Oklahoma Value-Based Analytics Roadmap
Discussion Draft

Prepared for
Oklahoma State Department of Health
Center for Health Innovation and Effectiveness

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I. Introduction and Background

The Oklahoma Health Improvement Plan (OHIP) Coalition, chaired by Commissioner of Health Terry Cline, who also serves as Oklahoma's Secretary of Health and Human Services (HHS), is a public-private partnership of stakeholders that oversees the state's progress toward improving Oklahoma's strategic health outcomes. Stakeholders include representation from healthcare providers, businesses, hospitals, long-term care, behavioral health, public health, private and public payers, and consumers. The purpose of the OHIP Coalition is to develop a comprehensive health improvement plan every five years.

The OHIP was first published in 2010 for the purpose of improving the physical, social, and mental well-being of Oklahomans. In 2015, the Oklahoma State Department of Health (OSDH) published an update to the OHIP to describe statewide health improvement goals for the next five years. This update is referred to as "Healthy Oklahoma 2020," and its purpose is to provide a strategic health improvement plan that addressed the crucial health needs in Oklahoma. As part of this process, the OHIP Coalition established goals in four core areas of work: 1) Health Efficiency and Effectiveness, 2) Health Information Technology (IT), 3) Health Workforce, and 4) Health Finance. A workgroup comprised of Oklahoma stakeholders has been established for each of the core areas.

To support the Health IT workgroup, OSDH engaged Milliman to develop a roadmap for establishing a Value-Based Analytics (VBA) tool in Oklahoma while highlighting key considerations and potential solutions based on the previous experiences of states with similar solutions. As part of this work, Milliman conducted research into VBA and other multi-payer claims database efforts across the country, evaluated existing Oklahoma system initiatives, and conducted interviews with subject matter experts.

This report presents findings identified during the interviews, findings from the review of VBA-like initiatives in other states, and a roadmap for Oklahoma's development of a VBA.

Caveats and Limitations

This report was prepared by Milliman, Inc. (Milliman) on behalf of the Oklahoma State Department of Health (OSDH) in accordance with the terms and conditions of the contract between OSDH and Milliman dated April 1, 2015.

This report has been prepared solely for the internal use of, and is only to be relied upon by, the Oklahoma State Department of Health. Although Milliman understands that this report may be distributed to third parties, Milliman does not intend to benefit, or create a legal duty to, any third-party recipient of its work. If this report is distributed to third parties it should be distributed only in its entirety.

In developing this report, we relied on data and other information provided by OSDH, from stakeholders interviewed, and from publicly available sources. We did not audit the source of any data or information Milliman received, nor did we perform independent verification. If the underlying data or other information is inaccurate or incomplete, the results of our assessment may likewise be inaccurate or incomplete.

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II. Methodology

In developing this report, Milliman worked with representatives of the Oklahoma State Innovation Model (OSIM) team to focus the research efforts on three primary sources of information expected to be informative for Oklahoma's potential development of a VBA model: interviews with external subject matter experts, a literature review, and Milliman's collective knowledge of industry best practices.

A. Interviews with Subject Experts

Milliman conducted interviews with external subject matter experts who provided perspectives on national VBA and VBA-like initiatives, including several individuals who have played instrumental roles in shaping the All-Payer Claims Database (APCD) Council, a national learning collaborative for states and stakeholders that are developing or interested in developing state claims databases. A list of individuals participating in the interviews is shown in the table in *Exhibit 1: Interview Participants*.

Exhibit 1: Interview Participants

Name	Role	Organization
Denise Love	Executive Director *and* Co-Chair	National Association of Health Data Organizations *and* APCD Council
Michael Lundberg	Executive Director	Virginia Health Information
Patrick Miller	Founder and Principal *and* Founder and Former Chair	Pero Consulting Group *and* APCD Council
Josephine (Jo) Porter	Interim Director *and* Co-Chair	Institute for Health Policy and Practice at the University of New Hampshire *and* APCD Council

The primary objective of these interviews was to collect information on existing national multi-payer claims database capabilities, their operational models, and possible strategies for developing a VBA in Oklahoma.

B. Literature Review

Milliman conducted research on publicly available information and evaluations of state, regional, and national efforts to establish capabilities similar to the OSIM VBA roadmap goals. In our research, we consulted governmental websites and other authoritative grey literature from resources such as the APCD Council, the APCD Showcase, and the Centers for Medicare and Medicaid Services (CMS).

C. Industry Knowledge

In addition to the literature review, we consulted with Milliman consultants who have experience with APCD and VBA-like initiatives nationally to gain their perspectives on key criteria that should be considered in developing and operating these databases. Milliman has incorporated these best-practice learnings into this report.

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III. Value-Based Analytics Key Concepts

To facilitate a uniform understanding of the concepts and terms used throughout this report, common definitions for selected key terms are presented below.

- **All-Payer Claims Database:** An APCD is a type of data warehouse that includes information from multiple payer organizations, usually for the purpose of analyzing aspects of the environment surrounding those claims. APCDs generally include data derived from member eligibility information, medical claims, and pharmacy claims, and may be expanded to include vision claims, provider information, and dental claims. Data typically come from both private and public payers.

- **Health Information Exchange:** A Health Information Exchange (HIE) is broadly defined as a system designed to pass health information from one party to another. Functionality such as portals, reporting, and analytics may be added to increase the utility of the system.

- **Participation Model:** The participation model of a system defines whether data-contributing organizations provide data on a voluntary or mandatory basis. Multi-payer claims databases have been established under both models.

- **Pharmacy Benefits Manager:** A pharmacy benefits manager (PBM) is a third-party administrator typically responsible for managing a prescription drug benefit, including processing prescription drug claims.

- **Population Health Management:** Population health management refers to the analysis of the health outcomes of a group of individuals, rather than focusing on the health outcome of a single individual. Population health management is an approach to health that seeks to improve the health outcomes of the entire population. Use of data for analytics and measurement is an essential component of population health management.

- **Third-Party Administrator:** A third-party administrator (TPA) is an organization that processes claims or performs other administrative functions on behalf of an organization that is assuming the underlying insurance risk. Self-insured companies frequently utilize TPAs.

- **Value-Based Analytics**: Value-Based Analytics tools (VBA) and similar systems are tools that aggregate information from multiple sources that can be used to measure health outcomes, quality, and cost. As envisioned in Oklahoma, a VBA tool will use claims and clinical data to develop analytics and metrics to measure outcomes and assist in value-based purchasing. Oklahoma's VBA will also incorporate supporting information from peripheral sources, including public health data and workforce information, to further enhance the state's desired analytics, health outcome improvement, and value-based purchasing initiatives.

These definitions and concepts are used throughout the remainder of this report.

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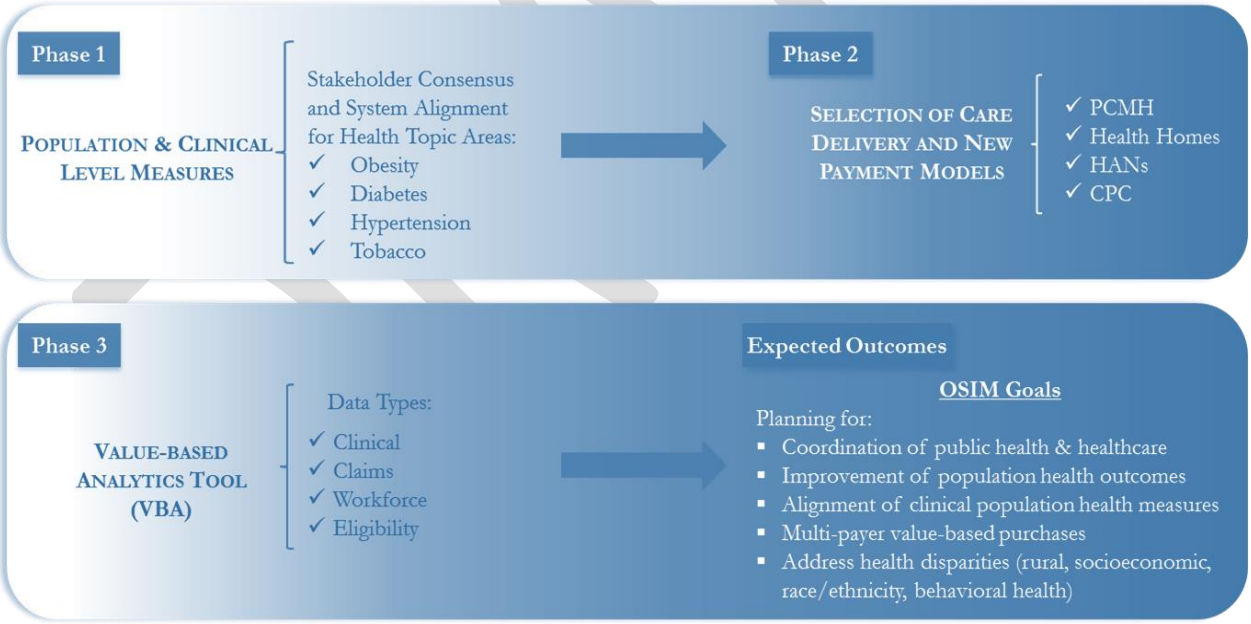
IV. Oklahoma's Value-Based Analytics Goals

Oklahoma has taken a leadership role through OHIP and "Healthy Oklahoma 2020" in developing strategies to improve and measure the health of the population. The OHIP Coalition also submitted a proposal for a State Innovation Model (SIM) grant on behalf of the state of Oklahoma to provide a state-based solution to Oklahoma's healthcare challenges. Oklahoma was successful and received the grant in December 2014. The grant is administered by the OSDH, which in turn created the OSIM leadership team (part of the OSDH's Center for Health Innovation and Effectiveness) to manage and direct the work detailed in the SIM grant. The OSIM's goals align with those of the Institute for Healthcare Improvement (IHI) Triple Aim Initiative: to improve health, provide better care, and reduce health expenditures for Oklahomans.

Oklahoma's SIM grant application describes a phased and integrated design that will accomplish health system transformation in three phases, as shown in *Exhibit 2: Oklahoma State Innovation Model* below. Phase 3, development of the VBA tool, is intended to incorporate numerous types of health information, including data which are typically stored in numerous independent sources (e.g., hospital and physician electronic health records (EHR), HIEs, APCDs, public health records, and health plan data), but which is siloed and not readily able to be used to develop a health system transformation plan that targets value-based insurance design.

Exhibit 2: Oklahoma State Innovation Model



Source: Oklahoma State Innovation Model Application

When fully developed, the VBA will create the opportunity for Oklahoma to conduct data analysis to measure population health outcomes and social determinants of health (e.g., education, employment, income, and access to services), and to provide analytics supporting culturally and linguistically appropriate care. The VBA will be used for monitoring and reporting clinical, population health, and quality measures across providers, payers, employers, and patients. A sample of the clinical and

claims information that is envisioned to be incorporated in the VBA is shown in *Exhibit 3: Sample VBA Data Elements*.

Exhibit 3: Sample VBA Data Elements

Clinical Information	Claims Information
Patient Information	Health Plan Payments
Diagnoses	Member Payments
Test Results	Diagnosis
Medications	Procedures
Problem History	Drug Codes
Allergies	Prescribing Physician
Procedures	Type of Insurance Product

Examples of questions that may be able to be answered using the VBA include the following:

- While claims data can be used to determine what portion of the population receives appropriate clinical testing, (e.g., glucose level and hemoglobin A1c testing for diabetics), it cannot be used to determine what portion of the population's test results are within the "normal" or expected range for a well-controlled diabetic. The VBA will contain both the claims data and the clinical information on the population, thus it could help answer this question. The results could then be used to develop state-wide programs to improve the population's health outcomes. Health plans could also use the information to develop value-based purchasing strategies that hold providers accountable for results.

