FINAL REPORT

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Consulting for Vermont's Social Determinants of Health (SDoH) Roadmap

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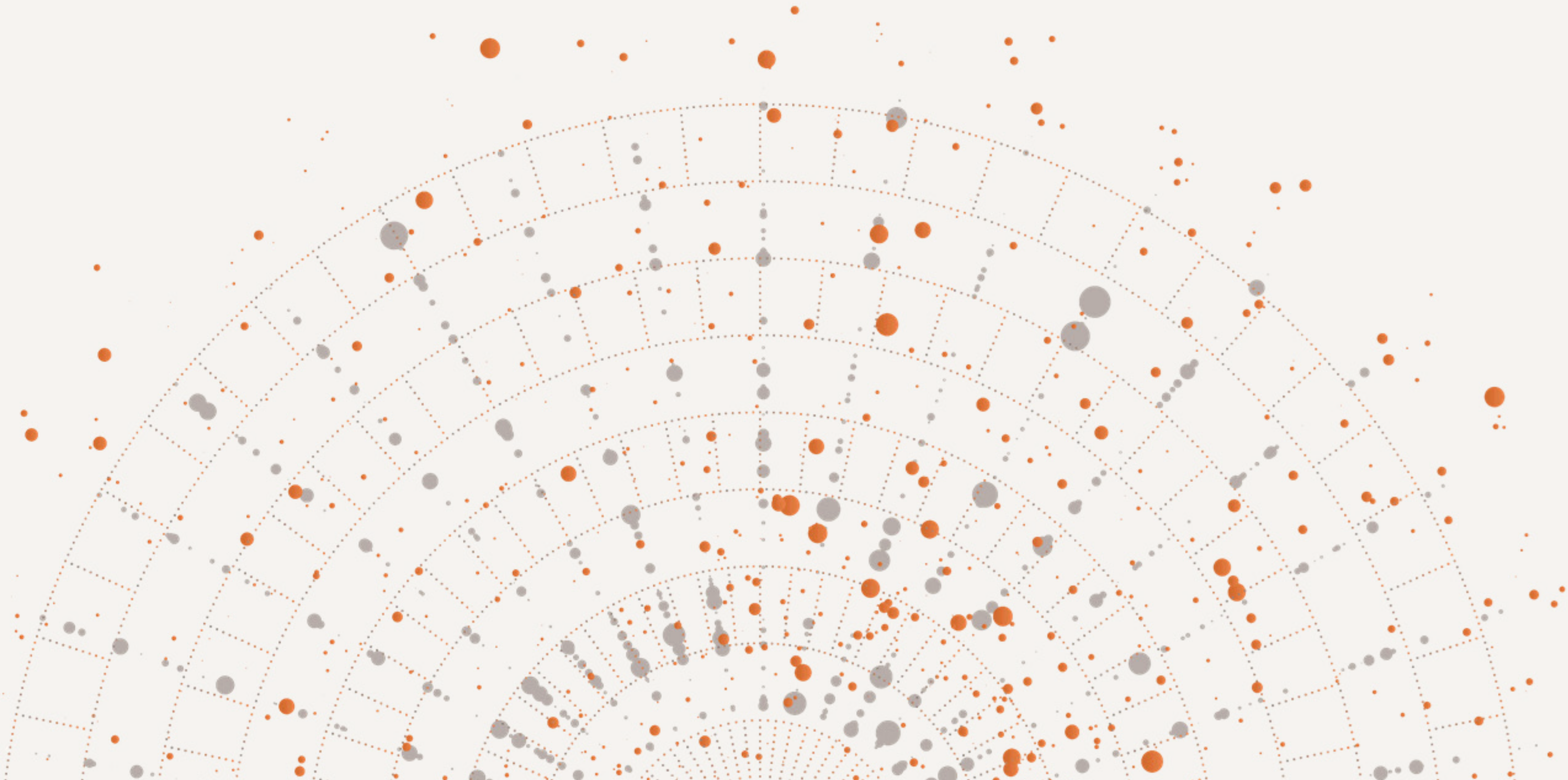

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List of Exhibits

AAFP	American Academy of Family Physicians
ACO	Accountable Care Organizations
ACORN	Assessing Circumstances and Offering Resources for Needs
ACS	American Community Survey
AHA	American Hospital Association
AHC	Accountable Health Communities
AHEAD	All-Payer Health Equity Approaches and Development
AHIMA	American Health Information Management Association
AHRQ	Agency for Healthcare Research and Quality
AHS	Agency of Human Services
AISP	Action Intelligence for Social Policy
AOT	Agency of Transportation
ASSIST	Alcohol, Smoking and Substance Involvement Screening Test
BRFSS	Behavioral Risk Factor Surveillance System
BRIC	Baseline Resilience Indicators for Communities
CBEL	Community, Business, and Education Leaders
CBO	Community-based organizations
CCO	Coordinated care organization
CDC	Centers for Disease Control and Prevention
CHNA	Community health needs assessments
CHR&R	County Health Rankings & Roadmaps
CHW	Community health workers
CIE	Community information exchange
CMMI	Center for Medicare and Medicaid Innovation
CMS	Centers for Medicare & Medicaid Services
CRI	Community Resilience Index
CRISP	Chesapeake Regional Information System for our Patients

DA	Designated Agencies
DHCS	Department of Health Care Services
DHIN	Delaware’s Health Information Network
DHS	Department of Human Services
DVHA	Department of Vermont Health Access
ED	Emergency department
EHR	Electronic health record
EPA	Environmental Protection Agency
EPHT	Environmental Public Health Tracking
EPHTN	Environmental Public Health Tracking Network
FAQ	Frequently asked questions
FERPA	Federal Education Rights and Privacy Act
FHIR	Fast Healthcare Interoperability Resources
FQHC	Federally-Qualified Health Centers
GA	General Assessment
HCBS	Home- and community-based services
HCPCS	Healthcare Common Procedure Coding System
HDU	Health data utility
HEDIS	Healthcare Effectiveness Data and Information Set
HIE	Health information exchange
HIPAA	Health Insurance Portability and Accountability Act
HRSN	Health-related social needs
ICD	International Classification of Diseases, Tenth Revision, Clinical Modification
ICS	Integrated Client Services
IG	Implementation Guide
ILOS	In Lieu of Services
INPH	Indiana Network for Population Health
IPV	Intimate partner violence

IT	Information technology
KPI	Key performance indicators
LGBTQ	Lesbian, Gay, Bisexual, and Transgender
LMS	Learning Management System
LOE	Level of effort
LOINC	Logical Observation Identifiers and Codes
MDAAP	Medicaid Data Aggregation and Access Program
MDHHS	Michigan Department of Health and Human Services
MMIS	Medicaid Management Information Systems
MPI	Master Person Index
MVI	Municipal Climate Change Vulnerability Indicators
NACHC	National Association for Community Health Centers
NCDHHS	North Carolina’s Department of Health and Human Services
NLP	Natural language processing
NQF	National Quality Forum
NTM	New to Medicaid
OeHI	Office of eHealth Innovation
OHA	Oregon Health Authority
OKSHINE	Oklahoma State Health Information Network Exchange
OPIP	Oregon Pediatric Improvement Partnership
PCCI	Parkland Center for Clinical Innovation
PGIP	Physician Group Incentive Program
PHI	Personal health information
PII	Personally identifiable information
PLACES	Population Level Analysis and Community Estimates
PRAPARE	Protocol for Responding to and Assessing Patient Assets, Risks, and Experiences
QC	Quality control
QI	Quality improvement

RHI	Rural Health Information
ROI	Return on investment
RWJF	Robert Wood Johnson Foundation
SBIRT	Screening, Brief Intervention, and Referral to Treatment
SDHCQC	San Diego Healthcare Quality Collaborative
SDoH	Social Determinants of Health
SES	Socioeconomic status
SHIE	Social Health Information Exchange
SNF	Skilled nursing facility
SUD	Substance use disorder
TA	Technical assistance
UDS	Uniform Data System
UHDS	Unified Health Data Space
USCDI	United States Core Data for Interoperability
VBC	Value-based care
VBP	Value-based payment
VDH	Vermont Department of Health
VITL	Vermont Information Technology Leaders
VHIE	Vermont Health Information Exchange
VPTA	Vermont Public Transportation Association
WHO	World Health Organization
WPC	Whole person care

Executive Summary

Background

Social determinants of health (SDoH)[1] are one of the three priority areas for Healthy People 2030. Healthy People 2030 defines SDoH as “the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks” (Office of Disease Prevention and Health Promotion [ODPHP], n.d.). The changing sociodemographics and SDoH in Vermont highlight the importance of understanding Vermonters’ health-related social needs (HRSN)—or the individual-level social and economic needs that affect one’s ability to maintain health and well-being, often because of SDoH. This understanding is essential to ensure the Vermont Agency of Human Services (AHS, hereafter referred to as “the State”) can collect accurate, high-quality, secure, and purposeful data on these issues and ultimately wield them to effect change (Centers for Medicare & Medicaid Services [CMS], 2024). **Exhibit E1** shows Healthy People 2030’s five SDoH domains and examples of HRSN.

Exhibit E1: Healthy People 2030 SDoH Domains and HRSN Examples

Examples of HRSN:

- Financial instability
- Food insecurity
- Lack of access to affordable and stable housing and utilities
- Lack of access to health care
- Transportation insecurity

Data support the development of initiatives and interventions to address individuals’ HRSN and ultimately reduce health inequities. Vermont has several sources of SDoH and HRSN data available. However, compliance with federal and state privacy laws, capacity of technological infrastructure, workforce readiness and training, lack of standardization, and other factors pose challenges for

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[1] “Social determinants of health” and “social drivers of health” are often used interchangeably, but some organizations prefer “drivers” as a means of indicating that the factors that influence health outcomes are not static or predetermined and can be improved with intervention. We acknowledge this distinction; however, in this report, we use “determinants” to align with the language used by Healthy People 2030.

successful SDoH data integration, exchange, and use. SDoH data exchange requires time and investments to build trust and align partners, design data governance structures, ensure compliance with privacy, security, and consent requirements, and develop technical infrastructure for data exchange. The SDoH data landscape also continues to evolve with new efforts to standardize data, fill data gaps, and promote interoperability, with critical advancements led by experts from organizations such as Health Level Seven International (HL7) (the creator of the Fast Healthcare Interoperability Resources [FHIR] standards), the Gravity Project, the Office of the Assistant Secretary for Technology and Policy/Office of the National Coordinator for Health Information Technology (ASTP/ONC), and others (EMI Advisors, 2023).

Health information exchanges (HIE) expand capacity to collect, store, standardize, and use SDoH data across organizations, enhancing interoperability and providing a technical infrastructure, analytics, and privacy assurances. States across the nation use SDoH data in their HIEs to inform whole person healthcare delivery in diverse and innovative ways, creating learning opportunities by sharing their approaches to integration, challenges encountered, lessons learned, and successes (Bazzoli, 2023). The State's HIE Strategic Plan (2023-2027) offers a vision of statewide exchange of clinical, claims, behavioral health, and SDoH data within a Unified Health Data Space (UHDS) (AHS, 2024).

The UHDS has four main objectives:

1. Create one whole person health record for every Vermonter with current, accurate, and comprehensive information accessible to both patients and providers.
2. Improve health outcomes of Vermonters by promoting health and well-being within communities.
3. Leverage data collection, aggregation, analysis, and reporting to improve healthcare operations and quality.
4. Use data to guide Vermont decisions related to resource allocation and funding, policy, and programming.

As part of the State's health data strategy, the State contracted with NORC at the University of Chicago (NORC) to develop a multi-year roadmap on how to collect, standardize, analyze, and use SDoH within the UHDS to inform policy, care coordination, and risk stratification.

The roadmap is organized into four different chapters (see **Exhibit E2**). Each chapter builds on one another to provide a comprehensive path forward for the State. Findings and recommendations are organized by the ASTP/ONC 11 foundational elements[2] of SDoH information exchange for ease of interpretation.

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[2] Community Readiness and Stewardship; Mission and Purpose; Values and Principles; Policy; Legal; Measurement and Evaluation; Financing; Implementation Services; Technical Infrastructure and Data Standards; User Support and Learning Network; and Governance.

Exhibit E2: Vermont SDoH Roadmap Contents

Chapter 1: Landscape Survey and Needs Assessment	• Overview of Vermont Landscape • Methods • Current SDoH Data Landscape • Best Practices and Implementation Strategies • SDoH Data Source Review
Chapter 2: Implementation Strategy	• Overview • Recommendations for SDoH Data Efforts
Chapter 3: Training and Education Plan	• Overview • Assess • Prepare • Provide • Conclusion and Next Steps
Chapter 4: Change Management Strategy	• Overview • Initial Stage: Creating a Climate for Change • Preparation Stage: Engaging & Enabling Stakeholders • Implementation Stage: Implementing & Sustaining Change • Institutionalizing Change & for Long-Term Sustainability
Appendices	1. Methods 2. EHR Data Extraction 3. VHIE Metrics 4. Example Technical Assistance 5. State Comparison 6. Resources 7. SDoH Data Inventory 8. Ineligible Sources 9. Data Summary

Chapter 1: Landscape Survey and Needs Assessment

Chapter 1 uses a multi-tiered research approach to understand the current SDoH data landscape, best practices and implementation strategies, and available data sources based on:

1. Focused engagement (via convenings and group interviews) of Vermont stakeholders about their SDoH efforts and needs
2. Discussions with representatives from Maryland, Michigan, and Oregon who participated in efforts to integrate SDoH data into their states' HIEs
3. A landscape survey and needs assessment comprised of a scoping review of peer-reviewed and gray literature, technical documentation, data portals, and other materials on current and potential UHDS data inputs
4. A review and prioritization of SDoH data sources for potential integration into the UHDS

The crux of Chapter 1 is the document and data source review. However, findings from the focused engagement and discussions with other states are woven throughout for context. **Exhibit E3** and **Exhibit E4** summarize key findings from the landscape survey and needs assessment.

Exhibit E3: Chapter 1 Key Findings: Current SDoH Data Landscape

Current SDoH Data Landscape

There are **multi-faceted** and **complicated challenges at every step** of SDoH data integration - but research and lessons learned from other states' efforts suggest **mitigation strategies** for most.

Common challenges in defining, collecting, integrating, sharing, and using SDoH data include:

- Lack of universal and well-established terminology and data standards
- Barriers to interoperability due to disparate data-sharing policies and technical infrastructure
- Resource strain, time burden, and limitations in workforce capacity and expertise
- Provider perceptions of priority and/or lack of incentives for SDoH screening
- No clear method to prioritize which SDoH should be tackled first and how
- Insufficient evidence or direction for using SDoH data to address HRSN

Data sharing **across healthcare and social service sectors** can be complex to navigate due to **interoperability barriers** across disparate data systems and **patient privacy concerns.**

While some best practices are emerging, there is **no consensus on which SDoH measures to use** and how to screen for SDoH. SDoH data are collected via **three common methods**:

- **Patient-reported data,** often collected via SDoH screening tools, are the best method for assessing HRSN but are more burdensome and time-intensive for patients and providers.
- **Provider-reported data** on patient social needs are entered in an electronic health record (EHR) as International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes or unstructured notes. The quality of these data often depends on the provider. SDoH data in EHRs may require technical data extraction to be useful.
- **Community-level secondary data** are linked to patient data via geography (e.g., ZIP code) as a proxy for neighborhood-level measures. These data are diverse, high-quality, and widely available but not as accurate or actionable as individual-level data.

There are **three common types of SDoH data sources**:

- **Patient-level healthcare data** (usually in EHRs) are well-established, comprehensive, and actionable and can be securely exchanged with other healthcare providers. However, SDoH data collection may not be feasible due to patient/provider burden. SDoH data in EHRs often lack standardization and structure. These data may also omit key segments of the population – people who forgo healthcare and therefore are not assessed.
- **Individual-level social services data** can be used to make inferences about HRSN without added patient/provider burden but are typically collected in disparate data systems and not aligned with health data standards and formats.
- **Community-level data** can offer insights into neighborhood context and place-based disparities but are generally considered less accurate for rural areas. Patient addresses must be geocoded with geographic identifiers to facilitate data linkages.

There are promising efforts to collect, standardize, and disseminate interoperable SDoH data and promote its healthcare application – but these efforts are **largely in initial stages**.

Current SDoH Data Landscape

- **U.S. Core Data for Interoperability** (USCDI) and **FHIR** are two widely recommended standards for healthcare data exchange**.** USCDI defines standard data elements and classes while FHIR provides data-sharing standards.
- Federal standards for **FHIR Application Programming Interfaces (APIs**) support efficient and secure data integration and exchange.
- **The Gravity Project** develops consensus-driven SDoH standards for terminology, screening tools, coding, data collection and exchange, and applications in healthcare.
- **The World Health Organization** (WHO) establishes ICD codes ("Z codes") to document SDoH.
- **Healthy People 2030's** five SDoH domains are widely adopted by states as a framework to organize, share, and benchmark SDoH data.

Because efforts to develop standard protocols and best practices are ongoing, an overarching data-sharing system that is **agnostic to vendors, providers, and tools** is key.

While social service agencies have potential as an SDoH data source, there is **scant information** on how HIEs share, integrate, and use **individual-level SDoH data from non-HIPAA-covered entities**. SDoH data integration requires a **robust consent model** with a **cross-sector approach**, where there are different laws that dictate when consent is required that vary by type of data, who has data permissions, and for what purpose. For data collected in **non-HIPAA-regulated settings**, it is best practice to obtain informed consent from individuals.

Federal, state, and local policy levers are essential to capitalizing on available assistance in collecting and integrating SDoH data, including:

- **Value-based care (VBC) programs** that reward providers who close gaps in HRSN, offer reimbursement mechanisms for SDoH data collection, or require providers to integrate social risk adjustment into risk stratification processes
- **Medicaid 1115 demonstration waivers** to test approaches to addressing HRSN
- **"In lieu of services" policies** that allow Medicaid plans flexibility to address HRSN
- **Regulatory requirements** for SDoH data collection and reporting[3]
- Participation in a **CMS demonstration model** with an SDoH focus[4]

Because adequate workforce and technical capacity are common barriers, a **developmental approach to data integration** is suggested, beginning with basic aggregate data sharing and building up to more complex data sharing as use cases are successful.

Existing measurement and evaluation strategies for health data can also be applied to SDoH data.

- **Healthcare Effectiveness Data and Information Set** (HEDIS) reporting, the gold standard in healthcare performance measurement, developed a new Social Need Screening and Intervention (SNS-E) measure.
- The **Uniform Data System** (UDS) for health centers collects data on social risk and produces SDoH/HRSN dashboards and rankings.

ASTP/ONC defines **four measurement areas** that are integral to SDoH information exchange:

- **Process:** Track individual-level impacts (e.g., screenings, closed-loop referrals)
- **Utilization:** Track SDoH data exchange (e.g., service volume and participation)

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[3] For example, CMS-1802-F updates the fiscal year 2025 Skilled Nursing Facility (SNF) Quality Reporting Program by requiring SNFs to submit four new SDoH assessment items on living situation, utility difficulties, and food insecurity in the minimum data set.

[4] For example, Vermont was selected to participate in Cohort 2 of CMS' States Advancing All-Payer Health Equity Approaches and Development (AHEAD) Model in July 2024.

Current SDoH Data Landscape

- **Quality:** Assess associations between improvements in population-level health outcomes and SDoH data exchange, referrals, and use of services
- **Financial:** Measure cost-savings for improved health outcomes

Exhibit E4: Chapter 1 Key Findings: Best Practices and Implementation Strategies

Best Practices and Implementation Strategies

There is no one-size-fits-all approach to SDoH data infrastructure. SDoH efforts should be tailored to the specific needs of stakeholders and communities. However, one can still learn from others' experiences with common challenges and adapt successful mitigation strategies.

The development of HIEs takes time and requires flexibility. As states enhance their SDoH data infrastructure, lessons are learned, new strategies and technologies are developed, and stakeholder and community needs evolve. Implementing a **phased approach** responsive to changing priorities allows for stakeholders to leverage key learnings to fine-tune future steps.

Stakeholders should be engaged in HIE development, implementation, evaluation, and maintenance. Stakeholder feedback can help determine how to customize, evaluate, and sustain data infrastructure to maximize HIE utility for all those involved. Providers and other HIE partners also play a key role in elevating patient and community voices.

Careful considerations should be made regarding how SDoH data will be translated into actionable insights. Once the value of SDoH data is made explicit to stakeholders, stakeholders are often more willing to invest their resources in data systems. Collection of any data element needs to be purposeful and deliberate with a clear use case of how the data guide provider action.

States take varying paths toward SDoH data integration and exchange. Some states use a **decentralized, localized approach** to SDoH data exchange. For example, California, Michigan, and Colorado serve as more of a coordinating center to regionalized "hubs" or lead sites who manage the daily implementation of SDoH data work, tailoring strategies to accommodate local context. On the other hand, states like Maryland and Oklahoma use a **centralized organizational structure**.

Regardless of management approach, most states establish similar core capacities to support their HIEs' SDoH data efforts, including:

- **Identity management** protocols for person-level data linkages
- Up-to-date and centralized **resource directories** for referrals
- **Shared terminology** and **structured protocols** for data collection, exchange, reporting, and use
- Clearly articulated **consent** and **data governance** procedures
- Technical capacity for **longitudinal data aggregation** within a patient's record
- **Data dashboards** and **standardized reporting** to monitor and disseminate key metrics

While states integrate SDoH data using different approaches, most **use SDoH data to improve patient health** in similar ways. Most (if not all) states use HRSN data to match patients with resources and services to meet their needs, prioritizing closed-looped referrals to ensure resources are accessed and adequately address needs. Other use cases for SDoH data include:

- Identifying individuals at risk for HRSN
- Stratifying patients for interventions and resource allocation
- Benefits assistance
- Public health surveillance
- Evaluating progress towards health goals
- Conducting research, community health needs assessments, or gap analyses by area
- Informing health equity plans and policy

States provide **technical assistance** to their HIE partners in a variety of ways, including:

- A help desk to field partner questions
- Written protocols, "how-to" guides, use case workflows, and other documentation
- Support with monitoring, evaluation, and reporting
- In-person and virtual SDoH education, shared learning, and training opportunities
- Tools for data visualization, care planning, and building HIE functionality

Exhibit E5 (below) describes the results of the SDoH data source review, detailing each data source and its strengths. The "lowest hanging fruit" of data sources—publicly available, high-quality secondary data sources linkable by patient geography—are prioritized first. The SDoH data source review resulted in prioritization of 78 data elements from four data repositories:

- The Centers for Disease Control and Prevention's (CDC) Population Level Analysis and Community Estimates (PLACES)
- CDC's Environmental Public Health Tracking Network (EPHTN)
- The Agency for Healthcare Research and Quality's (AHRQ) SDoH Database
- University of Wisconsin Population Health Institute and Robert Wood Johnson Foundation County Health Rankings & Roadmaps (CHR&R)

CDC PLACES data are highest priority. Data elements sourced from the EPHTN, SDoH Database, and CHR&R are prioritized individually based on relevance, quality, availability of documentation, and other criteria.

Exhibit E5: Chapter 1: SDoH Data Source Review

SDoH Data Source Review

The **CDC PLACES**[5] web tool provides high-quality, model-based community-level estimates for seven HRSN and nine SDoH factors and is considered **first priority** due to these strengths:

- Based on **well-established surveys** (Behavioral Risk Factor Surveillance System [BRFSS] and five-year American Community Survey [ACS] estimates)
- Enables **statewide and nationwide comparisons**

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[5] **Economic Stability:** • Housing insecurity • Crowded housing • Housing cost burden • Utilities instability • Food stamps • Food insecurity • Unemployment • < 150% below poverty • No reliable transportation; **Social & Community Context:** • Single-parent household • Social isolation • Lack of social/emotional support; **Neighborhood & Environment:** • No internet subscription; **Healthcare Access & Quality:** • No health insurance • Disability status**;** **Educational Access & Quality:** • No high school diploma ; **Sociodemographics:** • Racial/ethnic minority status • ≥ 65 years

SDoH Data Source Review

- Uses innovative and validated **small-area estimation technique** to provide data uniformly across urban-rural spectrum
- Four of the seven HRSN overlap with **CMS' Accountable Health Communities [AHC] HRSN Screening Tool**
- **API endpoint** available for automated data extraction and integration with the UHDS

CDC's EPHTN is a dynamic repository of community-level data on health conditions, environmental factors, climate, the built environment, and population characteristics. The EPHTN:

- Provides a variety of HRSN/SDoH data elements and five high-quality **composite indices**[6]
- Accompanied by **well-documented methods** and data notes for each data element and a **GitHub repository** with code, documentation, and resources
- Offers a **data explorer tool** for quick queries and visualization
- Aligns with CDC's **Data Modernization Initiative**
- Includes **API** with accompanying user guide and frequently asked questions (FAQs)

AHRQ's SDoH Database is a one-stop shop for **well-documented, readily linkable community-level SDoH** variables across Healthy People 2030 domains. Strengths include:

- Contains **over 17,000 variables** from over 40 data sources on diverse topics
- Offers **more granular** HRSN/SDoH data elements (e.g., poverty by race/ethnicity)
- **Over 10 years'** worth of data (2009-2020)
- **Detailed documentation** on each data element, data sources, and notes on reliability, geographic levels, suppression rules, variable notes, and term definitions
- **Regularly updated** with new data sources

CHR&R compiles community-level data from national and state sources to produce annual health snapshots for U.S. counties. Strengths include:

- **Detailed documentation** on measure changes, data trends, and comparability across states over time to facilitate longitudinal analyses
- Data undergo **regular and systematic review**, evaluation, cleaning, and weighting
- Includes cross-sectional and trend data in **SAS and CSV format**

Chapter 2: Implementation Strategy

Grounded in the findings in Chapter 1, Chapter 2 provides a detailed plan with 40 strategy recommendations to integrate SDoH data in the UHDS. The recommendations include a variety of stakeholders and the data life cycle from collection and standardization through data application and evaluation. Through the establishment of clear guidelines and milestones, the plan ensures that efforts remain on course and align with broader state health initiatives.

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[6] CDC's Social Vulnerability Index; CDC's Environmental Justice Index; CDC's Heat and Health Index; Brandeis University's Child Opportunity Index; and University of South Carolina's Baseline Resilience Indicators for Communities

This implementation plan aligns the recommendations into four phases building up to the full-scale integration and implementation of SDoH data elements (see **Exhibit E6**). This allows for gaps to be identified and redressed and space for stakeholder collaboration. The four-phased approach is reflective of how SDoH data efforts are interdependent and build upon one another. Given that different recommendations build upon each other, the phases are not time-bound and consecutive; rather, they are intended to be iterative and customizable based on the State's capacity and priorities at different points in time and the stage of implementation.

Exhibit E6: The Four Implementation Phases

PHASE I	PHASE II	PHASE III	PHASE IV
• Assessment of current needs and readiness for change	• Identification, standardization, and validation of SDoH data sources	• Pilot of strategy implementation and evaluation	• Integration, optimization, and sustainability

Phase I: Assessment of Current Needs and Readiness for Change

Phase I defines technical requirements for UHDS integration at the data-, process-, and stakeholder participation-levels. This phase includes inventorying possible data sources and stakeholders, developing engagement strategies, and gathering information on needs and challenges. It sets the stage for ongoing engagement so that future implementations center on stakeholder experiences and adapt strategies as needed. An assessment of readiness for change, detailed in Chapter 4, lays the groundwork for feasible and effective strategies.

Sample Strategy from Phase I

3. *[Short-term, ongoing]* **Develop process to collect and respond to feedback on SDoH efforts**. The State already has diverse stakeholders engaged in the Steering Committee and can expand UHDS participation to include more patient representatives, caregivers, and community members. Feedback can be solicited from this expanded stakeholder group via quarterly **virtual townhalls** or an **SDoH Community Advisory Board**.
    - **Phase I**
    - **Frequency:** Quarterly or as needed
    - **Key Milestones:** 1) Virtual townhall series and/or formation of SDoH Community Advisory Board; 2) Other milestones to be determined in conjunction with stakeholders
    - **Responsible Parties:** UHDS leadership
    - **Resources Required**: Research and/or administrative staff to recruit new stakeholders, schedule events, develop a methodology to collect feedback, analyze feedback, and identify actionable next steps; Mechanism to share feedback with stakeholders; Software to host virtual town halls and/or Advisory Board meetings (e.g., Zoom)

Phase II: Identification, Standardization, and Validation of SDoH Data Sources

In Phase II, the data elements and platforms essential to operationalizing SDoH data (e.g., evaluation criteria or systemic responses to SDoH/HRSN indicators) are identified and integrated into protocols. Phase II strategies avoid duplication of efforts by identifying tools and opportunities to leverage to maximize already ongoing efforts. Leveraging existing data elements and infrastructure (e.g., publicly available secondary data, Vermont's SDoH efforts for the All-Payer Health Equity Approaches and Development (AHEAD) Model) builds in efficiency and standardization. Data standardization and system testing help confirm the functionality and interoperability of Phase II efforts.

Sample Strategy from Phase II

15. *[Medium-term, ongoing]* **Develop a methodology for using community-level data to identify communities of need**. The methodology should incorporate the UHDS analytics layer. The State should identify specific SDoH/HRSN of interest that can be viewed by geography in the analytics layer. Additionally, a definition or threshold indicator for "communities of need" should be developed. Such analyses could inform community outreach efforts.[7]
    - **Phase II**
    - **Frequency:** Ongoing as UHDS participation and data collection expands
    - **Key Milestones:** 1) Methodology to identify community SDoH/HRSN; 2) Analytic plan to visualize SDoH/HRSN; 3) Develop and test technical infrastructure; 4) Monitor, analyze, and report on findings
    - **Responsible Parties:** UHDS leadership
    - **Resources Required:** Research staff to create methodology, develop a definition for communities of need, create an analytic plan, analyze data, and summarize findings; Software for analysis and visualization (e.g., SAS and Tableau)

Phase III: Pilot of Strategy Implementation and Evaluation

Once protocols are established based on stakeholder needs and processes are validated, a structured pilot will be launched in Phase III to test the successful integration of SDoH data on a larger scale. Developing training materials, technical support, and tools will enhance partners' understanding and use of SDoH data and adoption of new strategies. New workflows are assessed and recommended for best practices to implement more widely.

Sample Strategy from Phase III

16. *[Medium-term, ongoing]* Develop, test, and iterate through **anonymous closed-loop referral use cases** with participating providers. This workflow may vary from organization to organization; however, this process should develop best practices as a starting point and set up a workflow for actions taken after different types of referrals are initiated.
    - **Phase III**
    - **Frequency:** Ongoing as UHDS participation and data collection expands

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[7] For example, if a particular ZIP code scores high on a heat vulnerability index due to housing instability, state decisionmakers may consider setting up "cooling centers" in that area.

Sample Strategy from Phase III

- **Key Milestones:** 1) Workflow development, testing, implementation, and refinement
- **Responsible Parties:** UHDS leadership; UHDS data contributors
- **Resources Required:** Staff to develop, test, and iterate on the referral workflow; Data contributor engagement and time to test the referral workflow; Technical staff to manage technical requirements for the workflow (e.g., referral tracking system)

Phase IV: Integration, Optimization, and Sustainability

Phase IV refines processes based on pilot feedback, integrates evolving national standards and policy changes, and ensures ongoing scalability. Continuous evaluation and dashboard reporting support long-term optimization and policy alignment.

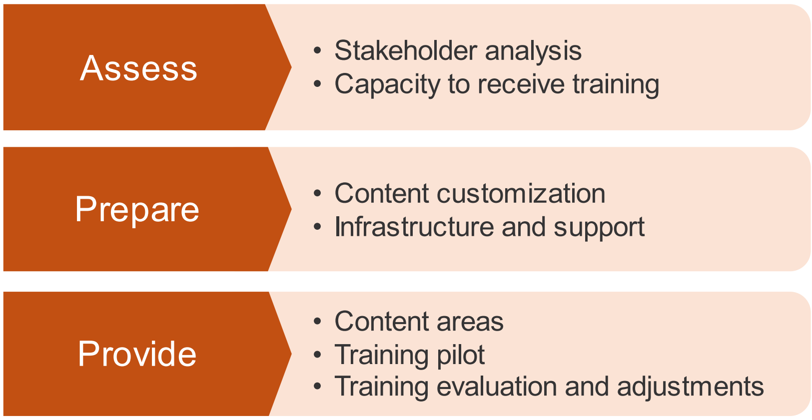
Sample Strategy from Phase IV

40. *[Long-term]* Review Fiscal Year 2025 Skilled Nursing Facility (SNF) Prospective System Final Rule (**CMS-1802-F)** and **develop processes and infrastructure to ingest these data**. In fiscal year 2027, SNFs must collect and submit four new HRSN items as standardized data elements. The State should develop protocols and infrastructure to ingest these data once available. This includes development of data-sharing agreements with providers, review of consent processes, outreach to submitting entities, and incorporation of the data into analytic plans.
    - **Phase IV**
    - **Frequency:** Ongoing
    - **Key Milestones:** 1) Review CMS-1802-F and develop plan for UHDS integration; 2) Conduct outreach to SNFs to discuss participation; 3) Develop legal documentation needed for data submission; 4) Ingest data into UHDS
    - **Responsible Parties:** UHDS leadership
    - **Resources Required:** Research and legal staff to review CMS-1802-F, update legal agreements and analytic plans, and conduct outreach to potential submitting entities; Technical staff to develop data submission protocols

Chapter 3: Training and Education Plan

Chapter 3 provides the training and education plan, a staged approach to equip stakeholders with the knowledge and tools necessary for SDoH data integration (see **Exhibit E7**). The training content endows stakeholders with the knowledge and skills to enact the strategies selected for implementation following the shared vision in the State's HIE Strategic Plan. When supported by training and education within a climate primed for change, these strategies will yield optimal, long-lasting results. This plan also equips public and private sectors with the knowledge to comply with data governance laws (Health Insurance Portability and Accountability Act [HIPAA], 42 CFR Part 2) and best practices for data sharing.

Exhibit E7: Training and Education Plan Staged Approach



- **Assess**
  - Stakeholder analysis
  - Capacity to receive training
- **Prepare**
  - Content customization
  - Infrastructure and support
- **Provide**
  - Content areas
  - Training pilot
  - Training evaluation and adjustments

Assess: Stakeholder Analysis, Capacity to Receive Training

The initial step in deploying a training is to assess training gaps or needs, the optimal approach, and scope of content by stakeholder audience. This approach ensures that stakeholders (e.g., healthcare providers, state agencies, community-based organizations [CBO], payers, and information technology [IT] professionals) receive customized content via training modes optimized for their role in SDoH data efforts.

Training capacity assessments are crucial for effective change management to determine if an organization has the necessary resources and digital literacy to benefit from designed training initiatives. SDoH data integration efforts and trainings should be introduced in phases and through multiple formats for stakeholders with different learning needs. Lessons learned from these assessments and a phased rollout approach can be used to continue refinement to maximize the uptake of training content. **Exhibit E8** provides recommendations on delivery mechanisms for different types of content and audiences.

Exhibit E8: Training Mode Features

Training Mode	Best for Content Type	Audience Size
Webinars	Policy updates, regulatory compliance, and general SDoH overview	Large (50+)
Self-paced e-learning	Technical skills, data governance, and interoperability training	Medium-to-large (20-100)
Interactive workshops	Hands-on technical training, referral coordination, and system demonstrations	Small-to-medium (10-50)
Printed toolkits and FAQs	Quick reference materials for daily use and compliance guidance	Universal (any size)

Training Mode	Best for Content Type	Audience Size
In-person training	Intensive skill-building, complex workflow integration, and troubleshooting	Small (10-30)

Prepare: Content Customization, Infrastructure, and Support

Training materials and delivery methods should be tailored to meet stakeholders' unique needs and incorporate change management principles for smooth implementation. Messaging should address barriers (e.g., patient outcomes, time burden, technological capacity, costs) and leverage early adopters of training methods as champions of the transition. Training should proactively address concerns like increased workload, data privacy, and reimbursement challenges and spotlight pilot programs that demonstrate the benefits of SDoH data integration. Ongoing support, feedback loops, and clear documentation helps ensure that stakeholders adapt effectively while maintaining compliance and protecting patient data.

