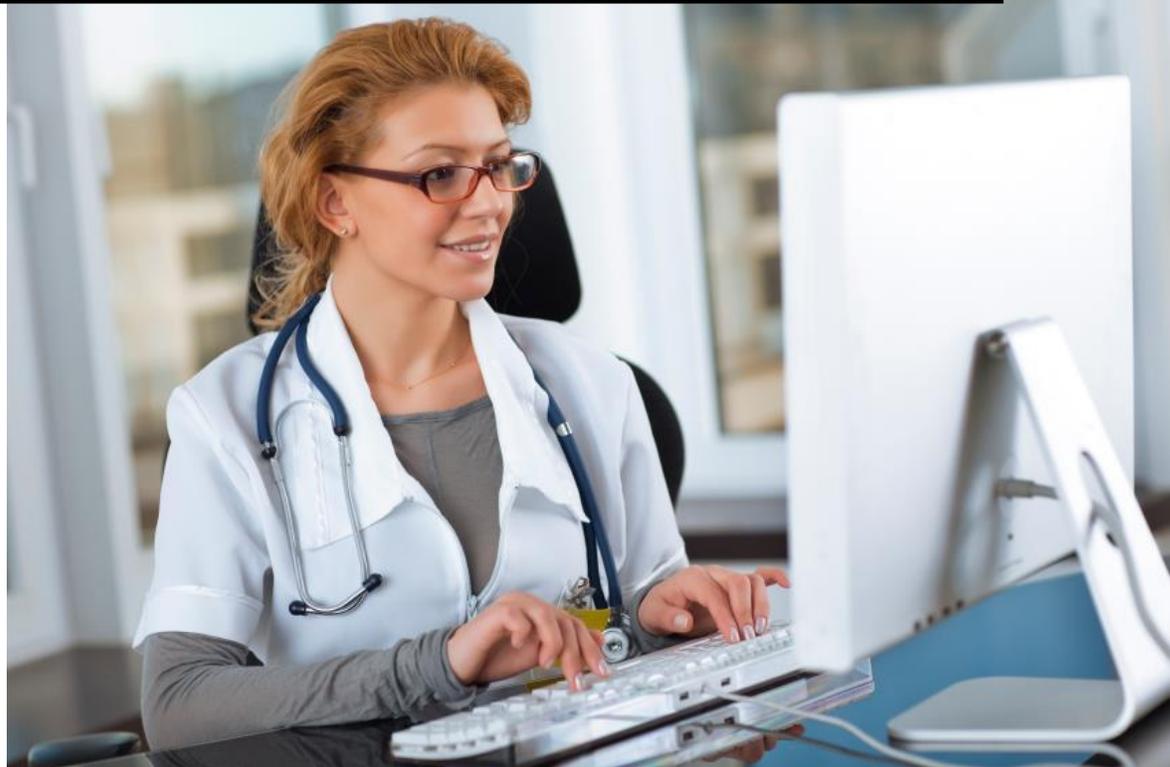


Leveraging Data for Targeted Patient Population Health Improvements



Diabetes' Impact on Health in America

Diabetes is a major health concern in the United States today. The Centers for Disease Control's 2014 National Diabetes Statistics Report estimated that in 2012, 29.1 million Americans of all ages were living with diabetes, while an additional 86 million people aged 20 or older are estimated to have pre-diabetes.ⁱ Diabetes can lead to acute comorbidities, including:

- **Heart disease and stroke.** 2010 hospitalization rates for heart attack among adults aged 20 or older were 1.8 times higher for those who had diabetes than for those who did not, while hospitalization rates for stroke among adults aged 20 or older were 1.5 times higher for those who had diabetes than for those who did not.
- **Vision loss.** During the years 2005 – 2008, almost 30% of diabetic patients aged 40 or older (4.2 million people) had diabetic retinopathy, which could lead to vision loss.
- **Kidney failure.** In 2011, diabetes was recorded as the primary cause of 44% of all new kidney failure cases.
- **Death.** In 2010, diabetes was the seventh leading cause of death in the United States.ⁱⁱ

