Agency of Human Services Office of Health Care Reform

Act 68 (2025) Sec. 10(d)(1)

Advantages and Disadvantages of Health Care Data Integration

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EXECUTIVE SUMMARY

Act 68 of 2025 requires the Agency of Human Services (AHS) to evaluate integrating Vermont's major healthcare datasets including clinical, claims, social drivers of health (SDOH) and other data. Today, these datasets exist separately across multiple systems. Integrating them into a single, secure Unified Health Data Space (UHDS) would:

- Give providers and state leaders a clearer and more complete picture of how Vermonters use the healthcare system,
- Identify where gaps exist, and
- Identify which interventions have the greatest impact.

A combined dataset would make quality measurement and reporting more reliable and less costly. This would result in more effective care coordination and targeted investment decisions.

The UHDS offers four core benefits:

1. **Strong protections and governance**
   The UHDS would be governed by existing statutes and rules. It would operate with robust privacy and security standards. There would be strict limitations on access to sensitive information. These protections would ensure that data is used only for approved purposes. Solutions for patient privacy will include clear and transparent data governance policies, opt-out consent management for general medical information, granular opt-in consent management for 42 CFR Part 2 SUD information and other highly sensitive data types, strictly enforced role-based access to information, and comprehensive audit mechanisms for data access.

2. **Better patient outcomes**
   Providers can use linked healthcare data to offer effective preventive services to participating patients who need it to improve health outcomes and reduce avoidable future healthcare costs.

3. **Better oversight and accountability**
   A single, comprehensive dataset would allow the State to track the healthcare system more accurately and consistently. The dataset could give insight into system performance, equity, access, and cost trends.

4. **Increased efficiency and reduced provider burden**
   Providers, payers, and state programs could rely on one consolidated data infrastructure. Doing so would prevent duplicating similar efforts across multiple systems. This reduces administrative costs and manual reporting. Healthcare organizations currently combine clinical and claims data manually to report on quality measures. A linked clinical and claims dataset would save administrative time and prevent duplicative work across these organizations.

Implementation of the UHDS could be phased over time. First, the State had the Medicaid Data Warehouse and Analytics Solution (MDWAS) go live in early January 2026, including linked clinical and claims data to ensure Vermont's Medicaid program is compliant with federal interoperability requirements. Second, the State could develop a UHDS for multi-payer patient populations by incorporating Medicare claims, statewide clinical data, health-related social needs information, and other statewide non-claims datasets by 2028-2029 within the existing solution. Third, the State could scale the UHDS to incorporate commercial claims datasets by 2029-2030. A phased approach:

- Keeps costs manageable,
- Leverages existing federal funding,
- Ensures consistent alignment with Vermont's healthcare reform timeline.

This approach positions Vermont to make smarter, data-driven decisions that improve affordability, access, and outcomes for all Vermonters.

TABLE OF CONTENTS

Contents

STATUTORY PURPOSE

This report has been produced in response to the following provision of Act 68 of 2025, Section 10; 18 V.S.A. Section 9353(d)(1):

“On or before January 15, 2026, the Agency of Human Services shall report to the House Committees on Health Care and on Human Services and the Senate Committee on Health and Welfare regarding the advantages and disadvantages of integrating clinical data, claims data, data regarding social drivers of health and health-related social needs, and other data types in the UHDS; how an integrated system can improve patient and provider access to relevant information, increase efficiencies and decrease administrative burdens on providers, increase access to and quality of healthcare for Vermonters, and reduce healthcare system costs; and how an integrated system can be implemented in a manner that protects proprietary information relating to payers and providers.”

BACKGROUND AND CONTEXT

Vermont’s healthcare system is currently facing a precarious financial situation with its largest domestic insurer and a significant percentage of its hospitals and healthcare facilities facing financial challenges. Many factors have contributed to this problem including a small and rural population, an aging population, and workforce challenges that amplify the drastic increases nationwide in the cost of healthcare.

In June 2025, the Vermont Legislature passed Act 68 of 2025. The purpose of this act is to achieve transformation of and structural changes to Vermont’s healthcare system. The legislation is intended to generate improvements in health outcomes, population health, quality of care, regional access to services, and reducing disparities in access resulting from demographic factors or health status. As these improvements are underway, it is critical that data regarding how healthcare is utilized and paid for are included in outcome measures. Within the Act 68 work, the State of Vermont will be considering the advantages and disadvantages of integrating clinical data, claims data, data regarding social drivers of health and health-related social needs, and other data types in the UHDS. Key items to be covered include:

- How an integrated system can improve patient and provider access to relevant information,
- Increasing efficiencies and decreasing administrative burdens on providers,

- Increase access to and quality of healthcare for Vermonters,
- Reducing healthcare system costs;
- How an integrated system can be implemented in a manner that protects proprietary information relating to payers and providers.

These topics are also consistent with Vermont's Health Information Exchange (HIE) Strategic Plan[1], which emphasizes data utility, patient access, and integration across state platforms.

