving Stage 1 Meaningful Use.

2.2 Current As Is Assessment

OSDH as a public health agency has programs and systems primarily funded by the Centers for Disease Control and Prevention (CDC), with some maternal/child health programs funded by the Health Resources and Services Administration (HRSA). A few other programs are funded by other federal agencies; for example, the Women, Infants and Children program (WIC) is funded by the United States Department of Agriculture (USDA). CDC and HRSA funding is categorical by program/condition/population, and these funding sources do not provide IT support funding at the same level or as a regular adjunct to operating the programs as CMS does for Medicaid. Instead, CDC either often makes a program-specific system available to the states at little/no cost, or provides some funding, usually at program start up, to develop a system to support program activities. Unfortunately, many of the CDC systems are developed independently and established to support CDC reporting requirements rather than State programmatic needs; the systems are developed using different platforms, software and technologies and to date have rarely incorporated or considered national standards; often use text fields and codes local to the system that cannot be easily aligned with national code structures; and are often not supported by the CDC for very long. If the state creates its own system, usually many of the same conditions apply. In addition, CDC's funding approach has created independent systems for the

same program in many states, while funding is provided only for a few years before the entire cost is shifted back to the states.

Public health agencies in general have not had to comply with HIPAA although many have opted to do so. CDC has reflected and reinforced the perception that public health is not required to meet HIPAA over the years, maintaining and further creating distance between other health care providers and PH agencies. This has led to a lack of attention in many cases to what is happening in the health care delivery sector, with major federal changes to standards often ignored. These include privacy and security under Health Insurance Portability and Accountability Act (HIPAA), national standards for transactions, code sets, and health information exchange and meaningful use criteria as being promulgated under the Department of Health and Human Services, CMS and the Federal Health IT Strategic Plan and EHR certification requirements as developed under the HITECH Act and direction of the Office of the National Coordinator for Health Technology (ONC). Where public health bills for services they must conform to the HIPAA transactions. Regardless, OSDH has made a commitment to observing the HIPAA requirements and has established policies and procedures in accordance with HIPAA and the HITECH Act.

2.3 Systems Overview

The Cognosante team conducted a series of interviews of selected OSDH systems with Department staff to develop a description of the Department's current HIT landscape. A total of 18 systems were examined; in addition, two additional interviews were conducted on OSDH's claims billing process and the department's privacy policies. This section summarizes the findings of those interviews.

2.3.1 Business Processes Supported

The bulk of OSDH's systems are designed for capturing, tracking, and reporting information, and mostly for non-clinical purposes. A few are used in providing both clinical and non-clinical services. The most common business processes supported by OSDH systems are data capture/collection, data management, data analysis, tracking, and data reporting. Some systems additionally support limited case management functions, threshold identification, and notification/letter generation, primarily to providers. All of the systems supporting direct client services have been migrated into modules in the Public Health Oklahoma Client Information System (PHOCIS), which is the system that supports county-level public health activities and services.

2.3.2 Systems Capabilities

In general, OSDH systems have limited automated capabilities. Most OSDH systems are primarily data repositories with some limited capabilities such as:

- Standard reports
- Some search and query functions
- Tracking and matching functions

- Systems used in service provision often also have some case management and letter generation functions

Most data is entered manually or requires human intervention to import electronic data into the systems, and most analysis and reporting is done external to the system using business analytics statistical software such as SAS. Even when data is automated coming into and leaving the systems, in many cases the programs still convert data into and out of flat file formats to import data into the system or retrieve for use or to respond to requests. Much of the activity related to getting data into and out of the system for use or exchange is labor intensive.

2.3.2.1 System Technologies

Most of the systems were independently designed, developed, and are uniquely customized to the particular program. Where CDC-developed systems are being used, there is little commonality of platform, format, or content across systems. OSDH is working to migrate some of the systems to a standard SQL-based platform and integrate them into OSDH's PHOCIS, which supports client services at the county level and allows these external users to directly and more effectively access and use the data. Few systems have direct interfaces that allow data to be sent/received between systems with no human intervention. Of the small number that are automated, only a few are set up to utilize Health Level 7 (HL7) formats.

2.3.2.2 System Data

While many of the OSDH systems capture some limited clinical data, most of the systems, and the programs they serve, were not designed to support clinical care or client services. Even those programs that do provide some clinical services or connect clients to clinical services perform very limited clinical functions (e.g., testing, screening, notification/referral) and maintain very limited client information; clients are generally referred outside of the public health services system for full primary care and treatment. This limited clinical data is not always shared with providers and little to no follow up information is collected by most OSDH programs and systems. All systems have their own unique internal identifiers, most of which are randomly or sequentially generated and therefore do not match the identifiers in any other system. OSDH uses a separate program, Elink, to match individuals on their demographics across systems when needed. All systems are also subject to federally driven program-specific data requirements and content and rarely incorporate any national codes (ICD, CPT) or formats. Much of the data in the various OSDH systems is in free text and is not standardized in any way across systems. In many cases data must be converted/translated for reporting and analysis purposes.

2.3.3 Privacy and Security Requirements

2.3.3.1 Privacy Restrictions

The legal privacy requirements for the data in the OSDH systems examined ranges from little to extremely restrictive, particularly for those systems containing HIV/AIDS/STD information. A recently passed law will impose greater privacy restrictions on most public health data; some read these protections to be as strict as those for HIV/AIDs, which has severe limitations on sharing data for almost any purpose. Some systems have no specific legal confidentiality requirements, but most programs use a fairly conservative approach to sharing data, particularly

in raw form. Written policies or guidelines on privacy for most systems do not exist, and data sharing is often decided on a case by case basis.

At the agency level, OSDH has recently decided to revise its HIPAA status from a covered entity to a hybrid entity and applies the HIPAA restrictions to numerous programs within the agency. Some programs apply the HIPAA privacy protections if no other legal privacy requirements exist. There are some issues and concerns in applying the HIPAA privacy protections, as they seem to sometimes hinder normal data sharing for programmatic and other activities. It appears that use of the public health exceptions in the HIPAA regulations could be more fully explored.

2.3.3.2 Security

All systems are governed by the standard security established by the OSDH and Office of State Finance (OSF) and used across all systems and programs. Agency security uses Windows authentication and security tools; external applications and web interfaces use application security, while county departments/ OSDH use Active Directory. Independent health departments use external applications and set up internal users who manage access to OSDH systems for the county departments. User access requires a login and password. Remote access is enabled using Netmotion. Data within the individual OSDH systems is not encrypted at rest; data on laptops is encrypted, and double encrypted for transmission. Some of the systems are further secured on stand-alone computers; for some, the application is resident on individual computers and not via the network. The systems/applications almost all require system-specific passwords for access.

2.3.4 Current System Interactions – External

Most OSDH systems do engage in some level of exchange, even if just among related programs and for federal reporting purposes. The systems that have the most data exchanges, both for data reporting as well as exchanging the data with other external parties, are the Vital Statistics Birth and Death systems and Oklahoma State Immunization Information System (OSIIS), the immunization registry. Some systems do little to no data exchange, some for confidentiality reasons (e.g., systems supporting HIV/AIDs and STD information), others because of lack of demand for or awareness of the data existence or value (e.g., childhood lead). Required federal reporting from OSDH systems in most cases is only a very tiny proportion of the actual data being provided; the bulk of the data exchanged is for other programmatic purposes, for research and analysis, to assist with confirmation or augmentation of data in other systems, or to respond to specific data requests.

Most data exchange occurs through the creation and provision of electronic files; little to no OSDH data is exchanged through direct electronic interfaces. For external exchange, data is often provided on hard media (CDs, flash drives, etc.). Direct electronic transmission primarily occurs between some of the state's laboratories and internal OSDH systems; a few of these have some bi-directional capability. Most exchanges for federal reporting or for external information requests require manual intervention to pull data from the particular system and convert it to some other electronic format or report (Excel, flat file, federal reporting format, etc.). When a portal is available to upload the data electronically, in most cases the data requires human intervention and must be manipulated outside of the OSDH system to create the format/dataset required before it can be uploaded.

2.3.4.1 OHCA

OSDH exchanges data with OHCA and the SoonerCare program as described above, primarily through the creation and exchange of data files created from the source system. Files are sent in a variety of ways, often through a secure file transfer protocol (SFTP) site where the OSDH program can securely place the data for OHCA to retrieve. The primary exchange of data from SoonerCare is with the Medicaid eligibility system, which is an online electronic system but which needs improvements to operate smoothly and consistently. Other data from the MMIS or data warehouse comes in a variety of ways, mostly low tech such as on a disk in a text file.

2.3.4.2 CDC/HRSA

OSDH exchanges data with CDC and HRSA as required under program funding. Most of the reporting consists of aggregated and de-identified data sent in a variety of ways as required by the individual program. These federal agencies often have reporting mechanisms/portals, formats, and requirements that are unique to each program. OSDH staff create reporting data files or reports outside of the source system and then upload those to the federal interface.

2.3.5 Current OSDH System Interactions – Internal

Many OSDH programs share data although most of this exchange is conducted in a manual fashion. In other words little exchange occurs through direct electronic interfaces; internal sharing often involves creating a data file and loading the file to a shared directory.

2.3.6 Meaningful Use Requirements

Stage 1 of Meaningful Use includes several objectives related to the electronic exchange of public health information. Anticipating that State Medicaid agencies would have a role in promoting EHR adoption and health information exchange (HIE), CMS issued a State Medicaid Director (SMD) letter[2] on May 18, 2011 that provides further detail on the criteria on funding health information exchange promotion activities: 1) have costs that are divided equitably across other payers (e.g., private/commercial) based on the fair share principle and are appropriately allocated, 2) leverage efficiencies with other federal HIE funding, and 3) are developmental and time-limited in nature. This letter outlines the circumstances in which states can use enhanced administrative federal financial participation (FFP) to join or spearhead efforts to build this needed infrastructure. CMS has made numerous public statements to encourage public health participation under this program as a means to further develop the public health exchange infrastructure and provide a means for exchanging data with state Medicaid agencies and with Medicaid providers to enable them in meeting several meaningful use criteria and further state exchange capabilities in support of the Medicaid EHR Incentive Program. Stage 2 and 3 of Meaningful Use will require additional public health exchange objectives, such as with laboratory systems, vital records, and other public health registries.

In preparation for the Stage 1 Meaningful Use requirement to electronically exchange immunization data, OSDH is currently in the process of redesigning its Immunization Registry, which is scheduled to be completed by December 31, 2011. The redesign effort includes:

[2] SMDL# 11004; ARRA #9

1. Redesign of Oracle databases to Microsoft SQL database.
2. Verify and validate business requirements with business users.
3. Develop new screens.
4. Improve external web interface.
5. Integrate OSDH internal systems with PHOCIS.
6. Implement messaging.

The plan is for eligible providers participating in the Oklahoma Medicaid EHR Incentive Program to submit Stage 1 Meaningful Use immunization information to the OSDH new Structured Query Language (SQL) database using OHCA's OpenHIO as well as to obtain bi-directional access to the Immunization Registry through OpenHIO. OHCA will implement several tools through its MMIS re-procurement that may be leveraged to enable interoperability between the state agencies. Tools available include: BizTalk, Apelon, and VisionWare. The OHCA may have two additional tools, Initiate and dbMotion, available when OpenHIO is implemented.

2.3.7 Reporting Requirements

Almost all of the reporting requirements to and from these systems are driven by state and federal law and CDC/ HRSA requirements, often passed on through grant funding. Reporting to the state systems is at the individual or case level; reporting to CDC and HRSA is generally summary aggregate data. Nearly all data reported to OSDH systems is driven by these state/federal requirements; in a few cases the State or the program has augmented the data being reported for other program purposes. Required federal reporting from OSDH systems in most cases is only a very tiny proportion of the actual data being provided to external parties.

2.3.8 System Challenges

OSDH programs and systems are primarily funded by CDC, with some maternal/child health programs funded by HRSA. CDC and HRSA funding is categorical by program/condition/ population, and these funding sources do not provide IT support funding at the same level or as a regular adjunct to program operations as CMS does for Medicaid. Instead, CDC either makes a program-specific system available to the states at little/no cost, or provides some funding, usually at program start up, to develop a state-specific system to support program activities. Most CDC systems are developed independently by program and established to support the CDC program reporting requirements rather than State programmatic needs. Because of the categorical funding and CDC program silos, these systems often use different platforms, software and technologies and to date have rarely incorporated or considered national standards; often use text fields and/or codes local to the program/state/system that do not align with national code structures; and are often not supported by the CDC for extended periods. Costs for maintenance and support and even system upgrades usually fall to the states.

Two operational issues stood out from the interviews as things that could be addressed by using a business process approach and adopting interoperable solutions. First was the amount of time program and IT staff spend converting electronic data into and out of different forms, formats and subsets to both bring data into the system and exchange data with any other agency,

programs or systems, whether internal or external. Even internal program use of the data for analysis and other program purposes usually requires extracting data from the system and using external software.

Second is that most systems are primarily data repositories. These systems perform very few program functions electronically, and these functions could easily be automated in the system or through a shared services solution. This understanding enables the agency to explore a common system platform and solution to support a broad range of agency programs and functions, CDC requirements permitting.

2.3.9 OSDH System Summary

Below is a table summarizing selected system characteristics for each system reviewed. An additional table listing more technology-specific characteristics of the systems is in Appendix B: OSDH Systems Technology Characteristics.

Table 2: Oklahoma State Department of Health Systems Overview

System Characteristics									
System/ Database	**Business Processes**	**Reporting Capabilities**	**System Technologies**	**System Security**	**System Exchanges**	**Privacy Restrictions**	**Standards**	**Federal Support**	
								Yes	**No**
AIDS Drug Assistance Program (ADAP)	Support client application process for drug assistance Determines approval for participation Direct data entry	Create files from database and send on media, through shared folders or other mechanisms	Module of PHIDDO Direct data entry via web portal Developed in house: SQL 2005, ASP.net, Orion Rhapsody, Eclypsis translator Being modified to use MS Silverlight Want to move ADAP functions to CAREWare and collect more client data	Standard agency security Identifier is encrypted for exchange	No direct interfaces Portal is bidirectional, offers limited report/view access HRSA Other state HIV/AIDS programs CMS/Medicare Part D	Specific HIV/AIDS privacy laws and policy A bit less restrictive than other HIV/AIDS programs	None System generated unique person identifier uses name, birth date, gender	HRSA	
Birth Defects Registry (BDR)	Track statewide birth defects Data manually entered with full chart (paper) maintained Visit hospital to review charts	Create files from database and send on media, through shared folders or other mechanisms	CDC Access Database now Plan to upgrade to SQL backend & .Net interface	Standard OSDH security applied	No direct interfaces Hospitals CDC State Maternal & Child Health Programs	HIPAA Specific privacy regs applied Requires MOU	ICD-9 condition codes Messaging Standards Person identifier is sequential number	CDC	

System Characteristics									
System/ Database	Business Processes	Reporting Capabilities	System Technologies	System Security	System Exchanges	Privacy Restrictions	Standards	Federal Support	
								Yes	No
Breast and Cervical Cancer Early Detection Program Cancer Screening and Tracking (CaST)	Track cancer screenings and follow up Data manually entered from paper forms Letter generation Bills for some services manually	Create files from database and send on media, through shared folders or other mechanisms	Stand alone CDC Access database	Standard OSDH security applied	No direct interfaces OHCA Medicaid CDC OCCR	HIPAA Requires MOU	Cancer DX coding Unique system generated person identifier	CDC	
CAREWare	Track all HIV treatment and care services funded by Ryan White Direct data entry	Create files from database and send on media, through shared folders or other mechanisms	HRSA-contracted SQL system from JPROG JPROG makes regular updates	Standard agency security Stand-alone system Identifier is encrypted for exchange	No direct interfaces Direct data entry through web interface HRSA Other state HIV/AIDS programs	Specific HIV/AIDS privacy laws and policy Highly restricted	None System generated unique person identifier uses name, birth date, gender	HRSA	
Evaluation of HIV/AIDS Reporting System (eHARS)	Monitor HIV/AIDS treatment and tracking Paper forms manually entered	Create files from database and send on media, through shared folders or other mechanisms	Web-based CDC Windows application	Standard agency security Tough physical security; locked doors, badge access only Data only on secured server	No direct interfaces CDC Other state HIV/AIDS programs TB programs	Specific HIV/AIDS privacy laws and policy Highly restricted	Some ICD-9 codes Variable length sequential system crested unique identifier	CDC	

System Characteristics									
System/ Database	Business Processes	Reporting Capabilities	System Technologies	System Security	System Exchanges	Privacy Restrictions	Standards	Federal Support	
								Yes	No
HIV/STD Prevention System (XPEMS)	Tracks counseling and testing for HIV Direct data entry	Create files from database and send on media, through shared folders or other mechanisms	Module of PHIDDO Direct data entry via web portal Developed in house: SQL 2005, ASP.net, Orion Rhapsody, Eclypsis translator Being modified to use MS Silverlight Ongoing addition of data and capabilities	Standard agency security Identifier is encrypted for exchange	No direct interfaces Portal is bidirectional, offers limited report/view access CDC Other state HIV/AIDS programs	Specific HIV/AIDS privacy laws and policy Highly restricted	Some LOINC, SNOMED PHIN VADS Several messaging standards (HL7, PHINMS) System generated unique person identifier uses name, birth date, gender CDC case number	CDC	
Laboratory Information Tracking System (LITS/LIMS)	Combination of manual and direct data entry Specimen tracking Tracks laboratory test processing Captures lab results	Reports lab results to original requester	Powerbuilder with SQL backend RFP out for COTS using national standards	Standard agency security Application uses integrated security with Windows security.	No direct interfaces Primarily exchanges with original requester	CLIA privacy	CDC PHINMS Testing HL7 exchange Identifiers for labs, specimens, test performed, and patient, most are sequentially assigned	CDC	
Newborn Hearing Screening System	Combination of manual and direct data entry	Create files from database and send on media, through shared folders	Neometrics layered system: Oracle back end, case management/fron	Standard agency security Role based Log-in and	Direct interface with hearing testing equipment	State statutes for reporting HIPAA	Currently none, but adding LOINC and SNOMED codes	CDC	

System Characteristics									
System/ Database	Business Processes	Reporting Capabilities	System Technologies	System Security	System Exchanges	Privacy Restrictions	Standards	Federal Support	
								Yes	No
	Tracking and surveillance of initial and follow-up metabolic screening Diagnostic results Case management Letter generation Lab results directly fed in Other data manually entered	or other mechanisms	t end and static lab data component Converting to Citrix from Windows 2000 server and from Oracle database to SQL. May move to dot.net in future	password IT administers	Reporting to HRSA, CDC, and an NBS national consortium		Serial identifiers: on card for test; lab number associated with the child; serial identifiers underneath for tests. Also a patient number and lab accession number		
Newborn Metabolic Screening System	Combination of manual and direct data entry Tracking and surveillance of initial and follow-up metabolic screening Diagnostic results Case management	Create files from database and send on media, through shared folders or other mechanisms	Neometrics layered system: Oracle back end, case management/fron t end and static lab data component Converting to Citrix from Windows 2000 server and from Oracle database to SQL. May move to	Standard agency security Role based Log-in and password IT administers	No direct interfaces Reporting to HRSA, CDC, and an NBS national consortium	State statutes for reporting HIPAA	Currently none, but adding LOINC and SNOMED codes Serial identifiers: on card for test; lab number associated with the child; serial identifiers underneath for tests. Also a patient number and lab accession	CDC	

System Characteristics									
System/ Database	Business Processes	Reporting Capabilities	System Technologies	System Security	System Exchanges	Privacy Restrictions	Standards	Federal Support	
								Yes	No
	Letter generation		dot.net in future				number		
Oklahoma Central Cancer Registry (OCCR)	Track statewide cancer diagnoses and treatment Data comes electronically but uploaded by staff	Create files from database and send on media, through shared folders or other mechanisms	Rocky Mountain Cancer Data Systems, proprietary software and platform unknown Update to WebPlus to utilize CDC software (in addition to RMCDS)	Secure website using Syntax/Semantic Language, housed on dedicated server	No direct interfaces Indian Health Service National Death Index SSDI NAACCR CDC NPCR	No major legal restrictions	Cancer coding (ICD-O-3) System assigned unique ID for each tumor and individual	CDC	
Oklahoma Childhood Lead Poisoning Prevention Program (OCLPPP)	Track and notify of abnormal lead test results Case management and follow up Letter generation Environmental investigation documenta-tion Some paper data entered manually; electronic data uploaded	Create files from database and send on media, through shared folders or other mechanisms	Neometrics Oracle based system Program expansion will require new system	Standard agency security Neometrics administers Login/ password, not role-based Separate login to machine, then another for the application	No direct interfaces Environmental labs OHCA DEQ NIOSH	No legal restrictions Requires MOU	None System generated random six digit ID	CDC	

System Characteristics									
System/ Database	Business Processes	Reporting Capabilities	System Technologies	System Security	System Exchanges	Privacy Restrictions	Standards	Federal Support	
								Yes	No
Oklahoma State Immunization Information System (OSIIS)	Track immunizations provided Track vaccine inventory Default immunization record for county health departments	Create files from database and send on media, through shared folders, FTP, or other mechanisms	Direct data entry via web portal View access via portal CDC database structure with Oracle backend database and ASP front end Upgrade to dot.net and SQL server	External apps/ web interfaces use application security; health departments/ OSDH use Active Directory	No direct interfaces OHCA Medicaid CDC County health departments Indian Health Services Vaccines for Children (VFC) providers Vital Records Schools State maternal child health programs	HIPAA Specific privacy regs for selected conditions	CDC registry standards Vaccine codes Messaging standards	CDC	
Public Health Investigation and Disease Detection in Oklahoma (PHIDDO)	Tracking and surveillance of communicable disease Support disease investigation Direct data entry	Create files from database and send on media, through shared folders or other mechanisms	Direct data entry via web portal Developed in house: SQL 2005, ASP.net, Orion Rhapsody, Eclypsis translator Being modified to use MS Silverlight	Standard agency security	No direct interfaces Portal is bidirectional, offers limited report/view access CDC	State statutes for reporting HIPAA	Some LOINC, SNOMED PHIN VADS Several messaging standards (HL7, PHINMS) Sequential person number and internal case number CDC case number	CDC	

System Characteristics									
System/ Database	Business Processes	Reporting Capabilities	System Technologies	System Security	System Exchanges	Privacy Restrictions	Standards	Federal Support	
								Yes	No
Public Health Oklahoma Client Information System (PHOCIS)	Direct data entry and access through a hub that supports county programs and client services: shared demographics encounters appointments invoicing/payments some population based services provides access to some OSDH systems and data Feeds into local expenditures system	Create files from database and send on media, through shared folders or other mechanisms	Developed in house in program/function specific modules Uses MS dot.net and SQL Implementing a pharmacy module Integrating with an inventory tracking system Adding immunization registry connectivity	Windows authentication for users Standard agency security tools Data double encrypted for transmission Laptops encrypted for remote use	No direct external interfaces Some lab connections, WIC check processing through third party, with OK.gov for credit card processing. Internal - No direct electronic connections. Billing Medicaid enrollment Newborn screening Automated requests to state lab Share for client service provision	Data specific and HIPAA privacy rules	HIPAA X12 transactions (converting to 5010) HL7 ICD-9 Two client IDs last 4 SSN + random number + BD + gender; other is sequential		No
Sexually Transmitted Disease Management	Track reporting and investigation of all STD	Create files from database and send on media, through	CDC DOS-like system which uses Xbase, Plus Moving to	Standard agency security Stand alone	No direct interfaces CDC	Specific HIV/AIDS privacy laws and policy	None System generated unique	CDC	

System Characteristics									
System/ Database	Business Processes	Reporting Capabilities	System Technologies	System Security	System Exchanges	Privacy Restrictions	Standards	Federal Support	
								Yes	No
Information System (STD*MIS)	tests (including HIV/AIDS) Case management Manual data entry	shared folders or other mechanisms	PHIDDO when funds available	system Users sign two confidentiality statements to get log-in and password	Other state HIV/AIDS programs	Highly restricted	person identifier		
Vital Records - Birth	Registry of in-state births Produce legal certificates Direct data entry via dedicated system	System creates data sets for National Center for Health Statistics (NCHS) and Social Security Administration (SSA). Create files from database and send on media, through shared folders, FTP, or other mechanisms	Direct data entry via web application SQL database, Oracle application server Documentum EMC Application Extender	Role-based access HTTPS system for web security	No direct interfaces OHCA Medicaid CDC County health departments Federal agencies View access through Electronic Verification of Vital Events (EVVE) and STEVE OSIIS Newborn screening PRAMS, TOTS Birth defects registry State maternal child health programs	Specific privacy regs applied Medical portion highly restricted Requires MOU	NCHS Birth Certificate standards Sequential certificate number	CDC/ NCHS	

System Characteristics									
System/ Database	Business Processes	Reporting Capabilities	System Technologies	System Security	System Exchanges	Privacy Restrictions	Standards	Federal Support	
								Yes	No
Vital Records – Death	Registry of in-state deaths Produce legal certificates Direct data entry via dedicated system	System creates data sets for National Center for Health Statistics (NCHS) and Social Security Administration (SSA). Create files from database and send on media, through shared folders, FTP, or other mechanisms	Direct data entry via web application SQL database, Oracle application server Documentum EMC Application Extender Still being deployed	Role-based access HTTPS system for web security	No direct interfaces OHCA Medicaid CDC County health departments View access through Electronic Verification of Vital Events (EVVE) and STEVE Injury surveillance HIV/AIDs Cancer Registry Infant death records to immunization, maternal/child health, child death review board	Specific privacy regs similar to birth applied Requires MOU	NCHS Death Certificate standards Sequential certificate number ICD-10 (not CM) for cause of death	CDC/ NCHS	
Women, Infants and Children (WIC)	Set of direct data entry modules within PHOCIS: client health documenta-	View access for WIC clinics	Set of modules in PHOCIS Developed in house in MS dot.net and SQL Updating	Windows authentication for users Standard agency security tools Data double	No direct interfaces WIC check processing through third party OK.gov for credit	None, loosely use HIPAA privacy but not required	No standards Two client IDs last 4 SSN + random number + BD + gender; other is sequential	USDA	

System Characteristics									
System/ Database	Business Processes	Reporting Capabilities	System Technologies	System Security	System Exchanges	Privacy Restrictions	Standards	Federal Support	
								Yes	No
	tion health history risk assessment food instruments (coupons) Encounters Determine BMI, WIC eligibility Issues food instrument Communi-cates with WIC bank		modules in dot.net Moving to EBT card in 2013	encrypted for transmission Laptops encrypted for remote use	card processing				

3 THE VISION OF HIT FUTURE

3.1 Vision for OSDH

Oklahoma ranks 46th among the states in national health status[3]. Many of the indicators measured are related to conditions that Oklahomans must live with every day. Poverty, lack of insurance, limited access to primary care, and inadequate prenatal care, along with risky health behaviors associated with these determinants, such as low fruit/vegetable consumption, low physical activity, and a high prevalence of smoking, all contribute to the poor health status of Oklahoma's citizens. In 2010 the Oklahoma State Board of Health published the Oklahoma Health Improvement Plan (OHIP) for 2010-2014, and documented the vision for the state's health:

> *Oklahomans will achieve optimal physical, mental and social health and the state health status will be in the top quartile of states by 2014.*

The Plan also laid out the following health priorities and imperatives:

Priorities

- Tobacco Prevention and Control
- Obesity Reduction
- Children's Health
- Immunization Coverage
- Preventable Hospitalizations
- Occupational Fatalities
- Cardiovascular Health

Public Health Imperatives

- Licensing, inspections and investigations
- Medical system coordination and sustainability
- Infectious Disease Surveillance and Control
- All hazards, Preparedness and Emergency Response
- Consumer Protection

The plan also laid out some infrastructure goals, one of which is titled Health Systems Effectiveness. This goal area focuses on ways to strengthen private/public partnerships and identify best practices to improve Oklahoma's health outcomes. One of the specific goals is to:

[3] Oklahoma Health Improvement Plan Summary, 2011, http://shapeyourfutureok.com/downloads/OHIP_Executive_Summary_020711.pdf

Utilize the Health Information Technology (HIT) and Health Information Exchange (HIE) Systems in accomplishing health systems effectiveness.

3.2 HIT Vision

The Cognosante team conducted a 2 hour interview with OSDH Interim Chief Operating Officer Julie Cox-Kain to garner some insight on the agency vision for OSDH HIT. Ms. Cox-Kain also serves on the Oklahoma Health Information Exchange Trust (OHIET) Board and is one of the co-chairs of the Health Systems Effectiveness Workgroup for the OHIP.

The OSDH leadership supports improving exchange and interoperability, but faces a number of challenges. The major issue is funding, as CDC and HRSA program funding does not include infrastructure financing. Other key issues are:

- Complexity of public health with many different programs with different federal requirements
- Privacy and security restrictions
- Data ownership and control
- Mapping accuracy

The OSDH leadership recognizes the need to connect data and systems and has been investigating ways to move forward; for example, OSDH is already looking to adopt an agency-wide enterprise master person index (EMPI) solution.

Because of the limited sources of funding for public health interoperability and exchange infrastructure, OSDH leadership sees tremendous value in partnering with OHCA under the EHR Incentive Program and the state HIE initiative. These programs offer additional opportunities to advance public health infrastructure, such as through sharing interoperability tools and obtaining infrastructure funding, that OSDH can explore.

In the near term, building exchange for meaningful use with the Immunization Registry under a current project provides an opportunity to test solutions that can be expanded to accommodate other systems and data. Other opportunities to explore include working with Health Information Service Providers (HISPs) which provide services needed to exchange data from providers to HISPs to OSDH. OSDH believes there are doctors who will have a HISP and will not want to join an HIO; therefore the agency must be prepared to accommodate that choice to enable continued reporting and exchange with all providers.

In the future, OSDH sees value in being able to more quickly identify, intervene in, and minimize the effects of outbreaks, to obtain more robust information on the state's population to target interventions to reduce smoking, obesity, and other behaviors that lead to poor health and chronic disease, provide more timely information to providers to influence care and encourage better lifestyle behaviors, and enable bidirectional exchange of health information between the local health departments and providers delivering care to Oklahomans.

Cognosante also conducted a two-hour facilitated session with OSDH staff representing the various systems under review for this project. This included a variety of personnel from program

directors to epidemiologists to data managers and program line staff who extensively use the systems and data from them.

Discussions initially focused on specific process improvements such as automating currently manual and labor intensive processes, simplifying current processes, and automating forms. The discussion then expanded to the bigger picture, recognizing the value in standardizing data and exchange processes, adopting a single client identifier and access portal for the agency, and integrating and/or consolidating systems, data and common program functions where possible. Benefits of these changes would be improved timeliness, completeness of reporting, communication, and analysis; better client care and services and improved population health, and reducing agency costs of supporting separate and heterogeneous data, systems and processes. The end result was the following draft vision:

- In the OSDH vision, the agency uses an EMPI to exchange and access information on individuals across various data and systems when requested by authorized users. The core system/exchange can translate and archive data, populate records, identify and send alerts, feed data directly to a data warehouse for analysis, and talk to external systems via a secure encrypted network using program specific exchange rules.
- Under this vision, OSDH program staff can then concentrate on program goals, analysis, and services, and not on getting data into/out of systems and translated into the various languages, content, and formats needed for linkage and analysis.

3.3 HIT Vision Summary

The HIT Vision for the future is based on a service oriented approach. This service oriented approach will enable end users to enjoy the benefits of secure data exchange while appropriately protecting the data and being shielded from the complexities of the underlying systems. Below is a representation of the full realization of this vision at the state level. While this is the future, it is important for OSDH to take the first step by pursuing the scenarios outlined in Section 5 of this document**.**

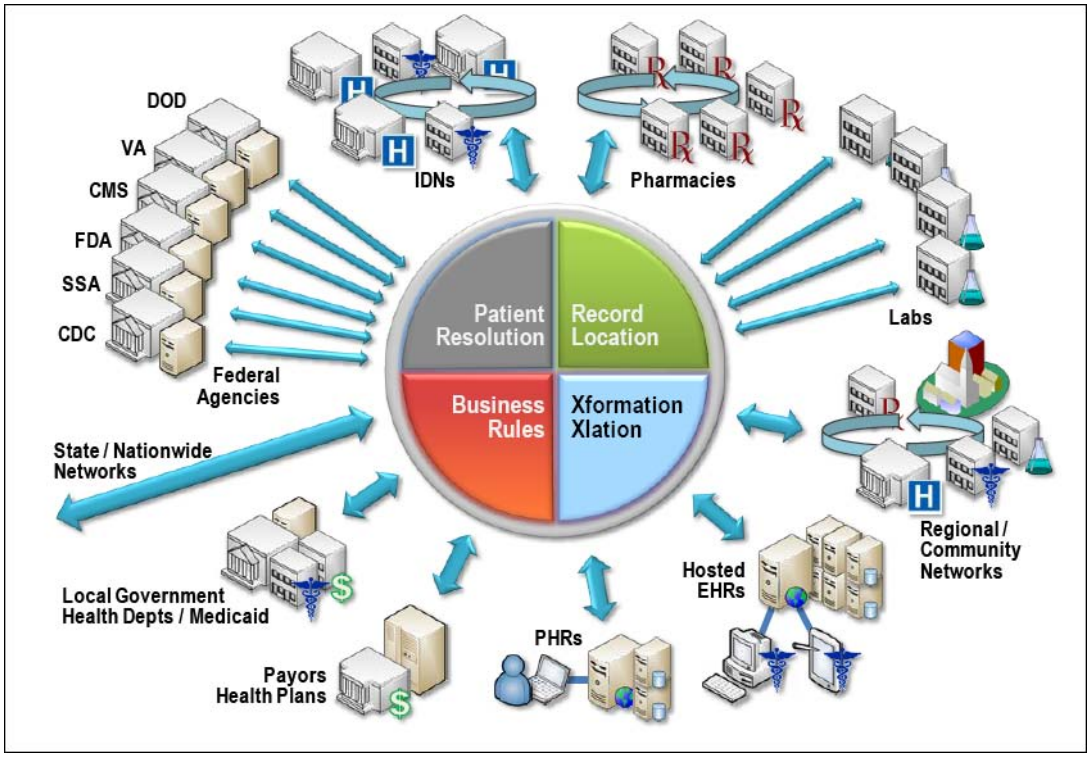


Figure 1 Future Vision of Health Information Exchange

4 BACKGROUND ON THE OHCA HIO

The OHCA mission is to purchase state and federally funded healthcare in the most efficient and comprehensive manner and with the goal of achieving optimal health status for Oklahomans through access to quality healthcare.[4]

OHCA has a significant challenge to meet these intents and goals. Oklahoma is currently one of the worst performing states in healthcare in the nation. The Commonwealth Fund, both in 2007 and again in 2009, ranked Oklahoma's overall health system 50th in the United States. Further, public health researchers have observed that Oklahomans born today have a shorter age-adjusted life expectancy than their parents.

This challenge is especially prevalent in the population served by OHCA. The deployment of an HIE backbone is planned and will provide authorized personnel within OHCA as well as other "front line" providers a view to a comprehensive care record for each SoonerCare member. When implemented, this comprehensive care record will be the path that enables data sharing between OHCA and clinicians at the point of care to promote efficient care delivery, improve patient safety, decrease adverse medication events, reduce duplicate procedures, and increase the overall health quality of this population.

[4] http://www.okhca.org/about.aspx?id=32

In 2009, the Oklahoma legislature demonstrated Oklahoma's commitment to HIE amongst government agencies by enacting legislation that created the Health Information Infrastructure Advisory Board (HIIAB). The HIIAB was to develop a strategy for the adoption and use of EHRs/electronic medical records (EMRs) and health information technologies that would be consistent with emerging national standards and promote interoperability of health information systems between state agencies in Oklahoma.

