

Hospital Report Update

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Agenda

- Research Questions
 - Where do Vermont residents seek care?
 - Where do Vermont hospitals' patients come from?
 - How do these trends impact residents/providers?
- Today's agenda
 - What are the data at our disposal?
 - How have we used these data to date?
 - How are we improving data connections?
 - What can we do with the data moving forward?

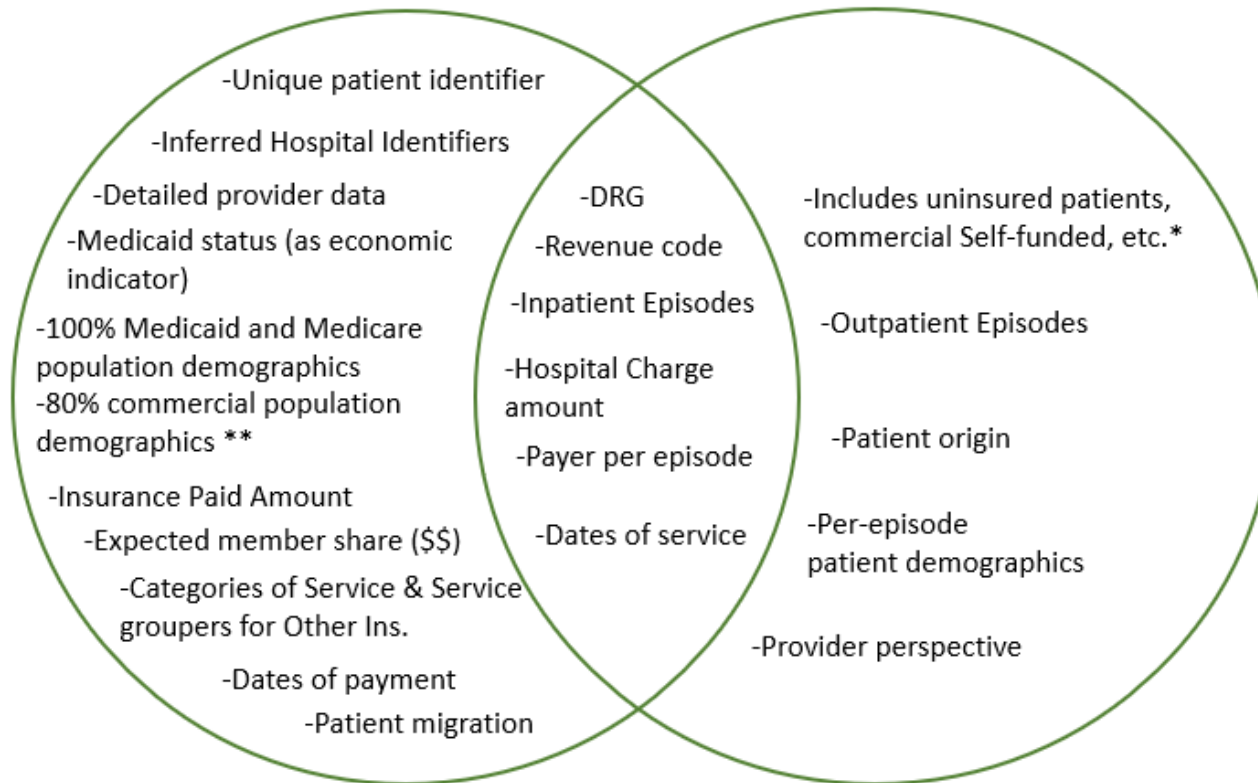
- Vermont Uniform Hospital Discharge Data System
- Includes:
 - Data for 2006+ with a year of run-out
 - Inpatient and outpatient discharge records
 - Charges, diagnoses, procedures
 - All payers including self-pay and free care
- Excludes:
 - Vermont residents at non-Vermont hospitals
 - Actual paid and out-of-pocket amounts for care
 - Patient identifiers (name, birthdate, SSN, etc.)
 - Clinical data from EMR or clinical notes
 - Professional component of hospital encounters

- Vermont's All-Payer Claims Database (APCD)
- Includes:
 - Data for 2007+, with 6 months of run-out
 - Medical claims & Retail pharmacy claims
 - Insurance eligibility information
 - VT Medicaid, Medicare, Commercial (QHP, Large group)
 - ~ 1/2 Commercial Self-Funded market is included
- Excludes:
 - Personal health information (name, birthdate, SSN, etc.)
 - Clinical data from EMR or clinical notes
 - Health costs or utilization for uninsured persons
 - 1/2 Commercial Self-Funded market, Workman's Compensation, Tricare, VA plans, FEHBP, self-pay, payers with <200 VT residents.

Summary of differences

VHCURES data elements

VUHDDS data elements



*Other insurances not in VHCURES: Commercial Self-Funded, Workman's Compensation, Tricare, VA plans, FEHBP, self-pay, payers with <200 VT residents.

