COVID-19 Impact on Trauma and Socioeconomic Status in MI

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Spectrum Health & St. Mary Mercy Livonia

Impact of COVID-19 on Trauma Patients and their Socioeconomic Status in Michigan

ST. MARY MERCY LIVONIA
SAINT JOSEPH MERCY HEALTH SYSTEM

Spectrum Health

Trauma Research Institute

UNIVERSITY OF MICHIGAN MEDICAL SCHOOL
MICHIGAN MEDICINE

Ms. Laura Krech, MPH
May 18, 2022
MTOIR Traverse City

Spectrum Health

Study Personnel

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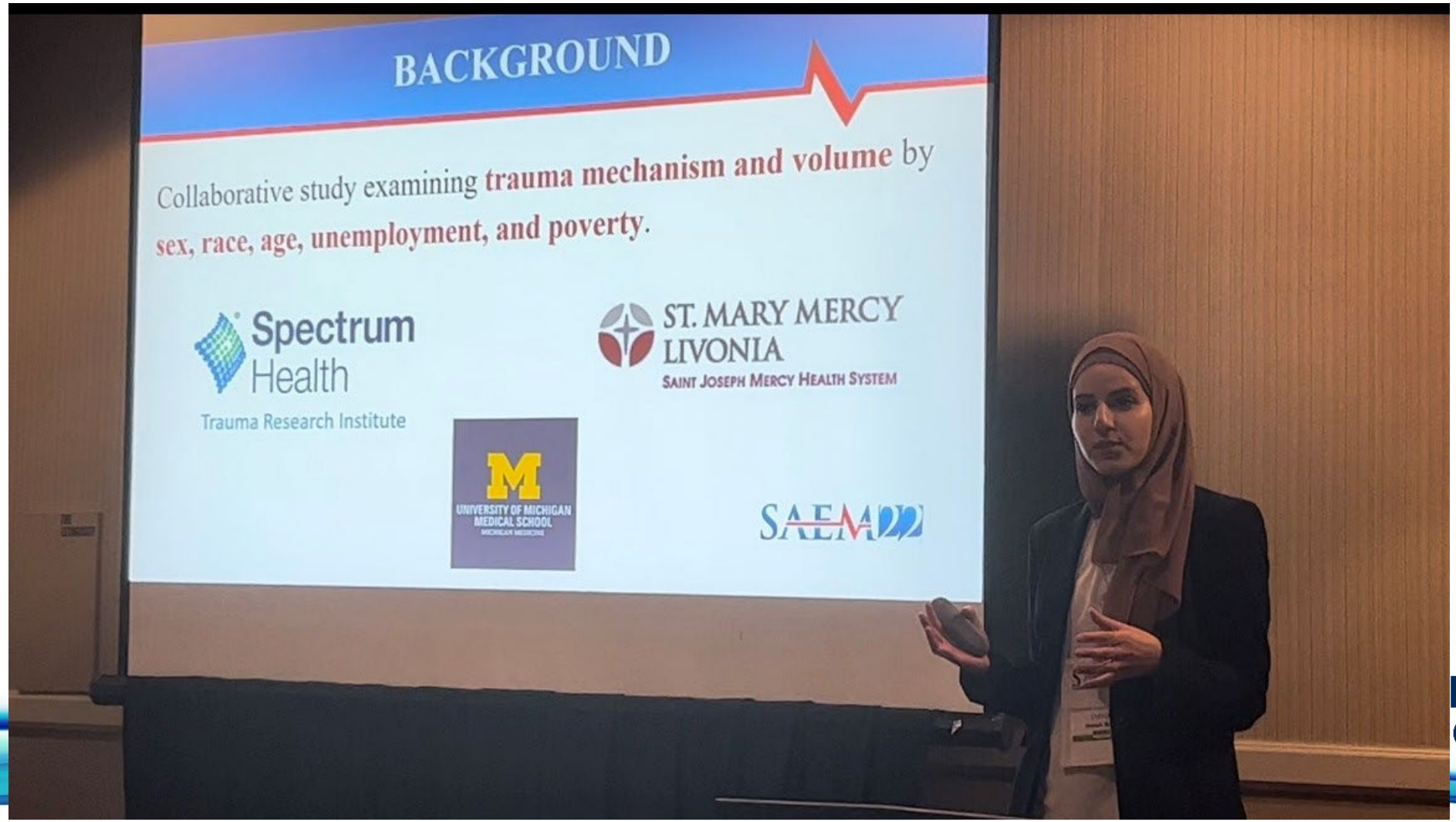
Podium Presentation at the Society for Academic and Emergency Medicine (SAEM)
May 13th in New Orleans

Ms. Hebah Reda, first year UofM medical student



No Disclosures

All authors have nothing to disclose

BACKGROUND

Collaborative study examining **trauma mechanism and volume** by **sex, race, age, unemployment, and poverty**

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SAINT JOSEPH MERCY HEALTH SYSTEM

METHODS

MTQIP Database Query

Pre-pandemic

March 1, 2018 – June 30, 2019

During Pandemic

March 1, 2020-June 30, 2021

Merged with other databases:

***American Community Survey* and**

MI Unemployment database

AMERICAN COMMUNITY SURVEY
U.S. CENSUS BUREAU

+

M·TQIP

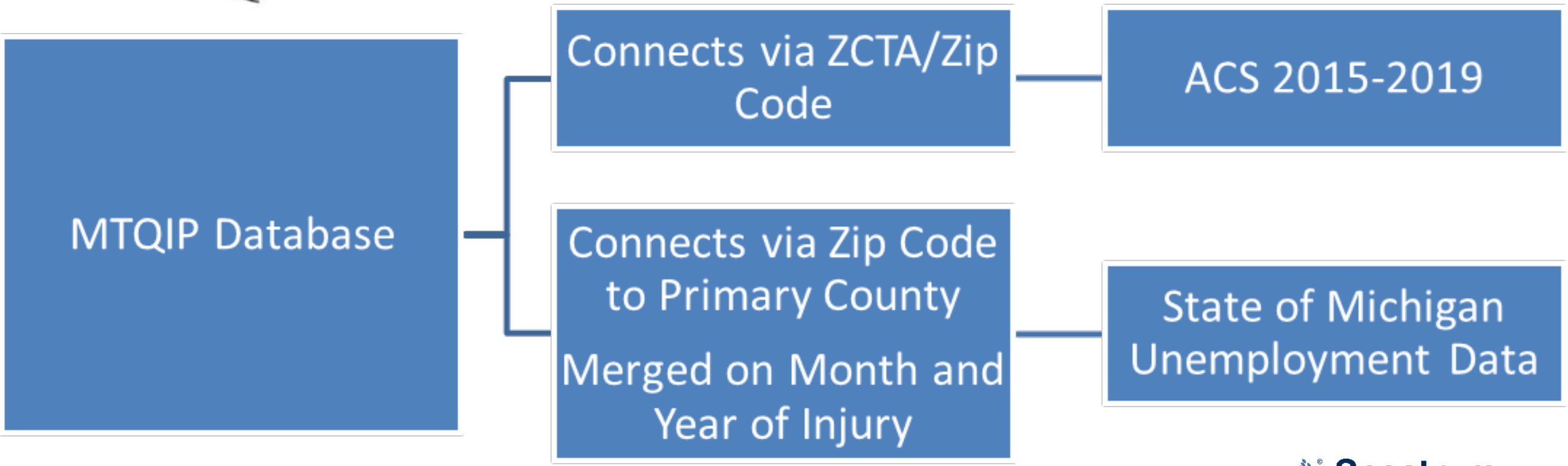
+

MICHIGAN DEPARTMENT OF LABOR & ECONOMIC OPPORTUNITY

METHODS

M·TQIP

AMERICAN COMMUNITY SURVEY
U.S. CENSUS BUREAU



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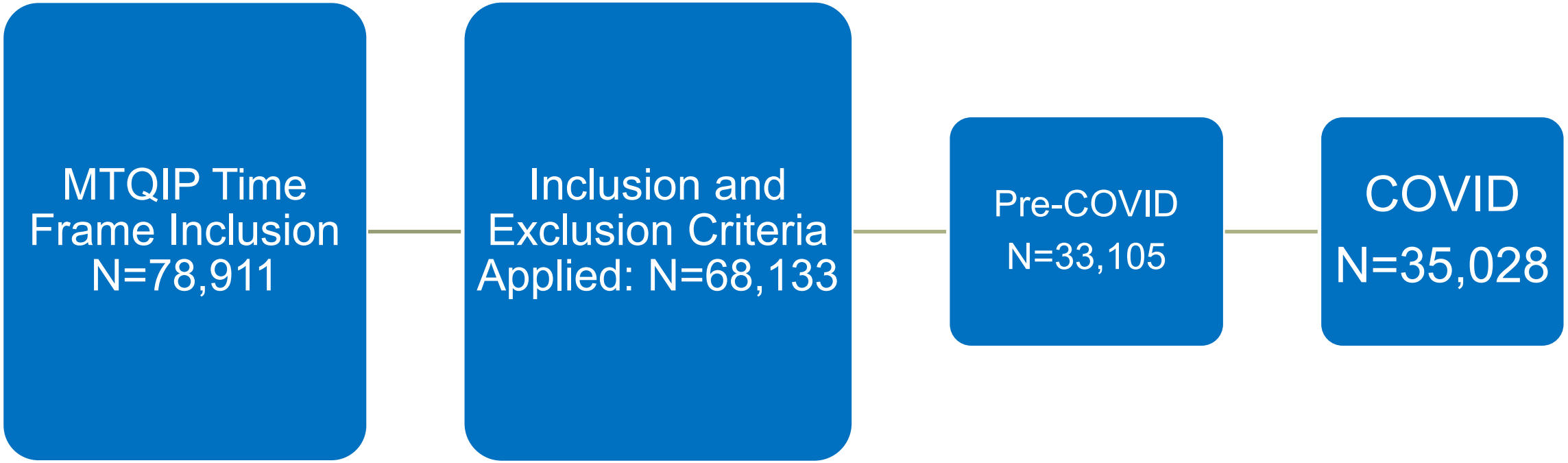
METHODS



- Normally distributed numeric data: two sample independent T test
- Non-normally distributed data: Wilcoxon Rank Sum
- Categorical data: count (percent) Chi-Square or Fisher's Exact

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Demographic Results

Variable	Pre COVID (N=33,105)	COVID (N=35,027)	p-value
Age	64.9 ± 22.4	62.8 ± 23.1	<0.0001
Gender (Male)	16,684 (50.4)	18,316 (52.3)	<0.0001
Race			
Black/African Amr	4,330 (13.1)	3,626 (10.3)	<0.0001
Other Race	1,305 (3.9)	1,436 (4.1)	
White	27,470 (83.0)	29,965 (85.6)	
Ethnicity			
Hispanic or Latino	602 (1.8)	784 (2.2)	0.0001
ISS	9 [6, 11]	9 [8, 13]	<0.0001

Socioeconomic Status Indicators

Variable	Pre COVID N=33,062	COVID N=34,997	p-value
Median Household Income	59,500 ± 22,217	58,403 ± 22,126	<0.0001
Unemployment Rate	4.3 ± 1.2	9.2 ± 6.0	<0.0001
Poverty Proportion	N=33,078 0.11 ± 0.09	N=35,008 0.12 ± 0.10	<0.0001
Insurance Group	N=32,207	N=33,566	
Private	4,961 (15.4)	5,593 (16.7)	<0.0001
Medicaid	3,542 (11.0)	4,483 (13.4)	
Medicare	18,550 (57.6)	18,378 (54.8)	
No Fault Auto	3,892 (12.1)	3,984 (11.9)	
Self Pay	1,262 (3.9)	1,128 (3.4)	

