



COLORADO

**Governor's Office of
Information Technology**

Serving people serving Colorado

January 18, 2018

Dear Secretary Nallapati,

It is my pleasure to deliver the 2017 Government Data Advisory Board (GDAB) Annual Report in accordance with C.R.S. 24-37.5-701 et seq.

This report reflects ongoing work by the GDAB to improve data governance and interagency data sharing. This particular work was identified as important for data sharing when the GDAB began meeting again in 2016. It has relied on significant contributions by GDAB members and has created momentum for continued activities that will expedite data sharing while enhancing data privacy and security. Specifically, the GDAB has:

- Developed a commonly accepted and understood vocabulary for data sharing and governance. This lexicon provides a standard set of definitions for use in data sharing agreements across the state enterprise, and it will be incorporated into OIT processes and data sharing agreements going forward.
- Defined a standard framework for data governance. Standardized data governance will facilitate data sharing and improve the security and privacy profile for the state's data assets. The data governance framework developed by the GDAB is based on a maturity model approach that provides flexibility for state agencies. Rather than imposing a mandatory, monolithic structure for data governance, the maturity model allows agencies to assess their level of maturity and identify specific steps to increase their data governance maturity based on available resources and organizational structure.
- Supported development of a common framework for data sharing agreements. Health agencies in the state have developed a common data sharing agreement, and the GDAB followed this work and expects to adapt this for broader applicability in 2018.

In addition, the GDAB received updates and provided feedback on data-related issues such as amendments to the Open Records Act and the Evaluation and Action Lab at the University of Denver. The annual report also sets out the work agenda for the GDAB in 2018. This includes developing a toolkit and protocol to expedite data sharing among agencies.

I look forward to any comments you may have about this work. Of course, if you have any questions or concerns, please do not hesitate to contact me.

Best regards,

A handwritten signature in blue ink, appearing to read 'Jon Gottsegen'.

Jon Gottsegen
Chief Data Officer

Introduction

The State of Colorado has recognized that greater efficiencies and innovations in state government will be achieved through improving data sharing processes and procedures. While there are several advanced data management programs and data sharing or integration efforts among state agencies, data sharing between state agencies continues to require labor intensive execution of data sharing agreements and manual transfer of data using a wide variety of tools adopted by state agencies independently. Additionally, the lack of a standard data governance framework across the state enterprise results in data being managed differently among state agencies. This hinders data sharing, as an agency that is sharing data may not have a common reference with the requesting agency for how the shared data may be handled.

More efficient and effective data sharing and integration will make data available for sophisticated analyses of policy and program effectiveness across state programs. With more standardized approaches to governing and sharing data across the enterprise, the sharing of data will also be better governed, thereby protecting the data and the value invested in those data by the state.

Improving data sharing, integration and governance has been the focus of the state's Government Data Advisory Board (GDAB or the "Board"). The Colorado General Assembly recognized this need for more effective sharing and governance of data when it created the GDAB in 2009 specifically



to advise the State Chief Information Officer (State CIO) on activities and policies necessary for developing an interdepartmental data protocol. This protocol should facilitate information sharing across agencies and assist in determining the effectiveness of state policies related to data sharing, governance and distribution to the public. The interdepartmental data protocol and GDAB are codified in C.R.S. 24-37.5- 701 et seq. The Board is managed and chaired by the Governor's Office of Information Technology (OIT).

The Board was preceded by a Data Protocol Development Council (Council), also created by statute to provide guidance, policies, and procedures for implementing a data sharing architecture across the state enterprise, and driven by the need to use data across state agencies to analyze the effectiveness of state policies and inform strategy for the use of state resources. Before it sunset, the Council recommended establishing a formal governing board, which ultimately became the GDAB, to advise on enterprise policies, directions and priorities for data governance and management across agencies. While the GDAB's work followed the Council's focus on unit records (i.e., records pertaining to individuals within the state), it now provides recommendations on records of any type. Nonetheless, unit records will continue to be a priority for the Board due to the privacy and compliance related issues surrounding them.