** Due to Gobeille vs. Liberty Mutual

Patient Migration

Objective: To follow residents' movement In-State (H.S.A.s) and Out-of-State (other regions)

- "Expenditures" are claims payments: total medical & pharmacy by insurance
- "Patient" defined as anyone with medical coverage at any point in 2014-2019

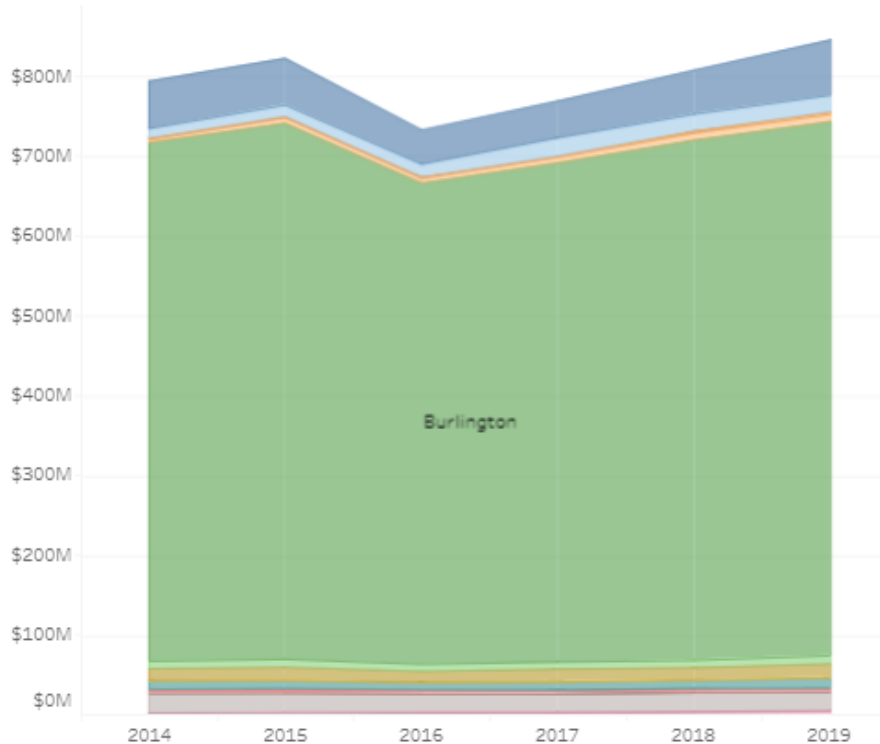
Advances: Addition of MS-DRG, "episode" logic, and care type flags

Variable	Values
H.S.A. of residence	Based on the patient's zip code
H.S.A. of care	Based on provider practice location zip code
Claim type	Medical, Retail Pharmacy
Episode Type (v2)	Inpatient hospitalizations
Payer	Medicare, Medicaid, Commercial
MS-DRGs	All (disagg'd as needed)
Tertiary Care	DRGWT > 1 DRGWT <= 1
Month-Year of discharge	2014, 2019
Length of Stay	All - to normalize charges in future analyses
Exclusions	Newborns and neonates Transfers from hospitals
Charges	Charge amount from the hospital (not equivalent to paid amounts)
Total expenditures	The sum of the insurance paid portion and the expected member share

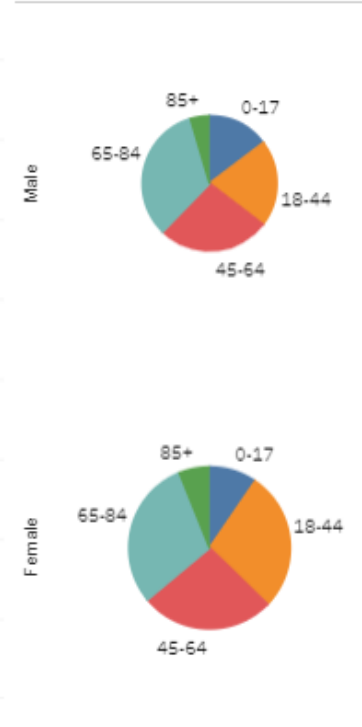
Patient Migration

- Year
- 2014
 - 2015
 - 2016
 - 2017
 - 2018
 - 2019
- HSA of Residence
- Barre
 - Bennington
 - Brattleboro
 - Burlington
 - Middlebury
 - Morrisville
 - Newport
 - Randolph
 - Rutland
 - Springfield
 - St. Albans
 - St. Johnsbury
 - White River Jct

Medical Expenditures for Residents of the Burlington HSA



Age & Gender Profile for Burlington Residents in 2019



What proportion of total spend for Burlington HSA Residents stays within Vermont, and what proportion goes to providers outside of Vermont?

