

MN EHR Consortium COVID-19 Project

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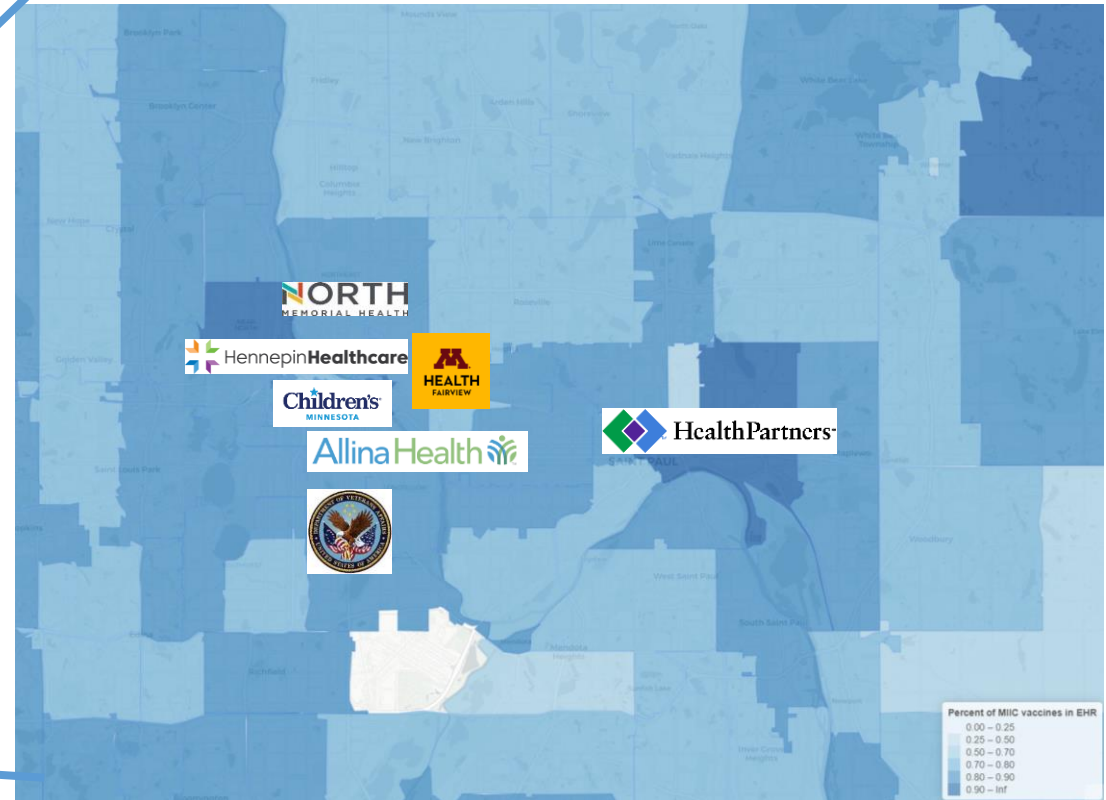
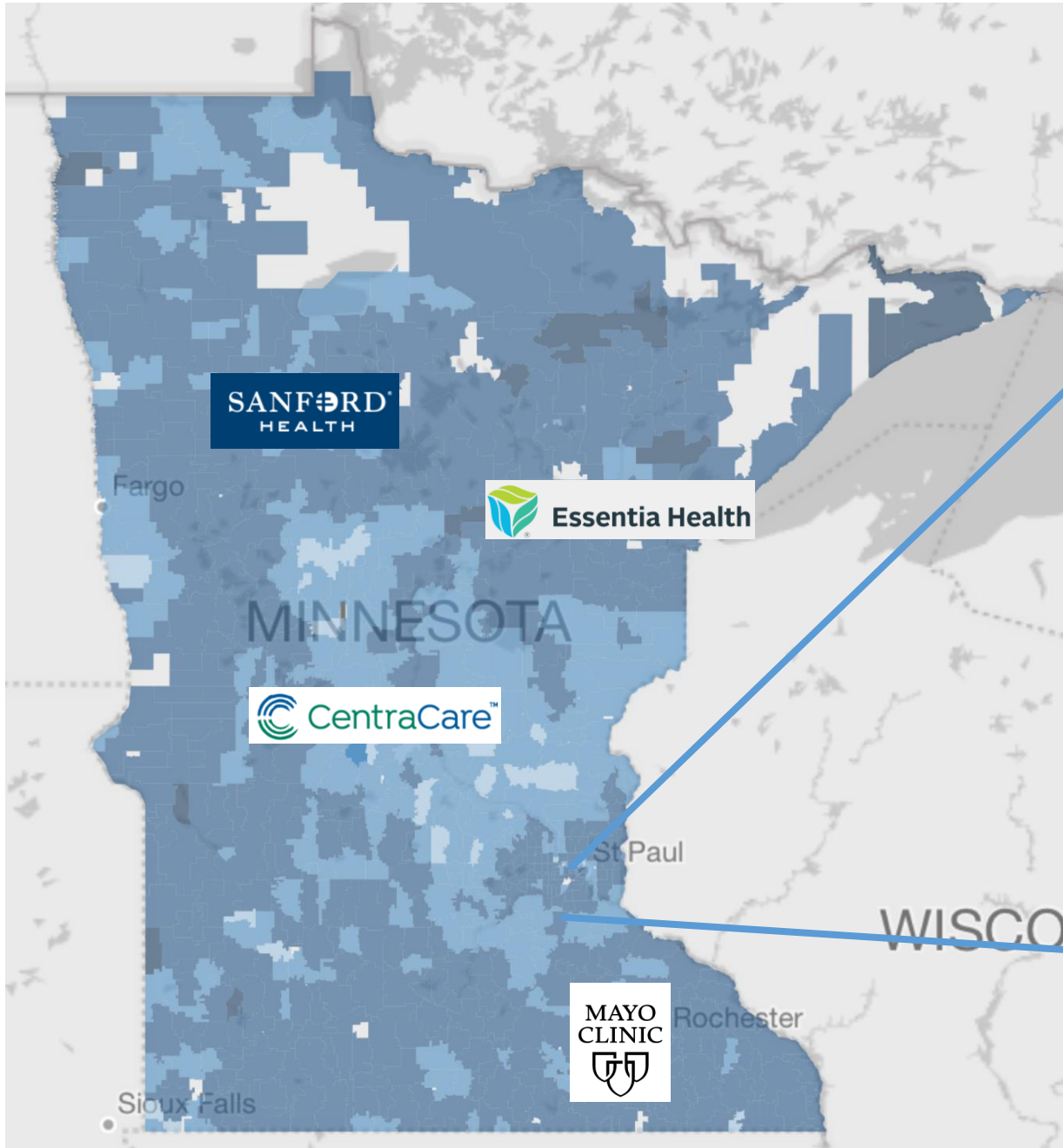
Agenda