- By incorporating public health data, the VBA could help identify the impact a person's education or income may have on his or her likelihood to be compliant with treatment protocols. The results of that analysis could be used to help develop strategies to address the social determinants of change and to improve population health outcomes. As an example, for a disease like hypertension, where medication adherence is typically suboptimal and can be difficult to track, combining real-time clinical info (EHR) with potential point-of-sale pharmacy data (claims) could result in more real-time monitoring of these patients to ensure they adhere to the prescribed treatment plan.

- The VBA could facilitate improved capability to compare provider performance by enabling use of risk-adjustments for factors such as patient type, condition, severity, complications due to related conditions, and local population attributes.

- As new care delivery and payment models are implemented, a VBA can provide tools for better evaluation of which interventions and innovations are most efficacious at improving quality outcomes and reducing the overall cost of care.

As demonstrated through the examples above, the effort to combine clinical, claims, and other data sources has the potential to improve the analysis of clinical outcomes and effectiveness.

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A. Active Oklahoma Data Sharing Initiatives

Like many states, Oklahoma has a number of active data sharing efforts underway. These efforts are in varying stages of development and were initially created for different intended uses. Oklahoma has already made substantial progress in healthcare data exchange. For example, data are exchanged though HIEs and EHRs. HIEs are primarily used to share clinical data from EHRs to ensure providers have a complete clinical record when caring for patients.

Competition has spurred innovation and technological development within the state, and two competing HIEs have emerged. Oklahoma's two HIEs began as regional initiatives: Coordinated Care Oklahoma (Coordinated Care) in Norman and Oklahoma City, and MyHealth Access Network (MyHealth) in Tulsa. Each organization is currently in the process of expanding its reach across the state. OSDH is also working on a shared-service state agency HIE. Short descriptions of these options are provided below.

1. Coordinated Care Oklahoma

Coordinated Care has been in operation in the Norman and Oklahoma City areas since 2014. The organization was founded by local hospitals and providers with a goal of providing physicians secure access to health information for their patients for treatment purposes.

When a patient sees a new provider, improvements in care can be achieved if a complete clinical record is available to the provider as he or she delivers care. Coordinated Care focuses on providing support for a patient's transitions between care settings by delivering a complete clinical record, including advance directives (if available) at the point of care. Coordinated Care has also developed a data model that can accept claims data.

2. MyHealth Access Network

MyHealth was started in 2009 with the goal of improving health, improving healthcare, and reducing costs by creating a complete view of all of the care Oklahoma patients receive. Based in Tulsa, the MyHealth HIE collects patient information to assist in treatment decisions during the patient visit and to enable population management programs through analytics and reporting tools.

Blue Cross and Blue Shield of Oklahoma has signed a participation agreement with MyHealth to send regular extracts of claims data to the HIE to measure pay-for-performance outcomes in its provider network. MyHealth has also received claims data from Oklahoma's state Medicaid agency, SoonerCare.

3. Oklahoma State Department of Health

Oklahoma's state agencies handling health information have historically experienced challenges in sharing data across departments. To address this challenge, the Oklahoma Health and Human Services (OHHS) cabinet created the Deliverable Interoperable Components Utilizing Shared Services (DISCUSS) committee designed to collaboratively share resources among the OHHS agencies for the development and implementation of shared information technology products, services, and

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technology frameworks. Membership of DISCUSS includes the Department of Health, Department of Human Services, Department of Mental Health and Substance Abuse Services, Department of Rehabilitation Services, and the Health Care Authority.

In 2015, DISCUSS members agreed to create a shared-services state agency HIE that would facilitate the sharing of the state's data across agencies and would link the disparate systems. State health data has a number of factors that influence how and when it can be shared. For example, birth and death information and sensitive patient registries cannot be shared with a public information exchange. Other data, however, would most certainly benefit from clinical integration. One example of such data is clinical data services provided by county health departments and labs.

A system for sharing data among agencies is anticipated to create benefits for private sector entities in Oklahoma, as well. For example, hospitals are required by law to report patient discharges to several agencies. Integration could mean that only one data feed would need to be sent to the state.

Summary

Careful consideration as to whether the identified vision and use cases for the VBA could be met by either of the existing HIEs, or possibly another state database, would be required before selecting one as a satisfactory solution for the state. Milliman did not identify any existing examples of privately led multi-payer claims databases competing within a state.

Interested readers can gain a deeper understanding of Oklahoma's current data sharing landscape by referencing Milliman's July 2015 report to OSIM, "Health Information Exchange: Statewide Environmental Scan Findings."

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V. Value-Based Analytics Framework

This report is intended to serve as a reference guide for the State of Oklahoma as stakeholders develop a VBA. The VBA will support the vision to improve health, provide better care, and reduce health expenditures for Oklahomans, as outlined in the "Healthy Oklahoma 2020" plan.

As described previously, VBAs and similar systems are tools that aggregate claims and claims-related information for a variety of purposes. Many states refer to their systems as APCDs because they include exclusively, or nearly exclusively, claims and administrative data. While Oklahoma may wish to consider including information sources beyond claims data in its system, for ease of readability, we will collectively refer to these efforts as multi-payer claims databases throughout the remainder of this report.

By incorporating multiple public and private payers' claims and administrative data into a single repository, a state can develop a database from which to measure health outcomes, quality, and cost for large portions of its population. With sufficient participation, Oklahoma could similarly develop an information source to support payment reform initiatives and to provide transparency on the cost, utilization, and value of health services across the state. Examples of how other states have utilized multi-payer claims database initiatives include:

- Conducting cost analysis and transparency efforts to support payment reform
- Identifying and analyzing geographic disparities in care
- Supporting performance improvement initiatives to address operational or clinical quality measures
- Analyzing health outcomes to evaluate the effectiveness of primary care demonstration projects, such as Patient Centered Medical Home initiatives

While claims data analysis is not a new discipline and is generally well understood by health plans and similar organizations, efforts to develop comprehensive repositories containing information contributed by multiple entities have only meaningfully begun within the past decade. While there is measurable progress occurring in many states, some efforts have faced considerable challenges in defining system usage, demonstrating value, ensuring high data quality, and addressing data privacy concerns.

A single proven blueprint for multi-payer claims databases has not yet emerged. The range of goals, health information technology maturity, and differences in political environments across states have led to the creation of many systems with similar components, but with distinctly different models. Many have taken significantly longer to implement than originally thought, and delivered less reporting capability than planned. Careful planning, transparency, and active, frequent stakeholder involvement are strategies that can help shape a more positive outcome and attainment of the database's goals.

The process of implementing a multi-payer claims database can be difficult because it requires many interrelated decisions to be made by a large number of stakeholders, and because it relies upon the

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synchronized timing of many dependent work efforts. In our research, we found that there are typically three distinct phases of implementation:

- **Phase I:** Establish a governance model
- **Phase II:** Implement the technology platform
- **Phase III:** Foster system adoption and improvement

Each phase is comprised of distinct concepts, which can be broken into a series of interrelated decisions. This framework is illustrated in *Exhibit 4: Multi-Payer Claims Database Implementation Model.*

Exhibit 4: Multi-payer Claims Database Implementation Model

Phase I Governance	**Phase II** Techonology	**Phase III** Adoption
• Vision	• Technology Selection	• System Training
• Supporting Legislation	• Data Loading	• Adoption
• Funding	• Report Design	• Continous Improvement
• Oversight Entity		• Expansion
• Data Management		

During the first phase, stakeholders define why the system is being created, consider whether any legislation is required to support or enable the system, and describe the funding structure and the data management model, including what data are required to be incorporated in the system. In the second phase, technology is selected and implemented, and data are tested for quality and loaded into the system. In addition, stakeholders are engaged to design the reports and outputs that users will receive, as well as the rules about how users can obtain reports and/or data. The final phase of implementation is comprised of training, expanding the system's user group, and establishing the process for improving both the content and capabilities of the multi-payer claims database on an ongoing basis.

The phase-based framework described above is a useful construct for grouping and prioritizing the important topics to address when creating a multi-payer claims database. For this reason, Milliman created a phase-based decision tree to guide Oklahoma's VBA development process. This decision tree is included in *Section VII: Oklahoma Value-Based Analytics Roadmap* and is accompanied by a discussion of how Oklahoma could approach each step.

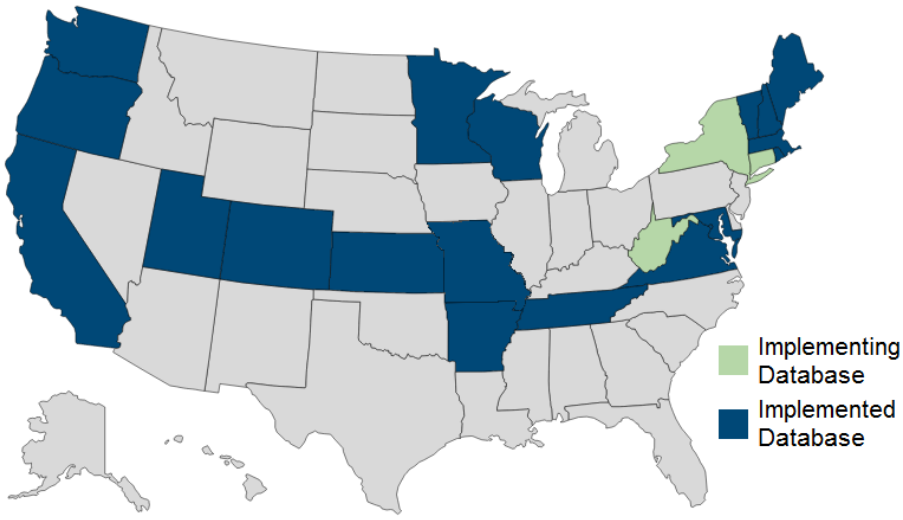
The remainder of this report is organized into two sections. The first section discusses similar efforts across the nation to orient the reader. The second section is a roadmap that illustrates the important decisions and considerations that must be accounted for when implementing a VBA in Oklahoma. By this report's conclusion, the reader should understand the key concepts in scope and governance of existing systems in use across the nation, and should have a frame of reference that can guide the process of establishing a VBA in Oklahoma.

VI. National Efforts

This section of the report includes discussion of national trends in multi-payer claims database models specifically related to their structure, use, and contents. It is organized to follow the concepts in Phase I of the Implementation Model shown in *Exhibit 4* above.

As of the date of this report, 18 states have implemented a multi-payer claims database system, and three more are in the process of implementation. Three states (Maine, Oregon, and Washington) have both a public and separate, coalition-led system. According to information posted by the APCD Council, all but nine states have expressed "strong interest" in, have implemented, or are in the process of implementing a multi-payer claims database. States that either have an existing multi-payer claims database or are in the process of implementation are shown in *Exhibit 5: National Multi-Payer Claims Database Efforts.*

Exhibit 5: National Multi-Payer Claims Database Efforts



Source: Milliman: Compiled from interviews and public sources, 2015

While each of the above states' multi-payer claims database is, or will be, a database containing claim-related information from multiple sources, there is a significant range across the initiatives in both the use of the systems, as well as the approach to system development. National efforts have resulted in a range of governance, funding, design, and user base structures. In the remainder of this section, we highlight some of the key similarities and differences among existing multi-payer claims databases.

A. Governance

As described in *Section V: Value-Based Analytics Framework*, the topic of governance includes identifying the vision for the system's use, legislation to support its creation and operation, and the ownership of the technical infrastructure and data assets, as well as the planned participation model. This section discusses the approach states with existing systems have taken to address each of these topics.

