



Reporting and Analytics Plan

Compiled for the Vermont Healthcare Workforce Data Center
(VT HWDC)

December 20, 2024

Table of Contents

STRATEGIC OVERVIEW	3
Overview of Reporting and Analytics Plan	3
Use Cases.....	3
Data Sources.....	4
Intended Audiences.....	4
FIRST TIER REPORTS	5
Summary	5
Immediate-Term Reports:.....	6
Short-Term Reports:.....	10
APPENDICES.....	13
Appendix A.....	13
Appendix B.....	16
Appendix C.....	17

STRATEGIC OVERVIEW

Overview of Reporting and Analytics Plan

The Reporting and Analytics Plan outlines the proposed approach for collecting, analyzing, and presenting information in support of Vermont's Healthcare Workforce Data Center (HWDC). The framework focuses on immediate and short-term analytic product development; those reports/dashboards that can be developed during the first year of implementation.

The plan aligns available data sources with stakeholder needs identified during meetings and documented in the Stakeholder Report.

The plan was further refined after receiving detailed data dictionaries for the VT Healthcare Workforce Census and Survey Data and VT Department of Labor Occupational Wage data, and after having further discussions with representatives from the Agency of Human Services (AHS). The primary goal of this plan is to improve healthcare workforce reporting in Vermont and extend existing information by:

- **Prioritizing Use Cases:** The stakeholder engagement process yielded many potential topics that the VT HWDC would be well-positioned to address. Illustrating responsiveness to stakeholder input through a phased approach to reporting will help gain early trust in the VT HWDC data and processes, and bolster support for future development.
- **Prioritizing Available Data:** Stakeholders identified many potential sources of data, many of which will require time to understand and gain access to. Therefore, the Reporting and Analytics Plan is focused on data primed for short-term data collection and integration based on its robustness and availability.
- **Focus on Scalability:** The proposed dashboards are designed to easily incorporate additional data sources and additional data enhancements as they become available.

Use Cases

Over 20 use cases were identified during the stakeholder interviews and National Consortium meetings. Outlined below are a few of the identified use cases in each of the three primary categories:

- **Workforce Pipeline Evaluation:**
 - Assess shortages in specific medical specialties, licensures, and credentials, by region. Forecast future workforce needs (e.g., aging population and chronic conditions using APCD healthcare claims data).
 - Healthcare Workforce Supply: Track licensed and non-licensed individuals and whether they continue to work as a healthcare provider; track students pursuing a career in healthcare starting at the high school level through graduation and residency.
- **Analysis, Problem Solving, and Decision Making:**
 - Evaluate reasons for workforce shortage (e.g., turnover, attrition, salaries, access to training/educational programs)

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- Identify existing training and educational opportunities and areas where these training opportunities are lacking.
 - **Program Evaluation and Benchmarking:**
 - Evaluate outcomes of educational and funding programs (e.g., scholarships, loan forgiveness, employer sponsored)
 - Compare VT Healthcare Workforce benchmarks across other states and against national benchmarks.

Data Sources

During the stakeholder engagement process, 22 healthcare workforce data sources were identified (see VT HWDC Stakeholder Report - Table 2). These data sources were prioritized for collection and integration based on the following considerations:

- **Importance to identified use cases:** Data sources varied in how many use cases they could meet. The more use cases the data set could fulfill, the higher the priority for integration.
- **Availability:** Data sources with fewer data sharing limitations, and which were already being shared with AHS or other state agencies, were given a higher priority.
- **Readiness for integration into the data center:** Data sources already normalized in a machine-readable format, with existing documentation in the form of a data dictionary, were given a higher priority for data collection.

Based on the above criteria, two data sources were identified for short-term reports:

1. Vermont Healthcare Workforce Survey and Professional Licensure Data
2. Vermont Department of Labor Wage Data

Appendix A shows which data sources are necessary for each use case. Use cases that only need data from the VT Healthcare Workforce Survey and Professional Licensure Data are marked as "Tier 1a" or "Tier 1b" and are aligned with the proposed dashboards that follow for initial development.

