Balancing characteristics of Veterans on long-term opioid therapy who used vs. did not use CIH services

Anne Black, PhD
Associate Professor, Yale School of Medicine
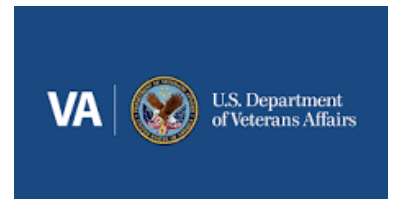Research Health Scientist, VA Connecticut Healthcare System

The PRIME Center

Pain **R**esearch, **I**nformatics, **M**ultimorbidities, and **E**ducation

Enhancing Pain Care for Veterans

Yale SCHOOL OF MEDICINE

VA | U.S. Department of Veterans Affairs

Disclosures

- No conflicts of interest

- The views expressed are those of the presenter and do not necessarily reflect the position or policy of the Dept. of Veterans Affairs or US government

- Funding:
  - Department of Veterans Affairs Health Services Research & Development; SDR 21-108
  - Office of Patient Centered Care and Cultural Transformation; Pilot funds
  - Pain Research, Informatics, Multimorbidities and Education (PRIME) Center of Innovation; CIN-13-407

Outline

1. Background
2. Study design
3. Cohort
4. Covariates by CIH exposure
5. Balancing on covariates
6. Next steps

Background

- Long-term opioid therapy: ≥ 90 days continuous treatment

- Limited effectiveness of LTOT for chronic pain

- Well-established, dose-related risks

  - Opioid use disorder

  - Opioid-related overdose

- Clinical guidelines recommend tapering or discontinuing opioid therapy when risks outweigh benefits

- Emphasis on multimodal approach to pain management including complementary and integrative health (CIH) modalities

Background

Promising evidence relating CIH to reduced opioid use in chronic pain among Veterans

- Reduced use of opioids among Veterans with chronic pain who used Whole Health services including CIH compared to those who did not[1]

- Reduced incidence of opioid initiation among Veterans with MSD exposed to CIH[2] compared to those not exposed

- Faster rate of opioid taper among Veterans with LTOT exposed to any CIH[3]

[1]Bokhour BG, Hyde JK, Zeliadt S, Mohr DC. Whole Health System of Care Evaluation- A Progress Report on Outcomes of the WHS Pilot at 18 Flagship Sites 2020. Veterans Health Administration, Center for Evaluating Patient-Centered Care in VA (EPCC-VA).
[2]Goulet et al. Association of Complementary and Integrative Health Interventions with Opioid Use among Veterans with Musculoskeletal Disorders and PTSD. https://www.hsrd.research.va.gov/for_researchers/cyber_seminars/archives/6304-notes.pdf
[3]Black et al. Association Between Exposure to Complementary and Integrative Therapies and Opioid Analgesic Daily Dose Among Patients on Long-term Opioid Therapy. The Clinical Journal of Pain 38(6):p 405-409, June 2022.