ADVANTAGES OF INTEGRATING MULTIPLE DATA TYPES IN THE UHDS

Overview of the major healthcare datasets in Vermont.

Vermont's major healthcare datasets include healthcare insurance claims, electronic health record (EHR) clinical data, social determinants of health (SDOH) information, and other data types, including administrative and survey data.

Health Insurance Claims. Health insurance claims are billing requests submitted by healthcare providers to payers, including commercial insurers, Medicare, and Medicaid. They are highly standardized and are generally based on two claim formats published by the Centers for Medicare and Medicaid Services (CMS); one for professional claims (Form CMS-1500), and one for facility claims (Form CMS-1450). They contain patient identifiers, demographic information, billing and attending provider information, diagnostic codes, service codes, and payment information, including dates, billed amounts, allowed amounts, and paid amounts. The focus of these records is on the essential information required by insurers for payments. Vermont currently collects Medicaid claims data in its Medicaid Management Information System (MMIS) and collects multi-payer claims data (including commercial insurance, Medicaid, and Medicare) in its All-Payer Claims Dataset (APCD), named the Vermont Health Care Uniform Reporting and Evaluation System (VHCURES).[2] Historically, most standardized population health measures and healthcare quality measures produced and reported by healthcare payers have been built primarily on

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[1] https://healthdata.vermont.gov/content/vermont-health-information-exchange-program

[2] Green Mountain Care Board (GMCB). "Introduction to Available Data Sources." 2020. https://gmcboard.vermont.gov/sites/gmcb/files/documents/Intro%20to%20Data%20Sources%20Final%2005.2020.pdf.

claims data, largely because of claims' standardized formats and because the data is readily available to insurers at a population level.

Clinical Data. Clinical data is information from individuals' healthcare records maintained by their healthcare providers. Its primary use is to help providers give high-quality, direct healthcare services to patients. The availability of clinical data at a mass scale for electronic processing and for population health analytics is relatively new and is largely the consequence of federal supports and incentives in the American Recovery and Reinvestment Act of 2009[3] to help healthcare providers migrate from paper medical records to Electronic Health Record (EHR) systems. Raw clinical data in EHR systems is less standardized than claims data, but all federally certified EHR systems are required to at least collect and exchange a common set of data elements from the United States Core Data for Interoperability (USCDI)[4] standard, and to calculate a minimum set of standardized electronic clinical quality measures (eCQMs)[5]. The USCDI common data elements and eCQMs overlap substantially with the content of claims data, but clinical data often contains much more detailed information about diagnoses and services, and contains healthcare measurement information that generally does not appear in claims data, including vital signs, observations, lab results, images, screening and test results, immunizations, allergies and intolerances, healthcare status, goals, treatment plans, and clinical notes. Among the more detailed service information available in clinical data is more complete information on preventive healthcare services and assessments, particularly those in primary care and prenatal care, which often get bundled together and not specified on claims for payment.

Social Determinants of Health. Social Determinants of Health (SDOH), or Social Drivers of Health (SDOH), are defined by the U.S. Centers for Disease Control and Prevention (CDC) as "non-medical factors that affect health outcomes"[6]. They include demographic, socioeconomic, geographic, and environmental factors that affect people's health. A closely related concept is Health Related Social Needs (HRSN), which the U.S. Department of Health and Human Services (HHS) defines as unmet social needs at an individual level

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[3] Centers for Medicare & Medicaid Services (CMS). "CMS Finalizes Requirements for the Medicaid Electronic Health Records (EHR) Incentive Program." 2010. https://www.cms.gov/newsroom/fact-sheets/cms-finalizes-requirements-medicaid-electronic-health-records-ehr-incentive-program.

[4] https://www.healthit.gov/isp/united-states-core-data-interoperability-uscd

[5] CMS. "Electronic Clinical Quality Measures Basics." 2024. https://www.cms.gov/medicare/regulations-guidance/promoting-interoperability-programs/electronic-clinical-quality-measures-basics.

[6] Centers for Disease Control (CDC). "Social Determinants of Health." 2024. https://www.cdc.gov/public-health-gateway/php/about/social-determinants-of-health.html.

that "have the potential to worsen health and well-being."[7] HHS makes the distinction that "Social determinants of health refer to community-level factors, while HRSN refer to individual-level factors, both of which impact an individual's health and well-being."[8] HRSN data may be considered a subset of SDOH data. HRSN data is often stored within claims data, clinical data, and administrative data related to social benefits eligibility. Within claims, HRSN summary data may be coded as a specialized subset of ICD-10 (International Classification of Diseases, 10th Revision) diagnostic codes often referred to as "Z-codes". Within clinical data, it may be coded either as summary assessments or as raw screening data (e.g., individual questionnaire responses) in SNOMED (Systematized Nomenclature of Medicine) codes, or it may appear in free text in clinical notes. A prominent, nationally standardized, screening instrument is the CMS Accountable Health Communities Health-Related Social Needs (AHC HRSN) Screening Tool[9]. OneCare Vermont and the Blueprint for Health program have collaborated to promote use of the first ten questions of this tool among their member primary care practices for the purposes of universal patient screening and referrals to assistance. A goal of the HIE is to collect and share among coordinated-care providers such screenings independently of the capability or limitations of providers' particular EHR systems. In addition to those sources, and as part of its commitment to addressing SDOH, the State of Vermont has recently contracted for use of the Deloitte PeoplePrism[10] product, which uses artificial intelligence to combine U.S. Census data with commercially available consumer and demographic data to predict the likelihood of health-related social needs and service needs by patient geography.