Injury Characteristics and GCS

Variable	Pre COVID-19 (N=33,105)	COVID-19 (N=35,027)	p-value
Blunt	31,598 (95.4)	32,809 (93.7)	
Penetrating	1,507 (4.6)	2,218 (6.3)	<0.0001
Mechanism of Injury			
Assault	2,222 (6.7)	2,791 (8.0)	<0.0001
GSW	143 (0.4)	183 (0.5)	
Fall	21,376 (64.6)	21,170 (60.4)	
MVC	5,878 (17.8)	7,091 (20.2)	
OVT + Ped/Cycle	2,363 (7.1)	2,702 (7.7)	
Other	1,123 (3.4)	1,090 (3.1)	
GCS in ED	N=30,030	N=32,557	
13-15	27,923 (93.0)	30,003 (92.2)	0.0003
9-12	654 (2.2)	825 (2.5)	
3-8	1,453 (4.8)	1,729 (5.3)	

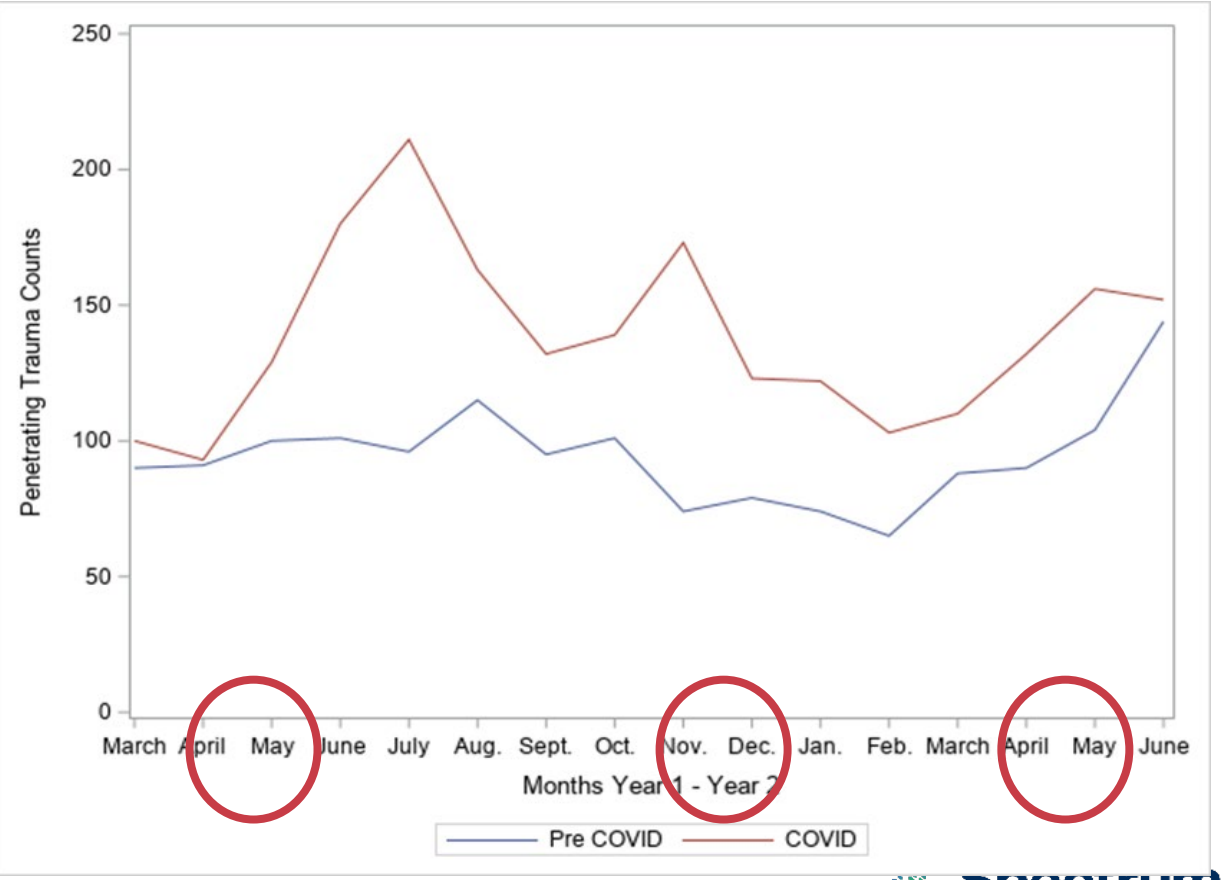
Selected Comorbidities

Variable	Pre COVID (N=33,105)	COVID (N=35,027)	p-value
Hypertension	16,382 (49.5)	16,475 (47.0)	<0.0001
COPD	3,347 (10.1)	3,421 (9.8)	0.1341
CHF	2,719 (8.2)	3,347 (9.6)	<0.0001
Mental/Personality Disorder	7,643 (23.1)	9,529 (27.2)	<0.0001
Substance Use Disorder	6,471 (19.6)	9,413 (26.9)	<0.0001
Diabetes Mellitus	5,574 (16.8)	5,452 (15.6)	<0.0001

Results: Red Line During COVID-19 (Top)
Blue Line Pre-Pandemic (Bottom)