Provide: Content Areas, Training Pilot, Training Evaluation and Adjustments

Training materials should align with best practices and the State's unique SDoH data ecosystem. Core content should cover data collection, referral coordination, interoperability, data governance, and emerging policy and funding opportunities. A pilot phase with early adopters, for example, could test training methodologies and content. Findings should guide refinements before broader implementation. Training programs should be evaluated and adjusted based on stakeholder feedback, annual assessments, and best practices observed from other states and federal programs. **Exhibit E9** provides samples of metrics to be used for measuring effectiveness of training and implementation strategies over time.

Exhibit E9: Sample Outcome Metrics for Training and Implementation Strategies

Measure Type	Short-Term	Medium-Term	Long-Term
Training Administration	• Attendance • Training participation	• Post-training assessments of knowledge acquisition	• System usage analytics to evaluate adoption of new tools and workflows
Training Effectiveness	• Increase in correct data submissions • Compliance with new workflows • Engagement rates	• Improved interoperability between healthcare and social service providers • Increased referrals	• Improved health outcomes in vulnerable populations • Decreased administrative burdens • Measurable policy impacts

Chapter 4: Change Management Strategy

Chapter 4 provides a change management strategy to guide stakeholders in SDoH data integration. It is intended to complement the implementation strategy by ensuring that the people, processes, and systems necessary for execution are aligned and that the State's approach is strategic, scalable, and sustainable. The change management strategy is divided into four stages as shown in **Exhibit E10**.

Exhibit E10: Change Management Strategy Stages

STAGE I	STAGE II	STAGE III	STAGE IV
• Creating a Climate for Change	• Engaging and Enabling Stakeholders	• Implementing and Sustaining the Change	• Institutionalizing Change for Long-term Sustainability

Stage I: Creating a Climate for Change

This stage lays the groundwork for adoption by defining a clear vision and climate for change, ensuring alignment with state and federal priorities, and engaging key stakeholders throughout the process. The State's UHDS leadership should define and communicate a unified vision for SDoH data efforts that maintains alignment with Vermont's HIE Strategic Plan.[8] Proactive engagement and external incentives can help ensure sustained participation during change management periods. It is critical to assess which changes have the greatest likelihood of successful adoption through readiness and needs assessments. Stakeholder readiness assessments can identify organizational capacity and limitations to participation.

Implementation Strategy Recommendations

8. Explore opportunities to **leverage Medicaid and/or Medicare funds for SDoH investments**, such as: Medicaid 1115 waivers; new payments for Accountable Care Organizations (ACOs) to address SDoH in the Medicare Shared Savings Program; Medicare's revisions to Physician Fee Schedule; Medicare's separate payment and coding for SDoH risk assessments; and Vermont's Medicaid Data Aggregation and Access Program (MDAAP), which offers incentives.

9. Explore opportunities to **leverage CMS' support for in lieu of services (ILOS) policies** that allow Medicaid plans flexibility to address HRSN in lieu of other medical services.

10. Explore opportunities created by the **CMS Interoperability and Prior Authorization Final Rule (CMS-0057-F).**

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[8] Agency of Human Services. (2024, November 1). Health Information Exchange Strategic Plan 2023-2027 Plan (2024 Update). Department of Vermont Health Access. https://healthdata.vermont.gov/sites/healthdata/files/documents/HIEStrategicPlan_2024_SUBMITTED.pdf.

Implementation Strategy Recommendations
11. Explore **VBC reimbursement models** (e.g., incentives for collecting SDoH data).
12. Explore how Vermont's position **in Cohort 2 of the AHEAD Model** can be leveraged to standardize and expand SDoH/HRSN data collection and integration.
19. Conduct **listening sessions with stakeholders** to understand challenges and barriers in their SDoH data efforts.
36. **Inventory current primary SDoH data collection** among healthcare providers, facilities, and payers.

Stage II: Engaging and Enabling Stakeholders

This phase focuses on proactively adapting implementation elements to the current environment for maximum strategic placement and sequencing. The State can use engagement mechanisms to support adoption of changed behaviors by reiterating the value of SDoH data to stakeholders (e.g., regular workgroups, advisory committees, cross-sector collaborations). To support the further adoption of new technologies, the State should use engagement channels to refine and iterate on training content (e.g., a centralized communication or support hub, peer learning communities, peer groups). As the State moves toward full-scale implementation of SDoH data in the UHDS, it is essential to establish and refine SDoH data protocols. The State should follow emerging national standards for SDoH data and promote participation in the UHDS as a learning environment for stakeholders.

Implementation Strategy Recommendation
3. **Develop process to collect and respond to feedback** on SDoH efforts.
20. **Develop tools to help users understand SDoH data** and its value.
22. Promote participation in the UHDS as a **learning environment for stakeholders.**
23. Establish **a centralized coordinating center to provide technical support**.
29. **Develop, test, QC, and document methodology for identifying individuals at risk for HRSN** based on relevant data elements ingested into UHDS.
30. Develop **technical specifications for the system backend and frontend when a "positive" SDoH/HRSN screen occurs.**
31. Develop **technical workflow and specifications** for what happens **after the provider is notified of a specific SDoH need/HRSN.**
34. Continue to **follow emerging national standards for SDoH data**.

Stage III: Implementing and Sustaining the Change

This third stage ensures that the adoption of SDoH data strategies is successful, scalable, and sustainable over time. The State should follow the approach prescribed in the implementation plan and conduct a structured pilot phase in advance of large-scale implementation. Similar to Michigan's pilot SDoH Hubs[9], pilot programs will allow the State to identify operational challenges, refine workflows, and adjust protocols before full implementation. Training content, technical support strategies, and other resources piloted will iterate and improve prior to larger-scale adoption. This piloting process enables the State to refine processes and approaches to facilitate adoption and ensure a smooth transition during full-scale implementation. At the end of Stage III, the State should establish performance metrics and evaluation mechanisms to relay the projected benefits of SDoH data integration to stakeholders. To measure success, the State must define key outcomes to evaluate the impact of SDoH data integration on metrics such as population health outcomes, data accessibility, and policy effectiveness that are impactful to stakeholders.

Implementation Strategy Recommendation
13. Develop a **standard mechanism for reporting key metrics** related to SDoH/HRSN to stakeholders in a timely manner.
24. Create a set of **standardized measures to evaluate performance** in improving population health over time.
25. Design a **dashboard with metrics** on health and social outcomes, UHDS participation, and data quality.

Stage IV: Institutionalizing Change for Long-Term Sustainability

For the success of SDoH integration, the State must establish governance mechanisms and policy structures that support ongoing optimization and sustainability. This includes integrating national standards, refining incentive structures, and ensuring the continued engagement of data contributors. The State can adapt to evolving needs and emerging best practices over time by maintaining continuous evaluation processes and stakeholder collaboration and timing integration efforts with larger funding and policy timelines.

Implementation Strategy Recommendation
40. For fiscal year 2027, review **CMS-1802-F and develop processes and infrastructure to ingest these data**.

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[9] Chapter 1 provides additional background on Michigan's piloting of SDoH Hubs (see "State Spotlights").

1. Landscape Survey and Needs Assessment

Introduction

Exhibit 1.1 outlines NORC at the University of Chicago's (NORC) technical approach to the first chapter of the roadmap summarizing the landscape survey and needs assessment, which consists of:

1. Focused engagement (via convenings and group interviews) of Vermont stakeholders to answer questions about their SDoH efforts and needs
2. Discussions with representatives from Maryland, Michigan, and Oregon who participated in efforts to integrate SDoH data into their states' HIE
3. A landscape survey and needs assessment comprised of a scoping review of peer-reviewed and gray literature, technical documentation, data portals, and other materials on current and potential UHDS data inputs
4. A review and prioritization of SDoH data sources for potential integration into the UHDS

Exhibit 1.1: Inputs to Landscape Survey and Needs Assessment

To facilitate interpretation and usability of our results, we organize key findings by the Office of the Assistant Secretary for Technology and Policy/Office of the National Coordinator for Health IT's (ASTP/ONC) 11 foundational elements of SDoH information exchange (hereafter referred to as "ASTP/ONC elements") (see **Exhibit 1.2**). As decided upon in partnership with the State, we focus on the elements most relevant to the current state of Vermont's SDoH data integration efforts; these elements are bolded and asterisked (*) below.

Exhibit 1.2: ASTP/ONC Elements of SDoH Information Exchange[10]

Foundational Element	Description
Community Readiness and Stewardship	Exploring the existing landscape in the geographic area and/or population of focus, assessing community capacity and willingness to participate, and developing stakeholders' roles through co-design and decision-making
Mission and Purpose	The intention of an initiative that addresses the various value propositions of stakeholder groups and vision, scope of services, and benefits
Values and Principles	Standards for establishing a framework for action
Policy*	Consideration of federal, state, and local policy levers to advance the ability to collect, share, and use SDoH data and align with other relevant efforts in the community and state for collective impact and improved outcomes
Legal*	Establishing the processes, rights, and obligations to support data use, sharing, and compliance with federal, state, local, and tribal laws
Measurement and Evaluation*	Monitoring and evaluation of performance metrics, individual and population outcomes, and quality improvement (QI)
Financing	Funding opportunities, costs, and incentives for community adoption
Implementation Services*	Includes technical and programmatic services and support for individual and community adoption and use
Technical Infrastructure and Data Standards*	Alignment of hardware, software, data, processes, and standards for scalable and interoperable data and IT systems
User Support and Learning Network*	Assessment of challenges and needs, education, training, technical assistance, and identification of promising practices and lessons learned
Governance	Decision-making processes for administrative and data governance

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[10] See pages 14 and 15 from the *Social Determinants of Health Information Exchange Toolkit: Foundational Elements for Communities*: https://www.healthit.gov/sites/default/files/2023-02/Social%20Determinants%20of%20Health%20Information%20Exchange%20Toolkit%202023_508.pdf.

In Chapter 1, we detail:

- An overview of the Vermont landscape, including population characteristics and related health needs and a description of the State's SDoH data integration efforts to date
- Methods used to collect and synthesize data across stakeholder engagement, state interviews, document review, and data source review
- Key findings related to the current SDoH data landscape, including common challenges, established and emerging practices in SDoH data collection and integration, and potential opportunities for the State to leverage in its own SDoH data integration efforts
- Key findings related to how other states collect, integrate, share, and use SDoH data, along with best practices and implementation strategies for technical assistance, implementation services, measurement, and evaluation and the resources required to support such efforts
- A prioritized list of SDoH data sources most relevant and feasible for integration into the UHDS

Overview of Vermont Landscape

The development of an achievable and comprehensive SDoH data roadmap begins with an understanding of what makes Vermont, residents of Vermont ("Vermonters"), and the healthcare and social service providers tasked with promoting health and well-being in the state unique. Vermont is among the **most rural and smallest** states with 26% of its population concentrated in one of its 14 counties, Chittenden County (Vermont Department of Health [VDH], 2024).

Vermont ranks among the **healthiest states with low unemployment and uninsured rates**. However, Vermonters pay some of the highest annual health insurance premiums, and recent reports describe the burdens of long wait times for care (Galewitz, 2024). In 2021, only 3% of Vermonters were uninsured, but slightly over **one-third were underinsured** (Robertson et al., 2022). Health and well-being vary by urbanicity, age, race/ethnicity, disability, sexual orientation, and housing (VDH, 2024).

Healthy Vermonters 2030 has three main goals for its SDoH topic area (VDH, n.d.):

1. Increase affordability of health and dental care
2. Increase economic resilience and well-being
3. Reduce hunger and food insecurity

In the following sections, we describe:

- Sociodemographic and health-related characteristics of Vermonters, zeroing in on subgroups most vulnerable to HRSN
- Related examples of needs targeted under Healthy Vermonters 2030, an effort led by the VDH to track and promote the health of Vermonters
- The State's completed and planned efforts to date to identify, collect, and integrate SDoH and HRSN data with clinical data into Vermont's UHDS

Population Characteristics and Health Needs

Most Vermonters (65%) live in rural areas. Compared to the U.S. population living in rural areas, rural Vermonters have lower poverty and unemployment rates and higher educational attainment (Rural Health Information Hub [RHI Hub], 2024). However, relative to urban Vermonters, rural Vermonters have higher rates of poverty (10.4% vs. 9.8%) and unemployment (2.9% vs. 2.2%) and lower attainment of college education (38.2% vs. 48.7%) (RHI Hub).

These disparities are compounded by issues that disproportionately affect rural residents' ability to access basic needs and healthcare, such as lack of high-speed internet (Vermont Department of Public Service, 2024), shortages of healthcare providers or under-resourced providers (Health Resources & Services Administration [HRSA], n.d.), and long travel times or transportation insecurity (VDH, 2024).

Healthy Vermonters 2030 goals for older adults include reducing the percentage living in poverty and increasing access to mental health, dental health, and other healthcare (VDH, n.d.).

The population of older Vermonters continues to expand. One-third of residents are over 55 (VDH, 2023). From 2010 to 2020, the percentage of residents aged 65 or over increased from 11% to 20% (VDH, 2023). Older Vermonters are at risk for chronic conditions and disability; social isolation; financial challenges related to informal caregiving and rising costs of food, medications, care, and housing; and transportation-related barriers to care (VDH, 2024).

Vermont has grown more diverse in the past 15 years. Vermonters of color are disproportionately impacted by poverty, food insecurity, and worse health outcomes. While only 8% of Vermonters identify as part of the Black, Indigenous, and People of Color communities, those that do are twice as likely to delay care compared to White Vermonters (VDH, 2023). Black Vermonters are twice as likely to live in poverty compared to White Vermonters (VDH, 2024). The median income among Indigenous Vermonters was about half that of White Vermonters in 2022. Indigenous Vermonters also report more suicide attempts, chronic disease, and food insecurity (VDH, 2024).

Under Act 167, VT is working towards expansion of HCBS (VT General Assembly, 2022), a type of long-term care that helps people with chronic conditions and disabilities remain in their homes or communities (CMS, n.d.).

Chronic conditions like obesity, arthritis, depression, and asthma are major health concerns among Vermonters. In 2022, six in ten Vermonters were living with at least one chronic disease (VDH, 2024). Healthy Vermonters 2030 goals center on mitigating chronic disease-related mortality and comorbidity and preventing environmental hazards (e.g., housing quality) that influence the rates of emergency department (ED) visits for asthma or heat-related symptoms (VDH, n.d.).

One in four Vermont adults has a disability. Half of Vermonters with a disability have more than one. Disability-related healthcare costs account for over one-third of the state's healthcare spending.

Vermonters with disabilities have unique challenges in navigating their community, finding jobs, and accessing healthcare services and report worse mental health outcomes (VDH, 2024; VDH, n.d.).

Vermont's unhoused population has grown rapidly. From 2020 to 2023, the number of Vermonters who were unhoused increased by 197% (VDH, 2023). Vermont had the second highest rate of unhoused residents per capita in the U.S. in the past four years (VDH, 2024). The unhoused population faces limited access to healthcare, heightened exposure to substance abuse, food insecurity, and disrupted education, and increased social isolation.

Healthy Vermonters 2030 goals include strengthening educational, social, and community context to increase mental resilience among high schoolers, specifically the percentage who have an adult they can confide in at school and feel they matter to their community (VDH, n.d.).

Vermont's Lesbian, Gay, Bisexual, and Transgender (LGBTQ+) population experiences disparities in physical and mental health and substance abuse. LGBTQ+ adults in Vermont are more likely to delay care and report worse mental health compared to non-LGBTQ+ Vermonters. LGBTQ+ youth in Vermont report more sadness, anxiety, poor mental health, and suicide attempts compared to non-LGBTQ+ youth (VDH, 2024).

SDoH Data Integration in Vermont

This section summarizes the State's progress related to the UHDS as of fall 2024.[11] **Exhibit 1.3** organizes completed and ongoing efforts by the ASTP/ONC elements most relevant to SDoH data integration:

Vermont's HIE (VHIE) Management
VT AHS manages the strategic vision for the VHIE and oversees its implementation, standards, and operations. **VT IT Leaders (VITL)** operates the VHIE.

- **Implementation,** including leveraging existing workflows and infrastructure and assisting stakeholder efforts
- **Data governance**, including the structure and development of guidance for data collection, sharing, and management, and quality control (QC)
- Technical infrastructure and data standards for IT systems and interoperability

Exhibit 1.3: Vermont's SDoH Data Integration Activities[12]

Implementation

- **New to Medicaid (NTM) and General Assessment (GA) HRSN data from the VT Chronic Care Initiative are ingested,** including data on transportation, food, and financial insecurity and material hardship; unstable or inadequate housing and homelessness; intimate partner violence (IPV) and elder abuse; and social connection.

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[11] Based on *AHS' 2023-2027 HIE Strategic Plan (Draft 2024 Update)*, *SDoH Data Governance Documentation (Version 0.8)*, and *SDoH HRSN Screening Alignment for VT: Progress Report*, in addition to discussions between NORC and the State at project meetings.

[12] Some activities in the exhibit cross ASTP/ONC elements. For simplicity, we list each activity only once under the element deemed most pertinent to understand where the State currently stands with SDoH data integration.

- **OneCare providers are required to collect the first 15 items from the CMS AHC HRSN Screening Tool and are in varying stages of implementation**. Providers are collecting some or all of the first 15 items and capturing data in EHR or via questionnaire. Some providers are collecting additional HRSN data via mechanisms other than this tool.
- **Vermont's Blueprint for Health Patient-Centered Medical Home primary care practices are asked to collect and store responses to the first 10 items of the CMS AHC HRSN Screening Tool in EHRs.**
- **Designated Agencies (DA) who offer substance use disorder (SUD) and mental health services submit utilization data to VITL**. VITL plans to implement security labeling (tagging) of SUD data. Once data are tagged, there is potential to extract SDoH/HRSN from these data.
- **The State continues to establish HIE connections and has a successful model for bi-directional data exchange** (based on immunization data exchange) that may inform bi-directional and multidirectional data exchange among HIPAA-covered entities.
- **Ongoing SDoH data priorities include**:
  - Upgrading the VHIE so that it has the technical capability to ingest, store, and securely share SDoH screening responses from the CMS AHC HRSN Screening Tool.
  - Diversifying data sources for integration into the UHDS.
  - Improving data completeness (via the Data Completeness Subcommittee).
  - Bolstering dissemination of health data literacy education to patients and providers.
  - Exploring ways to support smaller and/or more rural providers in their technical needs.

Data Governance

- **Act 53 of 2019 and 18 V.S.A., Section 9351 (a)(3)(B) established a consent policy that makes health data in the VHIE accessible to healthcare professionals and facilities and payers**, to the extent permitted under federal law, unless the patient explicitly opts out.
- **The HIE Data Governance Council established an SDoH Data Governance Subcommittee and a 42 CFR Part 2 (SUD) Governance subcommittee**. Both subcommittees submit recommendations to the HIE Data Governance Council for approval.
- **Short-term data integration priorities for the SDoH Data Governance Subcommittee include:**
  - Standardizing the collection of the first 15 items from the CMS AHC HRSN Screening Tool.
  - Developing standard processes for NTM and GA data use.[13]
  - Crosswalking standardized tools by Healthy People 2030 domain and establishing a plan for regular review, updates, and additions as new tools emerge.
- **Medium-term priorities include:**
  - Developing governance for collecting, ingesting, and using patient-generated SDoH data.
  - Using the crosswalk of standardized tools to recommend SDoH and/or HRSN screening items and patient risk assessment tools for the UHDS.
  - Inventorying entities who collect SDoH data via non-standardized mechanisms.
- **Long-term priorities include:**
  - Establishing data governance processes for SDoH data from non-HIPAA-covered entities.
  - Supporting all entities collecting SDoH data in data collection standardization efforts.
- **Ongoing priorities include:**
  - Engaging stakeholders to enhance SDoH data governance.
  - Upholding and assessing data governance to ensure relevance to changing landscape.
  - Exploring joining the Trusted Exchange Framework and Common Agreement national network.

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[13] The SDoH Data Governance Committee has decided to ingest IPV data, but IPV data will be masked on VITLAccess and Extracts until the committee determines how best to secure and share the information.

Technical Infrastructure and Data Standards

- **The UHDS can accommodate data inputs in different formats** from different vendors, and the VHIE uses a well-tested patient identity matching algorithm to link records.
- **The UHDS is aligned with the U.S. Core Data for Interoperability (USCDI),** a standard set of health data classes and data elements for data exchange (ASTP/ONC, n.d.).
- **The MDAAP incentivizes home- and community-based services (HCBS) providers** to implement EHRs to support VHIE connection.
- **CMS' AHC HRSN Screening Tool is mapped to Logical Observation Identifiers and Codes** (LOINC).
- **The following SDoH data integration activities are slated for 2025 and 2026**:
  - Improvements to enable national standards for FHIR Application Programming Interfaces (APIs).
  - Upgrading the VHIE infrastructure to enable ingestion of CMS AHC HRSN Screening Tool data.
  - Tagging of sensitive 42 CFR Part 2 data to comply with data-sharing policies.
  - Linking Medicaid claims and clinical data to facilitate reporting.
  - Developing an analytics layer featuring role-based access in the UHDS.

Methods[14]

We used a four-phased research approach to our landscape survey and needs assessment:

1. **Engage Vermont stakeholders** in two focused convenings and 10 in-depth, semi-structured small-group interviews to understand stakeholders' perspectives on SDoH data use, unmet data needs, and areas for improvement
2. **Outreach to three states** to learn about their experiences with SDoH data integration
3. **Inventory** the SDoH data landscape, best practices, and implementation strategies via a document review
4. **Evaluate and prioritize** SDoH data sources, leveraging information gleaned from the document review, stakeholder convenings, state interviews, and discussions with the State to inform data element selection and prioritization

For the document and source review, we surveyed peer-reviewed publications and gray literature, including data briefs, strategy reports, toolkits, data dashboards and repositories, and other resources (e.g., blog posts, webinars) produced by government agencies and research, policy, and provider organizations. We used the database manager Zotero to track all references. For quality assurance, two reviewers independently screened documents and sources using pre-determined inclusion and exclusion criteria. The task lead provided guidance on screening decisions and resolved any differences in screening between the two reviewers. We describe both reviews in greater detail below.

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[14] The methodological approach for stakeholder engagement and state outreach was submitted to the State in December 2024 in the *Consulting for SDoH Roadmap: Stakeholder Interview Summary Report* and is thus omitted from the "Methods" section of this chapter. We do, however, weave qualitative data collected from stakeholders and state key informants throughout Chapter 1 to provide context on the applicability of document and source review findings to Vermont.

Appendix 1 lists our research questions, inclusion and exclusion criteria, search terms, and data source feasibility assessment questions.

Document Review

We reviewed the sources included in our initial *Landscape Survey and Needs Assessment Plan*,[15] search engines for peer-reviewed literature (PubMed, Google Scholar), gray literature, public-facing information published by the State, and documents provided to NORC by the State.[16]

We cataloged eligible documents into a data abstraction form tailored to the focus area. The form included fields related to document characteristics, key takeaways and lessons learned, applications to a healthcare setting, applicability to Vermont, and more. We used the form to assess whether we had sufficient documents to answer our research questions.

Once our document inventory was complete, we conducted thematic analysis of detailed document notes to identify common takeaways, lessons learned, challenges and facilitators to SDoH data integration, best practices, and implementation strategies. To facilitate interpretation and usability of our results, we organized our findings by the ASTP/ONC elements (see **Exhibit 1.2**).

Document Review Metrics

- Summarized 90+ sources
- Documented approaches for 15 states
- Reviewed 40+ peer-reviewed articles, technical reports, fact sheets, data briefs, toolkits, and data dictionaries
- Viewed 10+ webinars and presentations

SDoH Data Source Review

Our data source review was informed by the document review, stakeholder discussions, and targeted online searches. We also reviewed an inventory of potential data sources provided by the State, supplemented with details from the VDH Data Encyclopedia, online content published by the Vermont government, and discussions with the State. We narrowed our online search of secondary sources to data dashboards, portals, and repositories, prioritizing resources from the AHRQ and the Centers for Disease Control and Prevention (CDC).

Like the document review, we cataloged each potential data source in a tailored data abstraction form. The form contained columns for basic source characteristics (e.g., data element, owner, source, Healthy People 2030 domain) and information relevant to our feasibility assessment questions.

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[15] This plan was delivered to the State in September 2024.

[16] Examples of internal documentation shared with NORC by the State include the draft *2023-2027 HIE Strategic Plan (2024 update)*, the *VDH- VHIE Integration Strategy: Data & Systems Integration Strategy Report* produced by Briljent, LLC, and the draft *HIE SDoH Data Governance Documentation (version 0.8)*.

We periodically reviewed entries in the form to determine our progress towards sufficient coverage of Healthy People 2030 domains and adjusted our search as needed. Once coverage of the domains was achieved, we iterated through prioritization of each data element based on the feasibility assessment questions, the anticipated level of effort (LOE) to integrate into the UHDS, and perceived benefits for the State.

In total, we identified and prioritized 78 potential candidates for SDoH data integration into the UHDS.

- 69% of candidate data elements are available at the census tract-level. The remainder are available at the county- or ZIP code-level.
- The majority (59%) are formatted as percentages,17% are formatted as rates, and 10% are indices. The remainder are categorical or integer (e.g., number of miles).
- Most data elements are relevant to more than one Healthy People 2030 SDoH domain. Two-thirds relate to neighborhood and environment. Slightly over 40% relate to economic stability.

Key Findings

Current SDoH Data Landscape

Key Takeaways

- The SDoH landscape is **evolving**, and there are promising efforts to collect, standardize, and disseminate interoperable SDoH data and promote its healthcare application – but these efforts are **largely in initial stages**.
- The two largest barriers are **lack of universal standards and interoperability**.
- While some best practices are emerging, there is **no consensus on which SDoH measures to use** and how to screen for SDoH.
- Data sharing **across healthcare and social service sectors** can be complex to navigate due to **interoperability barriers** across disparate data systems and **patient privacy concerns**.
- Because efforts to develop standard protocols and best practices are ongoing, an overarching data-sharing system that is **agnostic to vendors, providers, and tools** is key.
- While social service agencies have potential as an SDoH data source, there is **scant information** on how HIEs integrate and use **individual-level SDoH data from non-HIPAA-covered entities**. Data exchange across healthcare and social services most frequently takes the form of closed-loop referrals.
- There are **multi-faceted and complicated challenges at every step** of the SDoH data integration process - but research suggests **mitigation strategies** for most. Other states have had successes surmounting these hurdles (described in the “Best Practices and Implementation Strategies” section).
- There is growing evidence that SDoH data integration into patient records can lead to **better assessment and prediction of patient risk**.

We first describe **frequent challenges** of using SDoH data at various stages, from identifying appropriate data points to sensitizing stakeholders to the importance of SDoH data. Next, we review **SDoH data collection practices**. We then turn to the **landscape of SDoH data integration,** using select ASTP/ONC elements relevant to the technical aspects of SDoH data (see **Exhibit 1.2**) as a framework. We evaluate the **current state, challenges, and opportunities** of SDoH data integration into an HIE, with callout boxes noting applicability to Vermont and stakeholder feedback.

Challenges Related to SDoH Data

In 2024, the National Quality Forum (NQF) convened private and public sector stakeholders to discuss challenges in SDoH data integration. We use the challenges in NQF's resulting action brief as a framework, expounding on their list of challenges and weaving in our document review findings.

Lack of universal and well-established standards. Organizations like the American Health Information Management Association (AHIMA) have published general health data standards. However, there is no consensus on standards for defining, collecting, documenting, sharing, and using SDoH data to improve patient health and care coordination. SDoH data are often siloed across disparate clinical and social care provider systems with different technical requirements and data policies.

AHIMA Common Data Assessment Criteria (Buttner et al., 2022):

1. Accuracy: Data are free of errors.
2. Accessibility: Data are available when needed.
3. Comprehensiveness: Data contain required elements.
4. Consistency: Data are reliable.
5. Currency: Data are up to date.
6. Definition: Data elements are clearly defined.
7. Granularity: Data are available at correct level of detail.
8. Precision: Data are precise.
9. Relevancy: Data are relevant to the purpose of collection.
10. Timeliness: Documentation is current and timely.

No clear method to prioritize which SDoH should be tackled first and how. While there is recognition that SDoH plays a vital part in overall health, there is less known about which SDoH data sources are most important, most accessible, and highest quality. The literature does largely agree that selection of SDoH data elements should be responsive to community and stakeholder needs, and there are common criteria used to assess candidate data sources and data elements.

Vermont Stakeholder Feedback
Stakeholders described potential provider skepticism around SDoH data collection that may not be linked to clear use cases, suggesting that providers, many of whom are burdened by large workloads and patient panels, may be hesitant to take on the added workload of SDoH screening without clearly defined use cases for SDoH data.

Insufficient evidence or direction for using data to address HRSN. The first step in applying SDoH data in a healthcare setting is identifying patients with social risk factors and needs. The next step is to address these needs, which in turn demonstrates a return on investment (ROI) in collecting and integrating SDoH in HIEs (National Quality Partners, n.d.). While some literature has demonstrated that integration of SDoH data can improve predictive models and offer a more complete understanding of patient circumstances, stronger evidence of these benefits is needed (Cantor & Thorpe, 2018). Research requires more tangible evidence that using SDoH data to guide referrals to community-based services ultimately improve clinical outcomes.

Vermont Stakeholder Feedback
Stakeholders emphasized the need for more conversation around SDoH data governance. Some expressed concerns about HIPAA and patient confidentiality and suggested that data governance for future SDoH data be defined before expanding the VHIE to include SDoH data and implementing the UHDS.

Patient privacy, data-sharing policies, and regulatory considerations across data silos and sectors add further complexity to integration efforts. While there is agreement that governance around consent and policies for sharing and using patient data is a priority, these regulatory considerations vary depending on the data source (e.g., HIPAA-covered vs. non-HIPAA-covered entities like social service providers), type of data (e.g., SUD and mental health data are covered under additional protections, aggregate de-identified data face less restrictive data-sharing policies than individual-level data), and data use (e.g., for care delivery vs. research). Depending on these factors, one or several different consent methodologies may be used.

Resource and infrastructure strain, time burden, and workforce capacity and expertise are major limiting factors. Provider perceptions of priority and/or lack of incentives for SDoH screening compound these factors and other challenges listed above. In a survey of healthcare organizations' SDoH data capabilities, 52% reported time burden as a barrier, 44% cited lacking the necessary technology, and 32% mentioned lack of provider training and understanding of SDoH. Budget limitations are another major challenge. Even if an organization is funded to collect SDoH data, they may not have funding or incentives to actually address identified needs (e.g., patient outreach, referrals to resources). Scarce funding and lack of incentives for SDoH data collection and use in a healthcare setting may lead to providers' de-prioritizing SDoH efforts. There is evidence that some strategies are effective in incentivizing providers to collect SDoH data, including value-based payments (VBP) to providers who address SDoH, well-defined coding structures and reimbursements for identifying SDoH needs, and quality reporting and evaluation that integrates SDoH measures (Heidari et al., 2022).

Applicability to Vermont
OneCare providers are required to collect the first 15 items from CMS' AHC HRSN Screening Tool and can receive an incentive for screenings via the Population Health Model program.

Common Emerging SDoH Data Practices

While SDoH data practices continue to expand and evolve, there are several core approaches used by healthcare and social service providers, medical coders, and data staff. We discuss below **common methods and sources** for SDoH data collection, highlighting strengths, limitations, and examples. We reflect on the **current state of SDoH data integration**—a more nascent field and the crux of this chapter. We describe the **main challenges** of this work, **mitigation strategies**, and **promising opportunities** to advance these efforts in Vermont.

SDoH Data Collection Methods

There are three common methods for SDoH data collection:

1. Primary data collection from the patient
2. Provider-reported data on patient HRSN
3. Linkage to community-level SDoH data

Patient-reported Data

The first method involves **primary data collection from the patient**, typically, but not always, via established SDoH screening tools. Screening tools can be self-administered by the patient either before their visit (e.g., via text or patient portal) or upon arrival at their visit (e.g., via mobile device, tablet, or hardcopy questionnaire) or administered by the provider or clinical staff. Self-reported SDoH data are considered the best method for assessing HRSN and risk factors but often are more burdensome and time-intensive for patients and providers and may be subject to social desirability bias.

Federal law encourages but does not mandate EHRs, so EHR use for SDoH data collection may vary by provider capabilities, infrastructure, rurality, and preference. This means there may be an extra layer of complexity in integrating these data into a unified health record if data are collected via a hard copy instrument or a data system not linked to the EHR (although in the latter scenario, data collection platforms such as Qualtrics can be integrated into EHR systems like Epic, Cerner, Allscripts, and others).[18]

Example SDoH Screening Methods[17]

- SDoH tool is embedded in EHR and administered during patient rooming process or by provider
- Patient completes SDoH tool electronically or via hard copy as part of visit intake
- Patient completes SDoH tool electronically before visit to inform pre-visit care planning
- SDoH tool is integrated into other patient assessments (e.g., the broader Health Risk Assessment conducted during Medicare beneficiaries' annual wellness visits)

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[17] https://www.aafp.org/pubs/fpm/issues/2022/0300/p6.html

[18] https://www.qualtrics.com/marketplace/health-connect-integration/#:~:text=The%20Qualtrics%20Health%20Connect%20integration%20helps%20healthcare%20and%20public%20health,Allscripts%2C%20Athena%2C%20and%20more.

Exhibit 1.4 describes three widely used screening tools.[19] There is **insufficient evidence supporting any single approach** to asking about most social risk factors or HRSN. The U.S. Preventive Services Taskforce has guidance on screening for IPV and abuse of elder and vulnerable adults but not for other HRSN like transportation, food, housing, or social connection. Organizations often adapt some or all existing questions or tools to fit their service capabilities (National Committee for Quality Assurance [NCQA] & Janssen Scientific Affairs, 2020).

Vermont Stakeholder Feedback

Despite progress in implementing CMS' AHC HRSN Screening Tool, stakeholders emphasized that more work is needed to fully operationalize the use of a single screening tool. Some practices or health systems already use their own tools and are hesitant to transition to a new tool, so more coordination or incentives may be needed to integrate their screening data into the UHDS. Some provider types like DAs and Federally-Qualified Health Centers (FQHCs) have their own data collection needs and systems that may or may not be compatible with CMS' AHC HRSN Screening Tool.

Exhibit 1.4: Examples of Common Screening Tools

PRAPARE®: Protocol for Responding to and Assessing Patient Assets, Risks, and Experiences[20]

Background	Strengths	Example Uses
• Developed by the National Association for Community Health Centers (NACHC) • Validated across care settings • Questions can be selected based on population and needs • Covers sociodemographics, family, money, social and emotional health, experiences with the justice system, refugee status, and safety	• Aligns with several SDoH initiatives (e.g., Healthy People, ICD-10-CM codes, LOINC encoding, UDS reporting) • PRAPARE Implementation and Action Toolkit offers guidance on collecting HRSN and provides EHR templates for systems like eClinicalWorks and Epic (NCQA & Janssen Scientific Affairs, 2020)	• Standardize documentation of HRSN • Increase understanding of patient circumstances • Guide how community resources are integrated in care • Pinpoint gaps in community resources • Aggregate data to evaluate impacts on patient outcomes (LaForge et al., 2018)

CMS AHC HRSN Screening Tool[21]

Background	Strengths	Example Uses
• Developed by the Center for Medicare and Medicaid Innovation (CMMI) for AHC • Assesses needs across **five core domains** (housing, food, transportation, utilities, safety) and **eight supplemental**	• Gravity Project crosswalked LOINC, ICD-10-CM codes, and Standard Nomenclature of Medicine, Clinical Terms (SNOMED CT) for data entry • Food insecurity and housing quality items are fielded in CMS'	• The AHC model showed promise in addressing HRSN • The tool helped reduce healthcare costs and improve care quality

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[19] In March 2025, NORC delivered a more detailed crosswalk of HRSN/SDoH screening tools and items by Healthy People 2030 domain to AHS.

[20] https://prapare.org/wp-content/uploads/2021/10/PRAPARE-English.pdf

[21] https://www.cms.gov/priorities/innovation/files/worksheets/ahcm-screeningtool.pdf

PRAPARE®: Protocol for Responding to and Assessing Patient Assets, Risks, and Experiences[20]

domains (financial insecurity, employment, social support, education, exercise, substance use, mental health, disabilities) • Administered to patients or caregivers	Medicare Current Beneficiary Survey • One in five AHIMA providers collect the core domains; one in 10 collect the supplemental domains (NORC, 2023)	• After screening, beneficiaries from underserved groups were slightly more likely to have their HRSN resolved (CMMI, n.d.)