Intended Audiences

Each proposed dashboard below includes the purpose of the report and the specific groups that may be interested in the data. The list of intended audience includes:

- **Job Seekers and Students**
 - Access information on healthcare career pathways, salaries, and shortage areas to evaluate whether to pursue a career in healthcare and to remain in Vermont.
 - Track availability of openings or clinical placements
- **Educational Institutions:**

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- Interested in demand forecasting so they can proactively expand their educational and funding programs to meet the need.
 - Evaluation of educational programs and outcomes to build upon programs that demonstrate successful completion of programs and retention in the workforce.
 - **Healthcare Systems, Providers, and Payers:**
 - Assessments of network adequacy and access to care. Enhancement of that assessment with race, ethnicity, sexual orientation, and gender identity data of clinicians to evaluate whether the composition of the healthcare workforce meets the needs of Vermonters.
 - Support and/or supplement a provider directory.
 - **VT Governmental Agencies:**
 - Support new legislation or requests for state or federal funding for new programs.
 - Improve adequacy of, and access to, public health workforce and public services.
 - Tracking licensure compliance.
 - Support state and federal reporting requirements.
 - **All Vermonters/Public:**
 - Gain an understanding of the healthcare workforce within the State of Vermont

FIRST TIER REPORTS

Summary

The recommended first-year dashboards are divided into two categories:

Tier 1A (Immediate term): The first six months will focus on developing four Tier 1a dashboards (see Appendix A) using only the VT Healthcare Workforce Census and Survey Data.

These Healthcare Workforce Census surveys are updated every other year, and each dashboard will initially need at least two years of survey data per license type. Ongoing, these dashboards should be refreshed every other year to coincide with the VT professional licensing renewal schedule (see [Appendix B](#) for survey schedule). To speed up deployment, priority professions from [Appendix C](#) can be implemented first, with others added later.

Tier 1B (Short-term): The second six months will produce two Tier 1b dashboards that combine the workforce survey data with VT Department of Labor wage information. These reports also require the implementation of a longitudinal provider tracking system to follow providers across different data sources. As a future enhancement, collaboration with other agencies to include the National Provider Identifier (NPI) in their data collection efforts will provide an additional building block for a robust provider tracking system

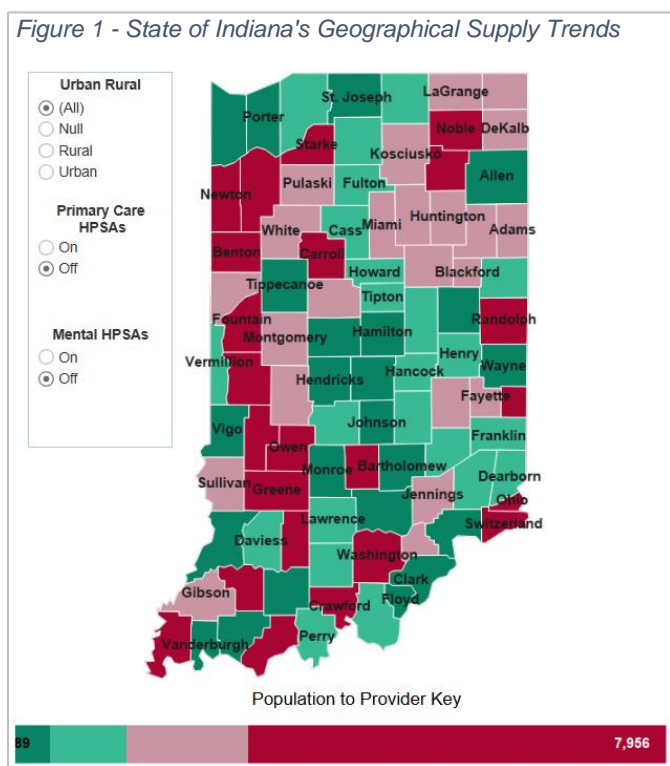
Future Dashboards and Enhancements: Future dashboard recommendations for medium- and long-term reports are identified as Tier 2 3, with additional planned enhancements for the Tier 1a and 1b dashboards.

Tier 1A (Immediate-Term) Dashboards:

Dashboard 1: Vermont Provider Full-Time Equivalency Map (Use Case 1)

This dashboard will display Full-Time Equivalencies (FTEs) for various healthcare professionals based on geographic units defined by the State of Vermont. The dashboard extends [previous reporting produced by the Vermont Department of Health](#) by providing information for healthcare professions in interactive dashboards as illustrated in the [State of Indiana's Geographic Supply Trends](#) dashboard.