Study design
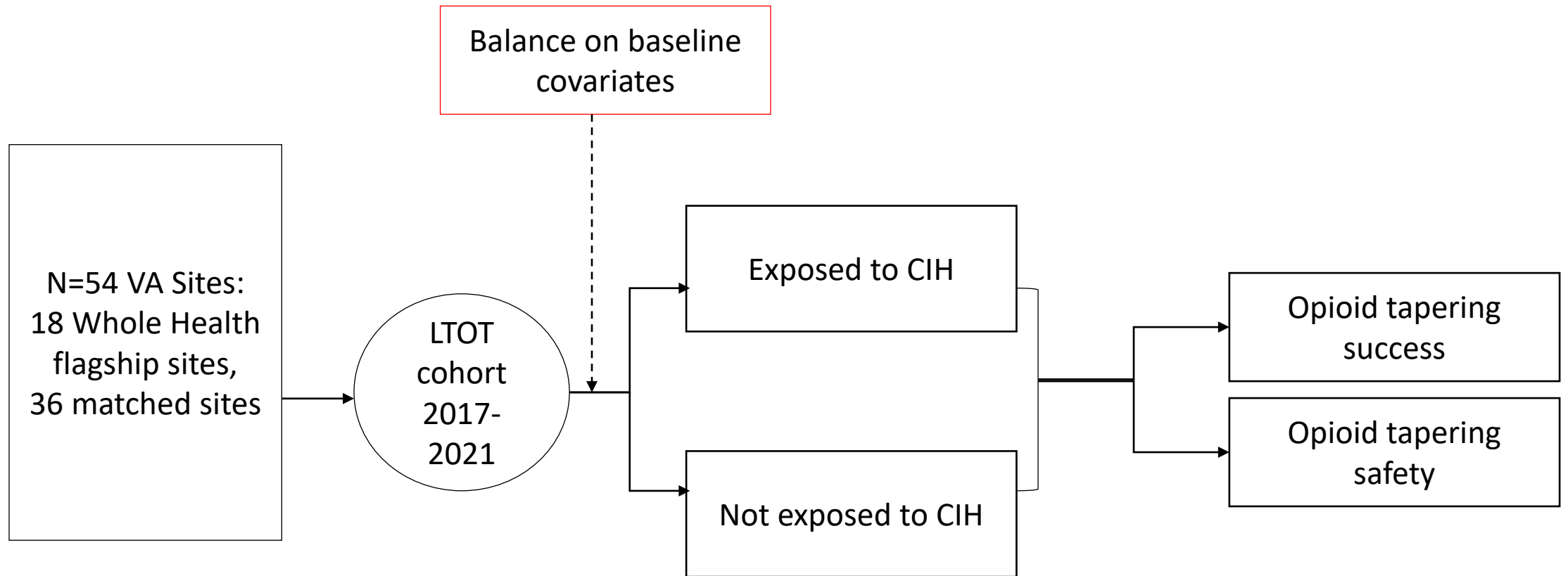
VA "List-1" CIH approaches

1. Acupuncture (Traditional and Battlefield)
2. Biofeedback
3. Chiropractic Care
4. Clinical Hypnosis
5. Guided Imagery
6. Massage Therapy
7. Meditation
8. Tai Chi / Qi Gong
9. Yoga
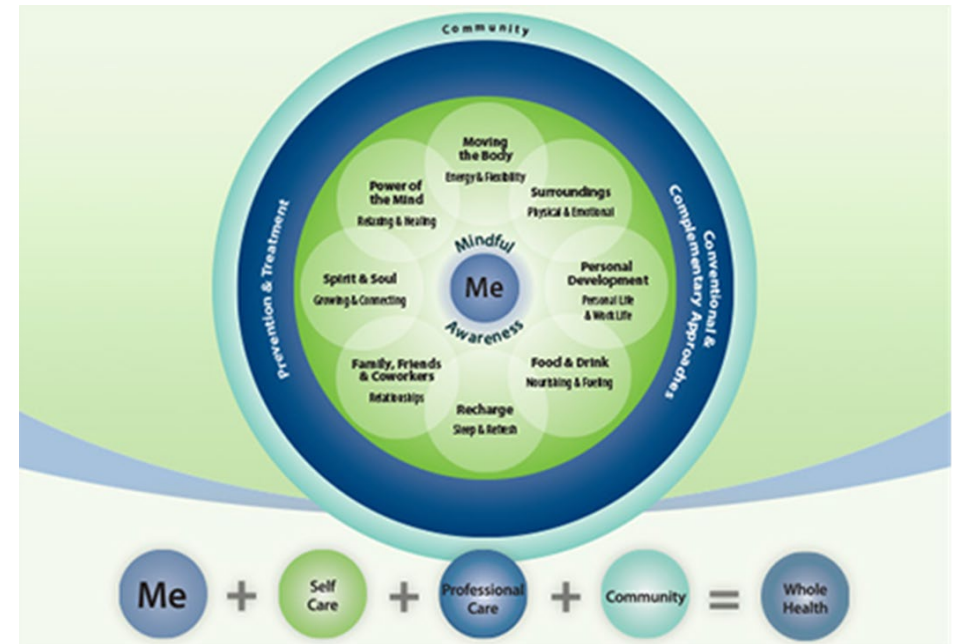
Approaches included on "List 1" must show evidence of safety and, at a minimum, promising or potential benefit and go through a review