American Academy of Family Physicians (AAFP) Social Needs Screening Tool[22]

Background	Strengths	Example Uses
• Developed by AAFP to assist physicians in screening for SDoH, finding community resources to assist patients, and working with patients on a health improvement plan • Screens for **five core HRSN** – housing, food, transportation, utilities, and personal safety • Administered by provider or self-administered by patient	• Part of larger health equity effort (The EveryOne Project) • Includes a full form (15 questions) and short form (11 questions) for adaptation to various clinical settings • Provides actionable information • Because tool was developed by AAFP, SDoH data collection barriers may be reduced (e.g., lack of provider buy-in)	• AAFP addresses SDoH in primary care in three stages: – Screen for SDoH – Identify resources for HRSN – Connect patients to resources • AAFP offers a free Neighborhood Navigator database of community resources. Referrals can be made via the Navigator where the provider can message the resource with the patient's information

Provider-reported Data

The second method involves the capture of **provider-reported data on patient HRSN**, typically entered in an EHR using ICD-10-CM SDoH Z codes or as unstructured clinical notes. Data quality often depends on the provider. Data may be subject to bias since a patient needs a healthcare encounter to be assessed – which may inadvertently omit those most at risk for HRSN from assessment, given these individuals face more barriers to care (NCQA & Janssen Scientific Affairs, 2020).

Vermont Stakeholder Feedback
Stakeholders described limited use of Z codes in their practices. They suggested there may be other SDoH data collection methods to collect similar information that would be more useful for providers.

Depending on the EHR structure, SDoH data may require extraction to be useful. **Appendix 2** details two approaches to data extraction from EHRs – **Z codes** and **natural language processing (NLP)**.

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[22] https://www.aafp.org/dam/AAFP/documents/patient_care/everyone_project/provider-short-print.pdf

Community-level Secondary Data

The third method involves **linkage to publicly available community-level SDoH data** via patient geography. These data are available at various geographies (e.g., census tract, ZIP, county) but cannot be drilled down to the individual. These data are used as a proxy for neighborhood-level SDoH. A literature review on SDoH data integration into EHRs found that **80% of studies appended SDoH data from external sources** like the Census Bureau (Chen et al., 2020).

Most studies use ACS data for neighborhood measures (Rojas et al., 2022; Chen et al., 2020). However, there is a wealth of secondary SDoH data available to enrich individual-level data, if **patient primary addresses are geocoded** with the necessary geographic identifiers appended. Publicly available datasets such as the Environmental Protection Agency's (EPA) Air Quality Index are appended to individual-level data to shed light on environmental factors (Rousseau et al., 2022). See the "SDoH Data Source Review" section for details.

Example NLP Terminology

- To detect housing instability, terms like "homeless," "shelter," "patient sleeps in car," and "patient stays with other family" are input into the model (McCormack, 2023).
- The model scans the context in which terms are used to distinguish between past and present tense to identify current patient circumstances (McCormack).

Using Secondary Data for "Hot Spotting"

One organization used ZIP-level data to locate patients with heart disease in areas with barriers to care. Patient records were run through an algorithm to identify those likely to engage with health advocates. This process informed health advocates' outreach to 800 patients to address their HRSN and heart disease care (NCQA & Janssen Scientific Affairs, 2020).

SDoH Data Sources

Common **types of SDoH data sources** include healthcare data, social services data, and community-level data (see **Exhibit 1.5**).

Vermont Stakeholder Feedback

Stakeholders voiced three concerns that potentially make secondary data lower priority for providers:

1. Small sample sizes for rural communities
2. Aggregate neighborhood data (e.g., mean values) masking important individual differences in HRSN
3. Lack of defined use cases, especially for rural areas

Stakeholders did express that showing secondary community-level data linked to individual records based on home address would add immediate value to patients and noted it would help to have examples and use cases of how providers can incorporate and use community-level secondary data in their daily workflows.

Exhibit 1.5: Types of SDoH Data Sources

Patient-level Healthcare Data (EHR)

Strengths	• Comprehensive, efficient, and established longitudinal data capture at point of care • Facilitates safe and secure data exchange with other providers • Prioritized since patient-level data are most actionable (Cantor & Thorpe, 2018)
Limitations	• Lack of standardized collection of SDoH data • Data are often unstructured (Rojas et al., 2022) or lower quality (Chen et al., 2020) • Data collection may not be feasible due to patient burden, limited provider time/training for SDoH tools, and extra data collection costs (Rojas et al.) • Data in EHR text fields require technical data extraction (Spencer et al., 2016) • Patient privacy concerns and reluctance to share SDoH data (Campbell, 2023) • Individuals most burdened by SDoH may be more likely to forgo healthcare and thus be missed in assessment (NCQA & Janssen Scientific Affairs, 2020)
Opportunities	• Potential to aggregate, analyze, and combine individual- and community-level data longitudinally and across settings within the EHR (Chen et al., 2020) • Efforts to store SDoH data in EHRs with screeners and Z codes (Patra et al., 2021) • Geocoding patient addresses enables seamless linkage to external SDoH data sources without added provider/patient burden (Cantor & Thorpe, 2018) • EHR workflows can be used to prompt providers to collect SDoH or refer patients immediately to HRSN resources (Campbell, 2023) • NLP can quickly and accurately extract SDoH terms (Patra et al.; Chen et al.) • Monetary and non-monetary incentives can motivate providers to screen for and act on SDoH metrics (Chen et al.; Heidari et al., 2022)

Individual-level Social Services Data

Strengths	• Individual-level data collected outside of healthcare can be used to make inferences about HRSN without added patient/provider burden (NCQA & Janssen Scientific Affairs, 2020) • States use individual-level SDoH data collected by social service organizations (e.g., requests for housing, employment, and/or food assistance and use of other HRSN-related services) to guide clinical decision-making
Limitations	• Need to communicate carefully with patients/providers about use of non-healthcare data for consent and privacy (NCQA & Janssen Scientific Affairs, 2020) • Often collected in disparate data systems and not aligned with health data standards and formats (Bloom et al., 2022) • Individuals most burdened by SDoH may be more likely to forgo social services and thus be missed in assessment (NCQA & Janssen Scientific Affairs)
Opportunities	• Multi-sector CIEs have successfully paired patient-level healthcare data with individual-level data collected in other settings to inform more whole person care • As with EHRs, NLP can be used to extract individual-level SDoH data from qualitative data collected in a social service setting (Patra et al., 2021)

Community-Level Data

Strengths	• Can track community-level disparities for interventions (Chen et al., 2020) • Potential for integration without burden to patient/provider (Cantor & Thorpe, 2018) • Typically, structured high-quality data (Cantor & Thorpe) • Neighborhood-level data are readily available and can be a good substitute for individual-level data, especially for new patients or under-utilizers for whom individual-level might not be available (Predmore et al., 2019; AHIMA, 2024)
Limitations	• Requires geocoded patient addresses (Cantor & Thorpe, 2018) • May be an acceptable proxy for patient information but is not as accurate or actionable as individual-level data (Rojas et al., 2022; Cantor & Thorpe) • Considered less accurate in rural areas due to small populations across large geographic areas, lower survey response rates, and neighborhood heterogeneity • Evidence varies on accuracy of using population-level data to predict individual outcomes (Predmore et al., 2019) • Some studies found little benefit of using neighborhood data in risk assessment – though these studies are limited to systems in one region (Chen et al., 2020)
Opportunities	• Statistical methods can be used to adjust area-level analyses to provide less biased individual-level estimates (Rojas et al., 2022) • Many potential data sources to fit stakeholder/community needs (Rojas et al.) • Used to prompt screening of at-risk patients for HRSN (Cantor & Thorpe, 2018) • Used to improve performance of predictive models and tailor interventions based on neighborhood characteristics (Cantor & Thorpe)

SDoH Data Integration

This section summarizes the current state of SDoH data sharing, integration, and standardization by high-priority ASTP/ONC elements, focusing on challenges in these areas and highlighting potential opportunities for the State to leverage in integrating SDoH data into the UHDS.

- **Data sharing** provides partners with access to data that they cannot access in their own data systems.
- **Cross-sector data sharing** securely provides access to data not otherwise available across agencies.
- **Data integration** is data sharing that involves merging data on common data fields, such as personally identifiable information (PII) (name) or an encrypted unique identifier used in records linkage (Kemp et al., 2023).

Applicability to Vermont
The Data Completeness Subcommittee is dedicated to VHIE data quality and standardization.

Creation of standards for **data mapping** (linking data across systems), **data cleaning** (removing errors, duplicates, and inconsistencies), and **code harmonization** (converting different codes for like concepts into a consistent set) are best practice (Action Intelligence for Social Policy [AISP], n.d.).

Technical Infrastructure and Data Standards

Challenges in aligning hardware, software, data, and IT processes for SDoH data integration include:

- Diverse technology and terminology across stakeholders,
- Evolving standards that make it difficult to implement consistent technical solutions,
- Costs of technical infrastructure and staff, and
- Lack of provider understanding and capacity regarding IT standards.

There are concerted efforts to reach expert consensus on three types of interoperability: **semantic** (meaning and terms), **syntactic** (data exchange formats), and **technical** (data transfer protocols). There are also **vocabulary/terminology** standards for representing concepts in a clear manner between senders and receivers of information (e.g., Current Procedural Terminology, Healthcare Common Procedure Coding System [HCPCS], and ICD-10 codes) (Healthcare Information and Management Systems Society, n.d.).

These efforts are largely **vendor-, tool-, and workflow-agnostic** for a few reasons:

- SDoH data integration approaches should leverage existing infrastructure, workflows, and technical capabilities as much as possible.
- Building HIEs to connect (vs. convert) disparate systems is less time- and resource-intensive.
- Technology and vendors are subject to frequent and rapid change.

Applicability to Vermont
VITL manages the Verato Master Person Index (MPI) and helps data contributors resolve issues in identity management and patient records (Verato, n.d.; Womack et al., 2023). A primary obstacle to the integration of SDoH and other person-level data is the lack of a common MPI for all relevant datasets.

In 2023, Michigan conducted a survey of the SDoH data-sharing landscape and noted the following:

> *"In order for a user of any given information system to effectively exchange personal information with someone using any other information system, the following capacities must be established and accessible to all:*
>
> 1. *Each software system must use **structured protocols** (such as data standards) for publishing and consuming data;*
> 2. *A person's **identity must be consistently recognizable** by each involved system; and*
> 3. *The people using each system must either use the **same words to refer to the same concepts** or be able to translate across different vocabularies that are used in different contexts.*
>
> *When these three conditions are in place – along with all the attendant means of security, legality, etc. – Community Information Exchange (CIE) can occur among many different*

information systems" (Michigan Department of Health and Human Services [MDHHS], 2023, p. 43).

While there is flexibility in hardware, software, and systems, it is recommended that for underlying standards, HIEs **align with or adopt USCDI and FHIR standards** (which the State has done).

The Gravity Project is at the forefront of developing consensus-driven SDoH standards across three workstreams (**Exhibit 1.6**) and offers resources to help others put standardized SDoH data collection, exchange, and use into practice (Gravity Project, n.d.). The Gravity Project relies on a **collaborative approach that is open and free** to the public.

Support for the Gravity Project

- CMS supports their technical leadership and workstreams.
- Robert Wood Johnson Foundation (RWJF) and Kaiser Permanente fund implementation and dissemination of standards (Gravity Project, 2022).

Exhibit 1.6: Gravity Project Workstream Goals, Accomplishments, and Opportunities

Terminology Workstream		
Goals	**Accomplishments**	**Opportunities**
• Establish a **shared vocabulary** across settings • Develop a **standardized dataset** with common data elements and value sets for social risk domains for screening, diagnosis, goal setting, and interventions • **Standardize coding** for SNOMED CT, HCPCS, LOINC, and ICD-10-CM	• Developed **datasets for 17 domains**[23] • Published **240 value sets** (SDoH domain-specific and USCDI SDoH activity aligned) in the National Library of Medicine Value Set Authority Center • Developed **new ICD-10-CM Z codes** for transportation and financial insecurity, counseling for socioeconomic factors, and noncompliance with diet/medical treatment due to financial hardship	• Developing definitions and datasets for **five additional SDoH domains**: digital literacy, digital access, utility insecurity, language access, and incarceration status

Technical Workstream		
Goals	**Accomplishments**	**Opportunities**
• Advance SDoH data for interoperability and standards-based data exchange using **FHIR** • Develop **standards for collection and exchange** of SDoH data across healthcare	• Published HL7 SDoH Clinical Care FHIR Implementation Guide (IG) that supports **three use cases**: • Record SDoH data from provider, payer, and CBO • Implement closed-loop referrals	• Developing guidance on conducting assessments that include **protective factors**, **"chaining" of referrals** (e.g., multiple or secondary referrals), and shared **care coordination over time**

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[23] Domains include food insecurity, housing instability, homelessness, inadequate housing, transportation insecurity, financial insecurity, material hardship, education, employment, veteran status, stress, social connection, IPV, elder abuse, health literacy, health insurance, and medical cost burden.

Terminology Workstream		
and social services ecosystem	• Identify subgroups with a common relationship to an entity like a payer	
Implementation Workstream (formerly known as the Pilots Workstream)		
Goals	**Accomplishments**	**Opportunities**
• Piloted terminology and standards to **validate terminologies, coding, and FHIR IGs** • Focus evolved from piloting to implementation	• The New York eHealth Collaborative is working on statewide implementation of Gravity Project terminology and technical standards	• The **Implementation Affinity Group** meets monthly to discuss emerging standards, lessons learned, and tips for implementation

The **WHO** contributes to SDoH coding standards through its ICD SDoH Z codes. In 2022, WHO released **ICD-11 codes** (including more granular Z codes), although the U.S. is still using a version of ICD-10 and has not released a timeline for migrating to ICD-11. ICD-11 codes will be more easily integrated with EHRs and provide more flexibility for clinical modifications (Feinstein et al., 2023). The WHO released a crosswalk for mapping ICD-10-CM Z codes to ICD-11 (WHO, 2024).

ICD-10 vs. ICD-11 Z Codes

Select ICD-10 codes were split into multiple ICD-11 codes for granularity. For example, "insufficient social insurance and welfare support" was split into seven codes that distinguish between social insurance and welfare support and also indicate the type of support (protection against homelessness, post-prison services, child protection, and protection against domestic violence).

Healthy People 2030's five SDoH domains are widely adopted as a framework to organize, share, and benchmark SDoH data. States adapt this framework to develop their own Healthy People metrics. For example, the Healthy Northeast Ohio data dashboard tracks progress towards Healthy People metrics with 300 indicators aggregated from national, state, and local sources.[24]

Applicability to Vermont

VDH uses Healthy Vermonters 2030 Scorecards to track progress towards health goals. An interactive dashboard to visualize goals by geography is under development.

Using Healthy People as a **shared framework can promote interoperability across providers** focused on different facets of health (e.g., primary care vs. substance use), given that the determinants of substance abuse overlap with SDoH. For instance, family substance use and lack of school connectedness are both substance abuse and HRSN risk factors. Some screeners from the **Screening, Brief Intervention, and Referral to Treatment (SBIRT)** suite of tools also collect SDoH information. SBIRT's Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) asks how

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[24] The full list of sources is here: https://www.healthyneo.org/content/sites/cuyahoga/Website_Documents/Healthy_NEO_Data_Sources_Visual_-_Final_4.25.24.pdf.

often substance use resulted in social, legal, or financial problems and whether a relative ever was concerned about their use—potential proxy indicators for social and community support (New York State Office of Addiction Services and Supports, n.d.).

The **Vermont Adult SBIRT (A-SBIRT)** screening asks whether individuals have a doctor and had an annual check-up—potential proxy indicators for access to care (Center for Behavioral Health Integration [C4BHI], 2020). There are also opportunities to borrow from practices established in **Vermont's Youth SBIRT (Y-SBIRT)** initiative for the State's SDoH work. For example, in addition to conducting screening in pediatric practices and EDs, Y-SBIRT engaged CBOs like Spectrum Youth and Family Services to conduct SBIRT screening during their intake process (C4BHI, 2024).[25]

Applicability to Vermont
VT conducted A-SBIRT and Y-SBIRT in partnership with C4BHI. The State may be able to leverage SBIRT data as SDoH proxy data. Lessons learned from SBIRT screening in VT may also be helpful for SDoH efforts.

A major opportunity in improving technical and syntactic interoperability in SDoH data integration is the **standardization of open APIs.** APIs allow for vendor-neutral and secure flow of data across various systems. There are federal standards for FHIR APIs implemented through **CMS-9115-F** and **CMS-0057-F** that require organizations (e.g., Medicaid managed care plans) to use APIs to advance health data exchange. The APIs must meet certain technical standards that are updated and monitored in part by the ASTP/ONC Health IT Certification Program (CMS, 2024). Importantly, APIs facilitate accessing and merging external data from sources like the Census Bureau with clinical data based on geographic fields. The Indiana Network for Population Health (INPH) uses APIs to pair clinical data with geographic SDoH data on topics like food access and eviction (Regenstrief Institute, 2020). The UHDS currently pulls in claims and clinical data through non-FHIR methods, but **FHIR APIs offer an opportunity to more efficiently ingest** claims and clinical data into the UHDS.

Applicability to Vermont
CDC PLACES data are available for small areas across the U.S., which allows for analysis of burden and geographic distribution of HRSN and SDoH measures, regardless of population size and rurality. **Exhibit 1.7** displays prevalence estimates for a more rural county in VT, Essex County.

One novel and innovative data source available via an API is CDC's 2024 release of the **PLACES** data. PLACES includes model-based estimates from the 2022 BRFSS five-year ACS, and annual census population estimates for all counties, incorporated and census-designated places, census tracts, and ZIP Code Tabulation Areas (ZCTA) (CDC, 2024).

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[25] For information on how substance use risk factors map to Healthy People SDoH domains, see the *Incorporating the Social Determinants of Health into Substance Use Prevention* toolkit released by the Substance Abuse and Mental Health Services Administration's Strategic Prevention Technical Assistance Center (SPTAC).

Exhibit 1.7: CDC PLACES HRSN and SDoH Data for Essex County, Vermont, 2024 Release

2022 BRFSS (Age-adjusted prevalence estimates, %)[26]		
HRSN	• Social isolation (35%) • Food insecurity (12%) • Received food stamps (16%) • Housing insecurity (12%)	• Utility service shut-off threat (8%) • Lack of reliable transportation (8%) • Lack of social and emotional support (23%)
2017-2021 ACS (%)		
SDoH	• Over 65 years of age (26%) • No household internet (23%) • Persons living < 150% of Federal Poverty Line (28%) • Crowded housing (4%)	• Racial/ethnic minority status (6%) • Single-parent housings (5%) • Housing cost burden (30%) • Unemployment (6%) • No high school diploma (10%)

Legal

Consent and compliance with federal, state, tribal, and local laws are essential. SDoH data integration requires a **cross-sector approach**, where there are different laws that dictate when consent is required that vary by type of data, who has data permissions, and for what purpose (see **Exhibit 1.8)**.

The University of Pennsylvania's AISP organization helps multi-sector stakeholders create legal frameworks for responsible data sharing. AISP offers several underlying principles to abide by:

- Use **de-identified, aggregate data** rather than PII to reduce risk when possible (e.g., for use cases that do not require individual-level data, such as community health needs assessments [CHNA]).
- The **Individual Choice principle** says that people should have the chance to make informed decisions about the collection, use, and disclosure of their data (Office for Civil Rights, n.d.).
- The default rule is that sharing **PII requires informed consent**.
- Consent for disclosure of information can be granted in writing, electronically, or verbally.
- Consult with legal experts on consent models and materials.

The most relevant **federal laws** for Vermont's SDoH data efforts are the Federal Education Rights and Privacy Act (FERPA), the Privacy Act of 1974, HIPAA, and 42 CFR Part 2. Under **FERPA**, written consent must be secured from a parent or student to disclose PII and must include signature and date, disclosure purpose, description of records to be disclosed, and recipient name. The **Privacy Act** permits

FERPA and Data Sharing
According to workshop proceedings from Data Across Sectors for Health and the Network for Public Health Law, "… it is possible to have very simple permission slips that allow parents to opt in to sharing between the school and relevant public health departments or providers."

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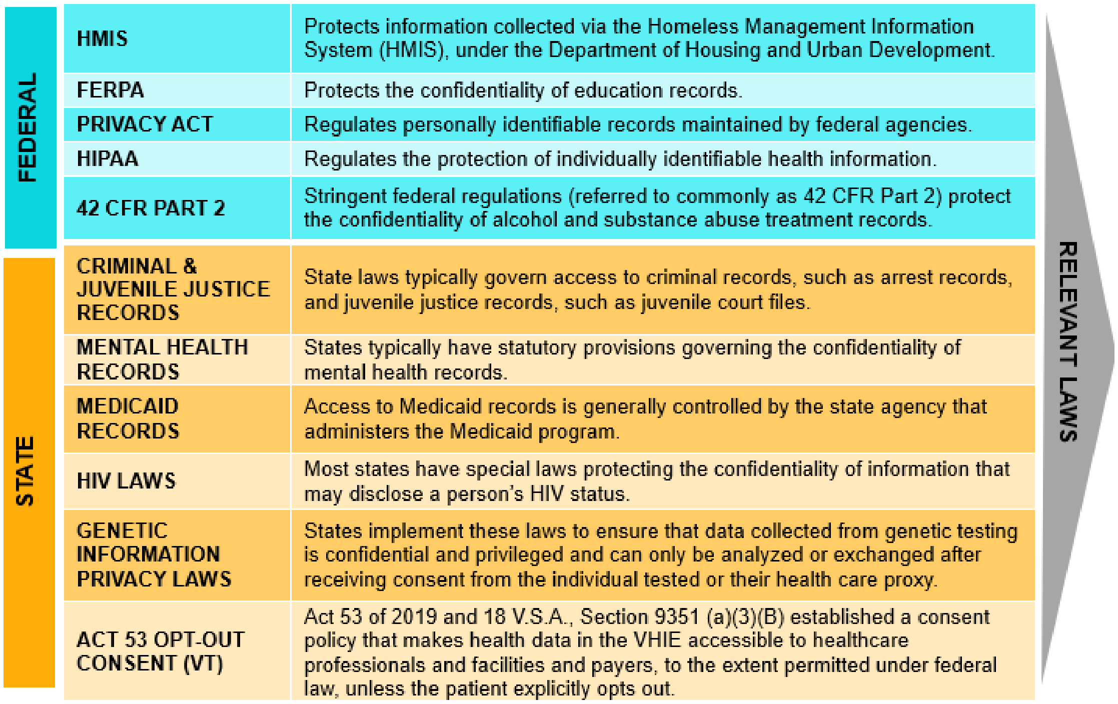
[26] All measures except for social isolation and lack of social and emotional support have a reference period of "in the past 12 months."

disclosure without consent for “routine use” – the use of a record for a purpose that aligns with the purpose for which it was collected (e.g., program planning).

In Vermont, SDoH data sourced from health information stored in the VHIE are covered by the opt-out consent policy. However, protocols and legal agreements must be put in place for organizations that do not contribute to the VHIE (many of whom are also **non-HIPAA-covered entities**) to integrate SDoH data into the UHDS. State laws may exceed federal protections in **42 CFR Part 2** (Kemp et al., 2023). The State will tag sensitive data in patient records subject to 42 CFR Part 2 for data-sharing compliance, which presents an opportunity to **use non-tagged SUD data to extract SDoH/HRSN**.

Organizations generally use **two types of legal agreements** to ensure ethical and appropriate data exchange practices: a Memorandum of Understanding and a Data Use License. These agreements are described in the “Best Practices Across ASTP/ONC Elements” section.

Exhibit 1.8: Federal and State Laws Relevant to Data Sharing[27]



FEDERAL	**HMIS**	Protects information collected via the Homeless Management Information System (HMIS), under the Department of Housing and Urban Development.
	FERPA	Protects the confidentiality of education records.
	PRIVACY ACT	Regulates personally identifiable records maintained by federal agencies.
	HIPAA	Regulates the protection of individually identifiable health information.
	42 CFR PART 2	Stringent federal regulations (referred to commonly as 42 CFR Part 2) protect the confidentiality of alcohol and substance abuse treatment records.
STATE	**CRIMINAL & JUVENILE JUSTICE RECORDS**	State laws typically govern access to criminal records, such as arrest records, and juvenile justice records, such as juvenile court files.
	MENTAL HEALTH RECORDS	States typically have statutory provisions governing the confidentiality of mental health records.
	MEDICAID RECORDS	Access to Medicaid records is generally controlled by the state agency that administers the Medicaid program.
	HIV LAWS	Most states have special laws protecting the confidentiality of information that may disclose a person’s HIV status.
	GENETIC INFORMATION PRIVACY LAWS	States implement these laws to ensure that data collected from genetic testing is confidential and privileged and can only be analyzed or exchanged after receiving consent from the individual tested or their health care proxy.
	ACT 53 OPT-OUT CONSENT (VT)	Act 53 of 2019 and 18 V.S.A., Section 9351 (a)(3)(B) established a consent policy that makes health data in the VHIE accessible to healthcare professionals and facilities and payers, to the extent permitted under federal law, unless the patient explicitly opts out.

States obtain patient consent for integrating, sharing, and using their data in HIEs in a variety of ways, including, but not limited to:

- **Opt-out** policies like Vermont’s, where a patient must explicitly opt out of their data being shared (this type of policy is common among HIEs that maintain longitudinal records)
- **Opt-in** policies where patients give explicit permission for data sharing

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[27] Adapted from: Kemp, D., Hawn Nelson, A., & Jenkins, D. (2023). Yes, No, Maybe? Legal & Ethical Considerations for Informed Consent in Data Sharing and Integration. Actionable Intelligence for Social Policy. University of Pennsylvania.

- **Segmented consent** forms that allow patients to select which types of data they feel comfortable sharing (e.g., medical, mental health, substance use) or select the entities with which they are willing to share data
- **Universal consent** forms that document consent across all data types
- **Digital consent platforms** that allow patients to update their consent and see how their data are used and by whom

Applicability to Vermont
For data collected in non-HIPAA-regulated settings, it is best practice to obtain informed consent from individuals to integrate their data into the UHDS.

Under HIPAA, a healthcare provider may disclose the minimum necessary personal health information (PHI) to social service providers without the consent of the individual if the healthcare provider believes the disclosures are a necessary component of, or may help improve, the individual's health. HIPAA-covered entities may also disclose PHI to non-HIPAA-covered entities (e.g., social service agencies) with an authorization signed by the individual. Under a single authorization, multiple non-HIPAA-covered entities can be identified as recipients of PHI with the consent of the individual (Chesapeake Regional Information System for our Patients [CRISP], 2023).

While the literature on consent models specific to using **SDoH data managed by non-HIPAA-covered entities** is limited, guidance released by Michigan's CIE Task Force states:

> *"In all contexts not subject to existing regulatory frameworks, entities conducting CIE activities should ensure that data collection and use is subject to consumers' informed consent. A designated governing body should establish policies outlining specific requirements for solicitation and preservation of informed consent and associated consumer protections, especially for interaction not already governed by existing regulatory frameworks" (MDHHS, 2023, p. 58)."*

The Task Force recommends drafting a **"Bill of Rights"** for patients and communities to review and understand their protections (MDHHS, 2023). We discuss additional state-specific approaches to consent in the "Best Practices and Implementation Strategies" section.

Exhibit 1.9 lists Maryland's HIE (CRISP) **onboarding requirements for non-HIPAA-covered CBOs**.[28]

Exhibit 1.9: Onboarding Agreements for Non-HIPAA-covered CBOs in CRISP

CRISP Document	Description
Non-HIPAA-covered Entity Participation Agreement	Authorizes the use of CRISP for sending and receiving SDoH referrals, entering and viewing the CBO's screening data, and capturing patient HIPAA authorization to view clinical information

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[28] Additional information on CRISP's consent process for non-HIPAA-covered entities can be found in the "Maryland State Spotlight" section later in this report.

CRISP Document	Description
CRISP Program document	Confirms the CBO’s willingness to receive program referrals through the CRISP Referral Tool
CRISP Program Description	Includes the name and description of each of the CBO’s programs/services that should be included in the CRISP Referral Tool
Bulk User document	Documents staff who should have access to the CRISP CBO Referrals Tool to accept referrals (CRISP, 2023)

Policy

Federal, state, and local policy levers are essential to capitalizing on available assistance in collecting and integrating SDoH data. There are several ongoing and forthcoming efforts and policies that present opportunities for the State to leverage for the UHDS.

In a survey of healthcare entities’ SDoH data capabilities, respondents emphasized **monetary and non-monetary incentives** to increase SDoH data use (Heidari et al., 2022). Monetary incentives include VBP programs that reward providers who close gaps in HRSN or reimbursement mechanisms for SDoH data collection. Non-monetary incentives include integrating SDoH data into quality reporting or research to demonstrate cost-savings and increased quality of care.

Vermont Stakeholder Feedback
Stakeholders emphasized the importance of technical and financial support to providers, particularly CBOs and primary care practices, to enable them to collect data electronically and improve their EHR systems for data sharing. Stakeholders noted that the State may want to consider providing support and funding for new EHR implementation and developing a standalone screening and reporting tool.

CMS offers several policies to support providers in addressing HRSN. **Medicaid 1115 demonstration waivers** can be used to test approaches to addressing HRSN among the Medicaid population. CMS’ increased support for **ILOS policies** allows Medicaid plans flexibility to address HRSN in lieu of other medical services (e.g., providing nutritious meals). ILOS can be structured to require engagement with CBOs, thus increasing the pathways for CBOs to access funding for their services (MDHHS, 2023).

Applicability to Vermont
VT’s Global Commitment to Health Demonstration 1115 Waiver is used to fund MDAAP, which provides health IT infrastructure support to Medicaid providers to increase connectivity to VHIE (Department of Vermont Health Access [DVHA], n.d.).

Physicians can bill for clinical resources used to identify unmet HRSN among the Medicare population under **HCPCS code G0136,** the payment code for completion of SDoH risk assessments (Domestic Policy Council & Office of Science Technology Policy [OSTP], 2023). CMS issued another potential policy lever via **CMS-1802-F** in March 2024. This rule updates the fiscal year 2025 Skilled Nursing Facility (SNF) Quality Reporting Program by requiring SNFs to submit four new SDoH assessment items on living situation, utility difficulties, and food insecurity in the minimum data set (CMS, 2024).

CMS' Interoperability and Prior Authorization Final Rule (**CMS-0057-F)** requires payers like Medicare Advantage and Medicaid managed care plans to adopt FHIR APIs to improve HIE. This policy includes a patient and provider access API and payer-to-payer API and will be implemented by January 1, 2027 (CMS, 2024). This presents an opportunity to increase the amount of payer (claims) data in the UHDS.

Vermont is participating in Cohort 2 of CMS' **AHEAD model**. The model advances health equity through use of social risk adjustment of provider payments and HRSN screening in hospitals and primary care practices to identify unmet needs and connect patients to resources (CMS, n.d.). Model participants can leverage several tools in screening for HRSN and strengthening their relationships with CBOs, including incorporating social workers, community health workers (CHW), or other staff responsible for resource coordination (CMMI, 2023).

In 2023, the White House released an **agenda to increase emphasis on SDoH** and support evaluation of increased payments to providers for assessing and addressing SDoH. This agenda resulted in updates made by the Internal Revenue Service to the instructions in **Schedule H (Form 990)**, which guides hospitals on reporting activities as community-building programs and benefits. The instructions now clarify that hospital spending on food security and other SDoH may be allowable community benefit activities.

Applicability to Vermont
AHS/VITL currently link Medicaid claims and clinical data, which covers one-quarter of VT's population. The State is exploring including Medicare claims data in VHIE through AHEAD model participation. The addition of Medicare data would result in linked clinical and claims data for 45% of Vermonters.

The agenda also emphasizes connecting veterans to social services. The federal government's **Assessing Circumstances and Offering Resources for Needs (ACORN) initiative** screens veterans for HRSN using the ACORN screening tool.[29] This initiative is currently implemented in over 25 Veterans Affairs medical centers (Domestic Policy Council & OSTP, 2023).

Applicability to Vermont
Several states are involved in the ACORN initiative (Cohen et al., 2024). It may be helpful for VT to monitor the rollout of ACORN as participation presents an opportunity as a data source on a population at risk for HRSN, veterans.

SDoH data are often used in **VBC programs** to encourage providers to address HRSN. Reimbursement systems compensate providers for identifying and managing HRSN (e.g., as direct contracts, care management fees, or adjusting quality reporting measures to account for social risk factors) (Heidari et al., 2022; Domestic Policy Council & OSTP, 2023). VBC programs typically require providers to integrate SDoH, like **social risk adjustment**, into their risk stratification processes (Rojas et al., 2022; NCQA & Janssen Scientific Affairs, 2020). Risk stratification can inform which populations to prioritize when addressing HRSN and guide VBC decisions more broadly (NACHC, 2024).

To motivate providers to help reduce disparities, some VBC programs add **progress benchmarks** to their requirements (Domestic Policy Council & OSTP, 2023). In some states, providers are allocated **VBP incentives** based on their progress in addressing HRSN (Heidari et al., 2022; Domestic Policy

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[29] https://www.va.gov/HEALTHEQUITY/docs/ACORN_Screening_Tool.pdf

Council & OSTP). Many VBC programs prioritize funding providers that primarily serve disadvantaged populations (NCQA & Janssen Scientific Affairs, 2020; Predmore et al., 2019; NACHC, 2024).

These programs also encourage providers to develop **value-based partnerships** with community stakeholders. For example, providers may engage community partners by offering them a portion of their shared savings (NCQA & Janssen Scientific Affairs, 2020). Health systems may consider investing portions of their VBPs into their community partners, who often lack financial resources and/or technical infrastructure and knowledge to participate in HIEs (Domestic Policy Council & OSTP, 2023).

Applicability to Vermont

The HIE Strategic Plan notes several ways its framework supports VBC and management of total cost of care:

- **Integration of Diverse Datasets:** The inclusion of clinical, SDoH, person-generated, and other data sources in the HIE provides a holistic view of patients and is critical for VBC.
- **Analytics Layer Development:** The analytics layer will support analysis by demographics, health, and geography and help identify patterns in care delivery and outcomes to support decision-making in VBC.
- **Integration of Public Health Systems**: This integration provides a comprehensive view of population health and overall trends, which supports VBC by informing effective interventions.
- **Incentive Payments for Digitization and Connections:** The plan includes incentives for providers to connect to the VHIE. This improves data sharing and care coordination, which are key to VBC.

Implementation Services

Common **programmatic challenges** in implementation include:

- Lack of regular stakeholder engagement,
- Competing stakeholder priorities, and
- Too much emphasis on technical standards rather than the aspects of implementation that concern stakeholders most, such as defining use cases and workflows.

Applicability to Vermont

The State established a steering committee that meets regularly with UHDS stakeholders to gather input on the current needs and future goals of stakeholders.

These challenges can be alleviated by **engaging diverse stakeholders early and often** to help garner support for SDoH data integration to succeed and be responsive to an ever-changing landscape. Sustained and frequent stakeholder engagement sets the stage for several opportunities, including:

- Leveraging existing community and healthcare networks for implementation support,
- Creating peer initiatives to develop a suite of informational resources,
- Developing educational and training materials for data submitters, users, and the public, and
- Paving the way for stakeholders to own the areas of the UHDS that matter most to their work.

Adequate workforce and **technical services** are additional challenges. Easy-to-use, automated processes for SDoH data collection, integration, and use can reduce staff and time burden and the need for technical workforce capabilities. One study found that stakeholders preferred **timely data over "perfect" data** since timeliness of information to guide care decisions is a priority (Gordon et al, 2024). It may be that more timely data with some quality concerns are more useful to stakeholders, especially those seeking data to inform their care delivery, than data that pass all QC checks.

AISP suggests "…a **developmental approach to data integration**, beginning with basic data sharing for aggregate, descriptive analysis, and building with complexity as use cases are successful" (Nelson et al., 2020). Using **publicly available, census tract-level data** sources geocoded to patient addresses as a proxy for SDoH data can be a solution to reduce workforce and time burden, build stakeholder data readiness and capabilities, and establish early use cases demonstrating the value of SDoH data in healthcare.

Data Sharing & Integration Best Practice
In their primer on integrating data, AISP states: "In most cases, we recommend starting with data sharing and integration work that can be reported in the aggregate and build on early successes toward the much more challenging work of coordinated operations and service delivery at the individual level" (Nelson et al., 2020).

Measurement and Evaluation

A strong measurement and evaluation plan helps determine **strengths and areas for improvement** and creates a suite of evidence to **increase community support and funding**. Challenges associated with measurement and evaluation include:

- Defining quality measures to track,
- Difficulties establishing baseline measures,
- Lack of staff capacity and knowledge, and
- Limited technological resources.