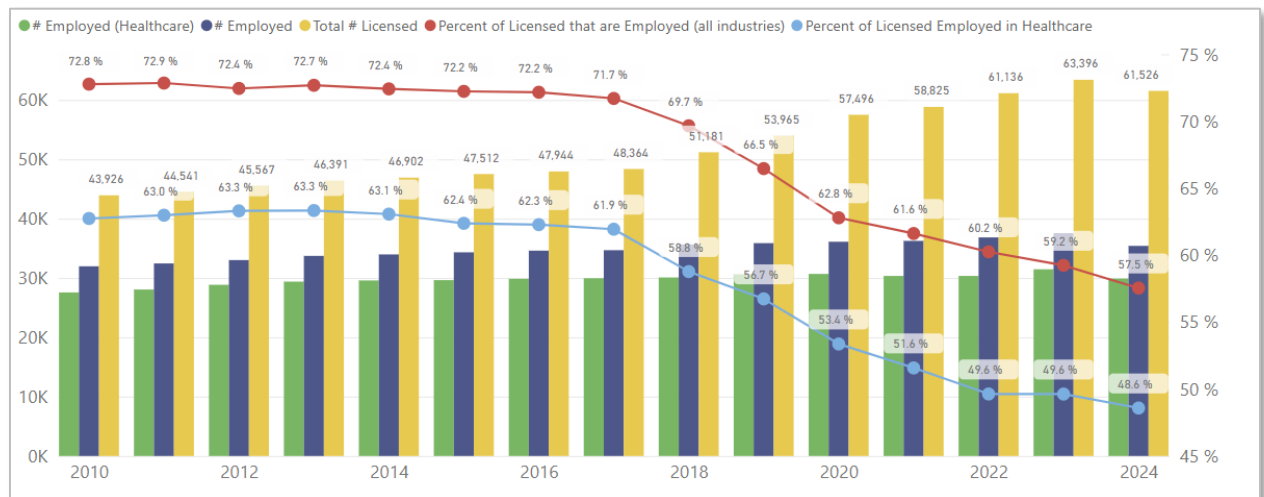
- **Purpose:** Evaluate potential opportunities to address healthcare workforce shortage areas (e.g., educational program expansions). Evaluate the healthcare workforce supply based on specific dimensions (e.g., by specialty, licensure, geographically).
- **Intended audience:**
 - Educational Institutions
 - Job Seekers and Students
 - Healthcare Systems, Providers, and Payers
 - Governmental Agencies
- **Data Sources:**
 - VT Healthcare Workforce Census and Survey Data
- **Filters:**
 - Geographic units: (e.g., county, Health Professional Shortage Area)
 - Time periods (i.e., survey biennium)
 - License type (e.g., Physician, Registered Nurse)
 - Specialties (e.g., primary care, mental health providers)
 - Practice setting (e.g., office based, Federally Qualified Health Center (FQHC), urgent care)
- **Refresh Schedule:** Annually. Surveys are updated every other year; groups of surveys are updated in alternating years.
- **Derived/Calculated Fields**
 - Full-time Equivalents (FTEs)
 - Geographic areas
- **Long-term Enhancements:** When educational data are integrated, this dashboard may be extended to predict opportunities to address shortage areas and analyze successful career pathways.



Dashboard 2: Vermont Provider Licensing Trends (Use Case 2)

This dashboard would summarize the licensing statuses of healthcare providers across two survey years of the VT Healthcare Workforce Census (e.g., active clinical practice in Vermont, Retired, etc.). These values would be provided for each type of license and include those with more than one type of license. This dashboard could be structured similarly to the [licensure summaries published by the State of Rhode Island](#):

Figure 2 - State of RI Number of Licensed Healthcare Workers in RI



- **Purpose:** Evaluate providers licensed in VT and whether they are still practicing or not, accounting for individuals that have more than one license.
- **Intended audience:**
 - Healthcare Systems, Providers, and Payers
 - Governmental Agencies
- **Data Sources:**
 - VT Healthcare Workforce Census and Survey Data
- **Filters:**
 - Time periods
 - License type (e.g., Physician, Registered Nurse)
 - Age Band
 - Gender
 - Race/Ethnicity subject to data availability
- **Refresh Schedule:** Annually. Surveys are updated every other year; groups of surveys are updated in alternating years.
- **Derived/Calculated Fields**
 - None
- **Long-term Enhancements:** With more cycles of Provider Census data and/or provider-level longitudinal wage data, the dashboard view could be extended to predict likelihood of length of time providers are expected to stay in Vermont's active workforce to inform longer term development strategies.