Vision

The Board's vision is to increase the effectiveness and efficiency of government services by promoting greater collaboration, innovation, and agility in government operations through more regular data sharing between state agencies and political subdivisions and more seamless, efficient, and strategic exchange of core data sets while protecting privacy and security of data.

The Board has the following cross-departmental responsibilities:

- Advise the state's Chief Information Officer (CIO) on the development, maintenance, and implementation of the data sharing protocol;
- Advise on the best practices for sharing and protecting citizen data;
- Review, advise, and provide input into the strategic plan for improving data governance;
- Advise on compliance, privacy, and security data requirements;
- Advise on internal and external data policies and procedures;
- Advise on financial and budgetary components required for implementation; and
- Specifically recommend education data sharing and management strategies.

Goals

The Board's mission is to facilitate information sharing across agencies and assist in formulating and determining the effectiveness of state policies. The Board's specific goals are as follows:

Goal 1: Develop recommendations for enterprise data sharing, integration, and consolidation, particularly in the area of data sharing agreements.

Goal 2: Recommend policies and procedures for managing data and resolving data sharing or data management conflicts.

Goal 3: Identify areas to reduce operational costs and complexity.

Goal 4: Provide recommendations to improve data privacy, regulatory compliance, and access management.

Goal 5: Establish an enterprise data governance framework and provide recommendations and best practices to improve data governance within the state enterprise.

Goal 6: Identify change management opportunities (e.g., service delivery, process improvement, organizational re-alignment) to enhance data governance and data sharing.

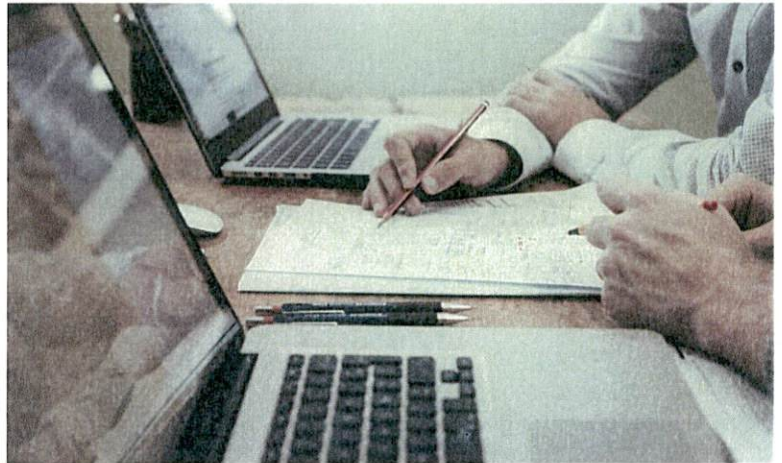
Goal 7: Provide feedback and guidance on an open data strategy for the state.

2017 Work Activities

The Board met monthly through the 2017 calendar year. In addition, the Board formed two working groups to work on the standard data governance framework and the standard data lexicon (i.e., dictionary). The specific meeting dates are listed in Appendix A.

Membership

State statute (C.R.S. 24-37.5- 703) specifies the state and local agencies that must be represented in the Board's membership, while also allowing the governor to include representatives designated by the executive directors of additional agencies. Statute also allows the secretary of state, attorney general, state treasurer, and the chief justice of the supreme court to select a member from his or her department. Currently the Board membership includes the departments of:



- Corrections
- Education
- Health Care Policy and Financing
- Higher Education
- Human Services
- Labor and Employment
- Natural Resources
- Public Health and Environment
- Public Safety
- Revenue
- State
- Transportation
- Office of eHealth Innovation

Local representation includes:

- Douglas County
- Jefferson County School District
- Littleton School Board

The state Chief Data Officer (CDO) serves as an ex officio member and chair of the Board. The specific members representing these agencies and statutory language directing the Board's membership are included in Appendix B. In addition to these official members, there has been participation from the Governor's Policy Office, OIT's Office of Information Security as well as other staff from within OIT.