1. Vision for System Use

States have invested significant time and effort in defining the intended uses for multi-payer claims database systems. It is important to understand how existing systems are being used. *Exhibit 6: Multi-Payer Claims Database Use Summary* shows which of the states with implemented systems are using the database for a given activity, including those states (Maine, Oregon, and Washington) with both public and coalition-led systems. The number of systems being used for a particular function is identified in *Exhibit 6*. For example, 12 systems are used for payment reform efforts. It should be noted that the audience for each use outlined in the exhibit varies by state; some states choose to publish performance analysis publically, while others allow a more limited set of users to view the information.

This exhibit also describes the general relationship between system maturity and how the data are used, progressing from left to right. It should not be interpreted as a linear ranking of difficulty or as a required progression among the identified uses (i.e., it is not necessary to use a system for payment reform prior to using it for policy analysis).

Exhibit 6: Multi-Payer Claims Database Use Summary

Quality Measurement	Performance Analysis	Payment Reform	Policy Analysis	Population Management	Academic Research
20 Systems	16 Systems	12 Systems	12 Systems	4 Systems	5 Systems

Degree of required system scope, maturity, and trust

To facilitate consistent understanding, the following bullets provide high-level descriptions of each type of system used:

- **Quality Measurement:** Quality measurement programs use system data to assess process-based measures of the quality of care provided to patients, such as clinical adherence to evidence-based standards for patient treatment. NCQA's Healthcare Effectiveness Data and Information Set (HEDIS) measures are commonly used for this kind of measurement.

- **Performance Analysis:** Performance analysis uses data contained in the system to compare providers or health systems using pre-defined metrics related to cost, utilization, or quality. Programs to assess statewide or regional trends across measure sets and comment on the condition of healthcare in a geographic area also are included in this category.

- **Payment Reform:** Payment reform refers to using the system to assess healthcare costs and payment trends for the purpose of analyzing and assessing cost containment initiatives or care delivery model changes to better utilize dollars spent on healthcare.

- **Policy Analysis:** In policy analysis, data from the system is used to explicitly inform and support public policy legislation and regulations.

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- **Population Management:** Population management programs use the system to take action in patient care, potentially through case management capabilities, to improve the health outcomes of a group of individuals. Encounter tracking and management programs are also included in this category.

- **Academic Research:** Academic research refers to the explicit use of the system by an academic institution for formal analysis, typically through a partnership between the APCD and the research organization. Many states make system data available to researchers, but fewer have explicit, ongoing partnerships for this purpose.

Process-based quality measurement, performance measurement, and payment reform are the most easily attainable uses for a multi-payer claims database. By collecting information about procedures, diagnoses, and cost, users can evaluate whether treatment complies with evidence-based guidelines for care, and can analyze the cost of care across the state's healthcare landscape. Also prevalent is the use of a VBA-like system to evaluate and rank the performance of healthcare delivery systems within the state.

Twelve states explicitly make use of their multi-payer claims databases to provide policy analysis. For example, New Hampshire used commercial claims data to analyze the impact of its House Bill 790, which expanded the definition of dependent young adults to age 26, to understand the costs and coverage impacts of the bill's passage. Significant system maturity and trust is typically required before using a system for this purpose. Five states make their data available for longitudinal health outcomes research, including formal partnerships with academic institutions in two states.

The number of states utilizing a system for population management may appear low to some readers. The seemingly low number may be due to the fact that many healthcare organizations have separately invested in healthcare information technology, such as data warehouses, or have connections to health information exchanges (HIEs) that provide population health management reporting capabilities based on clinical information.

Exhibit 7: Multi-Payer Claims Database Use, provides a state-specific view of the information summarized in *Exhibit 6: Multi-Payer Claims Database Use Summary* above.

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Exhibit 7: Multi-Payer Claims Database Use

State	Quality Measures	Performance Analysis	Payment Reform	Policy Analysis	Population Management	Academic Research
Arkansas	Yes	No	Yes	No	No	Yes
California	Yes	Yes	No	No	No	No
Colorado	Yes	Yes	Yes	Yes	No	Yes
Kansas	Yes	Yes	No	No	No	No
Maine	Yes	Yes	No	No	No	Yes
Maine *	Yes	Yes	Yes	No	No	No
Maryland	Yes	Yes	Yes	Yes	No	No
Massachusetts	Yes	Yes	Yes	Yes	No	Yes
Minnesota	Yes	Yes	Yes	Yes	No	Yes
Missouri	Yes	Yes	No	No	No	No
New Hampshire	Yes	Yes	Yes	Yes	No	No
Oregon	Yes	No	Yes	Yes	No	No
Oregon *	Yes	Yes	Yes	Yes	Yes	No
Rhode Island	Yes	No	No	Yes	No	No
Tennessee	Yes	Yes	Yes	Yes	No	No
Utah	Yes	Yes	No	Yes	Yes	No
Vermont	Yes	Yes	Yes	Yes	Yes	No
Virginia	Yes	Yes	Yes	Yes	Yes	No
Washington *	Yes	Yes	No	No	No	No
Wisconsin	Yes	Yes	No	No	No	No

** Denotes voluntary initiative in states with both mandated and voluntary models.*

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Multi-payer claims databases have been implemented for a wide variety of reasons. Identifying the intended use(s) at the outset of any development effort is a critically important first step as it guides all other aspects of the system's design.

2. Supporting Legislation

There are two primary methods for establishing a multi-payer claims database: initiatives are either started through a private coalition, or by state action. Each approach influences the system in different ways.

Legislative support for multi-payer claims databases varies by state. In some states, legislation simply specifies that a database must be created. Other states pass more proscriptive laws that describe the system's oversight, participation model, and funding structure, and identify which data are to be included in the database. Legislation that compels participation typically results in better participation in the initiative. Alternatively, legislation may also place limits on data sharing. The state may directly fund part or all of the cost of the system through general funds and federal grants available to states, or may direct the costs of ownership of the system to certain stakeholders through use-taxes or fees.

Coalition-led multi-payer claims database models may provide a higher degree of discretion on the part of participants to determine what data are contributed, how it is measured, under which circumstances data may be accessed, and with whom the data is shared. The cost burden is typically spread across coalition members. Some models also opt to supplement funding through data sales or by securing grant funds. Because of their voluntary nature, coalition-led databases may include limited data sets and fewer data sources than the state-led initiatives.

Exhibit 8: National Governance and Participation is a summary table that lists each state with an active multi-payer claims database, the governance model, the participation model, and the types of data that can be contributed.

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Exhibit 8: National Governance and Participation

State	Governance			Data Source					
	Legislated	Oversight Model	Participation Model	Commercial Payers	TPA/ Self-Funded	Medicaid	Medicare	PBM	Uninsured
Arkansas	Yes	Public-Private	Voluntary	Yes	Yes	Yes	Yes	No	No
California	No	Public Non-Profit	Voluntary	Yes	Yes	Planned	Yes	No	No
Colorado	Yes	Public-Private	Mandatory	Yes	No	Yes	Yes	No	Planned
Kansas	Yes	State Led	Mandatory	Yes	No	Yes	No	No	No
Maine	Yes	State Led	Mandatory	Yes	Yes	Yes	Yes	Yes	Yes
Maine *	No	Private Non-Profit	Voluntary	Yes	Yes	Yes	Yes	Yes	No
Maryland	Yes	State Led	Mandatory	Yes	Yes	Yes	Yes	No	No
Massachusetts	Yes	State Led	Mandatory	Yes	Yes	Yes	Yes	Yes	No
Minnesota	Yes	State Led	Mandatory	Yes	Yes	Yes	Yes	Yes	No
Missouri	No	Private Non-Profit	Voluntary	Yes	Yes	No	Yes	Yes	No
New Hampshire	Yes	State Led	Mandatory	Yes	Yes	Yes	Yes	No	Planned
Oregon	Yes	State Led	Mandatory	Yes	Yes	Yes	Yes	Yes	No
Oregon *	No	Private Non-Profit	Voluntary	Yes	Yes	Yes	Yes	Yes	No
Rhode Island	Yes	State Led	Mandatory	Yes	No	Yes	Yes	Yes	No
Tennessee	Yes	State Led	Mandatory	Yes	Yes	Yes	Planned	Yes	No
Utah	Yes	State Led	Mandatory	Yes	Yes	Yes	No	No	No
Vermont	Yes	State Led	Mandatory	Yes	Yes	Yes	Yes	Yes	No
Virginia	Yes	Public-Private	Voluntary	Yes	Yes	Yes	Yes	No	No
Washington	Yes	State Led	Mandatory	Yes	Yes	Yes	No	No	No
Washington *	No	Private Non-Profit	Voluntary	Yes	Yes	Yes	No	No	No
Wisconsin	No	Private Non-Profit	Voluntary	Yes	Yes	Yes	Yes	No	No

** Denotes voluntary initiative in states with both mandated and voluntary models.*

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While most existing systems were created via state legislation, six states (California, Maine, Missouri, Oregon, Washington, and Wisconsin) each have, or had, coalition-led initiatives. In these states, privately-led coalitions established data-sharing agreements and governance structures, and funded the development of technology to aggregate and analyze claims information from the participating organizations.

Maine and Washington passed legislation to expand the existing coalition efforts, leading to a mix of state and private governance. State involvement resulted in expanded payer participation, mandatory submission requirements, and diversified funding for the database. We note that a governance model that is structurally modified after the creation of the database may introduce complexity and operational challenges while each entity adjusts to the new governance model.

In order to ensure that the system includes sufficient claims data to be considered representative of the state, 13 initiatives are mandatory participation models, including four which are in geographic proximity: Colorado, Kansas, Tennessee, and Utah. States that wish to compel participants to submit data typically legislate this requirement.

Commercial health plans and TPAs are the most common participants in multi-payer claims databases, and are typically the first data sources integrated into the system. This occurs for two reasons. The first is that the majority of a state's insured citizens are typically covered through commercial insurance products, so they are a necessary data source for developing a comprehensive repository of the state's claims information. The second is that health plans are generally accustomed to reporting information externally, and thus have the sophistication necessary to develop and transmit the files for the multi-payer claims database.

After successfully integrating commercial health plan and TPA data, most states expand the database to include Medicaid data. The integration of Medicaid data is generally of equivalent, or greater (due to specific state requirements that deviate from commercial health standards), complexity when compared to the commercial health plan data sources.

Subsequent integration initiatives may include other data sources, such as Medicare fee-for-service (FFS), information from PBMs (if it is not contained in the health plan or TPA data set), and proxy data for uninsured claims. Information on uninsured patients can be particularly challenging to incorporate into a multi-payer claims database unless a consolidated source for information on the medical encounters of this population has been established (usually by a TPA or health plan on behalf of a health system). The ability to conduct analysis on the claims data for the uninsured is a goal of some states. Managing utilization, cost, and quality of care provided to this population could be of significant value, as uninsured care is not directly reimbursed. This is especially the case in states with high rates of uninsured. Maine has managed to develop a proxy-source of data for some uninsured claims, and has incorporated this information into its APCD.

These additional, non-commercial data sets are generally integrated after a system has been in use for some time because they may represent smaller portions of the state's population and/or be challenging to integrate. For example, the process to become certified as eligible to receive Medicare fee-for-service data from CMS can be difficult. Adding to the challenge, Medicare's data structure has caused

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integration challenges. Some states have concluded that the challenges presented by integrating these data sets make them better suited for later phases of implementation.