Dashboard 3: Vermont Provider Demographics (Use Cases 3 & 4)

This view would provide a summary of the FTEs of providers based on their self-reported demographic attributes (e.g., gender, race, ethnicity, age band). The report could be modeled after those generated by the [State of California](#) or the [State of Indiana](#):

Figure 3 - State of CA Race & Ethnicity of California's Health Workforce

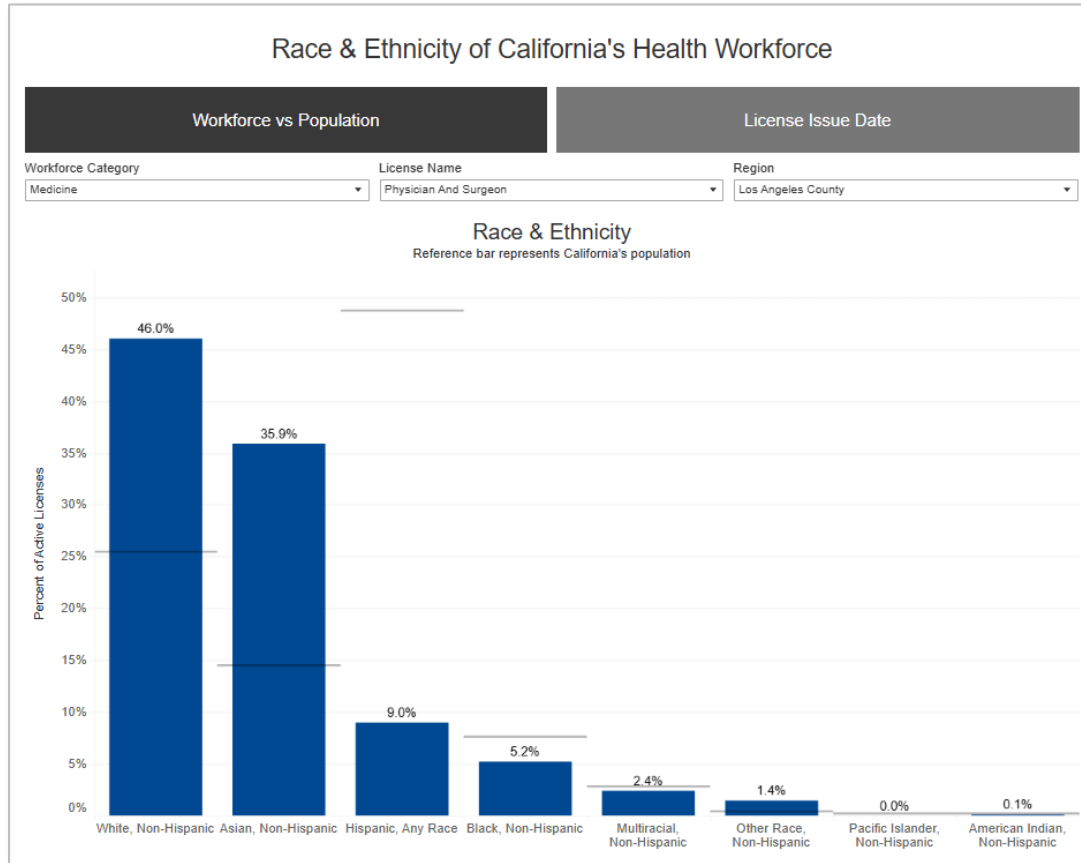
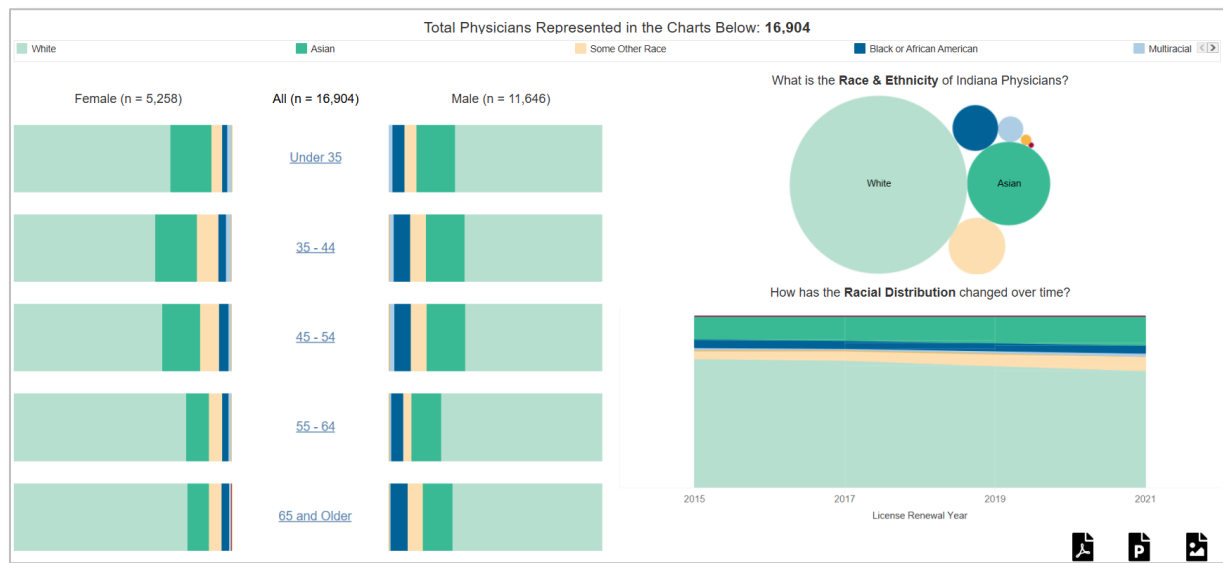