- Minnesota EHR Consortium Overview
- Data Infrastructure and Methods
- Demo

What is the MN EHR Consortium?

- Our mission is to improve health by informing policy and practice through data-driven collaboration among members of Minnesota's health care community.
- Our vision is to be the leading research network collaborating across Minnesota to equitably improve health outcomes.
- Monitor population level health metrics and analyze changes over time using aggregations of data to inform public health policy

Participating Sites (COVID-19 Vaccine Project)



Key Principles of the Consortium

- Prioritize privacy through a distributed data model
- Voluntary Collaboration
- Good governance through our Steering Committee
- Adaptable and nimble

MN EHR Consortium COVID-19 Vaccine Project

- A collaboration to inform the equitable distribution of COVID-19 vaccines
- The Consortium has access to more granular information and capabilities to merge novel data sources
- Deidentified, summary information together to report vaccine administration by race/ethnicity, language, comorbidity status, and other factors

	MN EHR Consortium	MN Dept of Health
Race, ethnicity, and language data	✓	⊘ ✓
Comorbidity data	✓	⊘
Combined COVID-19 vaccine/testing data	✓	⊘
Ability to merge novel datasets (housing, incarceration)	✓	⊘
Analytic capabilities to analyze at ZIP level	✓	✓
Weekly dosage reporting on a statewide level	✓	✓

Consortium Data Sources

- Primarily relies on EHR data
- Census data
 - Denominators
 - Socioeconomic data – income, rurality
- Minnesota Immunization Information Connection (MIIC)
 - Vaccine data
- Future population data
 - Social vulnerability index (SVI)
 - State homeless shelter, incarceration data
 - State mortality data

Health System – “Intermediate File”

- Year, week, patient level data
- Includes all patients with:
 - a) COVID test (+ or –), b) symptom, OR c) vaccine

study_id	year	week	covid_tests_pcr	covid_tests_pcr_pos	dose	mvx	fever_icd	age	race	dm
123	2020	44	1	1			1	45	white	1
123	2021	5	0	0	1	MOD	0	45	white	1
4567	2020	34	1	0			1	65	black	0
4567	2020	35	1	1			1	65	black	0
67899	2021	6	0	0	1	PFZ	0	74	hispanic	0
67899	2021	9	0	0	2	PFZ	0	74	hispanic	0