Standard data processing procedures and analytic tools help lessen challenges. Data protocols may detail how to handle missing values and outliers, transform data from wide to long format or vice versa, and apply recodes to standardize code frames. Using tools like dashboards can increase access to high-quality data resources for under-resourced providers (Gordon et al., 2024; MDHHS, 2024).

ASTP/ONC's Measurement Areas:

1. Process: Track individual-level impacts (e.g., screenings, closed-loop referrals)
2. Utilization: Track SDoH data exchange (e.g., service volume and participation)
3. Quality: Assess associations between improvements in population-level health outcomes and SDoH data exchange, referrals, and use of services
4. Financial: Measure cost-savings for improved health outcomes, reduced costs, and cost-benefit analysis

Applicability to Vermont
The State publishes VHIE outcomes-based metrics on process and utilization but not quality and financial. **Appendix 3** maps the State's existing metrics to ASTP/ONC's measurement areas.

Applicability to Vermont
In 2023, 11 VT health centers reported into the UDS. The UDS collects data on social risk and produces SDoH/HRSN dashboards and rankings (HRSA, n.d.).

Existing measurement and evaluation strategies for health data can also be applied to SDoH data. **HEDIS reporting** is the gold standard in healthcare performance measurement (NCQA, n.d.). In 2023, HEDIS developed a new **Social Need Screening and Intervention (SNS-E) measure** to assess the percentage of members who are screened for and receive an intervention for unmet needs, including food, housing, and transportation (Alexander, 2023). Health plans use EHRs, HIEs, case management systems, and claims to report the SNS-E measure (Reynolds, 2022).

Like HEDIS reporting, HRSA's **UDS reporting** is supported by existing standardization and a reporting infrastructure. **Exhibit 1.10** displays metrics for the 11 health centers in Vermont that reported into the UDS and served 198,334 patients in 2023.

Exhibit 1.10: UDS Reporting Metrics Related to SDoH/HRSN, Vermont Health Centers[30]

UDS Measure	% of Total (N=11)
Health center collects data on patients' social risk factors outside of UDS data	82%
Which standardized screener(s) for social risk factors did you use during the year? (Select all that apply)	
PRAPARE	33%
CMS AHC HRSN	11%
WellRX	11%
Other	56%
Did not use standardized tool	11%
HRSN positive screenings (out of total number of patients served)	
Food insecurity	5%
Housing insecurity	3%
Financial strain	6%
Lack of transportation/access to public transportation	2%

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[30] https://data.hrsa.gov/tools/data-reporting/program-data/state/VT/table?tableName=EHR

Best Practices and Implementation Strategies

Key Takeaways

- **There is no one-size-fits-all approach to SDoH data infrastructure.** SDoH efforts should be tailored to the specific needs of stakeholders and communities. However, one can still learn from others' experiences with common challenges and adapt mitigation strategies that have proven successful.
- **The development of HIEs takes time and requires flexibility.** As states enhance their SDoH data infrastructure, lessons are learned, new strategies and technologies are developed, and stakeholder and community needs evolve. Implementing a **phased approach** responsive to changing priorities allows for stakeholders to leverage key learnings to fine-tune future steps and enhances sustainability.
- **Stakeholders should be engaged in development, implementation, evaluation, and maintenance.** Stakeholder feedback can help determine how to customize, evaluate, and sustain data infrastructure to maximize HIE utility for all those involved. Providers and community partners also play a key role in elevating the voices of the individuals whose data are compiled and exchanged.
- **Careful considerations should be made regarding how SDoH data will be translated into actionable insights.** Once the value of SDoH data is made explicit to stakeholders, stakeholders are often more willing to invest their resources in data systems. Collection of any data element needs to be purposeful and deliberate with a clear use case of how the data guide provider action.
- **States take varying paths toward SDoH data integration and exchange.** Some states use a decentralized, localized approach to SDoH data exchange; for example, California, Michigan, and Colorado serve as more of a coordinating center to regionalized "hubs" or lead sites who manage the daily implementation of SDoH data work, tailoring strategies as needed to accommodate local context. On the other hand, states like Maryland and Oklahoma use a centralized organizational structure.
- **While states integrate SDoH data using different approaches, most use SDoH data to improve patient health in similar ways.** Most (if not all) states use HRSN data to match patients with resources and services to meet their needs, prioritizing closed-looped referrals to ensure resources are accessed and adequately address needs. Other use cases include care coordination and benefits assistance.
- **SDoH data have substantial and diverse potential for healthcare application.** Organizations use SDoH data in a range of impactful and creative ways, including:
  - Linking patients to resources
  - Guiding patient care
  - Stratifying patients for interventions
  - Public health surveillance and reporting
  - Evaluating progress towards target health goals
  - Conducting research, CHNA, or gap analyses by area
  - Informing health equity plans and policy

In this section, we overview how states **collect, integrate, and disseminate** SDoH data and support their partners in SDoH data integration. Although this list is not exhaustive, these examples were most frequently cited and had sufficient documentation. We highlight **select outcomes and successes** of state efforts. We "spotlight" the three states identified as exemplars of successful SDoH data integration (Michigan, Maryland, and Oregon), integrating our findings from discussions with key informants from each state in callout boxes. We use the ASTP/ONC elements to summarize **best practices across states**. We end with a description of **resources required** to implement best practices.

How Other States Compile, Use, and Share SDoH Data

Exhibit 1.11 summarizes practices used by agencies, health systems, and networks across states to collect, integrate, analyze, and disseminate HRSN and SDoH data. For a few states, we also note positive outcomes resulting from the state's SDoH data efforts.

Exhibit 1.11: Examples of How States Compile, Use, and Share SDoH Data

ARIZONA (Hovey et al., 2021; Kramer, 2022)

Data collection & integration:	Analytics & dissemination:	Healthcare application:
AZ's Medicaid agency and HIE use CommunityCares (powered by Unite Us) to make closed-loop referrals, monitor real-time patient alerts, and access a resource directory and HRSN screeners.	CommunityCares' dashboards visualize referral outcomes, service receipt, CBO activities, and other health metrics (e.g., COVID-19 immunization).	Providers and community partners use the platform's analytic tools to examine how social risk factors influence health outcomes and to guide patient referrals to different services.

SAN DIEGO, CALFORNIA (NCQA & Janssen Scientific Affairs, 2020; EMI Advisors, 2023)

Data collection & integration:	Analytics & dissemination:	Healthcare application:
The San Diego Healthcare Quality Collaborative (SDHCQC) created a community hub to link patients to CBOs. SDHCQC uses San Diego's 2-1-1 CIE to exchange HRSN data (collected via screening at point of care), link health data to SDoH geographic data, and use claims data to categorize patients by risk.	The 2-1-1 CIE disseminates data via a dashboard summarizing demographics, housing/utility insecurity, access to technology, and nutrition, as well as an annual client profile report describing the patient population and their HRSN.	250,000+ members consented to the exchange of their data with the 100+ healthcare and social service organizations that use the platform. CHWs use patients' HRSN data in care coordination.

CALIFORNIA (Tong & Hinton, 2022; Department of Health Care Services [DHCS])

Data collection & integration:	Analytics & dissemination:	Healthcare application:
CA's Whole Person Care (WPC) pilot sites increase care coordination for Medicaid enrollees. Each site has its own lead entity and collaborates with partners on infrastructure for data sharing, care coordination, and measuring performance.	Sites produce mid-year/annual reports with metrics on overall health, emotional health, ED visits, and services receipt and use dashboards to show progress toward HRSN indicators.	Several sites use CA's universal risk assessment tool to stratify patient acuity across SDoH domains. Care coordinators engage with CBOs to coordinate social services for housing, employment, and substance use. Providers apply SDoH data in risk assessments to prioritize referrals.

Success Story!

Within two years, ED visits and hospitalizations decreased across all sites. There were improvements in diabetes and blood pressure control; follow-up rates after hospitalization for mental illness; patient engagement with SUD treatment; and providers' use of care plans and suicide risk assessments.

COLORADO (Office of eHealth Innovation [OeHI], n.d.)

Data collection & integration:	Analytics & dissemination:	Healthcare application:
OeHI launched regional social HIEs (SHIE) for SDoH data exchange. SHIEs are tailored to regions; however, core services include resource inventories, identity management, a digital consent platform, and a scalable data-sharing platform.	The SHIE analytics portal is in progress until 2025. CO published an infographic to disseminate information on SHIE's purpose and objectives.	OeHI plans to build out the data infrastructure to facilitate coordination of in-person and remote services and improve health equity across CO.

FLORIDA (Rojas et al., 2022)

Data collection & integration:	Analytics & dissemination:	Healthcare application:
Baptist Health[31] integrated 30,800+ variables from 14 data sources.[32] Baptist Health uses DeGAUSS[33] to link patient and SDoH data via geography. To ensure processes are current and can be replicated: 1) Data staff maintain user-friendly and technical data dictionaries, 2) IT staff monitor sources for updates, and 3) IT and data staff refresh data as needed.	Baptist Health developed an SDoH data dashboard in Tableau that community focus groups use for their CHNAs. Stakeholders in the hospital system create and exchange other data visualizations to inform SDoH programming. The hospital system also publishes CHNA findings in public-facing reports.	SDoH data are integrated in case management dashboards and risk stratification algorithms to guide identification of patient HRSN and inform appropriate health plan matching. Baptist Health maps geocoded data and overlays community resources with HRSN to identify resource gaps in hospital service areas.

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[31] FL's largest not-for-profit hospital system with locations in Miami-Dade, Broward, and Palm Beach counties

[32] Variables were sourced from: ACS, Annual Homelessness Assessment Report, FL Environmental Public Health Tracking, U.S. Small-Area Life Expectancy Estimates Project, CDC Wide-Ranging Online Data for Epidemiologic Research, Mapping Medicare Disparities Tool, Fatality Analysis Reporting System, Area Health Resource File from American Medical Association, National Center for Health Statistics, CDC Diabetes Interactive Atlas, USDA Map the Meal Gap, National Center for HIV/AIDS Viral Hepatitis STD and TB Prevention STI Atlas, National Center for Education Statistics, and FL BRFSS.

[33] DeGAUSS is a HIPAA-compliant open-source geocoding software available via GitHub; see https://degauss.org/ for more details.

INDIANA (Regenstrief Institute, 2020)

Data collection & integration:	Analytics & dissemination:	Healthcare application:
The INPH links high-quality, publicly available data to patient data through geographic identifiers to create individual-level whole person records.	INPH is one of the largest, publicly accessible inter-organization data repositories in U.S. and offers customizable tools for users to construct SDoH analytic datasets.	Health systems within INPH use datasets and tools to enhance public health surveillance.

MARYLAND (CRISP, n.d.) (see "State Spotlights" section for further details)

Data collection & integration:	Analytics & dissemination:	Healthcare application:
CRISP is MD's health data utility (HDU) and is mandated by law to provide real-time data to providers and CBOs. The health department, nursing homes, electronic health networks, and prescription drug dispensers must provide data to CRISP (Raths, 2023). CRISP developed a vendor-, tool-, and workflow-agnostic system to collect and integrate clinical, claims, and SDoH data.	CRISP's Health Equity Explorer (hMetrix, 2023) summarizes community health disparities and SDoH using all-payer hospital case mix data[34] and the ACS in two reports. The Disparity Index report visualizes trends relative to a state, county, or ZIP code. The SDoH report shows social disparities (e.g., income) at county- or ZIP code-level.	CRISP enables whole person records with functionality that supports easy communication between providers and CBOs for referrals. The Health Equity Explorer data help support grant applications, identify need for interventions, and evaluate impacts of health investment and interventions.

MARYLAND (Maryland Healthcare Commission, 2023)

Data collection & integration:	Analytics & dissemination:	Healthcare application:
MD FQHCs collect SDoH data via the PRAPARE tool for entry into EHRs. Some implement the full tool while others use a targeted version. Most FQHCs work with community partners to track referrals and outcomes in referral management systems.	Some FQHCs use the referral management systems to also coordinate the exchange of patient HRSN data between providers.	FQHCs use the referral system to improve, document, and monitor care coordination across health and social services.

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[34] Includes inpatient, outpatient, and ED claims

MICHIGAN (MDHHS, 2024) (see "State Spotlights" section for further details)

Data collection & integration:	Analytics & dissemination:	Healthcare application:
MDHHS' SDoH Hubs allow for social and health services partners to coordinate data collection, monitoring, and evaluation. Hubs collect patient screening data and secondary census, vital statistics, and CHNA data for integration into a statewide CIE. MDHHS standardizes data exchange with shared screening tools and data collection standards.	Hubs publish annual reports that include best practices and successes. Each hub has its own dashboard that features easy-to-interpret visualization tools for mapping SDoH-related metrics to monitor and evaluate progress towards community health and HRSN goals.	MI's HIE supports anonymous closed-looped referrals to connect patients with assistance for more sensitive HRSN.

NEBRASKA (Hovey et al., 2021; CyncHealth, 2022)

Data collection & integration:	Analytics & dissemination:	Healthcare application:
CyncHealth partners with United Way to implement an HRSN screening tool and uses Unite Us for the Unite NE HDU, which features a resource directory, secure closed-loop referrals and collaborative outcomes tracking, and data exchange.	CyncHealth collaborates with the Gravity Project on approval for new SDoH/HRSN coding and terminology.	CHWs help facilitate closed-loop referrals. CyncHealth also offers a self-referral system where patients can access a curated database of local resources themselves to facilitate their own care, removing the access barrier for those without a primary care provider.

Success Story!

As of 2022, 3,700+ people from 466 organizations had used Unite NE to exchange data, resulting in 2,400+ closed-loop referrals facilitated by CHWs and translators. Over 550 patients were connected to housing, and 300 received food assistance.

NORTH CAROLINA (United Way, 2020; Ritzo & Little, 2024)

Data collection & integration:	Analytics & dissemination:	Healthcare application:
NC's Department of Health and Human Services (NCDHHS) manages NCCARE360 via the Unite Us Platform. Referral and outcomes technology are aligned with existing workflows. NCDHHS	NCCARE360 releases periodic reports highlighting community impact and quarterly reports with metrics on number served, referrals made, and HIE users (e.g., NCCARE360 Quarterly Report for September 2021).	NCCARE360 offers care navigators to high-risk patients. Navigators work with patients' health providers to ensure care coordination for their HRSN.

standardized HRSN screening to facilitate data integration across systems.		
OKLAHOMA (OK Health Care Authority, 2024; MyHealth Access Network, n.d.; Miller & Kendrick, 2024)		
Data collection & integration:	**Analytics & dissemination:**	**Healthcare application:**
The OK State Health Information Network Exchange (OKSHINE) facilitates providers' and public health authorities' access to consolidated health records, encounter notifications, and SDoH screening data. OKSHINE sends SMS text messages to patients' cell phones with a link to the SDoH screening tool. Data are then ingested into the HIE for sharing with healthcare providers.	OKSHINE uses the HealthTech electronic Clinical Quality Measure platform to generate 35 standard quality measures and 50 reports for providers to satisfy reporting requirements for federal and state programs.	Community referrals are automated and immediate based on patients' SDoH screening responses. OKSHINE's mobile screening enables patients to be connected immediately to a customized list of resources for housing, food, utility, interpersonal safety, and transportation. Patients who screen positive for HRSN are also presented the option to connect with care navigator staff for 1:1 consultation. This approach minimizes provider burden while providing timely community referrals.
Success Story!		
From 2018 to 2024, OKSHINE delivered 5 million invitations to the SDoH mobile screening system and received 862,000+ responses (84% delivery rate; 21% response rate). About 20% who responded screened positive for at least one HRSN and were then provided a list of community-based resources tailored to their needs.		
OREGON (Reuland et al., 2021) (see "State Spotlights" section for further details)		
Data collection & integration:	**Analytics & dissemination:**	**Healthcare application:**
The OR Health Authority (OHA) and Oregon Pediatric Improvement Partnership (OPIP) created a child health complexity model that combined parent and child data from the Medicaid Management Information Systems (MMIS) and Integrated Client Services (ICS) database.	OHA and OPIP release annual reports summarizing social and health complexity among the patient population to each coordinated care organization (CCO) and county.	Policymakers and community stakeholders use this pediatric model to shape priorities for family population health planning and demonstrate the value of strategic care coordination and resource allocation among Medicaid/ Child Health Insurance Program (CHIP)-insured children.

DALLAS COUNTY, TEXAS (AHA, 2020)		
Data collection & integration:	**Analytics & dissemination:**	**Healthcare application:**
The Parkland Center for Clinical Innovation (PCCI) integrates data from the hospital system's EHR, the local cancer registry, CHNAs, and focus groups.	PCCI conducts risk analyses to identify ZIP codes most affected by cancer and shares findings with care team members to refer at-risk patients to resources.	Providers use ZIP code-level data on breast cancer diagnoses to focus outreach efforts. PCCI worked with target communities to launch mobile mammography units and a breast cancer awareness campaign.

UTAH (Weber, 2023)		
Data collection & integration:	**Analytics & dissemination:**	**Healthcare application:**
Intermountain Health embeds an SDoH screener in pre-appointment texts and their digital ED registration. These data are integrated as Z codes into EHRs and used to predict social risk. The system allows exchange of alerts on patient events and encounters.	The health system creates accessible dashboards that track HRSN and resource referral rates, including the number of referral-related resolutions.	Providers within the system use the real-time alerts and dashboards to determine which members should be prioritized for resource referrals and what type of services are needed. Automated risk prediction is used to validate the HRSN of patients and examine food insecurity.

Though less extensively documented, other states have also implemented innovative SDoH data strategies. The Baylor Scott & White Health System in Dallas County, Texas uses **student volunteers to conduct HRSN screenings**. Positive screenings are documented with Z codes. Providers make referrals to resources, including food, childcare, and employment services (AHA, 2019).

Delaware's Health Information Network (DHIN) enhanced their platform by adding data sources from 40 new partners, including SNFs, Delaware's Division of Substance Use & Mental Health, and five Pennsylvania HIEs. DHIN **linked patients' lab results to race/ethnicity data** (DHIN, 2023).

Washington's Accountable Community of Health partnered with the HealthierHere collaborative to **manage a network of community hubs to address HRSN** of Medicaid beneficiaries in their service area. These community hubs enter relevant HRSN data into the Connect2 CIE and use the CIE to exchange patients' HRSN data for closed-loop referrals (Bloom et al., 2022).

Success Stories

- **Dallas County, TX:** 56% of patients accepted the assistance offered. There was an 88% drop in the 30-day re-admission rate among these patients (AHA, 2019).
- **Humboldt County, CA:** There was a 58% decrease in admissions to the psychiatric health facility and a 62% decrease in admissions to the Crisis Stabilization Unit one year after assisting previously admitted homeless patients with housing. Over 91% of patients who received support remained in housing (Activate Care, 2024).

Washington CHAS Health clinics use the **PRAPARE screening tool and transform the data into Z codes** for integration into their system. Clinic staff use screening data to visualize PRAPARE scores for SDoH metrics overall and by sociodemographics. Patients that receive positive screenings for HRSN are matched with a CHW, who refers them to additional resources and identifies concrete next steps in accessing services (Washington Association for Community Health & CHAS Health, 2024).

Lastly, in rural Humboldt County, California, the North Coast Health Improvement and Information Network and Department of Health and Human Services partnered with Activate Care to increase delivery of whole person care and **reduce ED use among the chronically unhoused population**. Stakeholders across healthcare, social services, and public health contribute a range of data types, including EHRs and public and private records. Activate Care's CareHub™ platform is connected to contributing organizations' HIEs and the Homeless Management Information System so that providers can share screening data, facilitate longitudinal care coordination, issue and track referrals, and log critical patient events like ED admissions and incarceration (Activate Care, 2024).

Applicability to Vermont
Humboldt is a rural county in CA that has successfully integrated HRSN screening data to address needs among their chronically unhoused populations.

How Other States Support Partners

Technical assistance refers to any type of support provided by a state to assist its partners with collecting, standardizing and interpreting data, increasing interoperability in HIEs and data-sharing platforms, and monitoring and evaluation. **Appendix 4** summarizes types of support frequently provided by states.

Often, **state agencies do not directly provide support**. Instead, states fund the development of platforms or entities responsible for technical assistance and contract vendors to implement software and tools to address partners' data needs. It is common for states to fund the **formation of implementation sites** (referred to as community or regional hubs or lead entities), typically based on geography or service area, to whom the state provides overall guidance on governance, data standardization, and protocols without imposing strict structure. This decentralized approach allows for stakeholder ownership and tailoring of SDoH efforts as the state functions like a coordinating center.

Designation of Implementation Sites

- **CA** designates "lead entities" in WPC pilots to serve as points of contact for partners and facilitate data management and implementation in their service area (Tong & Hinton, 2022).
- **CO's** regional SHIE hubs use technology to connect Medicaid beneficiaries with resources related to housing assistance, barriers to care for those seeking SUD help, and re-integration for previously incarcerated persons (OeHI, n.d.).
- **MI's** regional SDoH hubs provide the administrative and data infrastructure to improve data sharing among partners (MDHHS, 2024).

Michigan Interview Findings
Interviewees said the Task Force was key to establishing concrete data governance to support patient data privacy and establish data use cases and emphasized the importance of completing this phase before moving onto the next phase.

State Spotlights

Spotlight #1: Michigan

MDHHS took a phased approach to developing and implementing their SDoH hubs (see **Exhibit 1.12**). In **Phase I**, MDHHS aligned efforts at the state-, local-, and community-level by defining the vision of their strategic plan, which centered on the development of SDoH hubs. MDHHS collaborated with cross-sector stakeholders on an internal review of state programs and policies to identify which issues to prioritize. In **Phase II,** MDHHS worked with stakeholders to outline structural interventions to address issues from **Phase I**. These interventions included establishing a CIE, implementing more CHWs, and establishing convening bodies like the CIE Task Force and CHW Subcommittee.

MDHHS's Convening Bodies

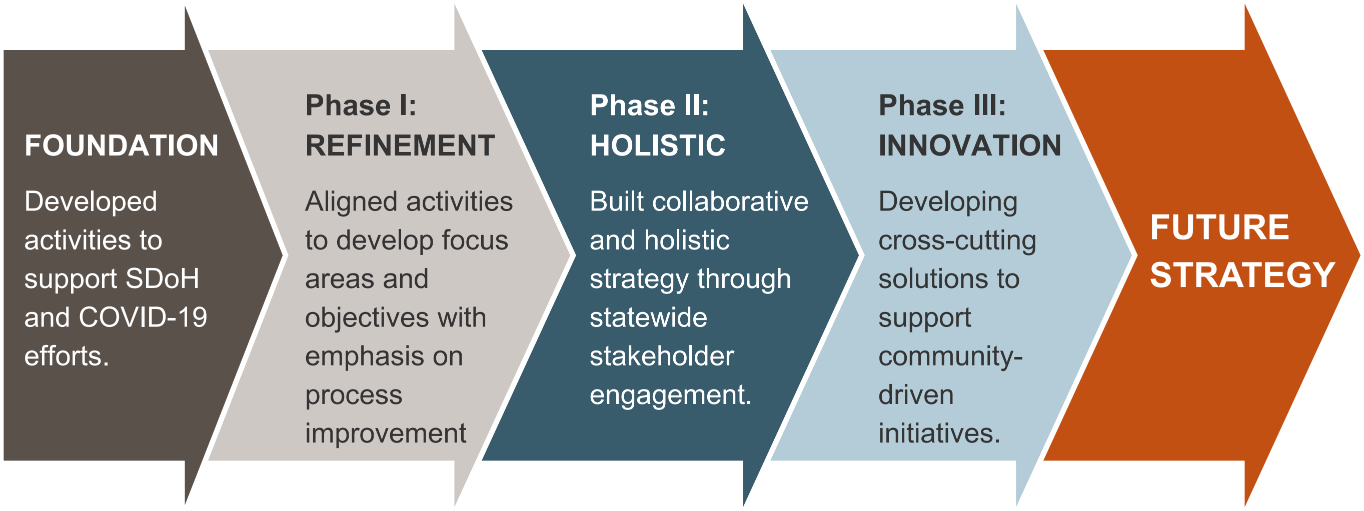
The CIE Task Force published a report with 33 recommendations for developing CIE capacities and infrastructure and a CHW Subcommittee. They published a 2nd report with 24 recommendations to support CHWs.

Michigan is currently in **Phase III**, during which partners are implementing their interventions, including the SDoH hubs, based on three foundational components: **resource sharing, funding integration,** and **technical assistance.**

Michigan Interview Findings

Interviewees shared that top-down support from the Governor helped align different departments and priorities and supported statewide collaboration to implement SDoH hubs.

Exhibit 1.12: Michigan's Phased Approach to Implementing SDoH Hubs[35]



FOUNDATION

Developed activities to support SDoH and COVID-19 efforts.

Phase I: REFINEMENT

Aligned activities to develop focus areas and objectives with emphasis on process improvement

Phase II: HOLISTIC

Built collaborative and holistic strategy through statewide stakeholder engagement.

Phase III: INNOVATION

Developing cross-cutting solutions to support community-driven initiatives.

FUTURE STRATEGY

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[35] https://www.michigan.gov/mdhhs/-/media/Project/Websites/mdhhs/Inside-MDHHS/Policy-and-Planning/Social-Determinants-of-Health-Strategy/SDOH-Strategy-Phase-III-FINAL-011724.pdf?rev=563815e5ebdd445394297b8aed433300&hash=2E56E1B40130871D2441B39CA46E632E

There is a consistent and centralized approach to collection, analysis, and dissemination of quantitative and qualitative data through SDoH hubs. SDoH hubs perform several core functions to support their partners, including:

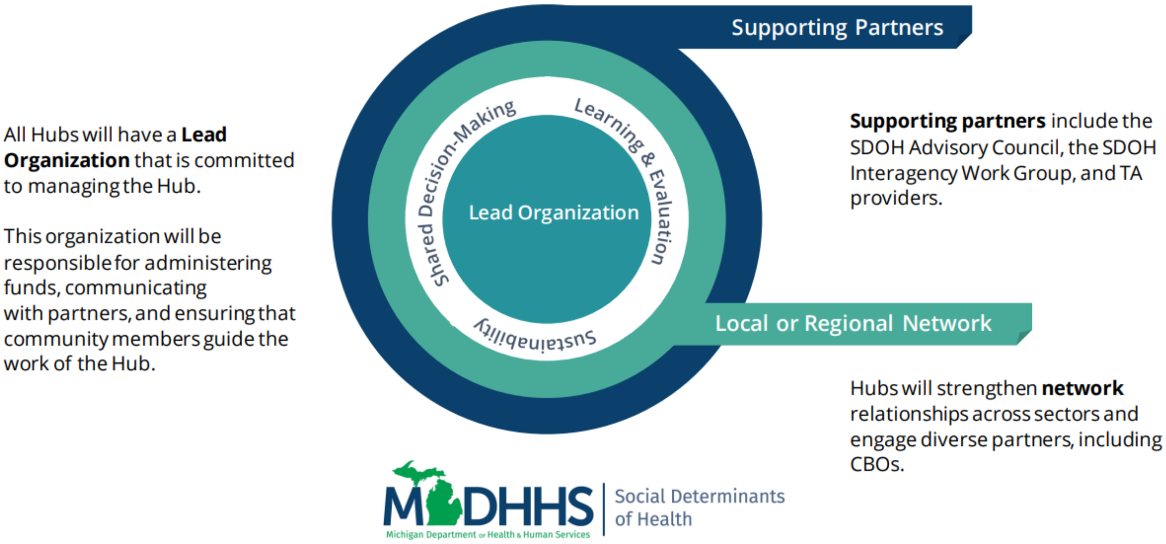
- Promoting **evaluation and evidence-building**
- Continuously **assessing the impacts** of interventions
- **Collaborating with one another** to measure success of the program overall

Each hub has a lead organization and local/regional network with supporting partners (see **Exhibit 1.13**). The hubs emphasize collaboration with the community to ensure alignment with their needs.

Michigan Engagement Findings

Interviewees emphasized the importance of implementing their hubs in cohorts, which allowed MDHHS to check each community for readiness and provide technical assistance through their CIE Task Force to ensure that hubs were not piloted until the communities felt supported and ready to do so.

Exhibit 1.13: SDoH Hub Pilot Structure[36]



All Hubs will have a **Lead Organization** that is committed to managing the Hub.

This organization will be responsible for administering funds, communicating with partners, and ensuring that community members guide the work of the Hub.

Supporting partners include the SDOH Advisory Council, the SDOH Interagency Work Group, and TA providers.

Hubs will strengthen **network** relationships across sectors and engage diverse partners, including CBOs.

**TA = technical assistance*

Michigan's CIE enables **longitudinal data aggregation of HRSN, service-related activities, and health outcomes**. The CIE is linked to a **current resource directory** with a system in place for **anonymous, closed-loop referrals** and care coordination. Closed-loop referrals are technology-enabled through a matching process in which PII/PHI is not shared with the receiving organization.

Applicability to Vermont

Because PHI cannot be shared with non-HIPAA entities without individual consent, the State could consider implementing anonymous, closed-loop referral processes to ensure adequate privacy protections.

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[36] https://www.michigan.gov/mdhhs/-/media/Project/Websites/mdhhs/Inside-MDHHS/Policy-and-Planning/Social-Determinants-of-Health-Strategy/SDOH-Hub-Intro-Slides-Website.pdf?rev=262a6b84b51b4b19abcdf60fa938df70&hash=B3DBCA2A29DB24B8323E1BD9A2D3ED66

Although the individual's information is anonymized, both the healthcare provider and CBO can maintain a feedback loop to track referral status and outcome.

One unique feature of the SDoH hubs is their focus on **developing the CHW workforce**. The hubs consider CHWs integral in bridging the gap between social and clinical services and communities and therefore provide CHWs robust opportunities for trainings and professional development.

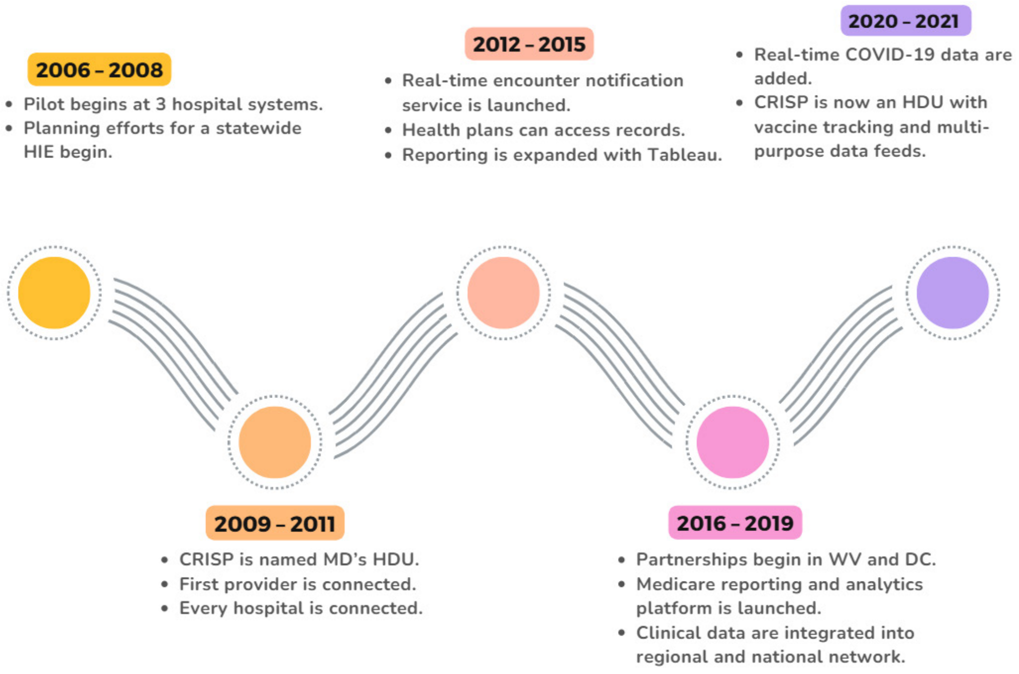
MDHHS is currently supporting the initial cohorts that launched their SDoH hubs in early 2024. Each hub has defined their overall goal and intended activities based on the priorities of local organizations and community members. MDHHS will eventually use these initial cohorts as model implementation sites to inform launching SDoH hubs throughout the state.

Spotlight #2: Maryland

Maryland's HDU CRISP is the gold standard for **bi-directional communication between healthcare and social service providers**. In CRISP, providers document screenings, programs, and services rendered to create whole person records with clinical and social data. Since CRISP is agnostic to vendors, tools, and workflows, providers have flexibility in the secure transfer of data via disparate systems. **Exhibit 1.14** shows a timeline of CRISP's development and major accomplishments.

Maryland Engagement Findings
MD providers were already using CRISP to house patients' health information. Adding HRSN data gave providers one place to access a patient's health and HRSN data, despite the challenges of providers using different EHRs.

Exhibit 1.14: CRISP's Major Milestones



2006 – 2008
- Pilot begins at 3 hospital systems.
- Planning efforts for a statewide HIE begin.

2009 – 2011
- CRISP is named MD's HDU.
- First provider is connected.
- Every hospital is connected.

2012 – 2015
- Real-time encounter notification service is launched.
- Health plans can access records.
- Reporting is expanded with Tableau.

2016 – 2019
- Partnerships begin in WV and DC.
- Medicare reporting and analytics platform is launched.
- Clinical data are integrated into regional and national network.

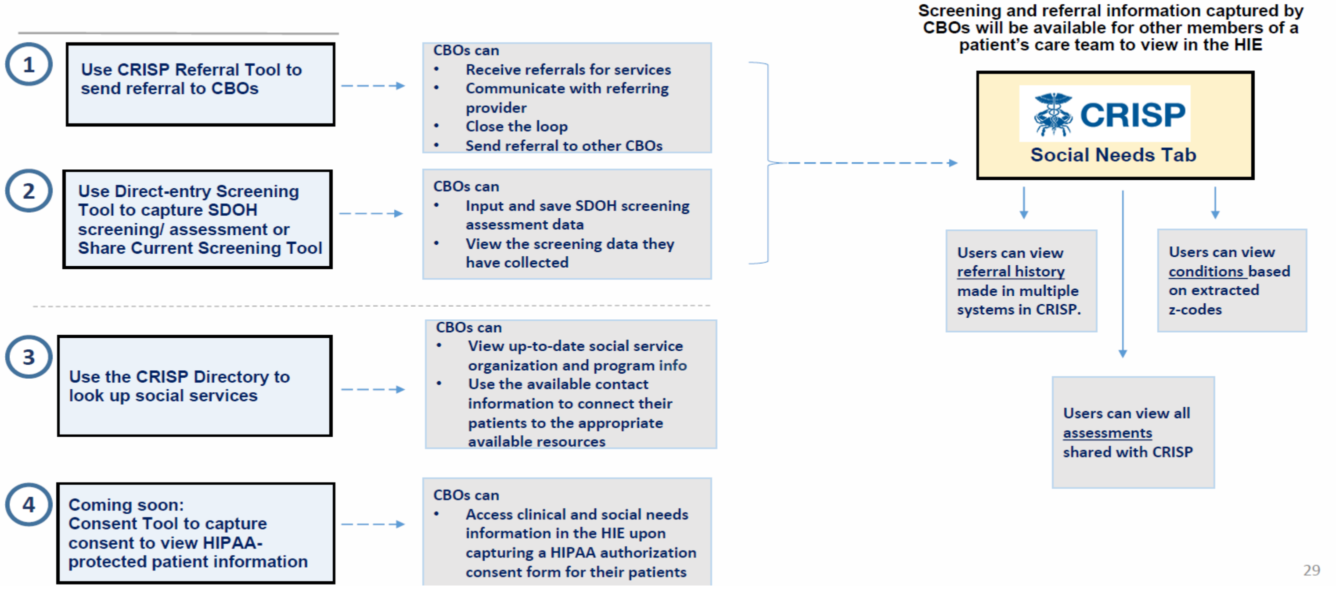
2020 – 2021
- Real-time COVID-19 data are added.
- CRISP is now an HDU with vaccine tracking and multi-purpose data feeds.

CRISP has several functionalities that enable providers to efficiently exchange data internally with care team members and externally with their peer organizations (see **Exhibit 1.15**). Through the InContext application, providers can view patient data collected from screeners in two categories: assessments and conditions. The assessments category contains **patient responses to HRSN screening tools** with flags for responses indicative of a social need. Providers can use this feature to reduce duplicative SDoH screening. The conditions category shows **SDoH Z codes assigned** to a given patient.