Figure 4 - State of IN Healthcare Worker Demographics



Purpose: Analyze the diversity of VT’s healthcare workforce and evaluate whether it aligns with the needs of the Vermont population (e.g., race, ethnicity, sexual orientation, identified gender, age bands).

- **Intended audience:**
 - Healthcare Systems, Providers, and Payers
 - Governmental Agencies
 - All Vermonters/Public
- **Data Sources:**
 - VT Healthcare Workforce Census and Survey Data
- **Filters:**
 - Time periods
 - License type (e.g., Physician, Registered Nurse)
 - Demographic attributes (e.g., gender, race, ethnicity, age band)
 - Geographic areas (e.g., county, Health Service Area)
- **Refresh Schedule:** Annually. Surveys are updated every other year; groups of surveys are updated in alternating years.
- **Derived/Calculated Fields**
 - Full-time Equivalents (FTEs)
 - Age Bands
 - Geographic areas
- **Long-term Enhancements:** This dashboard could be expanded by enhancing the demographic questions asked for in the Provider Census survey (e.g., including questions about language fluency). The report could be further enhanced by comparing provider demographics with those of the communities (as seen by the gray bar in Figure 3 above referencing California’s population). This would require additional data (e.g., US Census American Community Survey).

Dashboard 4: Vermont Provider Clinical Trends (Use Case 5)

With the data currently available, this dashboard would be limited to the questions occurring in the VT Healthcare Workforce Census. For Physicians, the view could include information about telemedicine, electronic communication with patients, and/or the division of workload between different activities (e.g., direct patient care, administration, research, etc.).

- **Purpose:** Evaluate changes in how services are provided to VT residents and who's providing the services (e.g., due to the pandemic, telehealth services increased with many providers located outside of VT). Assess changes in division of workload between patientcare and administrative activities.
- **Intended audience:**
 - Healthcare Systems, Providers, and Payers
 - Governmental Agencies
 - All Vermonters/Public
- **Data Sources:**
 - VT Healthcare Workforce Census and Survey Data
- **Filters:**
 - Geographic units (e.g., ZIP Code)
 - Time periods (i.e., survey biennium)
 - Demographic categories agreed to by the State of Vermont (e.g., practice location, provider age group).
 - License type (e.g., Physician, Registered Nurse)
 - Practice Information (e.g., offer telemedicine services)
 - Practice setting (e.g., office based, Federally Qualified Health Center (FQHC), urgent care)
- **Refresh Schedule:** Annually. Surveys are updated every other year; groups of surveys are updated in alternating years.
- **Derived/Calculated Fields**
 - Geocoding travel time
- **Long-term Enhancements:** With input from the State of Vermont, the view could also include geographic estimates of network adequacy, if FTE benchmarks are established by license type.