Motor Vehicle Collision

Penetrating Trauma



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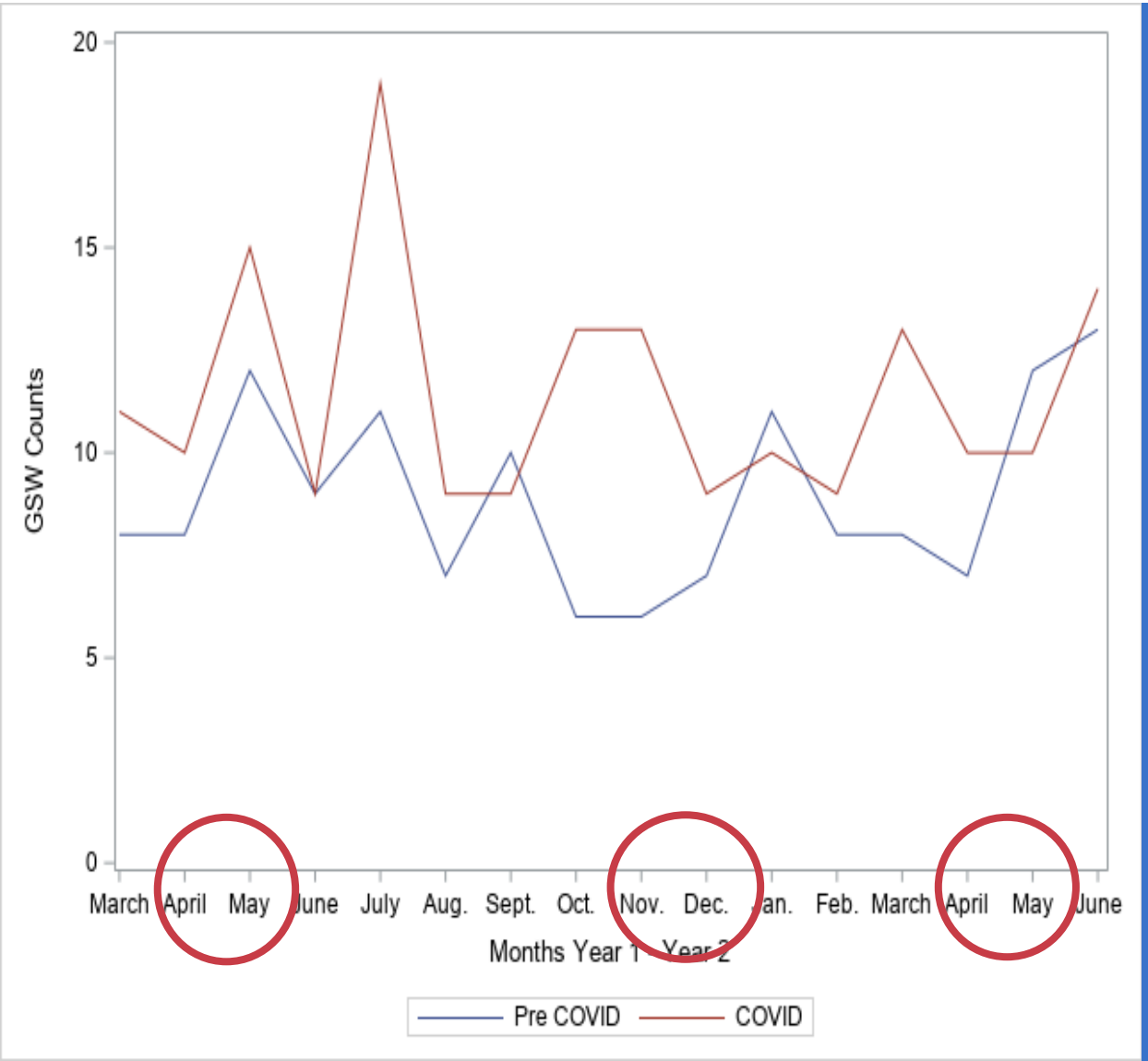
Penetrating Trauma: Intentional Assault and GSW