		2014	2015	2016	2017	2018	2019
Commercial	Within VT	90.5%	91.5%	93.5%	93.0%	91.9%	88.8%
	Outside VT	9.5%	8.5%	6.5%	7.0%	8.1%	11.2%
Medicaid	Within VT	95.0%	95.1%	95.6%	95.0%	94.4%	94.4%
	Outside VT	5.0%	4.9%	4.4%	5.0%	5.6%	5.6%
Medicare	Within VT	89.9%	89.5%	90.7%	90.9%	90.3%	89.8%
	Outside VT	10.1%	10.5%	9.3%	9.1%	9.7%	10.2%

Patient Origin

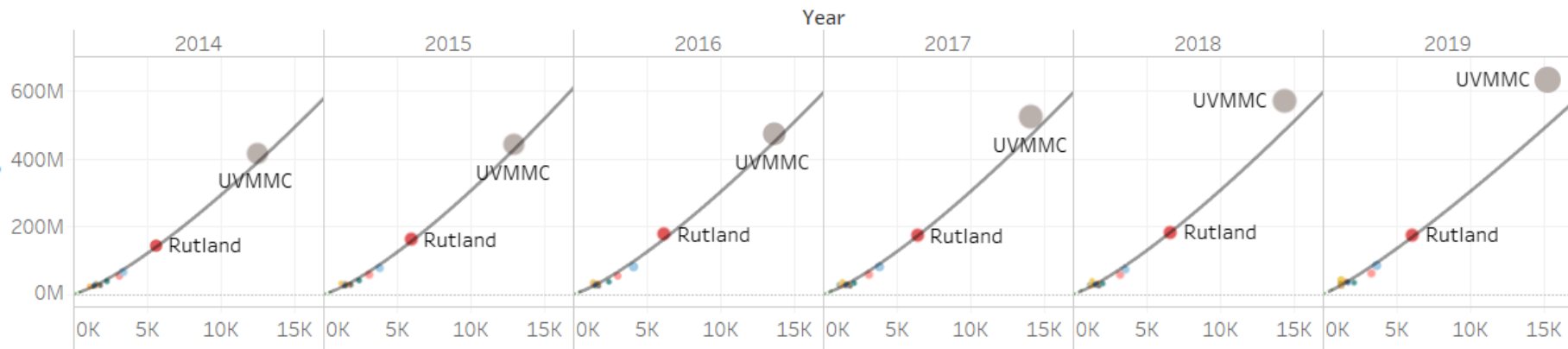
Objective: To track changes to hospitals' patients and the care they receive.

- "Hospitals" are all hospitals subject to budget review
- "Patients" are everyone who received inpatient care at a hospital or its practices

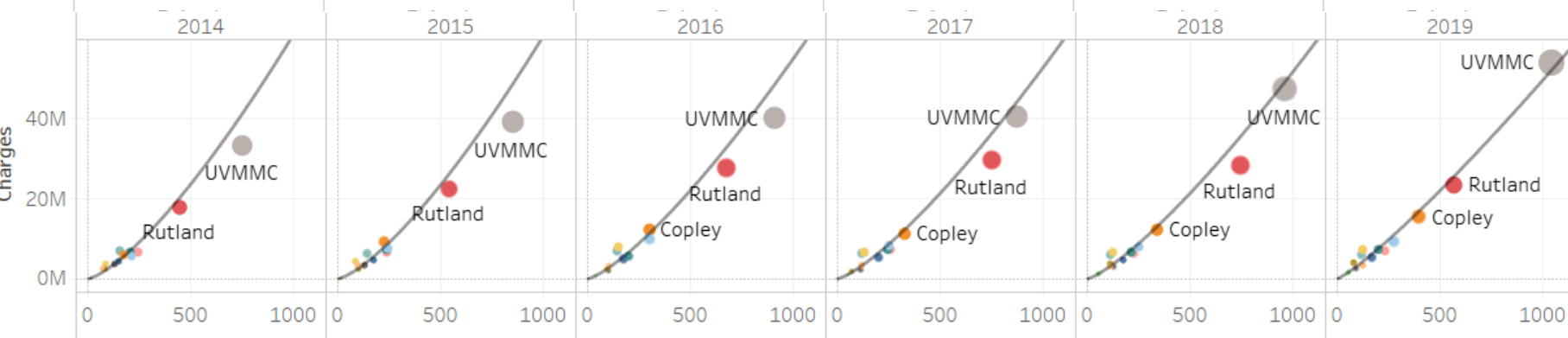
Advances: MDCs, MS-DRGs, DRG weights, LOS

Variable	Values
Hospital	All Vermont hospitals subject to budget review
Hospital Type	All Hospitals, PPS, CAH
Patient HSA	All Vermont HSAs, "Out of State" and "Unknown"
Episode Type	Inpatient (v2)
Payer	Medicare, Medicaid, Commercial, Self Pay, Free Care
Major diagnostic categories	"Circulatory System", "Respiratory System", "Nervous System", "Musculoskeletal", "Behavioral/SUD", "All Other"
MS-DRGs	All (disagg'd as needed)
Tertiary Care	DRGWT > 1 DRGWT <= 1
Month-Year of discharge	1/2014 to 12/2019
Length of Stay	All - to normalize charges in future analyses
Exclusions	Newborns and neonates Transfers from hospitals