Common Data Model (“Intermediate File”)

PCR COVID-19 Tests	covid_tests_pcr_symp
	covid_tests_pcr_asymp
	covid_tests_pcr
	covid_tests_pcr_pos
	covid_tests_pcr_symp_pos
	covid_tests_pcr_asymp_pos
Flu Tests	flu_tests
	flu_tests_pos
Vaccine Info	dose
	mvx
	org
Viral Symptoms	ili_icd
	pna_icd
	pna_spec_icd
	covid_icd
	corona_icd
	covid_ni_icd
	covid_exp_icd
	cough_icd
	resp_fail_icd
	sob_icd
	fever_icd
	throat_icd
	myalgia_icd
	headache_icd
	diarrhea_icd
	smell_icd
fatigue_icd	

Demographics	age
	white
	black
	native
	asian_pi
	multiracial
	other_unknown_missing
	hispanic
	female
	male
	interpreter_y
	lang_spanish
	lang_somali
	lang_english
lang_other	
Comorbidities	zip
	census_track
	death_year
	smoker_y
	smoker_n
	smoker_m
	bmi
	asthma
	copd
	hiv
	cancer
	heart_disease
	diabetes
	hypertension
ckd	
opioid	
amphetamine	
cocaine	
alcohol	

Deduplication

- Patients can be seen at multiple health systems
- Number of patients from all health systems:
 - 22,615,977
- Unique patients at health systems after deduplication:
 - 10,839,255
- Health systems are assigned to report on a patient based on:
 - Number of BPs in the last 12 months
 - Number of BPs in the last 36 months
 - Year of last diagnosis
 - Vaccine receipt, death year, random selection

Minnesota Immunization Information Connection (MIIC)

- <https://www.health.state.mn.us/miic>
 - “The Minnesota Immunization Information Connection (MIIC) is a confidential system that stores electronic immunization records. MIIC makes keeping track of vaccinations easier and helps ensure Minnesotans get the right vaccines at the right time.”
- Nearly all COVID vaccinations in MN recorded at MIIC
 - Exception – Veterans Affairs
- MN privacy laws previously limited reporting by race

Minnesota Immunization Information Connection

f_name	l_name	dob	sex	race	phone
Bill	Clinton	8/19/1946	M	White	501-683-5228
Good	Match	5/21/1975	M	Black	612-624-5555
Joan	Smith	8/20/1965			612 781-5544

f_l_dob_sex	f_l_dob_race	f_l_dob	f_phone
billclinton08191946m	billclinton08191946w	billclinton08191946	bill5016835228
goodmatch05211975m	goodmatch05211975b	goodmatch05211975	good5126245555
joansmith08201965	joansmith08201965	Joansmith08201965	joan6127815544

hash function

Hashes simplified for display purposes

hash1	hash2	hash3	hash4
a8d9	a9f9	a0n7	a4z5
g3k8	g9u4	g1x8	b3e9
j3r8	j2w4	j9s3	j4x8

Health System

mrn	f_name	l_name	dob	sex	race	phone
00042	William	Clinton	8/19/1946	M	White	501-683-5228
00345	Good	Match	5/21/1975	M	Black	612-624-5555
00256	Joan	Smit	8/20/1956			612 781-5544
01454	Anti	Vac	12/1/1985	M	White	651-766-9876

mrn	f_l_dob_sex	f_l_dob_race	f_l_dob	f_phone
00042	williamclinton08191946m	williamclinton08191946w	williamclinton08191946	william5016835228
00345	goodmatch05211975m	goodmatch05211975b	goodmatch05211975	good5126245555
00256	joansmit08201965	joansmit08201965	joansmit08201965	joan6127815544
01454	antivac12011985m	antivac12011985w	antivac12011985	anti6517669876