Work Agenda

In 2016, the Board identified several objectives to improve sharing and governance of data in the state. These objectives were identified to overcome organizational obstacles to data sharing and to realize opportunities for improved management of data across the state enterprise. Current pain points or challenges in data sharing can be categorized into:

- Statutory or programmatic restrictions
- Data governance practices (or lack thereof)
- Technological needs
- Data sharing agreements and policies
- Relationships between and within agencies

Benefits or drivers for improving data sharing in the state fall into the following categories:

- Statutory or legal drivers
- Improved data governance
- Interagency relationships and data interoperability benefits
- Technology improvements and innovation
- Strategic and organizational benefits

The Board's first product was a document titled *Why should Colorado develop an interdepartmental protocol?* that describes the obstacles to and drivers for improved data sharing and governance in greater detail. This led to a work agenda to improve the data sharing and governance environment in the state, and this work agenda continued into 2017. Specifically the agenda for 2017 and the resulting products from the GDAB included the following:

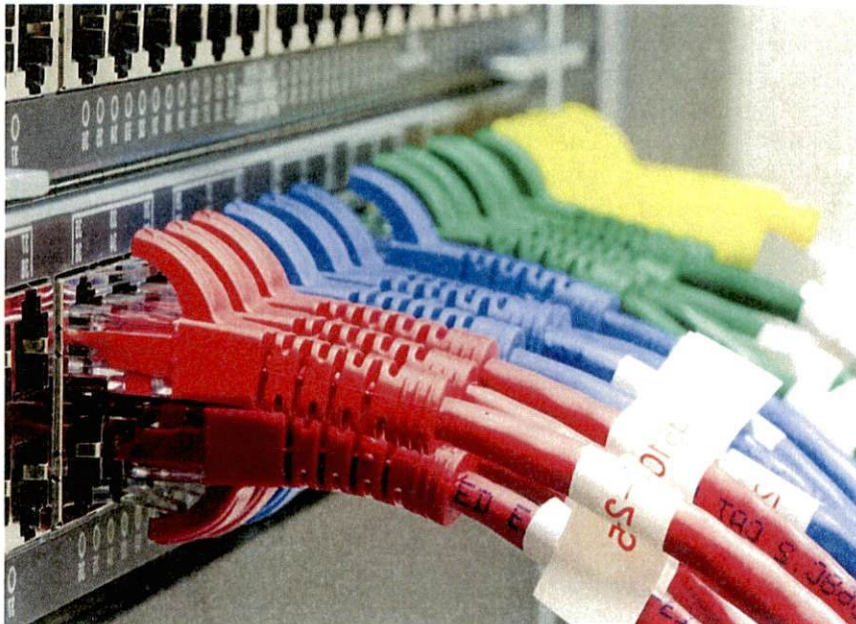
1. Data Sharing Lexicon:



The GDAB identified the need for a common language or lexicon when agencies talk about data sharing or data governance-related issues. Up to now, data sharing agreements from different agencies had their own definitions with varying terms or common terms that are used in different ways. This can lead to confusion or misunderstandings between the parties involved. Consequently, the GDAB set out to agree on a standard set of terms and definitions that can be referred to across state agencies when considering data sharing agreements or conditions for data sharing as well as discussing other issues related to data governance or management. After first simply agreeing on a discrete set of terms, and therefore specific concepts, that are salient when sharing data or discussing data management or data governance issues, the GDAB then agreed on definitions for these terms. This agreed on lexicon is included in Appendix C. To promote the use of this lexicon, the Board members desired to first socialize it in a manner non-intrusive to current agency activities.

Accordingly, the next steps will be to include it in data sharing agreements, integrate it into OIT's glossary, and promote its use by the system engineers and business analysts as they develop projects within OIT. Other opportunities for institutionalizing this terminology will be pursued as they arise as well.

