



# Colorado's State Health Information Exchange Strategic Plan



October, 2009

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## Executive Summary

Colorado has been investing in health information technology (HIT) and health information exchange (HIE) for more than five years. Whether it has been contracting with the Agency for Healthcare Research and Quality (AHRQ) to demonstrate Point of Care Inquiry capabilities or applying for Federal Communications Commission (FCC) grants to expand broadband capacity across the state or collaborating as a community to develop a local health information exchange as more than three communities have, Colorado has been at the forefront of efforts to improve care quality using HIT and HIE.

In addition, numerous organizations across the state are engaging in quality improvement efforts, including a Medicare Transitions of Care contract, multiple Patient-Centered Medical Home demonstrations, and Medicaid reform through Accountable Care Organizations, to name a few. These efforts have created a fundamental understanding and appreciation across the state of the benefits of HIT and HIE in quality improvement for all patients.

Acknowledging the importance of HIT and HIE to the success of these efforts, Governor Ritter has designated the Colorado Regional Health Information Organization (CORHIO) as the state-level entity for coordinating and facilitating the use of ARRA funds so that all Coloradans benefit from HIT and HIE efforts. In this role, CORHIO will have primary responsibility for coordinating, convening, and providing technical services to establish a new statewide health information network throughout the State, building on Colorado's impressive array of local and regional HIE and quality improvement activities.

This strategic planning document represents the accumulated knowledge and experience throughout the State of Colorado that contribute to a distinct readiness for expanding HIT and HIE across the state, as well as ambitious goals for achieving state-wide meaningful use of HIT and HIE by 2015. By aligning the numerous efforts already underway in Colorado and the opportunities presented by ARRA, Colorado is poised to effectively and successfully expand use of electronic capabilities to improve the health of all Coloradans.

Our vision, goals, objectives, and strategies for Colorado's statewide health information network, including how we support health care providers' meaningful use of EHRs, are briefly described below.

### Vision

Colorado will have an effective statewide system for electronic health information exchange used to promote and protect Coloradans' health and continuously improve the quality, cost-effectiveness and accessibility of health care services.

### Mission

To facilitate health information exchange to improve care for all Coloradans.

## Goals

The goals identified for the purposes of successfully implementing HIT and HIE across Colorado are the following:

1. 85% of all primary care providers/safety-net<sup>1</sup> community will be meaningful users of EHRs by 2014;
2. 85% of all providers will be meaningful users of EHRs by 2015;
3. Achieve financial viability and sustainability for HIE by 2015;
4. Coordinate with Medicare, Medicaid and Other ARRA Funded Programs; and
5. Maintain capability to be flexible and adapt to developing environments.

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<sup>1</sup> As defined by the Office of the National Coordinator's Regional Extension Center expectations

## General

### Evolution of Colorado's Commitment to Statewide HIE

Colorado has been investing in HIT and HIE for more than five years. Beginning in 2004, Colorado's health sector met frequently across the state to discuss the desire and need for health information exchange. At this time, three major HIE initiatives, the Quality Health Network, the Northern Colorado Health Alliance, and the AHRQ-funded Point of Care Demonstration Project began. Differing models of HIE developed to serve each of the three unique communities served by these initiatives.

By 2007, there was recognition that statewide HIE should be supported and encouraged through a formal organization. With this in mind, CORHIO was formally incorporated with a strong board of community leaders. In 2008, the state General Assembly established the HIT Advisory Committee comprised of health care and technology experts to review the state of HIE in Colorado and recommend methods by which HIE could be encouraged across the state.<sup>2</sup>

By 2009, in addition to the successful AHRQ-funded demonstration, Quality Health Network had become a community-wide, sustainable HIE with 90% of the health care providers in the Western Slope community connected. Expansion into neighboring communities has begun as well.

Acknowledging the importance of HIT and HIE to the success of these efforts, Governor Ritter designated CORHIO as the state-level entity for coordinating and facilitating the use of ARRA funds so that all Coloradans benefit from HIT and HIE efforts. Further, The Colorado Health Foundation has invested in CORHIO so that all may benefit from HIE.<sup>3</sup>

## Environmental Scan

### Health Care Market Assessment

Colorado has seven Medical Referral Regions (regions within which providers cross-refer patients to one another), which present natural boundaries for regional HIT initiatives that will form the basis of our statewide health information network. These regions include:

Boulder	Grand Junction
Colorado Springs	Greeley
Denver	Pueblo
Fort Collins	

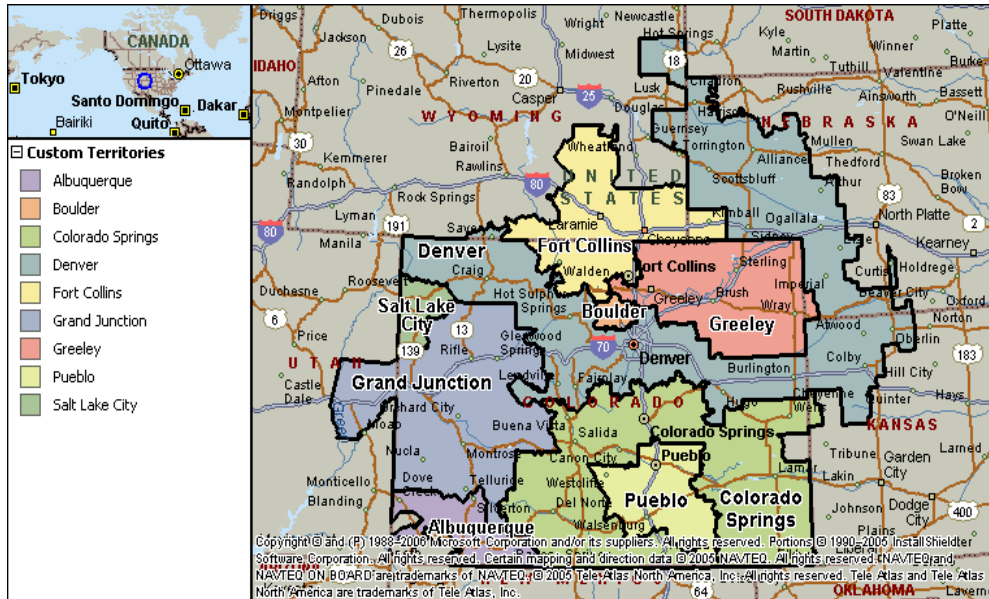
Each of these distinct Medical Referral Regions has unique medical referral patterns, as well as unique cultures, and unique relationships among parties. The Medical Referral Regions are a natural organizing unit for community-based HIE because providers that cross refer to each other have a vested interest in working together to establish a HIE. Our statewide HIE strategy is founded on the twin goals of leveraging our Medical Referral Regions and successfully serving the unique needs of the providers and patients within them.

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<sup>2</sup> <http://www.corhio.org/NewsEvents/HITReport.pdf>

<sup>3</sup> <http://www.corhio.org/NewsEvents/April3-2009-PressRelease.pdf>

## Colorado Medical Referral Regions



As depicted above, several of the Medical Referral Regions are large and cross state lines into Kansas, Nebraska, Wyoming and Utah. In addition, the Albuquerque Medical Referral Region crosses into Colorado and there is a very small region in Colorado that is part of the Salt Lake City Medical Referral Region. Also of note is that the Medical Referral Regions tend to follow major highway systems. Boulder is unique in that it is very self-contained. Pueblo is also unique in that it is surrounded by the Colorado Springs Medical Referral Region. Ensuring that Colorado patients who travel for care in external regions, such as the Albuquerque, NM region, or who live in the State's rural frontier areas are not left behind is critical to successful implementation of statewide HIE, as is coordinating with neighboring states to ensure interoperability.

Colorado's statewide HIE strategy appreciates the uniqueness of each Medical Referral Region and acknowledges that there are distinct cultures and communities in Colorado that affect how patients receive and how providers give care. Colorado's statewide HIE strategy also takes into account the current status of HIT adoption and HIE throughout Colorado's vast and varied health care system, which is described in detail below.

### *Health Systems and Hospitals*

Colorado has 80 hospitals across the state – metropolitan and rural, for-profit and non-profit, private and investor-owned, government-operated, teaching and critical access – that care for nearly 500,000 individuals each year. Of these, 78 are in the 7 Colorado Medical Referral Regions and 2 in the Albuquerque region. Thirty two of the 80 hospitals (40.0 %) are located in Denver. Reflective of the rural population, 45 of the hospitals (56.4%) have fewer than 100 beds and 26 have fewer than 25 beds. Six hospitals located in Denver and Colorado Springs have facilities with over 500 beds (7.5%). At least three health systems serve Coloradans in multiple Medical Referral Regions while many independent hospitals serve particular regions across the state. More than 8 million outpatient visits - including surgeries, home health care and emergency room visits - were recorded. With more than 55,000 people employed

(full-time equivalents) and a combined payroll and benefits of more than \$3.3 billion, Colorado hospitals are important to the state as major economic and employment contributors as well as health care providers.

From November 2008 through January 2009, the Colorado Hospital Association (CHA) conducted a survey of existing telecommunications infrastructure among Colorado's hospitals. Over three-quarters of hospitals surveyed indicated they have an IT plan as part of their overall organizational strategic plan. This indicates that the majority of respondents recognize the importance of incorporating IT solutions into their business decision making process. However, nearly 20% of respondents reported having no IT plan whatsoever. Successful statewide HIE will depend on the robust participation of the State's hospitals, both large and small. CORHIO has strong hospital representation on its multi-stakeholder Board of Directors and broader collaboration and participation will be sought at every opportunity to include all those facilities willing to work toward a common goal of streamlined and efficient HIE.

### *Physicians*

While it is frequently difficult to count the number of active physicians in Colorado, it is generally agreed that there are 10,500 practicing physicians. Practice sizes range from 1 to 842. The largest practices are Kaiser Permanente of Colorado with 842 physicians and University Physicians, Inc. with 807 physicians. Together these two practices represent 15.7% of the physicians in the state. The largest 34 practices (25 physicians or more) represent 29.4% of the physicians in the state, and the largest 60 practices (17 physicians or more) represent 34.5% of the physicians in the state. This means that the remaining practices, representing 65.5% of the physicians in the state, have fewer than 17 physicians each.

To date, there is a significant amount of electronic adoption in the State, primarily among the largest practices and health systems, which are well-funded and have information technology support. Many of the health systems have spent several years becoming electronic and are providing hospital portals and/or physician EMRs for their physicians. Representative health systems and facilities that have developed or are considering such strategies include Boulder Community Hospital, Children's Hospital in Denver, Kaiser Permanente Colorado, and HealthONE. In 2007, Physician Health Partners, a physicians group representing several physician IPAs and several hundred physicians, signed agreements with Centura Health and Exempla Healthcare to provide funding for physician EHRs in practices across the state. New West Physicians, a large independent group practice, has already adopted EHRs across all of its sites.

The above situation describes a very active environment in which more physicians are becoming electronic and connecting to health systems and other providers. However, this activity obscures the reality that there are many practices that are not yet electronic and face many barriers to becoming so. Nationally, only 18% of physicians in office-based practices report using an EHR. The same report on adoption rates also reports that adoption rates vary widely depending on the size and ownership of the practice. The national adoption rate of a 2-4 person practice is 16% compared to an adoption rate of 29% for a practice with 10-19 physicians. The adoption rate is 39% for practices with more than 20 physicians. This is particularly impactful in Colorado because, as noted above, a large majority of the state's physician practices have fewer than 17 physicians. Practice ownership also impacts adoption. Compared with practices owned by physicians or physician groups, those owned by other health care organizations were twice as likely to have EHRs, and those owned by HMOs were three times as likely to have EHRs. Estimated costs of an EHR are \$40-50,000 per year per physician in the first year of adoption

and \$10-\$20,000 ongoing. While these patterns are national, they appear to be reflective of Colorado as well.

### *Laboratories and Radiology*

In many communities around the country nationally-owned laboratories and, to a lesser extent, radiology groups have moved quickly to establish direct data feeds to physicians' practices to gain a competitive advantage. As a result, some laboratories and radiology groups could see the Statewide Health Information Exchange as competition; they could also see the Statewide Health Information Exchange as a low-cost solution to an expensive interface problem. National laboratories are very attuned to the HIE movement at the corporate level and may welcome state-level entities that can work through the complexity of interoperability and privacy and security. Generally speaking, with education and outreach, it is reasonable to anticipate that laboratories and radiology groups will be willing to participate in the Statewide Health Information Exchange.

