





Identifying Disparities through Establishing Discrete Occupational Injury Surveillance

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Introduction

- Minnesota
 - Biosciences
 - Banking and finance
 - Agriculture
 - Healthcare
 - Clean and renewable energy
 - Data centers
- Underrepresented populations
 - Largest number of refugee per capita within the U.S.
 - Foreign: 7% of MN population
 - Native-born Hmong, Hispanic and East Africans
- Populations of minority groups continue to grow
 - Asian and Black population tripled since 1990
 - Hispanic population quadrupled since 1990

Introduction (cont'd)

• Occupational Health Disparities

- Inevitable
- Lower-paying jobs more hazardous, require less education
- More likely to pursue precarious work
- More likely to have suboptimal work/safety conditions
- Increasing immigrant populations language, temporary
- Occupational injuries more likely in some populations
- Occupational Safety and Health Administration (OSHA)
 - No mandate to collect demographic data for workers

• Electronic health records (EHR)

- Have limited information
- Prone to inaccuracy
- Race: White, Black, Asian, Hispanic, Native, Other...?

Steege AL, Baron SL, Marsh SM, Menéndez CC, Myers JR. Examining occupational health and safety disparities using national data: a cause for continuing concern. Am J Ind Med. 2014 May;57(5):527-38. doi: 10.1002/ajim.22297.

Moyce SC, Schenker M. Occupational Exposures and Health Outcomes Among Immigrants in the USA. *Curr Environ Health Rep.* 2017 Sep;4(3):349-354. doi: 10.1007/s40572-017-0152-1.

H H

OSHA's General Duty Clause

The <u>General Duty Clause</u> from the OSHA Act of 1970 requires that, in addition to compliance with hazard-specific standards, all employers provide a work environment "free from recognized hazards that are causing or are likely to cause death or serious physical harm." Workplace violence is a recognized hazard within the healthcare industry and as such, employers have the responsibility via the Act to abate the hazard. The Occupational Safety and Health Administration (OSHA) relies on the General Duty Clause for enforcement authority.





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"A number of occupational injury researchers have called for

the addition of occupation, industry,

and other work-related information

to hospital databases used for surveillance activities"

Sears JM, Bowman SM, Hogg-Johnson S. Disparities in occupational injury hospitalization rates in five states (2003-2009). Am J Ind Med. 2015 May;58(5):528-40. doi: 10.1002/ajim.22427.

"If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle."

- Sun Tzu

Know your target!

Initial Work (2018)

- Scott Riester (Mayo OEM)
- Two years of HealthPartners OEM encounters
 - ~10,000 encounters
 - Looked at injury rates and hazard models by race/ethnicity
- Hispanic workers with $\mathbf{3x} \uparrow$ rates of **low back injury**

• Limitations

- What does "Hispanic" really mean?
 - Common geography?
 - Common language?
- What jobs did these workers do??
 - We collect employer name and job title
 - Only free-text data



Riester SM, Leniek KL, Niece AD, Montoya-Barthelemy A, Wilson W, Sellman J, Anderson PJ, Bannister EL, Bovard RS, Kilbride KA, Koos KM, Kim H, McKinney ZJ, Abrar FA. Occupational medicine clinical practice data reveal increased injury rates among Hispanic workers. Am J Ind Med. 2019 Apr;62(4):309-316. doi: 10.1002/ajim.22949.

Healthcare-Related Injuries

- Most workplace injuries in the healthcare setting are preventable
 - Little research for injury rates among healthcare workers of different racial and ethnical background
 - Existing data shows disparities, especially in Black workers
 - (OR 1.22 2.27)
- Studies most of the time focus on the type of injury
 - Clinically, we treat the condition
 - Lack detailed demographics
 - Underrepresented individuals are more likely to get injured within the healthcare and social assistance industry

Sabbath EL, Boden LI, Williams JA, Hashimoto D, Hopcia K, Sorensen G. Obscured by administrative data? Racial disparities in occupational injury. *Scand J Work Environ Health*. 2017 Mar 1;43(2):155-162. doi: 10.5271/sjweh.3611.