2. Data Sharing Agreement:



The need for a common data sharing agreement structure was identified to overcome redundant efforts executing data sharing agreements when agencies share new data sets or data that has been altered. This has been a concern for state agencies for several years, and previous attempts were made by the GDAB to develop common data sharing agreements. Currently, when state agencies try to share sensitive data (sometimes any data), most agencies require a data sharing agreement that establishes the expectations for responsibilities and liabilities for the data. Often, each time data is shared, and consequently with each iteration of the agreement, a new agreement

must be executed and approved by the agencies' legal staff and executive even if the new data being shared is very similar to previous data either in its content or use by the receiving entity. An agreement that remains somewhat constant and standard and that can be approved once will avoid these costly, repetitive efforts.

Recently state agencies concerned with health issues and health data (i.e., the Colorado Departments of Health Care Policy and Financing, Human Services, and Public Health and Environment) along with the Governor's Health IT Coordinator, have made significant progress on creating a standard data sharing agreement they can each sign. This agreement has been drafted and agreed on by the contracts teams and data experts within each agency and is now being reviewed for signature by their respective Executive Director's Offices. GDAB members followed this effort closely and used the Board meetings to establish how common approaches to data governance and standards can support such common agreements. While there was some ambition to consider such an enterprise-wide agreement during 2017, the development of this agreement among the health agencies has been a lengthy process and has taken the better part of the year. Expanding this agreement to other agencies will, in fact, require one or more years of work. In addition, the GDAB has recommended that such an enterprise-wide agreement be reviewed by the Office of the Attorney General to ensure it has proper legal standing. This agreement is included in Appendix D.

3. Data Governance:

An enterprise approach to data governance is necessary to preserve the value, security, and integrity of data assets in the state. The issue of varying data governance policies and procedures across state agencies puts the state's data at risk and does not preserve or yield full advantage of the state's data assets. It potentially also leads to redundant data management and confusion about which data should be used for what purpose.

The GDAB reviewed several data governance maturity rubrics and adapted them into one that fits Colorado's needs. It is important to recognize that different agencies have differing levels of capacity or capability for data governance, so the GDAB set out to present a "sliding scale" of governance maturity so an agency may identify where along that scale it currently is positioned and how it can advance its maturity in data governance. Accordingly, the GDAB developed a data governance framework in the form of a maturity model for data governance, and it developed a matrix articulating the various levels of maturity based on a general application of the five maturity levels from the Capability Maturity Model Integration (CMMI). Further, the GDAB recognized that before improvements could be made, they needed to first identify what level of governance is already in place within the agencies. The Board approved a data governance maturity self-assessment tool which presents a set of questions, with examples of how these questions may be answered, to assign a specific maturity level for various components of data governance. It provides an in-depth depiction of where an agency may improve its data governance and allows the agency to make informed choices regarding specific steps to enrich it. This framework is [available here](https://goo.gl/pW8jTg). [https://goo.gl/pW8jTg]

4. Open Data:

While Colorado has been committed to opening state data for public access, there has never been a concise, thorough strategy for open data in the state. Consequently a strategy that elucidates what constitutes open data, how those data will be published, and how public engagement with those data will be expanded is still necessary.

Colorado has expanded the number of data sets available on the state's open data portal, the Colorado Information Marketplace at data.colorado.gov - or CIM, as it is more commonly known. Currently the number of data sets available on CIM is 980, and is the result of the partnership with the Secretary of State's Office through their GoCode Colorado effort and efforts among OIT staff. The GDAB and OIT are reviewing the functional requirements for an open data platform and will be evaluating whether a different software platform will meet the state's needs more effectively. The rubric for this review has been developed and the next step is the actual assessment of alternative options.