18 Whole Health flagship sites, 36 matched VA sites
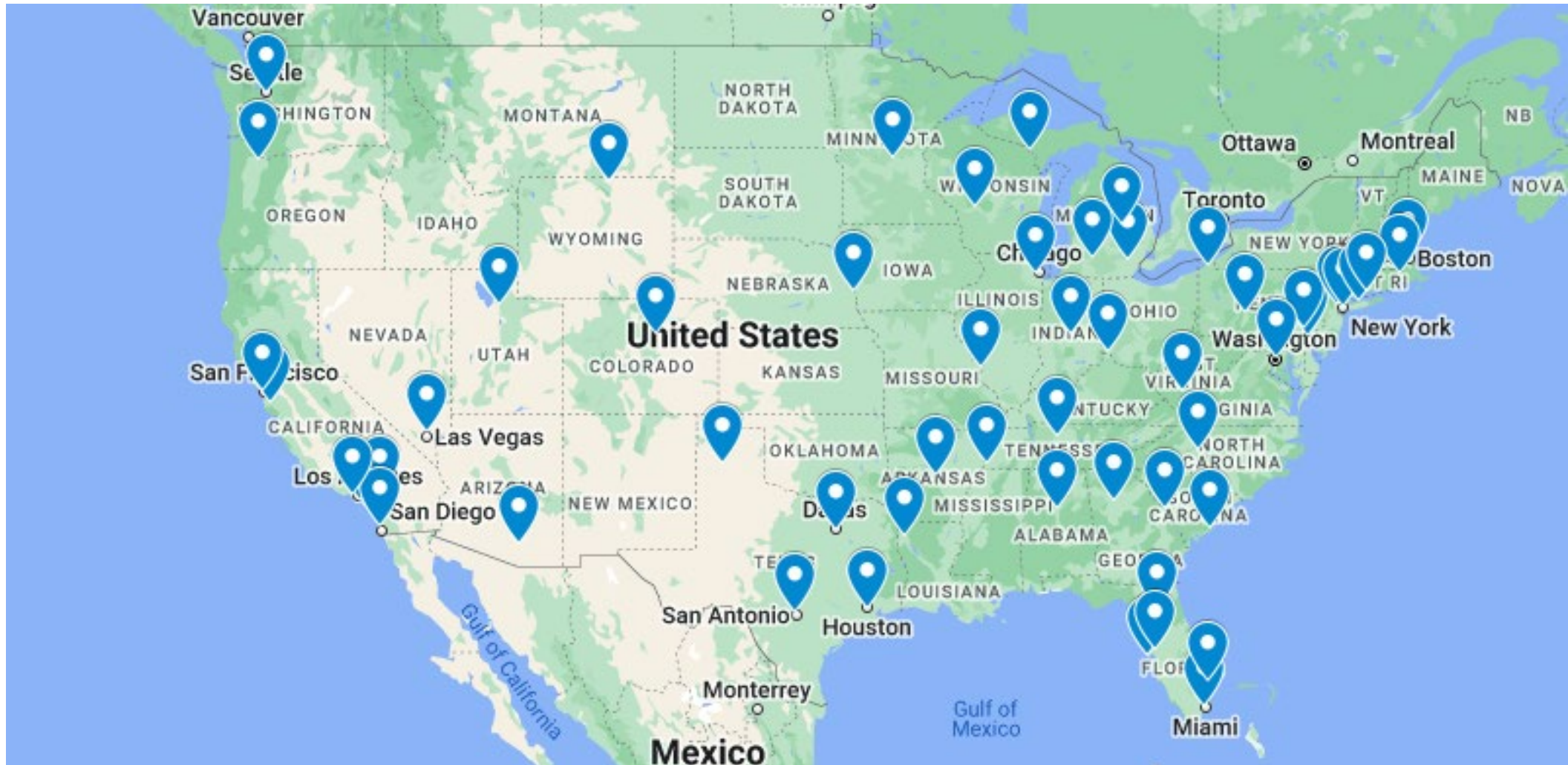
Cohort

Demographics (N=314,451)	
Male N (%)	289,628 (92%)
Age (Mean, SD)	63.2 (12.2)
Race N (%)	
White	236,918 (75)%
Black/African American	49,980 (16%)
Other race/more than one race	9,175 (3%)
Unknown race	18,378 (6%)
Hispanic ethnicity N (%)	13,939 (4%)
Married N (%)	165,510 (53%)
Rural/highly rural residence N (%)	122,399 (39%)

Cohort

Opioid Use and Pain

LTOT dose (mg MEDD) (Median, IQR)	23mg (15mg, 40mg)
<20 mg MEDD	155,520 (50%)
20-49mg MEDD	109,579 (35%)
50-89mg MEDD	27,068 (8%)
≥90mg MEDD	22,284 (7%)
Pain Numeric Rating Scale Score (Mean, SD)	4.3 (3.2)