Tier 1B (Short-Term) Dashboards:

Dashboard 5: Vermont Provider Trends (Use Case 6)

This dashboard would include two survey years of Provider Census Survey data to summarize the stability of Vermont's workforce based on the proportion of providers:

- Maintaining the same license(s)
- Changing license(s)
- Staying with the same practice
- Moving practices
- No longer included in data set

NOTE: An identity resolution solution (e.g., NPI) is needed for this report to properly track providers over time and across data sources. Without identity resolution, a snapshot of this information could be provided as shown in Figure 5 below.

Figure 5 - State of IN Physician Employment Plans



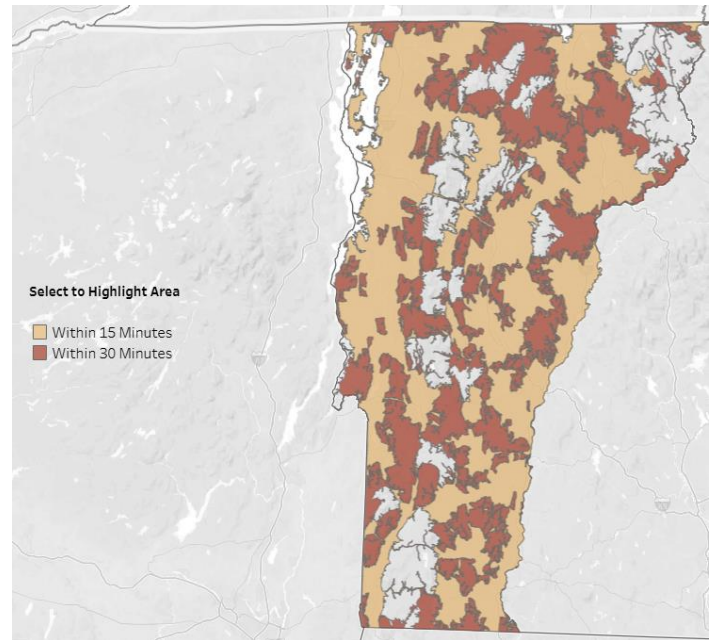
- **Purpose:** Evaluate workforce stability; turnover, attrition (to include individuals taking on a new role in administration), and retention by facility/organization/practice and by type of staff including predicting potential future turnover (e.g., aging workforce).
- **Intended audience:**
 - Healthcare Systems, Providers, and Payers
 - Governmental Agencies
 - Educational Institutions
- **Data Sources:**
 - VT Healthcare Workforce Census and Survey Data
- **Filters:**
 - Geographic units: (e.g., county, Health Professional Shortage Area)
 - Time periods (i.e., survey biennium)
 - Demographic categories agreed to by the State of Vermont (e.g., practice location, provider age band, race, gender).
- **Refresh Schedule:** Annually. Surveys are updated every other year; groups of surveys are updated in alternating years.
- **Derived/Calculated Fields**
 - Unique individual identifier (e.g., Enterprise ID)
 - Full-time Equivalent (FTEs)

- Geographic areas
- Age bands
- **Long-term Enhancements:** To the extent allowable by the data sources, the dashboard view could also summarize typical wages associated with each type of license based on Vermont Department of Labor summary statistics. This view could be extended if additional years of survey data are integrated into the VTHWDC.

Dashboard 6: Access to Care (Use Case 7)

This dashboard would summarize the approximate drive times for Vermont residents to access care by specialty (e.g., primary care) based on the nearest practice location, as estimated based on the Provider Census data. The dashboard would provide an interactive view similar to that provided in the [Physical Access to Primary Care Facility dashboard](#) produced by the Green Mountain Care Board, expanding it to other specialties beyond primary care:

Figure 6 - State of VT Physical Access to Primary Care



- **Purpose:** Evaluate network adequacy and access to care.
- **Intended audience:**
 - Healthcare Systems, Providers, and Payers
 - Governmental Agencies
 - All Vermonters/Public
- **Data Sources:**
 - VT Healthcare Workforce Census and Survey Data
- **Filters:**
 - Geographic units (e.g., ZIP Code)
 - Time periods (i.e., survey biennium)
 - Demographic categories agreed to by the State of Vermont (e.g., practice location, provider age band).
 - License type (e.g., Physician, Registered Nurse)
 - Provider specialty (e.g., primary care, cardiology)
 - Practice Information (e.g., accepting new patients, participating in governmental programs, offering care via telemedicine)
 - Practice setting (e.g., office based, Federally Qualified Health Center (FQHC), urgent care)
- **Refresh Schedule:** Annually. Surveys are updated every other year; groups of surveys are updated in alternating years.
- **Derived/Calculated Fields**
 - Geocoding travel time
- **Long-term Enhancements:** With input from the State of Vermont, the view could also include geographic estimates of network adequacy, if FTE benchmarks are established by license type.

APPENDICES

Appendix A

Prioritized Use cases and Associated Data Sources

Use Case #	Tier	Use Cases	Data Source
1	1a	Look at shortage areas for potential opportunities for educational program expansions. Evaluating the demand for specific clinical areas of shortages (e.g., by specialty, licensure, geographically). Long-Term: Integrate with educational programs and their waitlists for students to enter the programs.	Immediate Term: VT Healthcare Workforce Survey Data Long Term: Educational Data.
2	1a	Evaluate providers licensed in VT and whether they are still practicing or whether they are just maintaining their license and accounting for individuals that have more than one license.	VT Healthcare Workforce Survey Data
3	1a	Analyze health equity data among the healthcare workforce focusing on equity, inclusion, and diversity.	VT Healthcare Workforce Survey Data
4	1a	Evaluate whether the diversity of the healthcare workforce meets the needs of the Vermont population (e.g., race, ethnicity, sexual orientation, gender identify).	VT Healthcare Workforce Survey Data Census Data
5	1a	Evaluate changes in how services are provided and who's providing the services (e.g., due to the pandemic, telehealth services increased with many providers located outside of VT).	VT Healthcare Workforce Survey Data
6	1b	Evaluate workforce stability; turnover, attrition (to include individuals taking on a new role in administration), and retention by facility/organization/practice and by type of staff including predicting potential future turnover (e.g., aging workforce).	VT Healthcare Workforce Survey Data VT Department of Labor Wage Data
7	1b	Evaluate network adequacy and access to care.	VT Healthcare Workforce Survey Data

Use Case #	Tier	Use Cases	Data Source
8	2	Assess shortages in specific specialties or individuals with specific licensures and certifications by region, what the current workforce is currently vs. what is needed. Develop benchmarks for positions needed to aid in evaluating shortage designations. Include non-certified, non-licensed workforce (e.g., personal care attendants).	VT Healthcare Workforce Survey Data (Licensed Workforce) Need Department of Labor data for non-certified, non-licensed workforce
9	2	Provide information to individuals regarding healthcare career pathways and salaries to entice/inspire individuals to pursue these careers and to stay in VT.	VT Department of Labor Wage Data
10	2	Predict future areas of need for healthcare workers based on trends in healthcare (e.g., aging population, chronic conditions using APCD data) to inform educational programs (e.g., demand modeling).	VT APCD VT Healthcare Workforce Survey Data
11	2	Licensing data: tracking whether practicing individuals have a valid and current license and collection of information on non-licensed professionals. New legislation Peer Certification (July 2025) and tracking these individuals.	VT Healthcare Workforce Survey Data Professional Licensure Data VT Department of Labor Data
12	2	Provider experience in the workforce, effects on career progression, or wage data, or duration to reach top of license.	VT Healthcare Workforce Survey Data VT Department of Labor Wage Data
13	2	Compare benchmarks across states and against national benchmarks.	Health Resources & Services Administration (HRSA) Health Workforce Data
14	3	Perform workforce demand modeling, assess future workforce demands. Is workforce supply meeting the demand - compare workforce demands with graduating students and residents.	VT APCD VT Healthcare Workforce Survey Data Workforce Placement Data - VT State University
15	3	Track availability of openings or availability of clinical placements for students pursuing degrees or licensure in healthcare. Provide students with practical experience to prepare students for "what they are getting into" to help with retention.	Hospital Staffing Data Mental Health Services Staffing Data Dept. of Corrections Staffing Data VNA's of Vermont - Vacancy and Turnover Data
16	3	Define, measure, and track vacancies, at the position and FTE level (e.g., per diem positions in the and seasonality in mental health).	Hospital Staffing Data Mental Health Services Staffing Data Dept. of Corrections Staffing Data VNA's of Vermont - Vacancy and Turnover Data