5. Data Sharing Policy:

An interagency data protocol implies a comprehensive program that includes many of the efforts described in this report, such as policies and procedures for data sharing, standards and practices for data governance, and potentially policies and recommendations for appropriate charges for data. There is a need for a clear policy regarding data sharing in the state that outlines data that should be shared by default, appropriate protections for sharing other data, and means for overcoming obstacles for sharing these data. The concept of sharing by default, when appropriate and with appropriate controls, is important in establishing the principle of data sharing as contrary to lack of data sharing simply due to issues such as convenience. An example of where this gap in data sharing was evident and impactful, and where a sharing by default policy would have improved information use by the state in a critical time, was after the Front Range floods in 2013. At that time, data were shared based on the sometimes ad hoc opinions of individuals maintaining the data at the time. This hindered the information used in response to the floods. The consideration of a policy raises the question of what authority the Board has and how such a policy may be enforced. OIT has authority to set information technology (IT) policies, but the Board expressed that agencies are more likely to adhere to recommendations and best practices than mandates, and that it would be more palatable to agencies, if such a policy were first socialized as a recommended procedure.

In 2017, the GDAB did not develop or consider a statewide data sharing policy, but the lack of a standard, statewide policy has become a significant concern of the Office of the Governor. Several activities within the Offices of the Governor and Lt. Governor are pointing to more explicit policy or statutory language for improved data sharing. Representatives from those offices have participated in the GDAB meetings and have used GDAB discussions to inform their considerations and potentially guide future data sharing efforts.

In addition to these objectives and deliverables, the GDAB reviewed other issues that arose during the year and helped state agencies respond. These include:

- Amendments to the Colorado Open Records Act (CORA) - Senate Bill 17-040 proposed several amendments to the existing CORA language to mandate more openness of data. These amendments require agencies to respond to requests for structured or "searchable" data by delivering these data in a structured and/or searchable form. A member of the Attorney General's Office (AGO) discussed these amendments with the GDAB. The AGO is developing clarification of these amendments for state agencies and invited input from the GDAB on which issues or questions they should address or clarify.
- Governance, Risk, and Compliance tool - This tool is being used by the Office of Information Security to manage requirements and information related to compliance audits for protected information. The requirements can be specified for different types of protections and then associated with particular data sets or agencies that maintain such data and that may be subject to associated audits. This allows the state to be proactive in ensuring that the requirements are met and that data are protected adequately and consistently across the state.
- University of Denver Colorado Evaluation and Action Lab - This lab has been funded by the Arnold Foundation and supported by the Office of Lt. Governor to perform innovative, cross-agency analyses on the effectiveness of state policies or strategies. These analyses will look at what aspects of programs are more or less effective than others and what leads to this effectiveness, rather than simply whether a program is working or not. The analyses will cross agency responsibilities because the lab will look at the overall outcomes of these programs.
- University of Pennsylvania Actionable Information for Social Policy technical assistance grant - Colorado is included in a cohort of state and local entities to receive this assistance from the University of Pennsylvania. The assistance is directed at promoting "integrated data systems," and their focus is primarily on the organizational issues in data sharing. This overlaps well with several inter-agency projects requiring data sharing.

Agenda for 2018

Based on the outstanding objectives from 2017 and the pressing needs for ongoing improvements to the data sharing and availability environment in the state, the GDAB will work on the following items in 2018:

- **Data Governance** - Continue to test and refine the data governance maturity framework and promote it to all state agencies, assisting them where requested in applying the self assessment tool to their agency data landscape.
- **Data Sharing Agreement** - Leverage the work done by health agencies to expand the applicability of the standard agreement language to other agencies. Ultimately, the ideal structure would be to make this a multilateral agreement that is signed by multiple agencies before new data sharing requests arise.
- **Tactical Issues Related to Data Sharing** - In an effort to make questions and solutions related to data sharing more concrete, the GDAB is embarking on identifying agencies' specific data sharing requirements (i.e., specific data requested from other agencies). With this knowledge, the GDAB representatives can address the specific issues around these data and then generalize broader solutions across the state enterprise.
- **Data Sharing Toolkit** - To expedite data sharing and avoid creating processes and procedures on an ad hoc basis for each data sharing request or use case, the GDAB has suggested creating a data sharing checklist (e.g., ensuring data ownership and stewardship are clear before passing data onto other agencies or receiving data from other agencies). This can develop into a toolkit for data sharing that agencies can utilize to facilitate the data sharing process from initial request to transfer of data and continuing governance of the data sharing agreement.
- **Data Sharing Strategy** - A long-term strategy and plan for sharing, management, and governance of data should be in place and is part of the responsibilities of the state CDO. The CDO will develop this plan and obtain feedback from the GDAB during the year.

