Consensus Study on a Data Infrastructure
for Measuring the Care Economy:

DATA NEEDS FOR MEASURING THE CARE ECONOMY (Session 1)
A Framework for Creating Data Infrastructure –
Climate Resiliency of Skilled Nursing Facilities (SNF) in Virginia

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Use Case: Climate Resiliency of Skilled Nursing Facilities (SNF) in Virginia

Conceptual Data Map sets the stage for Data Discovery aligned to Purposes and Uses (below);

Q1: Can SNF workers make it to work during a flooding event?
Q2: Are SNFs prepared for emergencies?
Q3: What is the local capacity to mitigate emergency events?

Baseline Skilled Nursing Facility

Skilled Nursing Facilities
- Type (profit, not for profit)
- Chain status
- Last sold
- Emergency deficiencies
- Fire Safety deficiencies
- Inspections dates

Residents
- Total # of Residents
- % > 65
- % Minority
- % on Medicaid
- Cognitive function
- Mobility
- Physical Health

Nursing Staff (NS)
- Total # of Nursing Staff
- Where NS live
- How NS get to work
- Composition of NS family

Climate Change Threat

Riverine Flooding
- # of events
- Annualized frequency
- Risk scores

Coastal Flooding
- # of events
- Annualized frequency
- Risk scores

Preparedness

Skilled Nursing Facilities
- # Emergency deficiencies and Inspections over 4yrs
- # Fire safety deficiencies and Inspections over 4yrs

Community Built Environment
- # Hospitals
- # Fire Stations
- # Red Cross Chapters
- # National Shelter System Facilities
- # Urgent Care Facilities
- # Emergency Medical Service Stations
- # Primary care providers
- Transportation infrastructure
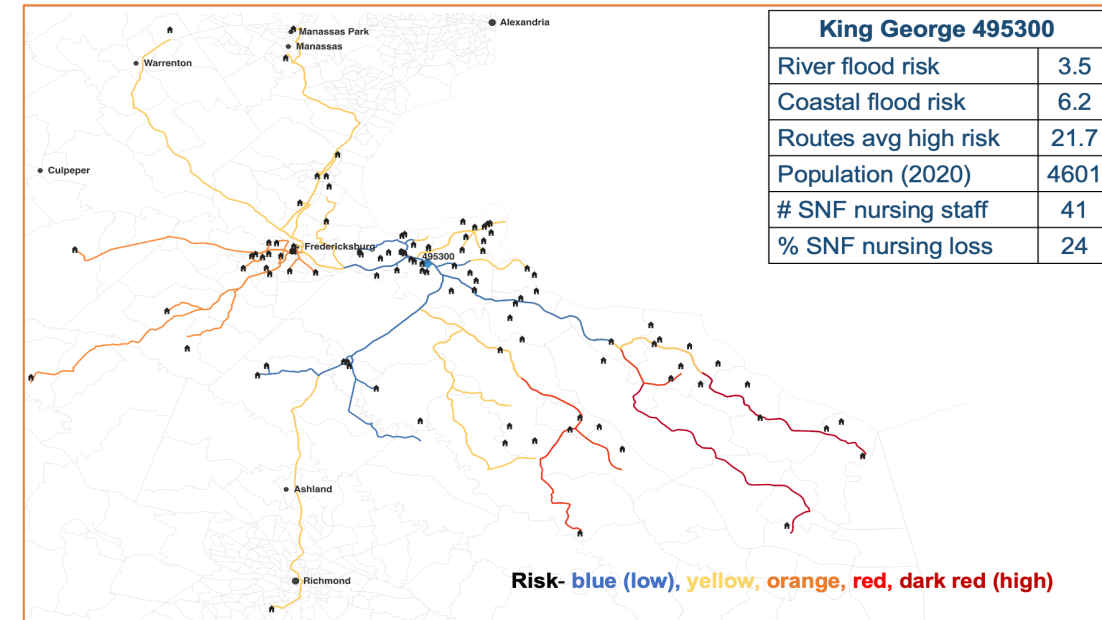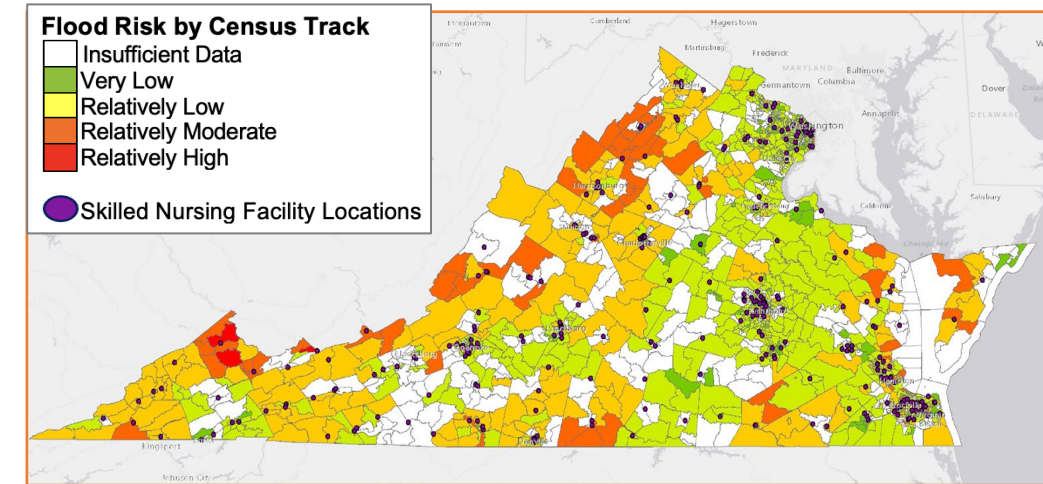
Community Population Resilience
- % < High School
- % Disabilities
- % Unemployed
- % No vehicle
- GINI Index