The OHCA chairs group meetings of a statewide HIE group to develop a state government exchange mechanism. This group consists of state health and human services agencies, including: Department of Corrections, Department of Mental Health, Vocational Rehabilitation, Department of Human Services, Department of Health, and Department of Insurance. In the future all these entities will be involved in the statewide HIE governance committee. OHCA is also working collaboratively with State Health Information Exchange Cooperative Agreement Program (SHIECAP), Oklahoma Foundation for Medical Quality (OFMQ), OKHITEC, Broadband grantees, and Beacon Communities grantee to identify other collaborative efforts and initiatives providers are involved in to identify economies and efficiencies that may be achieved through shared state IT assets.

Oklahoma's 2010 legislative session enacted SB 1373, setting up a new public trust, the Oklahoma Health Information Exchange Trust (OHIET). OHIET serves as the organizational structure and state-designated entity (SDE) for the State Health Information Exchange Cooperative Agreement Program (SHIECAP) funding and activities. OHIET is a state beneficiary public trust created under legislation expressly aimed at establishing an entity capable of serving not only as Oklahoma's permanent SDE during the SHIECAP grant period, but also ensures the State meets future meaningful use requirements and the full advancement of HIE throughout the State.

The HIIAB collaborates with OHIET participants and HIIAB members will continue to improve HIE and standardization of data formats and metadata descriptions will occur. National standards will be adopted and used by all participants in these exchanges as soon as available. The focus of these collaborations is to oversee OHCA's HIE development, which provide participating state agencies access and ensure the intent and goals for an open health information exchange are met.

The 2009 legislation that created the HIIAB also directed OHCA to serve as the hub for exchange amongst state agencies. In surveying the landscape of HIEs already operating in the state for the SHIECAP grant, it became apparent that no existing HIE served the state's health agencies, and this legislation mandated that OHCA spearhead its creation. This effort is now known as the Open Health Information Organization (HIO), and is being developed under OHCA's Reprocurement Project and receiving enhanced funding through CMS.

In the HIE Project Initiative Workshop Session held on August 17, 2011, the OHCA and HIIAB participating agencies identified the following as the Charter for OpenHIO:

> *The OpenHIO HIE establishes a standards-based HIE that facilitates the exchange, viewing and analysis of health related information between Healthcare Providers, State Agencies and Consumers in support of high quality, efficient and improved healthcare for Oklahomans.*

The OpenHIO is in the early stages of planning and development and is not anticipated to be operational until July 2012. The OHCA and participating HIIAB state agencies, including OSDH, continue to collaborate on the requirements for data sharing through OpenHIO. As planned, OpenHIO will provide a gateway for these state agencies to access other Oklahoma HIOs participating in SHIECAP and through those HIOs provide access to clinicians at point of care statewide when these health care providers participate in an HIO.

5 SCENARIOS AND LOGICAL ARCHITECTURE

5.1 Overview

In order to take the first steps in realizing the broader vision described in Section 3, OSDH requested the development of the logical view of three different architectural scenarios. This logical view will enable OSDH to better understand/visualize how the various scenarios can enable both intra- and inter-departmental exchange of data. These scenarios are:

- Scenario 1 – A Fully Integrated Approach Leveraging Existing Tools
- Scenario 2 – An OSDH Standalone Architecture
- Scenario 3 – A Hybrid Model

For simplicity, the scenarios are primarily oriented towards external exchange with OHCA and the SoonerCare program. However, each scenario would set the foundation for broader exchange capacity. Each scenario is reviewed in this section.

5.1.1 Open Toolkit

The existing Open Toolkit will serve as the foundational tools available to each scenario. These tools are:

- Microsoft's BizTalk Server
  - BizTalk Server is Microsoft's entry into the interface engine market. The interface engine provides bi-directional message translation services by receiving messages from an inbound source, e.g., an OSDH system, and translates that message construct (not the data) into a consumable format by another system, e.g., OHCA's MMIS system.
- Visionware's MultiVue Identification Server
  - MultiVue serves as an enterprise master person index (EMPI) that creates and maintains a single view of patients/people. MultiVue incorporates a set of probabilistic matching algorithms to match one or more records across multiple, disparate systems to provide a Record Locator Service (RLS). The RLS enables a search request to find person-specific information across multiple systems, without storing the actual clinical data. The RLS is a key component to a federated (distributed) HIE approach.

- Apelon's Terminology Asset Management
    - This product translates proprietary medical terminology into industry standard language, e.g., local lab codes to LOINC, or local pharmacy codes to RxNORM. The value of this tool is that it enables better management of multiple vocabularies, code sets, and terminologies while improving the quality, comparability, and accessibility of clinical information.

5.1.2 Scenario 1 – A Fully Integrated Approach Leveraging Existing Tools

Scenario 1 is an approach that leverages the complete aforementioned toolkit, in a shared model, to enable the exchange of data between the OHCA, and eventually the OpenHIO, and OSDH. This scenario enables the complete reuse of existing tools and minimizes redundancy associated with the exchange data between the two departments. With this reuse, the State of Oklahoma will save money by enabling the extension of terms for existing software versus purchasing of new licenses. In addition, annual software maintenance costs could be reduced. Conversely there is a small increase and lesser risk associated with non-OSDH systems holding demographic information, i.e., the EMPI, than in holding full OSDH records and data.

The intrinsic value of the toolkit to this scenario is that it provides a truly common platform to support data exchange that includes:

- Providing EMPI services based, via Visionware, on a consistent, accessible and inter-departmental approach for patient identification.
- Leveraging OSDH and OHCA expertise to develop cross-departmental vocabulary translation, e.g., the expertise of OSDH in the public health arena will meld with the OHCA areas of expertise like pharmacy and case management/nursing to build complete and accurate vocabulary translations. This will be accomplished using the Apelon Terminology product suite.
- Implementing a common product suite for the translation and orchestration of inbound and outbound messages. The common product suite, Microsoft's BizTalk, will enable OSDH and OHCA to save money by minimizing redundancy of software and leveraging any contract services.

Scenario 1 serves two purposes: 1) a data push and 2) a data pull. The data push is when the system is triggered by 1) a message received from an external source, 2) data is input manually, or 3) a timer is set off to gather specific data. In all three events, the trigger generates messages that conform to an appropriate message format or file layout and are then transmitted to receiving systems. The data push is for services data storage only and will be used appropriately as determined by OSDH.

The data pull is fulfilling a request for data from an OSDH system(s).

With this approach OSDH systems would enable:

1. Inter and Intra OSDH Data Exchange
    a. Inter-OSDH Data Exchange - Outbound Messages from OSDH to other systems (for storage)

Please note in this case these other systems may be external to OSDH or this mechanism may be used for Intra-Departmental exchange between OSDH systems.

i. OSDH systems would transmit, if capable, electronic and encrypted (128-bit SSL/HTTPS or Secure FTP (SFTP)) messages containing information. The messages that transport the information may be:

   1. Real or near real-time messages that are generated and sent by the appropriate OSDH system. These messages are triggered by 1) a message received from an external source, or 2) data is input manually. An example focusing on the Vital Records – Birth would entail a user of the Vital Records systems to record information about the birth. The birth information entered by the user is transmitted immediately to the appropriate receiving system(s).
   2. Batch messages that are sent at predefined times, e.g., every night or every week as triggered by a timer. These files could contain an entire "dump" of the system or simply the new information acquired since the last batch was sent. An example focusing on OSIIS would entail OSIIS gathering new information since the previous week's batch, placing the new data in the predefined file format and transmitting the information to the appropriate receiving system(s).

ii. The encrypted message may pass through the OSDH firewall, if a firewall is needed, to the shared services area. Upon receiving the message in the shared services area:

   1. The BizTalk interface engine will then de-encrypt the message and parse that message to extract the pertinent data. Any demographic data and patient identifiers will then be sent to the Visionware EMPI. The EMPI will ensure appropriate assignment of the data to an existing patient or create a new entry for that patient. In parallel to the EMPI process, any appropriate local codes will be sent to the Apelon Vocabulary Server for translation to standard code sets. Once the EMPI and Apelon processing is complete, the interface engine will transform the information into a consumable message for the appropriate receiving system(s).

iii. An example using OSIIS immunization data would entail the transmission of the encrypted batch file (see 1b) to the interface engine; the interface engine would de-encrypt the file and begin extracting the data from the batch file. Once the data is extracted the interface engine would send appropriate information to the EMPI as well as to the vocabulary server. Once the EMPI and vocabulary functions are complete the interface engine would transform the data into a message consumable by the OpenHIO and/or the end receiver, such as the MMIS.

b. Inbound Messages from External Systems to OSDH (for storage)

i. External systems, e.g., OHCA MMIS or other systems attached to the OpenHIO, would transmit electronic and encrypted (128-bit SSL/HTTPS or SFTP) messages containing information. The messages that transport the information may be:

1. Real or near real-time messages that are generated and sent by these external systems. These messages are triggered by 1) a message received from an external source, or 2) data is input manually. An example focusing on the MMIS would entail a user of the MMIS systems to record updates to patient demographics and claims data. This information entered into the OHCA is transmitted immediately to the appropriate receiving system(s), e.g., OSIIS.
2. Batch messages that are sent at predefined times, e.g., every night or every week as triggered by a timer. These files could contain an entire "dump" of the system or simply the new information acquired since the last batch was sent. An example focusing on a reporting system connected to the OpenHIO would entail OSIIS gathering new information since the previous week's batch, placing the new data in the predefined file format and transmitting the information to the appropriate receiving system(s), e.g., OSIIS.

ii. The encrypted message moves to the shared services area. Upon receiving the message in the shared services area:

1. The BizTalk interface engine will then de-encrypt the message and parse that message to extract the pertinent data. Any demographic data and patient identifiers will then be sent to the Visionware EMPI. The EMPI will ensure appropriate assignment of the data to an existing patient or create a new entry for that patient. In parallel to the EMPI process, any appropriate local codes will be sent to the Apelon Vocabulary Server for translation to standard code sets. Once the EMPI and Apelon processing is complete, the interface engine will transform the information into a consumable message for the appropriate receiving system(s).

c. An example using the OHCA MMIS system would entail the transmission of the encrypted batch file to the interface engine; the interface engine would de-encrypt the file and begin extracting the data from the batch file. Once the data is extracted, the interface engine would send appropriate information to the EMPI as well as to the vocabulary server. Once the EMPI and vocabulary functions are complete the interface engine would transform the data into a message consumable by the OSDH receiving systems, e.g., OSIIS or others.

2. External Data Request (Data Pull) – A Request for Information to the OSDH Systems

a. The data pull or request is best illustrated by example. An OpenHIO user that has all appropriate clearances requests a view of data from the STD*MIS for a specific patient. The request comes from the OpenHIO user and is electronically

transmitted to the shared services area. Once received by the shared services area, the interface engine parses the request and sends demographic data to the EMPI. The EMPI then returns this demographic data with the appropriate STD*MIS patient identifier. The interface engine then formats a STD*MIS consumable data request message and forwards that to the STD*MIS. The STD*MIS finds the requested data and returns a message with the request results to the shared services interface engine. The interface engine then formats the results into an OpenHIO consumable format and the STD*MIS is displayed to the user. Please note – in this case the view is temporary/transient, no data is stored in the OpenHIO central repository.

3. The OpenHIO is a future addition and will be the recipient of data in most cases, i.e., OpenHIO will transport existing data to the appropriate recipients and will not generate new data. In most cases, especially with OSDH, the OSDH data used would be a transient/temporary view of the data rather than being stored in the centralized data repository associated with the OpenHIO.

The figure below provides a view of this scenario in a logical view.

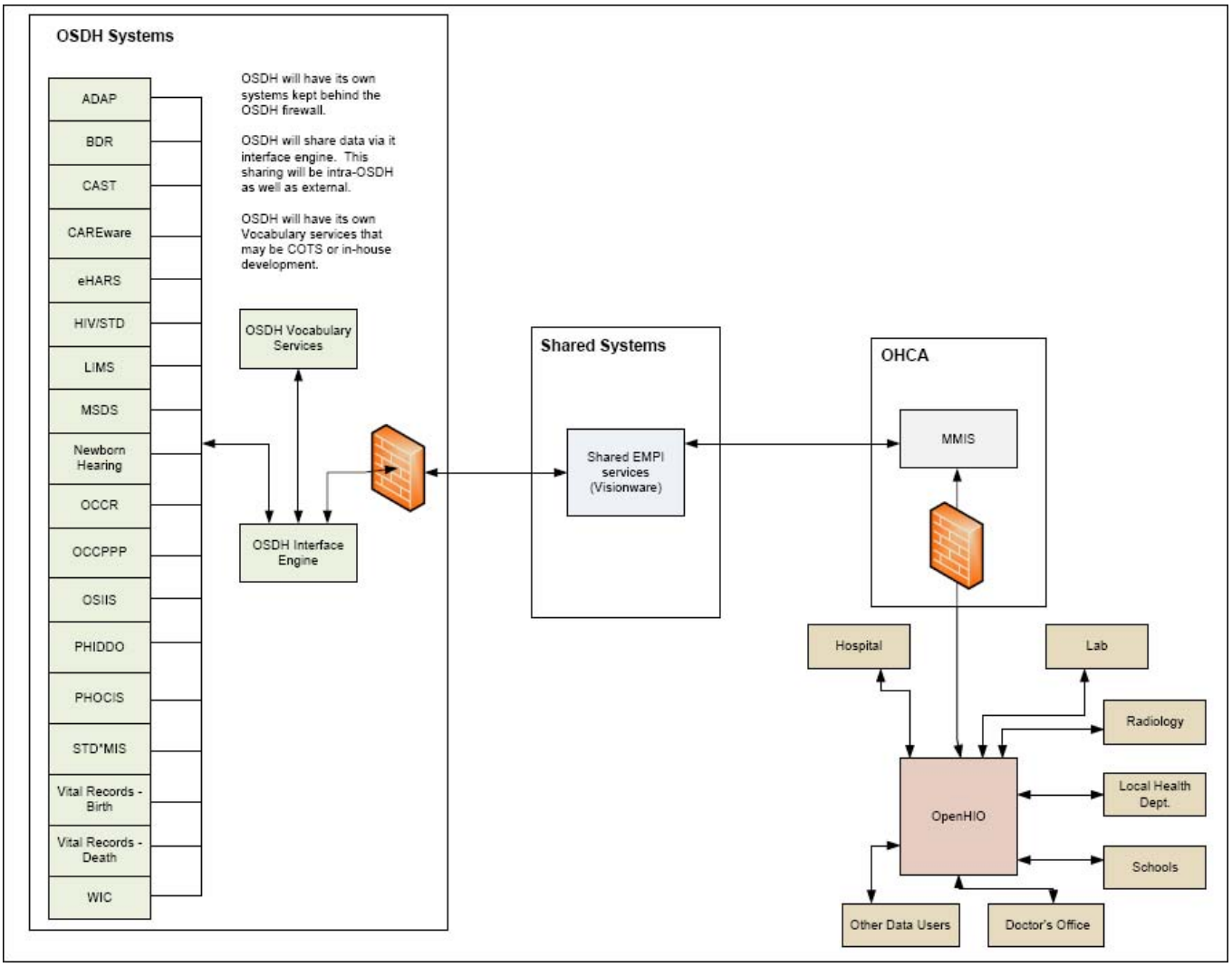


Figure 2: Fully Integrated Approach

5.1.3 Scenario 2 – OSDH Standalone with External Interactions

Scenario 2 is quite similar to Scenario 1 except all processing is done behind the firewall of OSDH. The value of this scenario to OSDH is that OSDH has absolute control over all aspects of interactions with external systems. The risk associated with this is the level of redundancy and cost of maintenance associated with the systems. Also if the systems are developed in-house, turnover of staff could present significant risk as the knowledge of components of the system could disappear as staff turns over or is reduced due to budget cuts.

Scenario 2 would enable OSDH to have a variety of options: build systems, acquire alternative COTS products, leverage the toolkit from OHCA or create some combination of the aforementioned. The existing OHCA toolkit could provide the same intrinsic value as described in Section 1, scaled to “fit” within the OSDH firewall. Each of the other approaches, build, acquire, or a combination, have a higher probability of creating additional costs.

That notwithstanding, Scenario 2 can provide a platform for intra-OSDH system data exchange as well as inter-departmental and external data exchange. The following details these three areas.

1. Intra-OSDH Data Exchange
    a. Transmit, if capable, electronic and encrypted (128-bit SSL/HTTPS or SFTP) messages containing information. The messages that transport the information may be:
        i. Real or near real-time messages that are generated and sent by the appropriate OSDH system. An example focusing on the Vital Records – Birth would entail a user of the Vital Records systems to record information about the birth. The birth information is then transmitted immediately to the appropriate receiving system.
        ii. Batch messages that are sent at predefined times, e.g., every night or every week. These files could contain an entire “dump” of the system or simply the new information acquired since the last batch was sent. An example using OSIIS would entail the OSIIS gathering new information since the previous week’s batch, placing the new data in the predefined file format and transmitting the information to the appropriate receiving system(s).
    b. The encrypted message would be passed to the BizTalk interface engine that will then de-encrypt the message and parse that message to extract the pertinent data. Any demographic data and patient identifiers will then be sent to the OSDH EMPI. The EMPI will ensure appropriate assignment of the data to an existing patient or create a new entry for that patient. In parallel to the EMPI process any appropriate local codes will be sent to the vocabulary server for translation to standard code sets. Once the EMPI and vocabulary processing is complete, the interface engine will transform the information into a consumable message for the appropriate receiving system(s).
        i. An example using OSIIS immunization data would entail the transmission of the encrypted batch file (see 1b) to the interface engine; the interface engine would de-encrypt the file and begin extracting the data from the batch file. Once the data is extracted the interface engine would send appropriate information to the EMPI as well as the vocabulary server. Once the EMPI and vocabulary functions are complete the interface engine would transform the data into a message consumable by the PHOCIS system. This example focuses on OSIIS and PHOCIS although it would apply to any two systems.
2. Inter-departmental Data Exchange
    a. Transmit, if capable, electronic and encrypted (128-bit SSL/HTTPS or SFTP) messages containing information. The messages that transport the information may be:

i. Real or near real-time messages that are generated and sent by the appropriate OSDH system. An example focusing on the Vital Records – Birth would entail a user of the Vital Records systems to record information about the birth. The birth information is then transmitted immediately to the appropriate receiving system.

ii. Batch messages that are sent at predefined times, e.g., every night or every week. These files could contain and entire "dump" of the system or simply the new information acquired since the last batch was sent. An example focusing on OSIIS would entail the OSIIS gathering new information since the previous week's batch, placing the new data in the predefined file format and transmitting the information to the appropriate receiving system(s).

b. The encrypted message would be passed to the BizTalk interface engine that will then de-encrypt the message and parse that message to extract the pertinent data. Any demographic data and patient identifiers will then be sent to the OSDH EMPI. The EMPI will ensure appropriate assignment of the data to an existing patient or create a new entry for that patient. In parallel to the EMPI process any appropriate local codes will be sent to the vocabulary server for translation to standard code sets. Once the EMPI and vocabulary processing is complete, the interface engine will transform the information into a consumable message for the appropriate receiving system(s).

i. An example focusing on OSIIS immunization data would entail the transmission of the encrypted batch file to the interface engine; the interface engine would de-encrypt the file and begin extracting the data from the batch file. Once the data is extracted the interface engine would send appropriate information to the EMPI as well as the vocabulary server. Once the EMPI and vocabulary functions are complete the interface engine would transform the data into a message consumable by the OpenHIO and/or the end receiver, such as the MMIS.

c. Inbound Messages from External Systems to OSDH (for storage)

i. External systems, e.g., OHCA MMIS or other systems -participating in the OpenHIO, would transmit electronic and encrypted (128-bit SSL/HTTPS or SFTP) messages containing information. The messages that transport the information may be:

1. Real or near real-time messages that are generated and sent by these external systems. These messages are triggered by 1) a message received from an external source, or 2) data is input manually. An example focusing on the birth of a child to a SoonerCare Mom: in this case, shortly after birth the newborn's information would be entered into the Online Enrollment System. This information would flow into the MMIS and a new, unique Medicaid number would be assigned to the newborn. This

information would be transported immediately to the appropriate receiving system(s),

2. Batch messages that are sent at predefined times, e.g., every night or every week and are triggered by a timer. These files could contain an entire "dump" of the system or simply the new information acquired since the last batch was sent. An example focusing on a reporting system connected to the OpenHIO would entail the MMIS gathering new information since the previous week's batch, placing the new data in the predefined file format and transmitting the information to the appropriate receiving system(s), e.g., OSIIS.

ii. The encrypted message moves through the OSDH firewall. Upon receiving the message OSDH will:

1. Re-verify with OSDH security the appropriateness of the message
2. Once authorized, the OSDH interface engine will then de-encrypt the message and parse that message to extract the pertinent data. Any demographic data and patient identifiers will then be sent to the OSDH EMPI. The EMPI will ensure appropriate assignment of the data to an existing patient or create a new entry for that patient. In parallel to the EMPI process, any appropriate local codes will be sent to the OSDH Vocabulary Server for translation to standard code sets. Once the EMPI and vocabulary processing is complete, the interface engine will transform the information into a consumable message for the appropriate receiving system(s).

d. An example using the MMIS would entail the transmission of the encrypted batch file to the interface engine; the interface engine would de-encrypt the file and begin extracting the data from the batch file. Once the data is extracted, the interface engine would send appropriate information to the EMPI as well as to the vocabulary server. Once the EMPI and vocabulary functions are complete the interface engine would transform the data into a message consumable by the OSDH receiving systems, e.g., OSIIS or others.

3. External Request for Data

a. The data request is best illustrated by example. An OpenHIO user that has all appropriate clearances requests a view of data from the STD*MIS for a specific patient. The request comes from the OpenHIO user and is electronically transmitted to OSDH. Once received by OSDH, appropriate security would be re-checked and if approved the interface engine parses the request and sends demographic data to the EMPI. The EMPI then returns this demographic data with the appropriate STD*MIS patient identifier. The interface engine then formats a STD*MIS consumable data request message and forwards that to the STD*MIS. The STD*MIS finds the requested data and returns a message with the request results to the shared services interface engine. The interface engine then formats the results into an OpenHIO consumable format and the STD*MIS

information is displayed to the user. Please note – in this case the view is temporary/transient, no data is stored in the OpenHIO central repository.

4. The OpenHIO is a future addition and will be the recipient of data in most cases, i.e., OpenHIO will transport existing data to the appropriate recipients and will not generate new data. In most cases, especially with OSDH, the OSDH data would be used in a transient/temporary view of the data rather than being stored in the centralized data repository associated with the OpenHIO.

The figure below provides a view of this scenario in a logical view.

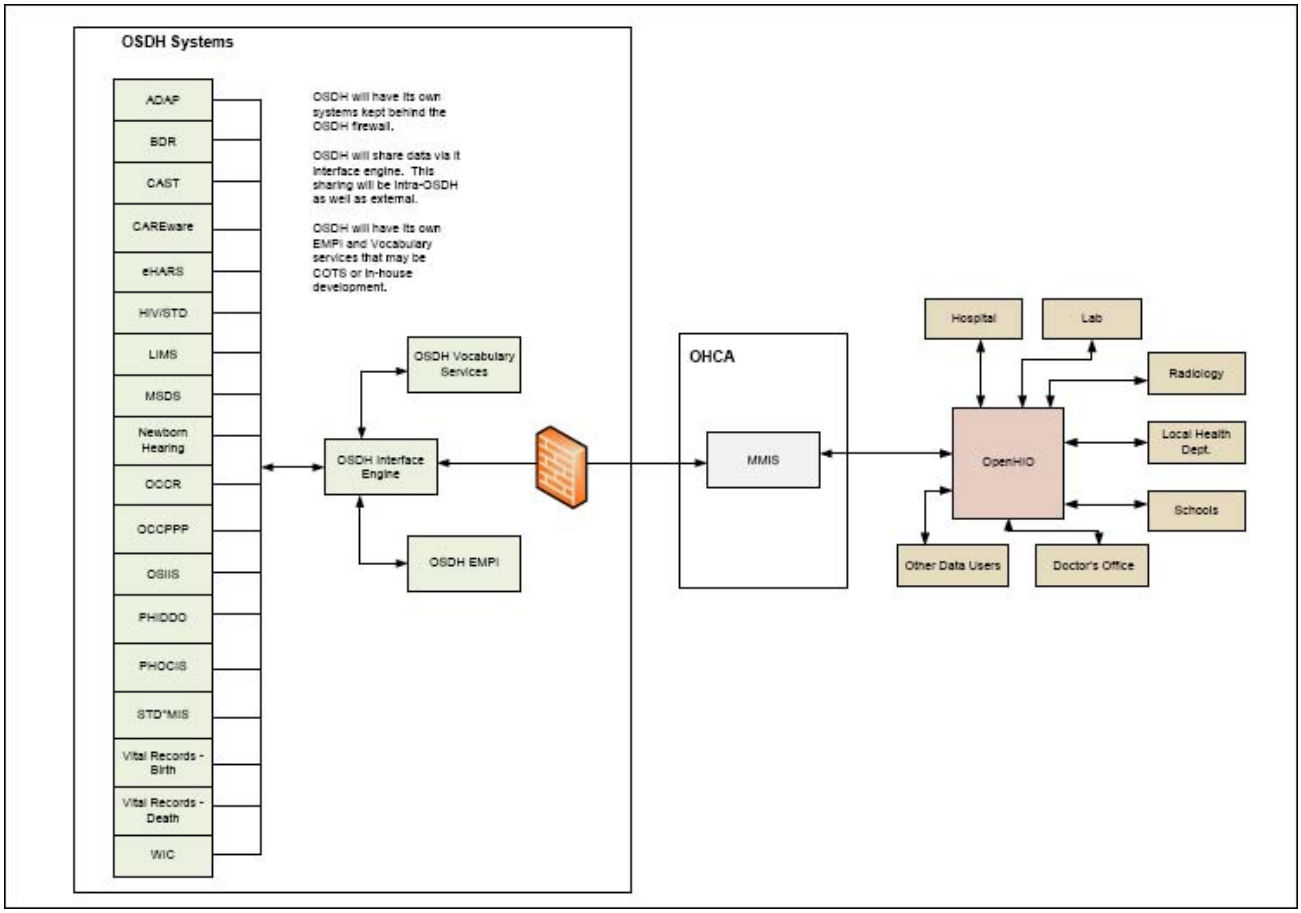


Figure 3: OSDH Standalone Solution

5.1.4 Scenario 3 – Optimized Hybrid

Scenario 3 is an optimized hybrid solution using the example of sharing EMPI services between OSDH and OHCA. The use of a common identifier and/or the ability to map local identifiers to a common identifier is foundational to data exchange, and Scenario 3 provides exactly that service. The value of Scenario 3 is the ability to leverage existing software licenses as well as allowing OSDH the needed control of access to their data. There is lesser risk associated with releasing OSDH demographic data to the shared EMPI than with releasing complete OSDH

records and data. Note that a hybrid solution could be built using any of the available tools; however the costs, benefits, and the logical view associated with each would differ.

The following descriptions detail the use of the shared EMPI in the data push (information coming from OSDH to other systems) and the data pull or request for data.

1. Inter and Intra OSDH Data Exchange for storage
    a. Transmit, if capable, electronic and encrypted (128-bit SSL/HTTPS or SFTP) messages containing information. The messages that transport the information may be:
        i. Real or near real-time messages that are generated and sent by the appropriate OSDH system. An example focusing on the Vital Records – Birth would entail a user of the Vital Records systems to record information about the birth. The birth information is then transmitted immediately to the appropriate receiving system.
        ii. Batch messages that are sent at predefined times, e.g., every night or every week. These files could contain an entire “dump” of the system or simply the new information acquired since the last batch was sent. An example focusing on OSIIS would entail the OSIIS gathering new information since the previous week’s batch, placing the new data in the predefined file format and transmitting the information to the appropriate receiving system(s).
    b. The encrypted message would be passed to the OSDH interface engine that will then de-encrypt the message and parse that message to extract the pertinent data. Any demographic data and patient identifiers will then be sent through the OSDH firewall to the shared Visionware EMPI. The EMPI will ensure appropriate assignment of the data to an existing patient or create a new entry for that patient. The EMPI will pass the results back through the OSDH firewall to the OSDH interface engine. In parallel to the EMPI process any appropriate local codes will be sent to the Vocabulary Server for translation to standard code sets. Once the EMPI and vocabulary processing is complete, the interface engine will transform the information into a consumable message for the appropriate receiving system(s).
        i. An example using OSIIS immunization data would entail the transmission of the encrypted batch file to the interface engine; the interface engine would de-encrypt the file and begin extracting the data from the batch file. Once the data is extracted the interface engine would send appropriate information to the shared EMPI as well as the vocabulary server. Once the EMPI and vocabulary functions are complete the interface engine would transform the data into a message consumable by the OpenHIO Clinical Data Repository and/or the end receiver, such as the MMIS.
2. External Data Request – A Request for Information to the OSDH Systems

a. The data pull/request is best illustrated by example. An OpenHIO user that has all appropriate clearances requests a view of data from the STD*MIS for a specific patient. The request comes from the OpenHIO user and is electronically transmitted to OSDH. Once received by OSDH, appropriate security would be re-checked and if approved the interface engine parses the request and sends demographic data to the shared EMPI. The EMPI then returns the demographic data with the appropriate STD*MIS patient identifier added. The interface engine then formats a STD*MIS consumable data request message and forwards that to the STD*MIS. The STD*MIS finds the requested data and returns a message with the request results to the OSDH interface engine. The interface engine then formats the results into an OpenHIO consumable format and the STD*MIS is displayed to the user. Please note – in this case the view is temporary/transient, no data is stored in the OpenHIO central repository.

3. The OpenHIO is a future addition and will be the recipient of data in most cases, i.e., OpenHIO will transport existing data to the appropriate recipients and will not generate new data. In most cases, especially with OSDH, the OSDH data would be used in a transient/temporary view of the data rather than being stored in the centralized data repository associated with the OpenHIO.

The figure below provides a view of this scenario in a logical view.

Figure 4: Optimized Hybrid Solution

5.2 HIT Environment

The State of Oklahoma's technical vision for IT in general is to construct an inter-departmental, long-span enterprise service bus with a key component being federated identity management. This vision aligns with the directives coming from the Office of the National Coordinator for Health Information Technology (ONC) as well as the Seven Conditions and Standards for Enhanced Funding recently issued in April 2011 by CMS (https://www.cms.gov/Medicaid-Information-Technology-MIT/downloads/Enhanced-Funding-Requirement-Seven-Conditions-and-Standards.pdf).

In addition to supporting federal directives, the vision for health information technology must provide a technological foundation that will support the exchange of data between departments. This foundational technology will also enable OSDH data exchange to support key agency functions, as described below.

- OSDH acts to:

  - Prevent, investigate, and intervene to reduce disease, injury, and disability
  - Promote physical and mental health to improve overall population health
  - Bridge gaps in clinical services and provide entrée into the health system for needy and high-risk populations
- OSDH envisions many benefits in electronic exchange and interoperability to support those goals, such as:
  - Improved timeliness for surveillance and response
  - Improved communications for all programs, surveillance and services
  - Improved communications and exchange with and between local health departments and physicians
  - Better assessment, outreach and intervention of populations
  - Improved identification of populations/areas of need for prevention and intervention
  - Access to more complete and accurate data through EHRs
  - Utilize more person specific data in EHRs, such as lifestyle and risk factors, to help bridge service/care gaps
  - Mine EHR data directly to improve surveillance and assess population health
  - Mine EHR data to target and improve physician practice and education
  - Facilitate self-management of chronic conditions in coordination with other agencies and programs
  - Mandated reporting through the HIO
  - Better support for county health services
  - Simplify the process of matching client information across programs
  - Improved identification of reimbursable services

Scenario 1 and Scenario 3 of this document present two approaches to initiating data exchange between OSDH and an external department, OHCA. This is the first step in achieving broader exchange that will support the goals stated above and align with the national and Oklahoma vision.

Once the first step of data exchange is achieved, there will be an opportunity to launch forward in attaining the vision of interdepartmental data exchange on a much grander scale. The architecture to support this vision is illustrated in the figure below.

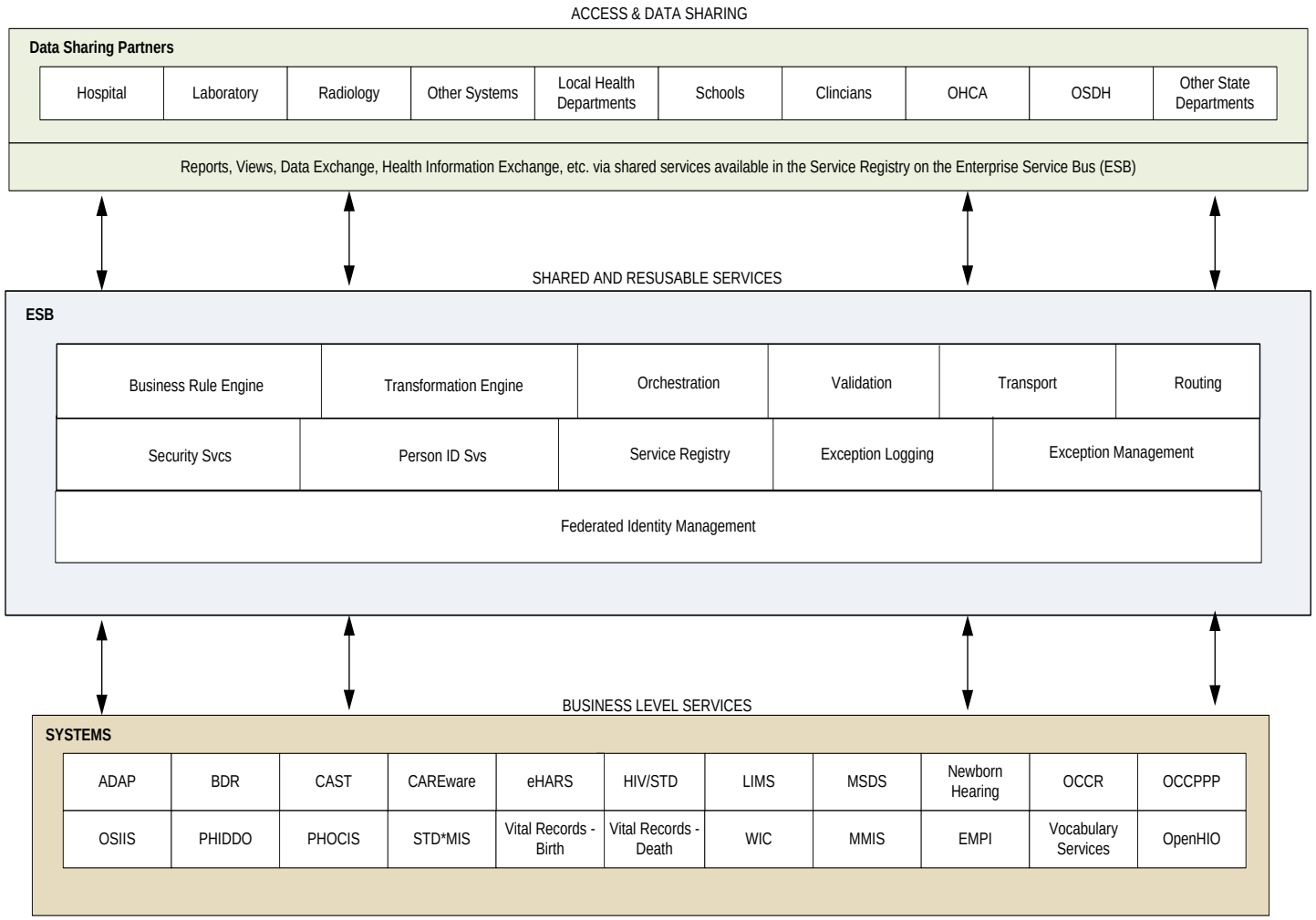


Figure 5: Architecture Supports the HIT Vision

5.3 Architectural Details

The Figure above presents an OSDH/OHCA representation of a service oriented approach to data exchange. This architecture proposes a multi-layer approach with the layers being (from top to bottom).