In addition, the GDAB discussed the following possible ongoing roles or activities:

- **Support technology initiatives related to data, such as the enterprise service bus (ESB).** This may take the form of helping to shape the initiatives, communicating how state agencies may use or support the initiatives, or communicating these initiatives back to the agencies.
- **Document use cases for sharing.** The state needs to demonstrate the powerful business cases for and benefits of data sharing to generate sufficient momentum and support for the work that will be required.
- **Promote data governance and other efforts beyond the IT or business technology groups.** This will require GDAB membership to actively engage in this effort.
- **Document data sharing efforts currently underway, issues encountered by these efforts, and the solutions they have developed.** Data sharing is happening now, in some places more successfully than others. The state needs to support those efforts, learn from them, and ensure they are consistently protecting the privacy of Colorado's residents and businesses.

Appendix A - 2017 Government Data Advisory Board Meeting Dates

- January 18
- February 15
- March 15
- April 13
- May 17
- June 21
- July 26
- August 16
- September 20
- October 18
- November 15
- December 20

Appendix B - Government Data Advisory Board Membership

The following individuals have been approved as members of the GDAB:

- Marcia Bohannon, Chief Information Officer, Colorado Department of Education
- Jeremy Felker, Executive Director, Student Data Privacy and Reporting, Jefferson County Public Schools
- Tobin Follenweider, Chief Operating and Performance Officer, Colorado Department of Natural Resources
- Jonathan Gottsegen, Chief Data Officer, Governor's Office of Information Technology
- Neil Hagenbrok, Director of Business Technology, Colorado Department of Labor and Employment
- Mike Hardin, Director - Business and Licensing, Office of the Secretary of State
- Steve Norman, Director of Records Management, Colorado Department of Revenue
- Carrie Paykoc, State Health IT Coordinator, Governor's Office of eHealth Innovation
- Erik Sabina, Data Branch Manager, Colorado Department of Transportation
- Jack Reed, Statistical Analyst, Colorado Department of Public Safety
- Erik Sabina, Data Branch Manager, Colorado Department of Transportation
- Parrish Steinbrecher, Health Information Office Deputy Director, Colorado Department of Health Care Policy and Finance
- Jim Stephens, Littleton School Board
- John Thompson, Data Services Manager, Douglas County
- Michael Vente, Research and Information Policy Officer, Colorado Department of Higher Education
- Rick Vynke, Associate Director - Office of Planning and Analysis, Colorado Department of Corrections
- Chris Wells, Director of eHealth & Data, Colorado Department of Public Health and Environment
- Herb Wilson, Director of Technology, Colorado Department of Human Services (recently transferred to OIT and will be replaced)