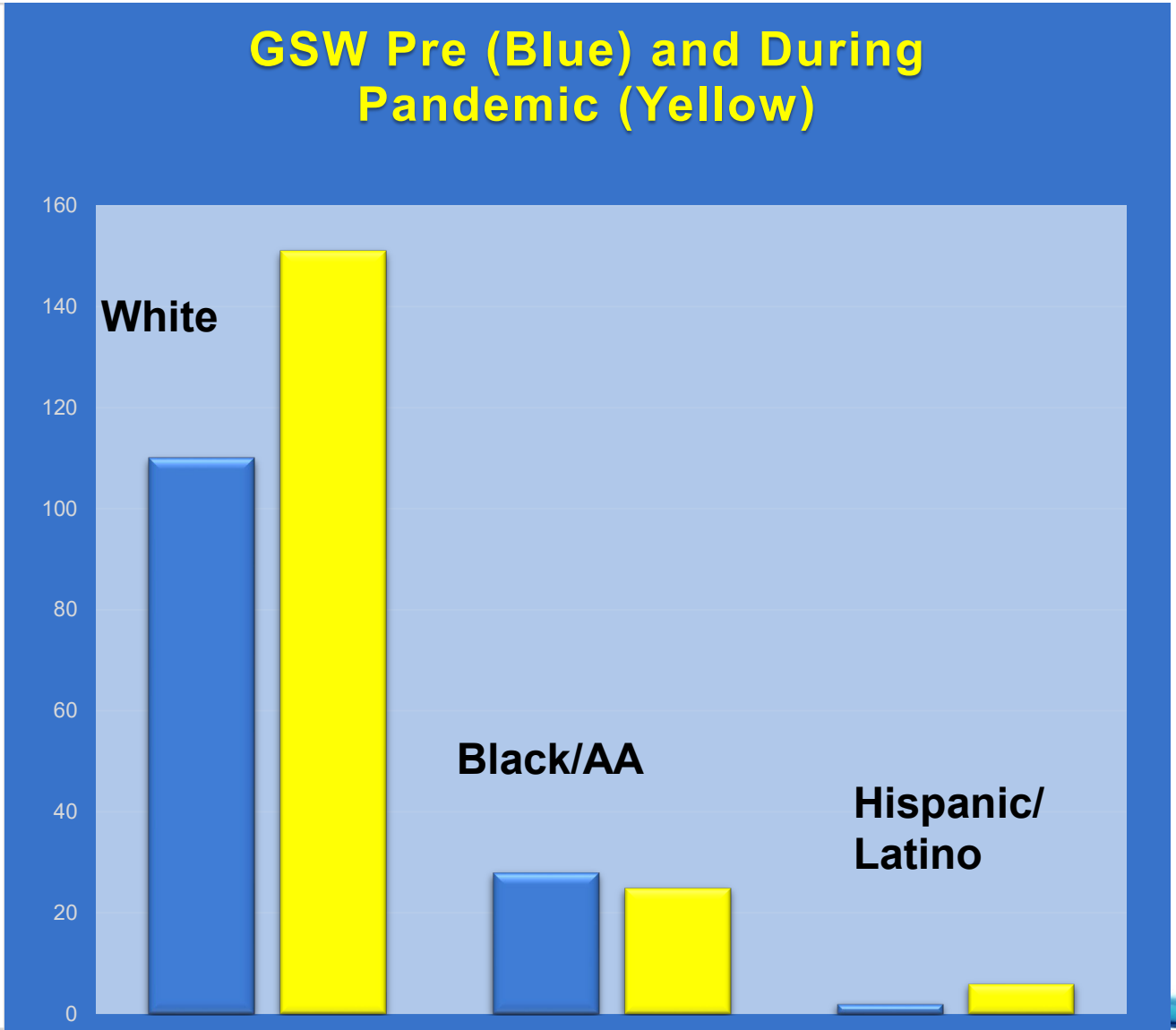
Variable	Pre COVID-19 (N=1,217)	COVID-19 (N=1,878)	p-value
Age	33.1 ± 13.6	33.1 ± 13.0	0.9399
Race			
Black	734 (60.3)	770 (41.0)	<0.0001
Other Race	51 (4.2)	86 (4.6)	
White	432 (35.5)	1,022 (54.4)	
Median Income	N=1,215 42,635 ± 18,515	N=1,877 40,404 ± 15,581	0.0005
Unemployment Rate	4.6 ± 0.9	10.6 ± 6.5	<0.0001
Poverty Proportion	N=1,216 0.21 ± 0.11	N=1,877 0.23 ± 0.11	0.0095

Gun Shot Wounds Increased and Followed Peaks

Red Line During COVID-19 (Top)

Blue Line Pre-Pandemic (Bottom)





Intentional Assault by Race: Blunt and Penetrating

Decrease -9.1% Assaults

Increase 68.4% Assaults

Black Trauma Patients

Patient Descriptors	Pre COVID-19 (N=1178)	COVID-19 (N=1067)
Age	35.4 ± 13.5	34.9 ± 13.8
Sex (male)	980 (83.2)	892 (83.6)
Medicaid	424 (38.2)	433 (41.5)
Substance Use Disorder	668 (56.7)	653 (61.2)
Mental Health Disorder	149 (12.7)	136 (12.8)

White Trauma Patients

Patient Descriptors	Pre COVID-19 (N=937)	COVID-19 (N=1578)
Age	40.0 ± 15.4	37.2 ± 14.3
Sex (male)	753 (80.4)	1253 (79.4)
Medicaid	391 (46.0)	636 (43.6)
Substance Use Disorder	516 (55.1)	982 (62.2)
Mental Health Disorder	238 (25.4)	364 (23.1)

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MVC by Race

16% Increase MVC
Black Trauma Patients

Patient Descriptors	Pre COVID-19 (N=1021)	COVID-19 (N=1190)
Age	38.1 ± 16.6	35.9 ± 15.1
Sex (male)	625 (61.2)	758 (63.7)
Substance Use Disorder	478 (46.8)	586 (49.2)
Mental Health Disorder	98 (9.6)	138 (11.6)
Medicaid	168 (17.2)	275 (23.5)

22.4% increase MVC
White Trauma Patients

Patient Descriptors	Pre COVID-19 (N=4514)	COVID-19 (N=5524)
Age	48.6 ± 21.0	45.5 ± 20.0
Sex (male)	2608 (57.8)	3484 (63.1)
Substance Use Disorder	1174 (26.0)	2307 (41.8)
Mental Health Disorder	875 (19.4)	1295 (23.4)
Medicaid	308 (7.0)	605 (11.6)

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Surging Traffic Deaths After Decades of Safety Gains Due to Pandemic

"This grim trend is another way that two years of isolation and disruption have damaged life...." Vehicle Crashes, Surging - The New York Times (nytimes.com) February 2022 [National Highway Traffic Safety Association, NHTSA]

"The pandemic has made US drivers more reckless-more likely to speed, drink or use drugs and leave their seatbelts unbuckled". Why car crash deaths have surged during COVID-19 pandemic - Los Angeles Times (latimes.com) December 2021 [National Safety Council, Johns Hopkins SPH, Governors Highway Safety Association]