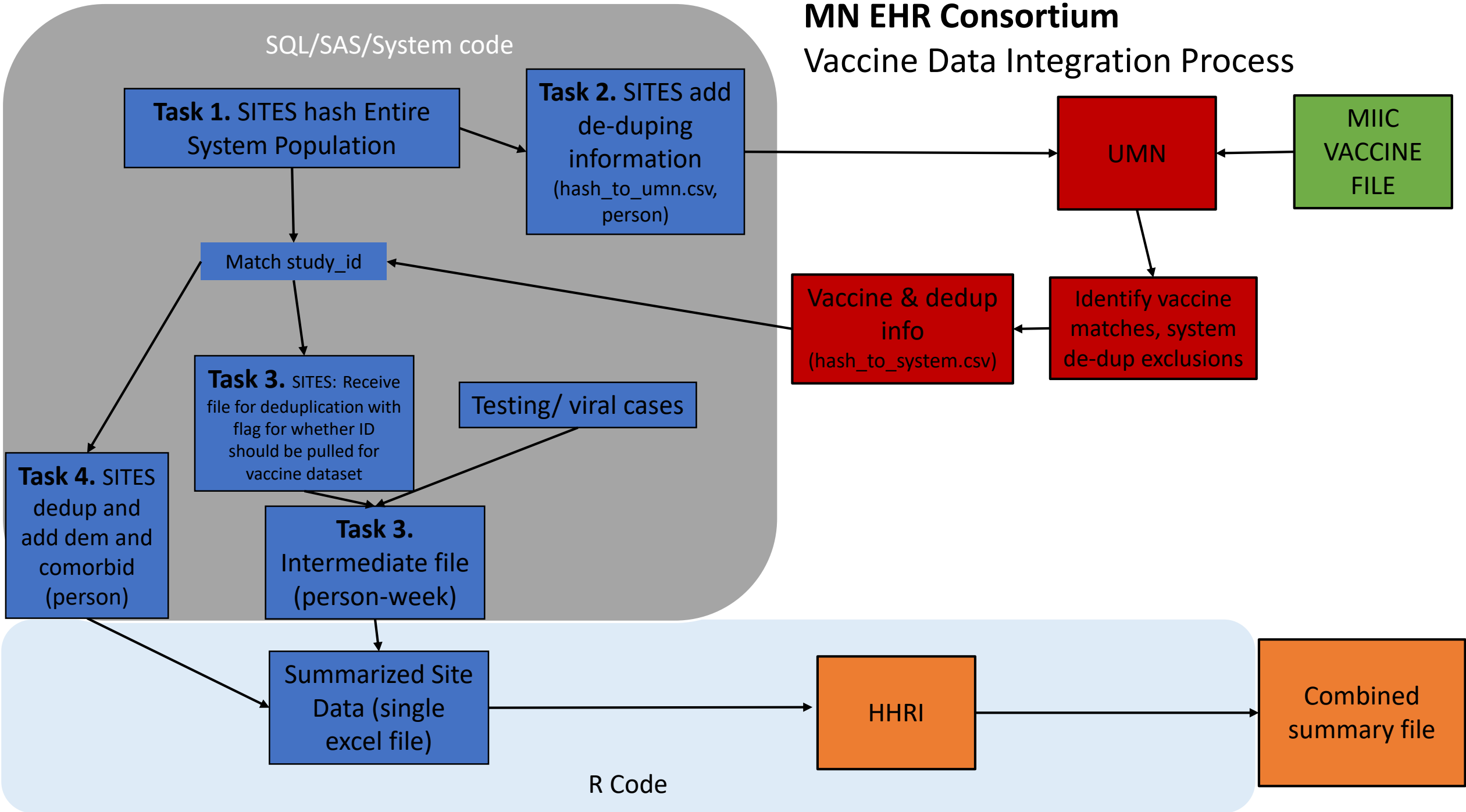
hash function

mrn	hash1	hash2	hash3	hash4
00042	x9b6	x6q3	x6i3	x2r5
00345	g3k8	g9u4	g1x8	b3e9
00256	x5f4	x9g2	x2k4	j4x8
01454	v8c3	v3g5	v2p9	v4n5

00345 – Consortium includes Mr. Match in summary reports as having received vaccine
00345 and 00256 – Site *can* send MRNs to health system for push to MIIC to confirm

MN EHR Consortium

Vaccine Data Integration Process



Consortium COVID-19 Vaccine Dashboard

- **Who is in the dashboard?** Minnesotans who have received a COVID-19 vaccine (any source) and had a visit at a Consortium site in the last 10 years (~90+% of state population)
- **How are the data merged?** MIIC data are matched for each site using a hashing algorithm. This process also allows for deduplication across sites.
- Dashboard is updated weekly on Fridays and provides data at the ZIP level by age categories and race/ethnicity.