Occupational. Health Disparities Research Initiative (OHDRI)

Our research:

 Larger disparities research related to occupational injuries

- Data from 4 HealthPartners Clinic sites:

- St. Louis Park, Downtown Minneapolis, Downtown St. Paul and Stillwater

- Identify health disparities within the Twin Cities and/or Minnesota workforce

 Endpoint: Determine population-specific interventions when disparities identified

Objective

1) Determine whether observed increased injury rates for Black healthcare workers truly represented an occupational health disparity

2) Compare and identify key predisposing injury risk factors, occupational exposures, and injury characteristics of Black and non-Black workers in the healthcare and social assistance industry



HealthPartners HDRI Pilot Data Collection

- Cross-sectional, observational study
- Data collected from HealthPartners occupational medicine clinic locations
- New patient injuries
- Twin Cities Metropolitan area (Minnesota)
- May, 2019 to March, 2020

Current (Sept., 2023) HealthPartners OEM Clinics:

- 1. HealthPartners St. Louis Park, MN
- 2. HealthPartners St. Paul, MN
- 3. HealthPartners Stillwater, MN
- 4. Park Nicollet Minneapolis, MN

Montoya-Barthelemy AG, Leniek K, Bannister E, Rushing M, Abrar FA, Baumann TE, Manly M, Wilhelm J, Niece A, Riester S, Kim H, Sellman J, Desai J, Anderson PJ, Bovard RS, Pronk NP, McKinney ZJ. Using advanced racial and ethnic identity demographics to improve surveillance of work-related conditions in an occupational clinic setting. *Am J Ind Med*. 2022 Mar 2. doi: 10.1002/ajim.23332.

Methods

- New work injury appointments
 - Paper-based demographic form
 - Completely voluntary
- Data entry
 - Clinical encounters extracted from EHR and imported into REDCap
 - Manual data entry of detailed demographics from new form
 - e.g., marital status, highest level of education, race, ethnicity, location of birth, and languages spoken at home
 - Manual coding of industry, occupation, and injury characteristics

Methods (cont.)

• Race/Ethnicity

- Not mutually-exclusive (historically EHR **only** allowed one selection)
- An individual can identify with multiple races/ethnicities
- An individual within a specific race could identify with multiple subpopulations
- e.g., White and Black
- e.g., African American and Somali
- Comparison of Black and non-Black (individuals that DID NOT identify as Black) workers

• Coding of industry, occupation, injury

- Not all employer names were able to be coded into industry (NAICS)
- Not all job titles were able to be coded into occupation (SOC)
- Not all injury descriptions were able to be coded into OIICS



Filling out this form is optional.

Detailed Demographic Form

1. What is your marital status?

- Divorced
- Legally separated
- Married
- □ Significant other/partner
- □ Single/never married
- □ Widowed

2. What is your highest level of education?

- □ Not a high school graduate
- □ High school diploma or GED
- Technical certificate or diploma
- □ Associate degree
- □ Bachelor degree
- □ Advanced degree

4. Where were you born?

- United States
- 🗌 Ethiopia
- 🗌 India
- Laos
- Liberia
- Mexico
- Somalia
 Thailand
- Vietnam
- Other country:

5. What language(s) do you speak at home?

- (Mark all that apply)
- 🗌 English
- Amharic
- □ Hmong
- 🗌 Oromo
- 🗌 Somali
- Spanish
- □ Vietnamese
- Other language: _____

- 3. Which of the following do you consider yourself? (Mark all that apply)
 - White
 - American Indian or Alaskan Native
 - 🗌 Asian
 - Chinese
 - Hmong
 - Indian
 - Laotian
 - 0 Thai
 - O Vietnamese
 - Other Asian background: _____

🗌 Black, African, or African American

- O African American
- Black
- O Ethiopian
- O Liberian
- Nigerian
- O Somali
- Other Black/African background: ____

🗌 Hispanic, Latino, or Latina

- Mexican
- O Puerto Rican
- O Other Hispanic/Latino background: ____
- □ Native Hawaiian or other Pacific Islander
- Other background not listed above: ____
- Form provided on one-page handout
- Focus on populations common in this area
- Could write-in anything otherwise

Data Sources

<u>Date range</u>: May, 2019 – March, 2020 (discontinued due to COVID-19 pandemic)

<u>Population</u>: new injuries presenting to HealthPartners OEM clinics

Data Category	Data Source	Data Element(s)
Clinical Encounter	EHR	Clinic location Encounter date Age
Demographics	New form (patient-reported)	Race/ethnicity Language Country of birth Marital status Educational attainment
Industry	Employer name (clinician note)	North American Industry Classification System (NAICS)
Occupation	Job title (clinician note)	Standard Occupational Classification (SOC)
Injury	Injury description (clinician note)	Occupational Injury and Illness Classification System (OIICS)

Results

n = 821 new injuries seen during date range

n = 773 workers completed new demographics form

n = 759 demographic forms with any race/ethnicity data entered

White population: n = 510 (67.2% of 759) (majority population)

Black population: n = 146 (19.2% of 759) Non-Black population: n = 613 (80.8% of 759)