### *Other Providers, including Clinics and Safety-Net Providers*

There are 211 nursing facilities. Of these, 207 are in the 7 Colorado Medical Referral Regions and four are in the Albuquerque region. Eight-eight of them (41.7%) are located in the Denver Medical Referral Region. An informal survey of nursing homes across the United States indicates that approximately 20% have electronic capabilities.

There are fifteen Federally Qualified Health Centers (FQHCs) spread throughout the state serving all Medical Referral Regions. These FQHCs operate over 138 clinic sites in 35 Colorado counties and care for patients living in 55 counties. Thirteen of these facilities have or are implementing electronic medical records. The remaining two are using ARRA HITECH funds to integrate electronic medical records across their clinics in Colorado. Clinics, Federally Qualified Health Centers (FQHCs) in particular, have been actively seeking ways for physicians to become electronic. As of last year, all but two FQHCs in Colorado had EMRs. Using ARRA funds, the last two will be implementing EMRs shortly so that the entire FQHC community will be electronically complete. Rural clinics, on the other hand, are less advanced.

Every Community Mental Health Center (CMHC) in the state has an EMR of one kind or another. Behavioral Health Organizations (BHOs) are managed care organizations that contract with the State to cover Medicaid mental health services. They are able to exchange health information with the Community Mental Health Centers (CMHC) in their networks.

Additionally, there are 44 certified rural health clinics and 29 critical access hospitals, and serving the needs of these organizations and their patients can be difficult since even reliable broadband capacity is still lacking in some areas.

An example of how safety net providers in Colorado have pro-actively addressed the need for electronic synergies is the Northern Colorado Health Alliance (NCHA), an alliance of safety net providers that has created a community health record for the 40,000 clients it serves. The NCHA includes a local hospital, FQHC, and CMHC. In another example, the Colorado Clinical Guidelines Collaborative (CCGC) has worked closely with the Colorado Medical Society and the physician community to reach out to physicians enabling them to use clinical guidelines and electronic tools to facilitate improved treatment, provide decision-support tools, and patient communication.

## *Payers*

Eighty-three percent of Coloradans are insured – 57% through employers, 8% Medicaid, 9% Medicare and 9% other. Within the employer group, 57% are fully insured, 34% are self insured and 8% are a blend. As of 2007, the largest health plans in Colorado are Anthem BlueCross/BlueShield, UnitedHealthcare/Pacific Care, KaiserPermanente Colorado, CIGNA, and Aetna. Together they have commercial coverage (fully insured and self-insured) on 2,250,000 lives excluding Medicare and Medicaid. As of August 2009, Medicaid covers 477,915 lives<sup>4</sup>, and the State’s caseload is increasing dramatically due to the economic downturn. Together Medicaid and the five largest commercial insurers cover at least 55% of the covered lives in the state. As mentioned previously, KaiserPermanente Colorado participated in the AHRQ-funded Point of Care Inquiry Demonstration to help solidify community-based knowledge on how to improve exchange across disparate platforms. In addition, both KaiserPermanente Colorado and UnitedHealthcare CEOs serve on the CORHIO board supporting the expansion of HIE across the state.

## *Colorado Residents and Health Care Consumers*

Just as provider adoption of HIT will influence Colorado’s ability to develop a statewide health information network, so too will the attitudes of Colorado residents and health care consumers toward HIT and HIE. The Colorado Demographers Office estimates that over 5 million people live in Colorado. Of those, 85% reside in thirteen of the sixty-four counties along the Front Range or in Mesa County on the Western Slopes of Colorado. Together, those counties only represent 19% of the land mass in Colorado. The remainder of the population (15%) is dispersed throughout the state—in mountain towns, in cities set deep in river valleys, and in farming communities on the eastern plains. To put this geographic diversity in perspective, the entire state of Rhode Island is the same size as the San Luis Valley. Similarly, driving from Denver to Durango requires a mountainous trek of 435 miles, while a trip from Washington, D.C., to Montreal is only 592 miles.

In terms of demographics, about 26% of Coloradans are under 18 years old, while just over 10% are over 65. However, the projected annual growth rate for Colorado’s elderly population is nearly five times higher than the growth rate for the child or adult populations through 2020. This means that the elderly population in 2020 will be nearly twice today’s population over 65. Colorado has one of the highest household income rates in the nation, with the median household income in 2008-2009 being \$38,393. However, approximately 19% of Coloradans live on incomes at or below 100% of the Federal Poverty Level (FPL), while about 40% live at or below 200% FPL.

Although estimates vary, about 17% of Coloradans are uninsured – compared to about 15% nationally. Approximately 56% of Colorado’s uninsured are employed but either are not offered or cannot afford employer-sponsored insurance. In terms of utilization, over 90% of Coloradans report visiting a primary care physician in the past year, while just over 24% report having utilized an emergency room. Similarly, 76% of Coloradans utilize a doctor’s office or private clinic as their usual source of care, with an additional 12% reporting community health centers or other public clinics as their primary care source. And finally, nearly 45% of uninsured Coloradans report deferring medical care due to cost, while only 18% of insured Coloradans report doing so.

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<sup>4</sup> <http://www.colorado.gov/cs/Satellite/HCPF/HCPF/1209635766663>

It is expected that Colorado consumers attitudes toward HIT and HIE reflect the general public's attitudes in that the majority support HIT and HIE provided that these efforts strive to protect their health information using the most up-to-date techniques available. It is also expected that Colorado consumers are equally concerned about the use of health information by employers and insurers.<sup>5</sup>

Through its involvement in the ONC-funded Health Information Security and Privacy Collaboration, CORHIO partnered with local organizations to explore both the Mexican immigrant community's interest and experience with HIT and HIE as well as the chronic care community as represented by the epilepsy community. In both cases, the findings in national studies were confirmed for these target populations in Colorado. This indicates a strong willingness by consumers for not only their health care providers to be using HIT and HIE effectively, but that consumers, themselves, particularly in these subpopulations, are eager to use these health care tools to improve their care.

### **HIE Initiatives in Colorado**

As noted above, CORHIO is serving as Colorado's State-designated Entity with the goal of facilitating HIE to improve care for all Coloradans. Created in 2007, CORHIO serves everyone including consumers, employers, doctors, hospitals, nursing homes, pharmacies, home health agencies, health plans and local health information exchanges that are interested in improving the health of all Coloradans through the use of health information technology. CORHIO provides collaboration/convening services to communities and offers secure and confidential technical services where needed. CORHIO is facilitating this work in many communities today that are beginning to assess and discern their needs for effective health information exchange.

While the task of developing and coordinating a statewide health information network in Colorado is large, CORHIO is fortunate to have a firm foundation of local and regional HIE activity on which to build. This includes, among others, several clinic-based initiatives serving the underserved, quality initiatives, and hospital/physician data exchange aligned with referral patterns. In addition, there are several regions that are considering establishing HIEs but have not yet done so. With the exception of QHN noted below, most are small HIEs or are in the exploration and planning stage.

There are also other significant health care initiatives and organizations forming and operating that have a high level of interest in making health care data available to improve the quality of health care. They include, among others, the Colorado Hospital Association's patient safety initiative including both a website that compares quality indicators for all hospitals in the state as well as the incubation of a regional patient safety organization; the Center for Improving Value in Health Care (CIVHC), an interdisciplinary, multi-stakeholder entity created by the Governor to identify and pursue strategies for quality improvement and cost containment; the Colorado Telehealth Network (CTN), which provides the infrastructure to support advanced health information exchange functionality; the Colorado Health Institute, an independent information clearing house and policy research and analysis organization; the Colorado Foundation for Medical Care, the Medicare-designated quality improvement organization; COPIC, a medical liability insurance company that offers programs to physicians to improve their care outcomes; and the Colorado Department of Public Health and Environment that houses many registries that practices would find beneficial for better serving their patients if they were accessible.

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<sup>5</sup> [http://healthit.ahrq.gov/portal/server.pt/gateway/PTARGS\\_0\\_1248\\_888520\\_0\\_0\\_18/09-0081-EF.pdf](http://healthit.ahrq.gov/portal/server.pt/gateway/PTARGS_0_1248_888520_0_0_18/09-0081-EF.pdf)

Quality Health Network (QHN) is notable among community-based health information exchanges because it is a fully-functioning HIE organized around the Grand Junction Medical Referral Region. No other HIE organized around Medical Referral Regions has emerged yet in Colorado. QHN serves 300 providers and 1,300 users. Other limited HIEs of note are the Northern Colorado Health Alliance and Community Health Partners, which provide more limited functionality to a subset of Medical Referral Region providers in the Greeley and Colorado Springs Medical Referral Regions respectively.

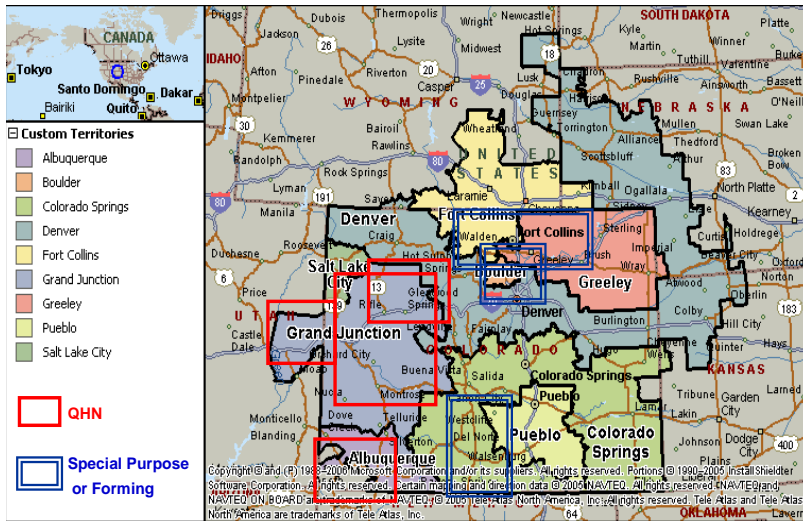
The Northern Colorado Health Alliance is comprised of three safety net providers in Weld County – the Weld County Public Health Department, Sunrise Community Health Center (a federally qualified health center) and North Range Behavioral Health Center. These three organizations share a community health record to serve the patients they see.

The Colorado Clinical Guidelines Collaborative (CCGC) and Colorado Associated Community Health Information Exchange (CACHIE) are both statewide quality initiatives that benefit from an HIE to facilitate quality improvement in clinical care. CCGC provides a disease registry, patient portal and clinical messaging system to 88 practices and 1,000+ users. CACHIE is building a data warehouse to manage and monitor quality performance for Federally Qualified Health Centers and other safety net clinics.

The table below lists the various HIE initiatives throughout Colorado.

HIE Initiatives in Colorado					
HIE	Medical Referral Region	HIE Type			Operational/Emerging
		General	Special Purpose	Safety Net	
CORHIO	Statewide	X			Emerging/Operational
Quality Health Network	Grand Junction	X			Operational
San Luis Valley	Colorado Springs	X			Emerging
Boulder Valley	Boulder	X			Emerging
NCHA	Greeley	X		X	Operational
Community Health Partners	Colorado Springs	X		X	Operational
Avista-IPN	Boulder	X		X	Operational

Below is a geographic view of existing or proposed initiatives layered atop our Medical Referral Regions. Of note is the geographic reach of the HIE initiatives across the state and the number of HIEs that may require cross-state data exchange.



### *Impact of Broadband Access on Provider Adoption of HIT and HIE*

The lack of broadband access in Colorado’s rural and mountainous areas presents a particular challenge for HIT adoption and HIE. Owing to Colorado’s mountainous terrain, construction of wireless and terrestrial facilities to facilitate high-speed internet (and intranet) connectivity is often economically infeasible. As described elsewhere in this Strategic Plan, however, State government, in partnership with private sector organizations like the Colorado Telehealth Network, are working intensely to deploy broadband and other telecommunications services to health care providers throughout the state, in support of HIT and other uses.

### *Prospects for Participation in Statewide HIE*

Colorado’s prospects for participation in statewide HIE are strong, buoyed by growing levels of health care provider adoption of HIT and a wealth of existing HIEs throughout the State. The value proposition for participation by health systems and other stakeholders in statewide HIE multi-faceted, and includes improving quality by reducing redundant testing and improving timely and accurate care. There is also a business incentive; most health systems will benefit from moving from paper to electronic transactions when communicating with providers and patients as well as from reducing the number of costly interfaces required to make those electronic connections. Integrated networks that have already established connections to referring physicians and other providers will benefit from being able to communicate with physicians and providers outside of their integrated network. Others will benefit from being able to send and receive data across regions and across state lines. Above all other considerations, is the potential for broad health information exchange to serve as a means for delivering higher quality, more cost-effective care. A statewide HIE will be particularly beneficial in efforts to better coordinate and integrate health care services, breaking down traditional barriers that obstruct the provision of comprehensive and effective care and possibly increasing access to these important services.