Data sources and estimation

- **HERE Premium Streets' proprietary data** includes information about roads, such as type of road, speed limits, number of lanes, etc.

- **Building Knowledge Base (BKB), proprietary synthetic population data**, is used to identify where SNF workers live and work to map transportation routes from home to SNF.

- **Federal Emergency Management Agency (FEMA) riverine and coastal flood data are used to estimate flooding risk** along the routes from nursing staff homes to the SNF.

The risk for each SNF is the percentage of workers who cannot make it to work during a flooding event.

Flood Risk by Census Track
- Insufficient Data
- Very Low
- Relatively Low
- Relatively Moderate
- Relatively High
- Skilled Nursing Facility Locations

King George 495300	
River flood risk	3.5
Coastal flood risk	6.2
Routes avg high risk	21.7
Population (2020)	4601
# SNF nursing staff	41
% SNF nursing loss	24

Risk- blue (low), yellow, orange, red, dark red (high)

CMS Skilled Nursing Home Deficiencies used to create
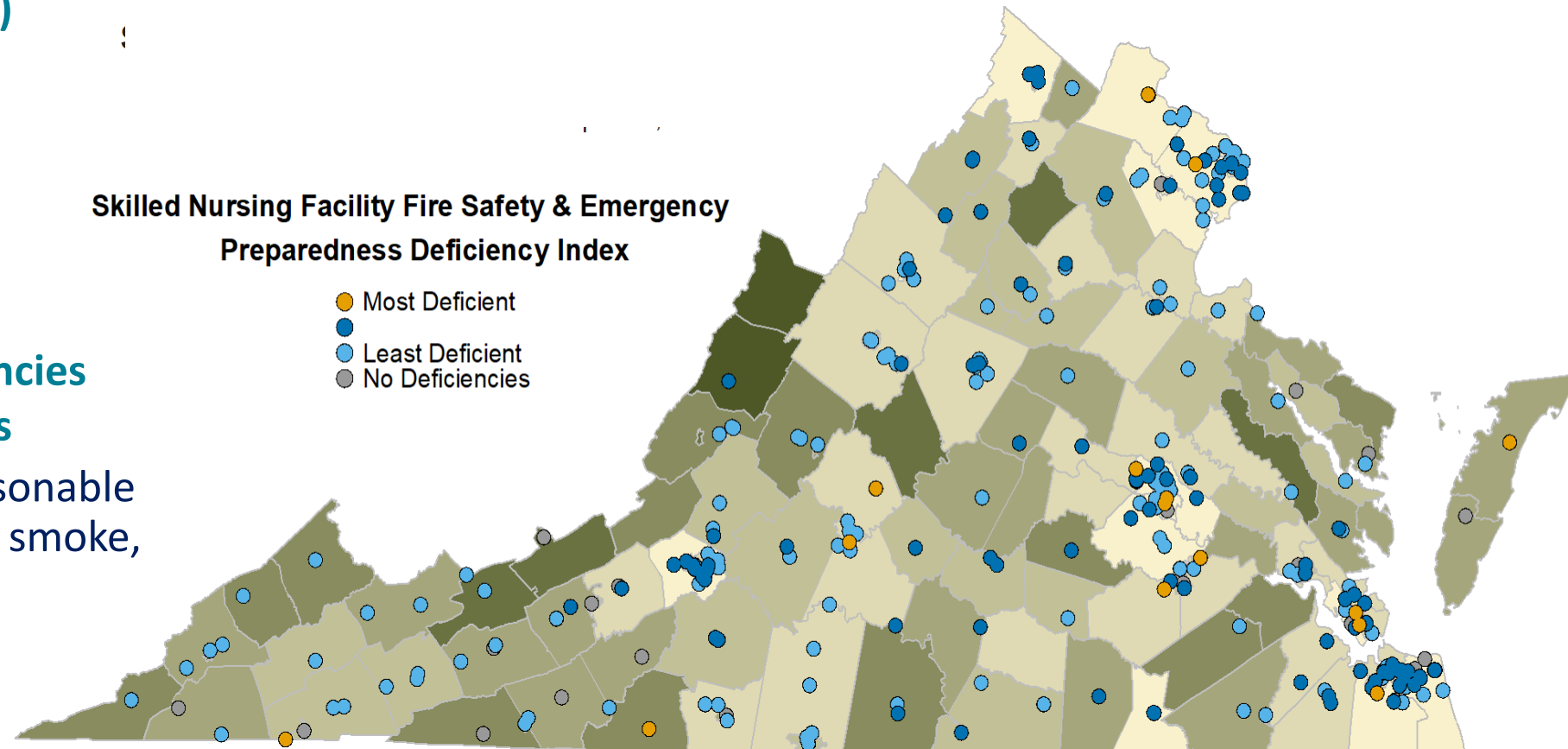*Emergency Preparedness Index to categorize SNFs into 4 groups.*