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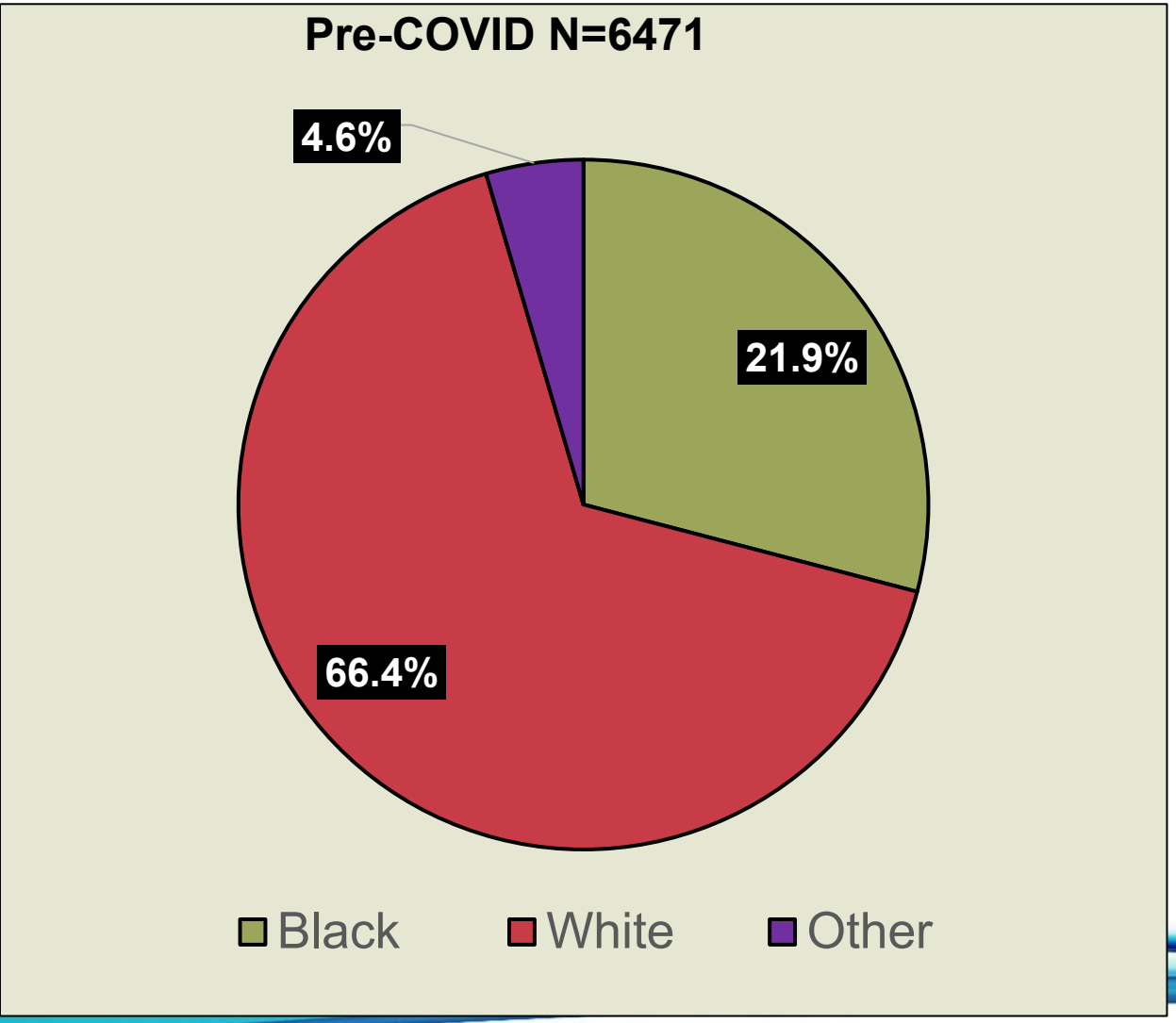
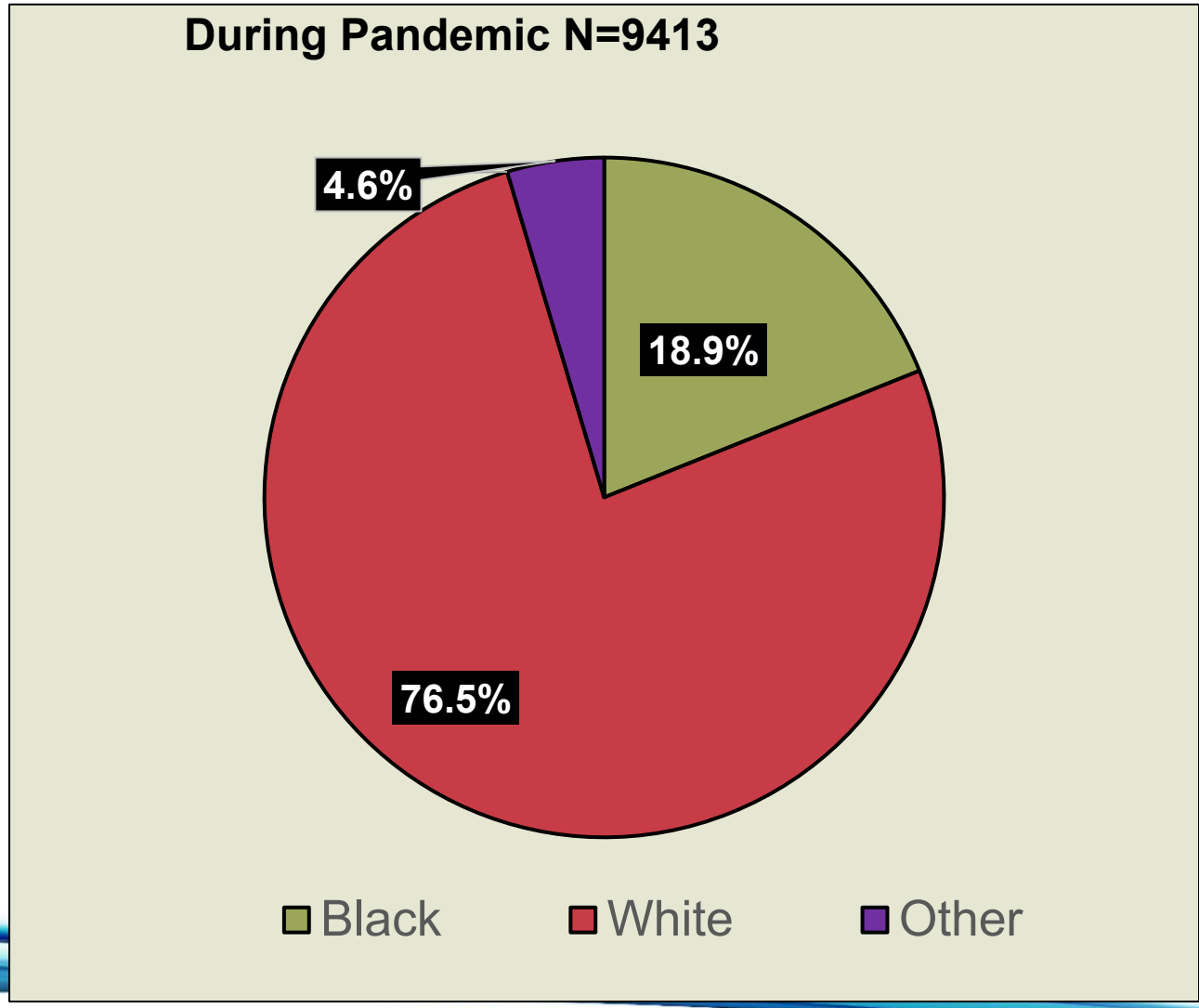
Substance Use Disorder by Race Pre and During COVID-19