Health systems are essential to participation to achieve sustainability in a statewide health information exchange. Large health systems set the benchmark for financial participation by the other systems. Yet, frequently, it is smaller hospitals in rural regions that can be the most energized by the prospects of health information exchange. Four health systems in Denver participated in the AHRQ-funded Point of Care Demonstration pilot completed by CORHIO. This demonstration offered a tremendous start in Colorado for establishing a robust set of policies, procedures and data sharing agreements that can be updated over time, offered a thoughtful review of how an effective electronic master patient index should operate and provided experience to multiple partners on the benefits and limitations of national standards in implementing HIE. However, through expanded functionality that meets the needs of both large sophisticated systems of care as well as small local offices and clinics, a statewide health information exchange, active physician participation and leadership, and outreach to other Medical Referral Regions outside of Denver, CORHIO is broadening its appeal to current and future participants by expanding its services from results delivery to inquiry to quality initiatives support.

## HIE Development and Adoption

Building on Colorado's existing local and regional HIT and HIE activity, as described above, CORHIO, as the State-designated Entity, will have primary responsibility for coordinating, convening, and providing technical services to establish a new statewide health information network. To this end, CORHIO will collaborate with, rather than compete with, existing and emerging HIE efforts in the Medical Referral Regions throughout the State. The work of the Governor's Office of Information Technology, the Colorado Telehealth Network, the many local HIEs and quality initiatives across the state, and other initiatives described herein, will all contribute to our success. Our vision, goals, objectives, and strategies for this network, including how we support health care providers' meaningful use of EHRs, are set out below.

### Vision

Colorado will have an effective statewide system for electronic health information exchange used to promote and protect Coloradan's health and continuously improve the quality, cost-effectiveness and accessibility of health care services.

### Mission

To facilitate health information exchange to improve care for all Coloradans.

### Guiding Principles

To achieve this vision and mission, Colorado abides by the following guiding principles:

1. **Collaboration** – Enable, rather than compete, with other HIE initiatives.
2. **Medical Referral Regions** – Strive to understand and serve the needs of patients, local communities and the Medical Referral Regions in which they are located both within Colorado and across state boundaries.
3. **Privacy and Security** – Place a high priority on protecting the privacy and security of patient data.

4. **Improving Quality and Value of Care** – Improving the quality and value of care is a cornerstone of these activities.
5. **Patient-Centered** – Facilitate the exchange of data to ensure that patients are engaged and empowered to manage their own health, and that clinicians have the tools to provide patient-centric, coordinated care.
6. **Sustainability** – Focus on strategies and activities that ensure that all partners contribute and that the Statewide Health Information Exchange is financially self-sustaining.
7. **Participation by All** – Strive to ensure not only that health information exchange is available to all communities across Colorado but also that all providers and patients are using health information exchange in a meaningful and culturally competent manner that will contribute to improved overall health.

## Goals and Objectives

Development of our goals and objectives was an iterative process. This strategic plan represents a comprehensive document that encompasses all activities occurring in Colorado, regardless of whether the activities will be funded through the ARRA or through other sources. This comprehensive approach allows for the full picture to be presented, and for goals, objectives and strategies to be aligned across all funding sources. The goals and objectives outlined below include those related HIE, broadband access, HIT adoption and our regional extension center program. We have developed them in concert to ensure coordination among these activities, all of which will be integral to the success of our statewide HIE network and our ability to support Colorado's quality improvement initiatives, many of which are described herein.

Our goals for our participation in the State HIE Cooperative Agreement Program are as follows:

1. 85% of all primary care providers/safety-net<sup>6</sup> community will be meaningful users of EHRs by 2014.
  - a. 27% of providers are meaningful users by 2011.
  - b. 55% of providers are meaningful users by 2012.
  - c. 70% of providers are meaningful users by 2013.
  - d. 85% of providers are meaningful users by 2014.
2. 85% of all providers will be meaningful users of EHRs by 2015.
  - a. Adopt a similar schedule for non primary care providers/safety-net community.
  - b. Deploy HIE in every Medical Referral Region by 2015.
  - c. Achieve financial viability and sustainability by 2015.
3. Achieve financial viability and sustainability for HIE by 2015.
  - a. Establish a clear and consistent value proposition for all stakeholders by 2011.
  - b. Create a multi-stakeholder financing plan, incorporating funding from all sources by 2011.
  - c. Implement the cost-model in each community within one year of deployment.
  - d. Reach critical mass of stakeholder participation across all Medical Referral Regions by 2015.

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<sup>6</sup> As defined by the Office of the National Coordinator's Regional Extension Center expectations

- e. Maintain capability growth to proactively respond to community and market needs and demands.
4. Coordinate with Medicare, Medicaid and Other ARRA Funded Programs.
  - a. Align objectives and strategies to ensure that statewide goals are achieved.
  - b. Identify interdependencies of each program and develop joint tactical plans to ensure coordination.
  - c. Identify common measures, evaluation needs and develop a uniform approach to jointly report those measures.
5. Maintain capability to be flexible and adapt to developing environments.
  - a. Anticipate and be responsive to changing market and policy environments including the integration of broadband capabilities, as well as state-wide registry functionality such as immunization and newborn screening information.
  - b. Operate a nimble organization able to master rapidly emerging developments.
  - c. Foster capacity to conduct innovative pilot and demonstration projects.

## Medicaid Coordination

HIE, and the coordination of care it supports, can significantly improve the health outcomes of Colorado's Medicaid population, which typically suffers from rates of chronic illness higher than the commercially-insured population. The federal government recognizes this potential, and has directed state Medicaid programs to integrate HIE into their Medicaid health IT strategies.

In Colorado, Medicaid is administered by the Colorado Department of Health Care Policy and Financing, (HCPF), which is committed to supporting HIE and the adoption of HIT by its provider community. HCPF intends to leverage Colorado's statewide HIE infrastructure to provide Medicaid patients and providers with needed medical information to improve quality of care and reduce program expenditures. For example, among other activities, HCPF plans to coordinate with CORHIO to:

- Improve administrative ease for providers and patients;
- Facilitate HIE to improve health care outcomes;
- Improve business intelligence capabilities; and
- Facilitate clinical decision support at the point of care.

To this end, HCPF is in the process of establishing an HIT Strategic Planning committee, which will guide the adoption and implementation of HIT/HIE in State health programs and monitor progress toward established statewide goals. Committee membership includes: the Colorado Medicaid Director; the CHIP Director; the MMIS Director; the State Health IT Program Director; the Governor's Office Senior Health Policy Analyst; CORHIO's Executive Director; CORHIO's Policy Director; and other support staff as appropriate.

The HIT Strategic Planning committee will work with CORHIO to develop Colorado's State Medicaid Health IT Plan (SMHP) and Planning-Advanced Planning Document (P-APD), which will dovetail with our larger statewide HIE plans, and will trigger revisions to this Strategic Plan as necessary. Among other things, the HIT Strategic Planning Committee will work in partnership with CORHIO to determine how the State can use Medicaid's administrative matching funds to develop the State's HIE infrastructure, an activity supported by both ONC and the Centers for Medicare and Medicaid Services (CMS).

The HIT Strategic Planning Committee will also be responsible for the monitoring and administration of meaningful use criteria for providers who are eligible to receive Medicaid EHR incentive payments. HCPF will work with CORHIO and other stakeholders to this end, and will address these activities in the State's Medicaid HIT Plan. Colorado's meaningful use requirements will be established through a collaborative process incorporating input and feedback from all relevant stakeholders.

The HIT Strategic Planning Committee will also assess how to coordinate the State's Medicaid EHR incentive program funding with existing Medicaid health IT initiatives, including those related to Medicaid Management Information Systems (MMIS), and Medicaid Information Technology Architecture (MITA), to leverage progress that has already been made in those areas. Potential areas for coordination include using MMIS to track and account for incentive payments.

In addition, to the extent that states will have latitude in determining which health care providers meet the minimum eligibility criteria for Medicaid's EHR adoption incentive payments, the HIT Strategic Planning Committee will work to define an approach that encourages the greatest number of eligible providers to participate in HIE throughout the State.

Finally, as CORHIO and HCPF work together to coordinate Colorado's statewide HIE strategy with the implementation of the Medicaid EHR incentive program, we will attempt to inform CMS's ongoing policy development related to use of Medicaid's administrative funding for HIE infrastructure development, and will plan to communicate early and often with our CMS Regional Office.

## **Coordination with Other ARRA Programs**

Coordinating the development of our statewide HIE infrastructure with the many other ARRA-funded programs that will be implemented throughout the State is a key aspect of our Strategic Plan. Below are brief descriptions of the strategies we will employ to coordinate with our State's Regional Extension Center, Broadband, and other ARRA initiatives to ensure careful stewardship of our investments.

### **Colorado Regional Extension Center**

The Colorado Regional Extension Center is a collaborative effort among a number of partners that are highly experienced in working in directly with providers to facilitate HIE and HIT adoption and improve quality. In its role as Convener/Collaborator and state-designated entity, CORHIO is leading this effort. Partner organizations include: Colorado Area Health Education Center; Physician Health Partners; Colorado Medical Society; Colorado Rural Health Center; ClinicNET; Colorado Community Health Network; Colorado Community Managed Care Network; Colorado Clinical Guidelines Collaborative; Colorado Foundation for Medical Care; the High Plains Physician Network; Quality Health Network; COPIC; and component medical societies. These partners are strategizing on the best way to effectively use the resources offered through the Regional Extension Center process. This effort will support expanding the work of these partners to assure the broadest reach across the state and will be known as the Colorado Regional Extension Center. The Colorado Regional Extension Center submitted its preliminary application to the Office of the National Coordinator on September 8, 2009 and the Colorado Regional Extension Center was invited to submit a full proposal.

The Colorado Regional Extension Center is currently working on its full proposal to the ONC to:

- Provide education and outreach to providers and disseminate knowledge about the effective strategies and practices to select, implement, and meaningfully use certified EHR technology to improve quality and value of healthcare.
- Participate in and become a member of the National Learning Consortium to support a national effort towards exchanging and incorporating best-practices that can be shared and easily disseminated and incorporated into Regional Extension Center's activities.
- Assist providers in assessing the health IT needs of their practice, and selecting and negotiating contracts with vendors or resellers of EHR systems, hardware and network infrastructure, and IT services, including holding vendors accountable for adhering to service level agreements.
- Provide end-to-end project management support over the entire EHR implementation process, including individualized and on-site coaching, consultation, troubleshooting, and other activities required to assure that the supported provider is able to assess and enhance organizational readiness for health IT, assess and remediate gaps in IT infrastructure, configure the software to meet practice needs and enable meaningful use, ensure adequate software training for all staff, and track and adhere to implementation timelines.
- Provide support for practice and workflow redesign necessary to achieve meaningful use of EHRs.
- Assist priority primary-care providers in connecting to available health information exchange infrastructure(s), including local health information exchange organizations and the Statewide Health Information Exchange.
- Support providers in implementing best practices with respect to the privacy and security of personal health information.
- Participate in program training and provide clients effective assistance in attaining meaningful use.
- Partner with local resources, such as community colleges, to promote integration of health IT into the initial and ongoing training of health professionals and supporting staff.

The Colorado Regional Extension Center will submit its full application to the Office of the National Coordinator in November, 2009 and expects to be awarded a Cooperative Agreement in December. The outcome of the Regional Extension Center award process will trigger a revision to the Statewide Health Information Exchange Strategic Plan.

### **Colorado's Broadband Initiatives**

Colorado's vast areas of mountainous terrain present many challenges for construction of wireless and terrestrial facilities to facilitate high-speed internet (and intranet) connectivity. Absent special incentives, the population dispersion throughout the state — and across rugged topography — often makes it uneconomical for the private sector to deploy facilities.

The State of Colorado has been actively working to enhance broadband deployment throughout the state since Governor Bill Ritter, Jr. made it a priority for Colorado's economic development. As a gubernatorial candidate in 2006, Bill Ritter Jr. outlined his plan to stimulate Colorado's economy and attract new jobs. Ensuring that broadband Internet access is available to all Coloradans was a key strategy within his economic development and job growth initiative. He articulated three roles of state government in this strategy: develop a clear vision for the importance of broadband, remove obstacles in the development of broadband services, and provide economic incentives to serve areas where broadband access is not currently available.