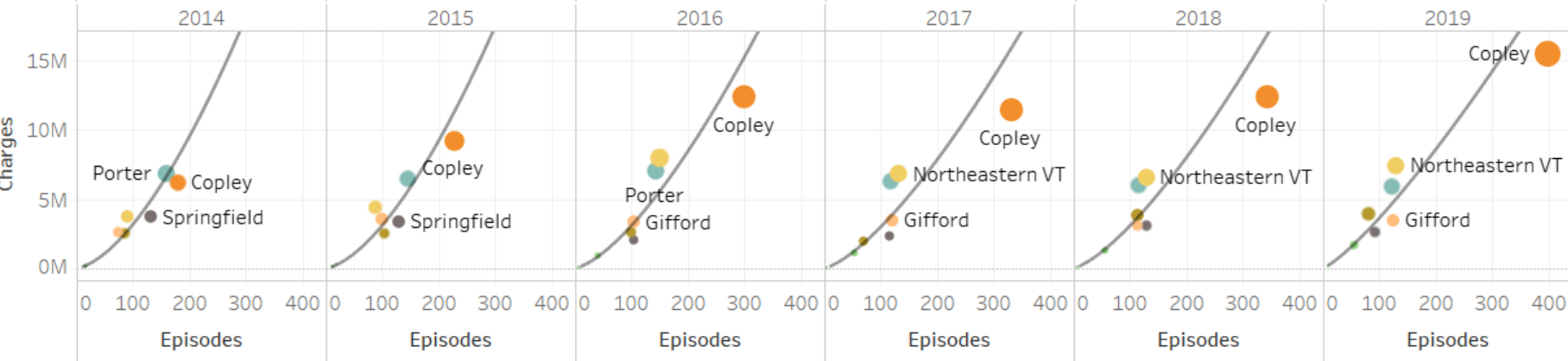
Inpatient Episodes Charges



Musculoskeletal paid by Medicare Charges

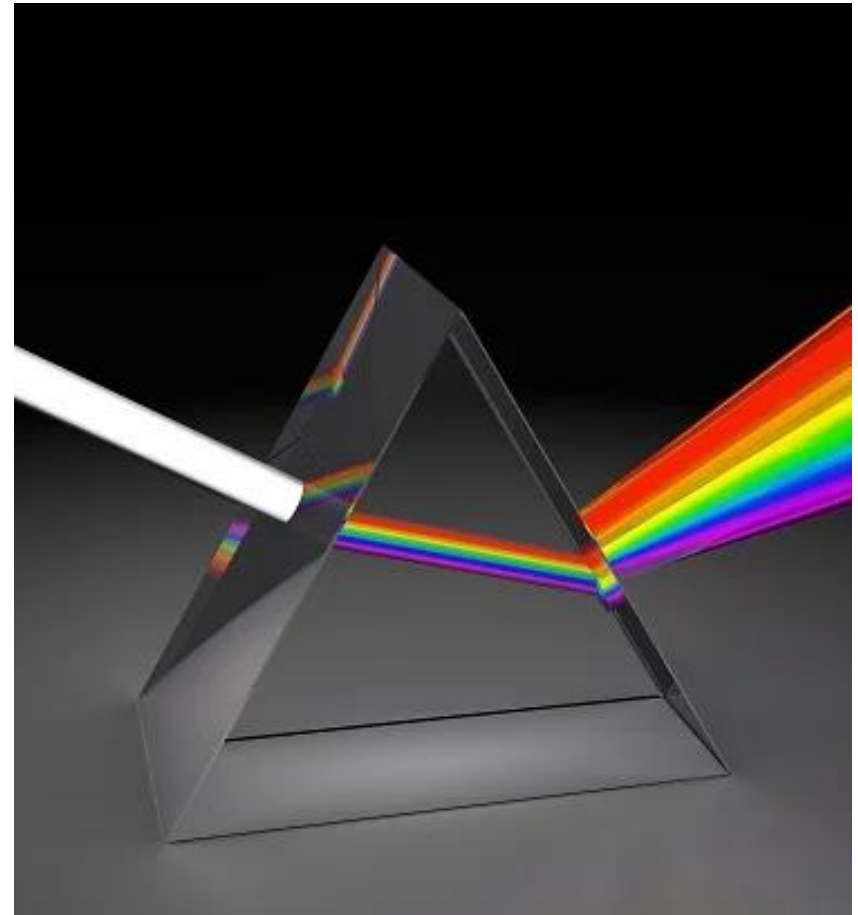


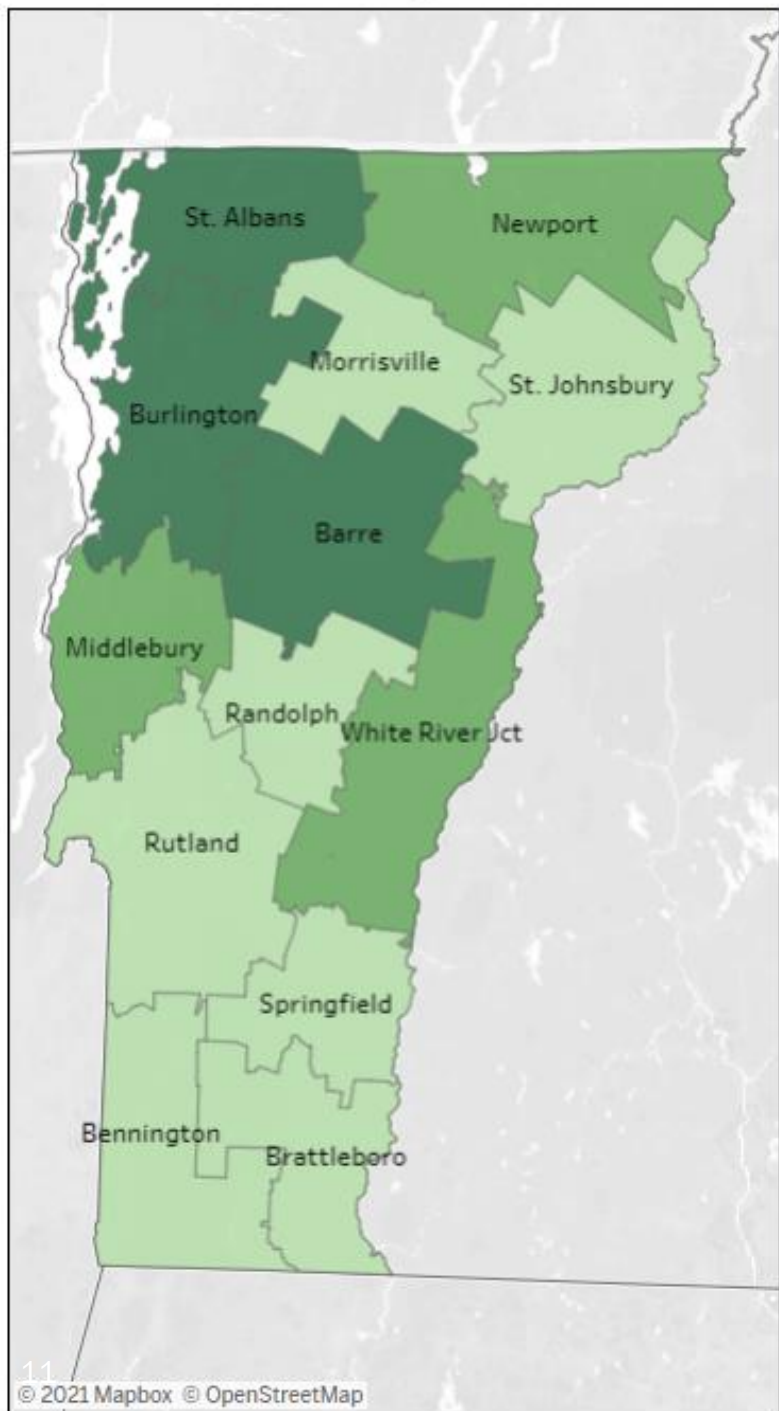
Filtered to CAHs Charges



Other Types of Data

- Firm data
 - Financials
 - Service lines
- Community data
 - U.S. Census data
 - Other federal and State resources, e.g., SVI
- Spatial data
 - Where people live
 - How people access care
- Human services data
- Public insight





Select Year

- 2015
- 2016
- 2017
- 2018

Health Indicator

- PCP - Physician Assistants (FTE) per 100K
- PCP - Physicians MD/DO (FTE) per 100K
- Percent individuals who did not visit a doctor in the past year because ...
- Percent of Adults Who Cannot Obtain or Delay Care
- Percent of Adults with a Usual Primary Care Provider
- Percent of Adults with Health Insurance
- Percent of children who have a developmental screening in the first 3 y...
- Percent of Children with Health Insurance
- Percent Underinsured

Percent of Adults with Health Insurance



State Value = 94.00

Drive Time to Primary Care

- Within 15 minutes
- Within 30 minutes

Takeaways

Most Vermonters live less than 30 minutes drive from primary care.

Bus lines tend to serve more densely populated communities within 15 minutes drive of primary care. (not shown)

Non-emergency medical transportation serves the entire state, although riders must be service-eligible.