Emergency Preparedness (EP) Deficiencies – 4 elements

- Emergency plans
- Communication plan
- Training and testing

- Policies and procedures

Life Safety Code (LSC) Deficiencies
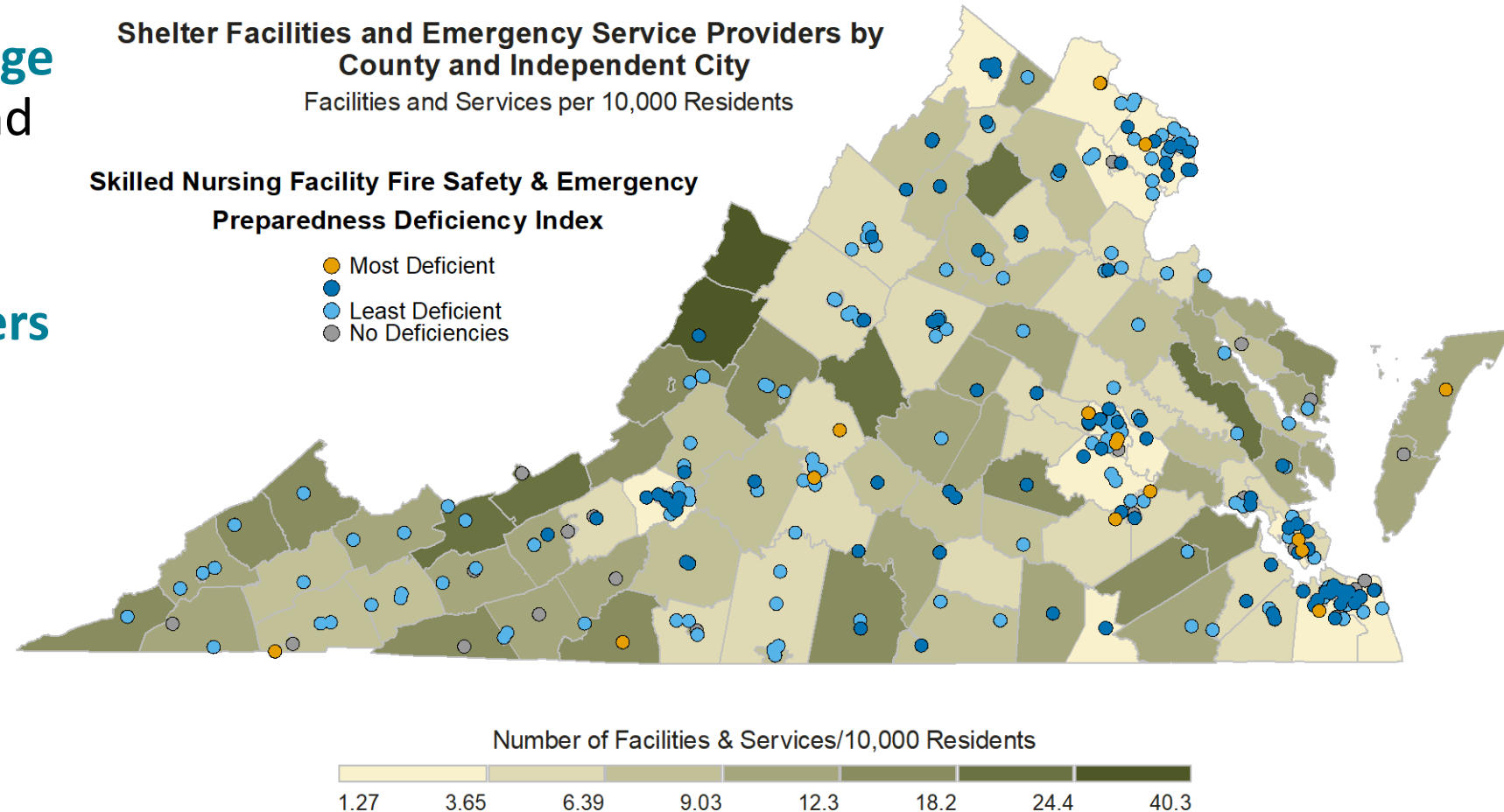## - Fire protection requirements