Other Data Types. Other major healthcare datasets in Vermont include the Vermont Uniform Hospital Discharge Data Set (VUHDDS), which is administered by the Green Mountain Care Board. VUHDDS tracks utilization of Vermont hospitals by all patients, not just Vermont residents, but it does not contain individual patient identifiers, individual provider identifiers, or service-location information below the hospital level.[11] Key public health surveys in Vermont include the Behavioral Risk Factor Surveillance System (BRFSS), Youth Risk Behavior Survey (YRBS), Pregnancy Risk Assessment Monitoring System

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[7] U.S. Department of Health and Human Services (HHS). "Addressing Health-Related Social Needs in Communities Across the Nation." 2023. https://aspe.hhs.gov/sites/default/files/documents/3e2f6140d0087435cc6832bf8cf32618/hhs-call-to-action-health-related-social-needs.pdf.

[8] HHS. "Addressing Health-Related Social Needs in Communities Across the Nation." 2023.

[9] CMS. "The Accountable Health Communities Health-Related Social Needs Screening Tool." n.d. https://www.cms.gov/priorities/innovation/files/worksheets/ahcm-screeningtool.pdf.

[10] Deloitte. "PeoplePrism." 2025. https://peopleprism.ai/.

[11] Green Mountain Care Board (GMCB). "Introduction to Available Data Sources." 2020.

(PRAMS), Adult Tobacco Survey (ATS), Household Health Insurance Survey (HHIS), and Health Care Workforce Census.[12]

Survey data can complement claim and clinical data to derive more accurate and precise insights.[13] [14] As a part of continuous quality monitoring and improvement efforts, most healthcare payer and provider networks are required to regularly collect and report information from patient satisfaction surveys, and in Vermont a commonly used instrument is the Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey,[15] administered nationwide by the Agency for Healthcare Research and Quality (AHRQ). Patient-access and system capacity is often assessed through reference to healthcare referral and wait-time data, which may be collected through a combination of administrative data and practice surveys. Given issues with patient access in recent years, an area of keen interest has been healthcare workforce data, including development of a standardized and more complete provider roster for the state. Finally, any complete look at the healthcare system needs reference to financial information, including hospital budgets, actuarial data, and similar resources.

INTEGRATION AND ITS MECHANISMS

There are multiple methods or mechanisms by which the major healthcare datasets for Vermont can be integrated with one another. The first is to make the various datasets available in a common, or unified, analytical environment or tool set. The data need not be physically located on the same server, but analysts need the ability to read, combine, transform, and generate output information from multiple sources within a single query or report, and having the datasets within a shared computing environment makes that more cost and time efficient. Second, the datasets need to have one or more common variables that can be used for matching or linking information, even if only at an aggregate level. Common elements used for linkage at the aggregate level include geography, time, and

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[12] AHS. "Population Health Surveys Data." 2025. https://www.healthvermont.gov/stats/population-health-surveys-data.

[13] Gontijo Guerra, Samantha, Djamal Berbiche, and Helen-Maria Vasiliadis. "Measuring Multimorbidity in Older Adults: Comparing Different Data Sources." *BMC Geriatrics* 19, no. 1 (2019): 166. https://doi.org/10.1186/s12877-019-1173-4.

[14] Berete, Finaba, Stefaan Demarest, Rana Charafeddine, et al. "Linking Health Survey Data with Health Insurance Data: Methodology, Challenges, Opportunities and Recommendations for Public Health Research. An Experience from the HISlink Project in Belgium." *Archives of Public Health* 81, no. 1 (2023): 198. https://doi.org/10.1186/s13690-023-01213-0.

[15] Agency for Healthcare Research and Quality (AHRQ). "Consumer Assessment of Healthcare Providers and Systems." 2025. https://www.ahrq.gov/cahps/index.html.

demographics. Finally, to link data at the level of an individual person or organization, some form of shared identifiers, or identity management, for those entities across datasets is required (e.g., to know which instances of "John Smith" or "Jack Smith" are referring to the same person).[16] For large datasets with information coming from multiple sources, that is generally accomplished using a Master Person Index (MPI) and/or a Master Organizational Index (MOI), which are essentially consolidated directories for people and organizations which generate common identifiers for use across different datasets.