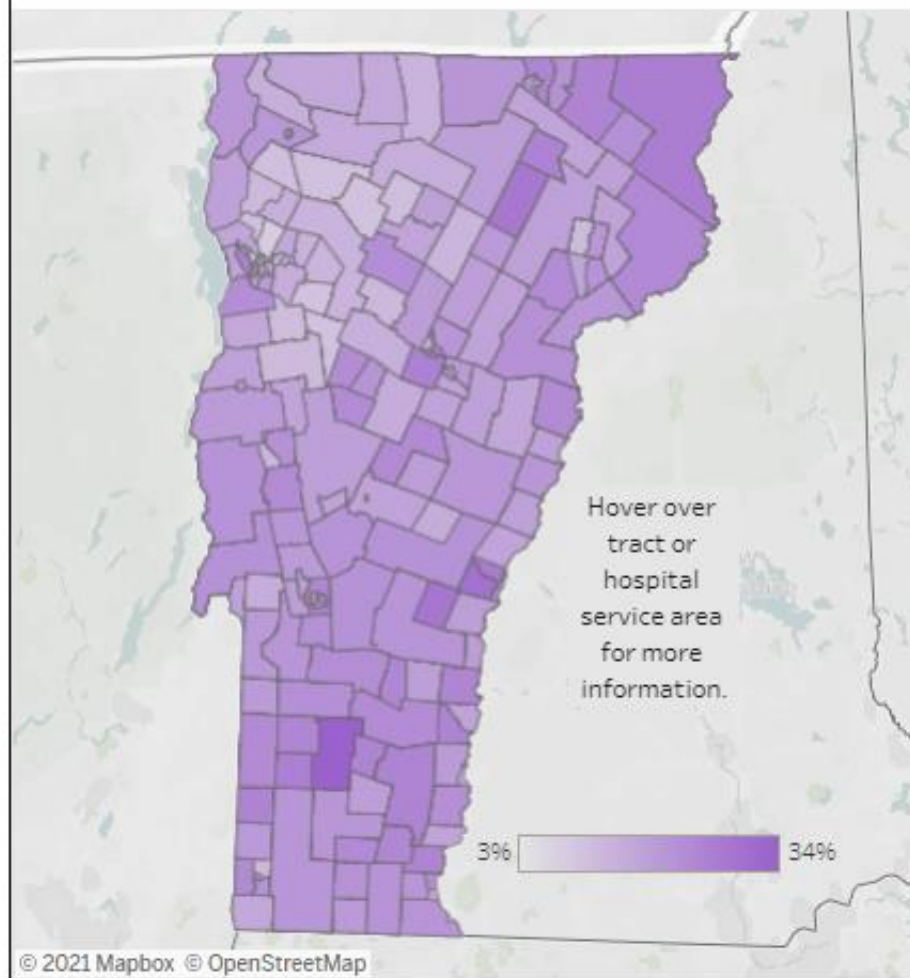
Vermonters who reside near state borders often have better access to out-of-state practices (not included in the analysis) than Vermont practices.

Most gaps exist in undeveloped areas, which often lack roads and residents.

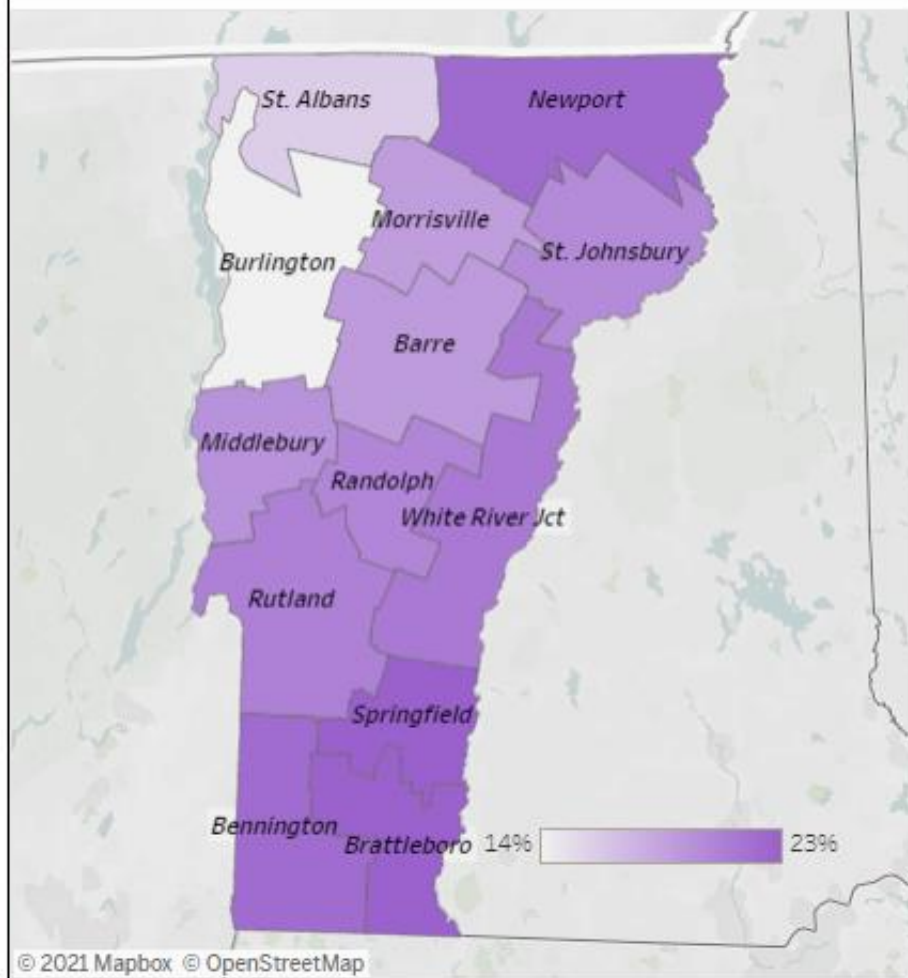
Select Measure:

Population Over 65 Years Old

Percent of Population Over 65 Years Old by Census Tract

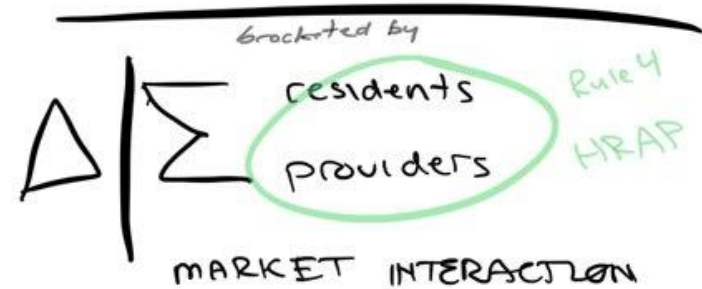
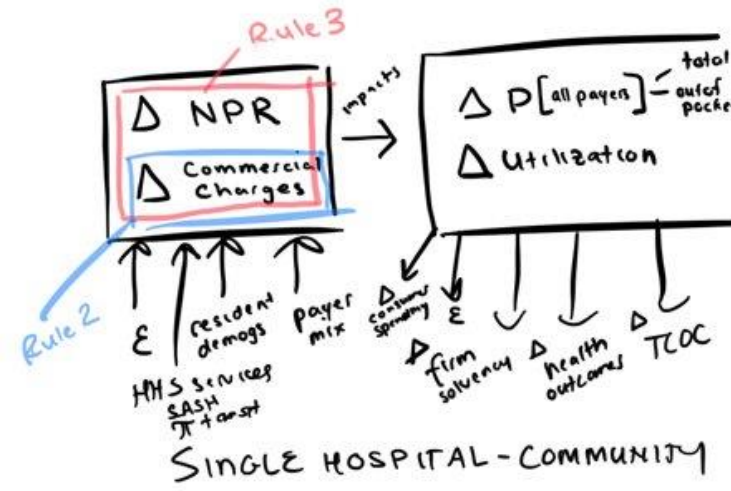
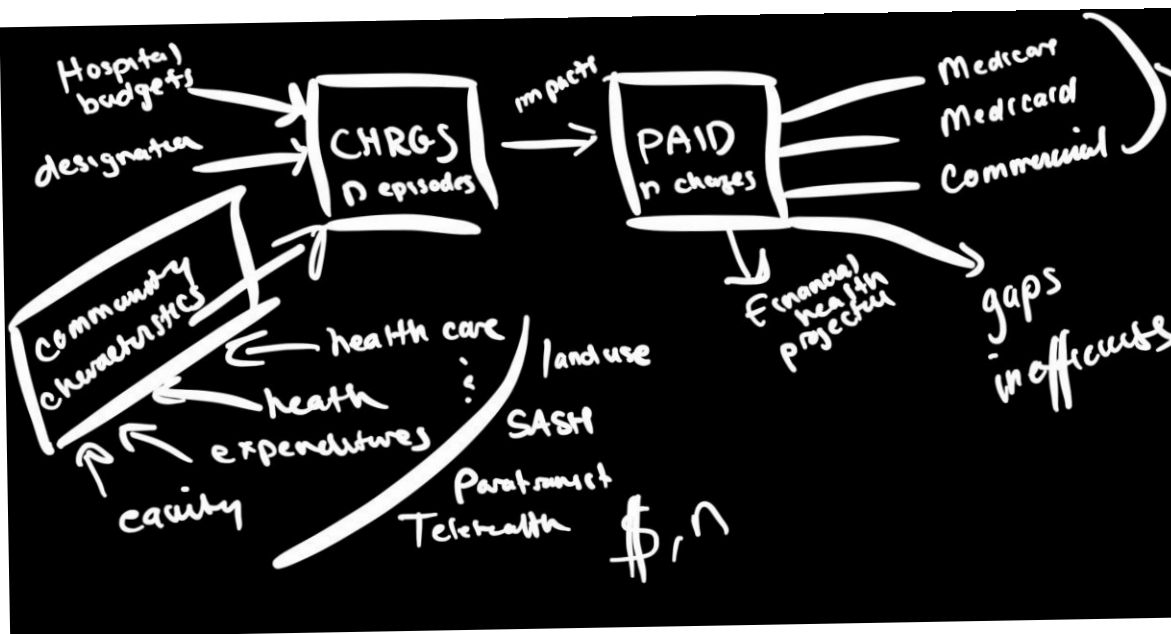


Percent of Population Over 65 Years Old by HSA



Note: These metrics were drawn from the CDC Social Vulnerability Index (SVI). The variables were selected for their ability to predict health outcomes in the peer-reviewed literature, as well as their ability to represent the spatial patterns of other SVI variables in a concise way ("dimension reduction").