- Designed to provide a reasonable degree of safety from fire, smoke, and panic
- Construction
- Protection
- Operational features

Skilled Nursing Facility Fire Safety & Emergency Preparedness Deficiency Index

- Most Deficient
-
- Least Deficient
- No Deficiencies

4

Data Sources

- **Health professional shortage areas** (Health Resources and Services Administration)

- **Shelter facilities and emergency service providers** (Homeland Security Geospatial Management Office)

- **Community Resilience Indicator Analysis and National Risk Index for Natural Hazards** (Federal Emergency Management Agency)

Shelter Facilities and Emergency Service Providers by County and Independent City

Facilities and Services per 10,000 Residents

Skilled Nursing Facility Fire Safety & Emergency Preparedness Deficiency Index

- 🟠 Most Deficient
- 🔵 Most Deficient
- 🔵 Least Deficient
- ⚪ No Deficiencies

Number of Facilities & Services/10,000 Residents

| 1.27 | 3.65 | 6.39 | 9.03 | 12.3 | 18.2 | 24.4 | 40.3 |

Homeland Infrastructure Foundation−Level Data: https://hifld−geoplatform.opendata.arcgis.com/
Fire Safety Deficiencies and Inspection Dates (01/2018−03/2022): The Centers for Medicare & Medicaid Services

Guiding Principles & Research Steps

The **Curated Data Enterprise** is a framework to identify data needs and products for measuring social issues, such as the care economy, that go beyond the use of single or multiple federal surveys and take advantage of all types of data.

We develop data infrastructure through Use Cases that require specific purposes and uses to address social issues. The components are reusable for other data products.

References

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2. What is the Curated Data Enterprise? (2024) Sallie Keller, Stephanie Shipp, Vicki Lancaster, and Joseph Salvo, https://realworlddatascience.net/applied-insights/case-studies/posts/2024/11/08/what-is-CDE-2.html

3. Translating the Curated Data Model into Practice through a Demonstration Use Case: Climate Resiliency of Skilled Nursing Facilities, (2024) Vicki Lancaster, Stephanie Shipp, Sallie Keller, Henning Mortveit, Samarth Swarup, Aaron Schroeder, and Dawen Xie, https://realworlddatascience.net/applied-insights/case-studies/posts/2024/11/19/use-case-2.html

4. Defining Purposes and Uses to Support the Development of Statistical Products in a 21st Century Census Curated Data Enterprise Environment, (2024) Stephanie Shipp, Joseph Salvo, and Vicki Lancaster, https://realworlddatascience.net/case-studies/posts/2024/11/22/development-plan-2.

Lancaster V, Shipp S, Keller S, Schroeder A, Mortveit H, Swarup S, Xie D, (2023), **Census Curated Data Enterprise Use Case Demonstration: Climate Resiliency of Skilled Nursing Facilities.** Proceedings of the Biocomplexity Institute, Technical Report. TR# 2023-53. University of Virginia. https://doi.org/10.18130/ce97-sp05. GitHub repository - https://github.com/uva-bi-sdad/census_cde_demo_2