The CDC and the American Diabetes Association estimate that diabetes cost the United States \$245 billion in 2012. This figure includes both direct medical costs and indirect costs such as lost working hours, decreased productivity at work, inability to work and premature death.ⁱⁱⁱ

Regular Monitoring is Key to Control

Given diabetes' impact on health, quality of life, and productivity, it is vitally important for improved public health that healthcare providers and patients be equipped with better tools to manage the condition, so that patients can enjoy higher quality of life and fewer complications. The National Committee for Quality Assurance reported that patients who decrease their HbA1c level by one percentage point lower their risk of eye, kidney and nerve complications by up to 40%.^{iv} Because monitoring HbA1c levels is an important component of managing overall health for patients with diabetes, it is beneficial to patients for providers to have access to reliable methods for monitoring and reporting these levels.

A study of one patient population's HbA1c levels over a three-year period found that 75% of patients who had an HbA1c score of 9 or above received that score on their first HbA1c test during the study period. Patients who had regular subsequent HbA1c tests saw their scores drop, so that by their fourth follow-up test, only 16.8% of patients still had scores of 9 or above.^v Courtemanche et al also found that 32.2% of patients in the study were 90 or more days late for a scheduled follow-up HbA1c test. Patients who were 90 or more days late for an HbA1c test were more likely to have a score of 9 or above on their next follow-up test. For example, patients who had previously tested in the 6-7 range and had a follow-up test three months late were nearly five times as likely to have a new score of 9 or above as patients who got their follow-up tests on time.^{vi}

These results indicate that patients who consistently engage with their providers in monitoring their health metrics have better control of their diabetes. In order to actively engage their patients in self-management and adherence to treatment plans, providers need to be able to give the patients clear information that helps them understand their condition and actions they can take to be healthier. Providers need a quick, reliable way to get exactly the information they need about their patient population, including HbA1c results.

The Role of Health Information Technology

A 2011 study examined whether electronic health records (EHRs) could be one such tool, and whether their use in the primary care setting would enhance providers' achievement of care standards and quality outcomes for patients with diabetes. The study found that the diabetes care provided in clinics using EHRs met all four standards established by the regional primary care program 35.1 percentage points more often than clinics using paper records, while outcomes for patients with diabetes were 15.2 percentage points higher at EHR sites.^{vii} This finding raises the consideration that a standardized electronic method for recording, displaying and looking up data could enhance providers' ability to efficiently use the data. Display clarity, reduced transcription errors, and ease of finding data may contribute to its usefulness for providers.

Population Health Reporting for Diabetes Monitoring and Care Plan Adherence

Studies have shown that population health management components of informatics systems can help enhance care processes and patient outcomes.^{viii} In particular, providers found that the ability to create reports that track metrics such as disease state and care plan adherence was beneficial. UHIN's experience as both a fully-functional healthcare clearinghouse for administrative transactions between providers and payers (healthcare claims, remittance advice, eligibility queries and responses, etc.) and the Utah state-designated health information exchange (HIE), the cHIE, has taught us that the greatest potential to improve care comes from systems that combine robust data with the electronic benefits of clear data displays, accurate reporting, and simple, flexible user interface.