USE CASES

Why go to all the trouble of integrating or linking healthcare datasets, when one could simply use each in isolation, as has been done in the past? There are multiple applications, or use cases, for integrated healthcare datasets. Use cases for linking multiple healthcare data types, especially claims and clinical data, are similar to those for health information exchange in Vermont generally[17]:

- Create one Health Record for Every Person
  - Support optimal care delivery and coordination by ensuring access to complete and accurate health records.
    - This is enabled by an effective MPI, provider portal, and patient-access Application Programming Interfaces (APIs).
- Improve Healthcare Operations
  - Enrich healthcare operations through data collection and analysis to support quality improvement and reporting.
- Use Data to Enable Investment and Policy Decisions (Population Health)
  - Bolster the health system's ability to learn and improve by using accurate, comprehensive data to guide investment of time, labor and capital, and inform policy making and program development.

A few specific use case examples are provided in the following table:

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[16] Padmanabhan, Shivani, Lucy Carty, Ellen Cameron, Rebecca E. Ghosh, Rachael Williams, and Helen Strongman. "Approach to Record Linkage of Primary Care Data from Clinical Practice Research Datalink to Other Health-Related Patient Data: Overview and Implications." *European Journal of Epidemiology* 34, no. 1 (2019): 91–99. https://doi.org/10.1007/s10654-018-0442-4.

[17] Vermont Agency of Human Services (AHS). "Vermont Health Information Exchange Use Case Scenarios." 2025. . Additional and more detailed use cases for linked claims and clinical information are presented in the following file: "VHIE Claims Pilot - Use Cases Consolidated.xlsx" at https://healthdata.vermont.gov/sites/healthdata/files/documents/VHIE%20Claims%20Pilot%20-%20Use%20Cases%20Consolidated_Copy.xlsx

Use Case Examples & Potential Impact

Use Case	**Data Source(s)**	**Impact**
Hospital transformation evaluation	Clinical + Claims + SDOH	Monitor hospital cost and performance outcomes
AHEAD Model Reporting	Clinical + Claims + SDOH + Other	Meet AHEAD model reporting requirements and support value-based payments
Health access dashboards	Clinical + Census + SDOH	Identify gaps in care
Opioid and housing risk stratification	Clinical + Claims + SDOH + stratification tool	Enable proactive interventions
Health workforce planning	Clinical + Claims + Vermont Department of Health (VDH) Census + VDH licensing + Office of Professional Regulation (OPR) licensing	Inform network adequacy and strategic alignment
Blueprint analysis	Clinical + Claims + SDOH + Other	Preventive care, care coordination, quality measurement (esp. hybrid HEDIS measures), quality improvement initiatives, quality performance payments, and annual outcomes reporting at the statewide, hospital-service-area and practice levels.

Generally, claims data are useful for measuring diagnoses and service utilization that are payment-relevant (e.g., ICD-10 diagnostic codes, types of services received, billing codes). Clinical data captures direct and more detailed health outcomes (e.g., detailed diagnostic information, observations, vital signs, lab results, screenings, and test results). SDOH data provide information on risk factors for service needs and costs. Other datasets, such as those described earlier, provide further information about patient needs, service capacity, and patient satisfaction. Combined, these datasets provide a more complete picture of healthcare and patient outcomes in Vermont.

IMPROVING PATIENT AND PROVIDER ACCESS TO RELEAVANT INFORMATION

Integrated, or linked, healthcare datasets can provide more information for more people by improving both patient and provider access to relevant information. A more complete, unified health record for a given patient from a single aggregation source facilitates access, as does the ability to aggregate similar unified data at the levels of a practice, provider-network, hospital-service-area, and state for context and comparison. Relatively fixed aggregate reports and interactive dashboards (with pre-configured limitations on minimum sample size and cell size), such as those on health system performance, Vermont population health, and healthcare quality measures, can be delivered through public web resources. More dynamic, detailed, and flexible interactive reports and dashboards can be delivered through a secure web portal with user role-based data-access controls, to ensure that users only view the data for which they are authorized. Finally, and perhaps most importantly, having linked, identified, healthcare datasets would allow healthcare providers to drill-down from aggregate, hybrid, healthcare utilization and quality measures to not only their own practice level but also to the specific patients in their care who are identified by the measure as needing further intervention or more coordinated care. In contrast to aggregate or de-identified data, linked, identified patient data is far more actionable for both healthcare providers and their patients, particularly when they can access it in consolidated form from a single source. Such a single, consolidated source could be in the form of a secure web portal or an application programming interface (API) which would securely feed data to a user's own EHR system interface or application on the user's phone, for example.