3. Funding

This section describes reported implementation costs and funding strategies for existing multi-payer claims database initiatives. One key observation from our research is that identifying funding sources early in the process of system implementation can expedite the development process; budget uncertainty can complicate already difficult decisions regarding data integration and reporting functions. States have used varied approaches to funding the databases' startup and operational costs.

The costs cited in this report assume that the database's technical infrastructure is sourced from vendors with existing technology platforms. Few states elect to build their systems and, as such, it is difficult to accurately forecast costs for such an endeavor.

Determining the cost of a multi-payer claims database system is also dependent upon the number of participating payer organizations. Each source must be mapped into the system and tested in order to complete integration. Cost is further influenced by the extent and variety of data being integrated into the system. For example, adding vision, dental, or pharmacy data to the standard set of medical claims and eligibility information increases complexity, and thus, cost. Additional considerations that can affect cost include the following:

- Number of covered lives
- Variety of data formats
- Scope of reporting
- Frequency of data updates
- Number of planned users
- Whether there is a web portal for users
- Data request management process
- Staff time and effort to educate submitters and address data quality issues

According to the APCD Council, the annual budget states have allocated to multi-payer claims database operations can range from approximately $350,000 for small efforts to over $2,000,000 for more complex initiatives. This range represents systems that house data for between 1.3 million and 5.5 million lives. Annual budgets reported to the APCD Council include:

- Kansas: Approximately $1.3 million
- Maryland: Approximately $1 million
- Tennessee: Approximately $0.5 million

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Funding for multi-payer claims databases typically comes from a variety of sources. A diversified revenue strategy minimizes the cost to a single stakeholder group. Diversified funding can also support ongoing operations should some sources become unavailable. Examples of funding structures include the following:

- Colorado funded startup costs through foundation grants, and plans to fund ongoing operations through the sale of data and reports
- Maine uses a combination of annual assessments on healthcare providers and payers based on market share, supplemented by data sales
- Several states have received rate review grants from CMS to fund costs, including Arkansas, Kansas, Maryland, Rhode Island, and Washington
- Utah and New Hampshire used a combination of general appropriation funds and matching funds from Medicaid to pay for implementation costs and to fund ongoing operations
- Vermont covers the costs of operating its database by assessing fees on payers and healthcare facilities
- Virginia splits funding across stakeholders by charging 40% to participating payers, and 40% to the healthcare and hospital association, with the state funding 20% through data sales
- Washington and Wisconsin's voluntary databases are primarily funded by coalition members

In order to reduce the cost burden, many states have structured the ownership of multi-payer claims database initiatives in a way that allows the utilization of funding from multiple state agencies, as well as state Medicaid programs. New Hampshire's APCD is run as a collaboration between the state's Department of Health and Human Services and its Insurance Department.

Some states are engaged in the sale of data from the database, where it is allowed by law. Maine and Virginia are examples of states that currently sell or have plans to sell data. Maine charges variable fees of up to $15,000 per year for access to certain data sets from its APCD, but most options cost between $1,500 and $6,000. While Virginia Health Information does not currently sell data from the Virginia APCD, the organization reports a data sales function generating over $1,000,000 of revenue annually from the sale of data-related products, including licensed data models and hospital discharge information. Subject experts we interviewed cautioned that relying on data sales as a primary funding mechanism could potentially compromise an initiative in the future if sales targets were missed.

The funding mechanisms used in each state are dependent on the state's political climate and their perspective on the purpose of the multi-player claims database. States that describe the system as a public utility are more likely to use general funds to operate it, whereas states with more limited distribution typically levy use taxes or fees on specific stakeholder groups.

4. Oversight Entity

Regardless of whether an initiative is state or coalition-led, multi-payer claims database initiatives generally have a two-tiered oversight model. Subject matter experts recommend that a board be convened to function as the initiative's strategic steering entity to address system usage, privacy, data collection policies, and expansion activities. Boards are most successful when comprised of

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representatives from as many distinct stakeholder groups as possible. Stakeholders generally include payers, employers, providers, the public, government agencies, and representatives from major state coalitions, such as hospital and physician associations and payer associations.

The oversight entity's second tier, the operations group, has a primary role of ensuring that processes and infrastructure are in place to collect, maintain, and report on the database's contents. The size and structure of this group will vary depending on the whether the entity has relationships with vendors to manage data processing activities, and depending on the type of reporting published by the oversight entity. Examples of existing oversight entities include:

- Independent Organization (Virginia Health Information)
- Purpose-Built State Agency (Maine Health Data Organization)
- State Department of Health (Minnesota)

Two representative examples of operations group staffing are found in Wisconsin and Maine. The Wisconsin Health Information Organization currently employs a staff of seven, including a chief executive officer (CEO), director of business development, program director, executive assistant, data analyst, business services coordinator, and a project manager. The Maine Health Data Organization employs a staff of six, with an executive director, administrative assistant, two health planners, and two programmer analysts.

The staffing needs of each state's operations group will vary based on the structure of the technology platform, reporting scope, and operations model.

5. Data Management Model

In this section, we discuss national approaches to data management. Typically, when the vision for the system is created, it will be accompanied by "use cases," which define system capabilities and how users will interact with the database. For example, a use case describing the public visiting a website to compare the average cost of a hip replacement in the state would inform later phases of the implementation when the system must be able to make information available to the public, manage a website, collect cost information related to specific procedures, and conduct the analysis to determine the average cost of the procedure. The combination of system vision and use cases serves as a guide for the overseeing entity to develop the rules governing the data collection process. These rules will typically define:

- Which entities must submit data (if not defined by the state)
- Submission thresholds for participating entities (e.g., by market share or covered lives)
- Content of submitted files (e.g., eligibility, medical claims, pharmacy claims)
- Structure and layout of submitted files
- Frequency of submission

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To determine submission thresholds, states first identify how much data is needed to populate the system in order to generate credible analytics and reporting. States then identify how many payers need to submit data to hit the target based on the unique payer mix in the state. This process is different for voluntary models. In a voluntary system, payers elect to participate, and so significant time is spent developing payer interest. States with voluntary contribution models generally have fewer data sources, and thus information on fewer covered lives than those with mandatory contribution models. If a voluntary contribution model is in place, system users must be mindful of any limitations on the conclusions that may be drawn from reports with limited sample size or non-representative geographic distribution.

In general, the data elements included in each system vary based on the state's goals, availability of information, and the current environment. *Exhibit 9: Nationwide Data Element Inclusion* summarizes the data elements reported into existing systems.

Exhibit 9: Nationwide Data Element Inclusion

State	Eligibility Data	Medical Claims	Dental Claims	Pharmacy Claims	Vision Claims	Provider Data	Clinical Data
Arkansas	Yes	Yes	No	Yes	No	Yes	No
California	Yes	Yes	Yes	Yes	No	Yes	No
Colorado	Yes	Yes	Yes	Yes	No	Yes	No
Kansas	Yes	Yes	Yes	Yes	No	No	No
Maine	Yes	Yes	Yes	Yes	No	No	Planned
Maine *	Yes	Yes	No	Yes	No	No	No
Maryland	Yes	Yes	Yes	Yes	No	Yes	No
Massachusetts	Yes	Yes	Yes	Yes	No	Yes	No
Minnesota	Yes	Yes	Yes	Yes	No	Planned	No
Missouri	Yes	Yes	No	Yes	No	No	No
New Hampshire	Yes	Yes	Planned	Yes	No	Yes	No
Oregon	Yes	Yes	No	Yes	No	No	No
Oregon *	Yes	Yes	No	Yes	No	No	No
Rhode Island	Yes	Yes	No	Yes	No	Yes	No
Tennessee	Yes	Yes	Yes	Yes	No	No	No
Utah	Yes	Yes	No	Yes	No	Yes	No
Vermont	Yes	Yes	Yes	Yes	No	Planned	No
Virginia	Yes	Yes	Planned	Yes	No	Yes	No
Washington	Yes	Yes	No	Yes	No	No	No
Washington *	Yes	Yes	Yes	Yes	Yes	No	No
Wisconsin	Yes	Yes	No	Yes	No	Yes	Planned

** Denotes voluntary initiative in states with both mandated and voluntary models.*

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All of the states shown in *Exhibit 7* collect eligibility data, medical claims, and pharmacy claims, which represents the vast majority of information needed for common analytics. States have also included dental and vision claims, as well as information about rendering providers. Maine has received federal grant funds to combine clinical data, such as laboratory information and vital statistics, from the Maine HIE with claims data from Maine's APCD, but the state is an outlier in this regard, as few states have attempted to include clinical information in their multi-payer claims databases.

At this time, there is no existing common national standard that can be used for defining claims data formatting. Efforts to develop a national standard for claims data files have historically been met with resistance by payer groups, which in large part is due to the perceived impact on existing systems infrastructure. However, the APCD Council, in partnership with the Accredited Standards Committee X12, has published a Uniform Medical Claims Payer Reporting Standard that could be used for this purpose. Additionally, many states have published data collection rules. Adopting an existing data model used by all payers in a state as a common standard could ultimately reduce the submission burden for participating payers.

The best practice to develop data submission rules or standards is through discussion and working group meetings with all key stakeholders, including payers. By involving payers, the overseeing entity will be able to balance obtaining the required data with formats that can be most readily supplied by the state's payers. Payers typically are accustomed to working with various data submission formats and can provide subject matter experts to advise on best practices.

Specific data types that are commonly provided to existing state databases include member identification information, demographic information, claim tracking information, insurance product identifiers, patient demographics, diagnosis and procedure codes, service dates, service and prescribing providers, national drug codes, and payments (both plan and member). Additional data elements, such as group name, Health Insurance Oversight System (HIOS) Plan ID, and payment arrangement type, may be included if they are needed for the intended use of the system.

Once the submitting organizations, data elements, and file formats have been determined, the overseeing entity defines how frequently data will be submitted to the database. Typically, data are submitted on a monthly, quarterly, or annual basis. Considerations used to determine submission frequency include data processing capacity and participating organization size. Very large health plans are generally required to submit data more frequently than those with lower volumes because the effort associated with processing such large amounts of data, including the ability to identify and correct data submission errors, is proportionately lower. A system with relatively small numbers of claims generated each month is more likely to request frequent, smaller data submissions.

Clear definition of the data management process is an important tactic for multi-payer claims database initiatives. This accomplishes two goals: engaging stakeholders, and limiting data submission delays by eliminating unexpected changes to file content and formatting.

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B. Models of Interest

In the research process, Milliman identified two models that may be of particular interest in Oklahoma. In this section we discuss operations of the Wisconsin Health Information Organization (WHIO) and efforts by the Maine Health Data Organization to integrate claims and clinical data. Both organizations were early adopters of multi-payer claims databases and now conduct robust operations with mature processes and widespread adoption.

1. Wisconsin Health Information Organization

To improve healthcare in Wisconsin, the state and a group of payers, providers, and employers voluntarily created WHIO in 2006. WHIO is unique in that it is one of the few, fully voluntary state efforts that is overseen by a private entity and that also includes data on a large portion of the state's population. The organization's stated goals include reducing unwarranted variations in care; improving the quality of care through information exchange between providers, purchasers, and consumers; and supporting value-based initiatives across the state. Operations are overseen by a board comprised of payer organizations, the Wisconsin Medical Society, Wisconsin Department of Health Services, the Wisconsin Collaborative for Healthcare Quality, and an area business foundation on health. The WHIO Datamart includes data on 72% of the state's population, thereby creating the opportunity for analysis of a majority of the state's claims data.