DEMO

Minnesota EHR Consortium: COVID-19 Project, Vaccines

Category

- Total
- Race/Ethnicity
- Gender
- Language
- Interpreter
- Income
- Urban/Rural

Attribute

- Select all
- American Indian
- Asian
- Black
- Hispanic
- Multirace
- White

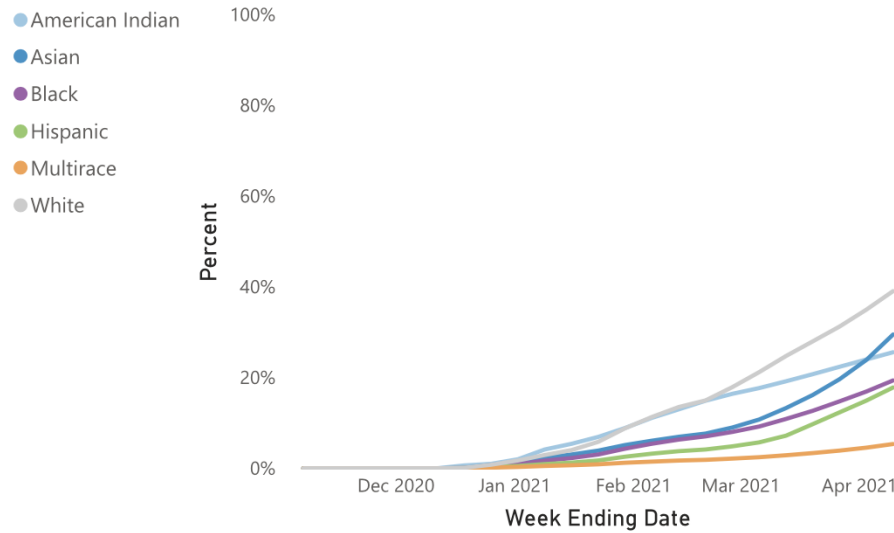
Reset page

At least one vaccine dose | Completed vaccine series | Cumulative | Weekly | **Percent** | Disparities

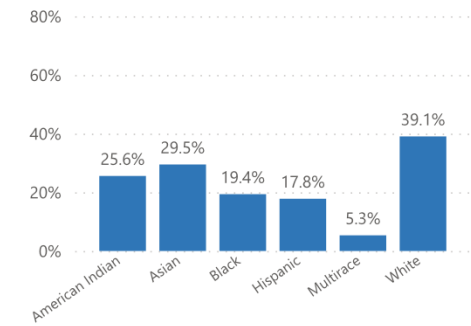
Total | Total, adj.* | Ages 75+ | Ages 65-74 | Ages 45-64 | Ages 25-44 | Ages 15-24

Hold CTRL while selecting to group multiple age categories together. About 7% of race/ethnicity values are missing.
 *Adjusted so results are age-neutral. All denominators are for the entire population, including those under age 15.
 Due to differences in tabulation between health systems and the U.S. Census Bureau, multirace is likely underreported
 For disparities, values greater than 0 = over-represented, values less than 0 = under-represented compared to MN population

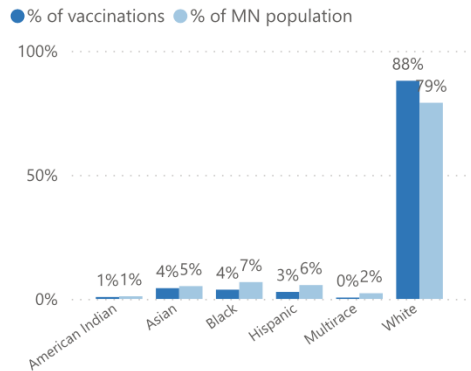
Percent Vaccinated, by Week



Percent MN population vaccinated to date



Vaccinated population vs MN population



Acknowledgements

Hennepin

Tyler Winkelman

Peter Bodurtha

Jessica Jeruzal

HealthPartners

Karen Margolis

Malini DeSilva

Terese Defor

Allina

Vino Raj

Steven Bradley

Narayana Mazumder

Sanford

Roxana Lupu

Jeff Rotar

North Memorial

Meetul Shah

Cameron Berg

Dylan Mortenson

M Health Fairview

Paul Drawz

Adams Dudley

Bryan Jarabek

Mayo

Alanna Chamberlain

Yue Yu

Essentia

Stephen Waring

Benjamin Venable

CentraCare

Lynn McFarling

David Lance

Tom Lenarz

Childrens

Anupam Kharbanda

Ernie Krause

ICSI

Claire Neely

MNCM

Julie Sonier

UMN

Steve Johnson

Andrea Chinchilla

VA

Steven Fu

Anjan Chakraborty

MDH

Stefan Gildemeister

Pam Mink

Karen Soderberg

Stephanie Yendell

Miriam Muscoplat

Aaron Bieringer

Many others!