In the spring of 2008, Senate Bill 08-215 charged the State's Chief Information Officer, in conjunction with the Governor's Innovation Council, with mapping the availability of broadband service throughout the State. A third-party vendor was selected for this project, and it is scheduled to be completed in November 2009.

Although this effort was initiated to assist the State in evaluating broadband efforts to address unserved and underserved areas of the State, it will also assist the National Telecommunications and Information Administration (NTIA) in its policy formation related to broadband expansion and serve as a tool to validate the data to be delivered to the NTIA.

The Governor's Office of Information Technology and the Broadband Working Group of the Governor's Innovation Council also hosted two Broadband Summits, held in November of 2007 and 2008, to bring together federal, state, and local government, higher education, and private sector leaders for one-day forums aimed at assessing the "State of the State" of broadband in Colorado. They also began developing strategies for extending and enhancing broadband Internet access throughout Colorado, identifying infrastructure capabilities and projects underway that could be expanded to meet the greater needs of the state and the critical need to develop public/private partnering opportunities to enable successful broadband deployment and adoption.

With ARRA calling for an investment of \$7.2 billion in broadband programs, the State is building on the efforts above and convened a Technical Conference to bring stakeholders together to discuss this opportunity and listen to the issues and priorities from across Colorado. The meeting had several sponsors including: the Governor's Office of Information Technology; the Colorado Office of Economic Development; Colorado Department of Local Affairs; the Innovation Council; Silicon Flatirons Center; and the University of Colorado at Denver School of Public Affairs. The conference included sessions that focused on: Colorado's broadband mapping project, the Colorado strategy for producing the best possible results through broadband deployment grants and loans, and opportunities around innovative adoption programs.

Since convening the conference, the State has continued work on the current broadband mapping effort and has served as a resource to providers, government agencies, and other interested parties and as a liaison to the various NTIA, Rural Utility Service, and Federal Communication Commission initiatives already underway or pending in Colorado. The State has issued a statewide broadband framework and established weekly webinars to detail and answer questions regarding the federal programs, the State's role, and the State's requirements. ARRA-related grant award dollars will not only aid in the ongoing development and maintenance of the statewide broadband map, but will also support ongoing grass roots planning efforts in the areas of broadband adoption barrier identification, the creation and facilitation of local technology planning teams, and the establishment of computer ownership and Internet access in low penetration areas.

The availability of broadband access is an underpinning to the success of our Statewide Health Information Exchange, the Colorado Regional Extension Center, and the Colorado Telehealth Network. The Chief Information Officer is an active member of the CORHIO Board. He will inform the CORHIO Board of the outcome of the award process which will trigger a revision to the Statewide Health Information Exchange Strategic Plan.

## **Colorado Telehealth Network (CTN)**

The Colorado Telehealth Network was initiated two years ago through two Federal Communications Commission grants awarded to the Colorado Hospital Association and the Colorado Behavioral Health Council. These grants have been aligned to provide the greatest benefit to as many health care providers as possible through a Virtual Private Network developed in partnership with Qwest Communications. The initial network will include approximately 360 physical and behavioral health provider organizations throughout Colorado. CTN will expand broadband capacity in virtually every region of the state aligning with HIE efforts in communities.

In August, the Colorado Telehealth Network submitted a grant under the Broadband Technology Opportunities Program and Sustainable Broadband Adoption Projects. The purpose of the Colorado Telehealth Project is to contribute to the improvement of health and health care in Colorado. CTN believes that communications and information technology will play a major role in achieving this purpose because they overcome barriers of time and distance and fragmentation and isolation of data and information. They also believe they can stimulate sustainable adoption of broadband by aggregating multiple broadband applications central to health care delivery on a geographical scope that spans the entire state of Colorado with emphasis on rural regions.

CTN's innovative approach leverages Colorado's existing broadband Federal Communications Commission (FCC) awards by adding content, in-office coaching and IT applications to supplement the raw access to bandwidth. It is statewide in scope, multi-disciplinary, and can serve as a model for other states and other FCC health care pilot projects. It aggregates multiple uses of broadband as the key to sustainability.

The outcome of the award process will trigger a revision to the Statewide Health Information Exchange Strategic Plan.

## **Coordination of Other State-Based Quality Improvement Efforts**

Quality of care is contingent on the ability for providers to effectively communicate with each other as a part of a care team working towards the effective coordination of care for an individual and upon the ability of patients to be engaged in managing their own care. Quality reporting allows the care team to evaluate progress toward meeting the goals of the care plan. In addition, HIE and HIT allow practitioners to easily understand the health of their entire patient population, allow communities to engage in efforts to improve overall health and allow patients to participate more fully in their own care experience. All of these efforts are nearly impossible without the effective support of HIE.

## **Center for Improving Value in Health Care (CIVHC)**

Establishing the overall vision for improved quality, Governor Ritter's Center for Improving Value in Healthcare (CIVHC) sets the tone for overall strategic direction. The Center for Improving Value in Health Care was established by Executive Order D 005 08 signed by Governor Ritter on February 13, 2008 as part of the "Building Blocks to Health Care Reform" plan. The Center was created to establish an interdisciplinary, multi-stakeholder entity to identify and pursue strategies for quality improvement and cost containment. Led by Joan Henneberry, Executive Director of the DHCPF, CIVHC works to bring consumers, businesses, health care providers, insurance companies, and state agencies together to

develop long-term strategies to identify, implement, and evaluate quality improvement strategies to ensure a better value for the care we receive in Colorado.

Governor Ritter announced on April 7, 2009 that he has appointed 22 Coloradans to serve as voting and ex-officio members on the new CIVHC steering committee. The steering committee has begun its work to set the strategic direction, vision and policy initiatives for this innovative initiative. CIVHC will advise the state on strategies to improve the health care service delivery system, leverage commitments from the public and private sectors, and integrate the work of other public and private entities in the state. CORHIO's Executive Director and many of the CORHIO Board members serve on CIVHC and will work to assure alignment between the value propositions that CIVHC provides and the services that CORHIO offers to assure state-wide use of HIE to obtain these goals.

### **Colorado Associated Community Health Information Exchange (CACHIE)**

The Colorado Associated Community Health Information Exchange (CACHIE) is a collaborative project of Colorado Community Health Network (CCHN) and Colorado Community Managed Care Network (CCMCN). With funding from the Health Resources and Services Administration (HRSA), the Agency for Healthcare Research and Quality (AHRQ), The Colorado Health Foundation (TCHF) and member investment dues, Colorado community health centers (CHCs) are joining forces to create a shared information technology system to support quality reporting, analysis, and improvement.

CACHIE's purpose is to lead collaborative information technology services for CHCs' quality and payment initiatives. CACHIE will promote the use of information technology to support quality reporting and improvement across the CHC networks. Fundamental to this effort is the concept of interoperability, which requires information systems to efficiently communicate thereby allowing use of shared technology to achieve stated goals.

Specific quality reporting features will support: clinic-based rapid cycle improvement efforts (e.g., Institute for Healthcare Improvement – Plan, Do, Study, Act); HRSA-sponsored reporting for health disparities collaborative work; and information needs for CHC advocacy and value-based reimbursements. By working together, CHCs can build valuable systems that serve multiple functions and multiple clinics. Momentum builds as more clinics engage in EHR implementations and seek the greatest value from technology investments to improve practice workflow and patient care.

CORHIO is working closely with CACHIE as it develops its analytic capacity so that data can be delivered to CACHIE's quality initiatives in a cost effective way for CACHIE and the safety net organizations it serves.

### **Care Transitions**

The Colorado Foundation for Medical Care (CFMC) has been awarded a Centers for Medicare and Medicaid (CMS) Care Transitions contract aimed at improved care coordination across the continuum of care. CFMC works with a community of providers in the Northwest Denver metro area to reduce unnecessary hospital readmissions, improve information transfer between providers and increase patient satisfaction. CFMC is focusing on implementing improvements that address medication management/reconciliation, post-discharge follow-up and patient-centered plans of care, improving information transfer between provider to provider and provider to patient based on data discovery of the drivers for readmission in the target community. The project provides coaches to educate patients

and their families as active participants in their safe care. As this project developed, the need for health information exchange has become more apparent. CORHIO is working with CFMC to identify the ways in which HIE will enhance this project and accelerate its success.

### **Improving Performance in Practice**

Colorado was selected as one of two states in the country to pilot a new physician-driven initiative called Improving Performance in Practice (IPIP). The Colorado Clinical Guidelines Collaborative (CCGC), selected in 2006 to lead this effort in Colorado, has been working with its many partners to implement IPIP across the state. IPIP was developed through the American Board of Medical Specialties along with the Boards and Societies of Family Medicine, Internal Medicine and Pediatrics. CCGC, working with its many partners, was selected to lead the effort in Colorado with substantial support from multiple funders including The Colorado Trust, Caring for Colorado Foundation, Robert Wood Johnson Foundation, and Colorado Department of Public Health & Environment. HIE is becoming an essential tool to assure that the required registry functionality in this pilot can be used effectively and efficiently by every practice participating and assure a seamless expansion into many practices.

### **Patient-Centered Medical Home**

In 2008, CCGC was selected to be the convening organization for the Colorado Multi-Payer, Multi-State Patient-Centered Medical Home Pilot (PCMH). PCMH is not a place, but an approach to providing continuous, comprehensive, coordinated care, with a partnership between patients and their personal healthcare team, as part of an integrated medical neighborhood. Beginning in 2009, the PCMH model will be tested in sixteen Family Medicine and Internal Medicine practices selected from across the Colorado Front Range as well as practices in Cincinnati, OH, its partner region. As with the IPIP project, HIE is an important component to the success of these practices as they move to more efficient workflow processes and a population-based approach to health care.

### **Coordination of Medicare and Federally Funded, State Based Programs**

Numerous federal programs benefit from HIE, and CORHIO already currently collaborates with many of them. For example, the State Office of Rural Health Policy (Colorado Rural Health Center) is an active participant with CORHIO and other organizations. Of particular note is the Colorado Rural Health Center's involvement with the development of the Colorado Regional Extension Center. Medicaid and CHIP are actively engaged in CORHIO through the leadership of Joan Henneberry, chair of the CORHIO board and executive director of HCPF. The Colorado Department of Public Health and Environment (CDPHE) houses many of the other federally-funded state-based programs, and Dr. Ned Calonge, Medical Director for CDPHE, is also a member of the CORHIO board. Through his leadership, CDPHE is an integral component of state-level HIE activities.

CORHIO is also partnering with the Colorado Department of Human Services (CDHS) and others to address particular issues surrounding mental health needs for health information exchange and staff from the state mental health data infrastructure grants for quality improvement activities are housed at CDHS.

### **Participation with Federal Care Delivery Organizations**

Our current understanding is that, since CORHIO is planning to connect to the NHIN gateway, connection with the Veterans Administration, the Department of Defense and the Indian Health Service will be achieved through this national network.

## Coordination with Colorado's Technology Sector

In April, CORHIO partnered with the Governor's Office of Information Technology and CSIA, Colorado's Technology Association, to reach out to the technology experts across the state and introduce them to the ARRA HITECH provisions as well as the state-wide efforts to facilitate health information exchange across the state. The University of Colorado, the DHCPF and Colorado HIMSS also supported the event. The ARRA Technology Summit was attended by 300 people who were able to learn more about how health care is transforming with technology, broadband advancement across the state, HIE activity across the state and technical expectations for health care improvement.

Feedback from the Summit was so positive that the partners have established a mechanism to update technology companies regarding ARRA developments as well as an advisory committee that can provide a sounding board for CORHIO and others regarding the latest technological developments in the marketplace. CORHIO will provide periodic updates to a website and blog hosted by the state technology association and will turn to the newly formed advisory committee frequently for advice and assistance in discerning the state of the art in technology today.

## **Governance, Finance, Technical Infrastructure, Business and Technical Operations, and Legal/Policy**

### **Governance**

We are proud to have already developed a policy and governance framework for statewide HIE in Colorado, under the leadership of our multi-stakeholder governance entity, CORHIO, which oversees our collaborative policy and decision-making process. We have also created a State Government HIT Coordination function. Together, these two concepts contribute to a comprehensive and transparent state governance model.