WHIO uses its database to report on quality measures and analyze performance across the state by giving participants access to both pre-built reports and organization-specific data marts. Example uses for this information include quality and efficiency benchmarks, provider variation analysis, and network leakage analysis. In addition to data access for WHIO members, WHIO launched a consumer-oriented website in 2015 that publically ranks primary care clinics against both industry benchmarks and peers within the state. Clinics that offer pediatric care, family medicine, and internal medicine departments are ranked as above average, average, or below average in providing recommended care for healthcare issues at the right time, and for making "good use" of healthcare dollars to help consumers select medical care.

WHIO receives medical and pharmacy claims information from commercial, Medicaid, and Medicare Advantage plans to support its reporting efforts. WHIO was certified as a qualified entity by CMS, and in 2015 will collect fee-for-service Medicare data. WHIO provides training to data mart subscribers in the form of webinars, classroom training, user workshops, and virtual office hours. In 2014, WHIO received funding support from the state to foster continued growth in operations and capabilities, and funded the remaining 48% of its budget through state contracts, subscription fees from members, and other sources.

2. Maine Health Data Organization

The Maine Health Data Organization (MHDO) was established in 1996 by the Maine legislature as an independent executive agency to collect, and responsibly make public, clinical and financial health information. MHDO policy is established by its 21-member board comprised of health care providers, payers, and consumers. Participation in the state-run initiative is mandatory, and the system is used for quality measurement, performance analysis, and academic research. MHDO first collected data for

its APCD in 2003. The APCD currently includes information from commercial payers, TPAs, PBMs, dental benefits administrators, Maine Medicaid, Medicare fee-for-service, and a proxy for uninsured claims.

MHDO provides access to its data warehouse via an online portal for credentialed users. MHDO recently released payment and quality measures through a public website called CompareMaine. This website includes average payment information for approximately 300 procedures, and select quality measures for roughly 150 Maine healthcare facilities. MHDO grades healthcare facilities as low, good, better, or best for each of the published measures. Published measures include categories such as overall patient experience, whether the facility uses treatments proven to be effective, and whether methods that make care safer are used. Qualified entities may also purchase data from MHDO, which includes commercial, Medicare, and Medicaid claims from the APCD; inpatient and outpatient hospital service data; Maine hospital quality data for care transitions, infections, and nursing sensitive information; and financial information for hospitals. The sale of certain types of sensitive data is governed by Maine privacy laws, and requires the intended purchaser to sign a confidentiality agreement to protect participant and patient privacy.

MHDO is currently planning to combine claims and clinical data sets within its APCD. In 2013, a successful proof-of-concept to match de-identified commercial claims with clinical information from Maine's HIE led to a federal Cycle IV Rate Review grant, which requires MDHO to better define the clinical information they collect and to explore integration strategies. CMS Rate Review grants are federal grants available to states to review proposed rate increases using transparent cost data. MHDO receives claims feeds from commercial payers, as well as Medicaid and fee-for-service Medicare claims data. Prior to sending claims feeds to MHDO, payers encrypt patient identifying information, such as names and Social Security numbers, for privacy reasons, as required by Maine's APCD model. As a result of preliminary discussions to merge Maine's claims and clinical data, MHDO has altered its data submission requirements to allow identifiable data to be submitted.

As one of the first APCD efforts in the country, Maine is among the leaders of integrating clinical data into an existing multi-payer claims database. Maine's proof-of-concept efforts to pair claims and clinical data have been underway for two years, demonstrating that combining the data sets, while valuable, is a complex process. It further demonstrates that merging information from databases initially developed for different purposes is also challenging.

C. Alternative Systems

A state that does not wish to develop the infrastructure required by a multi-payer claims database could potentially utilize a manual analysis process. An example of this approach can be found in Massachusetts. Massachusetts used varying manual processes for analyzing and reporting on information submitted by payers from approximately 2006 through 2009. This process was time-consuming, with limited scope and reach. The state understood the value of the analysis that it was conducting and began looking for ways to scale the operation. In 2009, the Massachusetts APCD Charter stipulated the creation of a database that met all state agency needs to reduce the submission burden on payers and the administrative burden for the state.

Due to the complexity and volume of data involved in analyzing state-wide health information, states embarking on multi-payer initiatives typically bypass the manual early phases that Massachusetts conducted and opt to build analytics-driven reporting databases. No evidence of scalable, long-term alternatives to a reporting database have been established in other states.

The breadth of national experience in establishing multi-payer claims databases provides multiple resources and examples for the state of Oklahoma to reference in its pursuit of similar capabilities.

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VII. Oklahoma Value-Based Analytics Roadmap

Oklahoma has expressed interest in developing a VBA to support healthcare and payment reform initiatives within the state. The summarized national efforts described in *Section VI: National Efforts* provide useful context for understanding the forms such an initiative could take. The past experiences of states with an existing multi-payer claims database also serve as guidance that can be used to develop strategies to implement a VBA in Oklahoma.

Multi-payer claims databases frequently serve as a data source for other state or privately-run initiatives, making the initiatives important stakeholder constituencies for the multi-payer claims database program. Our research suggests that multi-payer claims database efforts are most successful when the intended users of the system are involved in the planning process. While value-based purchasing programs are generally operated independently of multi-payer claims databases, if Oklahoma intends to support value-based purchasing programs through the database, the needs of the program should be treated as requirements for any Oklahoma-based VBA.

In our interviews, subject matter experts observed that, by adopting or building-upon established processes and systems, the effort required to develop and deploy a VBA may be reduced if the existing components directly supported the intended use of the system. Oklahoma should carefully consider what existing health information technology infrastructure within the state may be leveraged to develop a VBA. Two examples of existing infrastructure include hospital discharge data submission rules and data specifications and the infrastructure created by Oklahoma's HIEs to support pairing claims and clinical data. *Subsection VII.A.2.a: System Creation* discusses these considerations in more detail.

As demonstrated in other state efforts, the decisions made while establishing a VBA can have far-reaching consequences for its ultimate usefulness and success. Decisions related to system governance, legislation, content, and user base can be both difficult and expensive to alter once the process of establishing the system has been begun. However, by approaching the process in a structured manner, Oklahoma will be able to ensure that the fundamental decisions were made with diligence.

Establishing a multi-payer claims database is best viewed as a program comprised of many related projects due to the complexity and interdependencies throughout all steps of the process. As such, experienced program and project management oversight of the process is desirable. Recall the multi-payer claims database implementation model, which focuses on governance, technology, and adoption. It is replicated below in *Exhibit 10: Multi-Payer Claims Database Implementation Model.*

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Exhibit 10: Multi-Payer Claims Database Implementation Model

Phase I Governance	Phase II Techonology	Phase III Adoption
• Vision	• Technology Selection	• System Training
• Supporting Legislation	• Report Design	• Adoption
• Funding	• Data Loading	• Continous Improvement
• Oversight Entity		• Expansion
• Data Management		

Milliman used this construct to create a decision tree-based roadmap for Oklahoma. We segmented each phase of the roadmap into critical decisions Oklahoma should consider in its implementation process. The decision tree is presented first in its entirety as *Exhibit 11: Value-Based Analytics Roadmap Decision Tree*, providing a detailed guide to the key decisions and processes that relate to implementing a VBA in Oklahoma. It is designed to be a quick-reference guide to the entire process of VBA implementation. Each of the three phases of the implementation model—governance, technology, and adoption—is represented by a separate section. Relevant subsections are revisited throughout the discussion of the implementation process. The remainder of this report discusses the considerations related to each component of the decision tree.

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Exhibit 11: Value-Based Analytics Roadmap Decision Tree