INCREASING EFFICIENCIES AND DECREASING ADMINISTRATIVE BURDEN ON PROVIDERS

Integrated healthcare datasets can increase efficiencies and decrease administrative burdens for providers in several ways. First, the substantial tasks of statewide data collection, aggregation, identity management, and data linkage could be centralized, reducing the need for duplicated effort and investments on the parts of healthcare stakeholders, particularly for providers who need access to patient information beyond what they generate or already have stored in their own EHR system. Second, more users could share a statewide analytics and reporting platform, reducing the need for duplicated infrastructure development, maintenance, and licensing for business intelligence, population health analytics, quality measurement, and reporting tools. Third, having consolidated information available from a single source in a common toolset would enable simplified, faster, and lower-cost information retrieval as the data can be restructured to optimize (speed up) such retrieval. Having linked claims and clinical information in the same system would reduce the need for manual chart abstraction (i.e., manual extraction of clinical information from EHR records) for the purposes of calculating and reporting standardized healthcare quality measures that are hybrid; requiring data from both claims and clinical records. By minimizing manual abstraction, the task is more time and cost efficient, much larger patient sample sizes can be used for greater reliability of results, and the opportunities for manual data errors are reduced. Finally, having more data in one place could offer the possibility of reducing duplicated reporting burden across providers, such as when an individual provider, a practice, a practice parent organization, and a provider network all need to calculate and report healthcare quality measures or outcomes separately for various subsets of the same patient population, or to minimize duplicate data-entry into multiple systems, such as the provider's own EHR plus reporting tools or systems for various payers, including that of an Accountable Care Organization (ACO). A more efficient approach would be to have the data in one source and have a single report developed with optional drilldowns for various patient sub-populations.

INCREASING ACCESS TO AND QUALITY OF HEALTHCARE FOR ALL VERMONTERS

Increasing access to healthcare, and increasing the quality of healthcare, are important components for ensuring that Vermonters can get the care they need, with the best outcomes, at the lowest cost. Access and quality are both key components of major healthcare reform efforts in Vermont, including primary care expansion and hospital global budget initiatives.

Measures and Indicators

Patient access. Patient access to healthcare can be assessed by combining information from several of the data sources mentioned earlier in this report. The CAHPS patient-satisfaction survey asks specifically about access and wait-times during business hours, evenings, and weekends. Surveys of healthcare practices and EHR administrative data can provide information from the provider side on the duration of next-available-appointment scheduling, referral response times, and other wait-time data. Finally, provider roster information and hospital bed data can give information on system capacity more generally.

Quality. Most healthcare providers and most healthcare payers are required to regularly report on a set of standardized healthcare quality measures for their patient or member populations. Many of those quality measures are based on Healthcare Effectiveness Data and Information Set (HEDIS) measures developed and published by the National Committee for Quality Assurance (NCQA) or are measures developed and published by the Centers for Medicare and Medicaid Services (CMS).

A critical subset of those standardized measures is referred to as "hybrid" measures because they require the combination of healthcare claims and clinical data; generally, to obtain information about healthcare coverage and diagnoses from claims data and information about vital signs, health observations, test results, or lab results from clinical data. Those hybrid measures combine the greater standardization of eligibility, diagnostic, and service information found in healthcare claims with the more specific healthcare metrics information in clinical data. CMS has identified a core set of high-priority quality measures to be used across its programs, which it refers to as "Universal Foundation" measures[18], of which the following are hybrid measures which also have been identified as high-priority by Vermont stakeholders:

- Percent of patients with hypertension and blood pressure in control (CMS 167, HEDIS CBP, NQF 0018).
- Percent of patients with diabetes and hemoglobin (Hb) A1c in poor control (CMS 204, HEDIS DPC, NQF 0059)
- Percentages of patients with screening for clinical depression and a follow-up plan (CMS 672, HEDIS CDF, NQF 04189/0418e).

In the absence of an integrated dataset of electronic claims and clinical data, provider groups and payers must resort to manual chart abstraction to obtain the clinical values (e.g., blood pressure measurements, HbA1c test results, depression screening and follow-up information) from clinical records for such hybrid measures. Manual chart abstraction can be comparatively slow and costly, and as a result, it is often done only for limited patient samples (e.g., approximately 400 individuals) rather than full patient populations. Having integrated electronic claims and clinical data allows for greater time and cost efficiencies, enabling larger sample sizes and greater reliability and generalizability of results, and more options for subgroup analyses. If the integrated data were to consist of identified patient records, it would allow providers to drill-down from aggregate results to

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[18] CMS. "The Universal Foundation." 2025. https://www.cms.gov/medicare/quality/cms-national-quality-strategy/universal-foundation.

specific patient panels and specific individuals in need of additional intervention or care coordination.

Integrated data would also provide a fuller picture of information about patients to support healthcare quality improvement initiatives implemented by providers. Devoe et al. (2019) for example find that half of Medicaid members' cholesterol, diabetes, and kidney screenings as well as influenza vaccinations are documented in clinical data but not in claims data—an omission that was more likely among older members, men, and those who had gaps in their insurance coverage.[19] An integrated dataset containing claims and clinical data would facilitate validation checks among measures generated from each source and further support data and care quality within the healthcare system.

Improved Care Coordination

Integrated data would also facilitate care coordination across providers and programs by providing a more complete, consolidated, and longitudinal record of diagnoses, care plans, treatment providers, clinical interventions, insurer and out-of-pocket costs, and the net value of care as it relates to patient outcomes. Such consolidated information can be of great use for care coordination teams, such as those supported by the Blueprint for Health program (regional "Community Health Teams"), the Vermont Chronic Care Initiative (VCCI), and accountable care organizations (ACOs).