NAICS Sector

• NAICS

- North American Industry Classification System
- Organizes and divides businesses into sectors, sub-sectors, and specific industries
- Used by government/business in Canada, Mexico, and the U.S.
- Hierarchical structure with 20 sectors at the highest level (two-digit codes)
- Grouping code of up to 6 digits for each detailed industry

Main History Develo Part	opment iners	Federal Register Notices	NAPCS	FAQs	
NAICS Search: Enter keyword or 2-6 digit code	2017	VAICS Defi	nition		
2017 NAICS Search	T = Can	adian, Mexican, and Un	ited States in	dustries a	re comparable.
Enter keyword or 2-6 digit code	Searcl Number	of records found: 38			
2012 NAICS Search	<u>61</u> Ec	lucational Services ^T			
Enter keyword or 2-6 digit code	<u>611</u> E <u>6111</u>	ducational Services ^T Elementary and Seco	ndary Schoo	Is ^T	
2007 NAICS Search	<u>61111</u>	Elementary and Secon	dary Schools		
Downloads/Reference Files/Tools	<u>611110</u> <u>6112</u> 61121	Elementary and Seco Junior Colleges ^T Junior Colleges ^T	ndary School	S	
2017 NAICS	611210	Junior Colleges			
2012 NAICS	6113	Colleges, Universities	, and Profes	sional Sc	hools ^T
2007 NAICS	61131	Colleges Universities	and Professi	anal Scho	
2002 NAICS	611310	Colleges, Universities,	and Profess	ional Sch	
1997 NAICS	011310	Colleges, Universities	, and Profess	NOTAL SCH	
Concordances	<u>6114</u>	Business Schools and	d Computer a	and Mana	gement Training ¹
 NAICS Update Process Fact Sheet [PDF, 37KB] 	<u>61141</u>	Business and Secretar	ial Schools ^T		

You are here: Census.gov > Business & Industry > NAICS > NAICS Search/Tools

North American Industry Classification System

Black vs. Non-Black Patients by NAICS Sector

NAICS Sector (Sector Code)		Non-Black	Total
NAICS Sector (Sector Code)	(n=146)	(n=613)	(n=759)
Agriculture, Forestry, Fishing, and Hunting (11)	0.0%	1.0%	0.8%
Mining, Quarrying, and Oil and Gas Extraction (21)	0.0%	0.3%	0.3%
Utilities (22)	0.7%	0.3%	0.4%
Construction (23)	4.1%	3.8%	3.8%
Manufacturing (31-33)	11.0%	18.8%	17.3%
Wholesale Trade (42)	0.7%	5.1%	4.2%
Retail Trade (44-45)	10.3%	5.4%	6.3%
Transportation and Warehousing (48-49)	6.8%	5.9%	6.1%
Information (51)	0.7%	2.4%	2.1%
Finance and Insurance (52)	1.4%	0.3%	0.5%
Real Estate and Rental and Leasing (53)	0.0%	0.7%	0.5%
Professional, Scientific, and Technical Services (54)	1.4%	2.3%	2.1%
Administrative and Support and Waste Management and Remediation Services (56)	4.8%	4.7%	4.7%
Educational Services (61)	14.4%	15.3%	15.2%
Health Care and Social Assistance (62)	32.2%	14.5%	17.9%
Arts, Entertainment, and Recreation (71)	0.7%	2.8%	2.4%
Accommodation and Food Services (72)	6.8%	4.2%	4.7%
Other Services (except Public Administration) (81)	0.7%	1.3%	1.2%
Public Administration (92)	2.7%	9.8%	8.4%
Unclassified (N/A)	0.7%	1.1%	1.1%

Limitations for Industry Data

- Ex: A computer engineer working at Target corporation
 - "Target"
 maker of bullseyes?
 - Target is a retail organization, but the person performs more functions in computer programming
 - Industry may not match occupation!
- Ex: A chef working at a hospital cafeteria
 - Hospital is considered as health industry, but chef works in a kitchen
- What other examples can you think about?