Maryland Engagement Findings
Interviewees emphasized that one challenge of adopting CRISP for HRSN data collection was that providers had already developed and adopted different screening tools. To reduce provider burden and encourage engagement with CRISP, MD used a screening tool-agnostic approach so that CRISP would support data entry from any tool used by a participating organization.

CRISP has processes in place to **establish data-sharing policies with partner organizations**. HIPAA-covered partners can access and exchange patient data once they submit the Program Description and Bulk User documents available through the platform. For non-HIPAA-covered partners, in addition to these two forms, partners must submit the CRISP non-HIPAA-covered entity Participation Agreement and CRISP Program document to ensure compliance with policies related to viewing patient data and receiving and sending resource referrals via CRISP.[37]

Exhibit 1.15: CRISP SDoH Suite of Tools for CBOs[38]



① **Use CRISP Referral Tool to send referral to CBOs**

CBOs can
- Receive referrals for services
- Communicate with referring provider
- Close the loop
- Send referral to other CBOs

② **Use Direct-entry Screening Tool to capture SDOH screening/ assessment or Share Current Screening Tool**

CBOs can
- Input and save SDOH screening assessment data
- View the screening data they have collected

③ **Use the CRISP Directory to look up social services**

CBOs can
- View up-to-date social service organization and program info
- Use the available contact information to connect their patients to the appropriate available resources

④ **Coming soon: Consent Tool to capture consent to view HIPAA-protected patient information**

CBOs can
- Access clinical and social needs information in the HIE upon capturing a HIPAA authorization consent form for their patients

Screening and referral information captured by CBOs will be available for other members of a patient's care team to view in the HIE

CRISP
Social Needs Tab

Users can view referral history made in multiple systems in CRISP.

Users can view conditions based on extracted z-codes

Users can view all assessments shared with CRISP

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[37] More detailed descriptions of each of these documents are presented above in the "Current SDoH Data Landscape" section.

[38] https://www.healthit.gov/sites/default/files/2023-07/ONC%20SDOH%20Learning%20Forum_Implementation%20Measurement%20Evaluation_508.pdf

Providers use CRISP for **closed-loop referrals**. CRISP maintains a **longitudinal record of referral history** for providers to reference and generate new referral requests. To support providers in connecting patients with resources, CRISP offers an **updated, filterable resource directory**.

One of CRISP's standout features is its **pre-post report functionality**; the functionality creates customized reports about patients' utilization of healthcare and social services before and after their data are integrated in CRISP, individually and from a patient panel perspective. These reports contain a summary of overall key findings, a panel analysis, a relative trend analysis, breakdowns of charges, and visit details. These reports serve two main purposes – guiding how providers approach care coordination and informing QI initiatives.

Innovation in Addressing HRSN (Raths, 2023):
When a child presents to the ED with asthma, CRISP automatically triggers a referral to a Medicaid-funded program led by local health departments to connect families with environmental controls such as HEPA filters and vermin control.

Comparison of MI and MD Approach
Appendix 5 compares the states' governance, technical capabilities, implementation strategies, measurement, and evaluation.

Maryland Engagement Findings
MD prioritized connecting providers to CRISP and supporting providers' ability to upload data. The interviewee emphasized the importance of ensuring widespread CRISP participation before shifting focus to analytic functions and capabilities. Now that CRISP efforts in MD are reaching scale, the state is evaluating how population-level data can be used and shared to support federal agency reporting requirements and reduce provider burden. The state is exploring how to disaggregate population-level data by demographic factors (e.g., race, ZIP) to determine which communities should be prioritized for funding in certain domains (e.g., housing).

Spotlight #3: Oregon[39]

Recognizing the lack of a standard model that accounts for both the medical conditions and social factors faced by pediatric populations in Oregon, the OHA identified a need for a **new health complexity model**. With support from OPIP, OHA organized and conducted listening sessions with key stakeholders to develop their methodology and approach to data sharing.

OPIP created the **medical complexity** component of the model using claims data from the state's MMIS. OPIP assigned children to one of three categories (high, moderate, or no medical complexity).

Oregon Engagement Findings
OR has paused the health complexity data provision due to funding and shifting priorities. OR is maintaining the medical complexity model component since it is part of its waiver effort focused on children with special health needs.

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[39] OR provided four hyperlinks to NORC in their written interview responses: https://www.oregon.gov/oha/hpa/dsi-tc/pages/sdoh-metric.aspx; https://oregon-pip.org/area-of-focus/engaging-health-complexity/; https://oregon-pip.org/our-projects/galvanizing-efforts-for-children-with-health-complexity/; and https://lpfch.org/resource/health-systems-strategies-that-prioritize-children-with-health-complexity/.

OPIP also accessed the ICS database[40] to select specific factors that aligned with the Center of Excellence on Quality-of-Care Measures for Children with Complex Needs definition. Twelve indicators were chosen for inclusion in the **social complexity** component: poverty; placement in foster care; parent death; parent incarceration; child and parent mental health; child and parent substance abuse; child abuse and neglect; potential language barrier; and patient disability.

The social complexity indicators were then consolidated into three categories (three or more, one or two, or no indicators). After joining the medical and social complexity indicators, the final product was a **health complexity** matrix consisting of nine categories (see **Exhibit 1.16**) that could be linked to children and parents' vital statistics data compiled from the Department of Human Services (DHS) database.

Exhibit 1.16: Example of the Nine-part Health Complexity Matrix[41]

Medical complexity	Social complexity (out of 12 social complexity indicators)		
	3+ indicators	**1-2 Indicators**	**None**
High medical complexity (chronic, complex PMCA=1)	#1	#2	#3
Moderate medical complexity (non-complex, chronic PMCA=2)	#4	#5	#6
No medical complexity (healthy PMCA=3)	#7	#8	#9 (neither medically nor socially complex)

*Green shading refers to those with both medical and social complexity. Tan shading refers to those with only social complexity. Gray shading refers to those with only medical complexity. PMCA = Pediatric Medical Complexity Algorithm.

The model has helped providers better match children with resources in care coordination. Community partners, health systems leaders, and policymakers focused on children with special healthcare needs have used county-level, CCO-level, and statewide reports based on model analyses to inform population-based improvements. Stakeholders collaborated with OPIP to implement projects guided by model findings. OHA integrated these data in some aspects of rate setting (e.g., ensuring that patient-centered primary care homes receive VBPs).

Health Complexity Model Application

- **Douglas County:** Community members formed a steering committee and hosted meetings with OPIP. The committee wrote a Call to Action for the county's priorities based on the data.
- **Marion County:** Stakeholders formed the Community, Business, and Education Leaders (CBEL) collaborative and used the data to determine two priorities for funding (housing and behavioral health supports).

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[40] ICS data sources include: DHS programs - Aging and People with Disabilities, Child Welfare, Developmentally Disabled, Self Sufficiency and Vocational Rehabilitation; OHA programs - Alcohol and Drug, Contraceptive Care, Family Health Insurance Assistance Program, Healthy Kids Connect, Medical Assistance Programs, Mental Health and WIC; Department of Corrections; and OR Housing and Community Services.

[41] Adapted from https://innovations.bmj.com/content/7/1/18

In the future, OHA aims to increase engagement from families to ensure sustainability of the model and that individual- and community-level needs are met. Health system leaders are considering how else to use model results for rate setting in VBP models. OHA plans to develop risk adjustment models that provide financial incentives to provide health services to the Medicaid/ CHIP-insured population through whole person care (Reuland et al., 2022).

Applicability to Vermont
VT has an MMIS system and an all-payer claims database with the VT Healthcare Uniform Reporting and Evaluation System, which parallels the ICS. These two data sources could be used to mirror the health complexity model.

One notable aspect of Oregon's pediatric health complexity model is its **high level of replicability**. States that maintain a high-quality MMIS system can reproduce the medical complexity component. Similarly, states with systems like the ICS can mirror the process of identifying social complexity indicators.

In 2023, OHA began offering incentives for completion of a new HRSN screening and referral metric to encourage participating CCOs to commit to addressing HRSN. OHA disseminated specifications for the new metric and developed guidance including training resources, written agreements, and a list of approved screening tools. OHA also provides several forms of technical assistance to their partners:

- **The Café Connect Series [webinar]:** CCOs, CBOs, providers, and community stakeholders can attend webinars on how to strengthen their relationships with each other and implement the HRSN screening and referral incentive metric.
- **CCO learning collaborative [webinar]:** CCO data staff can share strategies for addressing priority needs and the "must pass" elements of the HRSN screening and referral metric.
- **CCO coding and value set round table discussion [virtual meeting]:** CCO data staff can discuss approaches to codes and value sets for tracking HRSN screening and referral data.
- **CCO office hours [virtual meeting]:** CCO data staff can attend office hours for guidance on SDoH/HRSN data integration and implementation processes, including data sharing at point of care, using aggregated race/ethnicity, language, and disability data, and aligning the new incentive metric with the Medicaid 1115 waiver and other upstream initiatives.

Best Practices Across ASTP/ONC Elements

We present below a synthesis of best practices across states by the 11 ASTP/ONC elements.

Community Readiness and Stewardship

Most states' SDoH efforts revolve around **sustained community involvement and input** in planning, testing, implementation, monitoring, evaluation, and refinement. The term "community" is inclusive of stakeholders across public and private sectors[42] along with consumers, patients, and caregivers. Involving community partners is instrumental in **increasing buy-in** and **building trust and relationships**. When communities are empowered to participate in the HIEs that serve them, SDoH data efforts are more likely to be sustainable.

Applicability to Vermont
CBOs need timely and aggregated population-level data to measure programs' impacts and justify funding. In engaging CBOs, the State could emphasize the analytic and reporting capabilities of the UHDS as a benefit of their participation.

When **engaging non-HIPAA-covered CBOs**, it is important to consider how partnerships can be mutually beneficial. In 2023, Michigan surveyed the SDoH data landscape and noted the following:

> *"CBOs are typically not opting into resource referral systems, in part because of an absence of apparent benefits, a range of apparent risks, and a lack of trust…there are significant prospective costs, and known risks, posed to CBOs by participation in data-sharing initiatives – whereas the prospective benefits are hypothetical, long-term, or otherwise uncertain." (MDHHS, 2023, p. 26)."*

Examples of approaches grounded in community ownership include:

- In 2-1-1 San Diego, community partner organizations are involved in **co-designing and testing** data system components. Their feedback informs QI cycles (2-1-1 San Diego, 2018).
- In Michigan, MDHHS involves community members by obtaining their **feedback to design interventions** that address specific challenges identified by the community (MDHHS, 2024).
- In Washington, community members and partner organizations co-create tools and policies for their network to come to consensus on its "look and feel." The network also incorporated a multi-sector advisory group in its community-led governance structure to ensure decisions on technology and functionality reflect community needs (Bloom et al., 2022).

Mission and Purpose

One common theme across states is an emphasis on **creating a shared culture of learning at all levels of participation** through strategies such as:

- Developing a **robust network of contributing organizations** who are aligned with HIE goals and expectations (Hovey et al., 2021)

Applicability to Vermont
The VHIE Steering Committee defines its mission as "work[ing] across organizations and disciplines to create and endorse a shared view of the definition, purpose, and goals of HIE in VT."

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[42] Healthcare and social service providers; researchers and academic partners; representatives from CBOs, QI organizations, and professional societies; payers; HIE and EHR vendors; care coordination software vendors and organizations; and policymakers.

- Establishing a **“homegrown mission”** in which local culture and community needs are considered, respected, and accommodated (Hovey et al.)
- Those involved with HIE governance develop use cases to **clarify the vision** and provide oversight to ensure partners are working toward that vision (2-1-1 San Diego, 2018)
- In anticipation of stakeholder hesitance toward engagement, **expected benefits** for collecting, sharing, and using data are well-articulated (Bloom et al., 2022)
- Acknowledging the **diverse stakeholder priorities** and how their contributions and participation are integral to achieving the HIE mission and purpose

Values and Principles

Some states develop a **“Bill of Rights”** that clarifies the legal and ethical framework, values, and principles for those involved in an HIE. For example, Michigan’s Bill of Rights for the state’s SDoH hubs provides guidance on data collection, exchange, and utilization processes that are not regulated by HIPAA, FERPA, or 42 CFR Part 2 (MDHHS, 2024). The Bill of Rights should be publicly available so consumers and communities can hold partners accountable for the ethical use of their SDoH data.

Applicability to Vermont
The Data Governance Committee could develop a “Bill of Rights” for stakeholders and Vermonters to generate shared understanding and support of the UHDS’ values, principles, purpose, and commitment to protecting PII/PHI.

Policy

Discussion of policy levers is largely presented above in the “Current SDoH Data Landscape” section. One best practice that emerged in the state-specific document review is the **establishment of a network inclusion policy on a local or statewide basis** (Bloom et al., 2022). This policy specifies anticipated participants, justifies their engagement, and clarifies the activities participants will complete (e.g., data exchange). This policy helps increases the visibility of the rationale for HIE participation. ASTP/ONC’s “Information Blocking Exceptions” fact sheet provides examples of scenarios where network exclusionary criteria may not be considered “information blocking” (and thus may be acceptable). Governance boards can reference these scenarios to clarify whether their proposed policy may inadvertently lead to information blocking.

Applicability to Vermont
VT has already implemented policies relevant to the VHIE and/or UHDS, including Act 187 (review of Health IT Plan), Act 53 (opt-out consent policy for the VHIE), and Act 167 (one health record per person). VT should continue to monitor and leverage state and federal polices to advance UHDS goals.

Legal

There are several best practices to ensure that SDoH data platforms follow federal, state, local, and tribal laws. Those involved with HIE governance **institute different legal agreements** with their partners to help create accountability for meeting privacy requirements (see **Exhibit 1.17**). One key practice is **offering incentives** to partners for executing data-sharing agreements (DHCS, 2023).

Exhibit 1.17: Example Legal Agreements for HIE Participation[43]

Type of Legal Agreement	Description
Memorandum of Understanding (also known as Standard Participation Agreement)	• A broad agreement between lead organization and partner(s) • Specifies legal rights, responsibilities, and requirements of each party; operational and management structure; and guiding principles, mission, values, and ethical framework • Should be written in plain language
Business Associates Agreement	• Contract between lead organization and business associate(s) that defines PII/PHI uses and disclosures by the partner, ensuring they comply with HIPAA standards
Data Use License	• A temporary data license to use a limited set of data for a certain purpose under certain conditions • Outlines duties of approved data user, including protection of confidential data, use limited only to what is outlined, date for termination, and immediate notification if privacy is breached • Might include requirements for citation, peer review, or advance notification before publication of any findings
Data Use Agreement (also referred to as a Data Security or Data-Sharing Agreement)	• Technical document that details terms and conditions of how data should be transferred, stored, and managed when shared and integrated within an integrated data system • Defines the contractual obligations of the data owner

The **development and distribution of standardized consent materials and procedures** both ensures that:

1. Individuals are aware of how their data are collected, shared, and used and
2. Partners are held accountable for ethically complying with established policies.

Applicability to Vermont
Patient-level data exchange among healthcare professionals, facilities, and payers participating in the VHIE is already covered by the opt-out consent policy. For CBOs and other non-HIPAA-covered entities to contribute data to the UHDS, the State will need to develop informed consent procedures in collaboration with these entities and establish data-sharing agreements.

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[43] https://aisp.upenn.edu/wp-content/uploads/2022/06/AISP_Finding-A-Way-Forward_Final_6.16.2022.pdf; https://www.hhs.gov/hipaa/for-professionals/covered-entities/sample-business-associate-agreement-provisions/index.html

As discussed in “SDoH Data Integration,” states follow one of two consent models—opt-in or opt-out. Below are some examples of successful consent models from different states:

- Colorado implements a **digital consent platform**, in which patients can track when and how their data are shared or change their consent decisions (OeHI, n.d.).
- In California, DHCS uses a **segmented consent form**, enabling patients to choose which medical, mental health, or SUD history data they consent to sharing (Pourat et al., 2022).
- Patients served by California’s WPC sites receive **universal consent forms**, which facilitate the release of patient data across WPC partners (Tong & Hinton, 2022). WPC patients who receive SUD services are required to complete a **SUD-specific form** to grant consent for sharing their SUD data (Pourat et al.).
- In Michigan, **informed consent is obtained from individuals whose SDoH data are collected by partner organizations not regulated by HIPAA** (MDHHS, 2024).

Vermont Stakeholder Feedback
Some stakeholders saw benefit in offering an online consent form and added that there may be value in allowing patients to enter their own SDoH data. Others expressed concerns about the need to clearly define each data type that patients could consent to share and thought that this would add to the complexity of the current consent process for data sharing.

Implementation Services

Stakeholders across sectors should collaboratively **define and prioritize SDoH data use cases** (Gebresellassie et al., 2023). Use cases may be especially important in demonstrating how providers can use data to make referrals and coordinate patient care; some providers may not be accustomed to SDoH data, and providers will need to learn how the HIE’s functionality can support different workflows.

In Colorado, stakeholders have established 33 use cases and counting as their SHIE efforts take form (OeHI, n.d.). 2-1-1 San Diego partners created use cases to guide providers in:

- Accessing patients’ longitudinal records in the CIE,
- Tracking patients’ ED visits,
- Identifying food insecurity during healthcare encounters and making appropriate referrals, and
- Prioritizing connection to housing services for unhoused patients (2-1-1 San Diego, 2018).

In Michigan, payers offer incentives to SDoH partners for participation in specific use cases, including:

- Sending Admission, Discharge, or Transfer notifications and
- Using SDoH Z codes to identify and track social needs (MDHHS, 2023).

Applicability to Vermont

Providing UHDS stakeholders with concrete workflows that illustrate how SDoH/HRSN data can inform care will help increase understanding of and support for SDoH data collection and integration. Workflows should detail step-by-step what action is “triggered” (either automatically by the system or manually by the provider) when a positive HRSN is identified. For example, how are local resources identified for a potential referral? Does the provider manually look up resources in a centralized directory, or will the system automatically return a list of resources? Once the provider and patient agree upon an appropriate resource referral, how is the referral sent to the receiving organization? How does the provider view the “status” of the referral in the system?

Another best practice is **leveraging existing data assets**. Since partners tend to identify immediate and near-term needs, it is much more efficient (both in terms of time and cost) to use existing infrastructure rather than investing in a new data system (2-1-1 San Diego, 2018). Similarly, integrating SDoH screenings into existing workflows prevents redundant data collection (LaForge et al., 2018). Often, partners are more willing to buy in to an SDoH data system if they only must adjust their capabilities within their existing technology instead of overhauling their software and processes.

Standardizing protocols increases adoption of technical services, data collection practices, and referral methods among partners (NCQA & Janssen Scientific Affairs, 2020). The routinization of data collection can improve data quality and reduce overall costs. Process standardization also helps minimize undesirable variations in care coordination.

Measurement and Evaluation

Applicability to Vermont

The UHDS will support longitudinal data aggregation into a single unified record so that providers and caregivers have access to current and comprehensive information from healthcare encounters.

Measurement and evaluation help ensure there is a holistic view of patient HRSN over time and an ROI in SDoH data. One best practice is the **development and maintenance of longitudinal data aggregation capabilities**. A longitudinal data infrastructure improves coordination of care, builds capacities for QI, and removes the burden of redundant application processes for persistent HRSN (Tong & Hinton, 2022; Domestic Policy Council & OSTP, 2023; MDHHS, 2023). Longitudinal data can also be used as inputs for algorithmic risk stratification processes and rate adjustments (MDHHS).

- Michigan aggregates longitudinal patient data for reporting, analytics, and evaluation of community needs and program efficacy (MDHHS, 2024). The state has standards to ensure that longitudinal data collection and retention are generally consistent statewide; however, decisions on how the longitudinal data are used occurs locally (MDHHS, 2023).
- 2-1-1 San Diego maintains a single longitudinal record of resource needs and referrals to guide subsequent referrals for a given patient (NCQA & Janssen Scientific Affairs, 2020).

Monitoring and evaluation activities help **inform individual and community interventions**. Data dashboards are especially helpful in reviewing performance metrics, population health outcomes, and QI efforts. **Appendix 6** includes links to example data dashboards.

- In California, DHCS requires WPC sites to track relevant outcome metrics on enrollee progress in dashboards to support strategic care decisions (Pourat et al., 2022).
- In Michigan, MDHHS developed a dashboard that shows change in health and social outcomes over time to guide hubs' approaches (MDHHS, 2024).

It is recommended to **adopt standardized performance measures** like HEDIS in addition to population-specific measures. Assessments should be **completed and disseminated frequently**, be iterative, and allow for data-informed adjustments to address evolving needs (MDHHS, 2024). Payers should be involved in selecting key indicators to minimize any silos that may exist between themselves and providers (Barros, 2024).

Technical Infrastructure and Data Standards

User-friendly software can help facilitate intra- and inter-organizational communication and is more accessible to stakeholders with varying technical expertise. When it comes to technology, cost often increases with complexity, so simpler technology that still meets data and service provision needs can also be more financially attainable for under-resourced organizations. The basic infrastructural capabilities that are promoted by the most technical standards can be used within any compliant software system.

Applicability to Vermont

States use different care coordination platforms for closed-loop referrals:

- AZ, NE, and NC use the Unite Us Platform
- Humboldt County, CA uses Activate Care's Community Care Hub program

- Florida's Baptist South Health System used DeGAUSS, a HIPAA-compliant open-source geocoding software to visualize the distribution of HRSN across patients (Rojas et al., 2022).
- 2-1-1 San Diego introduced easy-to-use software for users to integrate their SDoH data and exchange that data with other partners, increasing CIE uptake (2-1-1 San Diego, 2018).[44]

Governance boards should encourage stakeholders to invest in flexible software and federal standards like FHIR APIs that support bi-directional sharing of interoperable individual records between several data partners and diverse data systems (Domestic Policy Council & OSTP, 2023; Bloom et al., 2022).

Anonymous closed-loop referrals (see **Exhibit 1.18**) help facilitate prompt connections with CBOs once patient HRSN are identified and are also used to address more sensitive HRSN (e.g., IPV), where patient confidentiality is especially important. HIEs with these capabilities can connect individuals with

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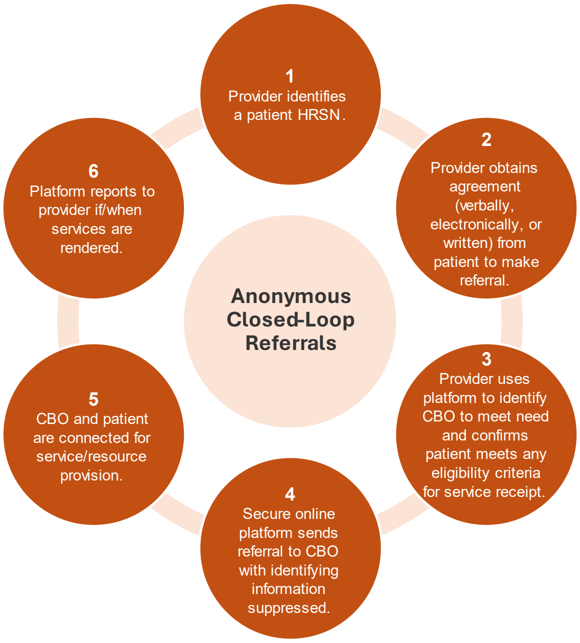
[44] Note: All 2-1-1 programs receive accreditation from Inform USA (formerly ARIS). This organization has a set of standards and requirements that 2-1-1 service providers must follow (Inform USA, n.d.).

supports and manage feedback on referral outcomes without the exchange of PHI/PII via an intermediary referral platform.

Exhibit 1.18: Closed-Loop Referral Workflow



1 Provider identifies a patient HRSN.

2 Provider obtains agreement (verbally, electronically, or written) from patient to make referral.

3 Provider uses platform to identify CBO to meet need and confirms patient meets any eligibility criteria for service receipt.

4 Secure online platform sends referral to CBO with identifying information suppressed.

5 CBO and patient are connected for service/resource provision.

6 Platform reports to provider if/when services are rendered.

In an anonymous referral, the patient's **PHI/PII is masked from the receiving CBO**, and the referral platform manages appointment scheduling. During this process, the referral is assigned a unique identifier to ensure that the platform is associating all actions taken and related communications with the relevant patient. Once the appointment is complete, the receiving CBO submits feedback to the referring provider under the unique identifier, confirming resource receipt. With this approach, providers do not need to exchange patient PHI/PII to provide care.

Another common technical practice is using an **identity management service** so that patient data are matched correctly and protected. States often set minimum technical standards for linking variables and work with data contributors to determine a primary method of establishing individual identity (Heflin et al., 2018).

We discuss the specifics of technical standards in the "SDoH Data Integration" section. However, we note below best practices related to ***implementation* of technical standards** among stakeholders with varying levels of technical expertise and comfort with data structures:

- Because standards like FHIR, the Gravity Project's terminology and coding, and Z codes continue to evolve, there should be ongoing efforts by HIE leadership to both stay abreast of changes and ensure that updated standards still harmonize with stakeholder needs.
- Stakeholders must feel confident that they can integrate standards in their workflows and that standards align with the needs of those they serve (Gebresellassie et al., 2023)

Governance boards can **form a stakeholder workgroup to address technical concerns about data exchange**. The workgroup can review technical processes of data exchange standards, vocabulary management, and identity management (MDHHS, 2024).

Applicability to Vermont

VT's 2-1-1 employs Community Resource Specialists to engage callers and make connections to resources. In 2023, the top three referred services related to housing needs, information on resources like Help Me Grow VT and VT Center for Independent Living, and disaster relief (Vermont 2-1-1, n.d.). The State could explore whether 2-1-1's resource repository, workflows, and/or staff training can be leveraged for UHDS.

User Support and Learning Network

There are opportunities for strengthening user support and learning network activities to ensure all stakeholders are well-informed on how to properly use and benefit from their HIE. One user support strategy involves **provision of centralized technical assistance.** In Michigan, learning occurs through their SDoH hubs, a centralized point of contact for partner training and education (MDHHS, 2024).

Some states **employ peer support specialists** to train providers, data staff, and community partners.

- In California's WPC sites, specialists help define the linkages between health, mental health, and SUD services for providers (Tong & Hinton, 2022).
- In Michigan, specialists train and integrate CHWs into SDoH hubs (MDHHS, 2024). Payers like Blue Cross Blue Shield help cover the cost of training CHWs for participating Physician Group Incentive Program (PGIP) organizations (MDHHS, 2023).

It is also best practice to offer **resource directories** to facilitate patient referrals.

Lastly, **listening sessions** or other **peer-to-peer learning forums** can be empowering spaces for exchanging best practices, concerns, opportunities, and strategies for meeting policy, funding, and technology needs (OeHI, n.d.). Listening sessions can also help HIE leadership, data governance, and technical staff understand communities' and partners' needs (2-1-1 San Diego, 2018).

For example, MDHHS conducted listening sessions with community members and CBOs to understand HRSN. These sessions were hosted by local organizations who recruited attendees from their existing networks in partnership with other organizations in their region (MDHHS, 2024).

Applicability to Vermont
The State established an overarching Data Governance Council and subcommittees for SDoH Data Governance and 42 CFR Part 2 Governance, both of which produce recommendations for Data Governance Council review and approval.

Governance

A governance structure that is community-led or has a **high level of community involvement** is preferred (Bloom et al., 2022; MDHHS, 2024; EMI Advisors, 2023). CBOs and community members may be tapped to co-design governance structure or participate in decisions on priorities and implementation strategies for the governance structure to uphold (Gebresellassie et al., 2023; MDHHS 2024). In this manner, the governance structure is set up to prioritize community needs.

- Michigan's HIE governance structure is led by a network of public and private organizations that collaborate to identify and resolve data-sharing barriers. Their efforts have largely been successful due to the alignment of values across stakeholders (Gebresellassie et al., 2023).
- King County, Washington's Connect2 Community Network encourages stakeholders to co-design tools and policies to support governance of the state's CIE (Bloom et al., 2022).

Financing

Braided or **blended funding** is often used to finance SDoH data activities, in which multiple funding sources are combined to coordinate an activity, allowing for partners to combine funding streams to maximize resources (MDHHS, 2024; Bloom et al., 2022; Domestic Policy Council & OSTP, 2023). It should be noted that to implement this financing strategy, statutory authority is required.

Applicability to Vermont

VT's SDoH data integration efforts are funded by the federal government's MMIS and the state's Health IT-Fund through July 1, 2026. AHS and VITL plan to explore diversifying funding streams.

Another approach is to **offer financial incentives to stakeholders** for HIE participation.

Applicability to Vermont

Payers can encourage providers to track and report on referrals with incentives, like directly paying the provider or distributing funding to physician organizations to develop their technical capacities further (MDHHS, 2023).

- Arizona's CBO Success Program uses tiered compensation to award CBOs for completing milestones in data integration (Kramer, 2022).
- MDHHS works with payers like the PGIP, Patient-Centered Medical Home, and Pay for Performance to leverage SDoH use case participation incentive programs for partners. Example programs include the Best Practice Incentive Program, the Z Code Submission Incentive, Performance Improvement Plan, and the Perform PLUS value-based model (MDHHS, 2023).
- If Oklahoma providers elect to participate in OKSHINE, associated costs include a one-time HIE connection fee and an annual subscription fee. In 2023, SB 32X was passed with funding allocated for the one-time connection fee cost on a first come, first served basis for providers interested in submitting data to OKSHINE (MyHealth Access Network, n.d.).

The provision of incentives is not only a mechanism for funding CBOs, but it also enables partners to improve workflows, compensate workforce, and access support tools and technical assistance.

Resource Requirements

In this section, we list key resource requirements for implementing and sustaining SDoH data activities.

Standardization of Terminology

A productive discussion on SDoH data collection, integration, sharing, and application to a healthcare setting requires a core set of standard terms to describe SDoH and HRSN data, including:

- Consensus-based crosswalking (if different vocabularies need to be retained across different contexts) and/or alignment of terminology across stakeholders and with federal standards (e.g., Healthy People 2030 SDoH domains, Z codes) and the Gravity Project's workstreams
- Documentation, dissemination, and implementation of terminology to routinize use

Development of Legal Framework

Ensuring the ethical collection, exchange, and use of SDoH data requires:

- Development of and commitment to legal agreements and frameworks that safeguard how PII and PHI are collected, integrated, shared, managed, and used
- Sufficient documentation of informed consent (for data not covered by Vermont's opt-out policy)
- Established processes for monitoring compliance with legal frameworks
- Consultation with legal advisors and/or subject matter experts to ensure proper handling of PII and PHI throughout the underlying technical and data governance infrastructure

Technical Capabilities

Implementing technical infrastructure within SDoH data exchange platforms requires:

- An investment in flexible and secure software that supports and automates integration and linkage processes across multiple systems
- A methodology for identity matching that can accommodate all partners contributing to the UHDS—specifically, the disparate PII/PHI fields each partner collects to be used in matching (e.g., Vermont's MPI)
- Well-documented and standardized processes for data processing, management, and QC
  - While data sources may vary in terms of format and structure, data elements must be standardized once ingested into the UHDS for data use and publication
  - Data can be regulated by an internal data manager, through a centralized platform, or with specific software like Salesforce
- Technical workforce training to ensure staff are educated on the agreed-upon standards, protocols, and best practices

Tools for Actionable Decisions by Providers

Creating resources for providers to make data-informed actionable decisions in care delivery requires:

- Staff that are well-informed on how to identify appropriate and available health services and community resources in patient referrals
  - Process flow diagrams, protocols, and staff training can help increase staff capabilities and agency in making these types of connections.
- A system capable of sending and receiving referrals
  - Integrating easy-to-use software that enhances closed-loop referral capabilities with existing technical infrastructure.

  - Alternatively, contracting a vendor or platform that facilitates the process of closed-loop referrals on behalf of providers.
- An exhaustive and comprehensive database of community resources
  - This platform or repository should be interactive and regularly reviewed and updated with active resources.
  - A patient's real-time eligibility status should be visible within this platform to avoid connecting patients with resources for which they are ineligible.

SDoH Data Source Review

Key Takeaways

- There are many high-quality and widely used community-level secondary data sources available at various geographic levels, many of which have **overlapping data sources and elements**.
- All secondary community-level data have a common limitation – masking individual-level variation in social risk factors. However, these data have proven useful in **targeting screenings and interventions and supplementing individual data** to better understand patient circumstances.
- Secondary data sources like CDC's EPHTN and PLACES offer **APIs to support users' efficient and accurate data integration**.
- It is recommended to **use census tract-level data** (if available) for community-level measures. Tracts are generally stable, designed for presentation of statistical data, and the most used geography among researchers and policymakers.
- Vermont agencies such as VDH have their **own versions of national indices and indicators** (e.g., Vermont's Heat Vulnerability Index) and performance tracking platforms (e.g., Heathy Vermonters 2030). There may be opportunities for the State to leverage and align with these efforts. Using a national standard has benefits in terms of lower LOE and benchmarking capabilities but may be missing important place-based factors that are integrated into Vermont-specific data.
- Some data elements may **become more relevant** for Vermont in the future (e.g., due to climate change or population change/urbanization).
- As a rule of thumb, the State should consider **binning continuous/ordinal data to create qualitative ratings** based on certain thresholds as these ratings are easier for providers and other users to understand and act on (e.g., grouping index values based on distributions or into quintiles from "Very Low" to "Very High").
- All data elements ingested into the UHDS **need to be purposeful** and intended for use to answer questions such as:
  - Will the data element **"trigger" an action** on the part of a provider? For example, if the data element meets a certain threshold, should the provider screen the patient for HRSN?
  - Are there other ways data might be used to **guide care**? For example, if a patient lives in a census tract with poor internet access, will the care team use that data to guide patient outreach and communications?

Key Takeaways

- Who are the **intended users** of the data and for what purpose? For example, will the data inform emergency preparedness and disaster response efforts?
- Will the data element be ingested into the UHDS analytics layer for **data visualization and analysis** only?

2019-2023 ACS 5-Year Estimates

Many secondary data sources rely on ACS estimates. 2019-2023 ACS 5-year estimates were released in December 2024, so it is likely that some of the prioritized secondary data sources will release updated estimates soon.

We summarize below the results of our SDoH data source review and prioritization. We prioritize first the “lowest hanging fruit” of data sources - publicly available, high-quality secondary data sources linkable by patient geography. We describe:

- The four prioritized data repositories from which the State can source a variety of community-level HRSN/SDoH data (CDC PLACES, CDC EPHTN, AHRQ SDoH Database, and University of Wisconsin’s CHR&R),
- Strengths and limitations of each repository, and
- The prioritized list of community-level data elements from each repository (see **Appendix 7**[45] for a detailed description of each prioritized data element).

We identified several other potential Vermont-specific sources for community- and/or individual-level SDoH data relevant to the State’s UHDS objectives that were ineligible for prioritization due to timing (e.g., the data are not available yet or have not been recently refreshed) and/or insufficient publicly available technical documentation. We highlight these potential sources in **Appendix 8**, should the State wish to keep on its radar for future use.

CDC PLACES

The CDC PLACES web tool provides high-quality, model-based community-level estimates for seven HRSN and nine SDoH factors for all areas populated with at least 50 adult residents. **HRSN data** are sourced from the 2022 BRFSS Social Determinants and Health Equity module. **SDoH data** are sourced from the five-year ACS estimates.

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[45] This appendix provides the following information for each data element in the “Data Element List” tab: source repository and owner; mapping to Healthy People 2030 domains; details on purpose and methods; associated variable/indicator name; original data source(s); most recent year availability; data periodicity; geography (tract, county, ZCTA); format (number, percentage, index, rate, miles, days, categorical); universe; and priority ranking. The “Documentation & Data Links” tab contains links to data download pages, documentation, dashboards, and other resources.

Strengths of the CDC PLACES tool include:

- Available at **various geographies** (county, incorporated and census-designated place, ZCTA, and census tract)
- Based on well-established surveys
- Enables statewide and nationwide **comparisons**
- Uses **innovative and validated small-area estimation** technique to provide data uniformly across urban-rural spectrum
- Four of the seven HRSN captured in BRFSS overlap with CMS' AHC HRSN Screening Tool
  - "During the past 12 months has a lack of reliable transportation kept you from medical appointments, meetings, work, or from getting things needed for daily living?"
  - "During the last 12 months was there a time when an electric, gas, oil, or water company threatened to shut off services?"
  - "How often do you feel socially isolated from others?"
  - "During the past 12 months how often did the food that you bought not last, and you didn't have money to get more?"
- **API endpoint** available to facilitate automated and customized data extraction and integration with the UHDS

Applicability to Vermont

The State could use the CDC PLACES HRSN/SDoH to supplement or target primary HRSN/SDoH data collection. For example, providers could prioritize HRSN screening for patients living in tracts with a certain proportion of people estimated to have a given HRSN.