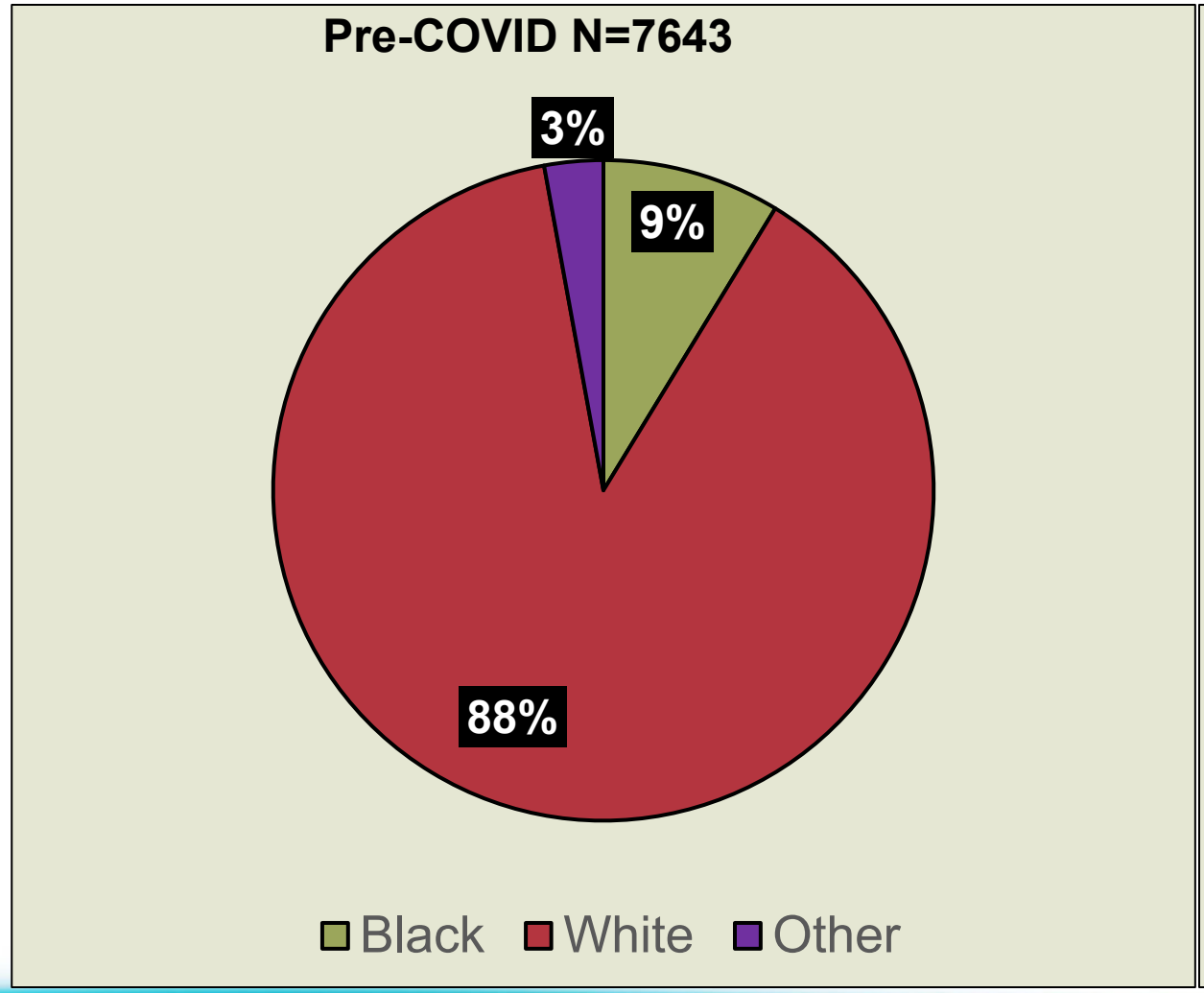
Overall: over 70% Male and median age 45