Use Case #	Tier	Use Cases	Data Source
17	3	Use data to support / supplement a provider directory.	VT Healthcare Workforce Survey Data NPPEs Provider Enrollment, Chain, and Ownership System (PECOS) VT Medicaid Provider Management Data
18	3	Analysis on individuals' education and licensure to evaluate whether they continue to work in the healthcare field, that they are working to their level of licensure and/or whether they are no longer working in healthcare, and if so, where are they currently working.	VT Healthcare Workforce Survey Data
19	3	Evaluate the pipeline of healthcare workers starting at the high school / regional career technical education centers level by identifying existing training and educational opportunities and areas where these training opportunities are lacking.	Educational data
20	3	Evaluate outcomes of educational and funding programs (e.g., scholarships, loan forgiveness, employer sponsored) - is the student engaged in the workforce, where are they working, etc. What are the most effective paths, how do educational programs focus on the best programs that ensure success in completion of programs and retention in the workforce.	Educational data
21	3	Evaluate the progression of individuals education and licensure levels.	VT Healthcare Workforce Survey Data
22	3	Partner with neighboring states to be able to include out of state providers in the data since many Vermonters receive care from NH and MA.	
23		National data sources do not always accurately reflect the Vermont landscape (e.g., CMS data showing that VT is over-resources in nursing).	
24		Use the data to help get additional State or Federal resources and funding.	

Appendix B

VT Healthcare Workforce Census and Survey Data Licenses and Survey Schedule

Licenses	Initial Survey Years
Advanced practice registered nurses	2021, 2023
Alcohol and drug use counselors	2021, 2023
Dental assistants	2021, 2023
Dental hygienists	2021, 2023
Dentists	2021, 2023
Hearing aid dispensing	2021, 2023
Mental health counselors	2021, 2023
Midwives	2021, 2023
Pharmacists	2021, 2023
Pharmacy technicians	2021, 2023
Podiatrists	2021, 2023
Radiologic technologists	2021, 2023
Registered nurses	2021, 2023
Acupuncturists	2022, 2024
Athletic trainers	2022, 2024
Audiologists	2022, 2024
Behavior analyst assistants	2022, 2024
Behavior analysts	2022, 2024
Chiropractors	2022, 2024
Dieticians	2022, 2024
Marriage and family therapists	2022, 2024
Naturopathic physicians	2022, 2024
Non-licensed non-certified psychotherapists	2022, 2024
Nursing assistants	2022, 2024
Nursing home administrators	2022, 2024
Occupational therapists	2022, 2024
Occupational therapy assistants	2022, 2024
Opticians	2022, 2024
Optometrists	2022, 2024
Physical therapists	2022, 2024
Physical therapy assistants	2022, 2024
Physician assistants	2022, 2024
Physicians (MDs and DOs)	2022, 2024
Practical nurses	2022, 2024
Psychoanalysts	2022, 2024
Psychologists	2022, 2024
Respiratory care	2022, 2024
Social workers	2022, 2024

Licenses	Initial Survey Years
Speech language pathologists	2022, 2024

Appendix C

VT AHS Prioritized Occupations for Reporting

State-Identified Priority	Occupations	Survey years	Licenses
Priority 1	Physicians	2022 and 2024	<ul style="list-style-type: none"> Physicians (Medical Doctor and Doctor of Osteopathic Medicine) Physicians Assistants
	Nurses (Group 1)	2021 and 2023	<ul style="list-style-type: none"> Advanced practice registered nurses (APRN) Registered nurses
Priority 2	Midwives	2022 and 2024	<ul style="list-style-type: none"> Midwives
	Dental Professionals	2021 and 2023	<ul style="list-style-type: none"> Dentists Dental Assistants
	Nurses (Group 2)	2021 and 2023	<ul style="list-style-type: none"> Nursing assistants Practical Nurses
Priority 3	Mental Health Counselors / Professions	2021 and 2023	<ul style="list-style-type: none"> Alcohol and drug use counselors Mental health counselors
		2022 and 2024	<ul style="list-style-type: none"> Behavior analysts Behavior analyst assistants Marriage and family therapists Non-licensed non-certified psychotherapists Psychoanalysts Psychologists Social workers