The main limitation with these data applies to all self-report sample surveys; some error may result from sampling, nonresponse, and measurement. **Exhibit 1.19** provides descriptive statistics for CDC PLACES HRSN/SDoH data for Vermont's 192 census tracts.

Exhibit 1.19: CDC PLACES HRSN/SDoH Tract-level Data for Vermont, 2022

2022 BRFSS HRSN Data (%)					
Measure	**Median**	**Minimum**	**Maximum**	**1st Quartile**	**4th Quartile**
Food stamps	11.2	4.6	31.6	8.8	13.5
Food insecurity	8.9	4.1	21	7.3	10.5
Transportation barriers	6.3	3.7	16.9	5.4	7.4
Housing insecurity	8.4	4.3	16	7.5	9.9
Utility services threat	5.7	3	11.6	5	6.6

2022 BRFSS HRSN Data (%)					
Lack of social/emotional support	21.5	17.1	28.2	19.9	22.8
Social isolation	32.8	28.6	47.9	31.7	34.4
2017-2021 5-year ACS SDoH Data (%)					
Measure	**Median**	**Minimum**	**Maximum**	**1st Quartile**	**4th Quartile**
Aged 65 years or older	20.2	2.0	39.9	16.1	24.0
Racial/ethnic minority	6.6	0.8	31.3	4.3	9.2
No high school diploma	6.0	0.0	17.8	3.6	7.9
Unemployment	3.3	0.0	17.9	2.1	4.8
Poverty	16.5	1.4	67.0	11.0	22.8
Single-parent households	4.3	0.0	18.0	2.5	6.6
Crowding	1.0	0.0	9.3	0.0	2.3
Housing cost burden	26.5	13.1	60.4	22.4	32.5
No broadband	15.0	2.1	47.2	11.3	19.8

CDC Environmental Public Health Tracking Network (EPHTN)

CDC also manages the EPHTN, a dynamic repository of community-level data on health conditions, environmental factors, climate, the built environment, and population characteristics. Public health practitioners, policymakers, healthcare professionals, and researchers use the EPHTN to monitor public health trends; inform policy, needs assessments, interventions, and care delivery; and study relationships between environmental factors and well-being.

Applicability to Vermont
VT has its own Environmental Public Health Tracking (EPHT) program that summarizes and visualizes many of the same metrics.

Strengths of the EPHTN include:

- Available at **various geographies**
- Incorporates **high-quality data** from national, state, and city sources

- Aligns with **CDC's Data Modernization Initiative**[46]
- **EPHTN Data Explorer** tool supports quick queries and visualization
- **Well-documented** methods and data notes for each data element, as well as a GitHub repository with code, documentation, and resources
- Provides data on **diverse topics** relevant to HRSN/SDoH, including five well-established **composite indices** (see **Exhibit 1.20**)
- **API** with accompanying user guide and FAQs available for users to leverage data

Why Use a Composite Index?

- Converts large quantity of publicly available data into efficient, comprehensive, and digestible neighborhood measures
- Accounts for intersecting and cumulative neighborhood effects
- Offers a more holistic approach than viewing indicators in isolation

It is important to keep in mind that EPHTN data are sourced from different places at different timepoints and geographic levels and may represent different universes (e.g., adults over 65, households).

Exhibit 1.20: Relevant Community-level Indices Available in EPHTN

CDC's Social Vulnerability Index (SVI)[47]	
Description	• **Social vulnerability:** Sociodemographic factors that negatively impact communities that encounter hazards, disasters, or disease outbreaks • Tract-level percentile rank based on 16 indicators across 4 themes: Socioeconomic (SES), Household characteristics, Racial/ethnic minority status, and Housing and transportation[48]
Application	• Help communities prepare for and recover from public health emergencies • Prevent negative effects among socially vulnerable populations (e.g., loss of property)
Strengths	• Already used by the State[49] • Theme-specific indices available for targeted analyses • Normed versions available at the national- and state-level • Cited in 500+ journal articles (see publications database)
Limitations	• Likely omits important local place-based factors that influence vulnerability • Excludes critically vulnerable populations like unhoused individuals

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[46] https://www.cdc.gov/environmental-health-tracking/php/about/environmental-health-data-modernization.html

[47] https://www.atsdr.cdc.gov/place-health/php/svi/index.html

[48] **SES:** <150% poverty level; Unemployment; Housing burden; No high school diploma; and No health insurance; **Household Characteristics:** ≥ 65 years; ≤17 years; Civilian with a disability; Single-parent household; and English language proficiency; **Housing Type and Transportation:** Multi-unit structure; Mobile homes; Crowding; No vehicle; and Living in group quarters

[49] Based on available information, it appears the State produces Vermont's SVI for publication on Vermont's Open Geodata Portal, mirroring the CDC's SVI methodology. The State may choose to source the SVI directly in-house, if easier, or source via the CDC EPHTN's API.

CDC's Environmental Justice Index (EJI)[50]	
Description	• **Environmental justice:** The just treatment of all people in activities that affect health and the environment so that people are protected from disproportionate health and environmental risks (e.g., climate change, structural/systemic barriers) • Tract-level percentile rank based on 36 factors across 3 core modules (Environmental Burden, Social Vulnerability, Health Vulnerability[51]) and 1 supplemental Climate Burden module on extreme events (e.g., heat, flooding)
Application	• Identify communities with high environmental burden to prioritize for policies and programs to reduce inequities and support in responding to hazards
Strengths	• First place-based national index to address cumulative impacts of environmental justice and inequity • Module-specific indices available for targeted analyses
Limitations	• Lacks data on some environmental justice issues (e.g., drinking water quality) • Uses a 1-mile buffer to measure proximity to hazards, regardless of hazard type

CDC's Heat and Health Index (HHI)[52]	
Description	• ZIP code-level percentile rank of areas **at risk for negative heat-related outcomes** based on four modules: Historical Heat/Health Burden (heat days and heat-related illness), Sensitivity, Sociodemographics, and Natural/Built Environment.[53]
Application	• Identify communities at risk during heat for public health education and response
Strengths	• Vermont's EPHT also tracks heat vulnerability • First national index to combine data on heat-related illness and community characteristics to measure heat vulnerability • Module-specific indices available for targeted analyses
Limitations	• Accounts for outdoor workers but does not account for other types of workplaces with high heat exposure (e.g., factories)

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[50] https://www.atsdr.cdc.gov/place-health/php/eji/index.html

[51] **Environmental Burden:** Air pollution; Air toxics cancer risk; Proximity to EPA hazardous sites and Coal/Lead mines; Lack of parks; Houses built pre-1980; Low walkability; Near High-volume roads, Railways, and Airports; and Contaminated watersheds; **Social Vulnerability:** Minority status; Poverty; No high school diploma; Unemployment; Renters; Housing burden; No health insurance; No internet access; ≥ 65 years; ≤ 17 years; Has disability; Limited English proficiency; and Lives in group quarters or Mobile homes; **Health Vulnerability:** Heart disease; Asthma; Cancer; Poor mental health; and Diabetes

[52] https://www.atsdr.cdc.gov/place-health/php/hhi/index.html

[53] **Sensitivity:** Heart disease; Obesity; Diabetes; Pulmonary Disease; Asthma; and Poor mental health; **Sociodemographics:** No health insurance; Poverty; Unemployment; No high school diploma; Lives alone; Limited English proficiency; Has disability; Outdoor workers; ≥ 65 years; and ≤ 5 years; **Natural/Built Environment:** Impervious surfaces; Tree canopy; No vehicle; Mobile homes; Renters; Ozone; and $PM_{2.5}$

Brandeis University's Child Opportunity Index (COI)[54]	
Description	• Tract-level index of 44 neighborhood features that promote **positive child development** across three domains: Education, Health/Environment, and Economic.[55]
Application	• Inform programs and policies to reduce inequities in neighborhood opportunity for children (e.g., restoration of parks, provision of public prekindergarten programs)
Strengths	• Used in 100+ journal articles about neighborhood effects on child health • Validated as a metric to also assess quality of neighborhood environment for adults • Covers more domains (school, physical environment) than other indices like the SVI
Limitations	• Does not factor in neighborhood data not available for national comparison

University of South Carolina's Baseline Resilience Indicators for Communities (BRIC)	
Description	• County-level index based on six categories of **community disaster resilience**: Human Well-being/Cultural/Social, Economic, Infrastructure/Built Environment, Institutional/Governance, Community Capacity, and Environmental[56]
Application	• Designate emergency preparedness funding by community need • Estimate supplies (e.g., food, water) and emergency personnel needed during disaster • Tailor emergency shelter planning, evacuation plans, and post-event support
Strengths	• Cited in 30+ peer-reviewed publications • Most replicated measure of community resilience with a high maturity rating (based on how tool was developed, operationalized, and validated) (Camacho et al., 2023)
Limitations	• Likely omits important place-based factors that influence resilience • May mask neighborhood differences, especially for vulnerable, less mobile people

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[54] https://www.diversitydatakids.org/child-opportunity-index

[55] **Education:** Pre-kindergarten enrollment; Reading/math test scores; Advanced Placement course enrollment; College enrollment; High school graduation; Educational attainment; Child enrichment CBOs; Teacher experience; and School poverty; **Health and Environment:** Airborne microparticles; Ozone; Industrial pollutants; Hazardous waste sites; Fast food and healthy food retailer density; Heat exposure; NatureScore; Walkability; Community safety- and health-related non-profits; Vacant housing; and Health insurance; **Economic:** Employment rates; Income; Poverty and public assistance; Adults with advanced degrees; Very high- and low-income households; Broadband access; Crowded housing; Mobility-enhancing friendship networks; Single-parent families; CBO density; Homeownership; and Home values.

[56] **Human Well-being/Cultural/Social:** Education; Pre-retirement age; Transportation access; English proficiency; Non-special needs populations; Insurance; Mental health support; Food security; and Access to care; **Economic:** Homeownership; Employment rate; Racial/ethnic and gender income inequality; Non-dependence on primary/tourism sector employment; Business size; Large retail with regional/national distribution; and Federal employment; **Infrastructure/Built Environment:** Housing types; Temporary housing availability, Medical care capacity; Evacuation routes; Housing stock quality; School restoration potential; Industrial re-supply potential; and Internet; **Institutional/Governance:** Mitigation spending; Flood and crop insurance, governance performance regimes; Jurisdictional fragmentation; Disaster aid experience; Local disaster training; Population stability; and Nuclear accident planning; **Community Capacity:** Volunteerism; Religious affiliation; Place attachment; Political engagement; Citizen disaster training; and Civic organizations; **Environmental:** Local food supplies; Natural flood buffers; Energy use; Perviousness; and Water stress

AHRQ SDoH Database

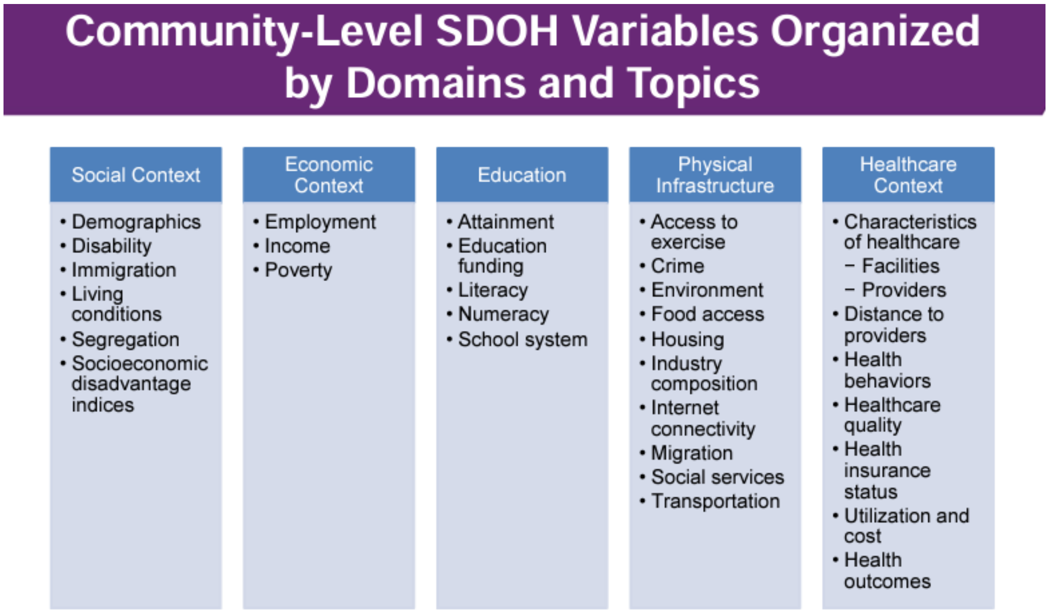
AHRQ developed the SDoH Database as a **one-stop shop for well-documented, readily linkable community-level SDoH variables** across Healthy People 2030 domains. The database includes data files and codebooks for each year and three levels of geography (county, ZIP code, and census tract).

Strengths of the SDoH Database include:

- Contains **over 17,000 variables** from over 40 data sources on diverse topics (see **Exhibit 1.21**)
- Offers **more granular** HRSN/SDoH data elements (e.g., poverty by race/ethnicity)
- **Over 10 years'** worth of data (2009-2020)
- **Detailed documentation** on each data element, data sources, and notes on reliability, geographic levels, suppression rules, variable notes, and term definitions
- **Regularly updated** with new data sources

Like CDC's EPHTN, the AHRQ SDoH Database includes data from different sources with varying availability and levels of missingness; these methodological considerations are well-documented in their Data Source Documentation.[57] One key limitation is that **AHRQ does not provide an API** for their database, so the State may need to manually download the database with each annual release.

Exhibit 1.21: AHRQ SDoH Database Contents[58]



Community-Level SDOH Variables Organized by Domains and Topics

Social Context	Economic Context	Education	Physical Infrastructure	Healthcare Context
• Demographics • Disability • Immigration • Living conditions • Segregation • Socioeconomic disadvantage indices	• Employment • Income • Poverty	• Attainment • Education funding • Literacy • Numeracy • School system	• Access to exercise • Crime • Environment • Food access • Housing • Industry composition • Internet connectivity • Migration • Social services • Transportation	• Characteristics of healthcare – Facilities – Providers • Distance to providers • Health behaviors • Healthcare quality • Health insurance status • Utilization and cost • Health outcomes

Source: AHRQ SDOH Database, version 1.

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[57] https://www.ahrq.gov/sites/default/files/wysiwyg/sdoh/SDOH-Data-Sources-Documentation-v1-Final.pdf

[58] https://www.ahrq.gov/sites/default/files/wysiwyg/sdoh/SDOH-overview-presentation.pdf

University of Wisconsin's County Health Rankings & Roadmaps (CHR&R)

The University of Wisconsin Population Health Institute, with funding from RWJF, compiles community-level data from national and state sources to produce annual health snapshots for U.S. counties.

Strengths of the CHR&R include:

- **Detailed documentation** on measure changes, data trends, and comparability across states over time to facilitate longitudinal analyses
- Data undergo **regular and systematic review**, evaluation, cleaning, and weighting
- Includes cross-sectional and trend data in **SAS and CSV format**

This data source has two major limitations:

1. Data are only available at the county-level; as in other states, Vermont counties vary greatly in terms of square mileage and population density, so county-level measures do not offer the same level of granularity as tract-level measures.
2. There are several measures of interest that cannot be included due to insufficient cell sizes or missing data for Vermont counties.[59]

Prioritized Community-level Data

We recommend the State prioritize community-level data elements available from the four data repositories described above according to the following priority levels:

- **Priority #1:** Data element captures a priority HRSN/SDoH identified by CDC and/or CMS that is 1) available at the census tract-level and 2) relevant to all or most Vermonters. Only CDC PLACES data are assigned this priority level, given their relevance, quality, representativeness of Healthy People 2030 domains and accessibility. We consider these 18 data elements to be the "lowest hanging fruit" with the most benefit.
- **Priority #2:** Data element is an alternate or more specific measurement of identified priority HRSN/SDoH and is relevant to all or most Vermonters.
- **Priority #3:** Data element is relevant to specific subgroups (e.g., households without internet with income less than $20,000).
- **Priority #4:** Data element is relevant for a specific use case (e.g., disaster preparedness, lead testing, community resource mapping).
- **Priority #5:** Data element may be available from another data source (e.g., opioid-related mortality rate by census tract may be available from Vital Statistics) or may be more useful for the UHDS analytics layer (e.g., population broken out by race/ethnicity, age, and gender).

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[59] The following measures are unavailable for some or all Vermont counties: Disconnected youth; Reading and math scores; School segregation; School funding adequacy; and Homicide rate.

Appendix 9 summarizes the prioritized list of 78 secondary data elements, with details in **Appendix 7.**

Geocoding Requirements

In this section, we list key resource requirements for geocoding data to enable linkage to secondary SDoH data sources via patient geography, including:

- Secure HIPAA-compliant geocoding software
- Technical staff (e.g., data manager) to develop, manage, and monitor geocoding processes and results
- Detailed procedural guidance and workflows describing:
  - Geocoding cadence (e.g., daily)
  - How new or updated patient addresses are flagged for geocoding
  - The acceptable threshold for a geocoding match
  - How to flag patient addresses that cannot be geocoded either on the backend or in the patient record (the latter may provide an opportunity for signaling to a provider that a patient's address needs to be verified)
  - Whether to overwrite the patient primary address in their record with the geocoded result (e.g., if the patient reports their address as 123 Front Street Northwest and geocoding returns an address as 123 Front St. NW)
  - Which geographic fields should be appended in geocoding (e.g., census tract, block group, ZIP code, county code, city, etc.) and whether fields are appended on the backend or visible in the patient record

Once geocoding processes are in place, appending secondary SDoH data sources via patient geography requires:

- Technical staff (e.g., data manager) to download, standardize, format, and QC secondary data to prepare for initial integration and refresh data as needed with subsequent data releases
- Software for data processing (e.g., SAS, Microsoft Excel, SPSS)
- Detailed procedural guidance and workflows describing:
  - Which SDoH data elements should be appended and by which geographic level (e.g., via census tract) and at what frequency
  - QC measures to verify resultant data look as expected

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2. Implementation Strategy Plan

Overview

This implementation plan provides a detailed execution guide outlining the actions and steps necessary to successfully integrate and centralize SDoH data within Vermont's UHDS. We have produced 40 strategy recommendations based on the findings in Chapter 1 “Landscape Survey and Needs Assessment.” This plan aligns the recommendations into defined phases building up to the full-scale integration and implementation of SDoH data elements. These recommendations span a variety of stakeholders and the data life cycle from collection and standardization through data application and evaluation. By establishing clear guidelines and milestones, the plan ensures that efforts remain on course and align with broader state health initiatives.

These phases index the State’s current data collection and integration processes and workflows and build in standardization for the future, allowing for gaps to be identified and redressed and space for stakeholder collaboration. The SDoH data efforts are interdependent and build upon each other; the phased approach represents the placement of a given recommendation in terms of operationalization rather than a time-bound sequencing. Select strategies may be iterative with built-in feedback loops informing further refinement and deployment. The underlying goal of these efforts is to enable the collection and sharing of quality health data and lay the groundwork for future systemic and outcome-based improvements.

Scope

The phases of implementation are broken into:

1. **Phase I: Assessment of current needs and readiness for change**

This phase focuses on defining technical requirements for SDoH integration at the data-, process-, and stakeholder participation-levels. It also involves inventorying possible key data sources and stakeholders, developing engagement strategies, and gathering information on needs and challenges. This phase will also set the stage for ongoing engagement to ensure that future implementation cycles center on the current stakeholder experiences to adapt strategies to the topical needs and challenges. A thorough assessment of readiness for change (see Chapter 4: Change Management Strategy) will lay the groundwork for strategies that are feasible and effective.

2. **Phase II: Identification, standardization, and validation of SDoH data sources**

In this phase, the data elements and platforms imperative to operationalizing SDoH data, such as evaluation criteria or systemic responses to SDoH/HRSN indicators, will be identified and integrated into protocols. Already existing data elements and infrastructure such as publicly available secondary data sources and Vermont’s participation in the AHEAD Model build in efficiency and standardization.

The strategies also avoid the duplication of efforts by identifying tools and opportunities that can be leveraged to maximize already ongoing efforts. Data cleaning standardization and system testing confirm the functionality and interoperability of Phase II efforts.

3. **Phase III: Pilot of strategy implementation and evaluation**

Once protocols have been established based on stakeholder needs and challenges and developed processes have been validated, a structured pilot will be launched with partners in Phase III to test the successful integration of SDoH data on a larger scale. Training materials, technical support, and tools are developed to enhance understanding and use of SDoH data and adoption of new strategies. Performance metrics are established to evaluate population health improvements, and necessary resources, including staffing and interoperable platforms, are allocated. New workflows will be assessed for best practices to implement more widely.

4. **Phase IV: Integration, optimization, and sustainability**

The final phase refines processes based on pilot feedback, integrates evolving national standards and impending policy changes, and ensures ongoing scalability. Mechanisms to encourage participation (e.g., incentives for data contributors) and redress positive SDoH/HRSN screenings are evaluated and iterated on for continued improvement. Continuous evaluation and dashboard reporting support long-term optimization and policy alignment.

Current and Future Recommendations for SDoH Data Efforts

Recommendations in **Exhibit 2.1** are ordered based on projected fit for future work and other known task-related inputs. Recommendations are numbered in the order in which they are presented and do not represent prioritization. Recommendation details provide additional implementation context including phase and frequency of data collection, needed resources, and other key implementation components. Suggested prioritization is indicated in bracketed italics using these categories:

- **Short-term:** Within one year
- **Medium-term:** One to two years
- **Long-term:** Two years or more
- **Ongoing:** Used in conjunction with short-/medium-/long-term and denotes repeat tasks

The “Frequency” row contains a recommended task cadence (for repeat tasks). The “Key Milestones” row includes suggested outputs. The “Responsible Parties” row lists the type(s) of stakeholders likely to be involved in strategy implementation. Specific entities (e.g., AHS) are named when possible, but otherwise strategies are assigned to generic categories that encompass certain roles, including:

- **UHDS leadership:** Core set of stakeholders across agencies like AHS and VITL and the Steering Committee responsible for the UHDS
- **UHDS governance committee:** Stakeholders overseeing UHDS data governance

- **UHDS data contributors:** Cross-sector stakeholders responsible for the collection, processing, and integration of SDoH data into the UHDS and is inclusive of healthcare and social services providers, payers, and other data contributors
- **UHDS stakeholders:** All stakeholders participating in the UHDS and is inclusive of all stakeholder types described above

Exhibit 2.1 summarizes the strategy recommendations by phase.

Exhibit 2.1: Implementation Strategy Recommendations for SDoH Data Efforts

COMMUNITY READINESS AND STEWARDSHIP

1. *[Medium-term, ongoing]* **Conduct annual mapping of UHDS stakeholder assets and needs** related to SDoH data collection, integration, and use. The State can leverage existing HIE Steering Committee activities to inform and support this exercise. The National Center on Advancing Person-Centered Practices and Systems offers a Toolkit for Stakeholder Asset Mapping.
    - **Phase I**
    - **Frequency**: Annual
    - **Key Milestones**: 1) Data collection; 2) Report on findings, lessons learned, and next steps
    - **Responsible Parties**: UHDS leadership
    - **Resources Required**: Research staff to collect, analyze, and summarize data; Development of a data collection tool for annual use; Participation from UHDS stakeholders

MISSION AND PURPOSE

2. *[Short-term, ongoing]* **Continue to update the HIE Strategic Plan** with progress in SDoH data collection and integration. Continue to set interim goals achievable in the short-term while modifying and expanding future goals based on evolving priorities and changing policy and data landscapes.
    - **Phase IV**
    - **Frequency:** Annual
    - **Key Milestones:** 1) Updated HIE Strategic Plan
    - **Responsible Parties:** AHS
    - **Resources Required:** AHS staff to review progress made towards prior year goals, identify emerging goals, and update plan; Feedback from UHDS stakeholders

VALUES AND PRINCIPLES

3. *[Short-term, ongoing]* **Develop process to collect and respond to feedback on SDoH efforts**. The State already has diverse stakeholders engaged in the Steering Committee and can expand UHDS participation to include more patient representatives, caregivers, and community members. Feedback can be solicited from this expanded stakeholder group via quarterly **virtual townhalls** or an **SDoH Community Advisory Board**.
    - **Phase I**
    - **Frequency:** Quarterly or as needed
    - **Key Milestones:** 1) Virtual townhall series and/or formation of SDoH Community Advisory Board; 2) Other milestones to be determined in conjunction with stakeholders

- **Responsible Parties:** UHDS leadership
- **Resources Required:** Research and/or administrative staff to recruit new stakeholders, schedule events, develop a methodology to collect feedback, analyze feedback, and identify actionable next steps; Mechanism to share feedback with stakeholders; Software to host virtual town halls and/or Advisory Board meetings (e.g., Zoom)

LEGAL; GOVERNANCE

4. *[Short-term, ongoing]* **Inventory potential SDoH data elements from non-HIPAA-covered entities** (e.g., programmatic data like requests for housing and/or SDoH/HRSN screening data). First, **solicit input from UHDS stakeholders on entities** to engage. Input may include identification of an entity contact person and how the entity's data may inform care, supplemented by internet searches of the entity's services and target populations.

   Next, conduct **initial outreach to the entities** to begin building relationships and gauge interest in UHDS participation. Given that HIPAA-covered data cannot be shared with non-HIPAA-covered entities, it will be important to **emphasize benefits of participation** (e.g., access to high-quality and timely population- and community-level data and referral metrics, potential incentives).

   - **Phase I**
   - **Frequency:** Ongoing as UHDS participation expands and new data sources are identified
   - **Key Milestones:** 1) UHDS stakeholder input; 2) Draft inventory; 3) Outreach to entities
   - **Responsible Parties:** UHDS leadership; UHDS governance committee; UHDS data contributors; UHDS stakeholders
   - **Resources Required:** Research and/or administrative staff, leadership, and UHDS stakeholder time to populate, review, and update the inventory; Identification of and initial outreach to non-HIPAA-covered entities; Software for inventory (e.g., Microsoft Excel)

5. *[Medium-term]* **Engage a subset of non-HIPAA-covered entities and community members** that receive services from these entities via focus groups and/or stakeholder convenings. The first goal of engagement is to assess the **feasibility of collecting and/or integrating entities' SDoH/HRSN data**. Special emphasis should be placed on informed consent and potential barriers to implementation. The second goal is to assess **community members' comfort with and interest in contributing their information** collected by non-HIPAA-covered entities to the UHDS.

   - **Phase I**
   - **Frequency:** One-time[60]
   - **Key Milestones:** 1) Identification of entities and community members; 2) Recruitment of participants; 3) Data collection (i.e., engagement); 4) Data analysis and reporting
   - **Responsible Parties:** UHDS leadership; UHDS governance committee; UHDS data contributors
   - **Resources Required:** Research staff to recruit non-HIPAA-covered entities and their clients for engagement and collect, analyze, and synthesize data; Staff to develop and maintain relationships with non-HIPAA-covered entities and their clients; Qualitative coding software (e.g., Dedoose); Monetary and/or non-monetary incentives (e.g., providing lunch) for participation; Software to support virtual engagement (e.g., Zoom)

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[60] We suggest a one-time effort given the resources and time required for stakeholder engagement and qualitative data collection and analysis. Assuming the initial inventory of non-HIPPA-covered entities completed under Strategy Recommendation #4 is generally representative of the types of entities the State is interested in engaging for the UHDS, then findings from Strategy Recommendation #5 will likely apply to additional non-HIPPA-covered entities identified for future engagement.

6. *[Long-term, ongoing]* In collaboration with CBOs and other non-HIPAA-covered entities, **develop options for consent approaches for cross-sector data sharing**. Create an **electronic universal consent form**[61] where Vermonters can opt in to share their social service data from all participating entities with UHDS. Easy-to-understand and visually appealing materials that explain the UHDS' purpose, benefits, and confidentiality policies could be posted and/or distributed via participating entities (either at their physical location or website). Hardcopy materials could include a QR code that directs to the consent portal. Virtual materials could include a direct link.

   For accessibility, a **hardcopy universal consent form** should be available at entities for individuals to either submit directly to the entity (who should submit to the State) or mail in. For the mail-in option, the State could offer prepaid postage. Front desk staff and/or providers at the entity should be briefed on how to answer UHDS questions (e.g., via frequently asked questions [FAQs] provided by the State). Designating one point person at each entity to handle consent questions may be preferred.

   Consent materials should be **available in multiple languages and use plain language** to explain how their data may be used, what kinds of data may be shared vs. not shared, how to retract consent at any time, and who to contact at the State for questions. There should be clear instructions on how to opt out of data sharing (e.g., mailing in or submitting an online "opt-out" consent form).

   The State will need to develop a mechanism (ideally automated) for **tracking and monitoring receipt** of electronic and hardcopy opt-in/opt-out consent forms at the individual level. Regardless of consent format, it will be important to document consent (or lack thereof) for non-HIPAA-covered entities on the individual's UHDS record using predefined identity matching procedures.

   For consent granted or revoked online, it may be possible to **sync the online consent portal with the UHDS** to automatically update consent status on individual records. Alternatively, a separate workflow may be devised to download electronic consent data from the portal at regular intervals for UHDS integration. Tracking and updating hardcopy consent is likely to be more manual and require procedures for consent form intake, QC (e.g., are the right fields signed), and entry into the UHDS.

   - **Phase IV**
   - **Frequency:** Ongoing as UHDS participation expands to other entities
   - **Key Milestones:** 1) Development of consent model, materials, and consent tracking mechanism for non-HIPAA-covered entities; 2) Implementation, tracking, and integration of consent status into the UHDS
   - **Responsible Parties:** UHDS leadership; UHDS governance committee; UHDS data contributors
   - **Resources Required:** Research, legal, and technical staff, data governance committee, and leadership time to work with entities in designing and implementing the consent model; Materials translation, printing, and distribution; Prepaid posted envelope for mail-in forms; Software for online consent portal, materials, and consent tracking

7. *[Long-term, ongoing]* In collaboration with participating non-HIPAA-covered entities, **develop governance around the consent model** from *Strategy Recommendation #6*. The State could create a data governance subcommittee specifically for data ingested from non-HIPAA-covered entities or leverage the existing SDoH Data Governance Subcommittee. The subcommittee should define how non-HIPAA-covered entities interact with the UHDS and the individuals whose data are in the UHDS. The subcommittee should also ensure that non-HIPAA-covered entities are compliant with consent procedures (e.g., via training materials, protocols, and legal agreements). The subcommittee should consider any access restrictions for these entities; for example, HIPAA-covered data should not be accessible by non-HIPAA-covered entities.

   - **Phase IV**
   - **Frequency:** Ongoing as UHDS participation expands to other entities

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[61] We recommend using a universal rather than a segmented consent model to simplify obtaining consent. Consent materials should make it clear to individuals that by opting in, they consent for their information to be shared by all non-HIPAA-covered entities that participate in the UHDS (including entities that are not currently participating but may participate in the future).

- **Key Milestones:** 1) Development of a new subcommittee or leveraging of existing subcommittee; 2) Development of legal agreements, protocols, procedures, compliance and monitoring checks, workflows, and training materials for non-HIPAA-covered entities; 3) Ongoing monitoring of governance
- **Responsible Parties:** UHDS leadership; UHDS governance committee; UHDS data contributors
- **Resources Required:** Leadership, data governance committee, and legal staff time to develop, test, refine, and implement appropriate data-sharing agreements, processes, and documentation and materials in partnership with non-HIPAA-covered entities

POLICY

8. *[Medium-term, ongoing]* Explore opportunities to **leverage Medicaid and/or Medicare funds for SDoH investments**, such as: Medicaid 1115 waivers to test approaches to addressing HRSN; new payments for ACOs to address SDoH in the Medicare Shared Savings Program; Medicare's revisions to its Physician Fee Schedule that account for clinical resources to identify HRSN; Medicare's separate payment and coding (HCPCS code G0136) for SDoH risk assessments; and Vermont's ongoing MDAAP incentive program.
   - **Phase II**
   - **Frequency:** One-time for specific policies listed above, but ongoing monitoring of emerging Medicaid and Medicare policies is recommended
   - **Key Milestones:** 1) Identification of policy levers to increase funding and support for SDoH/HRSN efforts; 2) Submission of applicable documentation; 3) Implementation of policy lever; 4) Completion of any reporting requirements
   - **Responsible Parties:** UHDS leadership; UHDS data contributors
   - **Resources Required:** Staff to identify and apply for potential opportunities; Provider time to meet service and reporting requirements for funding; Identification of and connection with any state agency or resources that track policy changes relevant to the state

9. *[Medium-term, ongoing]* Explore opportunities to **leverage CMS' support for ILOS policies** that allow Medicaid plans flexibility to address HRSN in lieu of other medical services. Efforts to use ILOS policies may be **structured to require engagement with CBOs** to **increase pathways for under-resourced CBOs** to access more funding and strengthen cross-sector partnerships.
   - **Phase II**
   - **Frequency:** Ongoing as UHDS participation expands
   - **Key Milestones:** 1) Evaluation of how ILOS policies fit into the Vermont landscape; 2) Cross-sector collaborations and workflows for ILOS provision; 3) Implementation of ILOS; 4) Completion of any reporting requirements
   - **Responsible Parties:** UHDS leadership; UHDS data contributors
   - **Resources Required:** Cross-sector staff to identify and implement alternative services allowable as ILOS and satisfy any reporting requirements

10. *[Medium-term]* Explore opportunities created by the **CMS Interoperability and Prior Authorization Final Rule (CMS-0057-F)**. Under this rule, payers must implement and maintain FHIR APIs to improve HIE, which may be an opportunity to increase the amount of payer data in the UHDS.
    - **Phase II**
    - **Frequency:** One-time
    - **Key Milestones:** 1) Requirements must be implemented by January 1, 2027
    - **Responsible Parties:** AHS; UHDS leadership; UHDS governance

- **Resources Required:** Established communication lines and partnership with payers in Vermont; Payer buy-in; Technical and research staff to integrate payer data into the UHDS

11. *[Medium-term, ongoing]* Explore **VBC reimbursement models** (e.g., incentives for collecting SDoH data). Through MDAAP, Vermont has an example system in place to incentivize and assist HCBS providers in digitizing health records. There may be opportunities to leverage learnings from MDAAP to inform if and how the State pursues other VBC reimbursement models to encourage providers to collect and submit SDoH data to the UHDS.
    - **Phase II**
    - **Frequency:** Ongoing as UHDS participation expands
    - **Key Milestones:** 1) Identification of available VBC models; 2) Application to relevant VBC model; 3) Implementation of VBC model; 4) Completion of any reporting requirements
    - **Responsible Parties:** UHDS leadership; UHDS data contributors; UHDS governance committee
    - **Resources Required:** Research or administrative staff and/or providers to identify, review, and apply for VBC models; Providers to implement model and reporting requirements; Data governance committee to ensure compliance with data-sharing standards and policies

12. *[Long-term, ongoing]* Explore how Vermont's **position in Cohort 2 of the AHEAD Model** can be leveraged to standardize and expand SDoH/HRSN data collection and integration (e.g., ingesting Medicare claims into the UHDS or using AHEAD funds to strengthen CBO relationships).
    - **Phase II**
    - **Frequency:** One-time for AHEAD Model, but ongoing for future model opportunities
    - **Key Milestones:** 1) AHEAD Model pre-implementation phase in 2025; 2) Performance year begins 2026 and continues for up to six years
    - **Responsible Parties:** AHS; UHDS leadership; UHDS governance
    - **Resources Required:** Established communication lines and partnership with AHS AHEAD Model leadership to understand potential opportunities and alignment; Technical staff, research staff, provider, and UHDS data governance committee time

IMPLEMENTATION SERVICES

13. *[Short-term, ongoing]* **Develop a standard mechanism for reporting key metrics related to SDoH/HRSN to stakeholders** in a timely manner. The report should include findings on spending, quality measures, outcome metrics (e.g., referrals for HRSN), and data quality.
    - **Phase I**
    - **Frequency:** Annual
    - **Key Milestones:** 1) Define metrics of interest; 2) Analytic plan; 3) Report production and dissemination
    - **Responsible Parties:** UHDS leadership; UHDS stakeholders
    - **Resources Required:** Research staff to analyze data and write report; Software for data analysis (e.g., SAS); Stakeholder feedback on structure, methodology, and findings

14. *[Medium-term, ongoing]* Establish and disseminate **standard screening tools, terminology, and workflows** where possible. The State can leverage the crosswalk under *Strategy Recommendation #28* and other standards described in this report. Protocols, how-to guides, and training materials can help familiarize stakeholders with standardization efforts and expectations.