### **Collaborative Governance Model**

As described elsewhere, CORHIO is a private-sector-led HIE with strong and active state government collaboration. On April 3, 2009, Governor Ritter issued Executive Order D 008 09 designating CORHIO as the state-designated entity to advance appropriate and secure health information exchange across the health care system. Within the Executive Order, he recognized CORHIO's broad stakeholder representation reflecting statewide perspectives from across sectors and interests including consumers, providers, health plans, government agencies and experts in health care quality, value and information technology. He also recognized the significant role that CORHIO has and continues to play as the statewide community collaborator and convener and the significant experience that can be leveraged from the learnings of the Point of Care Inquiry demonstration project that allowed The Children's Hospital, Denver Health, Kaiser Permanente Colorado, and the University of Colorado Hospital to share medical information in a secure fashion.

Colorado is a state where collaboration is vitally important to many of our healthcare successes. CORHIO offers a model to facilitate HIE adoption by leveraging work that already is being conducted across the state – whether health care providers are utilizing HIE and HIT at an advanced or elementary level – so that all communities can benefit from HIE and HIT in a way that best serves their patients and allows for solid adoption strategies. CORHIO facilitates these efforts through collaborating and convening communities as well as providing baseline services where they may be needed without disrupting successful efforts already underway.

CORHIO's Board of Directors represents a multi-stakeholder membership and a broad base of support from across Colorado for these efforts. The CORHIO Board of Directors includes active participation by:

- Health care providers and associations including the Chief Executive Officers of: The Children's Hospital; the Mental Health Corporation of Denver; the Colorado Behavioral Health Council; the Medical Group Management Association; the Colorado Medical Society; the Colorado Health and Hospital Association; the Weld County Department of Public Health; and Clinica Campesina, a federally qualified health center;
- Colorado's health plan community, including the Chief Executive Officers of Kaiser Permanente Colorado and UnitedHealthcare;
- The Executive Vice President of COPIC, a medical liability insurer;
- The Executive Director of the Colorado Consumer Health Initiative, a consumer advocacy organization;
- Local health information organizations, including the Chief Executive Officers of: Quality Health Network; and Northern Colorado Health Alliance;

- Health care purchasers and employers, including the Chief Executive Officers of the Berkowitz Firm and Alumni Consulting Group International as well as a partner at Brownstein, Hyatt & Farber;
- Project Director for AHIMA-FORE, an association of health information management professionals;
- Organizations that focus on quality, including the Chief Executive Officers of the Colorado Clinical Guidelines Collaborative, the Colorado Foundation for Medical Care and the Colorado Health Institute;
- Colorado Governor Bill Ritter's cabinet-level appointees for the: Colorado Department of Health Care Policy and Financing, the state's administrative agency for Medicaid and the Children's Health Insurance Program; Colorado Department of Public Health and Environment, the state's public health agency; and the State of Colorado's Chief Information Officer;
- And several other agencies, providers and community leaders that participate on standing and ad-hoc committees of the Board.

The CORHIO Board is supported by five standing committees: Executive Committee; Policy Committee; Consumer and Outreach Committee; Technical Committee; and Finance and Audit Committee. Each is further described below:

- Executive Committee: The Executive Committee's purpose is to manage issues delegated to it from the Board of Directors and oversee the day to day operations of CORHIO and its Executive Director. The Executive Committee is comprised of the: Chair; Chair Elect; Secretary; Treasurer; and three at-large members of the Board who are appointed by the Chair.
- Policy Committee: The purpose of the Policy Committee is to support the Board in adopting, communicating and overseeing effective organizational policies and procedures that support the mission and successful operation of CORHIO and of our statewide health information network. The Policy Committee is comprised of at least three members of the CORHIO Board as well as a number of community members. The Chair of the Board appoints the Chair of the Committee as well as individual Policy Committee members.
- Consumer and Outreach Committee: The purpose of the Consumer and Outreach Committee is to serve as a principle vehicle for HIE consumers to contribute to the development of health information exchange and the implementation of interoperable communication between Colorado providers by advising the CORHIO Board of Directors on issues of high importance to a broad range of consumers including business, physicians, other health care providers and individual consumers. The Consumer and Outreach Committee is comprised of at least two members of the CORHIO Board, one of whom serves as the committee chair. In addition, community members broadly representing the health care provider community, employers and individual consumers/patients are appointed by the Board Chair and are representative of both urban and rural constituencies.
- Technical Committee: The Technical Committee purpose is to develop strategies and activities that ensure the technical solutions needed to facilitate HIE adoption across Colorado. This committee will review the technical needs related to statewide HIE expansion that meet both regulatory and community standards. The membership of the Technology Committee is comprised of at least two CORHIO board members, one of whom serves as the committee chair. In addition, community members from the HIE user community are appointed by the CORHIO Board chair and are representative of Colorado's rural/urban communities and the range of local HIEs currently in place.

- **Audit and Finance Committee:** The Audit and Finance Committee’s purpose is to review the annual budget for conformance with the fiscal policies of CORHIO, recommend the approval of the annual budget to the full board, oversee the annual audit and establish and review the prudent financial management practices of CORHIO. The Audit and Finance Committee meets at least twice annually, but more often as necessary to discharge its responsibilities. Unless otherwise authorized by the Board, the Audit and Finance Committee does not have the power to act on behalf of the Board but rather presents its recommendations to the Board for action. The members of the Finance Committee are members of the Board who have no financial, family or other personal ties to management of the organization. No CORHIO staff may serve as a voting member of the Audit and Finance Committee.

Each of the Committees may establish workgroups to ensure that all activities are informed by and serve the interests of participants and beneficiaries from across the state and within each community. The Policy Committee, Consumer and Outreach Committee and the Technical Committee have each established workgroups to guide and inform their efforts.

The CORHIO Board of Directors is responsible for setting the strategic direction of the statewide HIE, including establishing goals, objectives and performance measures. The strategic direction is communicated through the Statewide Health Information Exchange Strategic Plan and progress is tracked by CORHIO staff and reported quarterly to the CORHIO Board.

### **State Government HIT Coordinator**

States have demonstrated the value in coordinating HIT programs and policies across State governments various agencies and offices. The competing priorities states are asked to fund, even within the confines of the HIT sector, are many. Without clear responsibility and authority for ensuring that funds are spent in a coordinated manner, precious resources, including the funding Colorado will receive under HITECH, could be potentially be invested with no demonstrable result.

To avoid this very real danger, Colorado will take stock of the various HIT initiatives underway statewide and designate responsibility for advancing Colorado’s health information infrastructure to the State Health IT Program Director, a senior official with the authority and ability to guide HIT policy, funding and implementation decisions across the Colorado’s many government agencies. This position will oversee development of Colorado’s health information infrastructure in a manner that is tightly coordinated with Governor Ritter’s Building Blocks for Health Care Reform plan, and with the activities of the DHCPF, which is responsible for initiatives like the new Accountable Care Collaborative and other reimbursement reforms under Medicaid. The Health IT Program Director will be closely integrated with both the Governor’s Office of Information Technology and the Governor’s Policy Office. The State Health IT Program Director will oversee and coordinate all of Colorado’s HIT funding and initiatives across all state agencies.

The State Health IT Program Coordinator will:

- Develop a statewide HIT coordination plan.
- Understand how State information systems operate and how they impact the health of individuals, families and communities.
- Coordinate and provide directional oversight for HIT programs that affect State Agencies including the Department of Health Care Policy and Financing, the Colorado Department of

Human Services, the Colorado Department of Corrections and the Colorado Department of Public Health and Environment.

- Participate as the State liaison to CORHIO, and other stakeholders in strategic planning around HIT and how solutions can be integrated to improve the health of individuals.
- Develop and maintain a HIT strategic plan for State Government.
- Represent the State at HIT related functions.
- Maintain a library of HIT literature and be able to analyze, write and brief the Governor, Legislature, and other health entities about the Health IT landscape.
- Assist in increasing consumer involvement in HIT/HIE development.
- Assist in the formation of public policy related to HIT/HIE as a part of health care reform efforts.
- Facilitate and expand usage of HIT online resources and tools.
- Understand how individual HIT projects further the greater HIT State strategic plan.
- Grasp objectives of ongoing projects and work to maximize productivity.
- An environmental scan of the national best practice in Health IT leveraging research recently performed through the Office of National Coordinator on state level initiatives.
- A detailed study of the current players on the Colorado health scene (providers, payers, prescribers) including an enterprise relationship diagram (ERD) and associated use case analysis depicting the “as is” current Health IT landscape.
- In partnership with the Colorado Health Foundation and other stakeholders, develop a detailed plan for Colorado Health IT.
  - Develop a high-level functional and technical requirements document to address the mission and objectives.
  - Develop a detailed project plan to include milestones, project dependencies, responsible stakeholders, detailed deliverables, etc.
  - Develop a detailed technical architecture and roadmap for advancement of statewide implementation and stakeholder adoption of a united and cohesive delivery of Health IT.
- Work with Governor’s Health Policy Team to develop strategy for Colorado HIT policy and potential supporting legislation, including components of Governor Ritter’s Building Blocks to Health Reform Agenda.
- Look for synergies with Governor’s Office of Information Technology consolidation efforts under Senate Bill 08-155.
- Look for synergies with the Statewide Internet Portal Authority (SIPA) such as self funded models to sustain HIE service delivery.
- Work with CORHIO and the Department of Health Care Policy and Financing to identify synergies with the State’s Medicaid transformation and Medicaid Information Technology Architecture (MITA) activities.
- Research and identify funding strategies including grants and donations and potential to advance HIT research and development.
- Identify potential interstate partnerships.
- Identify State privacy and security, interoperability issues and related solutions.
- Develop a plan for engaging the private sector to assist in fulfilling Colorado’s mission.
- Identify data from state systems that would be useful to providers and CORHIO and should be available via CORHIO. Monitor and inform efforts related to HB1364 around data sharing protocols.
- Manage projects that require an interface between state systems and CORHIO.
- Ensure that the spirit of “meaningful use” is achieved in implementation.

- Provide input the state-level plan being developed by CORHIO and due to be submitted to the Federal government.
- Best leverage recovery funding available via the Federal Government ARRA program.

The State Health IT Program Director is a new position with the Governor’s Office of Information Technology and has yet to be filled. The Governor’s Chief Information Officer, an active member of the CORHIO Board, will act as the State Health IT Program Director until the position is permanently filled.

## **Accountability and Transparency**

### *Colorado Economic Recovery and Accountability Board and the US General Accounting Office*

In February, 2009, Governor Bill Ritter, Jr. established the Colorado Economic Recovery and Accountability Board to ensure that funds that are received through the American Recovery and Reinvestment Act (ARRA) are spent effectively and transparently. The mission of the Colorado Economic Recovery and Accountability Board is:

“oversight of the funding received by the State of Colorado from the American Recovery and Reinvestment Act. Our job is to ensure that the state and local agencies that are directing funding do so with transparency, accountability and, ultimately, to the highest benefit possible.”

In other words, the mission of the Board is oversight – not management. According to its by-laws, the Board does not determine where funding should go or to whom. Rather, the Board’s job is to ensure that the agencies who are directing the funding do so with transparency, accountability and, ultimately to the highest benefit possible, given the direction provided by the ARRA. Part of the transparency and accountability oversight will be to ensure fair and equitable access to the decision making process. Citizens who feel they have a voice to be heard, if at all possible, need to be given that chance. Lastly the Board will facilitate a central point of communication regarding the recovery and reinvestment funding impacting Colorado.

The Board acts in accordance with the five principles included in the ARRA:

- To preserve and create jobs and promote economic recovery.
- To assist those most impacted by the recession.
- To provide investments needed to increase economic efficiency by spurring technological advances in science and health.
- To invest in transportation, environmental protection, and other infrastructure that will provide long-term economic benefits.
- To stabilize State and local government budgets, in order to minimize and avoid reductions in essential services and counterproductive state and local tax increases.

Part of the transparency and accountability oversight will be to ensure fair and equitable access to the decision making process. Citizens have the right to have both their voice heard, should they choose, and to have information readily available to them about ARRA funding. The website, [Colorado.gov/Recovery](http://Colorado.gov/Recovery), will be the main vehicle of communication for the Board and will provide each and every citizen of Colorado with the ability to monitor the progress of the recovery.