Appendix C - Data Lexicon Approved by the Government Data Advisory Board

Term	Accepted Definition
Assurance	Activities designed to reach a measure of confidence. Assurance is different from audit, which is more concerned with compliance to formal standards or requirements.
Confidentiality	The preservation of authorized restrictions on information access and disclosure, including the means for protecting personal privacy and proprietary information.
Data	The representation of facts as texts, numbers, graphics, images, sounds, or video. Facts are captured, stored, and expressed as data.
Data Governance	The oversight of data quality, data management, data sharing and access policies, business process management, and risk management surrounding the handling of data, and includes a set of processes that ensures that data assets are formally managed throughout the state agency, department organization, or enterprise.
Data Minimization	The act of limiting the collection of personally identifiable information to the least amount of information required to complete a particular transaction or meet a business need or requirement.
Data Privacy	The governance of personally identifiable, confidential, and other sensitive information to ensure information, digital or otherwise, is being collected, shared, used and disposed in appropriate ways.
Data Redisclosure	The act of sharing or releasing information that was received from a data owner or provider and included in data recipient's data.
Data Provider	The agency, department or organization that is providing the data to be shared. This may or may not be the same group as the data owner.
Data Sharing	The act of transferring data or authorizing access to data from the data owner or provider to the data consumer or recipient.
Data Steward(s)	The data steward takes ownership of the operational, technical, and informational management of the data according to policies and procedures defined by the data owner or data provider.
Data Stewardship	The practice of managing data and providing users access to that data. Processes will be based on clear, inclusive, and well-documented data architecture.
Interdepartmental Data Protocol	File sharing policies, processes, and procedures that permits the merging of data for the purposes of policy analysis and determination of program

	effectiveness.
Integrity	The prevention of improper information modification or destruction and ensuring information nonrepudiation and authenticity.
Linked Data	The resultant data set after two or more agencies' data has been combined. Once a data set is linked, the linking organization becomes the data owner and is responsible for following all rules and regulations regarding the security and privacy of the linked data set.
Metadata	Metadata is "data about data." It includes data associated with either an information system or an information object, for purposes of description, governance such as identification of data owners and data stewards, legal and confidentiality requirements, technical functionality and security, use and usage, and preservation.
Protected Data	Data that is subject to one or more restrictions on its dissemination based on state statute or rule or federal law and explicitly restricted from disclosure under the Colorado Open Records Act.
Provenance	The description of the origins and evolution of data and its movement between systems.
Role-Based Access	A method of regulating access based on the roles or positions of individual users within a state agency, department organization, or enterprise.
Sensitive Data	Any information where the loss, misuse, unauthorized access to or modification of which could adversely affect the interest or the conduct of information systems or agency business activity, or the privacy to which individuals are entitled.
Unauthorized Use	An act where an unauthorized user accesses protected or sensitive or "state Confidential" data, or when an authorized user uses or releases protected, sensitive or confidential data in a method that which is not within the scope of its permissible use.

Appendix D - STATE OF COLORADO INTERAGENCY DATA SHARING AGREEMENT

SIGNATURE AND COVER PAGE

State Agency Colorado Department of Public Health and Environment	Contract Number 105711
State Agency Colorado Department of Health Care Policy and Financing	Contract Performance Beginning Date The Effective Date
Contract Description: This Contract governs and memorializes the sharing of data between the Colorado Department of Public Health and Environment, and the Colorado Department of Health Care Policy and Financing.	

THE PARTIES HERETO HAVE EXECUTED THIS CONTRACT

Each person signing this Contract represents and warrants that he or she is duly authorized to execute this Contract and to bind the Party authorizing his or her signature.

<p style="text-align: center;">STATE OF COLORADO John W. Hickenlooper, Governor Colorado Department of Public Health and Environment Executive Director</p> <hr style="width: 80%; margin: 10px auto;"/> <p style="text-align: center;">By: Signatory</p> <p>Date: _____</p>	<p style="text-align: center;">STATE OF COLORADO John W. Hickenlooper, Governor Colorado Department of Health Care Policy and Financing Executive Director</p> <hr style="width: 80%; margin: 10px auto;"/> <p style="text-align: center;">By: Signatory</p> <p>Date: _____</p>
<p style="text-align: center;">STATE CONTROLLER Robert Jaros, CPA, MBA, JD</p> <hr style="width: 80%; margin: 10px auto;"/> <p style="text-align: center;">By: Signatory</p> <p>Date: _____</p>	<p style="text-align: center;">LEGAL REVIEW Cynthia H. Coffman, Attorney General</p> <p>By: _____</p> <p style="text-align: center;">Assistant Attorney General</p> <p>Date: _____</p>