Take the example of medications: both clinical and claims data may include aligned insights on the formula and dosage of prescriptions and the diagnoses behind them, but cost insights are only available in claims while adherence to prescriptions and the broader context of patient health and circumstances are only available in clinical data. Also, when linked to clinical data in a provider web portal, prescription claims data for a given patient can be used for medication reconciliation, to help providers understand and coordinate the medicines a patient is taking across all their providers and reduce the chances of dangerous drug interactions. Similarly, comprehensive and consolidated immunization records can be used by providers and care-coordination teams for targeted outreach to improve immunization rates.

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[19] DeVoe, J. E., R. Gold, P. McIntire, J. Puro, S. Chauvie, and C. A. Gallia. "Electronic Health Records vs Medicaid Claims: Completeness of Diabetes Preventive Care Data in Community Health Centers." *The Annals of Family Medicine* 9, no. 4 (2011): 351–58. https://doi.org/10.1370/afm.1279.

Financial Incentives for Quality

Once a statewide representative dataset of linked claims, clinical, and other healthcare data has been established, and hybrid metrics (or alternatively, pooled eCQMs) can be calculated for identifiable patient populations, those metrics can be used not only to inform higher quality, coordinated care, but also to incentivize it financially. For more than a decade, the Blueprint for Health program has directed and facilitated capitated, value-based incentive payments[20] of up to $0.25 per member per month from insurers to participating primary care providers in Vermont based on regional (hospital service area) performance on quality measures, two of which are hybrid claims/clinical measures from the CMS Universal Foundation measure set:

- Percent of patients with hypertension and blood pressure in control (CMS 167, HEDIS CBP, NQF 0018).
- Percent of patients with diabetes and hemoglobin (Hb) A1c in poor control (CMS 204, HEDIS DPC, NQF 0059)

Similarly, Vermont's ACO, OneCare Vermont, has distributed quality-based shared savings incentive payments to its participating providers for the above two measures plus the following additional CMS Universal Foundation hybrid measure[21]:

- Percentages of patients with screening for clinical depression and a follow-up plan (CMS 672, HEDIS CDF, NQF 04189/0418e).

To the extent that such measures could be calculated from a common, integrated healthcare dataset for Vermont, the process would be more cost efficient than the current practice of building multiple, single purpose, linked datasets for each analysis. To the extent the linked datasets are connected to identified patient records, providers could drill-down from their population-based, payment-related metrics to see the specific patient cases that might benefit from quality improvement interventions, enabling them to close any performance gaps for hospitals and/or primary care providers. In this way, data collection, measurement, incentive payments, and coordinated care could all be aligned to support higher-quality healthcare.

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[20] AHS. "Blueprint for Health: 2025 Performance Payment Profiles." 2025. https://blueprintforhealth.vermont.gov/payment-profile.

[21] OneCare Vermont. "Quality Performance." 2025. https://www.onecarevt.org/quality-performance/.

REDUCING HEALTHCARE SYSTEM COSTS

An integrated, whole-population, and identified dataset of clinical, claims, SDOH, and other data types in a UHDS could reduce healthcare system costs by providing more comprehensive patient data to providers more cost effectively. For all the reasons described above, more comprehensive and accessible patient data would support better and more targeted preventive care. Such a system would enable the healthcare community to identify and reduce low-value or unnecessary care. A UHDS would also streamline analytic work by replacing today's fragmented, single-purpose datasets with one cohesive environment for analysis (e.g., for calculating hybrid HEDIS measures for various patient populations). In short, a UHDS that aligns clinical, claims, SDOH and other data at the individual level over time would bolster efforts to maximize healthcare outcomes at the lowest cost possible.

Clinical-claims integration facilitates the creation of longitudinal data, which observes individuals or institutions over time, and can be used to tailor interventions at multiple scales: patient, provider, region, and state. Such data are integral to value-based care as one can neither glean clinical insights or SDOH from claims data, nor derive the cost of care across multiple sites from clinical data. Longitudinal data can also identify which high-cost treatments have not worked or been adhered to at rates required to justify their costs and allow stakeholders to identify alternatives with greater promise.