The Board is chaired by Don Elliman, Chief Operating Officer of Colorado, and is composed of public- and private-sector leaders from across the state, including:

- State Treasurer Cary Kennedy
- Secretary of State Bernie Buescher
- State Senator Moe Keller, chair of the legislature's Joint Budget Committee
- Don Marostica, Director of the Governor's Office of Economic Development
- State Representative Christine Scanlan
- Ray Baker, partner, Gold Crown Companies
- Reeves Brown, executive director, Club 20
- Taryn Edwards, president, Associated General Contractors of Colorado
- Robert Gibson, deputy director, Colorado WINS
- Sandy Gutierrez, president/CEO, Pueblo Latino Chamber of Commerce
- Tony Hernandez, director, Division of Local Government, Colo. Dept. of Local Affairs
- Andre Pettigrew, executive director, Denver Office of Economic Development
- Richard Truly, former director of NREL and former administrator of NASA

Governor Ritter's budget and policy directors and several Cabinet members will support the Board.

Meetings will be held on a time frame as determined by a consensus of the Board and are open and notices are provided in accordance with Colorado's Open Meetings Law. Attendance by Board members at meetings is highly encouraged but business can be conducted so long as 50% of the Board members are present either in person or via teleconference.

In addition, the Colorado Economic Recovery and Accountability Board works directly with the United States Government Accounting Office (GAO). The ARRA charged the GAO with a range of responsibilities to help promote accountability and transparency and ensure that funds are used as specified. Colorado is among 16 states, and the District of Columbia that the GAO will conduct a review of on a bimonthly basis.

The GAO's responsibilities include:

- Conducting bimonthly reviews on how funds are used by selected states and localities;
- Reviewing specific areas, such as trade, education, small business, and health care; and
- Commenting on reports filed by fund recipients.

Results of the GAO's bimonthly reviews are made available at [www.gao.gov/recovery/bimonthly](http://www.gao.gov/recovery/bimonthly).

## **CORHIO**

CORHIO is committed to ensuring that Colorado's statewide HIE efforts are pursued in the public interest, and characterized by high degrees of transparency and accountability. As described above, CORHIO's Board of Directors consists of stakeholders from across Colorado's health care delivery system. The uniquely comprehensive and collaborative composition of the Board is designed to enable all interested stakeholders, including consumers, to participate in the development of the State's health information network. In addition, CORHIO's committee structure, as described above in the Governance

section, will ensure that all issues, such as those related to policy, technical architecture, and finance, will be thoughtfully considered and debated collaboratively.

### *Conflict of Interest Policy*

To further ensure the accountability and transparency of the State's HIE efforts, the CORHIO Board has adopted strict conflict of interest policies and procedures. As a general process:

1. All directors and board members must complete a conflict of interest disclosure form annually.
2. Staff reviews the conflict of interest disclosure forms and presents them to Executive Committee for review.
3. The first agenda item for each board meeting, Board members note any items for which they believe they might have a potential conflict so that it is disclosed for the upcoming discussion.
4. A Board member can ask for a review by Executive Committee prior to upcoming meeting and the Executive Committee can request counsel support to make the determination.

For individual concerns:

1. Any Board member may raise a question regarding potential conflict of interest to the Executive Committee.
2. The Executive Committee will review the potential conflict of interest and can request counsel support to make the determination.

### *Open Meetings*

All CORHIO Board meetings are open to the public unless the Board of Directors chooses to enter into Executive Session, at which time only the members of the Board and any invited guests will be allowed. CORHIO Board meetings are publicly announced through the CORHIO website and are generally held the second Thursday of every other month. In addition, the Agenda for each meeting and Meeting Minutes from the previous meeting are made available as well and are generally available at least three days in advance. Time is made at the end of each meeting for public comment.

### *Communications and Outreach*

CORHIO believes that sound communications is a cornerstone to the development of stakeholder buy-in, support and collaboration. As such, CORHIO contracted with a Colorado-based mass communications firm focused on public policy issues and social marketing, to complete an audit of CORHIO's communications activities. The goal was to assess current communications priorities, practices and existing materials, make appropriate recommendations for future communications efforts, and develop an ongoing communications plan.

As part of this process, a stakeholder input survey was conducted in September, 2009. The purpose of the survey was twofold: to gather input that would inform CORHIO's development of the Statewide Health Information Exchange Strategic Plan; and to seek feedback on CORHIO as an organization. Based on the results of the survey, three strategies emerged related to practicing transparency in CORHIO communications and encouraging collaboration:

- Enhance the CORHIO website to create a broader opportunity for transparent, public communications and create a forum for stakeholder comments and questions.

- Ensure that communications with the media provide timely, accurate information about HIE development in Colorado generally and about CORHIO specifically. Conduct periodic outreach to reporters and editorial writers to let people know what CORHIO is doing and help illustrate the public “return on investment” of ARRA funding in Colorado.
- Hold periodic briefings with state and federal policymakers to let them know what CORHIO is doing.

## Finance

As ONC indicated in the FOA, ARRA funding will be instrumental in creating the demand for HIE products and services that will enable development of a sustainable market for HIE. In the absence of such organic demand, CORHIO developed a business plan to achieve sustainable financing of the State’s health information network. While this business plan will be continuously evolved to account for changing market dynamics, our goal, over the five year period during which ARRA’s Medicare and Medicaid meaningful use incentive payments will be disbursed, is to cease reliance on grant funding beginning in Year 4 and instead to finance Colorado’s statewide HIE through user subscription fees and other mechanisms, as described in more detail in the section entitled “Sustainability” below.

## Capacity

CORHIO was incorporated on March 27, 2007. Over the last two years CORHIO has developed substantial capability in effectively managing funding it has received to achieve its HIE planning and implementation goals. Key elements of this capability include:

- The establishment of an Audit and Finance Committee comprised of committee members chosen from the CORHIO Board of Directors. The primary purpose of the Audit and Finance Committee is to assist the Board of Directors in fulfilling its responsibility to oversee the integrity of the Corporation’s financial statements, the independent auditor’s qualifications and independence, and the performance of the independent auditor.
- Assignment of a Senior CORHIO executive staff member to the day-to-day oversight of CORHIO financial management.
- Engagement of a certified public accounting firm to perform annual financial audits, OMB A-133 Circular Audits and to complete annual 990 tax returns.
- Engagement of a bookkeeping firm, Bolder Business Solutions to perform day to day financial operations.

In the first two years of the State Health Information Exchange Cooperative Agreement Program, CORHIO will continue to leverage the committees, staff and third parties identified above to effectively manage funding necessary to implement the Strategic Plan. This includes ensuring that funds received are protected and placed into financial instruments where they will be fully insured while capturing the greatest return on investment to maximize income potential.

## Financial Policies, Procedures and Controls

In the last two years CORHIO has developed and implemented comprehensive financial policies and procedures to monitor spending and provide appropriate controls. The mechanisms currently in place include:

- CORHIO Financial Policies as established by the Board and Finance Committee to govern appropriate fiscal oversight.
- CORHIO Financial Procedures as established by the Finance Committee and staff to assure fiscally sound activity.
- Use of off-the-shelf accounting software to: record accounting transactions; generate financial reports to include Income Statements, Statements of Cash Flows, Statements of Functional Expenses and Budget Status Reports; and effectively demonstrate financial accountability to CORHIO's Board, Auditors, and other stakeholders.
- Engaging a certified public accounting firm, to provide guidance regarding Financial Accounting Standards Board (FASB) standards, Generally Accepted Accounting Principles (GAAP), and to provide input into Financial Policies, Procedures and Chart of Accounts.

In the first two years of the State Health Information Exchange Cooperative Agreement Program, CORHIO will continue to leverage the mechanisms identified above. In addition to tax/audit and accounting support described above, CORHIO has contracted with a certified accounting firm to assist CORHIO in the planning and implementation of the accounting and reporting processes required in connection with the receipt of ARRA funds that may differ from day-to-day accounting activities.

## Sustainability

In December, 2008 CORHIO completed an initial, comprehensive business plan that addressed all elements of the development, implementation and maintenance of a health information exchange for the State of Colorado. Key elements of this plan pertaining to sustainability and that consider public/private financing mechanisms were developed. Several scenarios were considered. The primary scenario forecasts that sustainability will be achieved in year 4 of the program.

The plan accentuates a multi-stakeholder financing plan that includes:

- Payment for HIE services from subscribers to the HIE such as hospitals, physicians, nursing homes and laboratories;
- Contributions from other beneficiaries of the HIE such as payers; and
- Grants and charitable contributions from organizations such as The Colorado Health Foundation.

Between October 2009 and January 2010 CORHIO will update its sustainability plan to account for new information and activities that have taken place recently. Specifically:

- Numerous grants awarded in 2009 by the Colorado Health Foundation including:
  - A \$16.5 Million, 2 year Healthy Connections Project grant to CORHIO to provide funding for the development of HIE services for health care organizations and providers in Colorado communities, while coordinating a strategy for statewide HIE.
  - A three year \$3.9 million grant for the Quality Health Network to support the expansion of its HIE to additional western slope communities, electronically integrating 354 additional physicians and 10 more hospitals to ensure these providers have access to secure, comprehensive health data for more than 200,000 people.
  - A \$19.5 million grant to support safety net providers that leverages federal ARRA funding for high-performing FQHCs to ensure that low-income, uninsured and under-insured Coloradans have access to high-quality, coordinated health care services.
  - \$2 million in grants to nonprofit health care organizations across Colorado to facilitate the adoption of electronic health records and related technologies. This grant permits these

organizations to provide more effective and efficient patient care. Organizations receiving grants include FQHCs, critical access hospitals, rural health clinics, community-based health information exchanges, an independent clinic, a CMHC and a statewide association of school-based health centers.

- An FCC award of \$4.6 million in federal funds over a three-year period to Colorado Telehealth Network, a project of the Colorado Hospital Association, and a \$5.1 million FCC award to the Colorado Behavioral Healthcare Council, a non-profit membership organization that represents Colorado's statewide network of community behavioral healthcare providers. In addition, a 15 percent match from participating healthcare providers will supplement the initiative. The network is being designed to enhance the delivery of health services, increase the use of tele-psychiatry, help control costs and make care more affordable, reduce travel time for consumers, reduce the potential for medical errors and enable healthcare providers to share critical information. Healthcare facilities participating in the program include hospitals, clinics, university and research centers, CMHCs, FQHCs and Rural Health Clinics.
- State of Colorado support of CORHIO through:
  - A \$250,000 Building Blocks to Health Care Reform Grant
  - Designation of CORHIO as Colorado's "qualified state-designated entity".

Between October 2009 and January 2010 the Strategic Plan will be refined to account for:

- The new funding sources specified above;
- Refined projections of the HIE development and operations costs;
- Additional analysis that is being performed to confirm the value of Colorado's statewide HIE to its beneficiaries; and
- The resulting finalization of the subscription pricing structure.

## Technical Infrastructure

### Interoperability

CORHIO released its Health Information Exchange Request for Proposals (RFP) in September, 2009, seeking vendors to provide the systems, functionality, and operations support required to link with and exchange clinical information among healthcare providers and organizations within and across defined communities, both within Colorado and across adjoining states.

The solution selected will support substantial provider adoption, interoperability with existing systems, and provide a roadmap for ever-increasing functionality and information exchange. All of this will be accomplished while adhering to established and planned federal guidelines for certification and meaningful use. Additionally, the CORHIO platform will be part of a larger network. As such, it will provide a secure "on ramp" and bridge to the NHIN.

To support Meaningful Use guidelines and overall improved quality and efficiency of care, CORHIO plans to build and implement the following capabilities:

1. Coordinate electronic eligibility and claims transactions. Many providers, private and public, currently use clearinghouses and have existing electronic exchange established with payers.

CORHIO plans to tap in to this existing network and assist or enable those entities without such capability. CORHIO is exploring how we can help get the claim to the adjudicator in the most efficient and effective manner. This includes working with HHS and ONC to help standardize the claims attachment process. Also, the Center for Improving Value in Health Care (CIVHC) discussed earlier will play a central role in collecting and coordinating claims data to track quality and outcomes improvements in coordination with CORHIO's other efforts.