For providers who continue to use non-standard tools, the State should develop basic technical standards that these providers must follow to submit these data to the UHDS.

- **Phase IV**
- **Frequency:** Ongoing as UHDS participation and data collection expands
- **Key Milestones:** 1) Define standardization protocols; 2) Development, dissemination, and refinement of standardization resources and protocols
- **Responsible Parties:** UHDS leadership; UHDS data contributors
- **Resources Required:** Research and technical staff to develop standards with input from stakeholders; Stakeholder support; Software for resources and protocols (e.g., PowerPoint)

15. *[Medium-term, ongoing]* **Develop a methodology for using community-level data to identify communities of need**. The methodology should incorporate the UHDS analytics layer. The State should identify specific SDoH/HRSN of interest that can be viewed by geography in the analytics layer. Additionally, a definition or threshold indicator for “communities of need” should be developed. Such analyses could inform community outreach efforts.[62]
    - **Phase II**
    - **Frequency:** Ongoing as UHDS participation and data collection expands
    - **Key Milestones:** 1) Methodology to identify community SDoH/HRSN; 2) Analytic plan to visualize SDoH/HRSN; 3) Develop and test technical infrastructure; 4) Monitor, analyze, and report on findings
    - **Responsible Parties:** UHDS leadership
    - **Resources Required:** Research staff to create methodology, develop a definition for communities of need, create an analytic plan, analyze data, and summarize findings; Software for analysis and visualization (e.g., SAS and Tableau)

16. *[Medium-term, ongoing]* Develop, test, and iterate through **anonymous closed-loop referral use cases** with participating providers. This workflow may vary from organization to organization; however, this process should develop best practices as a starting point and set up a workflow for actions taken after different types of referrals are initiated.
    - **Phase III**
    - **Frequency:** Ongoing as UHDS participation and data collection expands
    - **Key Milestones:** 1) Workflow development, testing, implementation, and refinement
    - **Responsible Parties:** UHDS leadership; UHDS data contributors
    - **Resources Required:** Staff to develop, test, and iterate on the referral workflow; Data contributor engagement and time to test the referral workflow; Technical staff to manage technical requirements for the workflow (e.g., referral tracking system)

17. *[Medium-term, ongoing]* **Create a centralized resource repository** with information on social service and community resources. The repository should tag resources with categories such as food, disability resources, and mental health and be searchable by key term and geographic area. There are existing repositories of resources that the State can leverage rather than starting from scratch (e.g., Vermont’s 2-1-1, Neighborhood Navigator). This repository should be integrated in the UHDS to assist providers in identifying appropriate resources for patients with HRSN.
    - **Phase II**

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[62] For example, if a particular ZIP code scores high on a heat vulnerability index due to housing instability, state decisionmakers may consider setting up “cooling centers” in that area.

- **Frequency**: Periodic review and updating
- **Key Milestones:** 1) Development of resource repository template; 2) Populate repository rows; 3) Integrate resource repository with UHDS; 4) Regular maintenance and updating
- **Responsible Parties**: UHDS leadership; UHDS stakeholders
- **Resources Required:** Staff to populate and periodically review and update resource repository; Technical staff to build infrastructure to integrate repository

18. *[Long-term, ongoing]* **Implement anonymous closed-loop referrals** to allow all UHDS providers to streamline, monitor, and track care delivery. Establish a communication mechanism for the State and UHDS leadership to field questions and feedback from receiving and referring providers.
    - **Phase II**
    - **Frequency:** Ongoing
    - **Key Milestones:** 1) Implementation and refinement of protocol and associated resources (e.g., resource directory, training materials on using the closed-loop referral system)
    - **Responsible Parties:** UHDS leadership; UHDS data contributors
    - **Resources Required:** Staff to develop protocols and resources for providers (e.g., resource directories, trainings); Stakeholder support and feedback; Established feedback loop between UHDS leadership and providers

USER SUPPORT AND LEARNING NETWORK

19. [*Medium-term, ongoing*] **Conduct listening sessions with stakeholders to understand challenges and barriers in their SDoH data efforts.** These listening sessions may be similar to NORC's stakeholder engagement conducted in late 2024 on behalf of the State.
    - **Phase IV**
    - **Frequency:** Annual
    - **Key Milestones:** 1) Development of data collection instrument; 2) Conduct annual listening sessions; 3) Data analysis and reporting
    - **Responsible Parties:** UHDS leadership; UHDS stakeholders
    - **Resources Required:** Research staff to develop instrument, conduct listening sessions, analyze data, and write report; Software for listening sessions (e.g., Zoom or Teams); Software to analyze qualitative data (e.g., Dedoose); Stakeholder feedback

20. *[Short-term, ongoing]* **Develop tools to help users understand SDoH data** and its value. The State could produce data briefs, maps, and infographics that showcase SDoH/HRSN data from the UHDS. The State can leverage the existing Healthy Vermont 2030 report card as an example.
    - **Frequency:** As needed; regular product releases may generate interest in and support for SDoH data collection and integration efforts
    - **Key Milestones:** 1) Identify key metrics; 2) Analysis of individual-level or secondary data; 3) Creation of data briefs, maps, and other data visualization tools
    - **Responsible Parties:** UHDS leadership; UHDS data governance
    - **Resources Required:** Research staff to analyze data and develop and disseminate products; Stakeholder feedback; Software for data analysis and report production; Software for map creation (e.g., ArcGIS or an open-source GIS software)

21. *[Short-term]* **Develop materials and trainings on using secondary SDoH data sources** with an emphasis on how secondary data can be applied to rural settings and linked to individual-level data.
    - **Phase I & Phase III**
    - **Frequency:** One-time
    - **Key Milestones:** 1) Identify secondary SDoH data elements of interest; 2) Develop materials, trainings, and visualizations to showcase data application
    - **Responsible Parties:** UHDS leadership
    - **Resources Required:** Research staff to develop materials; Forum to share materials

22. *[Medium-term, ongoing]* **Promote participation in the UHDS as a learning environment for stakeholders**. All UHDS processes and engagement need to be responsive and adaptable to changing policy, healthcare, and community-level circumstances. The UHDS should be framed as an environment in which stakeholders will continue to learn from one another's experiences.
    - **Phase I & Phase II**
    - **Frequency:** Ongoing as UHDS participation and data collection expands
    - **Key Milestones:** 1) Creation of a learning environment (e.g., connection meetings or dashboard communication)
    - **Responsible Parties:** UHDS leadership; UHDS stakeholders; UHDS data contributors
    - **Resources Required:** Staff to create a space for peer-to-peer learning; Technology to connect stakeholders (e.g., Zoom); Stakeholder buy-in

23. *[Long-term, ongoing*] **Establish a centralized coordinating center to provide technical support.** This coordinating center should provide technical assistance on consent policies, data collection, sharing, and integration, application to healthcare, and any other needs or questions that arise.
    - **Phase II**
    - **Frequency:** Ongoing
    - **Key Milestones:** 1) Develop plan, organizational structure, roles, and communication lines for centralized coordinating center and hubs; 2) Implement and refine approach
    - **Responsible Parties:** UHDS leadership; UHDS data contributors; UHDS stakeholders
    - **Resources Required:** Staff to administer technical assistance; Stakeholder support for creation of a centralized coordinating center; Funding for the coordinating center and hubs

MEASUREMENT AND EVALUATION

24. *[Medium-term, ongoing]* **Create a set of standardized measures to evaluate performance in improving population health over time**. These measures should align with existing measures, reporting requirements, and payer needs. The State could use HEDIS, NCQA, and population-specific performance measures. In specific, the SNS-E measure from HEDIS should be considered as an outcome measure. The SNS-E measure assess the percentage of members who are screened for and receive an intervention for unmet needs, including food, housing, and transportation. Vermont can also leverage the Healthy Vermonters 2030 scorecard for topical areas of interest and benchmarking metrics for population health.
    - **Phase II**
    - **Frequency:** Annual
    - **Key Milestones:** 1) Identification of key metrics for tracking; 2) Implementation, reporting, benchmarking, and refinement of key metrics

- **Responsible Parties:** UHDS leadership
- **Resources Required:** Research staff to identify and implement key metrics (with input from UHDS stakeholders); Software to create metrics and benchmark (e.g., SAS)

25. *[Long-term, ongoing]* **Design a dashboard with metrics on health and social outcomes, UHDS participation, and data quality** to support performance monitoring and strategic decision-making. The dashboard could incorporate VHIE's Outcomes-Based Certification - Outcomes and Metrics.
    - **Phase II**
    - **Frequency:** Periodicity to be determined by AHS
    - **Key Milestones:** 1) Identification of metrics to display; 2) Development and testing of the dashboard; 3) Periodic dashboard updates
    - **Responsible Parties:** UHDS leadership; UHDS stakeholders
    - **Resources Required:** Software for dashboard development (e.g., R Shiny); Technical staff to create dashboard; Research staff to identify metrics (with input from stakeholders)

FINANCING

26. [*Medium-term, ongoing*] **Develop a mechanism to provide incentives to data contributors (including CBOs) to encourage SDoH data collection and submission**. There may be opportunities to leverage existing incentive programs (e.g., MDAAP) to facilitate integration of electronic data. The State could consider using a tiered incentive approach like Arizona.
    - **Phase IV**
    - **Frequency:** Ongoing as UHDS data collection evolves
    - **Key Milestones:** 1) Review of existing efforts in Vermont and other states; 2) Development of a Vermont-specific incentive system; 3) Implementation of incentive system
    - **Responsible Parties:** UHDS leadership; UHDS data contributors
    - **Resources Required:** Staff to catalog existing efforts and develop Vermont-specific system; Knowledge of funding and incentive methodology; Funding to pay incentives

27. [*Long-term, ongoing*] **Explore opportunities for braided or blended funding** (i.e., combining federal and state-based funding sources) to be used to fund SDoH data integration into the UHDS.
    - **Phase II**
    - **Frequency:** Annual
    - **Key Milestones:** 1) Review funding mechanisms; 2) Funding plan and implementation
    - **Responsible Parties:** UHDS leadership; UHDS stakeholders
    - **Resources Required:** Knowledge of funding opportunities; Finance, administrative, and/or legal staff to determine eligibility, submit application, and satisfy reporting requirements

TECHNICAL INFRASTRUCTURE AND DATA STANDARDS

28. *[Short-term, ongoing]* **Crosswalk existing standardized SDoH screening tools at the domain- and question-level.** Build a process for a set review cycle to enable the State and its partners to monitor changes in existing tools and new tools that are developed.
    - **Phase IV**
    - **Frequency:** One-time delivery by NORC; ongoing updates by the State as needed

- **Key Milestones:** 1) Delivery of crosswalk and process documentation in March 2025
- **Responsible Parties:** NORC (through March 2025); AHS (April 2025 onward)
- **Resources Required:** From April 2025 onward, AHS research staff time to identify new or updated SDoH/HRSN screening tools and items and update the crosswalk accordingly

29. *[Short-term, ongoing]* **Develop, test, QC, and document methodology for identifying individuals at risk for HRSN** based on relevant data elements ingested into UHDS. Each data element that triggers a "positive" screening for SDoH/HRSN should have an accompanying methodology.[63]
    - **Phase I**
    - **Frequency**: Ongoing as UHDS participation and data collection expands
    - **Key Milestones:** 1) Creation of methodology to identify at-risk individuals; 2) Development, and testing of technical infrastructure; 3) Launch, maintenance, and refinement
    - **Responsible Parties:** UHDS leadership; UHDS data governance; UHDS data contributors
    - **Resources Required:** Research and/or technical staff to develop, test, and maintain methodology; Software to support methodology (e.g., create composite measures); Data governance regulations for methodology (i.e., protocols for handling PHI/PII)

30. *[Medium-term, ongoing*] **Develop technical specifications for what happens** in the system backend and frontend **when a "positive" SDoH/HRSN screen occurs** (e.g., a push notification is sent to the provider indicating the patient should be connected to a resource, or an HRSN flag is added to the patient record). A crosswalk that details which types of SDoH/HRSN positive screenings are mapped to which resources for referrals should be created.[64]
    - **Phase IV**
    - **Frequency**: Ongoing as UHDS participation and data collection expands
    - **Key Milestones***:* 1) Development of technical specifications; 2) Programming and testing of technical infrastructure; 3) Launch, maintenance, and refinement of technical infrastructure
    - **Responsible Parties:** UHDS leadership; UHDS data contributors
    - **Resources Required**: Technical and research staff to develop, program, test, QC, and document the specifications; Software to support desired system action; Feedback from UHDS data contributors on functionality, performance, and utility

31. *[Medium-term, ongoing]* **Develop technical workflow and specifications for what happens *after* the provider is notified of a specific SDoH need/HRSN**. The workflow should consider how the provider will identify the appropriate resource (e.g., manual look-up or automated through the system), how the resource referral will account for patient geography (e.g., the resource should be located within X miles from the patient's home), how the organization receiving the referral will be notified, and if applicable, the methodology used to track outcomes. UHDS leadership should develop protocols for providers to use in matching unhoused patients to accessible resources (e.g., training the provider to probe for the intersection at which the patient spends most of their time).
    - **Phase IV**
    - **Frequency:** Ongoing as UHDS participation and data collection expands

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[63] For example, for the CMS AHC HRSN Screening Tool, the State should draft a methodology that aligns with CMS recommendations for a "positive" HRSN screening.

[64] For example, if a patient screens positive for food insecurity, the system may indicate "food assistance" as the type of resource referral, or the provider may manually enter "food assistance" into a type of resource referral field.

- **Key Milestones:** 1) Development of workflow and specifications; 2) Testing and revision of workflow and specifications based on stakeholder feedback; 3) Launch, maintenance, and refinement of workflow and specifications
- **Responsible Parties**: UHDS leadership; UHDS data contributors; UHDS data governance
- **Resources Required**: Research and technical staff to develop workflow and specifications; Feedback from data contributors and providers on workflows, specifications, and documentation; Technical staff to integrate resources into the system (e.g., creating automated resource identification, anonymous closed-loop referral tracking); Software to support resource directories and/or anonymous closed-loop referral tracking

32. *[Medium-term, ongoing]* **Develop processes for batch geocoding most current patient primary address available in EHR**. In addition to standardizing and validating patient primary address, geocoding populates identifiers that can be used to append publicly available secondary data (see "SDoH Data Source Review" section for prioritized list of potential sources). The geocoding process should be automated, well-documented, and occur at regular intervals. Protocols should specify acceptable thresholds for a geocoding match and workflows for data integration (e.g., will geocodes be appended directly to EHR or to patient data on the backend in a data linkages layer).
    - **Phase II**
    - **Frequency:** Ongoing
    - **Key Milestones:** 1) Development, testing, and QC of methodology; 2) Geocoding
    - **Responsible Parties:** UHDS leadership
    - **Resources Required:** Valid patient primary address data for geocoding; Geocoding software (e.g., DeGAUSS, ArcGIS); Research staff to develop methodology, QC, and process documentation; Technical staff to automate and integrate geocoding process

33. *[Medium-term, ongoing]* Once geocoding processes are in place, leverage **publicly available secondary SDoH data sources as a proxy for individual- and community-level data**,
    - **Phase III**
    - **Frequency:** Ongoing
    - **Key Milestones:** 1) Select secondary SDoH data elements; 2) Develop processes for extracting, standardizing, linking, integrating, QC'ing, and sharing secondary data; 3) Develop process for monitoring and refreshing data as needed
    - **Responsible Parties:** UHDS leadership
    - **Resources Required:** Research and technical staff to identify, standardize, and integrate secondary SDoH data sources; Software to extract and process publicly available SDoH data sources (e.g., SAS); Comprehensive data and process documentation, including, but not limited to: a data dictionary with a listing of variable attributes, how-to guides and technical specifications for each step that must be taken to prepare secondary data for integration into the UHDS, and process documentation detailing who is responsible for monitoring data updates, refreshes, or new releases; UHDS data governance review

34. *[Short-term, ongoing*] Continue to **follow emerging national standards for SDoH data**. This includes continuing to align UHDS data standards with FHIR and USCDI standards as they evolve. To stay informed about changes to standards, the **Gravity Project** offers a listserv sign-up here. The State may consider joining the Gravity Project as a "Community Participant." Signing up for a Gravity Project membership would also align with the State's goal of participating in national networks, as outlined in the HIE Strategic Plan (2023-2027).
    - **Phase III**
    - **Frequency:** Ongoing

- **Key Milestones:** Updates are contingent upon revisions or additions to standards; however, UHDS governance should set a pre-determined goal timeline for alignment with current standards (e.g., within six months of an update)
- **Responsible Parties:** UHDS leadership; UHDS data governance
- **Resources Required:** Technical staff to monitor and review updated standards and determine if/how updated standards may impact the UHDS; Depending on updates needed, may require additional software and/or technical capabilities; Staff to participate in learning networks such as the Gravity Project

35. *[Medium-term, ongoing]* **Explore using NLP to extract SDoH/HRSN data** from EHR notes. First, identify whether there are existing portable NLP models for adaptation. Consult with research and technical staff on the feasibility of developing an in-house NLP model or adapting an existing model. This may involve reviewing EHRs to identify terms and assessing whether the benefits of combing through EHR data are worth the LOE. The State may wish to explore **potential academic partnerships** to secure resources for qualitative coding and model development or partnering with an NLP vendor (e.g., IMAT Solutions).

    If an NLP model is feasible and beneficial, the model will need to iterate through **testing and refinement**. The model itself can be automated so that the most time- and resource-intensive activities are frontloaded during development.

    Next, identify **how NLP model findings are integrated** into the UHDS.[65] Regardless of approach, implementation of an NLP model needs to be accompanied by a crosswalk of how model findings map to specific HRSN and how these needs should be coded and displayed in patient records.

    - **Phase IV**
    - **Frequency:** To be determined regular interval
    - **Key Milestones:** 1) Review of NLP model feasibility; 2) Development of key terms for model input; 3) Development, testing, automation, implementation, and refinement of NLP model; 4) Crosswalk of NLP model findings and HRSN- and SDoH-related codes
    - **Responsible Parties:** UHDS leadership
    - **Resources Required:** Research and/or technical staff to review feasibility and utility of NLP; Research and/or technical staff to develop, test, document, implement, monitor, and refine the NLP model; Potential academic partnership to secure resources for initial NLP model development; Software to program and implement an NLP model (e.g., SAS); Crosswalk of NLP model findings to HRSN- and SDoH-related codes; UHDS data governance time to review compliance with data-sharing policies; UHDS data contributor feedback on NLP model development (e.g., input on key terms) and its potential application to healthcare; Potential partnership with and funding for an NLP vendor

36. *[Short-term, ongoing]* **Inventory current primary SDoH data collection** among healthcare providers, facilities, and payers that currently contribute or will contribute data to the UHDS. This inventory will be helpful in determining representation of data elements across Healthy People 2030 domains, identifying gaps and redundancies, and taking stock of SDoH/HRSN data ingested from data contributors. The inventory should document each data element's purpose(s) (e.g., quality measure required by a payer), VHIE/UHDS connection status (e.g., not connected, in progress, connected), data quality, and any special privacy and/or confidentiality concerns.

    The inventory can serve as the basis for an **UHDS SDoH/HRSN Data Dictionary** that contains a listing of all variables and their attributes. Data dictionaries can also be instrumental tools in automation (e.g., a data dictionary may serve as an input in automated cleaning or linking processes) and guiding analytic and reporting tool design.

    - **Phase III**

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[65] For example, if the NLP model detects a housing need, will an ICD-10-CM Z code be used to document housing insecurity in the HER, or will another field on the HER be used to indicated that the patient needs housing assistance?

- **Frequency:** Annual
- **Key Milestones:** 1) Identification of HIPAA-covered entities that contribute or will contribute to the UHDS; 2) Inventory of data elements; 3) UHDS SDoH/HRSN Data Dictionary
- **Responsible Parties:** UHDS leadership; UHDS data contributors; UHDS data governance
- **Resources Required:** Research staff to create inventory and data dictionary in partnership with data contributors; UHDS stakeholder time to evaluate data gaps; Software for inventory and data dictionary (e.g., Excel)

37. *[Short-term, ongoing]* **Establish minimum technical standards for data submitted to the UHDS and develop automated data cleaning and processing procedures.** These standards should delineate required fields and formats (both data type and code frame), variable and dataset naming conventions, linking variables, and the minimum level of data quality before submission.

    Research staff will need to **review input data sources** to ensure data meet the minimum standards. If issues are found or data require re-formatting or manipulation, staff should follow protocols to clean, process, and QC data. Any additional processing should be **communicated via a feedback loop with the data contributor** to 1) ensure transparency and 2) identify steps that the data contributor can complete to ensure data quality *prior* to UHDS submission.

    Protocols should establish a methodology to account for **multiple, potentially conflicting, SDoH/HRSN screenings** for a given individual (e.g., display all screenings in order of recency for historical reference, but instruct providers to refer to the most current screening).

    - **Phase III & Phase IV**
    - **Frequency:** Ongoing as UHDS participation and data collection expands
    - **Key Milestones:** 1) Development, testing, and revision of initial standard protocols, programs, and tools; 2) Implementation, maintenance, and refinement of protocols, programs, and tools as data collection and sources evolve
    - **Responsible Parties:** UHDS leadership; UHDS data contributors
    - **Resources Required:** Research and/or technical staff to develop minimum data submission standards; Research and/or technical staff to develop, test, QC, monitor, and update automated cleaning and processing protocols and tools; Software to implement data cleaning and processing (e.g., SAS); Feedback from data contributors

38. *[Medium-term, ongoing]* **Establish a methodology for longitudinal data aggregation within the UHDS**. The methodology should consider collection, retention, use, and consent policies.

    - **Phase IV**
    - **Frequency:** Ongoing
    - **Key Milestones:** 1) Develop draft methodology; 2) Implement and refine methodology
    - **Responsible Parties:** UHDS leadership; UHDS data contributors; UHDS stakeholders
    - **Resources Required**: Research and technical staff to develop, document, implement, monitor, QC, and report on methodology; UHDS stakeholder engagement on display, functionality, and use cases for longitudinal data; Technical requirements include software for data processing and QC, valid and sufficient PII/PHI on which to link disparate data, and well-tested procedures for records linking; Stakeholder buy-in

39. *[Medium-term, ongoing]* **Develop technical infrastructure to support anonymous closed-loop referrals.** The infrastructure should support accepting/returning referrals, tracking referral outcomes, matching patients to resources, and communicating with the matched resource to schedule an appointment—all while preserving patient PHI/PII.

- **Phase IV**
- **Frequency:** One-time (with updates as needed)
- **Key Milestones:** 1) Development and testing of technical infrastructure; 2) Launch, maintenance, and refinement of technical infrastructure
- **Responsible Parties:** UHDS leadership; UHDS data contributors; UHDS data governance
- **Resources Required:** Technical staff to develop infrastructure; Platform that supports anonymous closed-loop referrals (e.g., Chess Health eIntervention); Appropriate data use agreements and protocols for both referring and receiving organizations; Referring and receiving organization buy-in; UHDS data governance approval and oversight

40. *[Long-term]* Review **CMS-1802-F** and **develop processes and infrastructure to ingest these data**. In fiscal year 2027, SNFs must collect and submit four new HRSN items as standardized data elements. The State should develop protocols and infrastructure to ingest these data once available. This includes development of data-sharing agreements with providers, review of consent processes, outreach to submitting entities, and incorporation of the data into analytic plans.
    - **Phase IV**
    - **Frequency:** Ongoing
    - **Key Milestones:** 1) Review CMS-1802-F and develop plan for UHDS integration; 2) Conduct outreach to SNFs to discuss participation; 3) Development of legal documentation needed for data submission; 4) Ingest data into UHDS
    - **Responsible Parties:** UHDS leadership
    - **Resources Required:** Research and legal staff to review CMS-1802-F, update legal agreements and analytic plans, and conduct outreach to potential submitting entities; Technical staff to develop data submission protocols

Exhibit 2.2: Phases of Implementation

Phase I	Phase II	Phase III	Phase IV
1. Conduct annual mapping of stakeholder assets and needs related to SDoH data.	15. Develop methodology to use community-level data to identify areas of need.	34. Continue to follow emerging national standards for SDoH data.	2. Continue to update the HIE Strategic Plan with progress.
13. Develop standard mechanism for reporting key metrics to stakeholders.	25. Design dashboard with health, HRSN, data quality, and UHDS metrics.	33. Leverage community-level SDoH data sources as a proxy for individual-level data.	19. Conduct stakeholder listening sessions on challenges and barriers.
21. Develop materials and trainings on secondary SDoH data sources.	27. Explore braided or blended funding for UHDS SDoH data efforts.	37. Establish minimum standards for UHDS data and automate data processing.	39. Develop technical infrastructure for anonymous closed-loop referrals.
22. Promote UHDS participation as a learning environment.	17. Create centralized repository of social	36. Inventory current primary SDoH data	14. Establish and disseminate standard screening tools, terminology, and workflows and develop standards for

Phase I	Phase II	Phase III	Phase IV
	service and community resources.	collection among entities engaged in the UHDS.	data submitted from non-standard tools.
29. Develop methodology to identify individuals at risk for HRSN.	18. Implement anonymous closed-loop referrals.	21. Develop materials and trainings on using secondary SDoH data sources.	30. Develop technical specifications for positive SDoH/HRSN screening.
3. Develop process to collect and respond to feedback on SDoH efforts.	24. Create standardized performance measures to track over time.	16. Develop, test, and iterate through anonymous closed-loop referral use cases.	28. Crosswalk existing SDoH screening tools and set review cycle.
4. Inventory potential SDoH data elements from non-HIPAA covered entities and obtain input/conduct outreach.	12. Explore leveraging VT's participation in the AHEAD Model to advance SDoH/HRSN data efforts.		37. Establish minimum standards for UHDS data and automate data processing.
5. Engage non-HIPAA-covered entities and community members.	11. Explore VBC reimbursement models.		38. Establish methodology for longitudinal data aggregation in the UHDS.
	10. Explore opportunities created by CMS' Interoperability and Prior Authorization Final Rule.		6. Develop options for consent models, including an electronic consent form and accompanying materials.
	9. Explore leveraging CMS' ILOS policies.		7. Develop governance around consent model.
	23. Establish centralized coordinating center to provide technical support.		26. Develop incentive mechanism for UHDS SDoH data contributors.
	22. Promote UHDS participation as a learning environment.		31. Develop workflow and specifications for what happens after provider learns of an HRSN.
	8. Explore opportunities to use Medicaid or Medicare		35. Explore using NLP to extract SDoH/HRSN data from EHR notes.

Phase I	Phase II	Phase III	Phase IV
	funds for SDoH investments.		
	32. Develop processes for batch geocoding patient primary address from EHR.		40. Review CMS-1802-F and develop processes and infrastructure to ingest these data.

3. Training and Education Plan

Overview

This training and education plan provides a staged approach to equip stakeholders with the knowledge and tools necessary for integrating SDoH data into Vermont's UHDS. The training content reinforces the shared underlying vision cemented in the State's HIE Strategic Plan and serves as the in-between stage that, when applied to a climate ready for change, leads to successful and long-term strategy implementation.

This plan ensures that stakeholders—healthcare providers, state agencies, community-based organizations (CBOs), payers, and information technology (IT) professionals—receive customized content and training modes optimized for their role in SDoH data integration. The training framework is designed to support successful implementation, foster collaboration, and ensure long-term sustainability.

Assess

Stakeholder Analysis

The initial step in successfully deploying a training is *determining the need, approach, and content* based on the stakeholder. Needs assessments are featured in Chapter 4 and will directly contribute to the final content and mode determinations for tailored stakeholder trainings. **Exhibit 3.1** includes sample content for each assessment type by relevant audience.

Exhibit 3.1: Sample Assessments and Training Approaches by Stakeholder Audience

Audience	Assessment Type	Sample Content
Healthcare providers	Proficiency assessments	Data collection workflows, EHR usage, referral processes
State agencies and policymakers	Surveys on data governance	Data governance, interoperability policies, regulatory compliance
CBOs and social service providers	Monitored walk-throughs	Data-sharing frameworks, privacy considerations, closed-loop referral systems
IT and data analysts	Skills evaluations	Health Level Seven/Fast Healthcare Interoperability Resources (HL7/FHIR), technical workflows

Trainings should be delivered through multiple formats to maximize accessibility (e.g., for rural providers with limited access to technologies) and use of training content. **Exhibit 3.2** provides recommendations on appropriate delivery mechanisms for different types of content and audiences.

Exhibit 3.2: Training Mode Features

Training Mode	Best for Content Type	Ideal Audience Size
Webinars	Policy updates, regulatory compliance, and general SDoH overview	Large (over 50 participants)
Self-paced e-learning	Technical skills, data governance, and interoperability training	Medium-to-large (20-100 participants)
Interactive workshops	Hands-on technical training, referral coordination, and system demonstrations	Small-to-medium (10-50 participants)
Printed toolkits and FAQs	Quick reference materials for daily use and compliance guidance	Universal (any size)
In-person training	Intensive skill-building, complex workflow integration, and troubleshooting	Small (10-30 participants)

Capacity to Receive Training

Another component of the change management strategy discussed in the next chapter involves organizational capacity assessments. These assessments also interplay with training development because various trainings and implementation strategies rely on specific technological resources or system infrastructures. An organization will only reap the benefits of a training webinar if they have *sufficient resources and digital literacy* to connect to and navigate a webinar. *Willingness and ability to adopt change* will also impact training outcomes. Per Everett Rogers' Diffusion of Innovations theory[66], the State should *strategically roll out* data integration efforts and corresponding trainings depending on *placement on the adoption curve.* "Innovators" and "Early Adopters" more open to risk and advancements could provide eager participants for the *piloting phase of training material and methodology*. The State can utilize successes and lessons

Rogers[1] categorizes group members as:

Innovators: First members of a group to adopt an innovation; generally more adventurous and can cope with a high degree of uncertainty; serve as gatekeeper of an innovation to their community

Early adopters: Following innovators in adoption; less able to deal with uncertainty than innovators

Early majority: Likely to adopt an innovation just before average; often deliberate before adopting a new innovation
Late majority: Adopt new ideas just after the average; skeptical about new behaviors; require peer feedback

Laggards: Final adopters in a system; suspicious of innovations; take a great deal of time to adopt an innovation

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[66] Rogers, E.M. (2010). Diffusion of Innovations. 4th Edition. New York: Simon and Schuster

learned during the piloting phase to improve training for administration to “Laggards” or “Late Majority” adopters who require additional proof of concept with a lower threshold for uncertainty.

Prepare

Content Customization

Based on findings and conclusions in the “Stakeholder Analysis” portion of this plan, the State should *customize training materials and delivery methods* to meet the needs of different stakeholder groups.

The training strategy will incorporate *principles of change management* to facilitate smooth implementation*. Messaging will be tailored t*o different stakeholder groups to address known barriers such as concerns about patient outcomes, time burden, technological capacity, and provider cost-savings. Early Adopters within the State will be *identified and engaged as champions* to lead the transition. Common concerns, including increased workload due to new data entry for providers, privacy concerns among CBOs regarding non-HIPPA data sharing, and reimbursement challenges for payers, will be proactively addressed within the training content and related materials. Piloting successful implementations will be used to *highlight the positive impact of SDoH data integration*. *Ongoing support and feedback loops* will ensure that stakeholders can adapt easily. *Clear documentation on compliance and legal safeguards* will be provided to reassure stakeholders on data security and patient protections.

Infrastructure and Support

The State can establish *dedicated technical assistance* to provide *help desk support* for interoperability troubleshooting and compliance inquiries. This service could also be integrated with already existing services such as the Vermont HIE Hotline. A *train-the-trainer model* for in-house training teams within ACOs, health systems, and CBOs would provide a steady training delivery resource. Additionally, content can be added to a *Learning Management System (LMS)* managed by the Agency of Human Services (AHS) to offer ongoing education, certification modules, and performance tracking.

Provide

Content Areas

Training materials will be developed in alignment with *best practices* defined in Chapter 1 and Vermont’s unique characteristics and SDoH data ecosystem. Core content areas will include *SDoH data collection and standardization* to ensure accurate and consistent data entry*. Referral coordination and closed-loop referrals* will be emphasized to strengthen provider and social service connections. *Interoperability and data governance training* will cover technical infrastructure, security, and compliance considerations. Additionally, training on *emerging policy and funding opportunities* will help stakeholders stay informed on relevant regulations and financial incentives. **Exhibit 3.4** provides a sample of developed training content the State may repurpose for its own use based on strategy recommendation, impacted stakeholders, training needs, and stage of development. *Already developed content* will provide a solid jumping-off point for the *development of SDoH training curricula*.

Training Pilot

A *pilot phase* will be conducted with key Early Adopters, such as ACOs and other known entities. Regardless of the training audience, post-training surveys should be gathered to assess knowledge retention and identify workflow integration challenges. This phase will allow for testing of training materials and methodologies. Pilot findings will inform refinements before broader rollout. Post-training surveys will be conducted to assess knowledge retention and identify workflow integration challenges.

What is “Evergreen” Training?

- Educational material that retains its value over time, such as tutorials, webinars, and case studies
- Can exist and be useful without much upkeep

Training Evaluation and Adjustments

Training programs should be refined based on a variety of data points. Stakeholder feedback documented in *post-training evaluation surveys* provide qualitative, user-driven commentary. *Annual assessments* can be conducted to inform improvements to the State’s evergreen training content and support provided by technical assistance centers. Training content can also be adapted to integrate *proven best practices* from other states and federal programs into future training iterations to maintain relevance and effectiveness.

The State should also *measure the effectiveness of trainings* using a range of quantitative indicators. Indicators can assess effectiveness through measures of both administrative facets of training participation and expected outcomes resulting from training implementation. To ensure sustained change is created, short-, medium-, and long-term indicators will track the impact of a given implementation strategy and the implementation strategy’s training over time. **Exhibit 3.3** provides example training measures.

Examples of Evergreen Content

Regulatory Compliance and Data Governance: Core principles of privacy, consent, and data sharing persist, though specific policies may evolve.

Interoperability and Health IT Systems: Data platforms and tools will change, but the need to integrate SDoH data into EHRs, HIEs, and case management platforms will remain.

Data-Driven Decision-Making: Content and issues will vary, but using data analytics to inform policy and improve patient outcomes is a long-term priority.

Exhibit 3.3: Sample Outcome Metrics

Measure Type	Short-Term	Medium-Term	Long-Term
Training Administration	• Attendance • Training participation	• Post-training assessments of knowledge acquisition	• System usage analytics to evaluate adoption of new tools and workflows
Training Effectiveness	• Increase in correct data submissions • Compliance with new workflows • Engagement rates	• Improved interoperability between healthcare and social service providers • Increased referrals	• Improved health outcomes in vulnerable populations • Decreased administrative burdens • Measurable policy impacts

Conclusion and Next Steps

To ensure long-term success, the training and education plan should *align with ongoing policy changes, funding opportunities, and evolving technical requirements*. The State should leverage its initial efforts in developing and administering training content by ensuring that the *material remains current and aligns with UHDS expansion and implementation timelines*. By mapping out training needs over time, the State can *secure the ongoing financial support* necessary to create and maintain essential resources for *technical assistance and continuing education*.

In addition to gathering stakeholder feedback, the development and utilization of *metrics to evaluate the effectiveness and adoption rates* of training programs can provide another source of valuable insights for programmatic improvements. As SDoH data continue to evolve, the State should ensure that implementation efforts remain beneficial by *establishing a continuing education framework* to inform stakeholders about new policies, advancements, and system requirements that affect their work. Finally, by continuing to foster a well-informed and well-supported stakeholder ecosystem, the State's SDoH data integration efforts will achieve sustainable, high-impact outcomes that improve coordination and health equity across the state.