- **Access and Data Sharing**
  This layer represents the users of the data exchange. Users in this case may be defined as people interacting with this service oriented approach or systems electronically interacting to exchange data.
- **Enterprise Service Bus (ESB)**
  This layer provides the shielding of users from the complexities of the business level services. The ESB will manage:
  - **Business Rules**
    The business rules describe the operations, definitions and constraints that apply to the data and use of the ESB
  - **Message Transformation**
    Message transformation is the basic interface engine services, i.e., translation of message from one format to another
  - **Orchestration**
    Orchestration is the management of the flow of messages, i.e., orchestration is the equivalent of the ESB traffic police ensuring a smooth, steady flow of messages.
  - **Validation**
    Validation services help ensure that only well-formed and conformant messages move on the ESB.
  - **Transport**
    The transport service moves the messages from point A to point B.
  - **Routing**
    Routing works hand-in-hand with orchestration and transport to ensure the right message gets to the right place.
  - **Security Services**
    Security services will ensure the rules associated with users' authentication and authorization are enforced. Please note that the security services do not replace or override the security associated with the various systems at the business services level, e.g., the security model associated with the STD*MIS is still in place and is not overridden.
  - **Service Registry**
    The service registry maintains the library of services available to the users of the ESB, e.g., Patient ID services. The service registry allows the users to

understand and "call" the services available on the ESB as needed given the users have the correct security clearance.

- **Exception Logging**
  Exceptions are instances where the normal flow of operation on the ESB is interrupted. The exception log records these instances.
- **Exception Management**
  The Exception Management service defines what to do when an exception occurs.
- **Federated Identity Management**
  The federated identity management service links a user's electronic identity and attributes, which may be stored across multiple distinct identity management systems

- **Business Level Services**
  The business level services are the actual systems that can provide data to the end users. In this example the systems listed are the core systems from OSDH and OHCA. As this model expands across departments the number of systems will increase.

5.3.1 Architectural Use Example

Figure 6, as previously stated, is a vision for HIT in the future. The following example will exercise this architecture. The example is a physician requesting a view of the immunizations available for the patient he is seeing. In this example, the immunizations are residing in the OSIIS system.

- Step 1: The physician will log on to their electronic medical record (EMR) at the practice
- Step 2: The physician will then request via the EMR to view immunizations
- Step 3: The EMR will electronically send, via a web services call, the physician's username and password to the ESB
- Step 4: The ESB calls the orchestration services
- Step 5: The orchestration service passes information to the federated identity management services to enable the logon based on the information sent from the EMR
- Step 6: Once logged, the orchestration services pass the user information to the security services to determine the physician's permissions on the ESB, e.g., what the physician can access
- Step 7: Once authorized, the orchestration services call the patient ID services that in turn access the EMPI
- Step 8: The EMPI returns identifier information, e.g., the patient identifier used in OSIIS
- Step 9: The orchestration services receive this information and calls a service to access OSIIS

- Step 10: OSIIS receives this information and validates the physician with its own security module, then gathers the appropriate data and returns that data to the orchestration services
- Step 11: The orchestration services then calls the message transformation services to ensure the information being returned to the requesting physician is consumable by the EMR
- Step 12: Once the message is complete the validation services are call to ensure the message being returned to the requesting physician is conformant
- Step 13: Upon validation the message is passed to the orchestration service and the orchestration service calls the routing service
- Step 14: The routing service returns the message to the requesting EMR
- Step 15: The EMR processes the data and displays the immunization information to the physician
- Step 16: Since the immunization view was transient, i.e., not stored in the EMR, when the physician logs out of his session the immunization data is flushed from all EMR caches or temporary storage mechanisms. Physicians with certified EHR technology will call the service each time the information is needed, ensuring the physician always has the most up to date information to make decisions on immunizations needed at the point of care

While there are many steps in the process, when properly deployed, these 16 steps will be executed in sub-second time.

6 COST/BENEFIT ANALYSIS

CMS has released several State Medicaid Director (SMD) letters that speak to funding allocations under HITECH and Affordable Care Act (ACA) funding and how those may be extended to Medicaid partners under certain conditions. These letters are:

- **August 17, 2010:** Federal Funding for Medicaid HIT Activities[5]
- **May 18, 2011:** Use of administrative funds to support health information exchange as part of the Medicaid EHR Incentive Program[6]
- **August 10, 2011:** Tri-Agency letter on exceptions to cost allocation requirements for eligibility determination systems[7]

In addition, CMS issued the Seven Conditions and Standards document outlining criteria that must be met by the states in order for Medicaid technology investments to be eligible for the enhanced match funding. These dimensions of development and artifacts are essential to help states ensure they are making efficient investments and will ultimately improve the likelihood of successful system implementation and operation. The Seven Conditions and Standards are:

[5] SMD# 10-016
[6] SMDL# 11-004/ARRA #9
[7] (USDA)

- Modularity
- MITA
- Industry Standards
- Leverage
- Business Results
- Reporting
- Interoperability

These requirements establish the parameters for enhanced funding and the criteria that will be considered in determining CMS approval.

The three scenarios described in this document were each subjected to a cost benefit analysis to determine both the overall estimated costs for each scenario and estimate the percentage of costs that could be covered by Federal Funds Participation (FFP) under Oklahoma's Medicaid EHR Incentive Program funding.

The cost categories included are those required by CMS for an Advance Planning Document (APD), which is the budget form required from state Medicaid agencies to submit funding requests to CMS. The categories include hardware, software, staffing, contracting, education and training, and other activities to plan/implement the solutions (e.g., installation and testing).

6.1 Federal Funds Participation and Other Requirements

CMS, under the State Medicaid Director's Letter (SMD) # 10-016 dated August 17, 2010, outlines guidance for Federal Funding for Medicaid HIT Activities receiving 90% FFP. In applying this guidance for HIT initiatives, the State of Oklahoma seeks to develop transformative tools that will improve the quality, efficacy, timeliness, and safety of patient care by leveraging the momentum provided by the American Reinvestment and Recovery Act's (ARRA) EHR Incentive programs to ensure that the innovations enabled by technology can support the framework of health exchange and health care reform (the Affordable Care Act, ACA).

The expenditures outlined below directly relate to the design, development, and testing of a gateway between the MMIS and an immunization registry that support meaningful use exchange in the short term and health care reform efforts over the longer term along with the development of an EMPI.

Additional guidance provided by DHHS outlined in an August 10, 2011 letter provides an exception to the cost allocation requirements set forth in OMB Circular A-87 (Section C.3) to allow federally funded human services programs to benefit from investments in State eligibility systems being developed by State-operated Exchanges, Medicaid and the Children's Health Insurance Program (CHIP).

The recent exception to OMB Circular A-87 supports the State's effort to meet the ACA requirements to expand health insurance coverage to tens of millions of individuals starting January 1, 2014 with the development of an EMPI. This exception would result in an FFP increase from 50% to 90% for DDI of these systems.

6.1.1 Assumptions

General Assumptions:

1. As noted in the summary table, the allocation of the EMPI at the enhanced FFP is currently set at 60% of the total cost applying to 90% FFP based on the Medicaid proportion.
    a. The actual proportion will be adjusted after the creation of the EMPI in order to determine an accurate Medicaid proportion.
2. DDI will cover 7 calendar quarters.

Scenario 1 Fully Integrated Option:

1. Leverage current contractor rates for the project and their current rates apply for development.
2. State and Contractor rates are based on actual personnel hourly rates.

Scenario 2, OSDH Standalone Solution:

1. OSDH rates of $48 per hour were used for the calculation of staff time. This rate includes fringe.
2. Ninety percent (90%) FFP will only apply to the development of system API connecting to the ESB.
3. DDI contractor rates for development are based upon SoonerCare Contractor rates increased by 25%. This assumption is based upon the completive rates OHCA receives due to the size of HPES.

Scenario 3, Optimized Hybrid Option:

1. HPES, OHCA's current FA is the contractor for the project and their current rates apply for development.
2. The Optimized Hybrid solution was estimated based on only one EMPI build and does not cover building separate EMPIs for OSDH and one for OCHA.

6.2 Scenario 1 – Fully Integrated – Leveraging the Existing OHCA Infrastructure

In the first scenario investigated OHCA would provide the current DDI contractor, staffing and tools to support OSDH in implementing an effective infrastructure in order to participate in the State's future HIO. This option provides the State of Oklahoma with the lowest total State funds participation of all three options reviewed. The financial advantages for the State of Oklahoma, as a whole, come from sharing several costly key components as shown in Table 3 below that are integral to the cost benefit analysis.

Table 3: Fully Integrated Option

Federal Fund Participation	FFY 2012	FFY 2013	FFY 2014	FFY 2015	Total
Federal Fund Participation (90%)	$2,529,008.89	$2,040,813.83	$3,326.40	$3,326.40	$4,576,475.52
Federal Fund Participation (75%)	$1,133,886.00	$357,565.80	$357,565.80	$357,565.80	$2,206,583.40
State Funds Participation	$728,962.99	$373,945.69	$147,558.20	$147,558.20	$1,398,025.08
Total FFP	**$4,391,857.88**	**$2,772,325.32**	**$508,450.40**	**$508,450.40**	**$8,181,084.00**
OSDH	$291,585.20	$149,578.28	$59,023.28	$59,023.28	$559,210.03
OHCA	$437,377.79	$224,367.42	$88,534.92	$88,534.92	$838,815.05
State Funds Participation	$728,962.99	$373,945.69	$147,558.20	$147,558.20	$1,398,025.08

One of the assumptions in Scenario 1 is that OHCA will continue to utilize its existing contract for the development of its HIO, precluding the need for an additional procurement, which would substantially reduce the time and effort needed to identify state or contractor resources to develop the RFP, and to evaluate and score bids. The OCHA has already purchased the software tools, and adding licenses would save additional State funds. Although a reprocurement would not require a significant increase in overall project funds, an additional benefit of retaining HPES in the HIO development effort is the purchasing power HPES commands in the market for software components. In some instances, the prices of specialized software HPES can obtain due to worldwide contracts cannot compete with the contracts a particular state or even another software integrator other than HPES could negotiate.

Scenario 1 also has the State purchasing a single EMPI product. This is a key element in meeting CMS requirements in the SMD# 10-016 dated August 17, 2010, Enclosure A and C. Moreover, this approach also meets section 2.4 Leverage Condition as referenced in the Enhanced Funding Requirements: Seven Conditions and Standards Medicaid IT Supplement (MITS-11-01-v2.0) Version 2.0 dated May 2011. Choosing to share an EMPI up front saves duplicate costs of developing a separate OSDH-specific EMPI and the additional costs of either synchronizing that EMPI with OHCA's EMPI or an eventual conversion to a single State or HIO identifier.

6.3 Scenario 2 – Option 2: OSDH Standalone

Scenario 2 is similar to Scenario 1 except all processing is handled by OSDH and done behind the OSDH firewall. The value in this scenario is that it would allow OSDH to drive the solution from beginning to end: selecting/building systems, acquiring alternative COTS products, leveraging parts or the entire toolkit from OHCA, or creating some combination of the aforementioned. Each of these approaches outlined below, to build, acquire, or a combination specific to OSDH, show additional costs over Scenario 1.

Table 4: OSDH Standalone

Federal Fund Participation	FFY 2012	FFY 2013	FFY 2014	FFY 2015	Total
Federal Fund Participation (90%)	$66,528.00	$0.00	$3,326.40	$3,326.40	$73,180.80
Federal Fund Participation (75%)	$0.00	$0.00	$0.00	$0.00	$0.00
State Funds Participation	$4,883,682.71	$3,153,908.68	$788,513.14	$788,513.14	$9,614,617.68
Total FFP	**$4,950,210.71**	**$3,153,908.68**	**$791,839.54**	**$791,839.54**	**$9,687,798.48**
OSDH	$4,843,765.91	$3,153,908.68	$786,517.30	$786,517.30	$9,570,709.20
OHCA	$39,916.80	$0.00	$1,995.84	$1,995.84	$43,908.48
State Funds Participation	**$4,883,682.71**	**$3,153,908.68**	**$788,513.14**	**$788,513.14**	**$9,614,617.68**

However, as expected, Scenario 2 has the highest overall costs and requires the largest contribution of State funds. Within each scenario in the cost benefit analysis, the base costs associated with the EMPI, the ESB and the application programming interface (API) are fairly similar, but in this scenario OSDH could bear additional costs related to purchasing and licensing for separate software. Both Scenario 2 and 3 would require a new procurement by OSDH, with the possibility of higher contractor rates over current OHCA vender rates, and with the likelihood that a new contractor could require a substantial learning curve in understanding the Oklahoma and OSDH environments to be fully effective. This scenario would receive the lowest FFP from CMS, making this the mostly costly option for OSDH to pursue. The FFP for Scenario 2 would only provide enhanced 90% DDI FFP for the development of the system APIs (Application Programming Interfaces) for connection to the EMPI.

Table 5: Scenarios Component Cost

Scenarios	Fully Integrated	OSDH Standalone	Optimized Hybrid
Sub-project 1: EMPI	$770,000.00	$887,075.00	$887,075.00
Sub-project 2: API Development and Testing	$81,312.00	$81,312.00	$81,312.00
Sub-project 3: ESB DDI & Op Hardware/Software	$2,326,111.20	$2,612,675.46	$2,729,750.46
Steering Team	$38,713.28	$29,034.96	$60,489.50
State SMEs	$438,649.12	$947,440.52	$537,345.17
SMEs Internal/Contractor	$2,548,000.00	$2,912,000.00	$2,839,200.00
DDI Contractor	$1,978,298.40	$2,218,260.54	$1,978,298.40
Total Estimated Project Cost	**$8,181,084.00**	**$9,687,798.48**	**$9,113,470.54**

There are specific areas that will affect the overall costs for this option. The EMPI costs in Scenario 2 are approximately 15% higher due to the additional cost to procure a DDI vendor, increased direct State (OSDH) resource time, and anticipated slightly higher resource rates than those used for OHCA existing DDI Contractor. Given the extent of the project, a full implementation by OSDH would require a DDI Contractor that would increase resource costs

over Scenario 1 by an estimated 13%. To calculate resource costs, a sampling of Salary.com developer rates were used and compared to currently contracted OCHA DDI Contractor rates. This disparity could be due to a number of reasons; however, the two most likely reasons are: 1) the length of engagement of the OCHA Contractor and 2) the availability of resources within the OCHA Contractor as opposed to that of Oklahoma City at large.

For Scenario 2, overall State SME costs are significantly higher and would be incurred by OSDH. This reflects the exclusion of enhanced 90% DDI FFP from CMS along with the need for a higher degree of internal SME participation to accomplish an independent development effort. While not specifically quantified, there will also be costs associated with taking time away from the State SMEs' normal jobs, potentially incurring additional costs to provide temporary coverage or hidden costs of work not accomplished in a timely manner.

6.4 Scenario 3 – Optimized Hybrid

Scenario 3 is an optimized hybrid solution where OSDH and OHCA would share EMPI services. The use of a common identifier and/or the ability to map local identifiers to a common identifier is foundational to data exchange, and Scenario 3 provides exactly that service. The value of Scenario 3 is the ability to leverage existing software licenses as well as allowing OSDH control over protection of and access to their data. Sharing an EMPI provides the biggest overall cost benefit, with a significant short term cost benefit from sharing software, licensing and expertise but also with longer term cost benefits as it would eliminate the need for aligning or replacing an independent EMPI in the future to enable full HIO participation.

Table 6: Optimized Hybrid

Federal Fund Participation	FFY 2012	FFY 2013	FFY 2014	FFY 2015	Total
Federal Fund Participation (90%)	$2,743,538.16	$2,196,789.60	$3,326.40	$3,326.40	$4,946,980.56
Federal Fund Participation (75%)	$1,059,489.21	$333,118.13	$333,118.13	$333,118.13	$2,058,843.58
State Funds Participation	$1,092,853.99	$500,742.89	$257,024.75	$257,024.75	$2,107,646.39
Total FFP	**$4,895,881.36**	**$2,945,631.74**	**$508,450.40**	**$508,450.40**	**$9,113,470.54**
OSDH	$702,799.22	$285,316.03	$187,828.78	$187,828.78	$1,363,772.82
OHCA	$390,054.77	$215,426.85	$69,195.97	$69,195.97	$743,873.57
State Funds Participation	$1,092,853.99	$500,742.89	$257,024.75	$257,024.75	$2,107,646.39

7 SUMMARY

7.1 Findings and Recommendations

From both a technical and a cost perspective, the Cognosante team recommends OSDH adopt the optimized hybrid architecture outlined in Scenario 3. This scenario enables OSDH to maintain control of its data while implementing a cross-departmental patient identifier using OHCA EMPI and would result in reducing agency costs. The figure below reviews the optimized hybrid architecture.

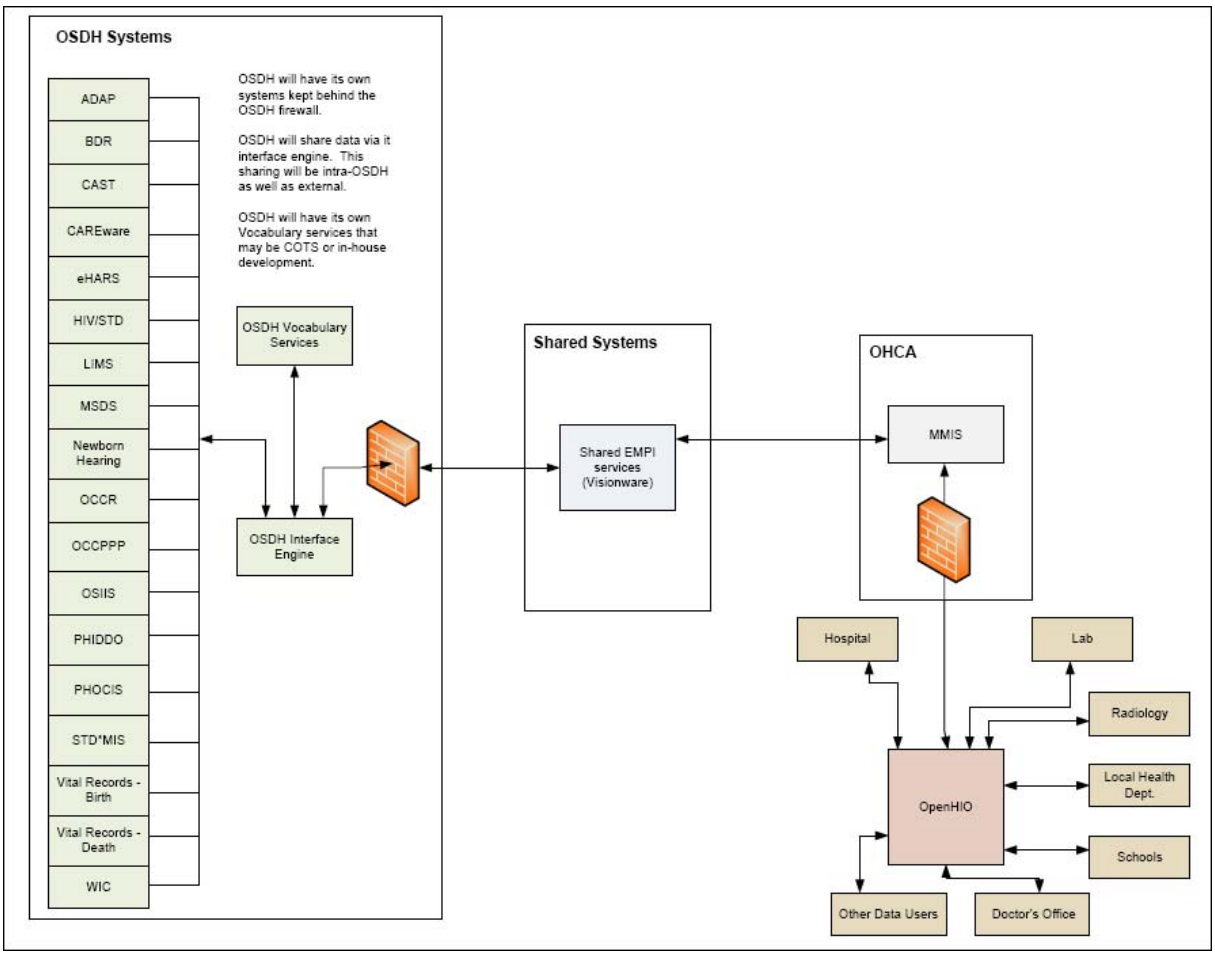


Figure 6: Optimized Hybrid Architecture

Table 7: Project Summary below summarizes the three scenarios analyzed in the Cost Benefit Analysis. The Excel workbook containing the full cost benefit analysis supplies the corresponding estimated costs in detail for the project term of November 2011 to January 2014 and is located in Appendix E. All three scenarios include hardware, software and licensing, and resource costs.

In Scenario 1, some aspects of hardware and infrastructure cost are lower than those in the Scenario 2 and 3 due to the use of components and/or tools already purchased and in place. Additional differences can be attributed to the labor rates of the current OHCA contractor and their ability to purchase software at deeply discounted pricing due to their enterprise size versus those that would be expected using a new contractor.

The differences between the scenarios then become substantial when the associated enhanced funding for the project is applied to the estimated cost. As the totals in Table 7 point out, the State Funds Participation is almost 9 times larger in Scenario 2 compared to Scenario 1.

Table 7: Project Summary

	Alternatives		
Federal Fund Participation	**Fully Integrated**	**OSDH Standalone[1]**	**Optimized Hybrid**
Federal Fund Participation (90%)	$4,576,475.52	$73,180.80	$4,946,980.56
Federal Fund Participation (75%)	$2,206,583.40	$0.00	$2,058,843.58
State Funds Participation	$1,398,025.08	$9,614,617.68	$2,107,646.39
Total Estimated Project Cost	**$8,181,084.00**	**$9,687,798.48**	**$9,113,470.54**
OSDH	$559,210.03	$9,570,709.20	$1,363,772.82
OHCA	$838,815.05	$43,908.48	$743,873.57
State Funds Participation	$1,398,025.08	$9,614,617.68	$2,107,646.39

NOTE[1]: OSDH would be eligible for enhanced funding under the OSDH standalone scenario for interface development to the EBS for the database under their management.

NOTE[2]: General - The allocation of the EMPI at the enhanced FFP for ongoing operations is set at 60% (OHCA share) which then receives 90% FFP based on the Medicaid proportion. The OSDH Standalone option bears all cost for the software and hardware behind the OSDH firewall with the exception of the API development cost.

In the final calculations, the results are dramatic when the 90% FFP for all three scenarios is computed. Table 8: FFP Project Percentages evaluates each option's FFP totals against that scenario's total estimated cost.

Table 8: FFP Project Percentages

Federal Fund Participation Project Percentages	Alternatives		
	Fully Integrated	**OSDH Standalone**	**Optimized Hybrid**
Federal Fund Participation (90%)	55.94%	0.76%	54.28%
Federal Fund Participation (75%)	26.97%	0.00%	22.59%
State Funds Participation	17.09%	99.24%	23.13%
Total Estimated Project Cost	**100.00%**	**100.00%**	**100.00%**
State Funds by Agency			
OSDH	40.00%	99.54%	64.71%
OHCA	60.00%	0.46%	35.29%
State Funds Participation	100.00%	100.00%	100.00%

As demonstrated, Scenario 1's 90% FFP represents 55.94% of the total estimated funds for this scenario, whereas Scenario 2's 90% FFP is reduced to 0.76%. A higher percentage of 90% FFP is demonstrated in Scenario 3 due to the increased contractor labor cost involved with both OHCA and OSDH contributing separate resources to accomplish the development.

It is important for OSDH to remember that this funding opportunity is available for the life of the Medicaid EHR Incentive Program, through 2016. Although the agency must choose a scenario to use for planning purposes for the first year and to develop the APD, it does not require an absolute decision for the life of the Incentive Program. Therefore, there will be annual opportunities for OSDH to rethink their approach and reconsider full participation (Scenario 1) as the OpenHIO comes together and becomes fully operational or as additional assessment by OSDH determines that another option is more appropriate.

7.2 HIT Roadmap and Next Steps

7.2.1 Roadmap

This section provides a high-level roadmap for OSDH to implement the recommended hybrid architecture. The roadmap is a series of tasks and is illustrated as a flowchart as depicted in the figure below.

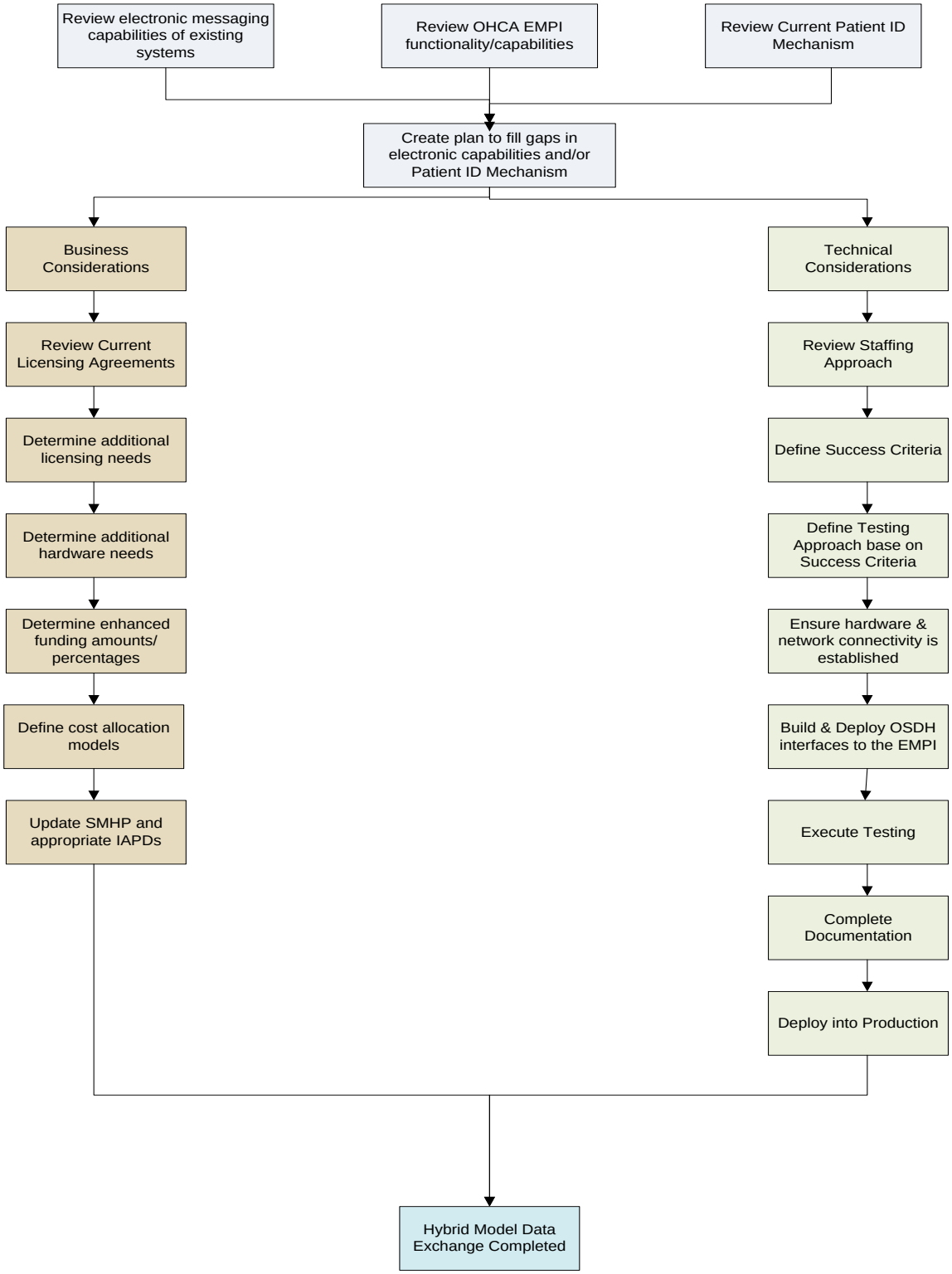


Figure 7: OSDH Roadmap to Realize Hybrid Architecture

7.2.2 Next Steps

Depending upon the chosen scenario, work on the project may begin immediately. If Scenario 1 or 3 is chosen, OSDH and OHCA will need to work collaboratively to develop an APD to submit to CMS through OHCA to request enhanced funding for the project. The planning effort will identify resources from both agencies to be dedicated to the project; parameters for interaction and data sharing; and in the process help both parties understand each other's critical needs. Agency and/or Contractor staff may be engaged to work on the planning effort, which will be undertaken jointly. The initial tasks will be to identify the purpose, develop a statement of needs and objectives, identify resource needs, define the nature, scope and activities to be undertaken; and develop the proposed schedule and budgets.

At the same time, there are immediate next steps OSDH will need to pursue to prepare for developing the APD and while awaiting funding approval. Those immediate next steps are:

- Review existing electronic messaging capabilities of the current OSDH systems. Specifically the ability to generate an outbound message with demographic information and receive inbound messages from the EMPI.
- Review OSDH capabilities for purchasing or building an interface engine and vocabulary services
- Review current OSDH system patient identification approaches
- Document gaps between the As Is and the To Be, i.e., hybrid architecture, states
- Develop timelines for implementation
- Determine planning activities necessary for adoption and implementation, such as:
    - Setting meeting schedules with OHCA and OSDH staff to plan and share information to develop a coordinated approach to using the tools and exchanging information
    - Investigating options for exchanging data from other OSDH systems using lessons learned from OSIIS
    - Establishing agency-wide exchange rules and policies
    - Establishing a single agency exchange agreement/MOU

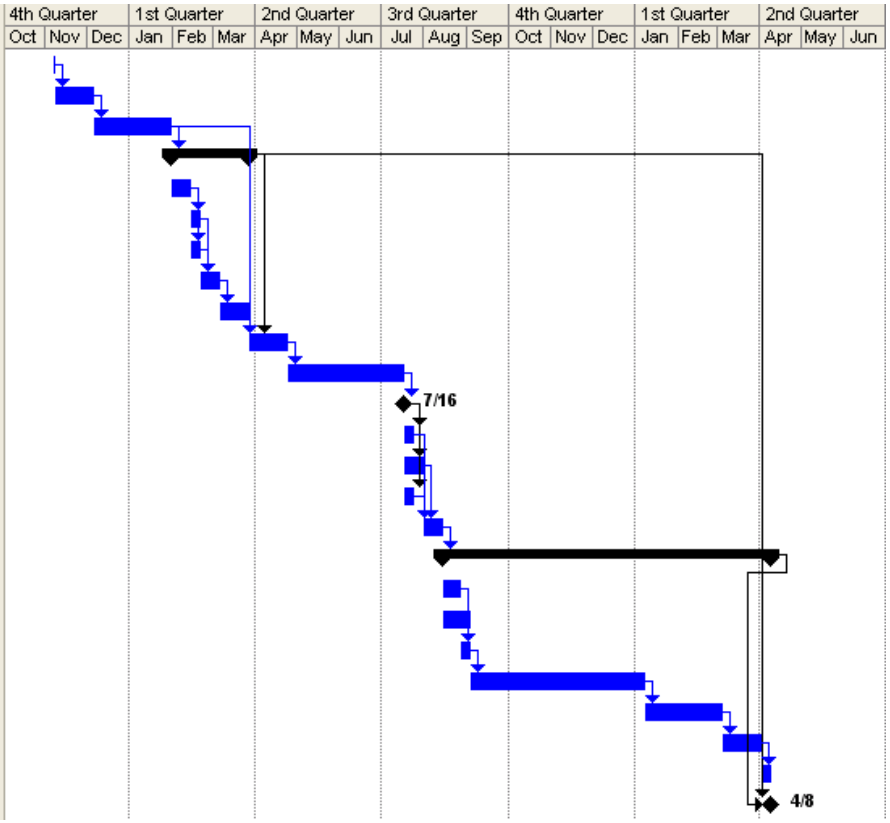
      Begin to identify the specific business rules required to exchange specific types of data

7.2.3 Timeline

The timeline for completing the Roadmap tasks is shown in Figure 8 below.

Figure 8 Project Timeline

Task Name	Duration	Start	Finish
Approval of Recommended Approach	1 day?	Mon 11/7/11	Mon 11/7/11
Build APD for Planning $$	20 days	Tue 11/8/11	Mon 12/5/11
CMS Approval of APD	40 days	Tue 12/6/11	Mon 1/30/12
Business Considerations	**40 days**	**Tue 1/31/12**	**Mon 3/26/12**
Review Current Licensing Agreements	10 days	Tue 1/31/12	Mon 2/13/12
Determine Additional Licensing Needs	5 days	Tue 2/14/12	Mon 2/20/12
Determine Additional Hardware Needs	5 days	Tue 2/14/12	Mon 2/20/12
Determine Enhanced Funding $$ & %	10 days	Tue 2/21/12	Mon 3/5/12
Define Cost Allocation Models	15 days	Tue 3/6/12	Mon 3/26/12
Construct IAPD	20 days	Tue 3/27/12	Mon 4/23/12
Submit for CMS Approval	60 days	Tue 4/24/12	Mon 7/16/12
CMS Approval	0 days	Mon 7/16/12	Mon 7/16/12
Review Current System Messaging Capabalities	5 days	Tue 7/17/12	Mon 7/23/12
Review Proposed EMPI Capabilities	10 days	Tue 7/17/12	Mon 7/30/12
Review Current Patient ID Mechanisms	5 days	Tue 7/17/12	Mon 7/23/12
ID Gaps & Prepare Plan to Fill Gaps	10 days	Tue 7/31/12	Mon 8/13/12
Technical Considerations	**170 days**	**Tue 8/14/12**	**Mon 4/8/13**
Review Staffing Approach	10 days	Tue 8/14/12	Mon 8/27/12
Define Success Criteria	15 days	Tue 8/14/12	Mon 9/3/12
Ensure hardware/network connectivity	5 days	Tue 8/28/12	Mon 9/3/12
Build & Deploy OSDH EMPI Interfaces	90 days	Tue 9/4/12	Mon 1/7/13
Execute Testing	40 days	Tue 1/8/13	Mon 3/4/13
Complete Documentation	20 days	Tue 3/5/13	Mon 4/1/13
Deploy Into Production	5 days	Tue 4/2/13	Mon 4/8/13
Hybrid Model Data Exchange Completed	0 days	Mon 4/8/13	Mon 4/8/13



APPENDIX A: SYSTEM INTERVIEW FORM

OSDH Interoperability & Tactical Plan
Public Health Information Technology Assessment

Date:

Information System: ***OSDH Unit:***

Interviewees (list):

Contact: (For additional information):

Title: ***Phone:*** ***Email:***

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1. Describe this information system and its functions, what it does. Identify the year it was implemented.

2. Describe whether the system is COTS, custom, or a combination. Identify the system platform.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.)

4. Does the data or system currently utilize any standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

5. What identifier or primary 'sequence' or 'key' is used in the data (e.g. Provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

6. Please describe the process flow for the business processes that utilize this system.

7. Describe any web or portal interfaces the system currently has. What are these interfaces used for: reporting, access to data, data analysis, other. What are the requirements to access the web or portal interfaces?

8. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? Note if any of those interfaces are automated, and how.

9. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)?

10. Please describe any privacy restrictions on sharing the data in this system.

11. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

12. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

System Documentation	Available?	Provided?
Logical and physical data models		
Business process model		
Detail data dictionary/ field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		

APPENDIX B: SYSTEM INTERVIEW NOTES

Interview List

1. AIDS Drug Assistance Program (ADAP)
2. Birth Defects Registry (BDR)
3. Breast and Cervical Cancer Early Detection Program Cancer Screening and Tracking (CaST)
4. CAREWare
5. Evaluation of HIV/AIDS Reporting System (eHARS)
6. HIV/STD Prevention System (XPEMS)
7. Laboratory Information Tracking System (LITS/LIMS)
8. Newborn Hearing Screening System
9. Newborn Metabolic Screening System
10. Oklahoma Central Cancer Registry (OCCR)
11. Oklahoma Childhood Lead Poisoning Prevention Program (OCLPPP)
12. Oklahoma State Immunization Information System (OSIIS)
13. Public Health Investigation and Disease Detection in Oklahoma (PHIDDO)
14. Public Health Oklahoma Client Information System (PHOCIS)
15. Sexually Transmitted Disease Management Information System (STD*MIS)
16. Vital Records - Birth
17. Vital Records - Death
18. Women, Infants and Children (WIC)
19. OSDH Billing Process (not a system)

AIDS Drug Assistance Program (ADAP)

1. Describe this system and its functions. Identify the year it was implemented.

The Aids Drug Assistance Program (ADAP) currently contains only drug information. OSDH is planning to implement process to include client level data. The ADAP system operates as a module in PHIDDO. The system uses a paperless application where case managers enter client application for program participation. HIV/STD Services approves/disapproves the client application. Have case managers at facilities, offices, etc. where clients apply. Have medical case management sites, community based HIV/AIDs organizations that channel people to services.

ADAP includes demographics, financial, insurance, medication, viral load, cd4 levels, other disorders, and other related data.

2. Is the system COTS, custom, or a combination? Identify the system platform.

The ADAP system was created in house, SQL 2005, ASP.net, messaging uses Orion Rhapsody, Eclypsis translator. It uses an address verification web service and GIS (separate).

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

See above.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

The ADAP system does not use national standards for content coding, etc.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

A unique record number, based on name, birth date, gender, is given to each client, and an encrypted number is also assigned and used for exchange purposes.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

The ADAP system is used to collect data, support/manage approval process, import drug utilization data from OU pharmacy and gather premium/home health utilization from Long

Term Care (LTC) Authority, tracking services, analysis. ADAP can connect and externally link to CAREWare data using the unique identifier.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphic below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

The PHIDDO web portal is used to enter applications directly into ADAP. Approvals, denials and other changes can be viewed by case managers on their home page.

OU pharmacy has view access to the system to see when clients are approved so that medications can be dispensed. The pharmacy submits invoices which are paid by the program, all in a manual process; invoices are scanned and paid through the OSDH accounting system.

Clients can be participants in Oklahoma Employer/Employee Partnership for Insurance Coverage, (O-EPIC) for Insure Oklahoma (state low-income insurance program) or receive care from Medicaid. OSDH pays premiums and co-pays for some services. Paper invoices are received from Insure Oklahoma (runs through a private plan) which goes through the agency accounting system for payment of premiums and co-pays.

OSDH would like Medicaid view access to see application status of clients during the eligibility process; individuals can't participate in Ryan White if they qualify for any other program that pays for the covered services. The ability to see client's application in progress would be helpful. The program goal is to ensure there are no gaps in client medication/treatment.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

ADAP interfaces with HIV surveillance and with CAREWare. It doesn't really go beyond that. OSDH sends a separate file to HRSA quarterly.

ADAP exchanges a file with CMS/Medicare Part D using the CMS interface. Ryan White support counts towards Medicare spend down. .

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

All exchanges above share client identifiers.

11. Please describe any privacy restrictions on sharing the data in this system.

Privacy restrictions are strict per State law and an internal policy manual. The privacy restrictions for ADAP are a little less restrictive than HIV/AIDS surveillance.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

Role-based security, Active Directory, HTTPS, firewalls, remote access via laptop using NetMotion.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

OSDH would like to move ADAP functions from PHIDDO to CAREWare. They want to collect more client data, such as risk factors, insurance, etc. System changes are driven by HRSA.

14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

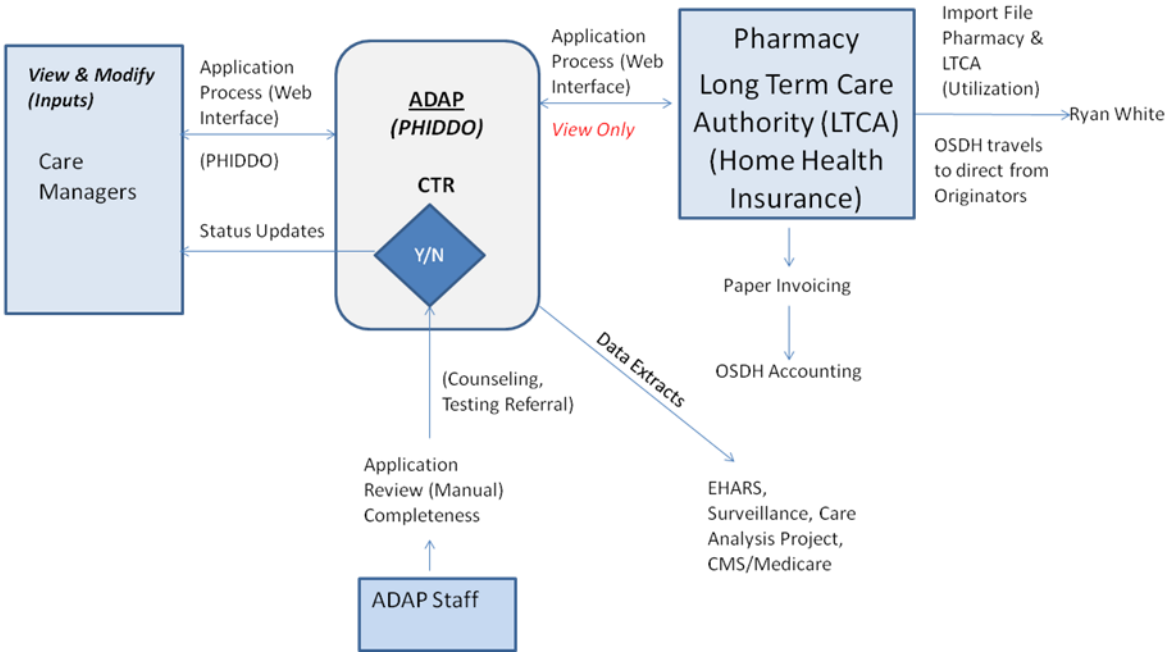
OSDH would like to connect to eHARS and Insure Oklahoma, but no current plans to do so.

15. Any other issues, concerns, considerations we should be aware of?

OSDH would like to connect to Insure Oklahoma during the eligibility determination process to see where the client is in the process to ensure medication coverage doesn't lapse.

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

OK OSDH Aids Drug Assistance Program (ADAP) Workflow Diagram (App Process)



Birth Defects Registry (BDR)

Interviewees (list): Keith Lindsey, Sharon Voss, Vincent Parry, Mike Divillio HCA, Becky Moore, Patsy Lesering, Head of IT

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1. Describe this system and its functions. Identify the year it was implemented.

The Birth Defects Registry (BDR) was implemented in 1991 and went statewide in 1994. The BDR system is a state-wide surveillance system and database. Hospitals send a list of ICD-9 codes for children under 6 (both inpatient and outpatient) to the State; abstractors review list, pull out charts, check registry to see if the child is already in the system. If more information is needed a request is sent to the hospitals. State staff looks into the mother's health and pre-natal care for children entered into the BDR system. Staff identifies the child's relevant records and goes back to the hospitals to manually look over the actual medical records. Create an abstract if one has not been created. In high volume hospitals State staff goes on site every week to review records. The Oklahoma BDR is an active registry vs. passive. The Registry operates on rolling 6 year surveillance. Data is only collected on kids born in Oklahoma, not those who are only treated in OK or transferred into the State. Receive codes electronically (email, etc), charts abstracted on paper, data entered by hand.

OSDH receives 1500-2000 cases per year. Cases are followed for 6 years. A State Editor reviews the sixth year for completeness and/or death before the case rolls off and closes.

2. Is the system COTS, custom, or a combination? Identify the system platform.

The BDR uses a CDC system, using an Access database; with plans to upgrade to a CDC SQL backend and dot.net interface. The program has no information on the current system, contains macros that are easily corrupted, no systems/data documentation. Current Access DB system now hardly works any more. No data dictionary exists.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

In an Access database now. SQL with dot net coming soon.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

The system receives ICD-9 codes sent by the hospitals. The program has an Editor (genetic counselor) who reviews and re-evaluates the ICD-9 codes. After review they can reallocate the child's codes to be more specific if needed (still in ICD-9). Ethnicity coded under CDC requirements? May be modeled on census data coding. Codes come from the hospital, abstracted on paper, and data entered by hand.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

The identifier is a sequential number created by the data manager. It is assigned when the abstractor (Editor) has decided this person should be added to the registry.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

The BDR is required to prepare reports and analysis for national statistics and data aggregation to show trends in ethnicity and health. The State of Oklahoma previously looked at clusters of birth defects and assisted in investigations. BDR data is shared with maternal/child health (MCH) program, and links with MCH high risk factors. The BDR is primarily a database with most analysis done outside of the system. Data maintained will assist with fetal infant mortality reviews, etc.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphic below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

Used to be a connection with Vital Records but no longer operational since Vital Records upgraded their system. The BDR used data from Vital Records to check address, death confirmation. State staff must manually check PHOCIS and OSIIS for this information.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

Birth defect data is primarily shared with MCH, but may have some sharing with epidemiologists for clusters. Data is used in infant mortality reviews. OSDH sends aggregate reports to CDC in Excel.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

OSDH IT is currently building a birth defects module for OKSHARE (using de-identified data).

11. Please describe any privacy restrictions on sharing the data in this system.

The BDR shares data for cluster investigations, which requires the physician to get parental consent. A Memorandum of Understanding (MOU) must be signed between BDR and MCH for data to be shared, due to restrictive law and policy.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

Standard agency security applies. The BDR program staff manages access to the system.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

OSDH IT is looking to perhaps upgrade to a CDC SQL backend and dot.net interface, not yet decided.

14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

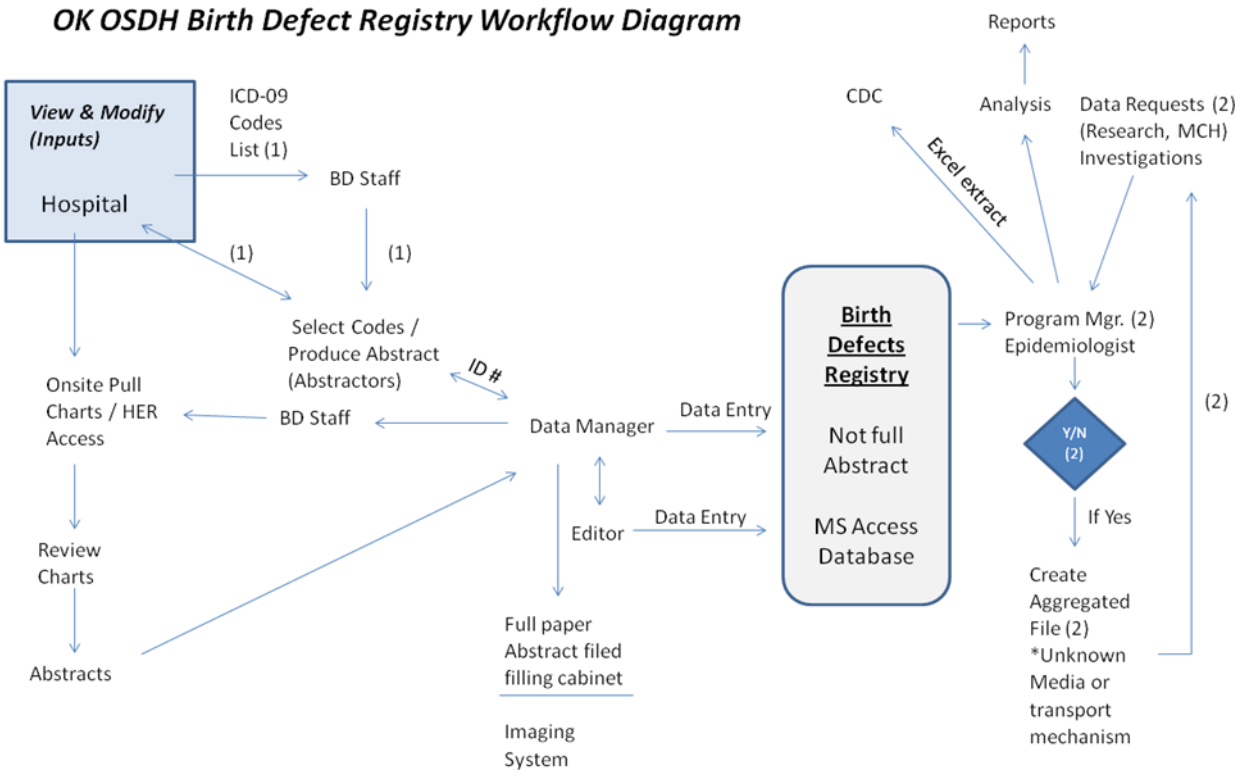
A new system, if adopted, should provide the opportunity to add new interfaces; but a decision has not yet been made. BDR would like to link to newborn screening and vital records systems to confirm in-State births.

15. Any other issues, concerns, considerations we should be aware of?

State staff has concerns about sharing information in an HIE network, feeling that information sharing is not really needed for patient care, etc.

Question: Over SDN secure data network? Is there a CDC web portal? – Sharon Voss will get back on this.

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		


OK OSDH Birth Defect Registry Workflow Diagram
View & Modify (Inputs)
Hospital
ICD-09 Codes List (1)
BD Staff
(1)
(1)
Select Codes / Produce Abstract (Abstractors)
ID #
Onsite Pull Charts / HER Access
BD Staff
Data Manager
Data Entry
Review Charts
Abstracts
Editor
Data Entry
Full paper Abstract filed filling cabinet
Imaging System
Birth Defects Registry
Not full Abstract
MS Access Database
Reports
CDC
Analysis
Data Requests (2) (Research, MCH) Investigations
Excel extract
Program Mgr. (2) Epidemiologist
Y/N (2)
If Yes
Create Aggregated File (2) *Unknown Media or transport mechanism
(2)

Breast and Cervical Cancer Early Detection Program Cancer Screening and Tracking (CaST)

OSDH Unit: Chronic Disease Service

Interviewees (list): Keith Lindsey, Amber – Data Manager/Epidemiologist, Anne Pate, Vincent Parry, Mike Divilio HCA, Becky Moore, Patsy Lesering Head of IT, Tia Yancey BCCEDP Screening and Diagnostics Coordinator

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1. Describe this system and its functions. Identify the year it was implemented.

The Oklahoma BCCEDP (Breast and Cervical Cancer Early Detection Program) began screening women in 1997. Data is collected and maintained in CaST (Cancer Screening and Tracking) database on all services provided to women screened through the program. All clinical information is collected from the screenings through all programs; regardless of who pays or provides the service (multiple sources may be used). CaST is a large Access database supplied by the CDC; which allows the State to track women for follow up services. Client lists are generated out of CaST for letters to be sent out; letters are not generated by CaST. Request for information letters are sent to screening providers if follow up information is not received. OSDH works with Oklahoma Health Care Authority (OHCA) and once a woman has an abnormal breast cancer screening result they qualify for Medicaid. Treatment will be paid by Medicaid; Medicaid does not provide information (other than claims) back to CaST once enrolled. The BCCEDP program receives follow-up data back from providers. OSDH submits Breast and Cervical Cancer (BCC) data to the CDC through the CDC website twice a year, in April and October.

Tracking of BCC clients begins when a provider fills out an imaging coupon which the client takes to a screening facility. After the client receives the screening test the coupon is sent to Chronic Disease Services for billing/payment. For tracking to be complete screening exam results must be returned and entered into CaST. Issues may arise if there is no screening (e.g. clinical breast exam) record in CaST.

2. Is the system COTS, custom, or a combination? Identify the system platform.

The application is an Access database provided by CDC. All data are manually entered into the system.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

The BCCEDP program utilizes a separate, stand alone edits program that is run on an extracted file from CaST. The application resides locally on individual computers, and the application and data resides on an internal server.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

The CaST database uses CPT codes, and standard drop down menus to fill in required data.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

Clients are identified by individual, including full demographics, upon entry the system automatically assigns an ID number (unknown how assigned, numeric). Each person has a record but can have multiple “cycles” which start with screening and go through follow-up. The program serves a large population of illegal immigrants, so it is necessary to search for duplicates; the system sets a probability for matches and the results are manually reviewed.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

All client information is based on forms from providers. There are two primary forms: one captures screening/clinical and test results, the other is a follow-up form. All forms are mailed in to OSDH and providers are paid based on forms submitted. Once a patient is referred, the referring provider also fills out a form and is paid for providing follow-up information. A State contract monitor performs reviews for completeness on all forms submitted and approves the forms for payment to provider. Forms are sent back to provider if incorrect

Forms are reviewed for payment, paid, and then data is entered into CaST. The billing/payment process is manual; no electronic billing is available. Payment is based on Medicare rates. The program has about 40 contract providers. Also work with staff that are part of OKCARES for services and payment.

CaST has the capability for direct provider entry, but not enough State staff to assist providers with training and usage.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphic below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

There are no direct interfaces to CaST, the system is stand alone, and applications are resident on each individual computer.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

CaST has no direct interfaces. Federal and State laws require reporting the results of testing, positives, treatments, etc. The Chronic Disease Service runs queries and reports in excel from data maintained in CaST. These statistics and reports are sent to the State Legislature. Information is also sent back to providers; reports can now run edits by provider. Staff also run reports and queries in Access to get statistics, and can use SQL, has a built in report and query functions.

The application highlights tumor information, etc. once a cancer diagnosis is made. Tumor information is important to be entered into the Cancer Registry. A notice is sent back to the provider to assure reporting to the Cancer registry.

Data from Cancer Registry is retrieved to complete tumor specific variables not submitted by providers. The data is exported in Excel, and then converted to flat file. Client name and demographics are reviewed for matching, then link with Link Plus, if client matches, data is exported from Cancer Registry to CaST. Common elements are standardized across Registry and CaST, but data must be entered into CaST manually. Not a many cases are located this way (approximately 10 per year).

Claims data is obtained from Medicaid when needed. Medicaid information is occasionally used to identify where a woman received diagnostic screening and/or treatments in order to contact the provider to obtain follow-up information.

OSDH sends de-identified raw data twice a year to the CDC by exporting a flat file to the CDC web site. No other entity receives raw data from CaST at this time.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

See above.

11. Please describe any privacy restrictions on sharing the data in this system.

BCCEDP and CaST use the same standards as for the Cancer Registry; there is nothing specific to BCC in State law at this time. OSDH would use a data sharing agreement if data was shared.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

The CaST application is on a secure Windows server which uses standard OSDH security. Users access system on computers through user name/password

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

The CaST system is provided free from CDC, OSDH is unsure of what will happen with the program under health reform since it only covers the uninsured. The State would still be required to do education and screening. Currently there are no plans to update the system: OSDH is waiting until future of the BCCEDP program is clearer.

14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

The OSDH Chronic Disease Service would like a more automated connection to the Cancer Registry, and would like to have access to county health department information in PHOCIS. Perhaps having an electronic interface for providers would be useful, but resources to support users are the concern. CDC requires that 60% of the funding must be spent on services, this limits administrative investment. There is some thought of feeding CaST data into clinical and analytic systems, or perhaps connecting with the Death Registry.

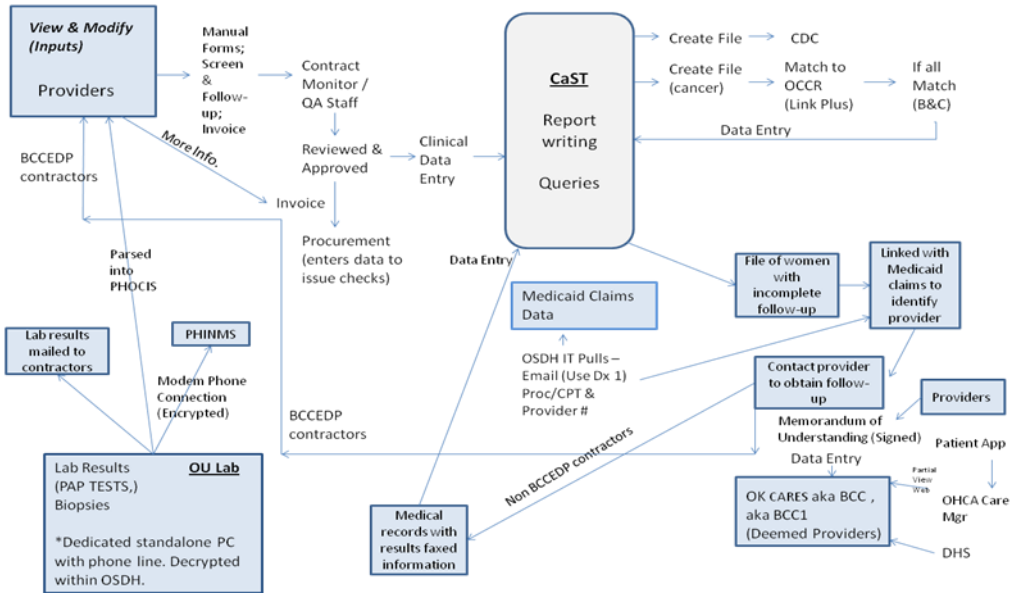
15. Any other issues, concerns, or considerations we should be aware of?

OSDH uses a Medicaid look-up system through a secure website to see if a person is on Medicaid. Services to clients are expanded by utilizing “deemed screeners”, which are non-contracted providers. Women who qualify and are eligible by having an abnormal screen can then immediately sign up for Medicaid. There is a special Medicaid program at OHCA where eligible women can sign up through an application with OSDH Breast and Cervical Program. It is then a manual process from there.

OSDH has a secure website for deemed screeners, which is populated from information on the provider’s screener agreement. The website contains provider demographics, whether they are accepting new clients, and identifies if they are a Medicaid provider. This is a huge Access database and not all the information is available on the website. DHS uses the website to determine if signer of deemed screener agreement is authorized. Approximately 800 providers are in the system now. Data that is entered in the Chronic Disease Service can be accessed by DHS when processing applications and used by OHCA case managers. The client application is mailed to DHS first where they determine if client is medically eligible for the program, and then reviewed for eligibility for other Medicaid programs. The application form is called (BCC-1) from the OCHA side, also referred to as BC1, BCC, etc. It would be useful for the application process to be automated and viewable as well. This application was developed by OHCA., The deemed screener access database resides on OSDH server and stores information such as license expiration, queries on whether the provider will remain a deemed screener, etc. Only information on providers is maintained in this system.

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

OSDH Cancer Screening and Tracking (CaST) / Breast and Cervical Cancer Workflow Diagram



CAREWare

Interviewees (list): Keith Lindsey, Vincent Parry, Becky Moore, Terrainia Harris

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1. Describe this system and its functions. Identify the year it was implemented.

CAREWare is the reporting system under Health Resources and Services Administration (HRSA) for Ryan White program clients. The Ryan White programs promote and track HIV treatment and care services. Mostly adults are enrolled in Ryan White programs. Information is collected on clients served; including demographics, medical care, case management, transportation, dental, and any areas or services that are funded under the program. Core services are primary care, case management, mental health, and transportation. The AIDS Drug Assistance Program (ADAP) has its own system which resides in Public Health Investigation and Disease Reporting of OK (PHIDDO). CAREWare primarily just collects and maintains the data, but also has reporting capabilities and mechanisms for program evaluation and quality assurance. CAREware was established in 2000-2001 and client level reporting to HRSA was instituted in 2010. The current version has been in place for 3 years.

2. Is the system COTS, custom, or a combination? Identify the system platform.

The CAREware system is SQL 2008 developed by a HRSA contractor (JPROG) designed specifically for Ryan White HIV/AIDS program administration. HRSA also contracts with JPROG for system support for users, but this support is only available a few hours/day. The software is free through HRSA.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

Data is in SQL 2008 format.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

Unknown. The CAREware system does not appear to use standard coding for diagnosis and treatment; text fields are used for diagnoses.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

Each client is assigned a unique record number or identifier which is formula-based on name, birth date, gender, and encrypted (for exchange purposes and uploading). The identifier exists in both encrypted and unencrypted forms.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

The CAREware system is used to collect data, for client evaluation, for tracking services, and for client and program analysis. Reporting works well in CAREware.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphic below.

Providers and case managers enter the data into system through a web interface.
Data goes through CAREWare web interface directly into system.
Some paper submissions are received from labs, but they mostly enter into CAREWare.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

CAREware is a stand-alone system which runs on a virtual server and does have a separate web interface for data entry.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

OSDH sends reports to contracted providers; provides a data file two times per year to HRSA (no names and encrypted), and reports de-identified information to HIV/AIDs community organizations.
HIC Care and Prevention primarily shares data with the OSDH HIV Surveillance program. Because of the strict privacy laws data is not shared with other areas. HIV Care and Prevention may respond to requests by doing the analysis internally and providing the response. The system is capable of importing provider data from another CAREWare system, which OSDH would like to add as a new feature.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

Contracted providers and field/case managers enter data into CAREware through a web interface. Data entered is now in an electronic form and goes directly into the system. Manual entry is no longer necessary. HIV Care and Prevention receives data from Medicaid but doesn't send them OHCA.

11. Please describe any privacy restrictions on sharing the data in this system.

HIV/AIDS clients' privacy rights are protected by strict laws, plus OSDH has an additional internal policy manual. However, the data maintained in CAREWare is a little less restrictive than HIV surveillance data.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

The CAREware system is accessed through an encrypted logon and password, etc., program manages access authorization. Data may be encrypted at rest but unknown, check website, probably uses standard agency security. It is unknown how the web portal is secured, probably HTTPS.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

OSDH would like to copy ADAP data from PHIDDO to CAREWare, but there are no current plans to do so. JPROG contractor does regular updates of the CAREware software; while HRSA directs change processes with participation from the states.

14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

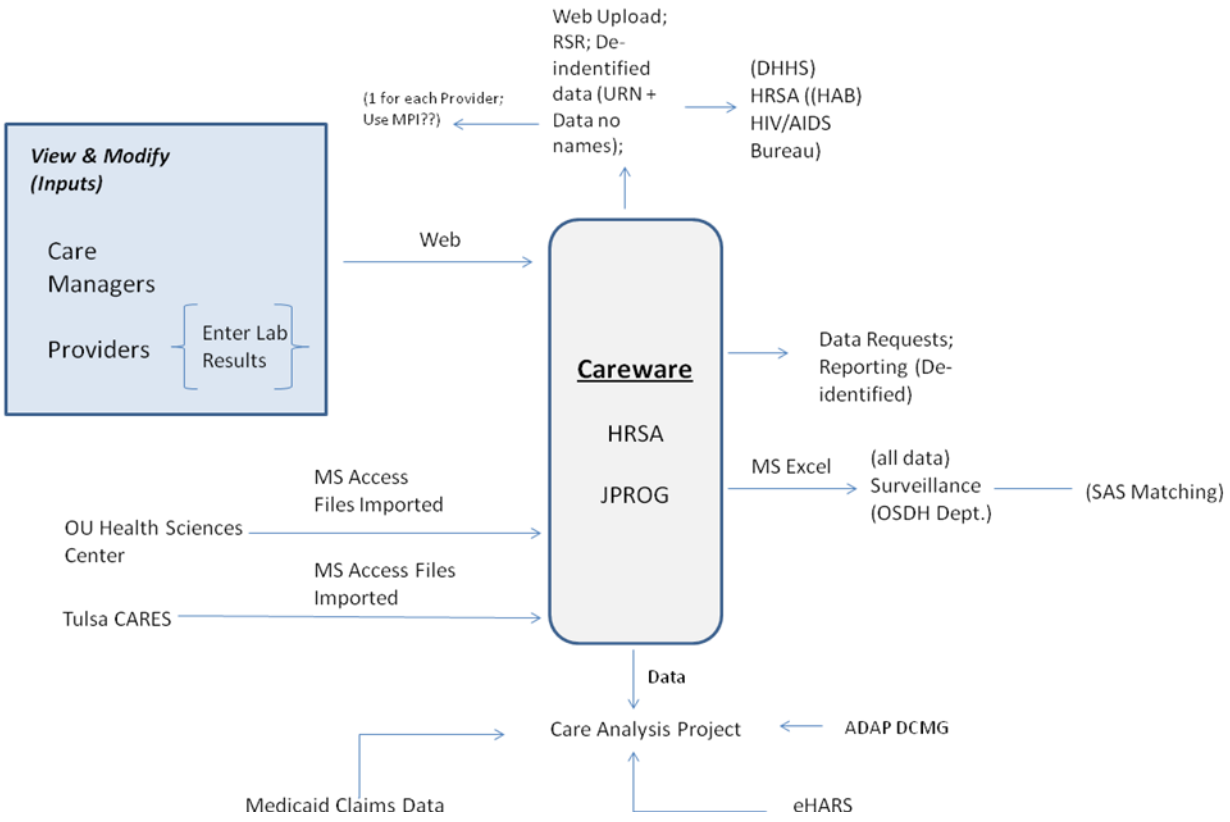
OSDH would like to have a provider data import function, which could bring data in from other CAREWare systems; for example, like the Health Sciences Center. Currently data imported from ADAP has to be manipulated, managed and sent manually by ADAP staff. CAREWare staff must manually pull the actual dataset. They would also like to share data with HIV surveillance.

15. Any other issues, concerns, and considerations we should be aware of?

System Documentation	Available?	Provided?
System specifications	System Administrator's Guide HRSA CAREWare site JPROG site	Yes Yes Yes
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data	Security and Confidentiality guidelines	Yes

System Documentation	Available?	Provided?
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

OK OSDH Careware Workflow Diagram



Evaluation of HIV/AIDS Reporting System (eHARS)

Interviewees (list): Amber Rose, Keith Lindsey, Terrainia Harris, Vincent Parry

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1. Describe this system and its functions. Identify the year it was implemented.

Evaluation of HIV/AIDS Reporting System (eHARS) is a web-based windows application created by the Centers for Disease Control (CDC). It was implemented in 2008 to replace HARS (an older DOS-based CDC system implemented in 1984). EHARS is a secured database, which is password protected and maintained by OSDH IT. This database is used for the collection, maintenance and canned analysis of confidential health information. HIV and AIDS health-related information is entered into eHARS only if positive results are returned, or when a newborn is perinatally exposed. Children are followed for up to 2 years. The information contained in eHARS is transmitted to CDC through CDCs secured network for national morbidity/mortality reports.

2. Is the system COTS, custom, or a combination? Identify the system platform.

eHARS is a customized health information reporting system designed/developed by CDC for health departments. It is a web-based, Windows application which could use PHIDDO for web-based direct entry. Currently, all surveillance forms are faxed or mailed and staff input the data into eHARS.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

The data structure used by eHARS might be HL7 based (need to confirm).

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

Data structure might be HL7 based. EHARS tracks ICD-9 codes relating to death, birth defects, or other information that is available.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

The primary identifier for the eHARS system is a unique five digit sequential system identifier internally created. This number is entered as a notation in the STD*MIS system. The program can add other numbers like field record, interview records, etc. May contain a provider number, SSN, CLIA number.

State number is currently using 5 digit numbers but there are many that are less or more.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

EHARS is a surveillance and treatment tracking system for reporting treatment, follow-up, locations, status, patient history, demos, risk, opportunistic infections, lab results, regular testing, medications, etc. and canned analysis

The eHARS process flow is similar to the HIV/STD system.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

Data for clients with AIDS or HIV comes from county health departments, doctors, labs, community-based HIV/AIDS organizations, correctional facilities, hospitals. This is the same as for STD*MIS data.

EHARS data can only be saved on the OSDH secured server.

See graphic below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

EHARS is web-based similar to STD*MIS, but data is not imported from PHIDDO. OSDH IT is currently working on this. All data is entered manually by the State office. OSDH exports data to the CDC through a web-based mechanism (SDN-Secure Data Network, password protected and digital ID required.) The Data Transfer module of eHARS facilitates the transfer of data from the State to the CDC.

The eHARS database at CDC is consolidated and remains intact in order to support the asynchronous batch processing of data transfer files from states and returning acknowledgment files. Field workers can access data in read only format. Providers or field workers may send confidential data through PHIDDO or send via US mail; all data must still be re-entered into eHARS.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

All data exchanges are currently manual. OSDH sends data to the Ryan White foundation. Ryan White sends data to OSDH eHARS.

OSDH sends data to CDC periodically. EHARS automatically encrypts data for export transmission. (Discussion item – Look at CDC website and see if the data in eHARS is encrypted at rest.) *Follow up—no detail on eHARS system CDC website.*

All data entry is done manually. EHARS is on the web and field workers can read only. Field workers send completed information by self-addresses mail to OSDHPHIDDO (HIV AIDS is never faxed).

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

No.

11. Please describe any privacy restrictions on sharing the data in this system.

This department has high physical security. The office has locked doors which require badge for entry. Only department staff have rights to the website, which requires login and a tougher password. The system is designed to time out if there is inactivity for a designated period of time. EHARS data cannot be saved on a user's hard drive; only allowed on a shared drive. EHARS automatically encrypts data upon export. It is unknown if data is encrypted at rest. All encryption is done through the application modules

Data is not generally shared outside the department. OSDH is reviewing the process and possible sharing arrangements. Following federal and CDC requirements data is sent to the CDC monthly, to CARE for Ryan White reporting, and to the CAREware manager. Some information is shared with OSDH TB department.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

View access to the eHARS system is granted to OSDH program employees, and to users, such as county health departments, that have signed a direct agreement with OSDH. Non-program users are only permitted access to cases in their areas, and then only get cases in their area or diagnosed there and only in de-identified form.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

CDC does regular software modifications, and provides technical assistance for states. No other updates are planned.