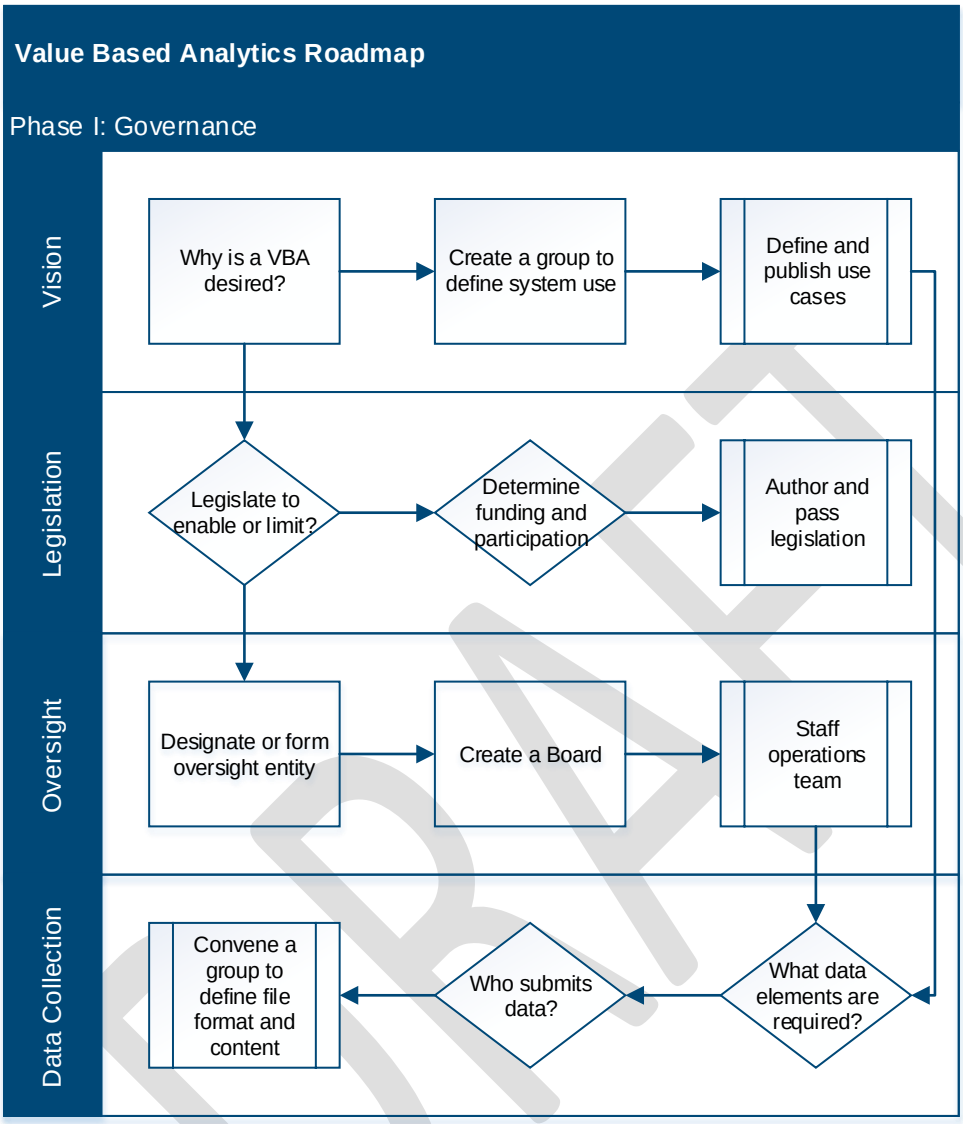

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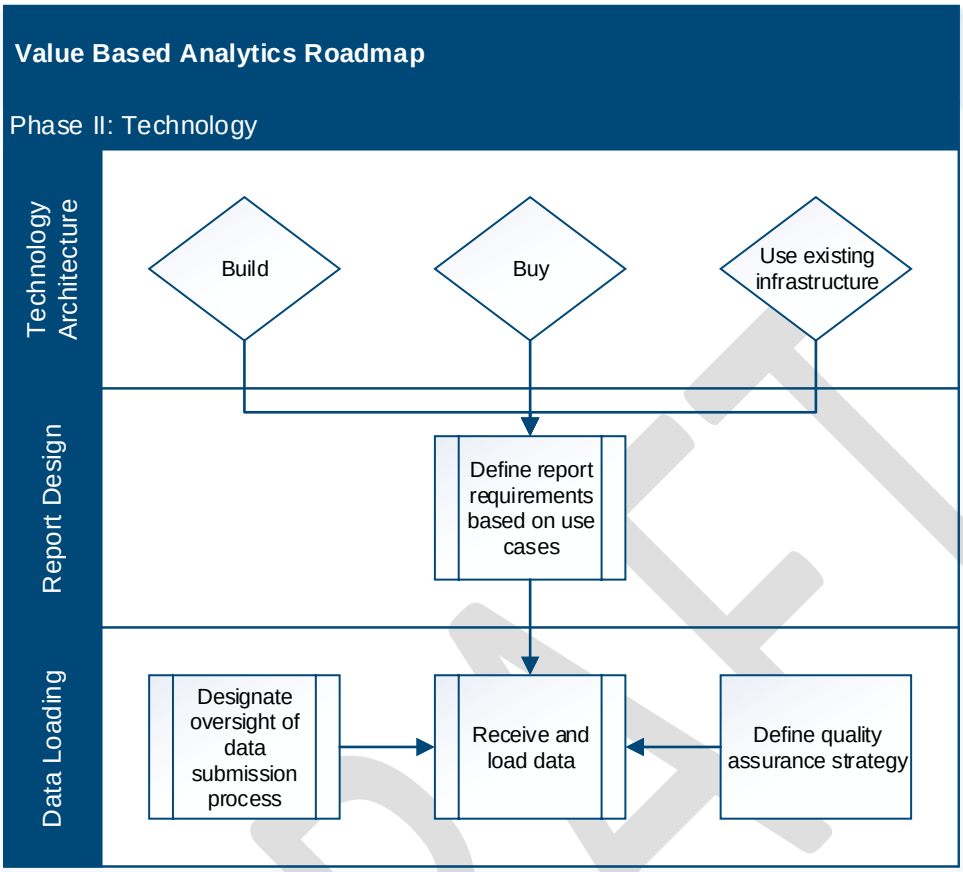
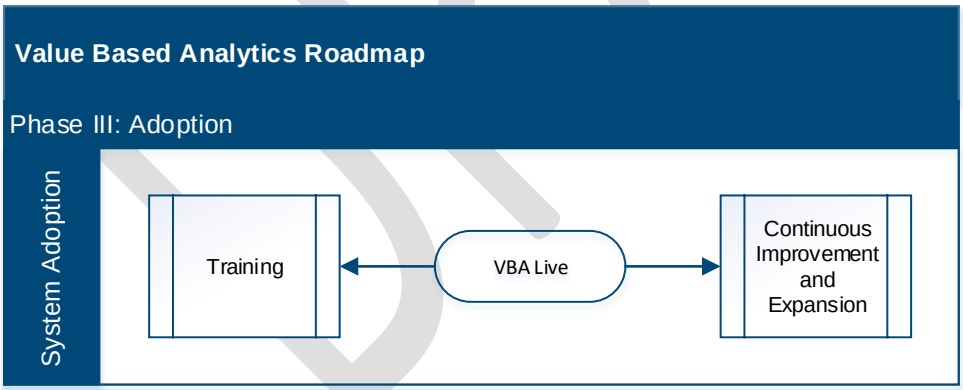
Exhibit 11 (continued): Value-Based Analytics Roadmap Decision Tree



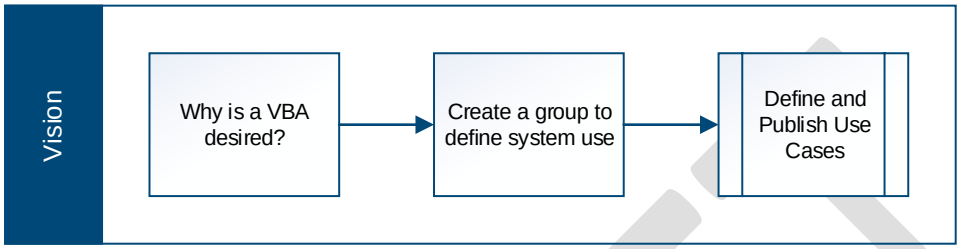


The following narrative expands upon the decision tree to further delineate considerations for Oklahoma as the state pursues a VBA capability. In each subsection, we refer to a component of the decision tree and have replicated part of the decision tree as a reference for the reader.

A. Phase I: Governance

This section discusses the process of establishing a governance framework for Oklahoma's VBA. Governance includes considerations related to vision, legislation, participation model, establishing an oversight entity, and identifying system participants.

1. Vision



The first action in implementing a VBA is to articulate a vision for why and how the system will be used, which is a two-step process. First, a unifying vision for the system must be defined. Second, the vision must be used to codify and publish use cases, or formal descriptions of how users will interact with and use the system. Regardless of whether the VBA is a state-owned system, these initial steps can benefit from the state serving as a catalyst for convening the group that will define them.

Experience from efforts in other states suggests that one of the best ways to develop the vision for a VBA is through a multidisciplinary stakeholder group. To ensure broad output, most states have sought the perspectives of stakeholders who will provide the system's data, those who will use the data, those who will produce the data, and those whom the data is about.

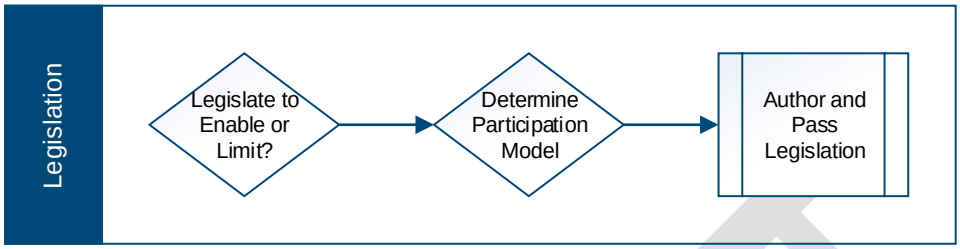
In Oklahoma, stakeholders may include commercial health plans, physical and behavioral healthcare providers, state agencies (such as OSDH), representatives of the public, and other special constituencies of interest, such as rural and small provider groups, or Native American nations and tribes. By including groups that may not be incorporated into the VBA immediately, but could be part of future efforts (such as telehealth practitioners), Oklahoma can ensure that a wide base of input is provided during the system's design.

Defining use cases is a critically important next step. Use cases describe the manner in which users interact with a system and, as a result, define some of the system's required capabilities. States frequently use the same group that defined the vision to develop use cases in order to ensure broad input. This effort may be most valuable if an expert in multi-payer claims database system development is included in the process of defining the use cases, both to ensure that they are fully documented and to provide expertise on the implications of system capabilities that the group expresses interest in.

The vision and use cases should identify who will access and interact with the system. Specific user access criteria will be defined during the technology implementation process or through legislation, but it is critical that the early stages of the process identify a preliminary user group to facilitate decision making through the VBA development process. Both the vision statement and the use cases will

inform and guide all remaining steps in the process, from informing legislation, to reporting requirements, to selecting a system architecture.

2. Supporting Legislation



After the VBA vision and use cases have been defined, the implementation process reaches a critical juncture—the state must decide upon its level of direct involvement in the VBA process.

The state of Oklahoma may opt to "remain silent" on any or all aspects of the decision tree, effectively deferring the decision to the free market. The experience in other states suggests that the likely outcome of such passive decision making is extended timelines to define the governance and participation model of the VBA, low data quality, limited reach of reporting, and difficulty in securing the participation of even well-intentioned participants. States with multi-payer claims databases generally have reached and expressed concrete decisions for each of the aspects included in the decision tree. Lack of clarity around the state's position may also hamper private sector efforts.

Oklahoma may benefit from considering five key components that could be included in potential legislation: 1) system creation, 2) system oversight, 3) system funding, 4) participation model, and 5) personal identifiers. The implications of each of these components are described below in more detail.

a) System Creation

The majority of states with existing multi-payer claims databases have opted to create them through the legislative process, effectively choosing to view them as "public utilities." Passing legislation in Oklahoma could require the creation of a VBA on a defined timeline, and may allow funding through state-specific grants. Deciding to legislate that a VBA be created, however, would likely require additional state involvement in the process. States that have legislated the creation of multi-payer claims databases also generally determine funding, system oversight, and administration, and often will manage the technology procurement process. Should Oklahoma elect to not require the creation of a VBA through legislation, implementation of VBA capability would rely on the free market development of a voluntary database.

Because the Healthy Oklahoma 2020 plan stipulates the integration of health information technology that supports payment reform, careful consideration should be given to whether the state choosing to take a position of "remaining silent" would support that goal.

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b) System Oversight

System oversight is an important concept in a VBA. The role of the overseeing entity is generally to establish policies and procedures necessary for the administration and management of the VBA, including procedures for the collection, processing, storage, analysis, use, and release of data. Three potential scenarios exist for system ownership and oversight:

1. State-Led System
2. Public-Private Partnership
3. Fully Private System

State-Led System: This is the most common model of system ownership among states with existing multi-payer claims databases. These databases are wholly managed by a state department or treated as a shared service by several departments, such as New Hampshire's collaboration between the state's Department of Health and Human Services and its Insurance Department. An example of an existing shared services arrangement in Oklahoma that could potentially be used for this purpose is the Oklahoma Health and Human Services cabinet group, DISCUSS. Designed to collaboratively share resources among the Oklahoma Health and Human Services agencies, DISCUSS focuses on the development and implementation of shared information technology products, services, and technology frameworks.

Public-Private Partnership: For states that plan to make data available to qualified public users, the alternative to a state-led model is a public-private partnership. Under a partnership model, the state delegates system ownership and process oversight to a private entity, either by creating it or through a competitive bid process, but may retain system oversight through funding and periodic audits. This model may be preferred in instances where the state perceives that an external entity has valuable prior experience and expertise, or if the state does not want to be seen as owning the system for political reasons. Arkansas, Colorado, and Virginia all operate APCDs under a public-private partnership model.

Fully Private System: Private initiatives exist in a minority of states with multi-payer claims systems. By choosing not to involve itself with the governance of the VBA, Oklahoma would effectively be opting for a solution driven by the free-market. Fully private governance structures are typically accompanied by voluntary participation models. The Wisconsin Health Information Organization is an example of this model.

National experience indicates that any of these three models could support a VBA. Based on Milliman's research, the most critical aspect of an oversight model is that the selected entity have expertise and experience in public reporting, data management, and relevant technology to support its role in system oversight and governance.

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c) System Funding

Oklahoma must decide how to fund the VBA if the state chooses to be involved. Most states utilize a variety of funding sources to cover the initial development costs and the ongoing operating costs of a VBA. Oklahoma may consider several potential funding sources that have also been used by other states. They include, but are not limited to:

- SIM grant money
- General allocation funding
- Medicaid match
- Excise tax on system users, such as delivery systems and health plans
- Operational budgets of state agencies
- Subscription fees
- Data sales

A diverse funding structure may be preferable because it could mitigate the risk of funding loss from a single funding source, and could help to ensure the VBA's continued operation if such an event were to occur.

Privately led initiatives are generally funded by their members. Typically, founding members will contribute a share of the required initial investment on a prorated basis. Ongoing maintenance and enhancement costs are borne by expanding the membership of the initiative and charging subscription fees to access reporting and analytics tools. This model is fundamentally similar to the subscription model currently employed by both HIEs in Oklahoma.

Public-private partnerships are funded through both state and private organizations. Virginia's APCD provides an example of a participant-based funding structure. In Virginia's model, participating health plans contribute 40%, the Virginia Hospital and Healthcare Association contributes 40%, and 20% of the funding is provided from data sales by Virginia Health Information, under the authority of the Virginia Department of Health.