UHIN's goal was to improve population health management for major health burdens by making clear, standardized, actionable data available to providers to help them improve care delivery and results. In UHIN's capacity operating the cHIE, we have secure connections to send and receive clinical data from healthcare provider organizations including hospitals; laboratories; multi-specialty, single-specialty and general-practice clinics; imaging centers; pharmacies and the Utah Department of Health. Data received by the cHIE is simultaneously routed to the cHIE's Clinical Data Repository for query by authorized users searching for individual patients, and to the Data Warehouse where it is sorted into individual "data cubes" comprised of patients who have been linked to a specific provider. Providers are then given access to the "data cube" of their own patients. The "data cubes" are also pulled into the cHIE's analytics tool, which is used to produce the population health reports that UHIN developed as a tool to support

providers' process and outcome improvement goals. The reports allow providers to securely access records for their diabetic patients and to apply a wide range of specific filters so that they can view the precise data they want to track. By using the filters, providers can easily narrow large amounts of data to manageable, actionable metrics for their patients. Providers can choose to see results only for a specified gender, age range, health indicator value (HbA1c or blood pressure metric), ZIP code, county, city, etc. This ability to analyze cross-sections of data supports providers in their efforts to create custom improvement plans or study correlating factors that affect disease patterns.

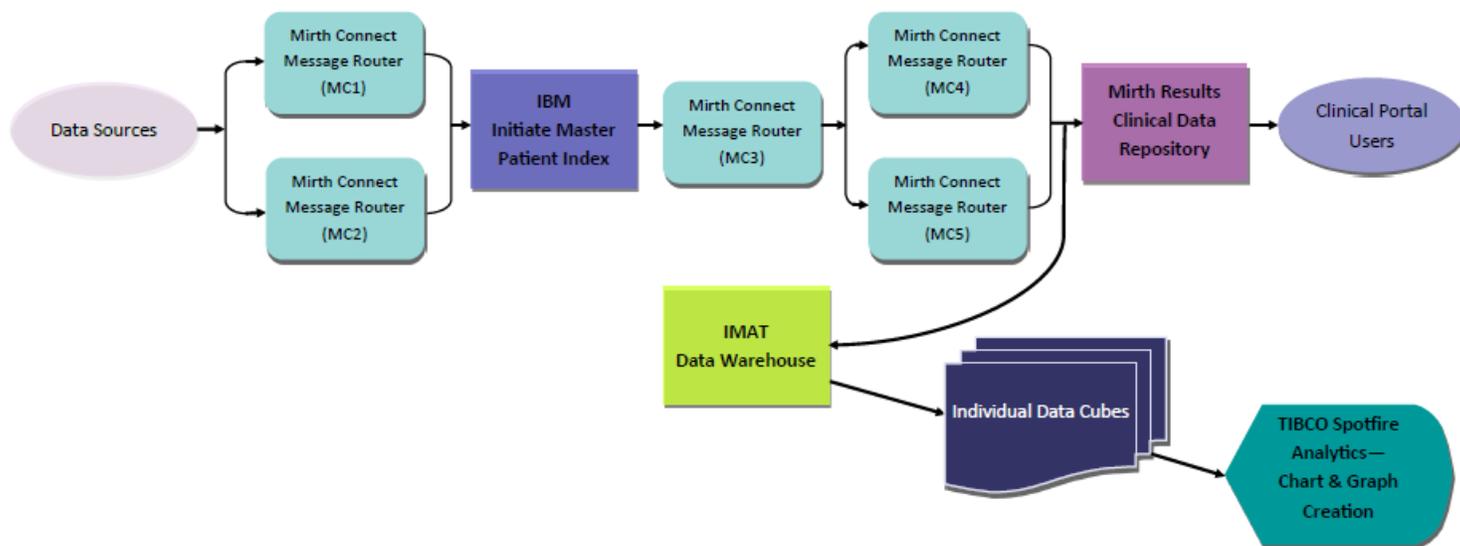


Figure 1. Data Flow for Population Health Reports. The products listed in this data flow are mentioned for informational purposes only. They are not the only products that offer the functionality discussed in this white paper.