14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

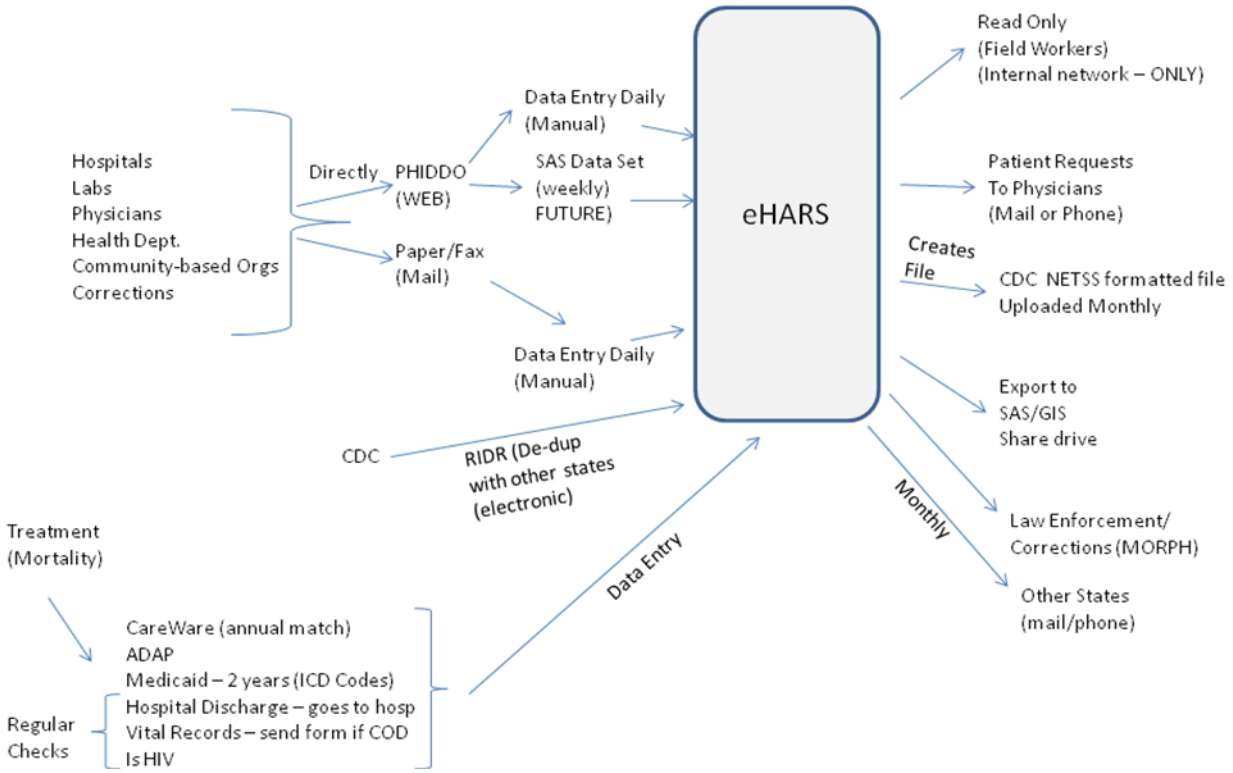
None at this time.

15. Any other issues, concerns, considerations we should be aware of?

Because the eHARS system relies on document-based surveillance, obtaining all results and reports on a patient is very important. Forms, test results, lab results, death certificates and reports can come from many places.

System Documentation	Available?	Provided?
System specifications	User guide	Yes
Logical and physical data models		
Business process models	Flow chart	Yes
Detail data dictionary/field layout	Yes	Yes
Copy of applicable privacy and security laws and regulations specific to the data	Laws Guidelines	Yes Yes
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation	Forms Instructions for forms Standard reports	Yes Yes Yes

eHARS Workflow Diagram



HIV/STD Prevention System (XPEMS)

Interviewees (list): Kristin Eberly

1. Describe this system and its functions. Identify the year it was implemented.

The system is the HIV/STD Prevention System or XPEMS (Program Evaluation Monitoring System). XPEMS is an online data collection and reporting system specifically for HIV Prevention and HIV Counseling and Testing. It collects counseling and diagnostic information for HIV testing, and maintains documentation of the process. The system was implemented in 2008, but complete data documentation did not occur until 2010. The information was all paper-based prior to implementation. County health departments, contracted sites, and unfunded sites all provide lab testing. Each site sends test results back to OSDH; the program does the analysis and reports data to the CDC.

Analysis for reporting is done in SAS with data pulled from XPEMS. OSDH has Access links to some of the data and some limited report capabilities.

2. Is the system COTS, custom, or a combination? Identify the system platform.

XPEMS is a module within PHIDDO, which was created by OSDH IT. It is a SQL 2005, ASP.net system with messaging capacity by Orion Rhapsody and Eclypsis translator. The XPEMS also uses an address verification web service and a separate GIS.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

See above.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

Lab reporting is done in HL7, and XPEMS uses NEDSS standards but is not a NEDSS system. The messaging uses the PHINMS and NEDSS physical data structure. Reporting is mandated from labs with large caseloads, but the electronic process is not used by all labs at this time. Some lab reports use LOINC and SNOMED. None of the reportable disease submissions are coded using national standards; results are received using CDC PHIN Vocabulary Access and Distribution System (VADS). ICD-9 codes are not used.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

A primary person identifier is a sequential number assigned by the system as clients are entered. The system also assigns a sequential case number. In addition, a CDC case number is created using a CDC established method, and appended to the State person

number when the data is sent to the CDC. Clients are in the system only once, but each client may have multiple cases.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

CDC has developed PEMS to strengthen monitoring and evaluation of HIV prevention programs. The system collects counseling and diagnostic information to allow more comprehensive reporting of HIV prevention activities, fiscal information, and community planning information.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphic below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

The data is entered directly through PHIDDO portal. PHIDDO offers limited report and view access. Data must be downloaded to upload to the CDC portal (Secure Data Network, or SDN).

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

No.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

CDC data is sent de-identified. Users of this system can see their own cases or data, but not anyone else's data.

11. Please describe any privacy restrictions on sharing the data in this system.

Privacy laws are very restrictive and the same as HIV surveillance; see the guidelines document provided by eHARS. Data is not readily shared; but is shared internally with CAREware, eHARS, and STD MIS.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

The system uses role-based security, Active Directory, HTTPS, firewalls, and enables remote access via laptop using NetMotion.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

OSDH is still modifying the system as user feedback is received. The XPEMS was originally built only to collect the minimum CDC requirements, but OSDH has added more data and capabilities over time.

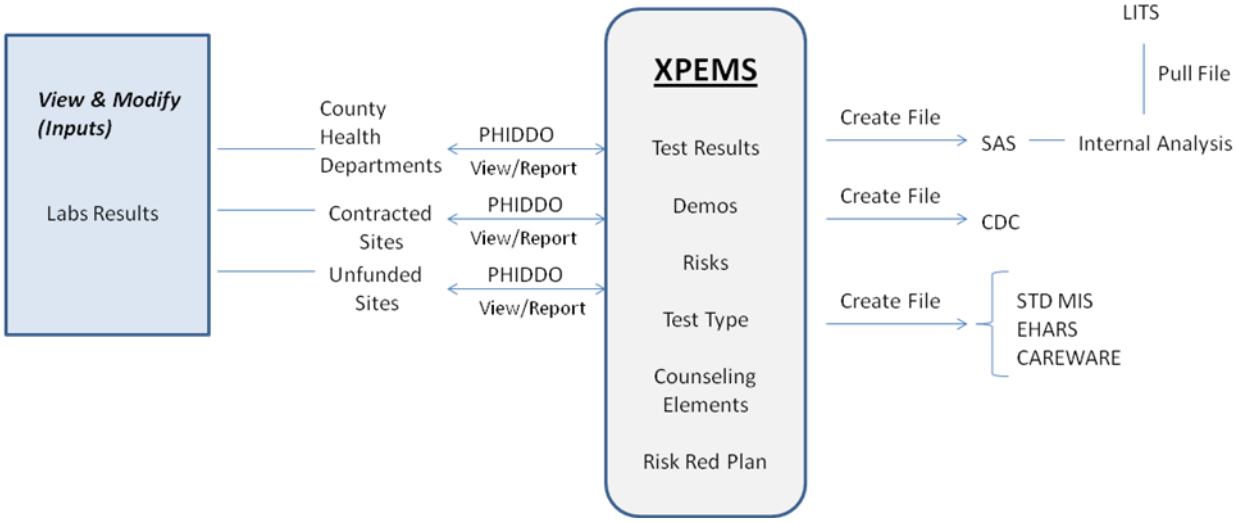
14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

Not at this time.

15. Any other issues, concerns, considerations we should be aware of?

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

OK OSDH HIV/STD Prevention System or Program Evaluation Monitoring System (XPEMS) Workflow Diagram



Laboratory Information Tracking System (LITS/LIMS)

Interviewees (list): Mike Divilio, Sonia Chambers, Becky Moore, Peter Lemon, Vincent Parry, Robin from the lab, Matt from the lab, Donna Chambers IT

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1. Describe this system and its functions. Identify the year it was implemented.

LIMS (Laboratory Information Management System) captures laboratory data, tracks specimens and results, and supports federal reporting. Implemented in 2004, it is a CDC product but CDC no longer supports it. Also known as the Laboratory and Epidemiological Public Health Information Tracking and Reporting System (LITS Plus), this client server system provides for seamless integration of laboratory and epidemiologic data in the public health laboratory.

2. Is the system COTS, custom, or a combination? Identify the system platform.

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The system is in Powerbuilder with SQL backend. There is no vendor support; OSDH had a consultant assist with implementation.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

The system uses the CDC-developed structure.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

.

Some interfaces are built into the system, but no national code sets are used.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

The system uses two main numbers: a LITS or lab number, which combines module, year and a sequence number, with a sequential specimen ID that links tables, only used internally. A test ID is also assigned that starts over each day at 1, also only for internal use; another number is assigned to labels to sequence those. There is a unique ID for each patient for each specimen, but the system doesn't link them together or make much use of the patient ID.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

The system tracks specimens through the test process, captures test results, stores the data and sends reports to CDC.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphic below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

The system has an accessioning (test ordering) interface. With 70% of the tests from County health departments, a County PHOCIS user has the capability to accession/order the test through PHOCIS. Test orders are also received on paper.

Every test is reported back to the ordering entity; the same system interfaces support both inbound and outbound exchanges. If electronic means are not available, the system can create a printed report and fax on request. PHOCIS users can print on site as well as directly from system.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

The system has interfaces with PHIDDO for reportable conditions, and can generate an HL7 message and send (export) to a PHIDDO test system.

The LITS Plus system is being implemented and will replace LIMS. The new system supports standards based HL7 ordering and reporting.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

Exchanges are primarily individual test results and therefore most exchanges include demographics.

11. Please describe any privacy restrictions on sharing the data in this system.

Lab data falls under CFR 493 (Clinical Laboratory Improvement Amendments, or CLIA) restrictions. These are interpreted by the lab chief, normally only share with the entities who order the test. Rabies doesn't fall under the rules for confidential information, as those test results are from animals, not people, and are reported to a vet.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

Standard agency security applies; the application uses integrated security with Windows security.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

Yes, procurement is currently underway; an RFP is on the street. The program is looking to buy a COTS system.

14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

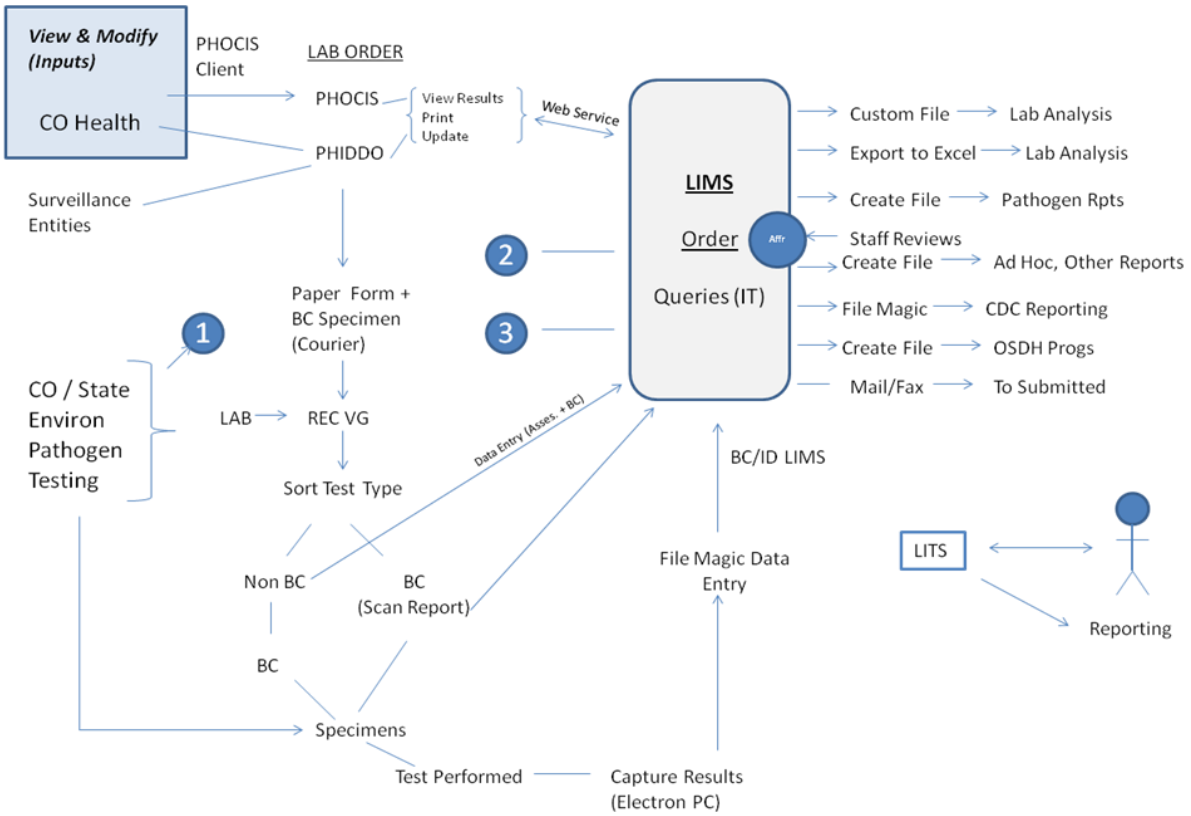
The program expects to have new interfaces through the new system, which should be standards based.

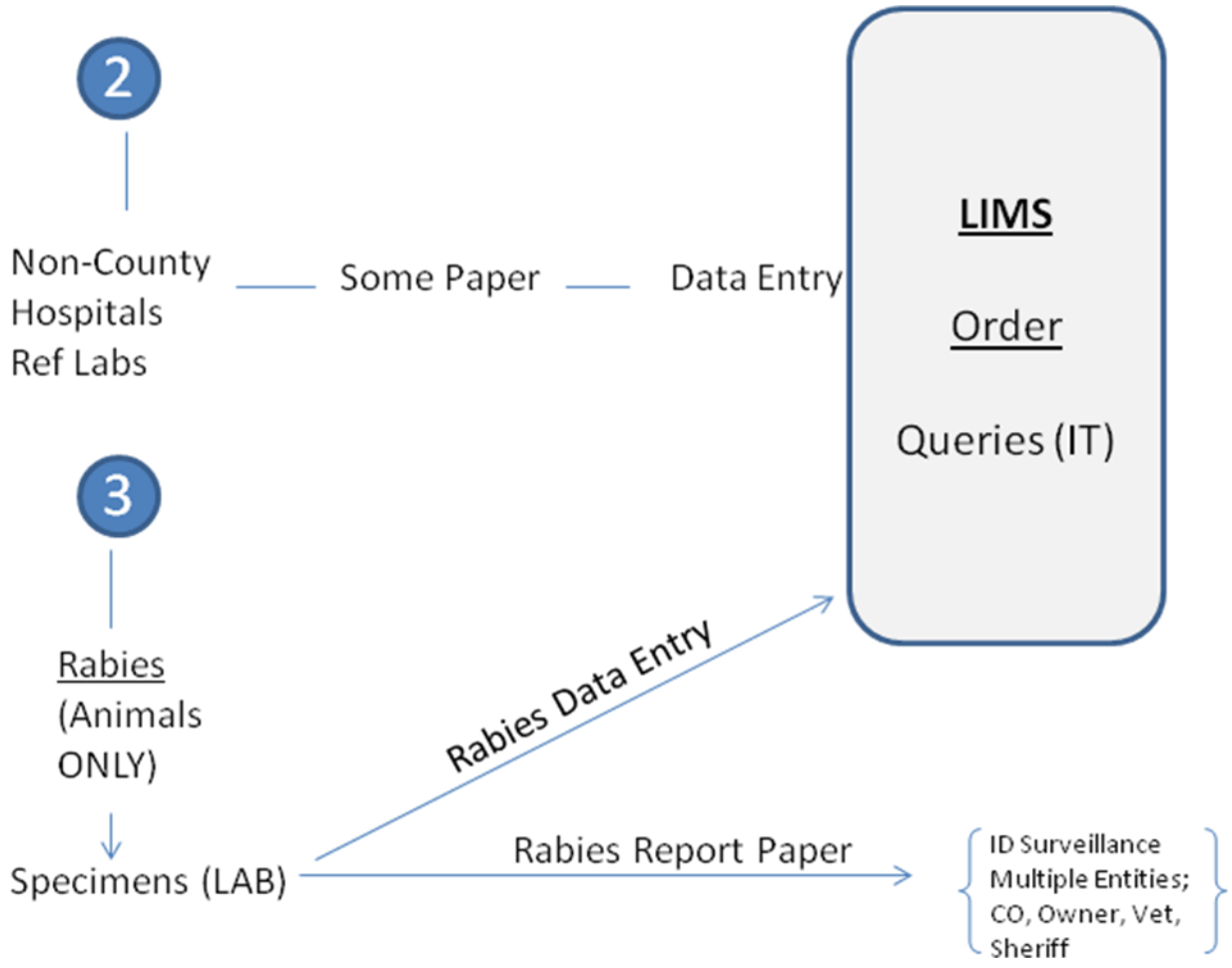
15. Any other issues, concerns, considerations we should be aware of?

There are issues with tools and translation—labs in general have issues with translating messages, when a lab result is translated and the meaning changes, it would be a violation of CAP/CLIA. Messaging should include standard national codes and local codes within the same message; earlier versions could not support this. Also contain object identifiers (OIDs) for value sets. There are some translation products in OSDH already, but for labs, need to assure the integrity of data exchanged, need clean mapping of national to local codes.

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

OK OSDH Laboratory Information Management System (LIMS) Workflow Diagram




2
Non-County Hospitals Ref Labs
Some Paper
Data Entry
LIMS
Order
Queries (IT)
3
Rabies (Animals ONLY)
Rabies Data Entry
Specimens (LAB)
Rabies Report Paper
ID Surveillance Multiple Entities; CO, Owner, Vet, Sheriff

Newborn Hearing Screening System

Interviewees (list): Tanya McAllister Newborn Screening (day 2), Donna Chambers IT (day 2) Becky Moore, Peter Lemon, Sharon Voss, Patricia Burk Newborn Hearing (day 2), Vincent Parry

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1. Describe this system and its functions. Identify the year it was implemented.

The Neometrics hearing module supports tracking and surveillance of initial and follow-up hearing screening and diagnostic results. The Newborn Screening system contains several databases: Lab portion or MSDS (all card information, blood spot and hearing test results) and follow-up/case management (CMS) portion. Almost all children are in lab portion, children who require follow up are in the CMS. Hearing also uses the DCMS (device capture) to receive electronic information direct from lab equipment. Every morning the databases are merged (the merge for MSDS and CMS and DCMS happens at the same time),.a follow up list is displayed; then the system generates a mailer with results for physicians, and for abnormal results, individual case letters to physician, some to family. Unknown when Neometrics was implemented, DCMS module went in 2010. CDC recommends 1-3-6 (months or weeks) as timeline for screening, diagnostics, and placement/early intervention.

2. Is the system COTS, custom, or a combination? Identify the system platform.

.

It is a layered system; Neometrics is the case management/front end (CMS) for users, and the MSDS is the lab data (and static) component. Has an Oracle back end, moving towards SQL, several states use this but in different variants. Vendor is moving to a dot.net platform.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

Proprietary, see CDC website.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

Currently none, but working on incorporating LOINC and SNOMED codes into Neometrics. Both codes and text fields are all internal codes/language.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

Paper (card) serial identifier, associates the card with test in system, and may have multiple cards/numbers for a single child. Lab number is associated with the child (Julian date, sequential ID for first test entered on that date), serial identifiers underneath that. Also have

a patient number (may be the lab number) and an accession number (also lab associated). Lab does the person matching, probably mostly through human intervention. If staff needs to locate an individual, have to look up by demographics instead. System allows you to use multiple demographics to search, various numbers, mom/baby info, etc.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

Tracking and surveillance of initial and follow up hearing screening and diagnostic results.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphics below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

Nothing goes directly into the system at present.
VR sends death certificates of babies. But it is too late for the information to be useful. So Newborn Screening unit, both hearing and metabolic, look at the obituaries daily to catch deaths quickly. They data enter if the child is dead and close the record.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

Not much exchange outside of program other than federal reporting. Run queries on workflow stats for hospitals, etc.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

No.

11. Please describe any privacy restrictions on sharing the data in this system.

State statutes for reporting, may be governed under HIPAA.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

Standard agency security, with a separate log-in and password to the system. IT administers user ID and password, uses role-based security.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

No definitive plans to move to new dot.net system when available. OSDH is currently moving the system to Citrix from Windows 2000 server, and will convert the Oracle database to SQL.

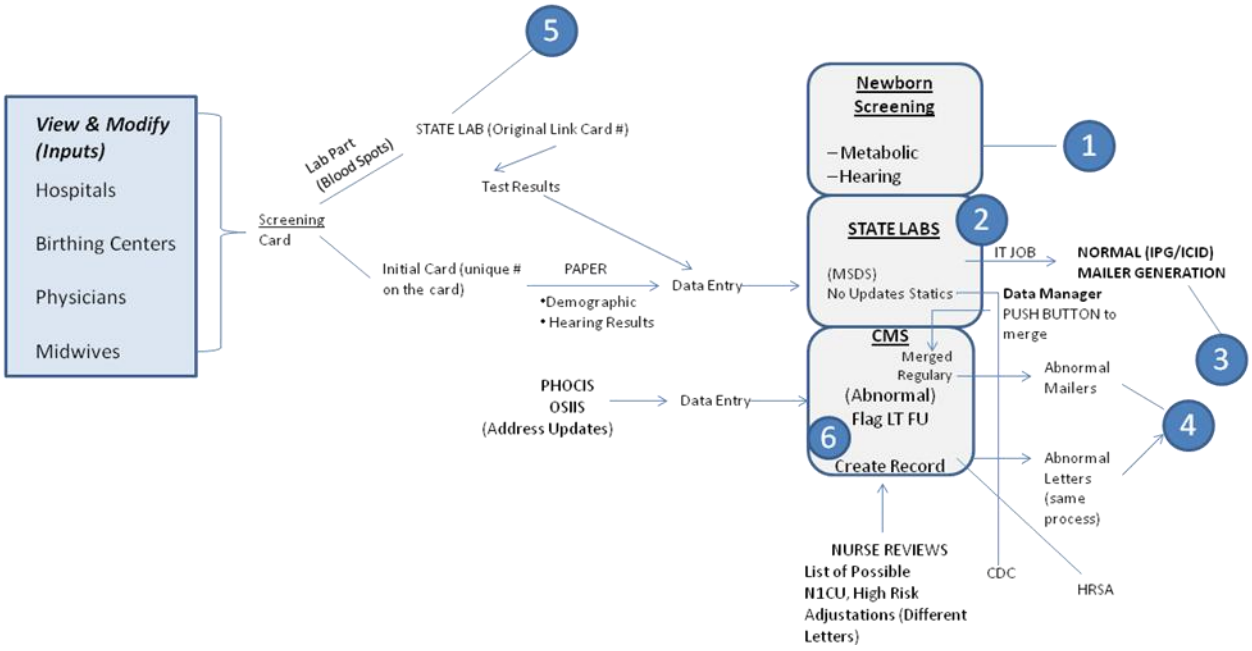
14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

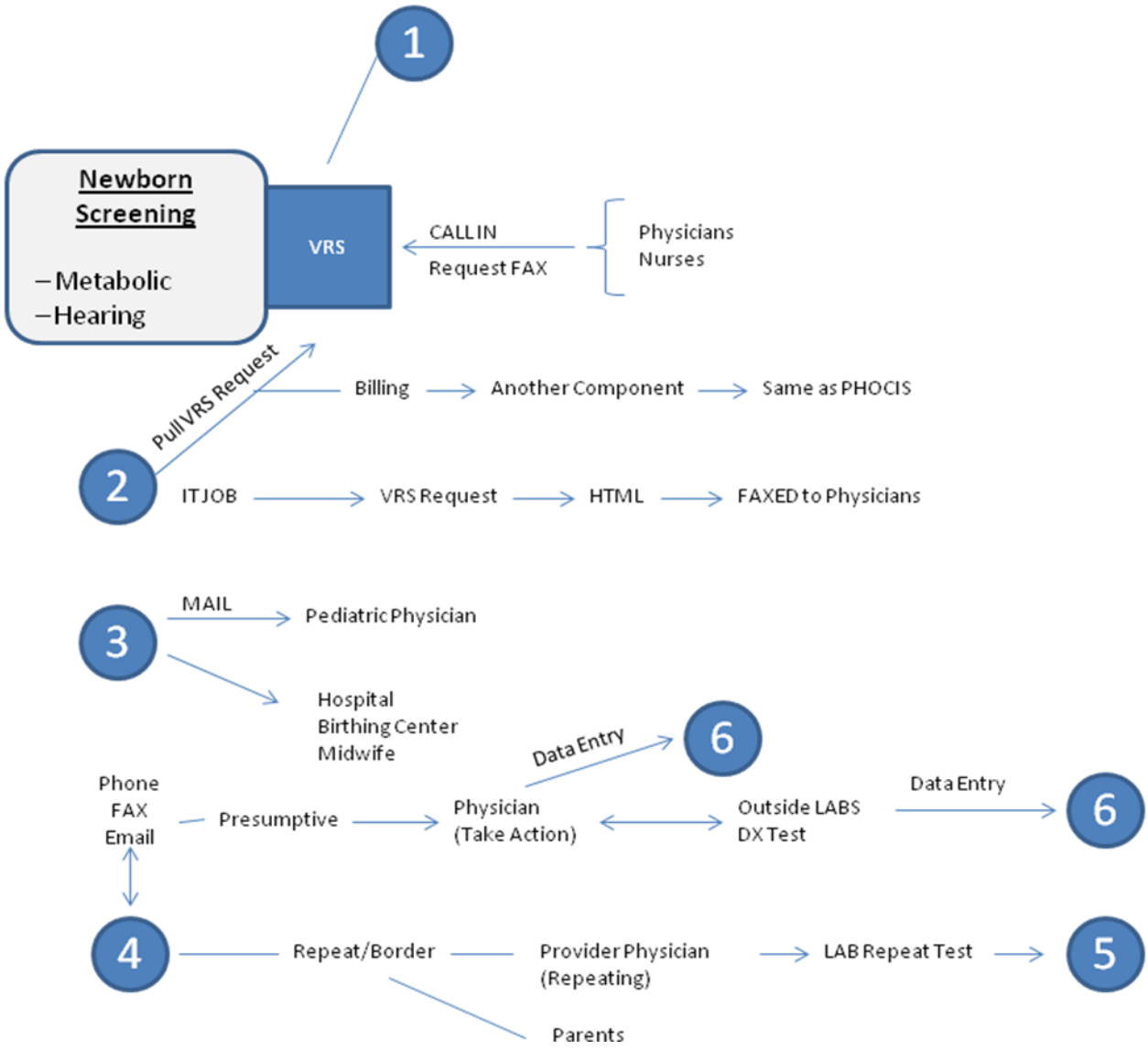
Would have to make significant investment to make lab interfaces go direct to the Oracle server, there will be better options under SQL. Neometrics is looking into adopting some of the national standards in the new system.

15. Any other issues, concerns, considerations we should be aware of?

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

OK OSDH Oklahoma Newborn Screening Metabolic & Hearing Workflow Diagram




1
Newborn Screening
– Metabolic
– Hearing
VRS
CALL IN
Request FAX
Physicians
Nurses
Pull VRS Request
Billing
Another Component
Same as PHOCIS
2
ITJOB
VRS Request
HTML
FAXED to Physicians
3
MAIL
Pediatric Physician
Hospital
Birthing Center
Midwife
Data Entry
6
Phone
FAX
Email
Presumptive
Physician
(Take Action)
Outside LABS
DX Test
Data Entry
6
4
Repeat/Border
Provider Physician
(Repeating)
LAB Repeat Test
5
Parents

Newborn Metabolic Screening System

Interviewees (list): Tanya McAllister Newborn Screening (day 2), Donna Chambers IT (day 2) Becky Moore, Peter Lemon, Sharon Voss, Patricia Burk Newborn Hearing (day 2), Vincent Parry

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1. Describe this system and its functions. Identify the year it was implemented.

The Neometrics metabolic module supports tracking and surveillance of initial and follow-up metabolic screening and diagnostic results. The Newborn Screening system contains several databases: Lab portion or MSDS (all card information, blood spot and hearing test results) and follow-up/case management (CMS) portion. All children are in lab portion, children who require follow up are in the CMS. Every morning the databases are merged (the merge for MSDS and CMS happens at the same time),.a follow up list is displayed; then the system generates a mailer with results for physicians, and for abnormal results, individual case letters to physician, some to family. It is unknown when Neometrics was implemented, DCMS module went in 2010.

Hospitals, birth center, midwives, and other birthing providers fill out an initial blood spot card for newborn metabolic testing. The demographic section of blood spot card comes to MSDS and demographics and hearing results are manually entered into MSDS. The other half of the card is sent to the State lab. The results for blood spot come from the labs direct to MSDS. Once results are entered, there are no further updates to the data in MSDS.

Mailers to physicians are generated nightly with lab results of all lab tests received that day. Abnormal results also generate letters for physicians and the family. Abnormal cases are designated either presumptive or borderline. Borderline cases require a repeat test. All presumptive cases have a red alert system. Physicians are notified immediately on presumptive cases via fax and phone as well as via the mailers.

All testing is done at the State lab; which links both initial and repeat results. These are returned to MSDS and reviewed by the Data Manager. All results are sent back to NBS; abnormal results are moved into CMS for follow up case management.

A nurse reviews the CMS system daily for those records flagged by the system as possible NICU or at risk babies. The nurse may manually adjust letter generation and call physicians to follow up these cases.
The system merges the MSDS data into the CMS first thing in the morning and several more times throughout the day. The merge itself is automated, but staff must “push the button” to initiate the merge process.

2. Is the system COTS, custom, or a combination? Identify the system platform.

.

It is a layered COTS system. Neometrics is the case management/front end (CMS) for users, and the MSDS is the lab data (and static) component. Has an Oracle back end, moving towards SQL, several states use this but in different variants. Vendor is moving to a dot.net platform. The VRS software is cobbled together from modifications to a COTS system.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

Proprietary, see CDC website.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

Currently none, but working on incorporating LOINC and SNOMED codes into Neometrics. Both codes and text fields are all internal codes/language.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

Each paper (card) serial identifier, associates the card with test in system, may have multiple cards/numbers for a single child. Lab number is associated with the child (Julian date, sequential ID for first test entered on that date), serial identifiers underneath that. Also have a patient number (may be the lab number) and an accession number (also lab associated). Lab does the person matching, probably mostly through human intervention. If staff needs to locate an individual, have to look up by demographics instead. System allows you to use multiple demographics to search, various numbers, mom/baby info, etc.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

Tracking and surveillance of initial and follow up metabolic screening and diagnostic results.

There is also a voice response system, Neo-metric VRS, that allows users to receive mailer results via voice or in print via fax. Physicians and nurses can request results using their Neometrics provider ID. During the daily morning merge the VRS database is also updated with lab results.

There is a PHOCIS piece attached to MSDS; searching for a mother by SSN or Medicaid ID number will query the MSDS and pull the child's data for view only. Data stays in MSDS. Low error rate on mother/baby linking results, under 2 percent.

Supports billing for this system is similar to PHOCIS but information for billing comes from the MSDS.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphics below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

Nothing goes directly into the system at present.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

Not much exchange outside of program other than federal reporting. Run queries on workflow stats for hospitals, etc. Dump a data extract into excel for analysis and reporting for metabolic program and reporting to HRSA. Also report to an NBS national consortium in Texas; report case management data to HRSA. MSDS also provides data to CDC.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

No.

11. Please describe any privacy restrictions on sharing the data in this system.

State statutes for reporting, maybe governed under HIPAA.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

Standard agency security, own log-in and password to the system. IT administers user ID and password, use role-based security.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

No definitive plans to move to new dot.net system when available. OSDH is currently moving the system to Citrix from Windows 2000 server, and will convert the Oracle database to SQL.

14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

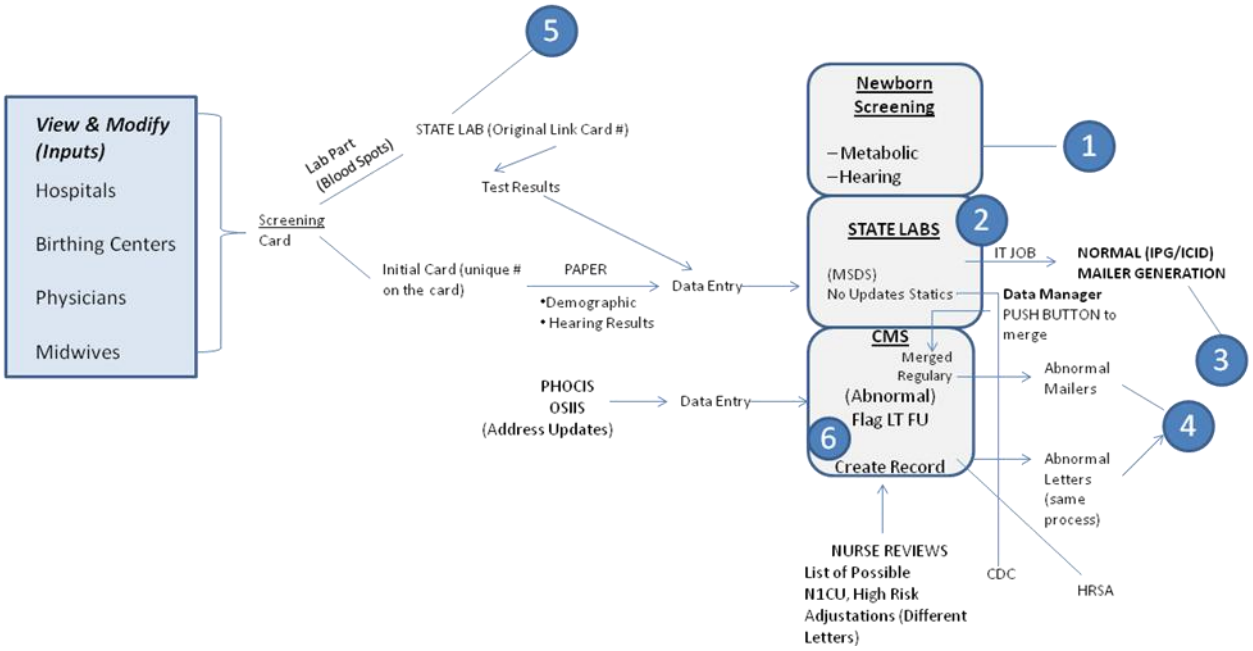
Would have to make significant investment to make lab interfaces go direct to the Oracle server, there will be better options under SQL. Neometrics is looking into adopting some of the national standards in the new system.