A whole greater than the sum of its parts?



Example 1: Measuring changes to access with discharge data



How does the closure of safety-net hospitals impact physical access among socioeconomic groups?

- Data
 - Several states' discharge data (1990s-2000s)
 - U.S. Census data at the zip code level (1990, 2000)
 - AHA Annual Survey data on hospital characteristics
- Approach
 - Drive time ("access") treated as a function of patient, hospital, community, and health system characteristics
 - Model run for five separate diagnostic categories

Example 1 (continued)

- Results
 - Uninsured and Medicaid patients experienced greater disruptions to care when safety net hospitals closed.
 - These groups had worse access to Behavioral/SUD and birthing centers after hospital closures than commercially-insured counterparts.
- Adding value with claims?
 - Claims data have actual paid amounts, including expected member share (out-of-pocket, copays, coinsurance, deductibles)
 - Claims data include nearby non-hospital services that could substitute for hospital care (ASCs, midwives, etc.)
- Isolate effects in greater detail
 - How do changes in physical access to a type of care impact resident utilization, spending, and health outcomes?
 - Related: How do changes in physical access to care impact competition on charge, price, and charge-to-price differences among commercial members?

Example 2: Measuring telemedicine impacts with claims



How do telemedicine visits associate with health care utilization, quality, and spending relative to in-person visits?

- Data
 - Minnesota APCD 2009-2014
 - Commercially-insured women under 65
 - Exposure: Initiation of DTC telemedicine coverage by commercial health plan
- Approach
 - Compare change in outcomes among those with telemedicine coverage against those without it
 - Difference-in-difference

Example 2 (continued)

- Results
 - Fewer services used, fewer antibiotic prescriptions, and lower total spending during a 30-day episode of care.
 - DTC telemedicine could reduce utilization and spending while maintaining a comparable quality of care to in-person services
- Adding value with discharges?
 - Discharge records include non-claim patients *but* exclude telemedicine if it is not from a Vermont hospital
 - Discharge records break down outpatient episodes much more cleanly than claims databases – an advantage over claims
- Isolate effects in greater detail
 - Does telemedicine spur price competition for on-site substitutes?
 - Does telemedicine adoption associate with change in **charges** for hospital services? What about changes in **price**? Changes in price-to-charge ratio?
 - Do these patterns vary based on broadband access or socioeconomic disadvantage by tract? What might these patterns mean for health equity?

Progress: Database Alignment, Migration Analyses

- Goal: To create summary datasets from both VHCURES and VUHDDS for comparison, eventually to be used in an analysis of patient in/out migration by types of care, payer, & other patient demographics
 - Potentially applicable to: hospital budget review, CON
- Possible directions:
 - Flagging expensive/complex types of care that Vermonters travel for
 - Flagging care that Vermont offers for those coming in-state
- Methodology
 - Focus is on inpatient episodes (eventually to add outpatient)
 - Use hospital, MS-DRG (MDC, type, weight, length of stay), insurance, patient origin, charge amounts, episode counts, other patient demographics all as inputs to the analysis
 - Will aggregate to relevant levels of detail, to display important and significant changes over time

Progress: Database Alignment, Migration Analyses



- Complete to date:
 - Identification of Ambulatory Care Sensitive Conditions (ACSC) and Tertiary Care episodes
 - Chosen methodology for both datasets
 - Summary files from VUHDDS, years 2014-2019
 - Summary files from VHCURES, 2014 and 2019
- Next steps:
 - Methodology review with VAHHS-NSO (VUHDDS) and Onpoint (VHCURES)
 - Testing data comparison on smaller scales to assess differences
 - Applying comparison to other analyses such as in/out migration and price variation

Progress: Data Linkages

- Advancing Census tracts as a complement to HSAs
 - Ready-to-go data direct from the U.S. Census Bureau
 - Demographics, boundaries, and population centroids
 - Able to convert VUHDDS/VHCURES zip codes to tracts
- Streamlining data collection and analysis
 - Dropping GUIs to focus on replicable codes/scripts/syntax
 - Harnessing existing code and Tableau workbooks to disaggregate trends by service line and other dimensions
 - Exploring APIs to extract and update data at regular intervals
- On the horizon
 - Integrate clinical data with VHCURES
 - Getting more people involved
 - Connecting this effort with other ongoing data quality work

Limitations

- Identifying a source of truth; there is value in both hospital discharge data and financial data from claims. Which one is "right"?
- Finding agreement across two different datasets that are already cleaned/curated
- Weighing the ethics of connecting all of these data sources
- COVID effects
 - It will complicate comparisons in aggregate
 - ...yet an opportunity to align databases

Discussion

- We continue to advance our analytic work by
 - Leveraging multiple data sources to tease out trends across space and society,
 - Analyzing effects in a replicable and generalizable way, and
 - Generating complex products with increasing efficiency.
- Not a simple project, but an ongoing ‘*what is*’ and ‘*how can we know*’ that will shape how we approach many projects.