2. Facilitate electronic prescriptions. This includes both initial prescribing and refill requests – a time-consuming activity for many healthcare organizations. Even healthcare providers without electronic systems should be able to participate with e-prescribing through the Health Information Exchange architecture. CORHIO has begun conversations with eRx vendors and is working to figure out how to incorporate medication history and transmissions into the exchange.
3. Facilitate electronic orders, results and reports delivery. Based on the experience and lessons learned from other states that have developed HIE, Colorado intends to focus first on reports and results delivery to providers. These include clinical lab orders and results delivery, diagnostic tests and results, prescription ordering and filling information, and discharge summaries and instructions.
4. Electronic public health reporting (immunizations, alerts, notifiable lab results, etc.). Across the state, immunization information is key data that needs to be exchanged throughout the state. Thorough, careful and confidential communication is required for diagnostic groups with Tuberculosis and HIV/AIDS.
5. Point of Care Inquiry. CORHIO is completing an AHRQ-funded Point of Care Inquiry Demonstration project that demonstrated the use of these services in emergency rooms for four, vertically-integrated, sophisticated health systems in Colorado. The electronic Master Patient Index (eMPI) using a robust algorithm was very successful in matching appropriate patient data across the four systems. It is anticipated that revisions and improvements to this component of HIE will continue to improve as CORHIO develop capabilities in communities across the state. The availability of a longitudinal view of medically-relevant patient information across health care settings supports better clinical decisions.
6. Area quality reporting and outcomes tracking. As communities progress towards meaningful use, the data is cleansed and normalized through CORHIO, it will better allow for clinical quality reporting and analytics to be applied. The HIE can encourage and facilitate the electronic reporting and tracking of data. It may be the organization to collect and aggregate data for analysis by other organizations (state and federal programs, professional associations, etc.).
7. Clinical summary exchange for care coordination and patient engagement. Discharge summaries and instructions, as well as periodic progress note updates, are key information for successful transition from hospitals to other placements (home, LTACS, nursing homes, etc.).
8. Personal Health Records and engaging the patient are also important components. Many of the quality initiatives mentioned previously recognize the importance of this service and are working with CORHIO to identify the best mechanisms to empower patients in their care experience.

The proposed solution must be able to connect with existing Health Information Exchange organizations, such as Quality Health Network on the Western Slope of Colorado, and the Northern Colorado Health Alliance in Weld County. Other local and regional initiatives underway will also interface with the Statewide Health Information Exchange.

Initially, the focus will be on the Medical Referral Regions or communities of Colorado. However, the intention is to expand to neighboring states and regions and eventually the entire nation, with commitment to participating with NHIN.

Colorado is a relatively rural western state that is surrounded by and shares borders with seven other states. These states, like Colorado, have wide geographic expanses and thus too, are in need of interoperability and Health Information Exchange. CORHIO is currently in conversation with some of these states as it begins to build its inter-state interoperability plan. To date, this includes Utah, Nebraska and Wyoming. CORHIO's plan is to collaborate and coordinate resources wherever possible.

CORHIO is keeping a watchful eye on federal government developments regarding Health Information Exchange and interoperability, and closely follows the publications of the Health and Human Services Secretary (HHS) and the Office of the National Coordinator (ONC), to be sure to adopt and adhere to standards and certifications for Health Information Exchange. CORHIO has working committees for standards, policy and technology, who are responsible for monitoring the Certification Commission on HIT (CCHIT) website for updates, and watching for the possible designation of the Electronic Healthcare Network Accreditation Commission (EHNAC) as the potential accrediting body. Through professional associations and various media, CORHIO stays abreast of the rulemaking process from HHS and the evolving definitions on meaningful use criteria. The selected solution must be CCHIT certified, align with NHIN compatibility standards, and support the defined Meaningful Use guidelines. These requirements are detailed in the RFP, and the selected vendor(s) will be contractually obligated to adhere to these standards and certifications.

### **Technical Architecture/Approach**

CORHIO envisions an overall "network of networks" architecture that it is comprised of participant communities that are sub-networks, just as Regional Health Information Organizations (RHIOs) are sub-networks to the National Health Information Network (NHIN). CORHIO anticipates connecting with and becoming part of the NHIN.

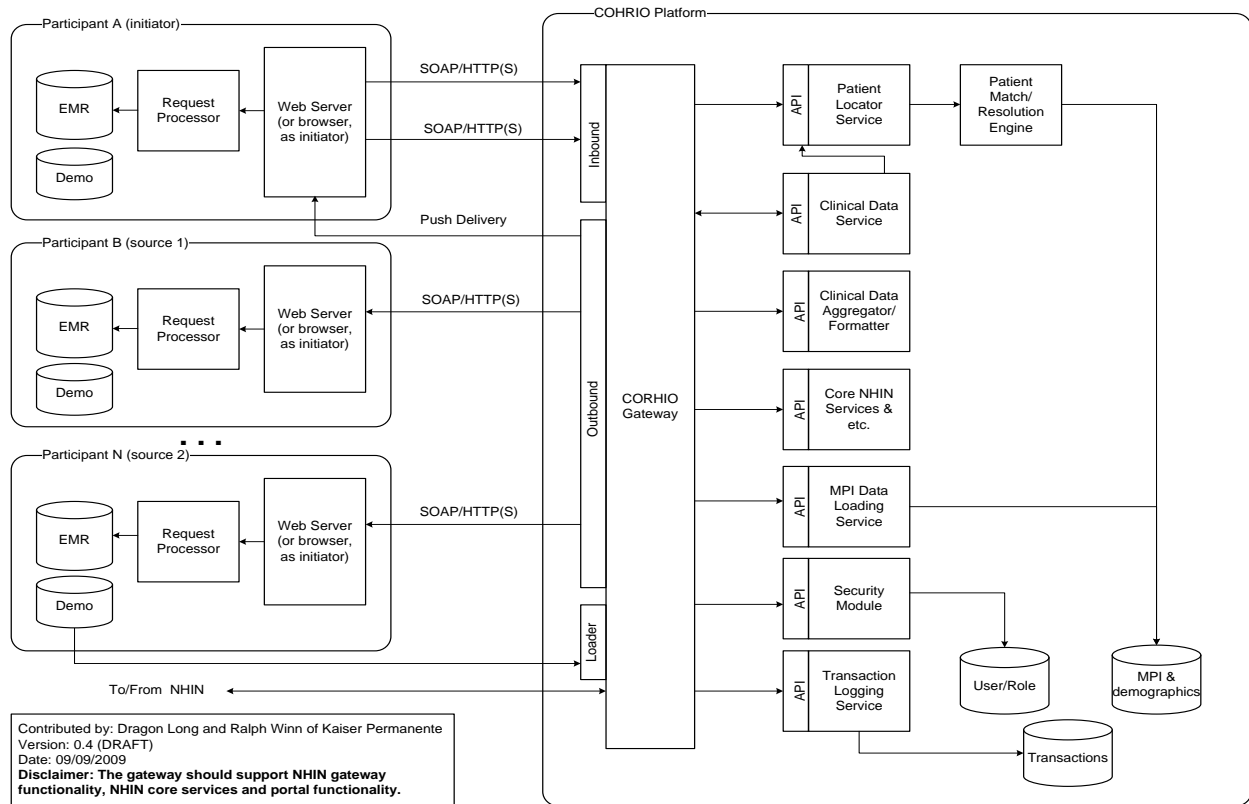
CORHIO intends to establish two levels of "HIE platform." First, there is a technical architecture comprised of well-defined protocols as a platform to enable participant communities to connect via standards based gateways and protocols. As such, it provides a secure way for entities to more widely share information that otherwise might not be made available via HIE. This approach lends itself to definition via Web Services and can be implemented using service-oriented architecture, supporting the flexibility and extensibility essential at this stage of development when both standards and products are rapidly evolving. These ideas are detailed below.

In addition, CORHIO intends to provide a technical infrastructure platform consisting of services labeled in the CORHIO Architecture Design figure below, assuring a foundation that supports the significant need for HIT services within the community. This infrastructure should therefore be considered a catalyst for HIE and a cornerstone for modernizing HIT in general.

Key design features of the architecture are as follows:

1. The CORHIO technical architecture platform is part of a larger network. As such, it provides a secure “on ramp” and bridge to the NHIN.
2. The CORHIO platform provides connectivity to participant communities via a standards-based NHIN compliant gateway. This gateway is essential to participants at various levels in the network, and enables high quality communication and secure exchanges of information.
3. The CORHIO platform supports a service-oriented architecture. All interface definitions will be specified and implemented as Web Services using accepted national standards. CORHIO will support NHIN core services.
4. As a platform, CORHIO does not assume a single centralized clinical data repository. Rather, a Master Patient Index (MPI) database and demographic data will reside on the core technical infrastructure platform. CORHIO can, however, assist communities with building data repositories that are not part of their core platforms.
5. The CORHIO platform has an open technical architecture. CORHIO assumes growth over time and must support features and functions that will emerge in the future. The capability to grow and evolve is necessary and critical to the success of CORHIO. This extensibility is supported by the use of well defined protocols and implementation via a ‘loosely coupled’ approach using Web Services.
6. CORHIO services are made available to all participant communities. Core HIE technical infrastructure services and common functionality such as transaction logging, security, and failover can be leveraged by and provide benefit to all participant communities.
7. The CORHIO technical infrastructure platform provides for additional services beyond HIE for those communities that need such functions. Core HIE services and capabilities can be re-used and extended to support use cases beyond the key use cases defined by NHIN, such as HITSP use cases. These services are made available to all participant communities.

# CORHIO Architecture Design



Note: Components depicted in "Participant" area of diagram may be provided either by entities that connect with CORHIO, or by CORHIO.

## Business and Technical Operations

### Implementation

CORHIO plans to mobilize healthcare information electronically across numerous organizations and systems throughout the state. It will provide the capability to electronically move information between disparate healthcare information systems while maintaining the meaning of the information being exchanged. The goal is to facilitate access to and retrieval of clinical data in order to provide timely, efficient, and effective patient-centered care. In addition, CORHIO may provide some electronic features and functionality to organizations that have not been able to automate their systems.

In September 2009, CORHIO issued a Request for Proposal (RFP) from qualified and proven vendors to provide the systems, functionality, and operations support required to link with and exchange clinical information among healthcare providers and organizations within and across defined communities, both within Colorado and across adjoining states.

As part of the vendor selection process, CORHIO is involving many of the organizations that will be users and participants, not only to ensure their needs will be met with the procured HIE solution, but to also educate, engage, and invest these partners early in the process. While not every community will utilize each service CORHIO intends to offer, CORHIO is working to understand the different needs across the state and the specific services that will be required to support statewide HIE. An incremental and phased rollout that incorporates and collaborates with other efforts already underway in the state is planned. Additionally, CORHIO will leverage existing HIE efforts and build on their experiences and lessons learned.

CORHIO intends to connect with and be part of the National Health Information Network (NHIN). CORHIO is presently talking with the contiguous states of Wyoming, Utah, Nebraska and New Mexico to coordinate efforts. CORHIO has plans to connect with all surrounding states and the southwest United States, and to subsequently connect the state and regional HIE with national HIE.

CORHIO will:

- Provide technical assistance as needed to HIEs and others developing HIE capacity within the state;
- Coordinate and align efforts to meet Medicaid and public health requirements for HIE and evolving meaningful use criteria;
- Monitor and plan for remediation of the actual performance of HIE throughout the state ; and
- Document how HIE efforts within the state are enabling meaningful use.

### *Provide Technical Assistance to Develop HIE Capacity*

Colorado has seven existing HIEs and seven defined Medical Referral Regions. Currently, CORHIO is engaged with two early adopter communities, where Letters of Intent are in place, to understand their functionality and business needs. These two communities are CORHIO's pilot communities for the initial implementation of the functionality defined in the RFP. These locations are in the San Luis Valley of southern Colorado and the Boulder area of northern Colorado.

Although the full implementation schedule has not yet been defined, CORHIO will implement in the remaining four Medical Referral Regions following the San Luis Valley and Boulder area implementations. The current plan is to implement in at least two MRRs per year with the goal of covering all Colorado communities in five years. CORHIO will also work towards interfacing with other existing HIE efforts, such as QHN, and adjoining states.

As noted earlier, QHN is a highly sophisticated, self sustaining HIE that has been operating effectively for several years, and provides a good model for emulation. In addition to working with QHN, CORHIO is also working closely with efforts in Northeast Colorado, specifically in Larimer and Weld Counties. Leveraging existing state and regional HIE capacity and shared services and directories are important dynamics for the success strategy of CORHIO.

As stated above, CORHIO's convener/collaborator role allows it to assist and guide communities in implementing governance activities and to gain insight into their needs and how the Statewide Health Information Exchange can be leveraged. For those communities that may not have sophisticated IT staff resources available, CORHIO will assist these communities to ensure they have adequate support with

their Health Information Exchange efforts, during planning, implementation, training, and in subsequent ongoing support and outreach.

### *Coordinate and Align Efforts with HCPF and CDPHE*

CORHIO is committed to coordination and alignment with Medicaid and public health efforts around the state. CORHIO is participating on the Medicaid Health IT Strategic Plan Committee with HCPF, and anticipates it can assist with building the various interfaces needed to connect with the EMRs that exist in the state.