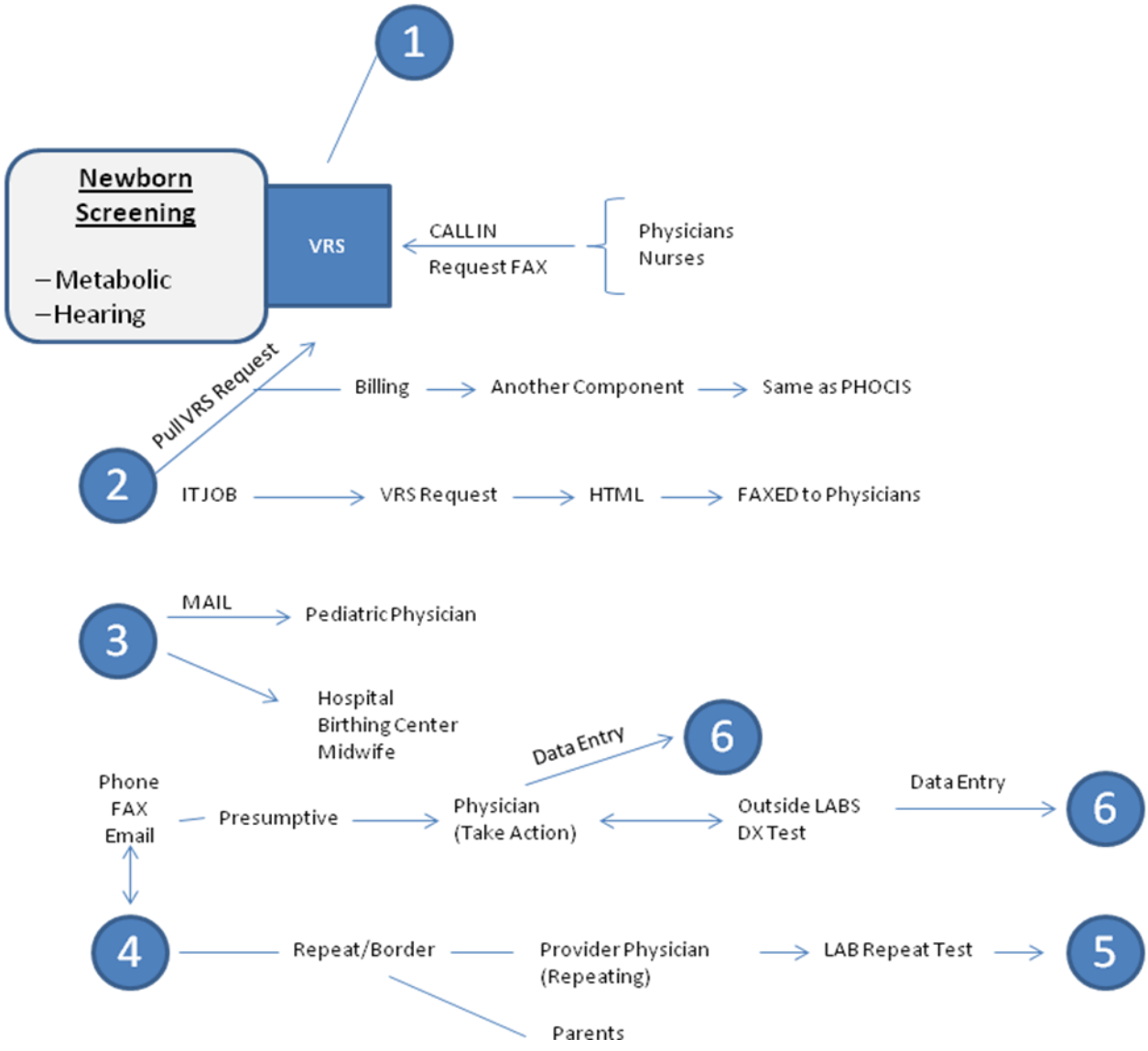
15. Any other issues, concerns, considerations we should be aware of?

Sharon has over 260 kinds of letters in metabolic. Need to reduce this.

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

OK OSDH Oklahoma Newborn Screening Metabolic & Hearing Workflow Diagram




1
Newborn Screening
– Metabolic
– Hearing
VRS
CALL IN
Request FAX
Physicians
Nurses
Pull VRS Request
Billing
Another Component
Same as PHOCIS
2
ITJOB
VRS Request
HTML
FAXED to Physicians
3
MAIL
Pediatric Physician
Hospital
Birthing Center
Midwife
Data Entry
6
Phone
FAX
Email
Presumptive
Physician
(Take Action)
Outside LABS
DX Test
Data Entry
6
4
Repeat/Border
Provider Physician
(Repeating)
LAB Repeat Test
5
Parents

Oklahoma Central Cancer Registry (OCCR)

OSDH Unit: Chronic Disease Service

Interviewees (list): Keith Lindsey, Amber – Epidemiologist, Epidemiologist for BCC and Cancer registry Anne Pate, Vincent Parry, Mike Divilio HCA, Becki Moore, Patsy Lesering

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1. Describe this system and its functions. Identify the year it was implemented.

The Oklahoma Central Cancer Registry (OCCR) is a large database/registry that supports data collection on Oklahoma cancer patients. Cancer reporting is required under State and federal mandate. OSDH began complete reporting in 1997. States are required to report and track any cancer case diagnosis or treatment data from in-State facilities within 180 days of diagnosis or treatment.

Many facilities perform cancer care; consequently reports are often received from several facilities for the same tumor. The OCCR often receives data from multiple facilities for one individual cancer case. Patients are identified by tumor and then person identifier and demographics.

2. Is the system COTS, custom, or a combination? Identify the system platform.

The OCCR is a specific cancer registry software and system support; provided by vendor Rocky Mountain Cancer Data Systems. The system was designed as a database for central state and hospital registries. The software is provided free to supporting facilities in the State; OSDH provides system support for those using it.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

Rocky Mountain is a proprietary system.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

All data associated with cancer diagnosis, treatment and demographic variables are coded according to an international system, ICD-O-3, which is specific to oncology. All information is available online. Data is in a fixed flat file format, using the North American Association of Central Cancer Registries (NAACCR) format), all exchanges happen in this format. The Cancer Registry nationally trying to get on board with meaningful use requirements. The oncology coding system ICD-O-3 can read and converted into and out of HL7. Emark reads the HL7 data received from participating national and regional pathology labs and places it into the system. Currently three labs participate in this process, with more expected in the future. This process also works for other types of facilities and hospitals that maintain their own registry. However, many physicians do not have the capability to send HL7 data. OSDH

must be able to communicate and receive data from any provider for input into the OCCR. OSDH works with individual providers to be sure they can report.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

Patients are identified by tumor and individual. The system assigns a unique ID for each tumor and each individual. CTR is the individual identifier; master patient pointer (MPP) is the tumor identifier. A sequence number is also assigned which identifies all information associated with a single tumor for a single individual.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

The OCCR collects data, then calculates and generates rates of cancers, creates subsets, and creates an annual snapshot for analysis. To gather this data, facilities must report any diagnostics or treatment within 6 months of patient encounter. Yearly analysis runs about two yrs behind because it takes this long to obtain all patient data for a complete year. OSDH is currently applying for a grant to create a process early case capture. This would be to obtain data within 30 days of diagnosis. Now OSDH may get test results/diagnosis early, but it is more difficult to collect the first course of treatment quickly.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphic below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

Reporting providers upload North American Association of Central Cancer Registries (NAACCR) files or abstracts to a secure OSDH website, this is being enhanced. When abstracted online, software puts it into NAACCR format that then can be loaded into the registry.

OCCR abstracting software was created in-house, but this will be replaced with CDC software WebPlus. This new software is more detailed does abstracting and exports data into a NAACCR file.

OSDH currently uses OCROW, OK Cancer Reporting on the Web, as the web connection. This will be replaced by WebPlus.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

The OCCR has no direct connections to any entities. Cancer Registries at hospitals, etc. are operated separately. Almost all information comes into OSDH electronically, but staff must intervene to actually load the data files into the system.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

The Chronic Disease Service places some de-identified data from OCCR onto OKSHARE and sends some to CDC Wonder. The system allows for the creation of some required reports, creation of data sets for data requests, conducts linkage, and provides data for cluster investigations, Extracts are created for research, must first go through State Institutional Review Board (IRB) review and approval process, etc. Tough privacy and security laws limiting patient contact for research, so no projects may involve contact with cases identified through the registry. The program does link OCCR data with many different national and international research studies, which are multi-year and multi-center. .

OSDH submits data to NAACCR, the CDC, and the National Program of Cancer Registries (NPCR). NAACCR does analysis of cancer data concentrating on o relationships, trends, etc. across multiple states. OSDH provides a centralized data resource for research, and certifies the completeness, timeliness and quality of the data. Data is de-identified with the exception of county indicator, and the entire database is sent to the CDC annually as part of grant requirements.

OSDH conducts annual linkages to Indian Health Services (HIS). All identifiers are sent to IHS, and in return IHS sends one variable indicating whether the case is linked to their database or not (0 or1). OCCR data is also cross matched to State death records, and performing follow-up with treating physicians if the case was not reported prior to death. All linkages are done outside of the Registry system using extracts and LinkPlus (free software from CDC).

Cancer data extracts are sent annually to the National Death Index and receive cause of death in return. Chronic Disease Service also sends data to SSDI to receive updates to case demographics and vital status.

Chronic Disease Service conducts internal linkages to hospital discharge data maintained in an Access database. In order to obtain updates to demographics, and to assist with follow up, coding, etc. OSDH had conducted linkages with Voter Registration, and Immunization Registry in the past.

11. Please describe any privacy restrictions on sharing the data in this system.

All data requests must go through State IRB review in order to access identified information. The requesting institution must also go through IRB review at and sign data sharing agreements. The OCCR system suppresses and will not release data on cancers that have 10 or fewer cases for possible confidentiality issues and invalid rate calculations. The Agency is working on data suppression standards. There is a consent process for releasing

information to researchers with the intent of contacting patients, but it is complicated, both from physician and client side.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

The OCCR receives data through a secure website which uses Syntax/Semantic Language (S/SL), and is on a dedicated server. Rocky Mountain software may only be accessed by authorized registry staff. Other electronically submitted information may go into another server and then be transferred to the registry. Physical access to the database and the server is restricted, and the Chronic Disease Service office is behind locked doors. Username and password are both required for computer and registry software/database access. Regular backups are performed at the agency and program level. The program manages access and inactivates users when no longer authorized.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

Every 3 years NAACCR makes data/format changes, which required OSDH to recently convert old data to the new format. OSDH is currently doing collaborative staging for future upgrades. The OCCR software is also regularly updated.

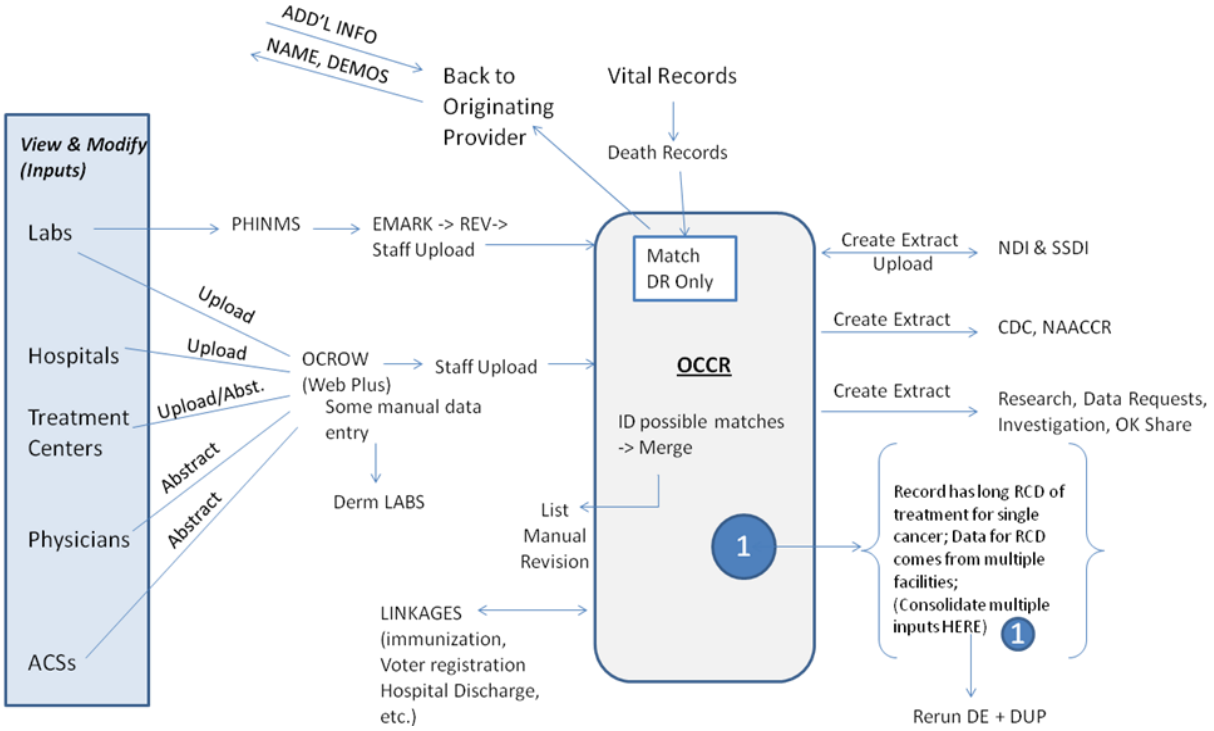
14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

OSDH plans to update to WebPlus from OCROW (see above) to utilize CDC software.

15. Any other issues, concerns, considerations we should be aware of?

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

OK OSDH Oklahoma Central Cancer Registry (OCCR) Workflow Diagram



Oklahoma Childhood Lead Poisoning Prevention Program (OCLPPP)

Interviewees (list): Peter Lemon (IT), Vincent Parry, Sharon Voss, Mike Divilio, Fahaad Kahn (Epidemiologist for Lead Program)

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1. Describe this system and its functions. Identify the year it was implemented.

OK Childhood Lead Poisoning Prevention Program (OCLPPP) is a CDC funded program, but OCLPPP is not using the CDC system. In 2004 it moved to the Neometrics (Oracle) system. The Neometrics system supports all screening and special services (including birth defects registry, newborn screening), and has a lead case management module. The system captures lead testing results (mandatory testing is required for children between ages 6-72 months) from labs and providers. Most lead testing results come from the State-contracted environmental testing lab in Denver, which is also used by most county health departments. Other labs also report (different labs than those reporting diseases). Seventy to eighty percent of lead testing results are sent electronically from the labs, the rest are sent by fax or mail/email (Excel). The remaining reports must be manually entered into the system. About 35-40,000 results are reported each year. Once results are entered into the Neometrics system, the program offers case management services to those testing at or over ten mcg/deciliters, which is the threshold for action. At levels from 10-14, the program works with the family and doctors; if over 15-19 and persistent, the program offers environmental case management at the home or any other site where the child spends a lot of time. The family can accept or decline an environmental investigation. Case management data is entered into the system as well. Children with levels over 20 are investigated after only one occurrence. Children with levels over 10 must be tested every 2 months until the child tests under 10 for 2 years in a row. The initial test is a finger stick; follow-up is a venous test. The environmental investigation uses a questionnaire, to obtain information on the child's environment, and take environmental samples, soil, dust and paint and send to lab. The test comes in as an electronic scanned copy and is hand entered into the system. A case manager or environmental investigator enters data based on the questionnaire used for investigation. Not all information from these documents is entered.

The program is expanding to become the Healthy Homes program, and will also cover indoor air quality, allergy/asthma, radon, mold, etc. in addition to lead.

OSDH provides a quarterly summary report to CDC, which includes both lab and environmental data.

2. Is the system COTS, custom, or a combination? Identify the system platform.

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Neometrics is a vendor system, program staff does not know much about it.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

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Reporting requirements are standard but the lab reporting is not. The labs may send in HL7 but use different versions. OSDH developed its own internal coding and data definition structure. CDC is in the process of developing a new system and moving towards national formats, but this has been delayed and is still in the testing stages.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

A unique client ID is auto-generated by the system. It is a random six digit number, Before the ID is assigned, incoming data is matched up to other demographics already in the system.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

Collect initial lab reports, follow up/case management, record environmental investigation results. The system has a provider library/directory for any reporting provider, and automatically populates/updates provider information from the lab reports. Constant review and revision needed. Also has an action library that generates letters for providers and families and populates addresses into the letters. Have 37 different letters depending on blood lead level, which maps with Word to generate. There is an export feature that can query and create subsets in dbf to use for reporting and analysis. Reports and analysis are done outside of the system.

The program also collects data on a small number of adult lead test results (3-400/yr) primarily from occupational lead exposure mostly from oil and gas industry. These come from a number of different labs, and are sent in various ways. The program is maintaining this data in a separate Access database, which is only used to report to NIOSH. Would like to build this collection into the new system.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphic below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

There are no direct interfaces with the system. For some labs the program staff must retrieve the data from lab's website. Some labs send to OSDH via PHINMS, which goes into

a database, runs through a pair of translators (Elink), and is dumped into the ELR part of PHIDDO. OCLPPP then pulls the data from PHIDDO. Also download text files, use a merge feature in Neometrics to import. Once imported, the program can use an edit window to make changes prior to the merge. The merge is performed weekly, is slow as it has to do a client demographics search in the process. Program staff do follow up as they are making the changes. Use OSIIS and PHOCIS to find most recent demographics on cases.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

Lab reporting is coming in various forms including electronic depending on the lab. Some still come on flat files and then are loaded into the system. The OU lab is still sending a flat file but using PHINMS to send it. Some data goes into PHIDDO and then is downloaded into OCLPPP. DLO uses a screen scraper (Elink?) to pull data from that system into an electronic message. However, data field locations are not fixed at some labs so data may come through in the wrong fields. OSDH has limited ability to change translators at the back end to accommodate this.

Once the program had access to Newborn Screening information, but no longer. Would like to match with high risk housing data via census, tax assessor data, and others. Sometimes match with Department of Environmental Quality (DEQ) data, which tracks licensed services to see if assessments were done. The program gets DEQ data upon request through email in Excel, unknown what the database is. Also have an MOU with OHCA, get data on children in age range to monitor test and prevalence rate in Medicaid, comes on a disk in a text file.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

Send summary extract to CDC and an aggregate data set to NIOSH in an Excel spreadsheet. Very little else goes outside of the program. The data is used internally for reports and analysis, respond to data requests, etc.

11. Please describe any privacy restrictions on sharing the data in this system.

There are no legal restrictions to sharing. The program requires a data sharing agreement to be in place to share data. At present the data is not being shared because no one requests it. Providers should be able to see the lead testing monitoring.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

Standard agency security is applied, with login/password access, but is not role-based, just by individual. Users much first access the machine and then the application using another login/password. Neometrics does administration for this system only, not the newborn

screening applications. Neometrics is unlikely to upgrade the lead system because other states are no longer using it.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

The program wanted to implement the new CDC system but it is not fully tested yet. The program is waiting for a grant response; but not committed to using CDC systems since several have created but then dropped. PHIDDO has added and PHOCIS/OSIIS is adding address validation to both systems that the program will use. Thinking about integrating lead data/system into PHIDDO, and PHIDDO has added case management capability recently. When the program expands to Healthy Homes it will need to get a new system anyway. The agency has talked about building an in-house system as another option. Any pressure on labs towards standardization would be a huge help.

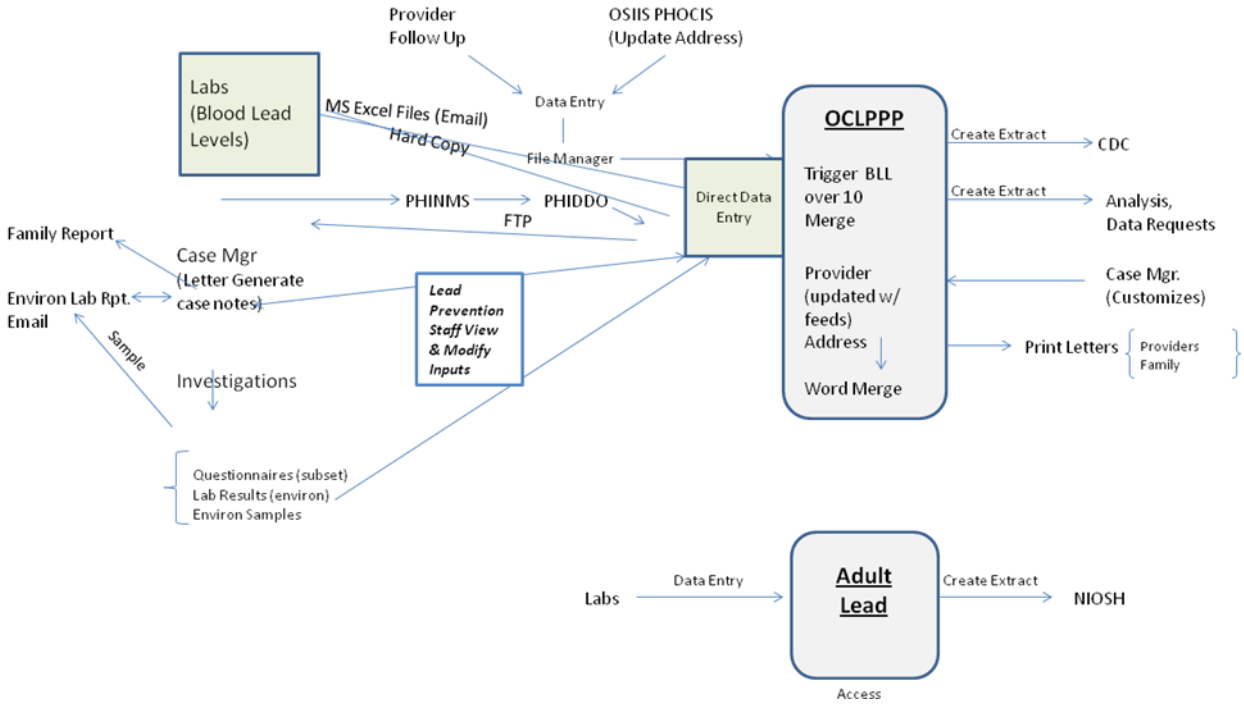
14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

There have been discussions with OHCA about sharing immunization and lead data, but these have not been pursued.

15. Any other issues, concerns, considerations we should be aware of?

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

OK Childhood Lead Poisoning Prevention Program (OCLPPP) Workflow Diagram



Oklahoma State Immunization Information System (OSIIS) (also part of PHOCIS)

Interviewees (list): Peter Lemon (IT), Derek Pate (VR), Ken Caderet, Mike Divilio (HCA)

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1. Describe this system and its functions. Identify the year it was implemented.

The Oklahoma State Immunization Information System (OSIIS) is primarily a database supporting the immunization registry. OSDH first used a CDC system, but in 2002created a new system in- house, which was originally built in FoxPro. The OSIIS system is based on the CDC DB structure. OSIIS collects immunization data, in addition to being an inventory tool for Vaccines for Children (VFC) program. OSIIS tracks vaccines by dose and lot number, collects ID numbers of providers administering immunizations, stores where/when/how the vaccine was given, keeps what body part was injected or site of shot, and all other information as required under the Vaccine Safety Act. OSIIS documents recipient name, age, demographics, etc. Users can enter vaccination history (if provided by someone not an authorized user of OSIIS). The immunization registry tracks and records immunization information. Users of the system are State health departments, primarily private providers, and some public providers. OSIIS also manages provider vaccine inventory around the state, checks for expiration dates, highlights lot of vaccines if ready to expire, prompts for move to a higher use location. When vaccines expire, OSDH collects and returns product to manufacture for tax credit and the manufacturer destroys. The State destroys what can't be returned. At county health departments, OSIIS is used as **the** medical record documentation, requiring no paper copy. OSIIS is used as the default medical record.

OSIIS also collects flu (H1N1) and adult vaccinations.

OSIIS is missing entirely the "prediction algorithm" which is a critical component and an ongoing maintenance headache.

2. Is the system COTS, custom, or a combination? Identify the system platform.

OSIIS was built by OSSH IT while keeping the CDC database structure (tables, etc.) It is CDC database structure served from an Oracle backend database and supported by a frontend application which is an aging ASP web application.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

See above.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

The OSISS system uses CDC registry standards, CVX codes (non-standard) plus other internal/local codes.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

Each provider is given a number generated by OSIIS (sequential or random). OSIIS manages inventory of providers. Persons or clients are assigned a sequential non-logical identifier. OSIIS also has key person identifiers and demographics viewable, but restricts SSN and Medicaid numbers from view. OSDH experiences many issues of duplication because users often enter a new record rather than search for client already in the system. OSIIS matches clients on name and data of birth. Vaccine inventory is based on lot numbers.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

All entities administering immunization are required to report. Examples of providers include physicians, hospitals, county health departments, Indian Health Services (IHS), tribal health, and Vaccines for Children (VFC) providers all report.

There are issues with IHS Resource & Patient Management System (RPMS), the Electronic Health Record (her) system for IHS. The RPMS can't talk to other systems, and also uses non-standard codes. OSDH administers the VFC program where regular providers, if they treat Medicaid patients, can use the VFC program and report immunization through OSSIS. IHS is given vaccines from VFC but not forced to use OSIIS. So results of HIS immunizations do not get entered into the registry database. Oklahoma is one of the few states with the VFC inventory built into the registry. The State provides all VFC for IHS and tribal providers as well.

Providers and county health departments have secure access to enter and modify their own immunization data, but are able to view everything in the system. County office staff can only update shots, etc in OSIIS but not the demographics. Demographic updates made in PHOCIS are used to update OSIIS. View-only access permitted for schools, day care centers, internal OSDH programs (newborn screening, childhood lead, occupational nursing services, STD, hepatitis B), DHS and Medicaid. Much view-only access of the system is used to help track people. User security and access capabilities are delegated and administration through OSDH IT. County health departments link to OSIIS through PHOCIS; the counties assign access to county employees. View-only access provides patient status and lookup for immunizations, but no alerts.

OSDH uses CDC Comprehensive Clinical Assessments and Statistical Analysis (COCASA) tool for clinical analysis for providers. Field consultants primarily use this same tool. Field consultants are OSDH employees that do a blend of county services and immunization. COCASA is independent of OSIIS; a subset of OSIIS data is loaded in into COCASEA along with site visit data.

The system generates user and program reports such as vaccine inventory, provider lists, etc. Actual data is shared with investigators, researchers, and OHCA where the data is used independently for internal analysis. A query of OSIIS data is pulled for analysis purposes and the entire raw dataset is sent through FTP to HCA once a month. Immunization data is also sent to OKC and Tulsa County Health Departments. Additionally, OSDH IT will run queries in response to data requests.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphic below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

OSIIS is linked through PHOCIS interface for the county health departments, but the database is accessed independently. Records in OSIIS are linked to records in PHOCIS, with each record having a linkage number so that if a record's demographics are updated elsewhere in PHOCIS they will automatically update OSIIS. County users cannot update demographics in OSIIS, but can update immunization record. Other users use the OSIIS web portal/ASP to access OSIIS; a few have modify rights such as school nurse, docs, etc. Many users just have view-only access.

There is an OSIIS "lite" application that was created for H1N1 and flu vaccines, it uses a separate web interface and connects into the PAR module of PHOCIS.

Birth records prepopulate OSIIS. OSDH Vital Records sends a weekly flat file extract that is read into OSIIS. Adoptions (monthly) and death (weekly) also come via the same process. Adoptions use some kind of subprogram to overwrite/delete info. Death deactivates the file (locks file).

The Governor's wife sends Hallmark cards to children. There is a process established before sending the cards out. It takes 2-3 months, but time line may be decreasing. Mail room has cards and files, and IT staff does checks to ensure child did not die (looks at various systems, tracks down obits, largely a manual process).

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

OSDH is currently working with a limited number of Oklahoma immunization providers to receive HL7 v2.5.1 VXU messages for Stage 1 Meaningful Use (MU) purposes. Incoming MU messages are parsed, validated, and stored in a separate VXU repository database. This work has included a pilot project with VisionShare (now Ability Networks) acting as a Health Information Service Provider (HISP) where VisionShare received DIRECT messages and forwarded them to OSDH using PHINMS. Future MU requirements are expected to

include bi-directional messaging either as a complex set of HL7 query and response messages or full Integrating the Healthcare Enterprise (IHE) XDS.b Health Information Exchange (HIE) profile functionality.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

Yes, see above. Most view-only access includes identifiers; but OSDH creates lots of data extracts for use and analysis in other programs/agencies. OHCA gets the entire registry monthly through an FTP file. Chronic disease, county acute disease department also see the whole file. These files are created in a data warehouse in OSDH on another server, where multiple analysts/programs access through a shared drive; IT database administrator manages access.

11. Please describe any privacy restrictions on sharing the data in this system.

Use HIPAA and HITECH restrictions, which have been evolving. There are restrictions on immunizations that may point towards certain conditions (like Hepatitis B), in State law. Access to OSIIS is supposed to be limited to need to know by view-only users, but in reality just runs on the honor system.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

External applications and web interfaces use application security; county health departments/ OSDH use Active Directory. Independent health departments use external applications and set up internal users who manage access for the departments.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

A major upgrade is underway for the immunization registry, with plans to complete a rebuild in dot.net and migrate to SQL server. OSDH IT hopes to have it completed by mid-2012, with pilot by the end of 2011. The resulting new registry system will allow greater integration with PHOCIS and interoperability with other OSDH systems once planned Agency EMPI is implemented. An Oklahoma resident's immunization history will likely span OSIIS and the repository used to store messaged immunization data. This will require extensive data cleansing and de-duplication.

14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

No current plans other than listed above. OSDH is doing a work around the VXU transaction for meaningful use in preparation to support HL7 transactions. State doesn't have the necessary message transport infrastructure in place currently. OSDH is using PHINMS for

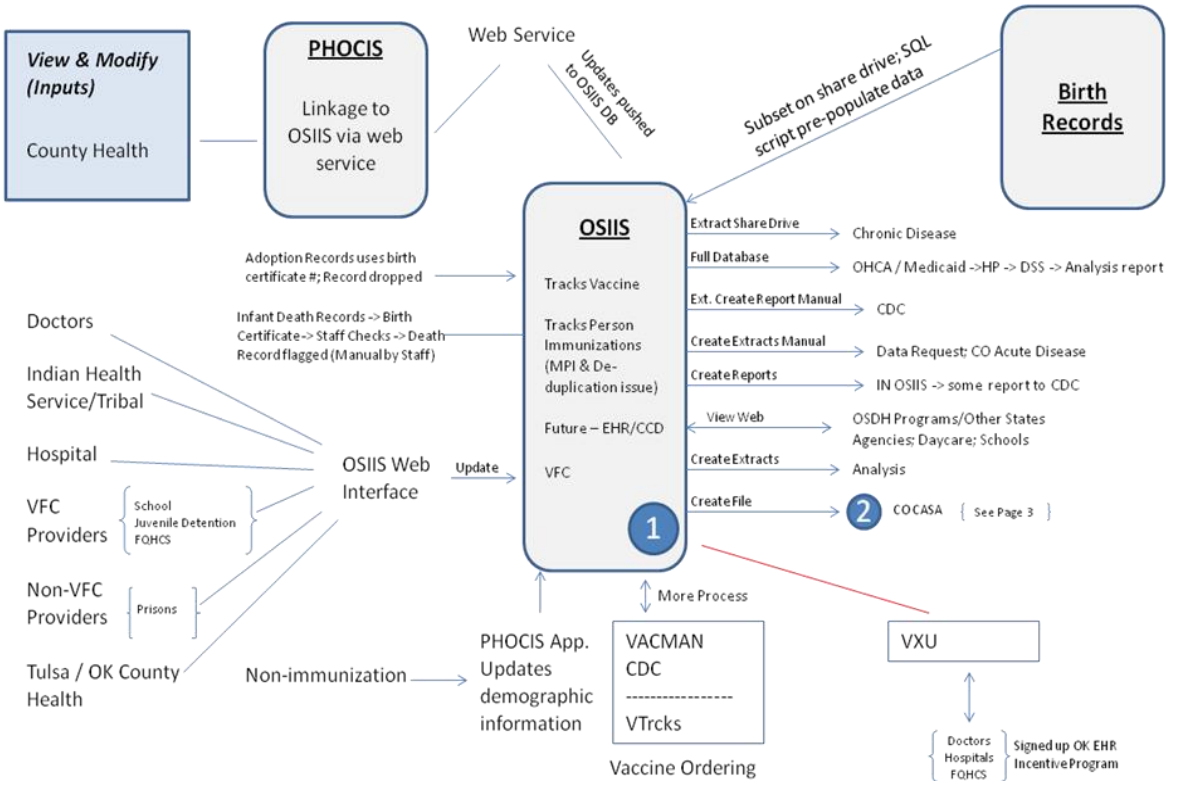
the time being. OSDH has been testing messages with selected providers. OHCA may support Direct, which supports meaningful use but not CCD connectivity. Current CDC Immunization Interoperability expert panel recommended SOAP (web service) message transport infrastructures. CDC recommends continuing use of PHINMS along with DIRECT messaging at least for the interim. Office of the National Coordinator (ONC) is promoting DIRECT message transport. DIRECT standards are still evolving and in flux.

15. Any other issues, concerns, considerations we should be aware of?

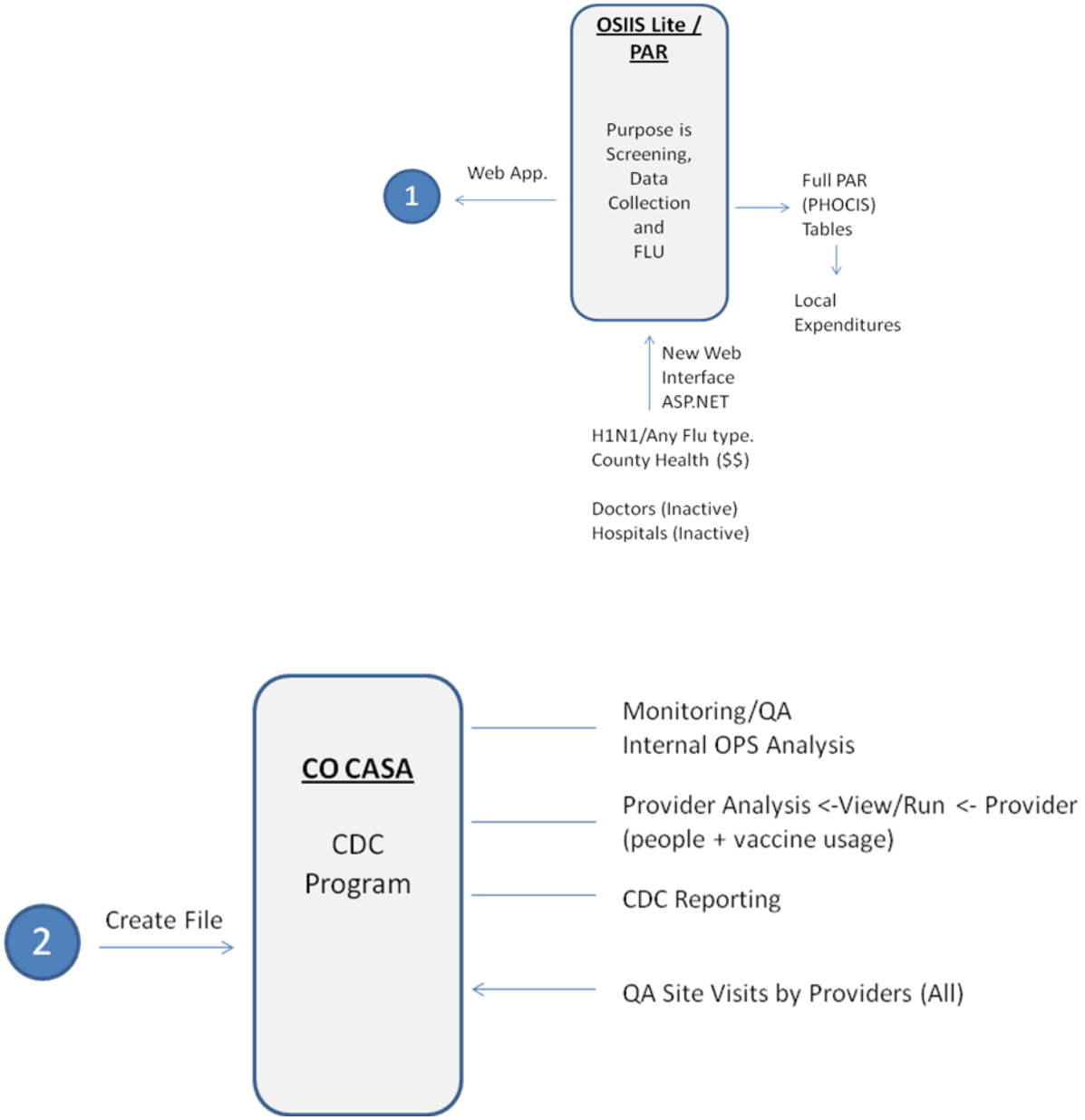
- Certified EHRs have limited capacity to create standards-based HL7 v2.5.1 VXU messages for Stage 1 MU purposes.
- Critical message transport infrastructure is lacking.
- OSIIS currently has both patient and immunization data duplication
- Lack of an Agency EMPI and Immunization data integration is an obstacle to reporting Immunization data to prospective messaging partners.