Predictive analytics, or the use of historical and real-time data to forecast future health outcomes and optimize health care interventions, also benefit from clinical-claims integration. Kharrazi et al. (2017) argue that predictive analytics become more precise when clinical and claims data are paired; for example, clinical data identify an additional 11.6% of patients with diabetes than claims alone.[22] Kharrat et al. (2024) employ artificial intelligence across multiple databases to identify the parameters and attributes that are significantly associated with the risk of suicide at a population and individual level, e.g., personal mental health utilization, social deprivation, rurality, and regional spending on

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[22] Kharrazi, Hadi, Winnie Chi, Hsien-Yen Chang, et al. "Comparing Population-Based Risk-Stratification Model Performance Using Demographic, Diagnosis and Medication Data Extracted From Outpatient Electronic Health Records Versus Administrative Claims." *Medical Care* 55, no. 8 (2017): 789–96. https://doi.org/10.1097/MLR.0000000000000754.

mental health interventions.[23] Similar approaches have been undertaken to predict those at risk for substance use disorder and associated non-fatal and fatal overdoses.[24] [25]

Such information can be used to adjust risk stratification models that are integral to value-based care as well as conduct outreach and deliver targeted interventions to high-risk, high-cost patients prior to the emergence of higher-acuity interventions. Clinical-claims integration would further facilitate the identification of those at-risk for chronic conditions or poor management of existing chronic conditions by aggregating disparate data on lab values, diagnoses, procedural interventions, prescription adherence, and social determinants of health.

Longitudinal and predictive analytics would enable human service stakeholders to undertake value-based care and systemic transformation with greater precision. Shared savings and global budget models, for example, could leverage adherence, readmission, and cost measures across multiple sources to systemically identify policy and regulatory interventions. Aligning cost and utilization data from claims with clinical outcome data can be used to better calculate total cost of care, a measure that currently relies on many proxies and estimates in lieu of direct data and then project the impact of potential interventions on patient outcomes and provider behavior, and thus total cost of care, into the future. Validation checks can be undertaken with more rigor in circumstances where claims data becomes less complete, for example, as the share of commercial data that gets shared with the state declines as adoption of Marketplace plans falls. Finally, healthcare regionalization and care transformation more broadly would benefit from cost and clinical outcome comparisons that could be used to ensure that decisions taken are accurate, evidence-based, efficient, and equitable.

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[23] Kharrat, Fatemeh Gholi Zadeh, Christian Gagne, Alain Lesage, et al. "Explainable Artificial Intelligence Models for Predicting Risk of Suicide Using Health Administrative Data in Quebec." *PLOS ONE* 19, no. 4 (2024): e0301117. https://doi.org/10.1371/journal.pone.0301117.

[24] The Ontario Drug Policy Research Network and Ontario Public Health. Healthcare Utilization and Clinical Comorbidities among People Who Died of a Substance-Related Toxicity Death in Ontario. Ontario Drug Policy Research Network, 2025. https://doi.org/10.31027/ODPRN.2025.01.

[25] Zedler, Barbara K, William B Saunders, Andrew R Joyce, Catherine C Vick, and E Lenn Murrelle. "Validation of a Screening Risk Index for Serious Prescription Opioid-Induced Respiratory Depression or Overdose in a US Commercial Health Plan Claims Database." *Pain Medicine* 19, no. 1 (2018): 68–78. https://doi.org/10.1093/pm/pnx009.

DISADVANTAGES, DATA PROTECTIONS, AND SOLUTIONS FOR INTEGRATION

The primary disadvantages, or risks, for integrating healthcare data in Vermont are similar to those for any large repository of sensitive data, and generally relate to data security, data privacy, and investment costs for infrastructure and data-aggregation services. We will review these issues individually with anticipated solutions.

Data Security

A UHDS in Vermont will need to meet rigorous federal and State requirements for the security of sensitive healthcare data, similar to those currently applied to other statewide healthcare datasets in Vermont, including VHCURES, MDWAS and the VHIE. The Vermont Health Care Uniform Reporting and Evaluation System (VHCURES) is compliant with federal Health Insurance Portability and Accountability Act (HIPAA) rules and National Institute of Standards and Technology (NIST) security guidance, and it holds both Health Information Trust Alliance (HITRUST) and Service Organization Controls 3 (SOC 3) certifications, while also operating under state laws like the Security Breach Notice Act. The Medicaid Data Warehouse and Analytics Solution (MDWAS) is currently Minimum Acceptable Risk Standards for Exchanges (MARS-E) compliant and is moving to the Acceptable Risk Controls for Affordable Care Act, Medicaid, and Partner Entities (ARC-AMPE) framework, which is replacing MARS-E. Similarly, the Vermont Health Information Exchange (VHIE), operated by VITL, complies with HIPAA and the comprehensive NIST 800-53 framework. It also functions in accordance with Vermont's laws on medical record confidentiality and provides patients with an "opt-out" choice. VHCURES data is person-identified in the technical back end, but deidentified for end-users, while VHIE data is fully identified throughout. The UHDS will be an identified dataset.

Data Privacy for Patients

For patients, healthcare data privacy will be critical, and risks of unauthorized data disclosures from such a comprehensive dataset will need to be addressed. In particular, the inclusion of sensitive SDOH and mental health and/or substance use disorder (SUD) information raises the privacy needs given the potential patient trust issues involved. Solutions for patient privacy will include clear and transparent data governance policies, opt-out consent management for general medical information, granular opt-in consent management for 42 CFR Part 2 SUD information and other highly sensitive data types, strictly enforced role-based access to information, and comprehensive audit mechanisms for data access. For public aggregate reports based on UHDS data, this will require withholding statistics for small sample sizes of patients where reidentification is a risk, consistent with cell-size suppression policies of the State of Vermont and the federal Centers for Medicare and Medicaid (CMS).