While CORHIO will start with public health alerts in its Phase 1 implementation, the need to exchange more sophisticated public health data to those that need it is also important. Enhancing public health exchange is key functionality defined for subsequent phasing.

Additionally, CORHIO has been in conversations for several months with the Colorado Department of Public Health and Environment to assist them with the Colorado Immunization Information System (CIIS) interfaces and possible electronic Master Patient Index issues that exist within their system. Further discussions concerning interfacing with the other registries that exist within the Colorado Department of Public Health and Environment are underway. CORHIO and CDPHE have identified at least 13 registries within the department that could operate more efficiently and effectively if HIE processes and workflows were developed between practitioners in the state and the department. In addition, these databases could become more effective population health tools if they were linked in a secure and appropriate way to practitioners in the field.

### *Monitor and Plan for Remediation of Performance*

CORHIO is committed to the widespread implementation and success of HIE throughout the state and region. To ensure this, our strategic plan includes elements to track actual adoption and utilization. For those communities or providers slow to engage or adopt, we have plans for further education, assistance and support. CORHIO will not only assist at the local level, but also will engage state and regional associations to further the mission of HIE. This collaboration currently involves:

- State and county medical societies;
- State physician practice management groups (Medical Group Management Association, PAHCOM);
- Hospital and primary care associations (Colorado Hospital Association, Colorado Community Health Network/CACHIE, etc.);
- Behavioral Health (Colorado Behavioral Health Council and local Community Mental Health Centers);
- Colorado HIMSS; and
- AHIMA and CHIMA.

Through these groups, CORHIO can better track utilization (through surveys, etc.) and better understand barriers or resistance to change. The plan is that these associations will assist with both identification of issues and efforts for improvement and remediation. With CORHIO support and clear, consistent communication, these organizations will be able to reach participants to better facilitate understanding and adoption.

A critical component of the statewide implementation plan is to monitor actual performance and develop plans to take corrective action as needed. CORHIO believes that participation of at least 60% of all Colorado physicians is required to ensure that enough data flows through the Statewide HIE to make HIE valuable. To ensure that target is achieved, CORHIO can apply lessons learned from QHN's successes, and develop remediation plans accordingly:

- Verify that the right incentives are in place. Aligned incentives drive providers to work together. Information sharing and collaboration lets providers see how their own performance on quality metrics compares to their peers. Peer-to-peer communication based on quality data has great impact, and financial incentives can be established for achieving quality targets.
- Verify that providers are pursuing their own strengths. This means that providers apply their specialties collaboratively to get patients the right care at the right time. This is in contrast to more typical scenarios where providers compete aggressively for patients and the revenue that accompanies them. When providers collaborate on the patient's behalf, the resulting high quality and efficient care benefits all providers.
- Maintain high level of primary care physician participation. Primary care is the foundation of a high performance health system. The shortage of primary care physicians is of concern because of the central role primary care plays in high quality care. Primary care expansion must be supported within healthcare reform legislation.

### *Document Progress Towards Meaningful Use*

Colorado is well positioned to meet the requirements of meaningful use that lead to improved quality, efficiency, and safety of healthcare. There a number of efforts within the state that are aligned with and being coordinated through CORHIO that will enable the exchange of clinical data, e-prescribing, and reporting of quality and other measures. Current Health Information Exchange initiatives within the state include: QHN in Grand Junction; Avista-IPN in Louisville; Community Health Partners (CHP) in Colorado Springs; and the Northern Colorado Health Alliance (NCHA) in Greeley. One of the primary provisions of meaningful is the ability to exchange clinical and administrative data. In its role as a technical service provider/broker, CORHIO will leverage and build on the success of these initiatives to establish the Statewide Health Information Exchange infrastructure services that links these "Network Neighborhoods" and Medical Referral Regions together to exchange clinical and administrative data.

As described earlier, there are number of organizations including CCGC, CFMC, CACHIE and others that are already working with healthcare providers to implement and report on population health processes and outcomes; implement the medical home model and improve care coordination across the healthcare system. These include the Safety Net Medical Home project, Family Residency Medical Home project, Southeast Rural Health Clinic Clinical Quality improvement project and others. CORHIO will build off these efforts to create the capability for statewide quality reporting and analytics.

Another key provision of meaningful use is e-Prescribing capabilities. The CORHIO roadmap provides not only for the transmission of electronic prescriptions in Phase 1, but also the option to provide e-Prescribing tools to providers that don't have this capability. Meaningful use guidelines also specify the ability to electronically report quality and safety data.

The latter phase of the CORHIO roadmap provides for clinical analytics and research capabilities. Clinical analytics and research capability include support for population-based analysis, and quality measures and reporting.

## Legal/Policy

As described above in the Governance Section, CORHIO will oversee the development of a common set of policies, technical standards, and other rules to enable interoperable HIE throughout the State.

As a condition of receiving ARRA funding, HIEs and other stakeholders throughout the State will be required to comply with the common policies and standards developed by CORHIO. Compliance will not be mandated through law or regulation; instead CORHIO and the State will mandate compliance through the contracts employed to disburse State HIE Cooperative Agreement funds or Medicaid's EHR loan and adoption incentive funds, or through other similar means.

## Privacy and Security

Colorado was fortunate to participate in the ONC-funded Health Information Security and Privacy Collaboration (HISPC) for 5 years. Much of the focus in the initial years was to understand the privacy and security framework in Colorado so that health information exchange could occur within the state. An environmental scan of state laws and regulations was conducted. This work became the basis for the policies and data sharing agreements developed to implement CORHIO's AHRQ-funded Point of Care Inquiry Demonstration Project, and will be the basis for developing policies and data sharing agreements that will govern statewide HIE in Colorado.

## State Laws

In addition to the HISPC work cited above, CORHIO's Policy Committee and its workgroups will periodically review and update what is known regarding both the state and federal policy framework for HIE and apply it to functioning and developing HIE activities. A broad range of perspectives are represented on this committee including legal, technical, clinical and policy/advocacy.

One area that is receiving particular attention is behavioral health laws within Colorado and nationally. Due to the sensitive nature of this health information, particular care must be given to address the unique issues surrounding the sharing of behavioral health information. Both federal and state laws and regulations can be interpreted to prohibit electronic exchange of this information. With the leadership of the Colorado Behavioral Health Council, leaders within the behavioral health community and the Department of Human Services are working with CORHIO to discern the best methods by which behavioral health information can be securely exchanged to improve patient care. This work may result in both federal and state-level recommendations.

Another area of focus is continued discussions with bordering states where patients contribute to a Medical Referral Region without regard to legal state boundaries. Colorado continues to discuss health information exchange possibilities with Nebraska, Wyoming and Utah and anticipates discussions with New Mexico and Kansas as efforts in each state mature. Specific plans for interstate coordination and harmonization of privacy and security laws will be included in our Operational Plan.

## Policies and Procedures

The CORHIO Board's Policy Committee supports the Board in adopting, communicating and overseeing effective organizational policies and procedures that support the mission and successful operations of CORHIO. This includes establishing policies and procedures related to privacy and security. The CORHIO Board has adopted Governing Principles that guide the Policy Committee's development of statewide privacy policies. The Governing Principles are:

1. **Openness and Transparency:** There should be a general policy of openness about developments, practices, and policies with respect to personal treatment data. Patients should be able to know what information exists about them, the purpose of its use, who can access and use it and where it resides.
2. **Purpose Specification and Minimization:** The purposes for which personal treatment data are linked should be limited to those treatment purposes or others that are specified on each occasion of change of purpose. This practice will minimize the potential privacy violations.
3. **Information Limitation:** Personal health information should only be linked for specified purposes, should be obtained by lawful and fair means and, where possible, with the knowledge or consent of the data subject.
4. **Use Limitation:** Personal treatment data should not be disclosed, made available, or otherwise used for purposes other than those specified.
5. **Patient Participation:** Patients should control access to their personal information:
  - a. Patients should be able to obtain from each entity that controls personal health data, information about whether or not the entity has data relating to them;
  - b. Patients' access to their information is through their home institution; and
  - c. No rights or responsibilities are overridden by CORHIO.
6. **Data Integrity and Quality:** All personal treatment data provided through CORHIO's linking capabilities should be relevant to the purposes for which they are to be used.
7. **Security Safeguards and Controls:** Personal treatment data should be protected by reasonable security safeguards against such risks as loss or unauthorized access, destruction, use, modification, or disclosure.
8. **Accountability and Oversight:** Entities in control of personal health data must be held accountable for implementing these information practices.
9. **Remedies:** Remedies must exist to address any security breaches or privacy violations.

These principles were developed in November, 2007 based upon the Connecting for Health Common Framework created by the Markle Foundation.

In cooperation with the privacy and security officers of the Colorado Department of Health Care Policy and Financing, the Colorado Department of Public Health and Environment, Kaiser Permanente Colorado, Denver Health and Hospital Authority, The Children's Hospital and University of Colorado Hospital and Exempla health system, CORHIO staff successfully aligned state privacy and security laws, regulations and organizational privacy and security policies to develop the following model privacy and security policies:

- **Access Auditing and System Accountability:** The purpose of this policy is to define the auditing process for CORHIO and ensure appropriate use of the Protected Health Information (PHI)

contained in the CORHIO system in compliance with federal, state and local laws and regulations as well as CORHIO Policies.

- **Appropriate Use and Disclosure:** The purpose of this policy is to ensure that Protected Health Information (PHI) contained in and used through the CORHIO system is used and disclosed in a manner consistent with all applicable federal, state and local rules, regulations, and laws so that patient information is protected appropriately.
- **Patient Identification:** The purpose of this policy is to establish the minimum data necessary for matching patient records, and to minimize, to the extent possible, incidental disclosures of protected health information.
- **Privacy Practices, Patient Participation & Control of Information in the MPI:** The purpose of this policy is to declare Participant privacy practices, standards for patient participation and control of information in the Master Patient Index (MPI).
- **Security Protocols:** The purpose of this policy is to ensure that data received, contained, and transmitted by CORHIO is managed in a secure manner.

These core policies establish a strong foundation for statewide health information exchange. All of the policies are currently slated to be reviewed and revised by the end of the calendar year to:

- Confirm alignment of the CORHIO Governing Principles and the HHS Privacy and Security Framework; and
- Incorporate changes made to HIPAA through ARRA.

Ultimately, CORHIO will build upon these policies and, through the open, transparent process described in this Strategic Plan, develop a set of privacy and security policies that will govern statewide HIE.

### **Trust Agreements**

Through the efforts entailed in the AHRQ-funded Point of Care Inquiry Demonstration Project, CORHIO developed a master data sharing agreement so that participants in the demonstration could securely share clinical information in emergency settings through a query model. This agreement was developed in concert with Denver Health and Hospital Authority, The Children’s Hospital, Kaiser Permanente Colorado and University of Colorado Hospital. Because of CORHIO’s involvement with HISPC and Kaiser Permanente’s involvement in the NHIN data sharing agreement process, this agreement is robust and incorporates data sharing, data use and reciprocal support activities. Colorado anticipates updating this document as the state-wide model moves to a more inclusive model that incorporates both large and small providers as well as multiple communities that have potentially disparate data sharing needs. Updating this agreement and assuring its relevance to community-based services will take place through the work of the CORHIO Policy Committee and the communities served.

Because local initiatives already exist in many communities, part of the data sharing development across the state will include aligning current local data sharing agreements and activities at the local level so that communities can share information across communities meeting the expectations of all participants. This is expected to occur through the work of the CORHIO Policy Committee as information exchange across Medical Referral Regions becomes more imminent.

### **Oversight of Information Exchange and Enforcement**

CORHIO policies state that any participant who misuses the CORHIO system and/or information gathered through the CORHIO system will be removed from the system and not allowed to use the system again. Prior to passage of ARRA, CORHIO incorporated auditing functions across the system. These audit functions will continue and processes are in place to assure that there is a mechanism for sharing potential misuse of the system with CORHIO. In order to support appropriate use, CORHIO requires all users participate in a training process that includes mechanisms to assure that users understand the expectations for system use. It is expected that these policies will continue to be refined as the statewide HIE capabilities are available in more communities across the state.

Because local initiatives already exist in many communities, part of the data sharing development across the state will include aligning current oversight and enforcement activities at the local level so that communities can share information across communities meeting the expectations of all participants.

Secondly, ARRA included new federal penalties and processes governing breaches of protected health information. Colorado will utilize this framework to develop breach policies and procedures applicable to all providers engaging in HIE throughout the State.