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

Oklahoma State Immunization Information System (OSIIS) Workflow Diagram Page 1



Oklahoma State Immunization Information System (OSIIS) Workflow Diagram Page 2



Public Health Investigation and Disease Detection in Oklahoma (PHIDDO)

Interviewees (list): Anthony Lee, Patsy Lesering, Vincent Parry, Keith Lindsay, Lauren Smithee, Mike Divilio (OHCA)

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1. Describe this system and its functions. Identify the year it was implemented.

PHIDDO (Public Health Investigation and Disease Reporting of OK) is a secure web-based reporting and disease investigation system, implemented 2004/2005. PHIDDO collects data directly from providers, assigns cases to county nurses/program staff, maintains data for surveillance data review and analysis, and transmits data to CDC. Most investigations are done by county staff, depending on the disease. The system allows for tracking and issuing of prophylactics. States determine case definitions, CDC adopts. CSTE manages the case definitions. PHIDDO receives lab reports from two labs; currently testing receiving feeds from two others. Test results are viewed in PHIDDO, and then program specifications determine whether or not situation is investigated.

Syndromic surveillance is not done in Oklahoma.

2. Is the system COTS, custom, or a combination? Identify the system platform.

PHIDDO was created in house; SQL 2005, ASP.net, messaging uses Orion Rhapsody, Eclypsis translator. Uses an address verification web service and GIS (separate).

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

See above.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

Lab reporting is done in HL7. PHIDDO uses NEDSS standards, but not NEDSS system. Also contains messaging using PHINMS and NEDSS physical data structure. Some lab reports use LOINC and SNOMED. None of the reportable disease submission is coded using national standards, using CDC PHIN VADS instead. PHIDDO does not use ICD-9 codes.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

A sequential person number is created for each participant in addition to an internal case number (also sequential). A CDC case number is appended to the PHIDDO case number before being sent to the CDC. The CDC number is created using CDC methodology. People are entered into the system only once, but a person can have multiple cases.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

PHIDDO collects data and runs SAS for statistical analyses. The system assigned the case identifier, and then the case record is modified by assignee as investigation proceeds. Multiple entities may be able to access a case if appropriate, use ActivX Groups. The system is searchable by individuals and cases. Requisitions and labels for lab specimens are generated electronically for submission to labs for testing. Electronic requisitions go through LIMS. An internal program generates CDC extracts from data maintained in PHIDDO.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

Providers are pre-authorized to access the PHIDDO web portal and directly enter data into a screen. Authorized users can search the system for persons already entered into PHIDDO. External users can only see cases associated with their own facility. Access is authorized by the State program. It is a bi-directional portal with provider lookup. The State lab has its own system; uses LIMS to submit to PHIDDO and then goes through several conversion/translation steps before data makes its way into PHIDDO. X-rays cannot be stored in PHIDDO; they are kept in a separate system.

For Tuberculosis (TB), PHIDDO captures a more expanded electronic record which contains all information related to that person and their disease. Data is maintained on all TB cases managed by the State. Client diagnostics and treatment and care are provided at the local level, with oversight at State. Most x-rays are digital, and stored in DICOM. Physicians dictate notes using DragonSpeak; the application sends data to county health department.

Physicians providing care to TB patients document the drug regimen. The State pharmacy can review and flag, using same system and portal. This process will work with new statewide inventory system, called the Inventory Supply System, and is currently being implemented. This new inventory system may be used for any non-fixed asset, including medications.

There is a loose association between PHIDDO and PHOCIS. When an authorized user searches PHIDDO, the system automatically checks PHOCIS. If PHIDDO matches a person already in PHOCIS, the demographic information for that person is sent to PHIDDO. If a case is entered that requires a specimen, PHIDDO can link with lab system to create an electronic lab requisition and label for the specimen.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

There is a separate program, which was developed in-house, to extract STD/HIV from the lab (ELR) database. PHIDDO produces a weekly file for OKC and Tulsa health departments to use for local investigation.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

See above.

11. Please describe any privacy restrictions on sharing the data in this system.

Data is confidential and only provided in redacted form under open records law. After November the State law will change and public health records will not be subject to open records law anymore, so no data will be released.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

Role-based security, Active Directory, HTTPS, firewalls, remote access via laptop using NetMotion.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

PHIDDO is currently being modified to use MS Silverlight, which will increase performance, etc.

14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

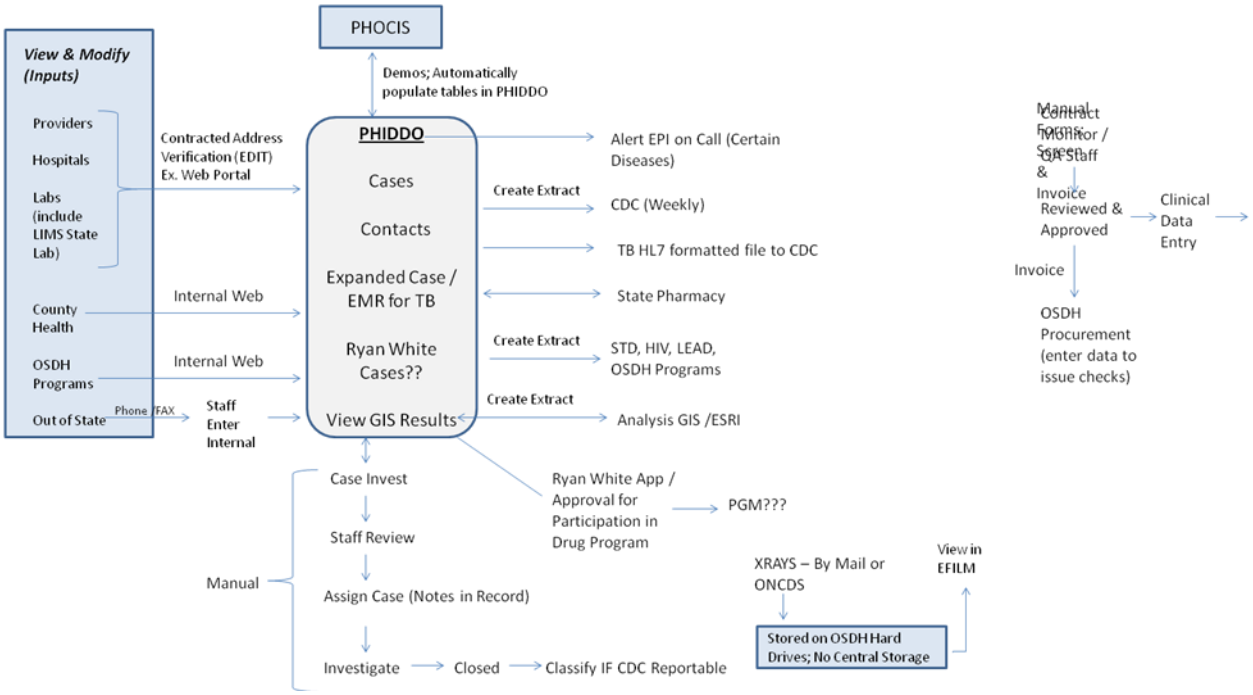
Interfaces to additional lab facilities are being created for electronic transmission sending and receiving. OSDH plans to convert to national standards in the near future, so that messaging will not be an issue. OSDH would like real-time or near real-time exchange for county health departments.

15. Any other issues, concerns, considerations we should be aware of?

Long term for TB: all cases have contacts in other counties, would like to be able to interact, autonomous counties have agreed to keep up. One has, other is getting digital. OSDH would like to be able to share x-rays, prescriptions, etc. with the counties electronically.

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

OK PHIDDO Workflow Diagram



Public Health Oklahoma Client Information System (PHOCIS)

Interviewees (list): Keith Lindsey, Mike Ewald, Paul Patrick (MCH Assess), Vincent Parry

1. Describe this system and its functions. Identify the year it was implemented.

Public health OK Client Information System (PHOCIS) was implemented by OSDH in 2000. The purpose of the system was to be a hub for common client demographics to support programs and services in Oklahoma county health departments. County health departments collect client data for Oklahomans participating in the State's programs. OSDH has modified the system over time; including adding new modules, programs and capabilities. County health departments use PHOCIS to process client determinations and re-determinations for participating in public health programs.

PHOCIS supports client encounters and appointments, invoicing and payments. OSDH is currently implementing a pharmacy module and inventory tracking functions. Operationally the system is somewhat like a practice management/billing services system. PHOCIS will be integrated with the state inventory and local expenditures systems.

There are a variety of modules in PHOCIS – Family planning, WIC, PHIDDO component, TB, STD, maternal/child health, adult services, flu shots (recorded in registry), Children First (home visits with nurses), Early Intervention (developmental screening for children under 3), child guidance (behavioral health, therapy), population-based module (POPS) for group services (testing, screening, education), dental services module (Tulsa has their own). There is also a module that can do HIPAA transactions. PAR is a key module in PHOCIS.

OSDH IT is working to put the immunization registry and immunization data into the PHOCIS system. Also, an imaging function will be integrated into the system for storing closed records so old paper files can be destroyed.

2. Is the system COTS, custom, or a combination? Identify the system platform.

PHOCIS was built by OSDH IT. It is based on MS dot.net, and SQL server. It runs real time.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

Information is entered into PHOCIS by clerks and nurses at county health departments. Data can be manually entered by reading barcodes on worksheets, or from 270/271 transactions received from Medicaid. Data is kept on SQL server, incorporating national standards where possible. The system also creates 270/271 transactions to send primarily to Medicaid. Claims 837 transactions are created in the TPL tab of PAR. Other separate databases are also available in PAR.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

PHOCIS produces HIPAA X12 transactions, and can utilize HL7, ICD coding, and OSDH IT is planning to convert to 5010 transactions.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

Clients are assigned an internal sequential client number, identified by name, birth date, etc. Client numbers are only used internally for OSDH programs.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

The PHOCIS system supports client encounters, appointments, invoicing and payments. OSDH is currently implementing a pharmacy module and inventory tracking functions. PHOCIS maintains a client-based record; but only retains some history for some programs; progress notes (such as for WIC), and encounter information by program. PHOCIS connects to the Medicaid online enrollment application.

OSDH IT is beginning work to implement private insurance billing, a ledger system. Most information is received on paper and data entered.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphic below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

PHOCIS interfaces to some labs for some test results; however, most labs are not yet automating results. The system maintains an interface for automated requests to the State lab (CAP not CLIA certified). The system is linked to newborn screening, WIC check processing goes through a third party, uses OK.gov to do credit card processing.

Case by case access to data sets is based on user need to know. PHOCIS is also used by WIC contractors (service providers) and Tulsa and OKC city/county health departments.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

OSDH sends bills to Medicaid by posting a 270 created in PHOCIS to an HTTPS website, and receives a 271 in return. Medicaid sends OSDH a non-standard remittance advice (called a UCC) in return

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

Person information is exchanged for billing, and for automated enrollment OKShare web query system includes de-identified data for statistical purposes.

11. Please describe any privacy restrictions on sharing the data in this system.

There is a State law that won't allow a treatment exemption under HIPAA for reportable disease by state agencies. WIC claims it is not subject to HIPAA; generally use need to know/minimum necessary to determine whether to share or not.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

System security uses windows authentication for users, uses standard agency security tools. Data not encrypted at rest, laptops are encrypted, double encrypted for transmission. System requires a logon and password, OSDH is working on a plan to upgrade PHOCIS networks and improve quality. Users can obtain remote access via laptops using NetMotion, Using state-owned equipment (laptops) for remote access.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

OSDH is working with OHCA to achieve eligibility with OHCA Medicaid. OSDH is also planning to better connect with CMS/Medicare; to add immunization, inventory; private insurance components.

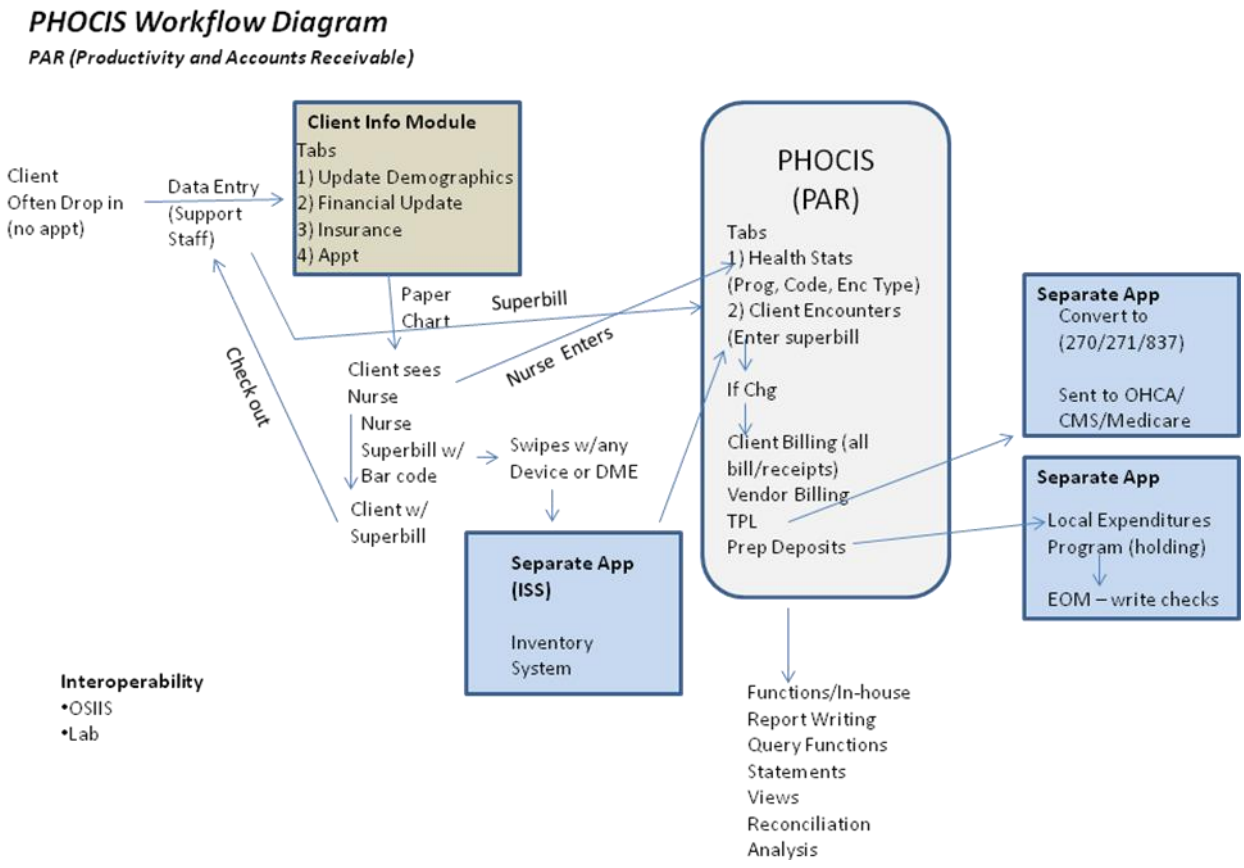
14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

OSDH wants PHOCIS to be able to feed immunization data directly into OSIIS. VXU is an update transaction, working towards making that bi-directional.

15. Any other issues, concerns, and considerations we should be aware of?

Consider level of trust needed with OHCA to feel comfortable engaging in this kind of effort.

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		



Sexually Transmitted Disease Management Information System (STD*MIS)

Interviewees (list): Amber Rose, Keith Lindsey, Terrainia Harris, Vincent Parry

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1. Describe this system and its functions. Identify the year it was implemented.

The Sexually Transmitted Disease Management Information System (STD*MIS) is a database used for collecting, reporting and investigating all tests done for STDs; and the tracking of all cases of Chlamydia, syphilis and gonorrheal disease.

This system was implemented in the early 80's. All STD disease investigation and information is stored here. Including HIV, there are only 5 reportable STD conditions in OK.

For HIV/AIDS, disease investigation and various test results are kept in STD*MIS, however, additional information and updates are entered and maintained in eHARS.

For Syphilis, in addition to disease investigation and recording test results, STD*MIS also includes case management. Cases of syphilis are tracked by a disease intervention specialist. Chlamydia and gonorrhea are only investigated if a patient is under 13 years of age, or a pregnant female. All conditions are tracked for surveillance, including every positive test for Chlamydia, gonorrhea and syphilis. STD Investigation—involves a disease specialist. The specialist assures treatment is followed and notification of partners takes place. If the person is under 13 the specialist looks at the possibility of abuse and notifies authorities if necessary. Case management for syphilis involves looking at test levels to see if investigation, treatment, and partner notifications are needed. Reporting for syphilis comes from labs and health care providers; reporting for HIV comes from labs and health providers and also from community organizations that do testing.

Case management for syphilis cases is ongoing. The disease specialist looks at titers to see if the disease is under control and no longer requires treatment, or if titers have risen and treatment is necessary. If titers rise the patient and the disease would get reported again. The OSDH specialist also finds and interviews or notifies any partners who may be affected. A full STD history is kept on those in the system.

2. Is the system COTS, custom, or a combination? Identify the system platform.

The STD*MIS is a CDC DOS-like system. OSDH is trying to convert to PHIDDO. CDC is updating the STD*MIS system but provides no technical assistance to states. The State uses CDC NETS to send the CDC a separate de-identified file. Required to use a federal SDN account for federal reporting (also with CDC). Use Xbase, Plus, etc.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

The data structure is based on Xbase, etc. (see above) and is proprietary to this system. The system uses some kind of relational database that doesn't hang together well; the data tables are not all relatable; some tables can be exported, but some cannot.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

The STD*MIS does not use national standards for data; it uses test type, which appears to use proprietary/non-standard coding.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

The system generates a random identifier that can be undone if needed. Client data also contains SSN, address, DOB, name, eHARS number, phone, and aliases. Client data is updated by staff by manually modifying data in the system. The system keeps a history of addresses. Don't keep lab assigned patient IDs.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

The system is basically a data repository used by field reporters for data surveillance, reporting, and disease investigation.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

Important to collect all lab reporting for STDs. Some lab results are received electronically through PHIDDO, others come through mail or fax (HIV/AIDS not faxed); then manually entered by staff. Chlamydia and gonorrhea data can be imported from PHIDDO to the STD*MIS database, (but not to eHARS). If a patient requests data, it is sent to the provider (by mail or phone). Separate file goes to CDC for reporting purposes. Some data comes through county health departments.

See graphic below.

Lab test results are received from:

- Labs and healthcare providers
- HIV/AIDS community organizations
- Lab reports
- Chlamydia and gonorrhea via PHIDDO.
- Hospitals
- Corrections
- Health Depts.

Test results are inbound only from PHIDDO, but not the reverse. The department mails letters or makes phone calls to providers when necessary for follow up. State staff manually enter lab data which arrives by mail. The State is required to use a certified line to report data to the CDC. Different levels of data are kept, stored, and shared; depending upon which disease is present.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

No electronic interfaces currently send/receive directly to/from the STD*MIS system. The system uses NetMotion to remotely connect securely through State-owned laptops. Data is imported from PHIDDO by converting to a SAS file, which is then read into STD*MIS.

Field staff authorized to access an OSDH shared drive can then be granted access to the STD*MIS and eHARS and PHIDDO; however, PHIDDO is also accessible on the web.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

The STD*MIS is a stand-alone system.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

The only PHI sent outside the system is when a patient requests own records be sent directly to a chosen provider.

11. Please describe any privacy restrictions on sharing the data in this system.

The privacy restrictions are not currently as strict as those for HIV/AIDS, but the State is considering raising STD privacy restrictions to same level as HIV. OSDH can share data if de-identified and with data sharing agreement. De-identified means no address, names or SSNs; however, data may include age, treatment, possibly zip codes (arguing now about whether or not to release zip codes). The system patient ID is not shared for any purpose.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

Data reporters desiring access must sign two confidentiality statements, and then are given log-in and password. Almost all data reporters are OSDH employees, with some being county health employees. Requestors must be on the OSDH internal network and in the appropriate security group to access this system. Access is through a shared site; users can get to STD*MIS, eHARS and PHIDDO through the same connection. Limited by user only, no field restrictions. Data not encrypted, lock out access.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

The entire STD*MIS system will be moving to PHIDDO when funds available.

14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

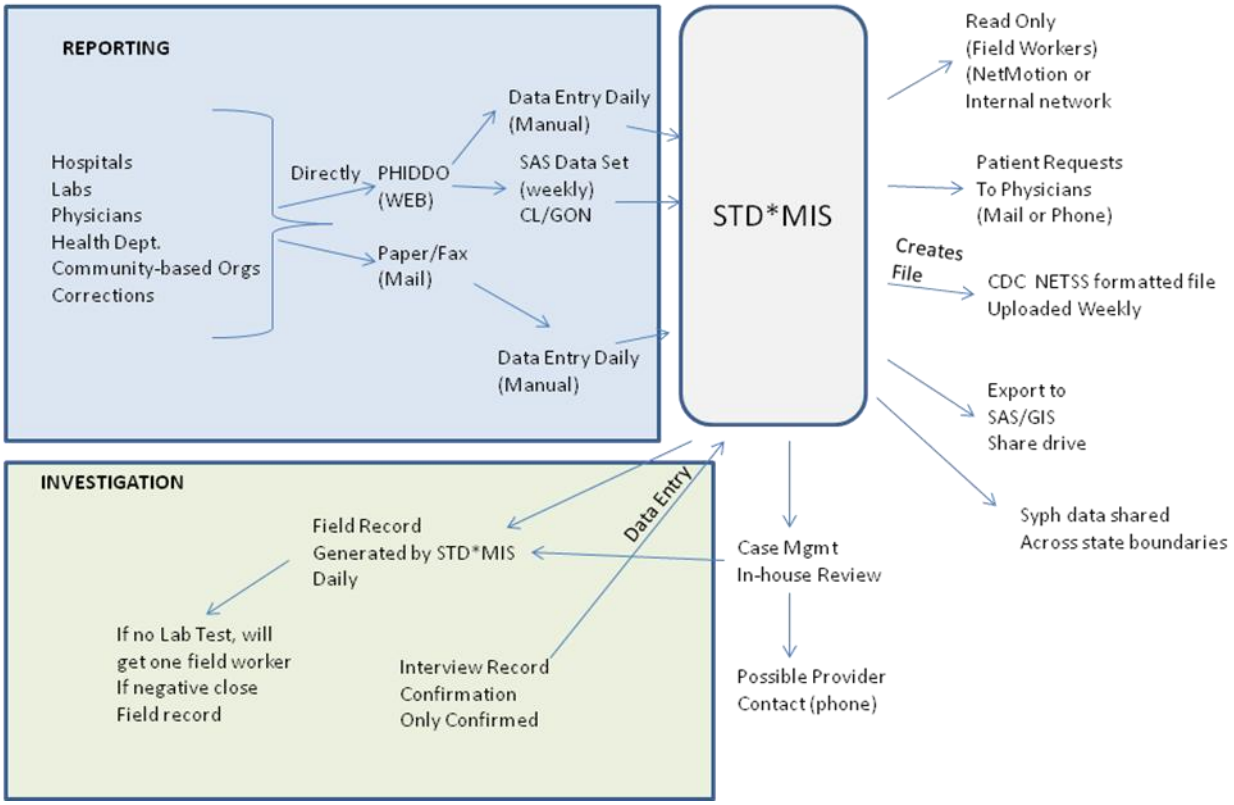
No new interfaces are planned with this system.

15. Any other issues, concerns, considerations we should be aware of?

None.

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data	Laws Guidelines	Yes Yes
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation	Forms Standard reports	Yes Yes

STD*MIS Workflow Diagram



Vital Records – Birth

Interviewees (list): Mike Divilio (OHCA), Derek Pate (VR), Vincent Parry, Kelly Baker**,** Keith Lindsey, Becky Moore

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1. Describe this system and its functions. Identify the year it was implemented.

OSDH released the web-based registration system April 1, 2009. Vital Records is part of the backbone of many OSDH programs and processes. Hospitals have access the birth registration site and enter birth records directly. A signature page is printed at the hospital for parents to sign and this is faxed to Vital Records (VR) department at OSDH. VR staff authorizes the record. The actual record must be entered directly. Midwives and home births may send birth record in on paper if there is no system access. All who regularly perform deliveries have access to the web application.

2. Is the system COTS, custom, or a combination? Identify the system platform.

The system is custom built on a SQL database, on an Oracle application server. Data also stored in Documentum EMC Application Extender (imaging system created from data). Optical Character Recognition (OCR) is also used for parent's signature page. Birth registration is 50 percent automated because many registrations must be manually reviewed before authorized. Some births require paternity documents or must be reviewed, or there are inconsistencies within the registration, unreadable signatures or unsigned documents. These records are identified by the system and must be corrected prior to registration. Front end edits are in place so issuer must make a correct entry. If the record contains an error the VR staff validate with the hospital first, then VR corrects the error or inconsistency. If the error is on the face sheet it may require legal action to change. If a legal change is needed a court order may be required, (like adoption, etc.). VR makes changes and for adoptions only seals original record. Records can also be amended for such things as legitimization of the father, with required court order.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

Data in the Birth Registration system is populated relationally but stored in a flat file. Each record is a line in the flat file. Information goes in live to the SQL server then entered into a form by VR clerk. Records are uploaded 24/7. Once records are entered the intention is to not allow them to be easily changed. Data exported from flat file (event table) to generate image using Web Service and imaging index for generating individual documents. Certificates are numbered as issued. There is a certificate number and version number for every certificate. Workers look up a birth certificate using an index. All printed birth certificates are picked up in person or mailed. Birth Certificates can be ordered online but only received via mail.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

The Birth Registration system uses NCHS standards.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

Each record is given a certificate number and a version number for tracking of certificate. Key numbers are used to track versions.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

The system was created to collect birth records and produce Birth Certificates. OSDH also creates a statistical file and data extracts for internal and external partners. System will create data sets to export to National Center for Health Statistics (NCHS) and Social Security Administration (SSA). Other data requests staff pulls files to send. Staff upload files to send to both NCHS and SSA, no direct connection. Staff also place data in shared folders that other state agencies can access by FTP through a secure site.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

VR Scan (issuance system), processes individual certificate requests and produces paper documents.

Electronic Verification of Vital Events (EVVE) is a nationwide system for state agencies (for 35 of 57 jurisdictions) to validate and obtain verification of legitimate birth. OSDH user enters request to EVVE and receives response of yes or no. EVVE does not provide the actual data. EVVE was implemented by National Association for Public Health Statistics and Information Systems (NAPHSIS), but other agencies can also apply for access. EVVE captures data on requester, must be pre-authorized to use. EVVE is also used for citizenship confirmation. Agencies can send a batch request. All use has a fee, although it can be waived for selected users. EVVE pings directly against state systems to check (same table is also used for Medicaid enrollment). Coming soon is an application called STEVE, which was also developed and run by NAPHSIS. STEVE is for requesting data by other state vital records organizations and NCHS. STEVE must be uploaded to something like PHINMS. Data is sent in flat file format.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

Data from the Birth Registry is used to populate OSIIS, newborn screening, PRAMS, TOTS (2yr survey), and the birth defects registry. Also used for maternal child health to link to Medicaid birth records, to the individual, and some data sent to HIV/STD for moms with Hepatitis B. Data may be shared for research with Commissioner approval and IRB review. OSDH creates datasets externally, sends to shared drive where authorized users access data. There is no direct access by any system.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

Yes, see number nine above.

11. Please describe any privacy restrictions on sharing the data in this system.

The State maintains privacy requirements through law and policy. Data can be given to an authorized applicant or released as a de-identified data set, or for public health research with approval. After November, law allows for public health use with the Commissioner's approval. Adoption records (original) are never released.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

Security is role-based for access and administered by VR staff. HTTPS system for web security, with no database encryption. STEVE and EVVE exchange encrypted messaging.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

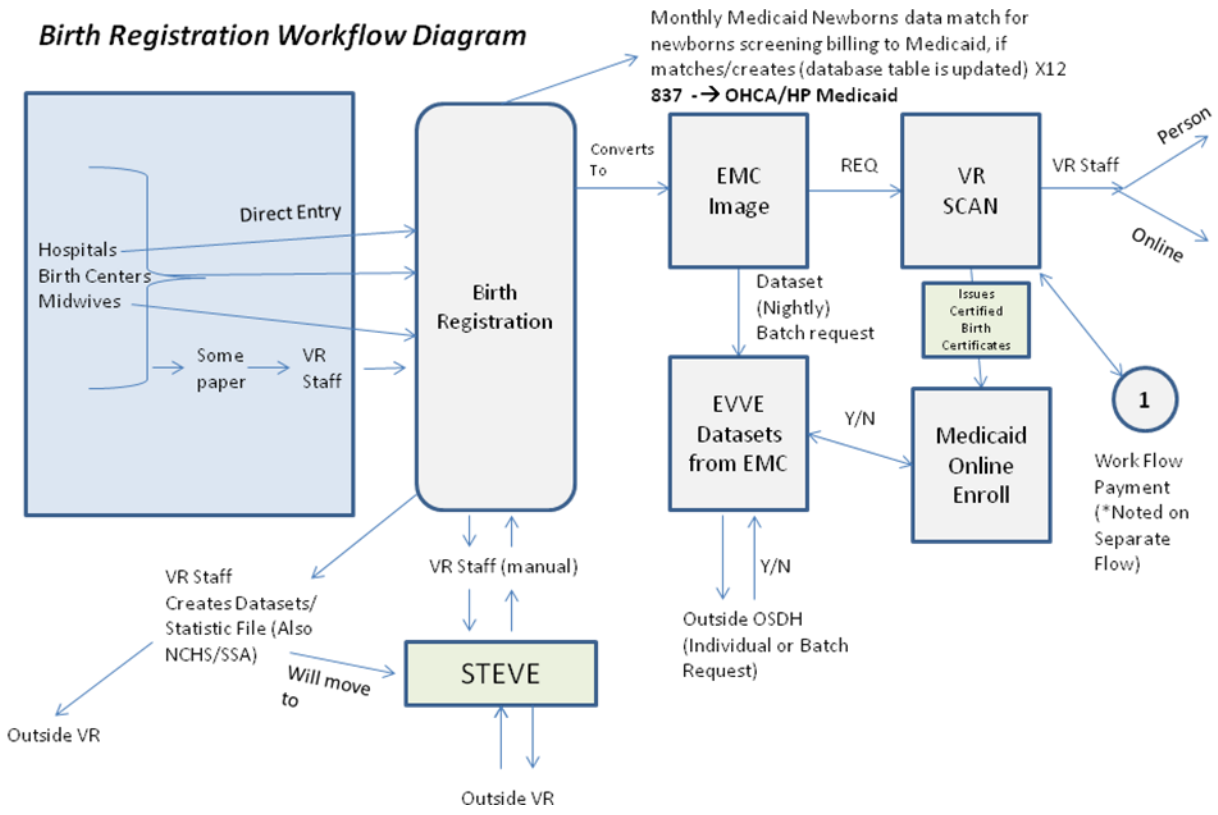
No modifications or replacement are planned at this time.

14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

Public Health is trying to get everyone to use EVVE or STEVE, but nothing else planned. Also, de-identified data is placed on OKSHARE public web query system.

15. Any other issues, concerns, considerations we should be aware of?

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		



Vital Records – Death

Interviewees (list): Mike Divilio (OHCA), Derek Pate (VR), Vincent Parry, Kelly Baker**,** Keith Lindsey, Becky Moore

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1. Describe this system and its functions. Identify the year it was implemented.

The Death Registration system is web-based for online user entry. OSDH is currently conducting a rolling implementation of system upgrades. But the system is completed for internal use. Funeral homes are the first and largest group to be implemented externally. All funeral directors should be online by summer 2012. OSDH wants most physicians on the system within three years, and will focus efforts on those with high death rates. There will always be death records that are submitted on paper. OKC Medical examiner's office is using the online system now; Tulsa is coming on in the next few months. Funeral directors and physicians electronically sign the death record.

2. Is the system COTS, custom, or a combination? Identify the system platform.

The system is an SQL database, on an Oracle application server. Data also stored in Documentum EMC Application Extender (imaging system created from data). Security for the system uses a fingerprint for funeral directors to sign death certificate; physicians have a secret question. There are some issues with the biometrics technology used for the fingerprint recognition. Inconsistencies are identified by the system but still needs manual review to correct. Front end edits are in place so submitter must make a correct submission. Initiator can only correct before the certificate is registered. The record is locked and registered immediately upon transmission. An online verification is performed simultaneously with SSA before death record registered and locked down. Corrections can only be done by vital records staff or medical examiner with verifications like birth certificate or physician statement. If the face sheet needs corrections it may require legal action. If legal changes are necessary, Vital Records (VR) staff makes changes upon receipt of appropriate legal documents. Vital Records can also amend records, usually for pending cause of death. Most demographics like age, DOB, SSN, will be cross-checked by SSA.

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

Data in the Birth Registration system is populated relationally but stored in a flat file. Each record is a line in the flat file. Information goes in live to the SQL server then entered into a form by VR clerk. Records are uploaded 24/7. Once records are entered the intention is to not allow them to be easily changed. Data exported from flat file (event table) to generate image using Web Service and imaging index for generating individual documents. . Death certificates can be ordered online, but only received via mail. Eventually hope to enable funeral directors to place orders.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

The Death Registration system follows NCHS standards; using ICD-10 coding for multiple and underlying causes of death. OSDH eventually plans to code occupations using national codes.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

The system assigns sequential numbers for death certificates. Death certificates also contain names, addresses, etc. but this information is not released with medical/statistical data files.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

The system was created to collect death records and produce Death Certificates. OSDH also creates a statistical file and data sets to export to National Center for Health Statistics (NCHS) and Social Security Administration (SSA)., SSA exchange uses Direct Connect. Otherwise staff pulls files or data extract to send for most purposes. Data is uploaded for both NCHS and SSA, there is no direct connection. Data requested by other State agencies like DHS, OHCA is placed in a FTP secure site for pickup. Death records are available to the public without restriction until November. After November of 2011 death records will be closed and access limited to eligible applicants. But Vital Records and the Commissioner can approve usage of the statistical data for requesting State agencies or other verified stakeholders/uses.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphic below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

VR Scan (issuance system), processes individual certificate requests and produces paper documents.

Electronic Verification of Vital Events (EVVE) is a nationwide system for state agencies (for 35 of 57 jurisdictions) to validate and obtain verification of legitimate birth. OSDH user enters request to EVVE and receives response of yes or no. EVVE does not provide the actual data. EVVE was implemented by National Association for Public Health Statistics and Information Systems (NAPHSIS), but other agencies can also apply for access. EVVE captures data on requester, must be pre-authorized to use. EVVE is also used for

citizenship confirmation. Agencies can send a batch request. All use has a fee, although it can be waived for selected users. EVVE pings directly against state systems to check (same table is also used for Medicaid enrollment). Coming soon is an application called STEVE, which was also developed and run by NAPHSIS. STEVE is for requesting data by other state vital records organizations and NCHS. STEVE must be uploaded to something like PHINMS. Data is sent in flat file format.