Protecting Proprietary Information Relating to Payers and Providers

For healthcare providers and payers, there is an additional concern of protecting proprietary and competitive business information. One solution is that provider and payer access to information can be limited based on their patient/member populations using role-based access to data. Another solution is that for certain datasets, the allowed and payment amounts of healthcare claims can be converted into price-standardized healthcare utilization units, such HealthPartners' Total Cost of Care (TCOC) Resource Use Index (RUI) units[26], which have been used successfully in Vermont for analytics and payment incentives by the Blueprint for Health program. It is important to note that neither option would place an administrative burden on providers, solutions would be deployed by the State and be made available to providers and payers.

Costs: Infrastructure and Licensing

The goal of developing an integrated healthcare dataset of claims, clinical, SDOH, and other data would be to achieve a net savings in return-on-investment for the Vermont healthcare system. In the short term, savings would be sought in reduced administrative costs and greater efficiencies by reducing the need for manual chart reviews, reducing duplicative efforts in developing single purpose, linked datasets for particular patient sub-populations and particular reporting requirements, and through shared hosting, processing, and analytics infrastructures. Longer-term, savings would be sought through improvements in preventive care, increased healthcare quality, and reduced overall healthcare expenditures. Additional investments required to move from the current state of multiple, isolated healthcare datasets to an integrated one would be minimized by primarily using existing data infrastructures being developed under Vermont's Medicaid

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[26] HealthPartners. "Total Cost of Care." 2025. https://www.healthpartners.com/about/improving-healthcare/tcoc/.

Data Warehouse & Analytics Solution (MDWAS)[27] and under the Vermont Health Information Exchange (VHIE)[28]. Costs will be minimized through technology reuse, shared infrastructure, efficiencies of consolidation and scale, and maximizing use of federal funding opportunities. AHS will collaborate with payers to utilize already collected claims data submitted to VHCURES to support the UHDS.

IMPLEMENTATION FRAMEWORK

An integrated healthcare data system would be implemented in phases and would use the following mechanisms to protect the interests of Vermonters: a clear and effective data-governance and consent-management structure, a flexible technical infrastructure with robust security protections, implementation of relevant legal and ethical safeguards, and extensive stakeholder engagement.

- Phased Integration Plan
    - Begin with Medicaid claims and clinical data (through MDWAS), scale to Medicare population to meet the State's Achieving Healthcare Efficiency through Accountable Design (AHEAD) model requirements, then commercial claims and SDOH and HRSN based on approved use cases in alignment with Act 68 requirements.
- Governance & Consent Structure
    - Use HIE Steering Committee and domain teams to:
        - Approve integration uses (Act 68 §10(b)(4))
        - Enforce use limitations and opt-out protocols
        - Align with VHCURES statutory restrictions
- Legal and Ethical Safeguards
    - Full compliance with Health Insurance Portability and Accountability Act (HIPAA), 42 Code of Federal Regulations Part 2, and Vermont-specific privacy standards.
    - All linkage subject to documented governance approvals per statute.
- Stakeholder Engagement
    - Engage payers, patients, hospitals, Federally Qualified Health Centers (FQHCs), Blueprint providers, and healthcare advocates in design and oversight.

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[27] AHS. "Welcome to MDWAS!" 2025. https://dvha.vermont.gov/initiatives/mdwas

[28] VITL. "About VITL." 2025. https://vitl.net/about-vitl/.

PERFORMANCE MONITORING AND EVALUATION

To establish and maintain quality and performance, the UHDS will need performance monitoring and evaluation metrics, and we propose the following ones, to be reported at least annually in the HIT Strategic Plan which will be posted on a related AHS website:

- Technical Key Performance Indicators (KPIs)
  - Match rates
  - Data quality scores
  - Latency
  - Access time
- Policy KPIs
  - Number of approved use cases
  - User satisfaction (e.g., provider & public health users)
  - Reduction in redundant data pulls
- Outcome KPIs
  - Decreased provider reporting burden
  - Increased care coordination across settings
  - Healthcare access indicators stratified by geography and social risk

All metrics will be aligned with the VHIE's Outcome-Based Certification (OBC) metrics, GMCB's Scorecard, the HIE Strategic Plan and VDH's Strategic plan.

RECOMMENDATIONS AND NEXT STEPS

- AHS began a rolling go-live with linked claims, clinical, and SDOH data for the Medicaid population in the MDWAS system in November 2025, with full functionality scheduled to be live by the end of January 2026, and users are being added to the solution. This can serve as a pilot for a UHDS for multi-payer patient populations.
- Develop a UHDS for multi-payer patient populations by incorporating Medicare claims, statewide clinical data, and other statewide non-claims datasets by 2028-2029.
- Scale UHDS to incorporate commercial claims datasets by 2029-2030.