State-led efforts are primarily funded via state-appropriated funds. Taxes, agency operational budgets, and grant awards may be used for this purpose. The specifics of state arrangements are varied, yet most structure the cost burden such that system users and data contributors fund material portions of operating costs.

Some existing, larger multi-payer claims database initiatives have opted to sell subscriptions or reports as a funding method. Given the relatively small population of Oklahoma, the sale of data may not be a viable primary funding option for the Oklahoma VBA. Additionally, the expected return from data sales should be weighed against the consideration that selling data may serve as a catalyst to embolden privacy advocates and any VBA opponents. States that sell data have overcome this challenge through transparent communication about what information is sold, to whom, and under what circumstances.

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Through our research, we noted that politically and fiscally viable funding structures often utilize many funding sources to reduce the burden on any one group or organization. Further, multi-payer claims databases are often funded through whatever channels are considered to be viable in a given state.

d) Participation Model

Oklahoma must determine whether to mandate participation from data-contributing organizations, and must determine the size threshold for that requirement. There are two primary considerations related to this decision: which types of data need to be collected to satisfy use cases, and what number of participants need to submit data from each group to meet both privacy needs and sufficient sample sizes for reporting.

In order to establish a state-wide VBA capability, Oklahoma should begin by identifying the minimum threshold for a representative portion of the state in the database. While Oklahoma's relatively consolidated payer market means that incorporating large insurers in the state will result in most of the covered lives being included, Oklahoma should take care to ensure that those covering rural Oklahomans or Native American tribes are included where possible.

Most states target between 70% and 75% of their state's population to serve as a representative sample of claims data. They also evaluate the data to ensure the system contains a diverse and reasonable representation of the state's population across lines of business and geography. Due to the nature of Oklahoma's health insurance marketplace, a voluntary participation model could potentially be successful in achieving this target, as fewer organizations would need to supply data to hit participation targets. If Oklahoma pursues this model, care should be taken to secure an agreement from targeted participants early in the process.

According to the *Oklahoma Insurance Market Analysis* report published by Milliman in August of 2015, 49% of Oklahoma's population is covered by commercial insurance through an employer or other private insurer. Another 21% is covered by Medicaid, 14% by Medicare, and 2% through other public sources. Approximately 14% of the state is uninsured. In order to achieve the threshold identified by other states as an acceptable participation floor, Oklahoma may wish to include major commercial payers, Medicaid, and Medicare. It is important to note that not all commercial payers in Oklahoma are of sufficient size to participate.

Oklahoma should also consider the impact of a mandatory versus voluntary model. Under a voluntary model, the onus for data transformation, cleansing, and quality rests with the VBA, which will have limited recourse to persuade contributing organizations to materially change the content of their submissions. Organizations may be hesitant to contribute, which is due to lack of clarity in both the effort associated with developing extracts, and also the possible uses for the data in a public forum. Each organization must decide if it is comfortable with those possibilities. A clearly defined system vision and use case set can help address this concern.

Data submission requires effort on the part of contributing organizations to develop the required extracts. If participation is mandatory, it is important to set minimum membership size thresholds at which payer organizations must submit data because the burden for small organizations may be greater

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than the value of the data they can contribute. Mandating participation and specifying penalties or fees for failures in compliance to both timely submission and data quality standards puts the obligation for submission on the contributing organizations. For example, New Hampshire has a mandatory participation model, but has exempted certain organizations if they cover fewer than 10,000 New Hampshire lives and are not participating in New Hampshire's health care exchange.

The participation model may also influence the implementation timeline for the VBA. Appropriate legislation required to initiate a mandatory VBA can take considerable time to pass, but may provide the penalties needed to ensure timeliness of submission and files that contain higher quality data. We note that, in some cases, the penalties are viewed as insufficient to cause changes in submitter behavior. In contrast, voluntary efforts have the advantage of not requiring the investment of time that legislation takes, but may result in lower data quality because penalties for non-compliance can be difficult to develop or enforce.

e) Personal Identifiers

Deciding whether to allow personal identification of patient data in the VBA requires balancing privacy concerns against the intended use of the database. The state must determine whether to support the system vision tacitly, support it explicitly, or decide to potentially reduce the scope of the system by limiting its contents to only de-identified patient data. The stakeholder-expressed vision and defined use cases will stipulate whether identifiable patient data is required to fulfill the goals for system usage.

Personally identifiable patient information (PII) (e.g., an individual's name, street address, email address, telephone number, or Social Security number) is a prerequisite for pairing claims and clinical data or for associating claims data with state public health data (such as registries) because it is the mechanism used to match a patient's records. However, including PII may result in patient privacy and data security concerns.

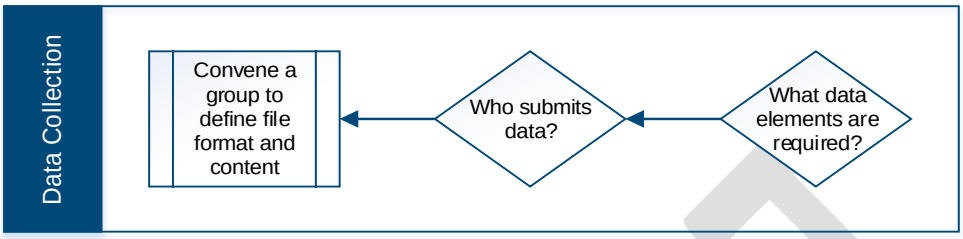
Some states, such as Rhode Island, have adopted a process whereby PII is submitted to a trusted technology vendor, or "lockbox" vendor, that manages the patient matching process and then sends a separate, consolidated, and de-identified data feed to the APCD. This process ensures that the data available to system users includes comprehensive aggregated claims records, but that it cannot be associated to a specific person. An alternative method that some states use is for payers to install software packages on their own servers, which encrypt the PII before sending data to the APCD. This approach ensures that the APCD is in control of encryption, and if every source is encrypted the same way, the same member can still be matched across sources, but no PII is stored in the APCD itself.

In addition to evaluating whether to involve itself in the decision to include or limit PII, the state may opt to place limits on its usage by stipulating that PII may be collected, but that it may not be used until that usage is approved by an oversight board, either from the state or by the group that oversees the VBA.

Clear communication and transparency to the public about the planned approach to patient identifiers is critical. Failure to do so can result in implementation delays if data privacy and use become a public

concern. Minnesota's APCD legislation includes precise language about what data will be collected and how it will be used as a result of privacy concerns that emerged during the APCD development period.

3. Data Collection



Collecting data from contributing organizations is a challenge faced by most multi-payer claims database initiatives. Experience indicates that even well-intentioned organizations that desire to participate in the process can have difficulty providing the required files. This occurs because payer organizations retain and store claims, eligibility, and other necessary data elements in varying levels of detail, formats, and locations.

It is important to plan not only the required content of the files to be sent to the VBA, but also the format, frequency, and allowable error rates. While no single national standard for claims and eligibility data exists, there have been efforts to develop and spread uniform standards. Utilizing an existing standard may decrease the time it takes to assemble the required files and ease the reporting burden for contributing organizations that submit data in multiple states. Based on our research, we expect that data collection efforts may be more successful if entities that will be submitting data, such as commercial payers, Medicaid, and healthcare delivery organizations, are invited to participate in the submission development process.

Four-steps are typically employed for the purpose of defining the required elements of the data collection process:

1. Identify any data gaps or system enhancements that need to be made to payer systems to meet the needs of the use cases
2. Determine the data feed format
3. Define quality standards and acceptable error rates
4. Determine how long it will take participants to begin submitting data

In summary, establishing the VBA governance model is a time-intensive, cyclical process that may require reevaluating decisions in the event that the original system vision conflicts with the political or technological realities of the state's health information technology infrastructure. By carefully crafting the legal and operational environment in which the VBA will operate, and by involving stakeholders throughout the process, Oklahoma can build a foundation to simplify challenges that frequently accompany technology implementation.

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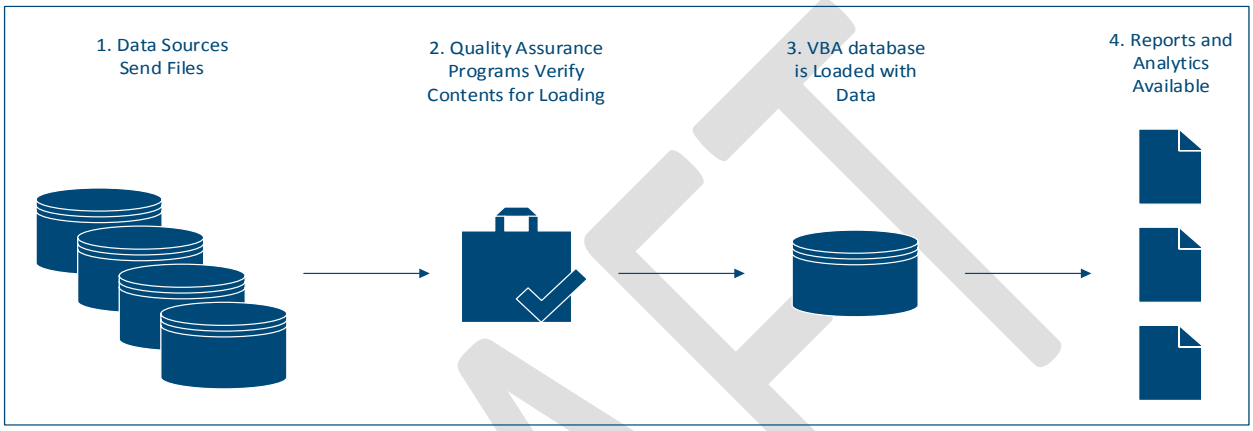
B. Phase II: Technology Implementation

In order to discuss the processes and considerations related to the implementation of the technology infrastructure that underlies the VBA, we first outline processes associated with moving information from the participating payer organizations or other data contribution sources into the VBA, and from the VBA into reports. This process is summarized in four primary steps in *Exhibit 12: VBA Data Processes.*

Exhibit 12: VBA Data Processes



Organizations submitting data assemble information from their databases into the defined file format, which is then sent to the VBA. Before information is loaded into the VBA's database, a series of quality checks ensure that the data received conforms to the defined standard and that the files are complete. Data that passes the quality checks is then loaded into the VBA, where it is accessible for reporting and analytics. Data quality checks should be consistent with the use cases to ensure that data are of the highest quality for intended reporting purposes.

Steps 2 through 4 above rely on the VBA's technology infrastructure, which, in Oklahoma's case, must be built, purchased, or expanded from existing technology assets in the state.