Vital Records provides OHCA Medicaid with a monthly file of deaths. Infant death records are sent to immunization, maternal/child health, and child death review board receives records of death for children up to 18 years of age.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

Death data is broadly shared with other programs and services for identifying/verifying death. Limited data is provided for those purposes.

- OHCA
- Traffic safety
- OHP (DPS) Dept of Public Safety
- OPERS (state retirement)
- Teacher's retirement
- LTC
- Law Enforcement

Death data is also shared for Injury surveillance, Dept of Commerce (aggregated birth and death), consumer product safety (federal review), acute disease, HIV/AIDs, Cancer Registry, DHS, Mental health, etc.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

Yes for now, while the records are public. In November 2011 death certificates will become closed and no PHI will be on data released.

11. Please describe any privacy restrictions on sharing the data in this system.

New restrictions will be similar to birth certificates, and data released will be limited to research or approved government purposes.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

Security is role-based for access and administered by VR staff. HTTPS system for web security, with no database encryption. STEVE and EVVE exchange encrypted messaging.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

OSDH is planning to add an online order capability for funeral directors.

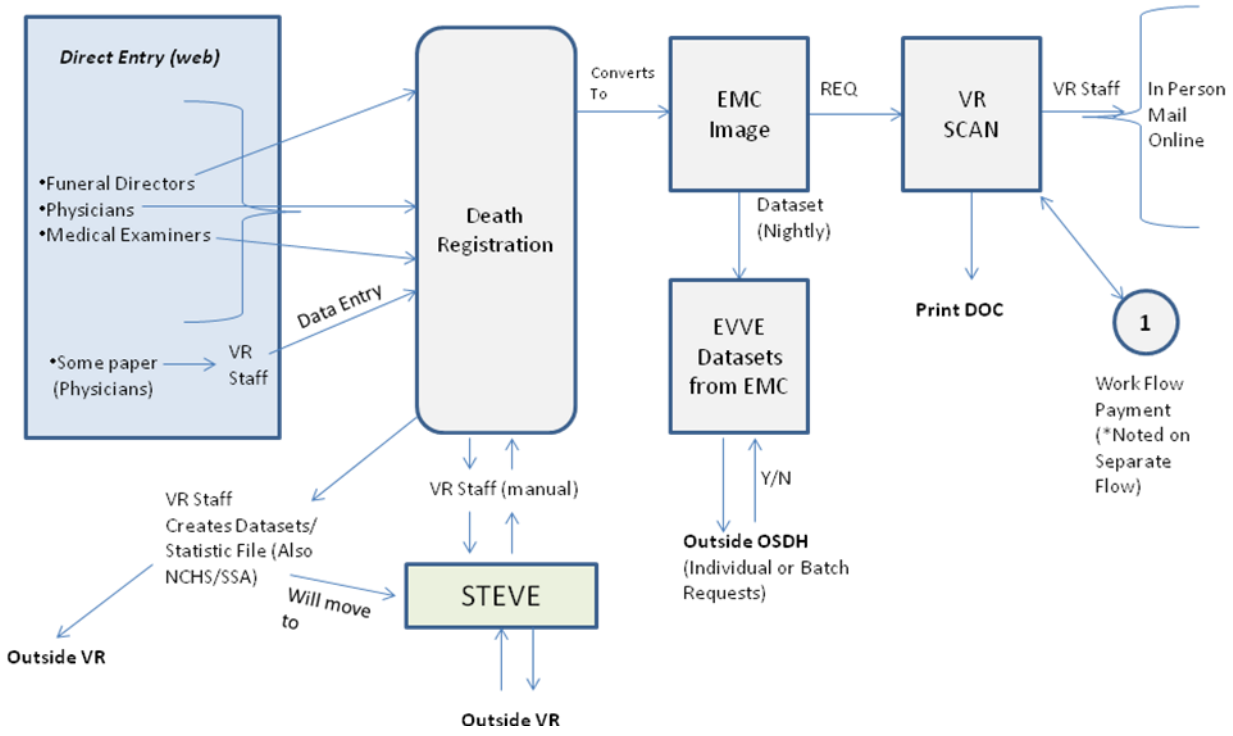
14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

Would it be possible to add a tag on the EMPI once deceased?

15. Any other issues, concerns, considerations we should be aware of?

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

Death Registration Workflow Diagram



Women, Infants, and Children (WIC) (also part of PHOCIS)

Interviewees (list): Nancy Ivins, IT; Priscilla Tiger, Clinical Consultant; Carrie Zeman, program ops

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1. Describe this system and its functions. Identify the year it was implemented.

The WIC system is a set of modules within PHOCIS. Modules used include demographics, financial, and appointment from PHOCIS, plus WIC specific modules: documentation, health history, risk assessment, food instruments and encounters. The system supports data entry and retrieval, helps determine BMI, WIC eligibility, issues food instruments (like checks), and communicates with the WIC bank to monitor client accounts. WIC clinics can be at the county, contractors, and others, but all are handled the same way in the system.

The current WIC modules were implemented in 2002, and are being modified over time. Currently the food package and breast feeding components are becoming separate modules.

Have a form with information that is entered into PHOCIS, then other forms/questions that are not. Participants usually complete the forms at the clinic but occasionally complete the forms out in advance and bring them to the appointment. “Checks” are normally printed on site at the time of the client visit.

Once the client spends the checks, the business forwards them to an intermediary bank (FSMC) that manages the WIC funds from the state and works with the OSDH/state accounting system to monitor accounts (this process is no longer within program purview).

2. Is the system COTS, custom, or a combination? Identify the system platform.

See PHOCIS. The WIC system also has 2 external system pieces, one is the WIC Checks that prints the client checks, goes to a vendor FormsPartner which is connected to PHOCIS, and the vendor formats the checks as legitimate financial instruments that are then issued/printed at the WIC offices. (Not sure about this – each clinic has a printer that prints the WIC food instruments after the information goes out to Forms Partner.)

3. Describe the data structure/format (e.g. IMS, DB2, SQL, Access, VSAM, etc.). Is the data coded/defined in a way that is understandable outside of the program/agency?

See PHOCIS.

4. Does the data or system currently utilize any national standards (e.g. HL7, ICD-9, LOINC, CCD, X12, etc.)? If so, which?

. See PHOCIS.

5. What identifier or primary number is used in the data (e.g. provider number, SSN, case number, etc.)? Is this number used in other systems in OSDH or in other agencies?

Two client IDs are generated by PHOCIS, last 4 SSN + random number + BD + gender (M/F); other is sequential (next available). One number in PHOCIS only (except for OSIIS); the system links those two numbers together. If a client has two numbers, a manual check is required to verify/decide which is “best” (most detail, most current information), then all information is merged under that identifier.

6. What business processes are supported by your system (reporting, analysis, research)? Please describe the process flow and data shared for each business process utilizing this system.

7. Describe the overall workflow for data collection, if appropriate, and data distribution, if appropriate. *(If not fully captured in workflows above).*

See graphic below.

8. Describe any web or portal interfaces the system currently has. What are these interfaces used for (reporting, access to data, data analysis, other)? What are the requirements to access the web or portal interfaces? Are any bi-directional?

See PHOCIS. Use PHOCIS interface with clinics, consultants, staff; can retrieve a view of a client record.

9. Does the system currently provide data to or directly interface with any other systems in OSDH? With Medicaid? With any other systems or databases in the state? For what functions/purposes? Note if any of those interfaces are automated, and how.

Share with the bank to issue checks/monitor accounts and funds. Have automated reports for accounting, create annual report for the feds (FnS, USDA) but have to pull data and analyze/create offline. Have an offsite online education program for participants; nutrition education is required to continue to receive WIC support, onsite group classes and individual appointments are also an option for nutrition education. PHOCIS tracks the online education by a file received hourly from the online site.
Interact with a third party vendor FormsPartner that sets up for printing, need special ink, formats, etc. Request for voucher goes to FormsPartner for set up, then goes right back to local printer to print.

10. Does it exchange person-identifiable information (may be PHI) with any other systems? If yes, what system(s)? For what functions/purposes?

WIC is not considered a covered program so WIC data is not PHI. Actual health information is limited; collect height, weight, BMI and hemoglobin in the health history module, the client has to have a “nutritional risk” to be on WIC. Also collect information on drug/alcohol use, other heath risks and issues, but all are self reported.

11. Please describe any privacy restrictions on sharing the data in this system.

Nothing specific, aligned somewhat with what is required in PHOCIS.

12. Please describe the overall security model for this system (authentication/authorization, access and restrictions as well as privacy and confidentiality)

See PHOCIS. WIC modules in PHOCIS are solely used by WIC staff, but users can see client level data. Access administered by PHOCIS rep at the clinic level. This is being rewritten, tightening up authorization and tracking more closely.

13. Are there any current plans to modify or replace the system or system technology? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

Currently being modified, most expected to be done in April; moving to EBT (card) in 2013. Use of the card will hit against an account instead of having funds loaded on the card.

Client history is not maintained on current WIC modules; once enter a client the old information is erased but working to retain. Updated WIC modules have been developed in dot.net and are being tested.

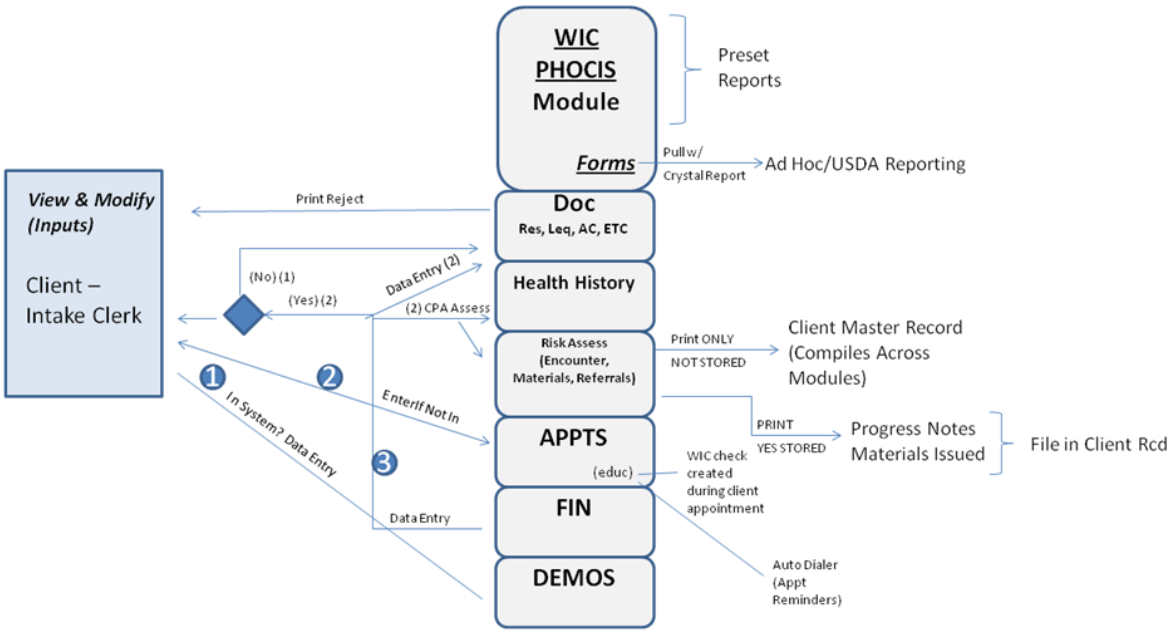
14. Are there any current plans to modify or add new interfaces? If so, please describe these plans and note the proposed timeline. Are any grant funds involved? If so, please describe.

Could be useful to use birth certificate information for confirmations since most WIC clients are seen shortly after birth. .

15. Any other issues, concerns, considerations we should be aware of?

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

OK OSDH Women, Infants and Children (WIC) Workflow Diagram



CPA = Component
Professional Authority

OSDH Billing Process

Interviewees (list): Noreen Smith, Anna Deen-Reynolds, Jo Lynn Johnson, Mike Ewald, Yvonne Myers

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1. Describe this business process and what it does.

OSDH is exploring private insurance billing, but for now primarily bill Medicaid, mass flu immunizations can be billed to Medicare. Billing is primarily for services rendered at the county health departments, but the billing is all handled centrally through OSDH. Data from PHOCIS is extracted monthly by OSDH IT to create the 270/271s, this begins the process. When name/number mismatches are identified in the 270/271, a staff person under the direction of Mike Ewald researches and updates information in Insurance Module. 270/271 is then rerun and submitted. IT handles all of the automated billing/reimbursement transactions. Billing staff are not involved at all in the process. Only some programs that can bill go through this process, like Family Planning, Early Intervention, Newborn Screening, Immunization, and Lab. Some programs are still manually billed by the county health department staff. Programs manually billed include Children First, Child Guidance, Child Health (EPSDT), Early Intervention case management, etc. Some are manual due to complexity of billing, lack of IT resources, and/or small numbers. Do plan to add Children First to the automated process. The billing unit handles the exceptions to the process, and wants to focus more on quality than billing/reimbursement.

Medicaid produces a monthly report called the universal claim extract (UCE, pseudo-RA list), then Medicaid UCE data is downloaded monthly from a secure web site and stored in database. OFFD imports to a spreadsheet for review, look at EOBs, paid claims, see if any denied claims can be resubmitted. (Extensive quality control is performed on all claims.) Medicaid online enrollment has a lot of duplicate IDs. Use PHOCIS as check system, check back with clinics, etc. to follow up, confirm and verify service, dates, etc. Once checked and revised, sent back to counties to review before any resubmission. Do claims audits, pick 4-8 normal claim line items and check in PHOCIS to confirm data. If anything unusual, go back to the counties to verify. Billing reports are posted in a confidential share for county health department staff with approved access to review.

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There is no system per se, just a series of automated process that compile, convert and format the data to the standard for submission and back for internal use. The automated billing process all flows through OSDH IT, which handles file downloads and conversions into and out of the 270/271 and 837/835. IT staff create and submits the standard transactions, used to have a translator but now use in-house developed dot.net programs. All electronic billing uses the HIPAA standard transactions (270/271, 835, 837), Medicaid process generally works okay, but Medicare does not return an 835/RA of any kind. From Medicaid get the UCEs, returns some 835s. Do get back acknowledgement transaction (997) from Medicare, and funds via EFT. All claims and other transactions submitted and received contain PHI.

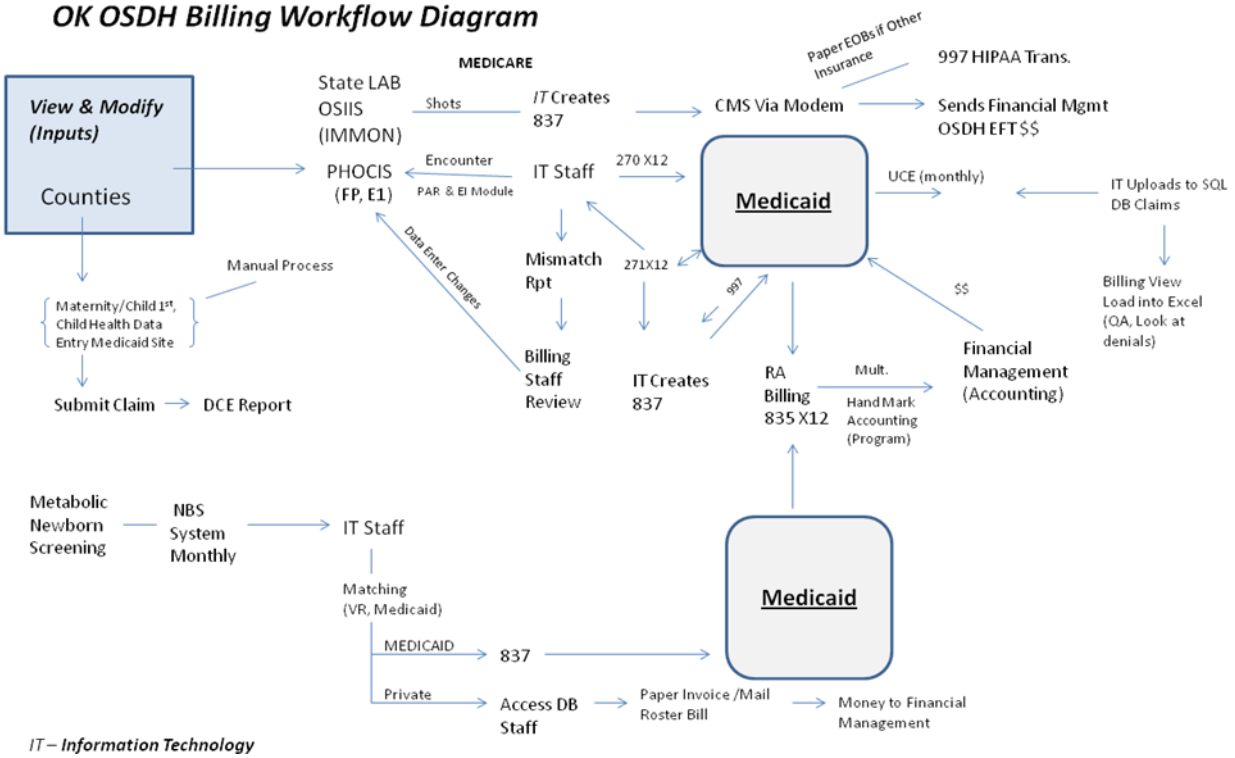
Scanned insurance card images are stored as a BLOB in SQL server, stored in and retrievable from PHOCIS. Not regularly updated though. PHOCIS also has capabilities to scan closed (old paper) records, but this is not being done at this time.

Use provider legacy numbers and NPIs (by program) for billing. Bill with the client Medicaid number, although PHOCIS also assigns an identifier (see PHOCIS interview). May also use/include an encounter ID, client ID, lab IDs. The 270/271 process also finds more clients Medicaid numbers. Do search Medicaid for eligibility, PHOCIS contains the Medicaid ID if known, and billing staff can add it to the Insurance Module of the PHOCIS client record if not already in.

The agency recently conducted a pilot for private insurance. The pilot involved purchased scanners that read barcodes/scan images and trained county staff on the proper intake process and how to use the scanners to check and image client insurance cards. Images are stored into the system, can be stored in the insurance module in PHOCIS. Learned more about the population the counties were serving in this process: 25% of immunizations were provided to people with private insurance; family planning data showed that while the counties were predominantly serving poor women and children, about 25% of the clients also had private insurance as well. Using public health services probably helps people avoid co-pays and deductibles.

System Documentation	Available?	Provided?
System specifications		
Logical and physical data models		
Business process models		
Detail data dictionary/field layout		
Copy of applicable privacy and security laws and regulations specific to the data		
Diagrams of system architecture, both current and planned (if any)		
Diagrams of system interfaces, both current and planned (if any)		
Other documentation		

OK OSDH Billing Workflow Diagram



APPENDIX C: OSDH SYSTEMS TECHNICAL CHARACTERISTICS

This table captures specific technical characteristics of each OSDH system evaluated. These characteristics were used to develop the context for the logical scenarios and the high-level technical architecture example for each Intro paragraph needed.

Table 9: OSDH Systems Technical Characteristics

System Name	Inputs	Outputs	Supported Standards	External Interactions	Internal Interactions	Does System Leverage Active Directory or Something else?	Is this system anticipated to merge with another system? Or to be updated?
AIDS Drug Assistance Program (ADAP)	Direct data entry. Demographics, financial, insurance, medication, viral load, cd4 levels, services, other disorders	Aggregate data/limited subsets.	None	No direct electronic connections. Import drug utilization data from OU pharmacy and premium/home health utilization from the Long Term Care Authority; Reports to HRSA, shares with CMS/Medicare Part D.	No direct electronic connections. Share with other State HIV/AIDS programs,	Yes(AD)	Would like to connect to eHARS, Insure Oklahoma
Birth Defects Registry (BDR)	Condition codes; demographics	Aggregate data/limited subsets.	ICD-9 codes	No direct electronic connections. CDC	No direct electronic connections. Staff manually access Vital	Yes(AD)	Plans to upgrade to a CDC SQL backend and dot.net

System Name	Inputs	Outputs	Supported Standards	External Interactions	Internal Interactions	Does System Leverage Active Directory or Something else?	Is this system anticipated to merge with another system? Or to be updated?
					Records, PHOCUS and OSIIS, Newborn Screening, Vital Records. Share data with MCH		interface
Breast & Cervical Cancer BCCEDP (Breast and Cervical Cancer Early Detection Program) CaST (Cancer Screening and Tracking) (CaST)	All cancer screenings clinical information from any program; demographics	Aggregate data/limited subsets; Ad hoc reporting	Cancer DX coding	No direct electronic connections. OHCA Medicaid, CDC	No direct electronic connections. OCCR	Yes(AD)	Would like a more automated connection to the Cancer Registry, access to county information in PHOCIS, and faster eligibility information from OHCA.
CAREWare HIV/STD Services (Care and Prevention)	Clients served, demographics, medical care, case management, transportation, dental, any program funded areas	Aggregate data/limited subsets.	Unknown, but believe none	No direct electronic connections. Data sent to HRSA	No direct electronic connections. PHIDDO; AIDS/STD - eHARS	Yes(AD)	Would like to pull data in from other CAREWare systems
Evaluation of HIV/AIDS	Direct Data Entry. HIV/AIDS treatment	Aggregate data/limited	Some ICD-9 CM codes but	No direct electronic	No direct electronic	Yes(AD)	Data on OSDH secured server.

System Name	Inputs	Outputs	Supported Standards	External Interactions	Internal Interactions	Does System Leverage Active Directory or Something else?	Is this system anticipated to merge with another system? Or to be updated?
Reporting System (eHARS)	and tracking of positive results and perinatal exposure; demographics	subsets	not universal	connections. Data from health departments, doctors, labs, community-based HIV/AIDS organizations, correctional facilities, hospitals.	connections.		High security required. No plans to update or interface.
HIV/STD Prevention *or* ***XPEMS (Program Evaluation Monitoring System)***	Information on counseling and testing for HIV and STD, demographics	Aggregate data/limited subsets	None	No direct electronic connections. CDC	No direct electronic connections. PHIDDO	Yes(AD)	Ongoing modifications per user feedback.
Laboratory Incident Management Systems (LIMS)	Data to support the laboratory testing process, tracks specimens and results; limited demographics	Test results only through interfaces.	PHINMS messaging standards	Some direct electronic connections.	Some direct electronic connections. PHIDDO PHOCIS	Yes(AD)	Procurement is underway, looking to buy off the shelf
NeoMetrics Newborn Hearing Screening System	Direct data entry. Hearing screening results, demographics	Device capture component (DCMS) to receive	None	No direct electronic connections.	Direct electronic connections with lab equipment. State lab	Application security	No definitive plans to move to new dot.net system when available.

System Name	Inputs	Outputs	Supported Standards	External Interactions	Internal Interactions	Does System Leverage Active Directory or Something else?	Is this system anticipated to merge with another system? Or to be updated?
		electronic information direct from State lab equipment. Aggregate data/limited subsets					Currently moving the system to Citrix from Windows 2000 server. Will convert the Oracle database to SQL
NeoMetrics Newborn Metabolic Screening Database System (MSDS)	Direct data entry. Metabolic screening results, demographics	Data into excel for reporting.	None	No direct electronic connections. Reporting to HRSA, CDC, and an NBS national consortium	No direct electronic connections.	Yes(AD)	No definitive plans to move to new dot.net system when available. Currently moving the system to Citrix from Windows 2000 server. Will convert the Oracle database to SQL
Oklahoma Central Cancer Registry (OCCR)	Direct data entry. Cancer diagnoses, demographics, cancer treatment and follow up	Aggregate data/limited subsets CDC reporting, OCROW	Cancer diagnostic coding.	No direct electronic connections. OK Share, CDC, Rocky Mount.	No direct electronic connections.	Yes(AD)	Every 3 years NAACCR makes data/format changes, software is

System Name	Inputs	Outputs	Supported Standards	External Interactions	Internal Interactions	Does System Leverage Active Directory or Something else?	Is this system anticipated to merge with another system? Or to be updated?
				Primary exchange partners are Indian Health Services, National Death Index, and SSDI. De-identified date is also sent to NAACCR, CDC, and NPCR.			regularly updated.
Oklahoma Childhood Lead Poisoning Prevention Program (OCLPPP)	Direct data entry Environmental labs, OHCA, DEQ	Aggregate data/limited subsets	None	No direct electronic connections. Environmental labs, OHCA, DEQ	No direct electronic connections.	Yes (AD)	Would like to integrate with PHIDDO
Oklahoma State Immunization Information System (OSIIS)	Direct data entry (web portal). Recipient name, age, demographics; information on immunizations provided; vaccine inventory	Aggregate data/limited subsets.	None	No direct electronic connections. CDC Report, FF to OHCA.	No direct electronic connections.	Yes (AD)	Plan to have immunization registry first meaningful use system.
Public Health Investigation	Direct data entry Case reports, lab	Aggregate data/limited	Some LOINC, SNOMED,	No direct electronic	No direct electronic	Yes (AD)	Continue to add additional lab

System Name	Inputs	Outputs	Supported Standards	External Interactions	Internal Interactions	Does System Leverage Active Directory or Something else?	Is this system anticipated to merge with another system? Or to be updated?
and Disease Reporting of Oklahoma (PHIDDO)	tests, demographics, investigation tracking	subsets	HL7, PHINMS but not universal CDC PHIN VADS	connections. Use PHIDDO Portal but no direct connections Providers, health depts., CDC	connections. Use PHIDDO Portal but no direct connections State lab, county health depts.		facilities to electronic transmission
Public Health Oklahoma Client Information System (PHOCIS)	Direct data entry Supports county client services; encounters, appointments, invoicing/payments, some population based services, implementing a pharmacy module, inventory tracking. Integrated with inventory system, feeds into local expenditures system.	Reporting Aggregate data/limited subsets	HIPAA X12 transactions, HL7, ICD-9, converting to HIPAA 5010	No direct electronic connections. Lab interfaces, WIC check processing through third party, through OK.gov for credit card processing.	No direct electronic connections. Billings, enrollment, share for client service provision; link to newborn screening, automated lab requests to state lab	Yes (AD)	Working on real-time eligibility with Medicaid and Medicare; will add immunization, inventory; private insurance components. Would like PHOCIS to feed immunization data directly into OSIIS

System Name	Inputs	Outputs	Supported Standards	External Interactions	Internal Interactions	Does System Leverage Active Directory or Something else?	Is this system anticipated to merge with another system? Or to be updated?
Sexually Transmitted Disease Management Information System (STD*MIS)	Direct data entry Test results, case management, demographics	Retest (Patient) Aggregate data/limited subsets Patient requests	None	No direct electronic connections. County health depts., doctors, labs, community-based HIV/AIDS organizations, correctional facilities, hospitals, CDC	No direct electronic connections. County health depts., OSDH HIV/AIDs/STD programs	Internal	Move to PHIDDO when funds available.
Vital Records - Birth	Direct data entry Birth certificate demographics, medical	EVVE Aggregate data/limited subsets	NCHS Birth Certificate	Subset available for electronic verification through EVVE and STEVVE (in development). Files shared with Medicaid	No direct electronic connections. OSIIS, newborn screening, PRAMS, TOTS (2yr survey), birth defects registry, maternal child health	Yes (AD)	No future plans
Vital Records - Death	Direct data entry Death certificate demographics, medical, cause of death	EVVE Aggregate data/limited subsets	NCHS Death Certificate ICD-10 (not CM)	Subset available for electronic verification through EVVE and STEVVE (in development). Files shared	No direct electronic connections. Injury surveillance, acute disease, HIV/AIDs, Cancer	Yes (AD)	Still rolling out latest system Add an online order capability for funeral directors.

System Name	Inputs	Outputs	Supported Standards	External Interactions	Internal Interactions	Does System Leverage Active Directory or Something else?	Is this system anticipated to merge with another system? Or to be updated?
				with Medicaid, OHCA, Traffic safety, OHP, Dept of Public Safety, OPERS (state retirement), LTC, Law Enforcement, Dept of Commerce, consumer product safety (feds), etc.	Registry, etc.		
Women, Infants and Children (WIC)	Direct data entry (PHOCIS) documentation, health history, risk assessment, food instruments (coupons), encounters	Food Voucher, Paper Check	None.	No direct electronic connections. Users access through PHOCIS	No direct electronic connections. Users access through PHOCIS, primarily WIC staff, bank for checks/vouchers	Yes (AD)	Separating some functions into independent modules; moving to EBT (card) in 2012.

APPENDIX D: ACRONYMS

Acronym	Definition
ACA	Affordable Care Act
ADAP	AIDS Drug Assistance Program
AIDS	Acquired Immune Deficiency System
API	Application Programming Interface
APD	Advance Planning Document
ASP.net	Active Service Page.net
BCC	Breast and Cervical Cancer
BCCEDP	Breast and Cervical Cancer Early Detection Program
BD	Birth Date
BDR	Birth Defects Registry
BLOB	Binary Large Object
BMI	Body Mass Index
CAP	College of American Pathologists
CaST	Cancer Screening and Tracking
CCD	Continuity of Care Document
CD	Compact Disc
CDC	Centers for Disease Control and Prevention
NETS	NPCR Education and Training Series
CFR	Code of Federal Regulation
CHIP	Children's Health Insurance Program
CLIA	Clinical Laboratory Improvement Amendment
CMS	Centers for Medicare & Medicaid Services
COCASA	Comprehensive Clinical Assessments and Statistical Analysis
COTS	Commercial Off-the-Shelf
CPT	Current Procedural Terminology
CPU	Central Processing Unit
CSTE	Council of State and Territorial Epidemiologists
CTR	Certified Tumor Registry
CVX	Vaccine Administered Code Set
DB	Data Base
DCMS	Data Capture Modules
DEQ	Department of Environmental Quality
DDI	Design, Development, and Implementation
DLO	Desktop Laptop Option
DOB	Date of Birth
DOS	Disk Operating System
DPS	Department of Public Safety
EBT	Electronic Benefit Transfer
EFT	Electronic Funds Transfer

Acronym	Definition
eHARS	Evaluation of HIV/AIDS Reporting System
EHR	Electronic Health Record
ELR	Electronic Laboratory Reports or Reporting
eMPI	Electronic Master Patient Index
EMR	Electronic Medical Records
EP	Eligible Professional
ePHI	Electronic Protected Health Information
EPSDT	Early Periodic Screening, Diagnosis, and Treatment Program
ESB	Enterprise Service Bus
EVVE	Electronic Verification of Vital Events
FA	Fiscal Agent
FFP	Federal Financial Participation
FnS	Food and Nutrition Services, as part of WIC
FSMC	First Security Mortgage Company
FTP	File Transfer Protocol
FTTP	Fiber-To-The-Premises
GIS	Geographic Information System
HARS	HIV/AIDS Reporting System
HIE	Health Information Exchange
HIIAB	Health Information Infrastructure Advisory Board
HIPAA	Health Insurance Portability and Accountability Act
HIO	Health Information Organization
HISP	Health Information Service Provider
HIT	Health Information Technology
HITECH	Health Information Technology for Economic and Clinical Health Act
HIV	Human Immunodeficiency Virus
HL7	Health Level Seven
HMP	Health Management Program
HPES	Hewlett Packard Enterprise Services
HRSA	Health Resources and Services Administration
HTTPS	Hypertext Transfer Protocol Secure
ICD-9	International Classification of Diseases and Related Health Problems, 9th Revision
ICD-10	International Classification of Diseases and Related Health Problems, 10th Revision
ICD-O-3	International Classification of Diseases for Oncology, Third Edition
ID	Identification
IHE	Integrating the Healthcare Enterprise
IHS	Indian Health Services
IMS	Information Management System
IRB	Institutional Review Board
IT	Information Technology
LIMS	Laboratory Information Management System

Acronym	Definition
LITS	Laboratory Information Tracking System (LITS)
LOINC	Logical Observation Identifiers Names and Codes
LTC	Long-Term Care
MCH	Maternal Child Health
MITA	Medicaid Information Technology Architecture
MITS	Medicaid Information Technology Supplement
MMIS	Medicaid Management Information System
MOU	Memorandum of Understanding
MPI	Master Patient Index
MPP	Master Patient Pointer
MS	Microsoft
MSDS	Metabolic Screening Database System
MU	Meaningful Use
NAACCR	North American Association of Central Cancer Registries
NAPHSIS	National Association for Public Health Statistics and Information Systems
NBS	Newborn Screening
NCHS	National Center for Health Statistics
NEDSS	National Electronic Disease Surveillance System
NHIN	National Health Information Network
NIOSH	National Institute of Occupational Safety and Health
NLR	National Level Registry
NPCR	National Program of Cancer Registries
NPI	National Provider Identifier
OCCR	Oklahoma Central Cancer Registry
OCLPPP	Oklahoma Childhood Lead Poisoning Prevention Program
OCR	Optical Character Recognition
O-EPIC	Oklahoma Employer/Employee Partnership for Insurance Coverage
OFMQ	Oklahoma Foundation for Medical Quality
OHCA	Oklahoma Health Care Authority
OHIET	Oklahoma Health Information Exchange Trust
OHIP	Oklahoma Health Improvement Plan
OHP	Oklahoma Highway Patrol
OIDS	Object Identifiers
OK	Oklahoma
OKC	Oklahoma City
OKHITECH	Oklahoma's Health Information Technology for Economic and Clinical Health Act
OMB	Office of Management and Budget
ONC	Office of the National Coordinator for Health Information Technology
OPERS	Oklahoma Public Employees Retirement System
OU	Oklahoma University
OSDH	Oklahoma State Department of Health

Acronym	Definition
OSDH TB	Oklahoma State Department of Health Tuberculosis
OSIIS	Oklahoma State Immunization Information System
PHI	Protected Health Information
PHIDDO	Public Health Investigation and Disease Detection of Oklahoma
PHINMS	Public Health Information Network Messaging System
PHIN VADS	Public Health Information Network Vocabulary Access and Distribution System
PHOCIS	Public Health Oklahoma Client Information System
POPS	Population based module
PRAMS	Pregnancy Risk Assessment Monitoring System
RA	Remittance Advice
RFI	Request for Information
RFP	Request for Proposal
RLS	Record Locator Service
RPMS	Resource and Patient Management System
S	Syntax
SAS	Statistical Analysis Software
SDE	State Designated Entity
SDN	Secure Data Network
SFTP	Secure File Transfer Protocol
SHIECAP	State Health Information Exchange Cooperative Agreement Program
SL	Semantic Language
SMD	State Medicaid Director
SME	Subject Matter Expert
SNOMED	Systematized Nomenclature of Medicine
SOA	Service Oriented Architecture
SOAP	Simple Object Access Protocol
SQL	Structured Query Language
SSA	Social Security Administration
SSDI	Social Security Death Index
SSL	Secure Sockets Layer
SSN	Social Security Number
STD	Sexually Transmitted Disease
STD*MIS	Sexually Transmitted Disease Management Information System
STEVVE	State Electronic Verification of Vital Events
TOTS	Oklahoma Toddler Survey
UCE	Universal Claim Extract
USDA	United States Department of Agriculture
VA	Veterans Affairs
VAN	Value-added Network
VFC	Vaccines for Children
VSAM	Virtual Storage Access Method

Acronym	Definition
VR	Vital Records
VRS	Voice Recognition Software
VXU	Unsolicited Vaccination Record Update
WIC	Women, Infants, and Children
X12	Accredited Standards Committee X12
XDS	Cross Enterprise Document Sharing (IHE)
XML	Extensible Markup Language
XPEMS	HIV/STD Prevention System (XPEMS)