Providers can study patterns in the incidence of diabetes among their patient population with graphical data displays. As one example, they can examine a scatter plot that maps the number of patients within a specific age range who have a particular HbA1c score and see what ages tend to have clusters of high scores, to help target the age at which patients with risk factors for diabetes should begin having regular HbA1c tests. This graph also helps providers get a clear view of how many of their diabetic patients have their HbA1c levels under control. Providers can also view the prevalence of diabetes and its level of control by the city and ZIP code where their patients live. Having this data enables them to target care interventions for groups of patients with similar demographics, and is useful for state and local Departments of Health seeking to implement diabetes control programs.

Providers also have the option to input the patient identifier(s) for a specific patient or group of patients and see where those patients land on the graphs, compared to the provider's patient population as a whole. This helps the provider determine when a particular patient's health metrics are nearing the levels that often signal trouble.

Expanding the Model: Reporting for Other Conditions

UHIN is also developing population health reports intended to help providers manage patients with hypertension. Providers can map their patients by age, gender and blood pressure measurement. As with the reports for patients with diabetes, providers can filter the data to focus on metrics for patients with a specific profile, helping them develop customized interventions. UHIN decided to develop reports for hypertension because blood pressure control, like diabetes management, is a national health goal. The national Million Hearts® program initiated by the Department of Health and Human Services in 2011 aims to avert 1 million heart attacks and strokes by 2017 through a combination of clinical and community strategies.^{ix}

As part of this initiative, providers are asked to use health information technology to support evaluation of cardiovascular risk factors in patients.^x This level of monitoring can produce better patient outcomes, but also can be burdensome without efficient tools. The population reports efficiently summarize large amounts of data so that providers can quickly grasp the burden of high blood pressure on their patients.

Conclusion

UHIN has identified a use case where access to clear, standardized data that can be displayed by selected metrics can help providers and patients work together to monitor and manage chronic health conditions. Our intention is to develop additional population health reports according to the needs indicated by the healthcare community.

ⁱ Centers for Disease Control and Prevention. *National Diabetes Statistics Report: Estimates of Diabetes and Its Burden in the United States, 2014*. Atlanta, GA: U.S. Department of Health and Human Services; 2014. (<http://www.cdc.gov/diabetes/data/statistics/2014StatisticsReport.html>.)

ⁱⁱ *National Diabetes Statistics Report*.

ⁱⁱⁱ *National Diabetes Statistics Report* and Yang W., Dall T.M., Halder P. et al. *Economic Costs of Diabetes in the U.S. in 2012*. *Diabetes Care* 36:1033-1046, 2013.

^{iv} National Committee for Quality Assurance. *Improving Quality and Patient Experience: The State of Health Care Quality 2013*. Washington, D.C.: October 2013.

^v Courtemanche T., Mansueto G., Hodach R., Handmaker K. *Population Health Approach for Diabetic Patients with Poor A1C Control*. *Am J Manag Care*. 2013; 19(6): 465-472.

^{vi} Courtemanche et al. *Population Health Approach for Diabetic Patients with Poor A1C Control*.

^{vii} Cebul R.D., Love T.E., Jain A.K., Hebert C.J. *Electronic Health Records and Quality of Diabetes Care*. *N Engl J Med* 2011; 365: 825-33.

^{viii} Dorr D., Bonner L.M., Cohen A.N., et al. *Informatics Systems to Promote Improved Care for Chronic Illness: A Literature Review*. *J Am Med Inform Assoc*. 2007;14:156-163.

^{ix} The “Million Hearts” Initiative –Preventing Heart Attacks and Strokes. <http://www.nejm.org/doi/full/10.1056/NEJMp11110421>

^x The “Million Hearts” Initiative.

About UHIN

The Utah Health Information Network (UHIN) is a non-profit coalition of healthcare providers, payers, state government and other stakeholders who have come together to reduce healthcare costs and improve quality and access for the community by ensuring that providers, payers and patients can exchange information securely and electronically. UHIN is a community-based organization that focuses on creating electronic data exchange solutions that work for the entire healthcare community, from single-provider offices to large integrated healthcare systems. For more information, please visit www.uhin.org.