Coding Occupation

- SOC
 - Occupations coded into 23 major groups (2-digit codes)
- Examples include:
 - Professional occupations
 - Associate professional occupations
 - Administrative and secretarial occupations
 - Skilled trades occupations
 - Caring, leisure and other service occupations
- Each occupation in the SOC is placed within one of these 23 major groups



Black vs. Non-Black Patients by SOC Major

(-roun			
SCC Major Gridp	Black	Non-Black	Total
(Major Group Code)	(n=146 <i>,</i> %)	(n=613, %)	(n=759, %)
Management (11)	0.0%	3.1%	3.1%
Business and Financial Operations (13)	0.7%	0.8%	1.0%
Computer and Mathematical (15)	1.4%	0.7%	1.0%
Architecture and Engineering (17)	0.0%	2.6%	2.6%
Life, Physical, and Social Science (19)	0.0%	2.6%	2.6%
Community and Social Service (21)	1.4%	1.8%	2.1%
Legal (23)	0.7%	0.3%	0.5%
Educational Instruction and Library (25)	6.8%	6.5%	8.2%
Arts, Design, Entertainment, Sports, and Media (27)	0.0%	0.7%	0.7%
Healthcare Practitioners and Technical (29)	5.5%	7.3%	8.6%
Healthcare Support (31)	17.1%	4.1%	8.2%
Protective Service (33)	1.4%	6.0%	6.4%
Food Preparation and Serving Related (35)	8.9%	3.1%	5.2%
Building and Grounds Cleaning and Maintenance (37)	6.8%	4.6%	6.2%
Personal Care and Service (39)	2.1%	3.3%	3.8%
Sales and Related (41)	1.4%	2.3%	2.6%
Office and Administrative Support (43)	5.5%	5.5%	6.9%
Farming, Fishing, and Forestry (45)	0.7%	1.6%	1.8%
Construction and Extraction (47)	2.7%	4.6%	5.2%
Installation, Maintenance, and Repair (49)	0.7%	3.3%	3.4%
Production (51)	14.4%	18.9%	22.3%
Transportation and Material Moving (53)	15.1%	10.0%	13.5%
Unclassified (N/A)	6.8%	6.4%	8.0%

Demographics of Healthcare Support

Injuries IthPartners OEM population, n = 510 White (67.2%) and n= 146 Black (19.2%)

- n = 57 workers in SOC 31, of which n = 50 provided race/ethnicity data
- n = 149 workers in NAICS 62, of which n = 136 provided race/ethnicity data
- n = 121 women in NAICS 62, of which n = 111 provided race/ethnicity data

	Total	Women	White	Black	Asian	Hispanic/Latino
Healthcare Support Occupation (SOC 31)	50	44 (88.0%)	18 (36.0%)	25 (50.0%)	4 (8.0%)	4 (8.0%)
Healthcare and Social Assistance Industry (NAICS 62)	136	111 (81.6%)	70 (51.5%)	47 (34.6%)	13 (9.6%)	11 (8.1%)

Detailed Demographics of Black Healthcare Support

 Data not mutually-exclusive

Injuries

• i.e., workers could select multiple ethnicities

			Ethnicity Selected	
Black	Ethnicity Selected	% of	(only NAICS 62,	% of
(n=146)	(n=146, all workers)	n= 146	n = 114)	n = 114
African American	43	29.5%	9	7.9%
Black	30	20.5%	13	11.4%
Ethiopian	13	8.9%	5	4.4%
Somali	9	6.2%	3	2.6%
Liberian	2	1.4%	1	0.9%
Nigerian	13	8.9%	4	3.5%
African	23	15.8%	9	7.9%
Eritrean	2	1.4%	2	1.8%
Moorish	2	1.4%	1	0.9%
Black American	1	0.7%	1	0.9%
East African	1	0.7%	1	0.9%
Guyanese	1	0.7%	0	
Kenyan	1	0.7%	1	0.9%
Nepali	1	0.7%	0	

East African Geography



Healthcare Support Injuries Compared with Job



OIICS

• Occupational Injury and Illness Classification System (OIICS)

- Developed by Bureau of Labor and Statistics (BLS)
- To standardize work-related injury/illness

• OIICS Code Trees

- Four (4) component hierarchical coding structures ("code trees")
- Two (2) regarding characteristics of injury:
 - Nature
 - Part of Body
- Two (2) regarding **incident circumstances**:
 - Source/Secondary Source of Injury/Illness
 - Event or Exposure
- Code trees accessible at: <u>https://wwwn.cdc.gov/Wisards/oiics/Trees/MultiTree.aspx</u>

OIICS Code Trees

OIICS Division Titles (v2.01)