It is important to note that the process of implementing the technology infrastructure can take up to or over a year. VBA leadership must proactively maintain stakeholder engagement throughout this process by communicating progress and involving participating organizations in activities that support these efforts, such as data validation. The Phase II decision tree is pictured in *Exhibit 13: Technology Implementation.*

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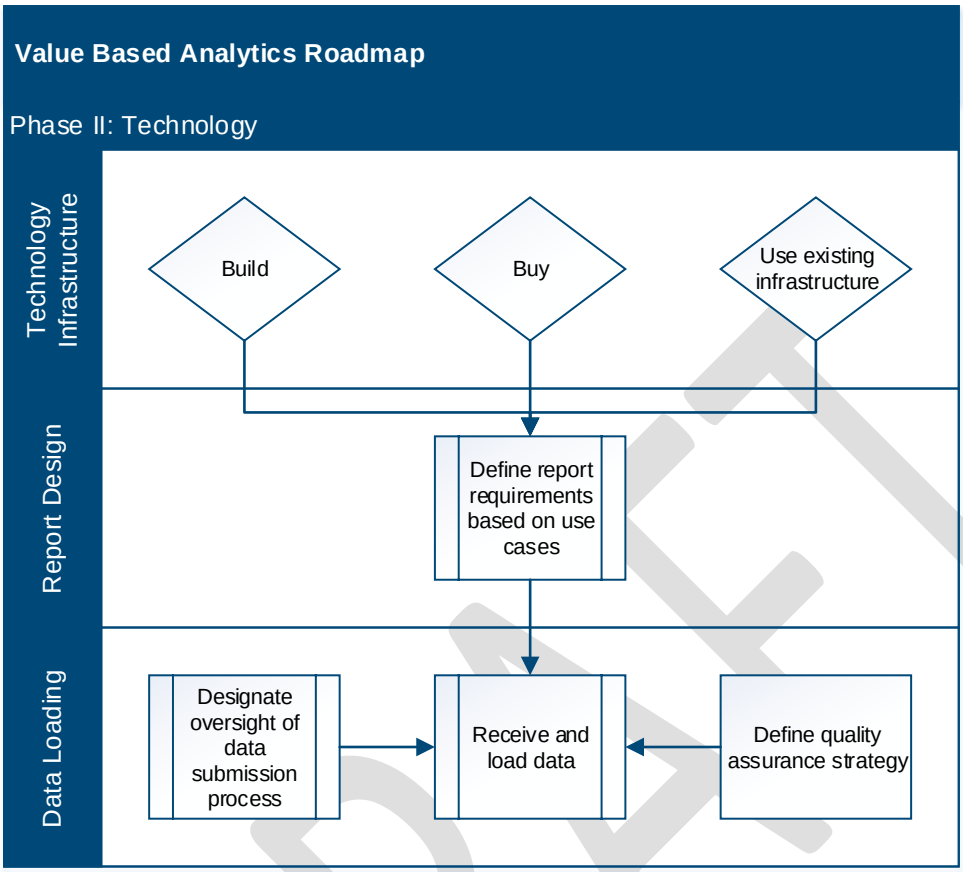
Exhibit 13: Technology Implementation



1. Technology Infrastructure

Existing multi-payer claims databases generally compartmentalize the technology platform into three subcomponents: the database itself, quality assurance and data processing, and analytics and reporting. Each of these components may be provided by the same technology vendor, or by separate organizations. Whether Oklahoma should build, buy, or leverage existing health information technology for this purpose is dependent on evaluation of the required capabilities, cost, and time to implement each one.

Past experience in other states suggests that the entity responsible for the technology platform should have three traits: 1) prior experience, 2) expertise, and 3) functionality that supports the desired system usage. For this reason, few states build their databases because it is typically a complex and time-consuming process.

The majority of VBA implementations to-date have either identified a technology vendor through a bidding process, or have leveraged existing, similar health information technology in the state. By comparing the expected costs and functionality of each option with the defined vision, use cases, and available funding, the state will be able to identify the best option for these combination of factors.

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2. Report Design

There are two typical models for accessing data: end users may directly query the database, or predefined reports may be made available to users. In order to design the system's output and reports, three processes (each of which may require compromise) must have occurred: 1) a governance framework that specifies what data will be collected and how it may be used will have been identified, 2) a technology platform will have been selected, and 3) the selected platform will have an expected deployment timeframe. Any one or all of these may place practical limitations on the analytics and reporting the system can produce.

The process of designing reports creates an opportunity for continued stakeholder involvement. It is also a key step in ensuring that stakeholders trust the reports produced by the system. Individuals with pertinent technical expertise should guide the report design process. Oklahoma may wish to utilize either the oversight entity's board, or a voluntary stakeholder group to provide input into the report contents. The goal of the design process should be to develop an initial set of reports that support the system's vision, and to create reports that can be aggregated to a state or regional level. This is a best practice designed to engender participant trust in the system.

Technology vendors may not provide support for customized reports, so it is important that the system capabilities are assessed during any procurement process. During implementation, the report design phase consists of prioritizing the available reports, and potentially designing custom reporting capabilities.

By involving stakeholders in the report design process, Oklahoma can ensure stakeholder buy-in to the selected measurement metrics. This stakeholder process should be repeated over the life of the system as part of a continuous improvement process, including VBA capability expansion and enhancement.

3. Data Loading

Trust is likely to be one of the most important determinants of VBA adoption within Oklahoma. A defined and closely-managed data loading process is a primary mechanism for ensuring that the VBA contains complete, high quality data. If the system does not have a data set that is both complete and high quality, the reports and analytics are less likely to be utilized, limiting the usefulness of the VBA until these issues are remedied.

To ensure that high quality data are loaded into the VBA, the overseeing entity should create a mechanism to manage data loading. Data management may be provided through delegation to a vendor, or by convening a subgroup of stakeholders or an oversight entity team to manage the process. During implementation, the group responsible for data loading should supervise two critical steps: quality checks to ensure received data are complete, and validation that the output from the VBA's database is correct after files have been loaded.

Data submission rules, targets, and penalties are typically specified during Phase I of the implementation. The group responsible for loading data should be tasked with establishing the technical checks to ensure received files conform to requirements, and tasked with the communication

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of the processes supporting this activity, which should ensure that any challenges are rapidly addressed. By establishing designated points of contact within both the governing entity and the data submitters' organizations, questions and issues can be quickly addressed.

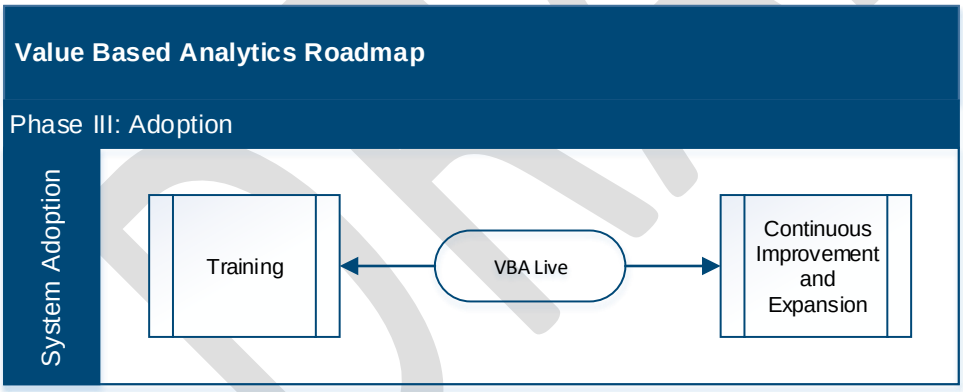
Validation serves two purposes. The first is to verify that the output from the VBA matches the input files submitted by participants. Typically, matching is internally verified by the organization responsible for data loading before the organization requests that data submitters do the same. Some states have automatic "checks" at the time of submission, where the carriers "sign off" on summary statistics of the files they submit. The two-step process ensures not only a higher level of quality, but also serves a critically important second purpose: trust in the system's accuracy.

Loading large volumes of data requires significant time. Oklahoma may elect to employ a process whereby participants submit files that contain up to a year's worth of data for validation purposes as part of an initial load. After participants are satisfied that quality assurance processes are functioning as intended and the data are of high quality, larger volumes of historical data may be loaded and a more frequent submission schedule, such as monthly or quarterly, may be prescribed.

A defined quality assurance and data-loading process is an important step in the VBA-implementation process.

C. Phase III: System Rollout Strategies

Exhibit 14: VBA Rollout and Adoption



Once the governance structure has been defined, technology infrastructure implemented, and data from participating organizations loaded into the system, Oklahoma will have achieved a major milestone, but will not have completed its work on the VBA. *Exhibit 14: VBA Rollout and Adoption* describes the processes used by national efforts to enhance adoption. In general, successful systems rely on training to familiarize users with the system, and continuous improvement cycles to increase the scope, quality, and reach of the tool.

Oklahoma should consider conducting two concurrent adoption initiatives. The first is to begin training the core user base on how to interact with and interpret the contents of the VBA. By focusing training efforts on an initially small group of users who have supported and been involved with the

initiative, a group of champions can be fostered. By creating supporters across participating organizations, Oklahoma can ensure the distribution of advocates across the state, which has been proven to be a critical component in information technology deployment. As the VBA is deployed statewide, Oklahoma may wish to follow a training model such as Wisconsin's, in which participants have access to webinars, classroom training, user workshops, and virtual office hours.

The second adoption initiative is to begin continuous improvement and system capability expansion activities by soliciting feedback and through continued stakeholder engagement. Actively soliciting feedback on the VBA's ease of use and capabilities can enhance system functionality and can maintain participant engagement after the initial implementation work is completed.

Continuous improvement cycles should follow all steps in the decision tree (Phases I through III), related to establishing vision and use cases, expanding governance or legislation to secure the necessary involvement, and enhancing the technical capabilities of the VBA to expand its usefulness. Due to the comparative ease of data integration, many multi-payer claims databases have chosen to collect commercial claims and eligibility data as part of the initial system implementation. Continuous improvement cycles can then focus on collecting Medicaid and Medicare data while simultaneously adding additional reporting and analytic capabilities.

Due to the scale and complexity of creating a VBA, a noted best practice is to structure the initial adoption periods as extended validation periods. This continued validation and correction of early issues will develop trust. One way the extended validation period can be structured is to publish initial reports exclusively to data contributors and to the governance organization for feedback. Simultaneously engaging stakeholders in ongoing improvement activities establishes an environment of partnership between the system administrators and system users that can result in increased system use and trust.

1. Special Considerations

As cited previously, approximately 31% of Oklahomans live in a rural area. Providers serving rural Oklahomans have two challenges in adopting health information technology: lack of funds, and lack of support staff to take action based on information gathered from technology systems. If the VBA is to be used by small provider groups or rural providers for population health management, addressing these issues will be an important step in the system adoption process.

Many providers and critical access hospitals in rural Oklahoma are choosing to affiliate with, or being acquired by, larger care delivery organizations. This process can help rural providers afford the technical infrastructure necessary to access systems. By waiving or reducing subscription fees, Oklahoma can further reduce the barriers faced by rural and small providers in adopting a VBA.

Population management programs rely on care coordination and case management capabilities that small and rural providers may not have. By utilizing resources such as regional extension centers set up to assist with electronic medical record systems, Oklahoma could use existing relationships to educate these providers on the discipline of population health management and attempt to establish cooperatives between groups of providers for patient outreach support.

2. Implementation Strategies

With 18 existing multi-payer claims databases across the nation, Oklahoma has many examples to draw upon as the state plans its VBA approach. Notable common themes cited across implementations include the following:

- Use existing data submission rules and formats where possible to derive potential cost savings through standardization
- Incrementally expand both the data set and reporting functionality over time
- Be transparent about what data will be collected, how it will be used, where it is stored, and how it will be protected
- Begin with statewide or aggregate measures and gradually report on more detailed levels as the system becomes more mature and more trusted
- Involve stakeholders throughout all phases of the process
- Communicate with stakeholders and the public throughout all phases of the program

Taking these considerations into account during the implementation of Oklahoma's VBA may help to limit complexity and mitigate risks inherent in the development and ongoing management process.

Summary

Multi-payer claims database initiatives are spreading rapidly across the country. Oklahoma's interest in developing such a tool to support its vision for improving the state's health outcomes and healthcare delivery model is commendable. By engaging stakeholders early in the process, being transparent about how information will be used and safeguarded, and learning from the successes and challenges of other states that have implemented multi-payer claims database tools, Oklahoma can leverage the learnings from other states to foster collaboration and trust in the stakeholders who will play a role in Oklahoma's VBA initiative.

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