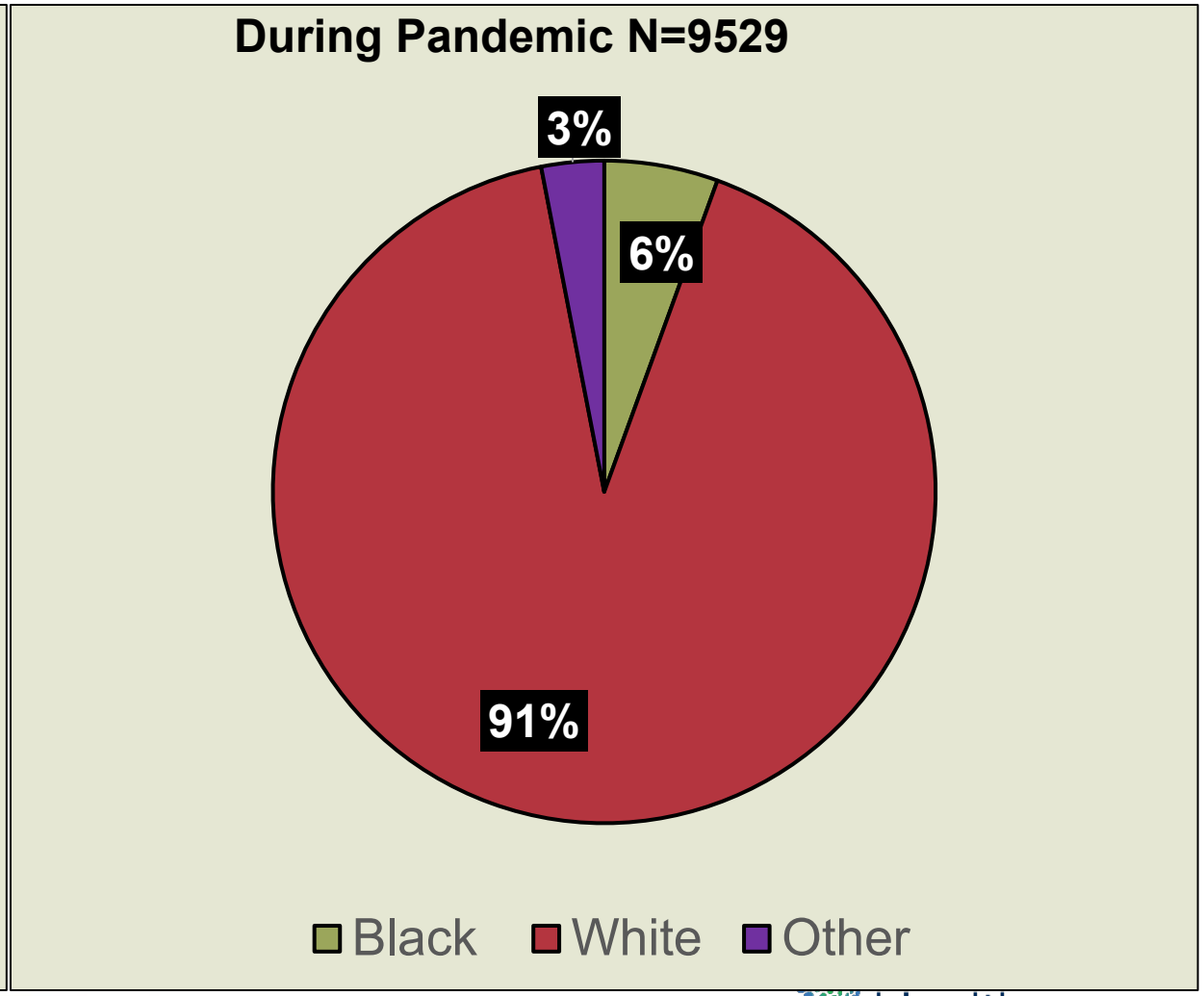




Mental Health Disorder by Race Pre and During COVID-19

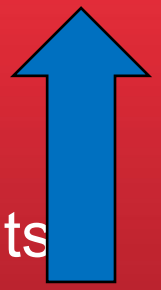
Overall: 40% Male and median age 65





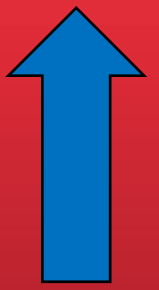
Summary: Comparing Pre COVID-19 and During Pandemic for all Trauma Patients

*Younger
*male %
*Medicaid recipients



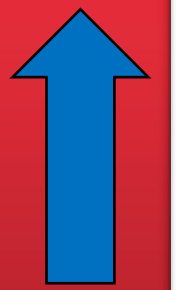
Black patients

White patients

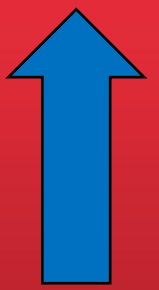


*Household income
*Poverty

Unemployment rate



*MVCs
*Penetrating trauma
*Intentional assaults



Summary: Comparing Pre COVID-19 and During Pandemic for all Trauma Patients

- Increased MVCs: 22.4% increase white trauma patients and 16.6% increase in Black trauma patients
- Literature and News: aggressive driving, social isolation, increased alcohol, substance use, and mental health disorders
- White trauma cohort: increase in assaults, penetrating trauma, GSW, substance abuse, and mental health disorders
- Black trauma cohort: decrease in assaults, penetrating trauma GSW, substance use, and mental health disorders

Black Trauma Cohort: Role of Social Engagement and Emotional Support

People of Color have a "Strong resilience and protective factors likely play a role in safeguarding the mental health of communities of color despite the numerous barriers they face." CHI_Resilience and Protective Factors Online_Final_1.pdf (coloradohealthinstitute.org) (2021)

"Black participants showed significantly greater posttraumatic growth (during COVID-19) compared to white participants. Additionally, the coping strategies of religion and positive reframing were found to be significantly associated with posttraumatic growth." EClinicalMedicine 45 (2022): 101343.

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Limitations

- Need trauma studies for Latinos, Asian, and other races/ethnicities
- Intentional Assault includes Self-Harm
- American Community Survey and MI Unemployment databases Zip Code level, not individual level for SES data
- Did not compare urban versus rural trauma volume and mechanism

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Questions?

Please contact me for any further information:

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Thank you MTQIP Leadership for allowing me to present our collaborative study to the group!