	Nature of Injury or Illness		Part of Body Affected	So	urce & Secondary Source		Event or Exposure
1*	Traumatic Injuries and Disorders	1*	Head Neck,	1*	Chemicals and Chemical Products	1*	Violence and Other Injuries by Persons or Animals
2*	Systemic Diseases or Disorders	2*	Including Throat	2*	Containers, Furniture, and Fixtures	2* 3*	Transportation Incidents Fires and Explosions
3*	Infectious and Parasitic	3*	Trunk	3*	Machinery	4*	Falls, Slips, Trips
4*	Diseases Neoplasms, Tumors, and Cancer	4*	Upper Extremities Lower	4* 5*	Parts and Materials Persons, Plants, Animals, and Minerals	5*	Exposure to Harmful Substances or Environments Contact with Objects and
5*	Symptoms, Signs, and Ill- defined Conditions	5* 6*	Extremities Body Systems	6*	Structures and Surfaces Tools, Instruments, and	6*	Equipment Overexertion and Bodily
6*	Other Diseases, Conditions, and Disorders	8*	Multiple Body Parts	/* 8*	Equipment Vehicles	/* 9999	Reaction 9 Nonclassifiable
7*	Exposures to Disease—No Illness Incurred	9*	Other Body Parts	9* 999	Other Sources 9 Nonclassifiable		
8*	Multiple Diseases, Conditions, or Disorders	999	9 Nonclassifiable				
999	99 Nonclassifiable						

Nature of Injuries in Healthcare Support Roles (OIICS)

OIICS Nature Division		Black (n,	%)	Non-Black (n, %)		
Traumatic Injuries or Disorders (1)	101	40	85.1%	61	66.3%	
Systemic Diseases or Disorders (2)	14	4	8.51%	10	10.9%	
Infectious or Parasitic Diseases (3)	0	0	0	0	0	
Neoplasms, Tumors, and Cancer(4)	0	0	0	0	0	
Symptoms, Signs, and Ill-Defined Conditions (5)	3	1	2.2%	2	2.2%	
Other Diseases, Conditions, and Disorders (6)	1	0	0	1	1.1%	
Exposures to Disease - No Illness Occurred (7)	20	2	4.3%	18	19.6%	
Multiple Diseases, Conditions, or Disorders (8)	0	0	0	0	0	
Nonclassifiable (9)	0	0	0	0	0	

• Percentages of injuries of this nature for Black vs. non-Black within this industry (NAICS 62)

Example OIICS Codes

• Codes grouped together at two-digit level for analysis



Nature of Traumatic Injuries in Healthcare Support

	Total	Black		Nc	n-Black
OIICS Nature Major Group	(n = 101)	(n =	40, %)	(n	= 61, %)
Traumatic injuries and disorders, unspecified (10)	0	0		0	
Traumatic injuries to bones, nerves, spinal cord (11)	3	0		3	4.9%
Traumatic injuries to muscles, tendons, ligaments, joints,					
etc. (12)	46	20	50.0%	26	42.6%
Open wounds (13)	3	1	2.5%	2	3.3%
Surface wounds (14)	10	6	15.0%	4	6.6%
Burns and corrosions (15)	3	1	2.5%	2	3.3%
Intracranial injuries (16)	4	0		4	6.6%
Effects of environmental conditions (17)	0	0		0	
Multiple traumatic injuries and disorders (18)	1	0		1	1.6%
Other traumatic injuries and disorders (19)	31	12	30.0%	19	31.1%

Limitations

- We did not ask about some demography also related to occupational discrimination
 - Identified gender
 - Documentation status
 - Sexual orientation
 - Would people be comfortable providing these?
 - Would asking these questions turn off people from answering the form at all?
- Limited sample size
 - n = 759 injuries with completed form AND including race/ethnicity
 - All injured workers did not necessarily come to our clinic
 - Uncertain if seeing different populations than other clinics
- Possibly limited generalizability due to Minnesota demography
 - Large East African population



Discussion



- Women overrepresented in healthcare support industry and occupation (> 80%)
- Black healthcare support workers observed elevated injury rates are higher than expected based on prevalence of workers by race at the local, state, and national level
- Detailed race/ethnicity data can be used to determine whether these disparities are related to specific ethnicities
- Minnesota's very large Somali population and relatively large East African population may contribute to this effect by virtue of limited employment opportunities after immigration
- Detailed injury data can determine what types of injuries are occurring such that interventions may be developed

Conclusions

- Black healthcare support workers have disparate rates of injury
- Occupational injury disparities are impossible to identify without appropriate data collection
- Identified race-based disparities may reflect more specific subpopulations
- Appropriate occupational injury surveillance will allow for targeted interventions of value to the employee, employer, and insurer



Future work

- Implementation of <u>electronic</u> (not paper) data collection of detailed demographics
- Inclusion of gender (and/or other demography) in next detailed demographic form given divergent occupational risks
- Use focused questions (decision support) to assist patients with semi-automated coding of industry, occupation, and injury characteristics (rather than manual coding)
- Evaluation of other clinical variables that may be associated with greater likelihood of occupational injury in this particular context
 - e.g., diabetes, obesity, smoking

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Everyone @ HealthPartners Occupational and Environmental Medicine Residency





Questions