Exhibit 3.4: Example Training Topics with Resources and Mode Recommendations

Training	Audience	Training Resources	Training Mode	Relevant Strategies
Consent model and management	Providers, state agencies, CBOs	HHS Data-Sharing Guidance; ONC Consent Management	Live webinar, FAQs, on-demand training	#6: Consent approaches #7: Governance around consent model

Training	Audience	Training Resources	Training Mode	Relevant Strategies
Referral best practices and service coordination	Providers, CBOs, Vermont 2-1-1	AHRQ Referral Coordination Guide	Live training, LMS modules	#30: Technical specifications for SDoH/HRSN screening
Client referral processes and outcome monitoring	Clinics, case managers, social workers, referral networks	HRSA Referral Guidelines	Peer learning, virtual TA	#18: Implement referrals to streamline care, monitor progress, and track outcomes
Closed-loop referrals	Providers, IT teams, CBOs	AHRQ Referral Management Guide	Virtual training, webinars	#39: Technical infrastructure for closed-loop referrals
Billing implications and Medicaid policy updates	Physicians, payers, Medicaid administrators	CMS Policy Briefings	Live webinars, policy update memos	#40: CMS-1802-F
Emerging SDoH policy and funding opportunities	State officials, Medicaid administrators, provider networks	Certificate in Implementing Social Determinants of Health	Live webinars, newsletters	#9: Leverage ILOS policies
Leveraging CMS funds	Providers, payers	CMS Value-Based Care Training	Webinars, moderated TA/T activities	#8: Leverage Medicaid/ Medicare funds for SDoH
Community engagement strategies	ACOs, CBOs, Vermont 2-1-1, public health officials	CDC Community Engagement Toolkit	Moderated TA activities, peer learning	#3: Collect/respond to community feedback
Data-driven community engagement	Public health departments, Vermont 2-1-1, CBOs	Social Determinants of Health Academy	Moderated TA activities, focus groups	#15: Community-level data to identify communities of need
SDoH data-driven decision-making	State agencies, ACOs, hospital networks	Reporting Academy: A Data-Driven Decision-Making Course	Peer learning webinars, leadership training	#24: Measures to evaluate population health improvements
Translating data into action	Providers (physicians, SNFs, CBOs, case managers)	CMS SDoH Best Practices	Interactive webinars, case-based learning	#24: Measures to evaluate population health improvements

Training	Audience	Training Resources	Training Mode	Relevant Strategies
Advanced SDoH data utilization	Providers, policymakers, CBOs	Social Determinants of Health: Data to Action Specialization	Interactive workshops, use-case-based training	#31: Technical workflow for provider is notified of SDoH need/HRSN
Direct service provider actions for SDoH data	ACOs, VHIE Steering Committee, SNFs	NCQA SDoH Impact Tools	Virtual workshops, on-site training	#17: Centralized repository of resources
Secondary SDoH data sources	Data analysts, policymakers	CDC SDoH Data Training	On-demand learning	#21: Trainings on secondary SDoH sources #33: Publicly available secondary SDoH data
SDoH screening and standardization	Providers, data analysts	AHRQ Screening Tools	Webinars, moderated TA/T activities	#14: Standard screening tools
Reporting standards and data quality	Data Governance Subcommittee, Data contributors	ONC Interoperability Standards	On-demand e-learning, self-paced modules	#24: Reporting standardized performance measures
Data quality assurance	Data Completeness Subcommittee, AHS, VITL	ONC Data Standards Training	On-demand learning, workshops	#37: Minimum technical standards
Training on data collection	Data contributors, IT teams, data analysts	CDC Data Collection Standards	LMS modules, virtual TA sessions	#23: Centralized coordinating center for technical support

**TA: Technical assistance*

** TA/T: Technical assistance and training*

4. Change Management Strategy

Overview

This change management strategy plan provides a structured approach to supporting the successful adoption and sustainability of Vermont's Social Determinants of Health (SDoH) data efforts. It is intended to complement the implementation plan by ensuring that the people, processes, and systems necessary for execution are aligned and that the State's approach is strategic, scalable, and sustainable.

While the implementation plan details the specific operational steps needed for SDoH data integration, this change management strategy plan ensures that the State is organizationally prepared to implement and sustain those efforts. It offers a roadmap for engagement, capacity building, and long-term system alignment, enabling the State and its stakeholders to successfully transition from current practices to a future state of integrated SDoH data exchange. The strategy follows a three-phase framework designed to support Vermont's evolving SDoH data landscape.

Initial Stage: Creating a Climate for Change

This phase lays the groundwork for adoption by defining a clear vision, ensuring alignment with state and federal priorities, and engaging key stakeholders throughout the process.

Establishing a Clear and Shared Vision

Vermont's UHDS leadership should *define and communicate a unified vision* for the successful utilization of SDoH data within the UHDS that maintains alignment with Vermont's HIE Strategic Plan.[67]

Implementation Strategy Recommendation
1. **Continue to update the HIE Strategic Plan** with progress in SDoH data collection and integration.

A shared strategic direction that *clearly defines the goals and benefits* of integrating SDoH data across *all key stakeholders and the communities they serve* will ensure a committed and informed coalition because interests and values are equally represented and supported. The State can further support the forward momentum of the shared vision by *grounding it within existing laws and policies* supporting SDoH data collection, integration, and application to a healthcare setting.[68]

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[67] Agency of Human Services. (2024, November 1). Health Information Exchange Strategic Plan 2023-2027 Plan (2024 Update). Department of Vermont Health Access. https://healthdata.vermont.gov/sites/healthdata/files/documents/HIEStrategicPlan_2024_SUBMITTED.pdf

[68] Chapter 1 provides examples of promising policies to leverage in the section on key findings for the current SDoH data landscape (see "SDoH Data Integration: Policy").

Formalizing Leadership and Engagement

Effective change management requires a structured governance model to oversee implementation and drive engagement. *Establishing clear leadership roles within the UHDS governance structure* and partner organizations creates the personnel infrastructure to propel SDoH data efforts. *Proactive engagement*, driven by UHDS leadership and a dedicated project management team, can unite implementation efforts with engagement outreach across partner organizations to foster buy-in and create an environment optimized to participate in SDoH data efforts. Instituting a *stakeholder champion or advocate program* (see Michigan's Community Influencer Program[69]) can facilitate adoption at various levels and serve as another means to stay attuned to community priorities and needs. Finally, the State can introduce *external incentives for continued engagement* through models such as participation incentive structures to ensure sustained participation during change management periods.

Implementation Strategy Recommendation
11. Explore **VBC reimbursement models** (e.g., incentives for collecting SDoH data).

Leveraging Workflows and Timelines

Additional factors will impact SDoH data integration beyond the activities plotted out within the "Implementation Strategy Plan" section. By *aligning these timelines*, the State can leverage existing momentum and resources by taking advantage of existing workflows related to stakeholder engagement, UHDS objectives and HIE priorities, legislative and funding cycles, and ongoing initiatives like the AHEAD model. Coalescing timelines facilitates *the integration of efforts with existing systems, relationships, and policies*. It *simplifies administrative burdens* by taking advantage of already existing mechanisms.

Implementation Strategy Recommendation
8. Explore opportunities to **leverage Medicaid and/or Medicare funds for SDoH investments**, such as: Medicaid 1115 waivers; new payments for ACOs to address SDoH in the Medicare Shared Savings Program; Medicare's revisions to Physician Fee Schedule; Medicare's separate payment and coding for SDoH risk assessments; and Vermont's MDAAP, which offers incentives.
9. Explore opportunities to **leverage CMS' support for ILOS policies** that allow Medicaid plans flexibility to address HRSN in lieu of other medical services.
10. Explore opportunities created by the CMS Interoperability and Prior Authorization Final Rule (CMS-0057-F).
12. Explore how Vermont's position **in Cohort 2 of the AHEAD Model** can be leveraged to standardize and expand SDoH/HRSN data collection and integration.

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[69] https://www.michigan.gov/mdhhs/inside-mdhhs/legislationpolicy/2022-2024-social-determinants-of-health-strategy/sdoh-community-influencer-program

Conducting Readiness and Needs Assessments

The final stage in creating a climate for change is learning more about which changes have the greatest likelihood of successful adoption through readiness and needs assessments. These assessments will provide insight into the degree of change the technical infrastructure is currently able to accommodate. *Stakeholder readiness assessments* will identify organizational capacity and limitations to participate in implementation procedures. Taking the form of *stakeholder surveys and engagement forums*, these assessments can also delineate *implementation barriers and gaps* to be proactively redressed through the implementation process, training and education, or risk mitigation.

Implementation Strategy Recommendation
19. Conduct listening sessions with stakeholders to understand challenges and barriers in their SDoH data efforts.
36. **Inventory current primary SDoH data collection** among healthcare providers, facilities, and payers.

Preparation Stage: Engaging and Enabling Stakeholders

After mapping the current environment, this phase focuses on steps needed to proactively adapt the implementation elements to that environment for maximum strategic placement and sequencing.

Aligning Stakeholders and Strengthening Collaborative Networks

Stakeholder communication pathways, motivations, and needs were identified during the initial stage. During the preparation stage, the State should implement a *stakeholder engagement strategy* that includes regular workgroups, advisory committees, and cross-sector collaborations. These efforts should be iterative and adaptable, ensuring that *feedback loops* are in place to refine strategy implementation over time while maintaining engagement (e.g., regularly sharing status updates and metrics with opportunities to debrief and reflect). The State can deploy these engagement mechanisms to provide continued support in the adoption of changed behaviors by *reiterating the value* of SDoH data. This strategy will ultimately ensure transparent communication with involved stakeholders, outlining expected impacts, timelines, and roles in the implementation process.

Implementation Strategy Recommendation
3. **Develop process to collect and respond to feedback** on SDoH efforts.
20. **Develop tools to help users understand SDoH data** and its value.

Building Training and Development Programs

To support the adoption of new processes and technologies, the State should deploy training and capacity development content to bridge any gaps or needs identified during the initial phase. Beyond that, preparation should occur to set the stage for larger-scale SDoH data implementation. The State should use engagement channels to further *refine and iterate on training content*. This should yield a *comprehensive training and education strategy* customized for state agencies, healthcare and social service providers, payers, and community partners covering topics including technical competencies, data literacy, SDoH screening mechanisms, and addressing HRSN. A central location or support hub with *toolkits, best practices, FAQs, and peer learning communities* should be established to facilitate continuous learning and capacity building.

Implementation Strategy Recommendation
22. Promote participation in the UHDS as a **learning environment for stakeholders.**
23. Establish **a centralized coordinating center to provide technical support**.

Standardizing and Validating Data Integration Processes

As the State moves toward full-scale implementation of SDoH data within the UHDS, it is essential to establish and refine data collection protocols. This phase involves identifying key SDoH data elements, ensuring alignment with national data standards, and integrating data sources into existing systems. Strategies should also focus on avoiding duplication of efforts by leveraging existing data sources and infrastructure, including data sources and models identified during the initial stage. Data validation processes, including cleaning, standardization, and systems testing, will be critical to ensuring reliability, accuracy, and interoperability. Developing systems that use existing and standardized inputs and processes will facilitate scalable and efficient SDoH data integration with potential for future expansion. Where appropriate, processes should be built out to fully use SDoH data (including collection, integration, sharing, application to a healthcare setting, and evaluation).

Implementation Strategy Recommendation
22. Promote participation in the UHDS as a **learning environment for stakeholders.**
29. **Develop, test, QC, and document methodology for identifying individuals at risk for HRSN** based on relevant data elements ingested into UHDS.
30. Develop **technical specifications for the system backend and frontend when a "positive" SDoH/HRSN screen occurs.**
31. Develop **technical workflow and specifications** for what happens **after the provider is notified of a specific SDoH need/HRSN.**
34. Continue to **follow emerging national standards for SDoH data**.

Implementation Stage: Implementing and Sustaining the Change

This final phase ensures that the adoption of SDoH data strategies is successful, scalable, and sustainable over time.

Launching Pilot Programs to Test and Refine Implementation

Before full-scale rollout, the State should follow the approach prescribed in the implementation plan and *conduct a structured pilot phase* in advance of large-scale implementation. Similar to the SDoH Hubs piloted in Michigan[70], Pilot programs will allow the State to *identify operational challenges, refine workflows, and adjust protocols* before full implementation. Training content, technical support strategies, and other resources piloted during this period will iterate and improve prior to larger-scale adoption. This piloting process enables the State to refine processes and approaches to better facilitate adoption and ensure a smooth transition during the *full-scale implementation.*

Beyond situational positioning and strategic deployment, the State can use information obtained during various stakeholder engagement venues to *identify challenges and barriers and address them directly*. The identified communication pathways can be used to share pilot, training, and implementation successes to galvanize support and interest in the data integration efforts.

Establishing Performance Metrics and Evaluation Mechanisms

Part of the combined vision and shared value behind SDoH data integration for the array of stakeholders relates to the projected benefits. Measuring the outcomes of data integration can provide a recursive loop, supporting this shared vision in the long-term. To measure success, the State must *define key performance indicators* (KPI) that evaluate the impact of SDoH data integration on metrics such as population health outcomes, data accessibility, and policy effectiveness. *Ongoing evaluation efforts*, including dashboard reporting, stakeholder feedback loops, and impact assessments, will speak to both the success of the data integration efforts and the success of utilizing the integrated data.

Implementation Strategy Recommendation
13. Develop a **standard mechanism for reporting key metrics** related to SDoH/HRSN to stakeholders in a timely manner.
24. Create a set of **standardized measures to evaluate performance** in improving population health over time.
25. Design a **dashboard with metrics** on health and social outcomes, UHDS participation, and data quality.

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[70] Chapter 1 provides additional background on Michigan's piloting of SDoH Hubs (see "State Spotlights").

Institutionalizing Change for Long-Term Sustainability

For SDoH data integration to be successful, the State must establish governance mechanisms and policy structures that support ongoing optimization and sustainability. This includes *integrating national standards, refining incentive structures, and ensuring the continued engagement* of data contributors. Full-scale implementation will occur in a climate able to accommodate changing protocols, utilizing validated and streamlined integration strategies supported by training content and communication infrastructures designed to support the adoption of new tools and practices. By maintaining continuous evaluation cycles and stakeholder collaboration and timing integration efforts with larger funding and policy timelines, the State can adapt to evolving needs and emerging best practices over time.

Implementation Strategy Recommendation
40. For fiscal year 2027, review **CMS-1802-F and develop processes and infrastructure to ingest these data**.

Appendix 1: Methods

Exhibit App 1.1: Document Review Research Questions

Current SDoH Data Landscape
How are SDoH/HRSN data used in healthcare (e.g., in value-based payment [VBP] models)?
What SDoH/HRSN data are most prioritized and/or most accessible from a data integration standpoint?
Are there significant gaps in data availability or utility in each SDoH domain?
What methods for data standardization, linkage, and sharing have proven success?
Are there preferred or standard data sources within each SDoH domain?

Best Practices and Implementation Strategies
How do other states compile, use, and share SDoH data?
What are the facilitators and barriers to implementation?
What type of support and technical assistance are provided to help constituents meet their data needs?
What are the requirements for implementation (e.g., staffing, infrastructure, funding streams)?
What are the outcomes of the implementation (e.g., applications for healthcare provision, etc.)?
How applicable and/or adaptable are these strategies to VT?

Exhibit App 1.2: Document Review Inclusion/Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
• Published ≤ 5 years ago. • Applies to U.S. healthcare setting. • Focuses on data use and integration related to HRSN and/or Healthy People 2030 SDoH domains.	• Involves a single data source and/or single data owner/user. • Does not have practical application to a healthcare setting.

Exhibit App 1.3. Document Review Search Terms

Topic Area		Key Search Terms
Equity		"health equity" or "SDoH" or "social needs" or "HRSN" or "SDoH Z codes" or "social determinant/driver"
and	Data Integration	"data linkages" or "data aggregation" or "data standards" or "interoperability" or "data management" or "data sharing" or "data governance" or "HIE" or "community information exchange (CIE)"
or	Healthcare Delivery	"healthcare delivery/service" or "clinical/public health application" or "health screening" or "person-centered care" or "VBP" or "value-based care (VBC)"

Topic Area		Key Search Terms
or	SDoH Domain	“economic stability” or “SES” or “education” or “literacy” or “healthcare access/quality” or “neighborhood” or “built environment” or “social/community context” or “food/housing/transportation/utilities insecurity” or “interpersonal safety” or “housing stability” or “transportation access” or “internet access” or “environmental health/safety”

Exhibit App 1.4: SDoH Data Source Inclusion/Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
• Published or refreshed ≤ 5 years ago. • Applies to U.S. setting. • Available at the patient-level or a granular geographic level (e.g., ZIP code, census tract). • Must be available for Vermonters.	• Does not capture SDoH or HRSN domains of interest. • Does not have sufficient technical documentation on basic data attributes (e.g., data source, year(s) available).

Exhibit App 1.5: SDoH Data Source Review Search Terms

Topic Area		Key Search Terms
Equity		“health equity” or “SDoH” or “social needs” or “health disparity” or “HRSN” or “social determinant/driver”
and	Source type	“indices” or “index” or “indicator” or “rate” or “dashboard” or “dataset” or “data file” or “data”
or	Healthcare access/quality	“access to care” or “access to services” or “quality of care”
or	Quality of life	“mortality” or “well-being” or “quality of life”
or	Food insecurity	“food desert” or “food security/insecurity”
or	Education access/quality	“education” or “graduation rates” or “literacy”
or	Economic stability	“financial” or “economic” or “income” or “poverty” or “employment/unemployment” or “deprivation”
or	Housing/transportation insecurity	“housing security/stability” or “safe housing” or “crime” or “transit/transportation” or “traffic”
or	Environmental health/safety	“environmental” or “water quality” or “air quality” or “pollutants/pollution”
or	Diversity	“racism” or “discrimination” or “gender” or “disability”
or	Internet access	“internet access” or “technology” or “broadband”

Exhibit App 1.6: SDoH Data Source Feasibility Assessment Questions

Accessibility of Data
Who owns the data? What is the cost, process, and timeline for requesting use? What are the regulatory considerations and requirements around reporting (e.g., Healthcare Effectiveness Data and Information Set [HEDIS], Uniform Data System [UDS]) and patient consent?
Data Relevance, Purpose, and Contents
What SDoH and HRSN data are available? Who is represented in the dataset (e.g., Medicaid enrollees, Vermont households)? Who currently uses the data (e.g., providers, internal agencies)? How are data shared and disseminated? What methodological and statistical documentation are available?
Data Quality and Timeliness
What elements are missing from the dataset? What is the quality of the data and strengths and limitations? How recent are the data and how often are datasets updated?
Data Granularity, Harmonization, and Linkage
At what level are the data available (e.g., individual, census tract)? Can the dataset be linked to other data while maintaining individual confidentiality? In what format(s) are the data available? Is standardization necessary for linkage? Are there parallel efforts to link datasets that can be leveraged?
Applicability to VT
What types of research questions and State objectives are informed by the data? What resources are required to maintain and use the dataset (e.g., funding, technical capabilities, etc.)? How does the level of effort (LOE) to integrate compare with potential benefits to the State?

Appendix 2: EHR Data Extraction

Exhibit App 2.1: Common Approaches to EHR SDoH Data Extraction

ICD-10-CM SDoH Diagnosis Codes (Z Codes)		
Description	**Strengths**	**Limitations**
• Despite slow and inconsistent adoption, Z codes are the most common classification used for SDoH in healthcare • Providers assign Z codes • Coders backcode clinical notes and other documents containing social data into Z codes	• Covers literacy, unemployment, environmental exposures, housing, food, and financial insecurity, social environment, and family circumstances (Office of Minority Health, 2023) • American Hospital Association (AHA) offers a Z coding clinic	• In 2019, CMS found that providers use Z codes for < 2% of Medicare Fee-for-Service beneficiaries (AHA, 2022) • Low uptake due to lack of clarity on who can document HRSN[71] or lack of training and/or prioritization of Z codes (AHA)
Natural Language Processing (NLP)		
Background	**Strengths**	**Limitations**
• Can extract rich SDoH data from EHR text fields with no impact to clinical workflow • Identify key terms to create SDoH lexicons via manual chart review or automated text mining • Create rule-based systems to tag clinical notes for SDoH • In a systematic review of using NLP to identify SDoH in EHRs, Patra et al. (2021) found that smoking, substance and alcohol use, and homelessness are the most identified SDoH	• Capable of identifying housing and financial strain data at accuracy needed to model risk • In a study testing NLP model portability among Indiana and Florida health systems, the model was ported with minor edits without model "re-training" • Study found that how people describe SDoH does not vary by region but did note variation in how people refer to resources like food banks and shelters (McCormack, 2023)	• Requires technical knowledge and software equipped to ingest EHR notes and extract data • Developing a list of terms used by a target population is time- and resource-intensive and may need to be iterative and/or regularly updated as new SDoH and associated words emerge

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[71] According to the AHA Coding Clinic (page 2), any "clinician" may document social needs. "…"clinicians" can include anyone deemed to meet the requirements, set by regulation or internal hospital policy, to document in the patient's official medical record. This means that in many cases, coding professionals can utilize documentation of social needs from clinicians including, but not limited to, nonphysician providers, such as social workers, community health workers, case managers, nurses or other providers" (AHA, 2022).

Appendix 3: VHIE Metrics

Exhibit App 3.1: VHIE Outcome-Based Metrics by ASTP/ONC Measurement Area

VHIE Outcome or Metric	Measurement Area
# of VITLAccess user accounts	Utilization
# of organizations using VITLAccess	Utilization
# of potential organizations that could use VITLAccess	Utilization
# of patient queries through VITLAccess	Process
# of Medicaid patient records transmitted from VHIE to the Medicaid care coordination tool	Utilization
# of event notifications (ADT) messages sent to PatientPing through VHIE connection	Process
Master Patient Index: % Medicaid match rate	Utilization
# of lab messages captured in the VHIE	Process
# of radiology messages captured in the VHIE	Process
# of transcribed messages captured in the VHIE	Process
% of immunization messages received by the Immunization Registry from VHIE	Process
% of total death records transmitted from Death Registry to VHIE	Process
Lab messages captured in the VHIE and transmitted to Public Health Authority	Process
Blueprint for Health Clinical Extract Report from VHIE	Utilization

Appendix 4: Example Technical Assistance

Exhibit App 4.1: Example Technical Assistance and Support Activities

Type of Support	Description
Help desk	Some states establish a **"help desk"** to which stakeholders can submit questions. The 2-1-1 San Diego CIE and NC's NCCARE360 offer a call center support line to field questions about integration (Hovey et al., 2021). OR's OHA provides virtual office hours to participating CCOs.
"How-to" guides	States share **written protocols** and **"how-to" guides** on topics related to consent and using SDoH data to make referrals and inform care. MI's hubs provide guidance to partners on how to interpret HRSN and increase community engagement (MDHHS, 2024). MD's CRISP offers resources on how to use the pre-post report and closed-loop referral platform functionalities. NC's NCCARE360 shares training materials, flyers, network standards, and a workflow guide within their Content Library.
Monitoring and evaluation	Several states support **monitoring** and **evaluation** of SDoH data efforts. CA's DHCS developed dashboards for sites to track outcomes with standard reporting (Pourat et al., 2022). MI's hubs regularly report findings and lessons learned related to technical activities (MDHHS, 2024).
Reporting	Many states **publish reports** to help partners assess impacts of their SDoH work. MD's CRISP produces pre-post reports on the impacts of social service referrals on their healthcare costs and utilization (Rabner & Lachenmayr, 2023). Baptist South Hospital System in FL disseminates CHNA reports to focus groups for discussions on community needs (Rojas et al., 2022).
SDoH education, shared learning, and training	Several states offer **in-person** and **remote trainings** to familiarize stakeholders with goals, workflows, use cases, and platforms. MD's CRISP offers a new user orientation and maintains a virtual learning center to promote peer learning networks. OK has training materials on OKSHINE's functionality and workflow. MI offers a CHW training program. OR's OHA and OPIP provide Café Connect Series for CCOs, CBOs, and providers to learn how to implement key metrics. They also invite CCO data staff to attend CCO learning collaborative sessions to share strategies to address HRSN.
Tools and resources	MI offers **data visualization tools** for hubs to develop graphs and maps (MDHHS, 2024). OH stakeholders access tools through Healthy NE Ohio to compare local data with 300 health benchmarks (ODPHP, 2024). CA's WPC sites provide tools to **build system functionality** (e.g., stakeholders can query care plans, needs assessments, and referrals) (Pourat et al., 2022). Other states develop **care planning tools** that integrate data from multiple sources (Hovey et al., 2021). The 2-1-1 San Diego CIE uses Salesforce's data management middleware for bi-directional exchange of care team alerts and creation of shared goals (Hovey et al.).

Appendix 5: State Comparison

Exhibit App 5.1: Comparison of MI and MD Approaches

Governance

Maryland	Michigan
• Legally designated state HDU • Centralized approach with CRISP managing day-to-day activities • Five advisory committees (Clinical, Finance, Privacy & Security, Reporting & Analytics, and Consumer)	• Implementation of a statewide CIE • Decentralized, community-driven approach with regional SDoH hubs that manage local efforts • Receives guidance from SDoH Hub Advisory Council • Incorporated a CIE Task Force to strengthen CIE capabilities

Implementation Strategies

Maryland	Both States	Michigan
• CRISP provides implementation (e.g., establishing environments for secure transactions), operational (e.g., periodic performance management), and user and technical (e.g., ticket logging system for technical errors) supports	• Offers an extensive, up-to-date resource directory to users • Provides data dashboard tools for providers and communities to access HRSN data • Facilitates closed-loop referrals	• SDoH hubs responsible for providing technical assistance • Implements initiatives to increase the number of participating CHWs, including a training program and CHW Subcommittee

Measurement and Evaluation

Maryland	Both States	Michigan
• Pre-post reports reflect patient utilization before and after their data are ingested in CRISP • Evaluates impact of community health investment with the Health Equity Explorer	• Maintains a longitudinal referral record	• Conducts SDoH hub readiness assessments consistently • Requires regular Hub-specific dashboarding to reflect key metrics defined by Hubs • Collects stakeholder feedback, shaping improvements of the model

Appendix 6: Resources

Exhibit App 6.1: List of Relevant Resources

Name/Link	Source	Description	Applicability to VT
HIPAA Decision Matrix	AISP	• Key questions on legal safeguards under HIPAA • Summarizes specific scenarios in which PHI may be disclosed	• Resource to adapt and share with providers and other HIPAA-covered entities
FERPA Decision Matrix	AISP	• Key questions on legal safeguards under FERPA • Summarizes specific scenarios in which education data may be disclosed	• Resource to guide integration, sharing, and use of education data
Finding a Way Forward: How to Create a Strong Legal Framework for Data Integration	AISP	• Includes best practices for data governance and legal frameworks for cross-sector data integration	• Resource for SDoH data governance practices
HDU Framework - A Guide to Implementation	Civitas Networks for Health	• Provides a framework for developing and implementing an HDU with existing infrastructure • Maps phases of adoption with key considerations	• Useful guide to next steps for a statewide HDU
The Community Bill of Rights	MDHHS	• Example “Bill of Rights” document shared with patients and community members	• Reference to create a Vermont-specific document “Bill of Rights”
CyncHealth Patient Information Guide	CyncHealth	• Explains the purpose of an HDU and how CyncHealth shares and protects PHI	• Example of patient resources that explain PHI collection and exchange in an HIE
Sharing SDoH Screening Data	CRISP	• Describes strategies and tools available in the CRISP platform to facilitate clinical decision-making based on SDoH data	• Examples of technical capabilities to facilitate use of SDoH data in care delivery
Using Z Codes: The SDoH Data Journey to Better Outcomes	OMH	• Outlines how Z codes are used to document SDoH data and enhance QI initiatives	• Useful tool in explaining and demonstrating value of Z codes

Name/Link	Source	Description	Applicability to VT
SDoH Screening and Referral Metric: Learning Collaborative Playbook	OHA	• Offers guidance on State's SDoH Screening and Referral Metric, including best practices for screening, completing referrals, improving data collection, and building the CIE infrastructure	• Example of an SDoH performance indicator and related activities to ensure providers conduct SDoH screenings and referrals
Social Needs Data: User Guide	CRISP	• Describes how participating organizations can use the CRISP system to interact with HRSN data	• Example of an HRSN-specific HIE user guide
Referral Use Case Summary	MiHIN	• Describes the purpose, value, and implementation of the referral use case	• Guide to developing care coordination and/or referral use case(s)
Proposed Metrics for SDoH Hub Evaluation[72]	MDHHS	• Lists key performance indicators aligned with these outcomes: Health Equity Advancement, Access to Services, SDoH Strategy Implementation, Cross-Sector Collaboration, and Data-Driven Decision-Making	• Examples of performance indicators
Data Dashboard	INPH	• Example dashboard filterable by program, metric category, grantee organization, and month	• Example of data dashboard
Health Equity Explorer Reporting Suite: User Guide	CRISP	• Describes the capabilities of the Health Equity Explorer Reporting Suite and how to use each feature	• Example of data dashboard user guide

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[72] This resource can be found in Appendix D (p. 94) of the linked document.

Appendix 7: SDoH Data Inventory

Appendix 7. SDoH Data Inventory has been included as a separate Excel file.

Appendix 8: Ineligible Sources

Exhibit App 8.1: Potential SDoH Data Opportunities Ineligible for Prioritization

Healthy Vermonters 2030 Dashboard

Rationale for Exclusion: The dashboard is in progress as of June 2024.

Description: Healthy Vermonters 2030 several HRSN/SDoH indicators related to forgone medical and dental care, food insecurity, and housing insecurity. Once released, the dashboard will feature these indicators broken out by geography and sociodemographics. The dashboard will also include information on what the data mean and how they are used by the State and partners.

Potential Opportunity: The State may wish to align UHDS SDoH data with Healthy Vermonters 2030 SDoH indicators to support analyses and benchmarking toward goals.

Unit(s) of Analysis: County, District office

Link: https://www.healthvermont.gov/about/plans-reports/healthy-vermonters

Vermont’s Municipal Climate Change Vulnerability Indicators (MVI)

Rationale for Exclusion: The MVI does not currently offer an index for comparing communities (although the MVI documentation notes the MVI could support production of such an index in the future). We were unable to determine whether data can be publicly downloaded.

Description: The MVI was developed by the Agency of Natural Resources and Vermont Climate Council as part of Vermont’s 2020 Global Warning Solutions Act to help communities understand their climate change vulnerabilities. The MVI is a tract-level tool derived from 48 factors across six domains (Built Environment, Natural Environment, Infrastructure, Social, Community, and Economy and Jobs).

Potential Opportunity: The MVI is an ongoing effort, tailored to Vermont, that stemmed from public and private stakeholder partnerships. The State may wish to leverage the MVI for UHDS SDoH data efforts.

Unit(s) of Analysis: Census tract

Link: https://climatechange.vermont.gov/mvi

Vermont’s Community Resilience Index (CRI)

Rationale for Exclusion: The CRI appears to be in beta form and internal to VDH. We receive a “specific account is disabled” message when attempting to access the CRI technical documentation. Once publicly released, CRI data will be downloadable from Vermont’s Open Geodata Portal.

Description: The CRI is a tract-level index used to measure community capacity to respond to and recover from public health crises across three themes: Socioeconomic, Housing, and Overall.

Healthy Vermonters 2030 Dashboard

Potential Opportunity: The CRI is not as comprehensive as the BRIC index but has potential in that it is in-house to the State.

Unit(s) of Analysis: Census tract, Municipality

Link: https://experience.arcgis.com/experience/90ddbecf30df486aa0cdcbb46b307df8/page/CRI-Application/

Vermont's Non-Emergency Medical Transportation

Rationale for Exclusion: Data are not publicly available.

Description: DVHA and the Vermont Public Transportation Association (VPTA) support Medicaid's provision of transportation to eligible appointments for beneficiaries who do not have their own transportation. VPTA submits claims forms for payment from Medicaid using specific billing codes.[73]

Potential Opportunity: Medicaid claims submitted with the applicable non-emergency transportation codes could be used to create a proxy indicator for transportation insecurity at the individual level.

Unit(s) of Analysis: Individual-level

Link: https://dvha.vermont.gov/providers/non-emergency-medical-transportation

Vermont's Agency of Transportation (AOT)

Rationale for Exclusion: Availability and accessibility of specific data elements are unknown.

Description: AOT's 2023 Transportation Equity Framework includes several SDoH-related recommended actions, including:

- Improve practices to identify underserved areas by using state data and producing local datasets
- Develop standard process to measure transportation inequities across underserved areas
- Invest in services and infrastructure to reduce transportation barriers

AOT also developed a Transportation Equity Planning Tool that includes data on subgroups by linguistic isolation, race/ethnicity, foreign born status, poverty, and disability status.

Potential Opportunity: There may be opportunity for the State to engage AOT as a UHDS data contributor as AOT implements their Transportation Equity Framework.

Unit(s) of Analysis: Census tract

Link: https://vtrans.vermont.gov/equity

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[73] See page 14 for billing codes: https://dvha.vermont.gov/sites/dvha/files/documents/NEMT%20Manual%209.3.24.pdf

Healthy Vermonters 2030 Dashboard
VTransparency
Rationale for Exclusion: The utility of these data may depend on the specific use case and would likely require additional manipulation (e.g., to calculate distance from a given resource).
Description: Vermont's Open Geodata Portal offers downloadable geographic data on a range of topics, including locations of schools, outdoor recreation sites, libraries, trails, health clinics, utilities, fire stations, and hospitals.
Potential Opportunity: These geographic data may be more accurate and current than other secondary sources in calculating metrics such as number of health clinics available or distance from a patient address to a given resource. The portal may also be leveraged for the UHDS analytics layer to produce maps and other data visualizations.
Unit(s) of Analysis: Geographic coordinates
Link: https://geodata.vermont.gov/

Appendix 9: Data Summary

Exhibit App 9.1: Prioritized Data Elements by Healthy People 2030 Domain

Priority #1 (n=18): PLACES
Economic Stability: • Housing insecurity • Crowded housing • Housing cost burden • Utilities instability • Food stamps • Food insecurity • Unemployment • < 150% below poverty • No reliable transportation **Social & Community Context:** • Single-parent household • Social isolation • Lack of social/emotional support **Neighborhood & Environment:** • No internet subscription **Healthcare Access & Quality:** • No health insurance • Disability status **Educational Access & Quality:** • No high school diploma **Sociodemographics:** • Racial/ethnic minority status • ≥ 65 years

Priority #2 (n=20): EPHTN, SDoH Database, CHR&R
Economic Stability: • Housing with no vehicle • Low income & low food access • Low income, low food, & low vehicle access • ≤ 200% below poverty • Renter-occupied housing • Housing without fuel • Food Environment Index **Social & Community Context:** • ≥ 65 years, living alone • Living in group quarters **Neighborhood & Environment:** • Housing without kitchen • Housing without plumbing • Childcare centers • Access to locations for exercise **Healthcare Access & Quality:** • Medically Underserved Area • Shortage of dentists • Shortage of mental healthcare providers • Shortage of primary care physicians **Educational Access & Quality:** • 9th grade cohort that graduates in four years **Sociodemographics:** • ≥ 5 years, speaks English less than "very well" **Indices (All Domains):** • SVI

Priority #3 (n=9): EPHTN, CHR&R
Economic Stability: • Childcare cost burden for two-child household • Income < $20k, no internet • Unemployed & ≥ 16 years with a computer, no internet • Free/reduced school lunch eligibility **Social & Community Context:** • # of deaths due to firearms **Neighborhood & Environment:** • ≤ 1 mile of park • ≥ 65 years with a computer, no internet **Educational Access & Quality:** • ≤ 1 mile of school • ≥ 25 years with at least high school diploma **Indices (All Domains):** • COI

Priority #4 (n=18): EPHTN, SDoH Database
Social & Community Context: • # of temporary shelters • # of community food services • # of community housing services • # of syringe exchange programs **Neighborhood & Environment:** • Year housing built • Mobile homes • Housing with ≥10 units • Vacant housing units • # of beer, wine, and liquor stores • # of convenience stores • # of fast-food establishments • # of supermarkets • # of fitness/recreational centers **Healthcare Access & Quality:** • # of home health care services • # of emergency/relief services **Indices (All Domains):** • BRIC Index • EJI • HHI

Priority #5 (n=13): EPHTN, SDoH Database

Economic Stability: • Households with a smartphone • Households with a smartphone, but no other device • Access to computer with internet, but no cell phone

Social & Community Context: • # of drug overdose deaths involving opioid

Neighborhood & Environment: • Population weighted average of National Walkability Index • # of days > Ozone standard • # of days > $PM_{2.5}$ standard

Healthcare Access & Quality: • Distance to nearest ED • Distance to nearest health clinic • Distance to nearest urgent care • Distance to nearest hospital with SUD inpatient care

Sociodemographics: • Population by 1) Age group, 2) Race/ethnicity, and 3) Gender

Indices (All Domains): • Segregation Index