Cohort

Mental Health and Substance Use

Mental Health Disorder N (%)	165,422 (52%)
Anxiety disorder	53,301 (17%)
Depressive disorder	96,446 (31%)
PTSD	72,480 (23%)
Psychotic disorder	6,442 (2%)
Alcohol Use Disorder N (%)	40,055 (13%)
Opioid Use Disorder N (%)	18,765 (6%)
Substance Use Disorder N(%)	22,303 (7%)
Tobacco Use	140,513 (45%)

Cohort

Musculoskeletal conditions

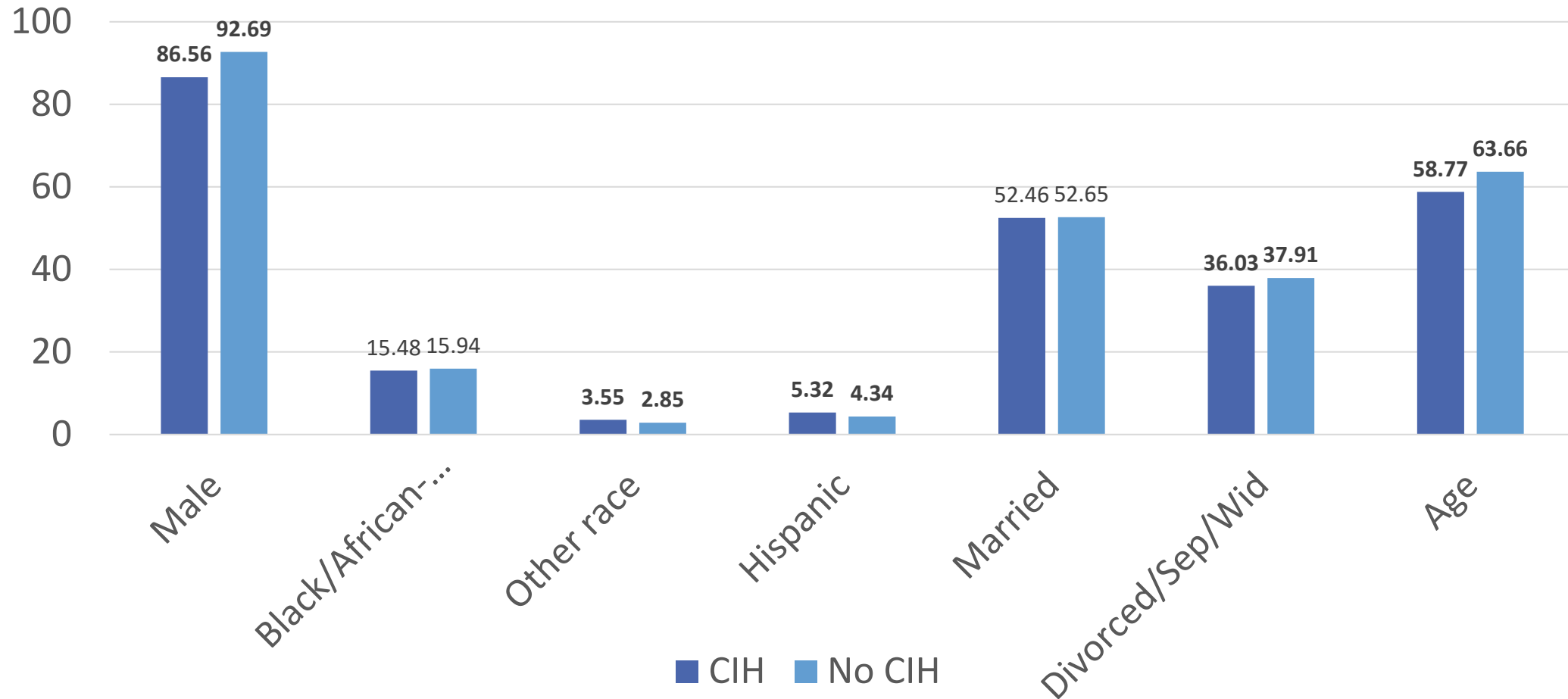|	
Back pain N(%)	192,651 (61%)
Joint d/o N(%)	160,623 (51%)
Limb pain N(%)	191,496 (61%)
Musculoskeletal chest pain N(%)	33,448 (11%)
Neck pain N(%)	59,105 (19%)
Osteoarthritis N(%)	75,715 (24%)

Cohort

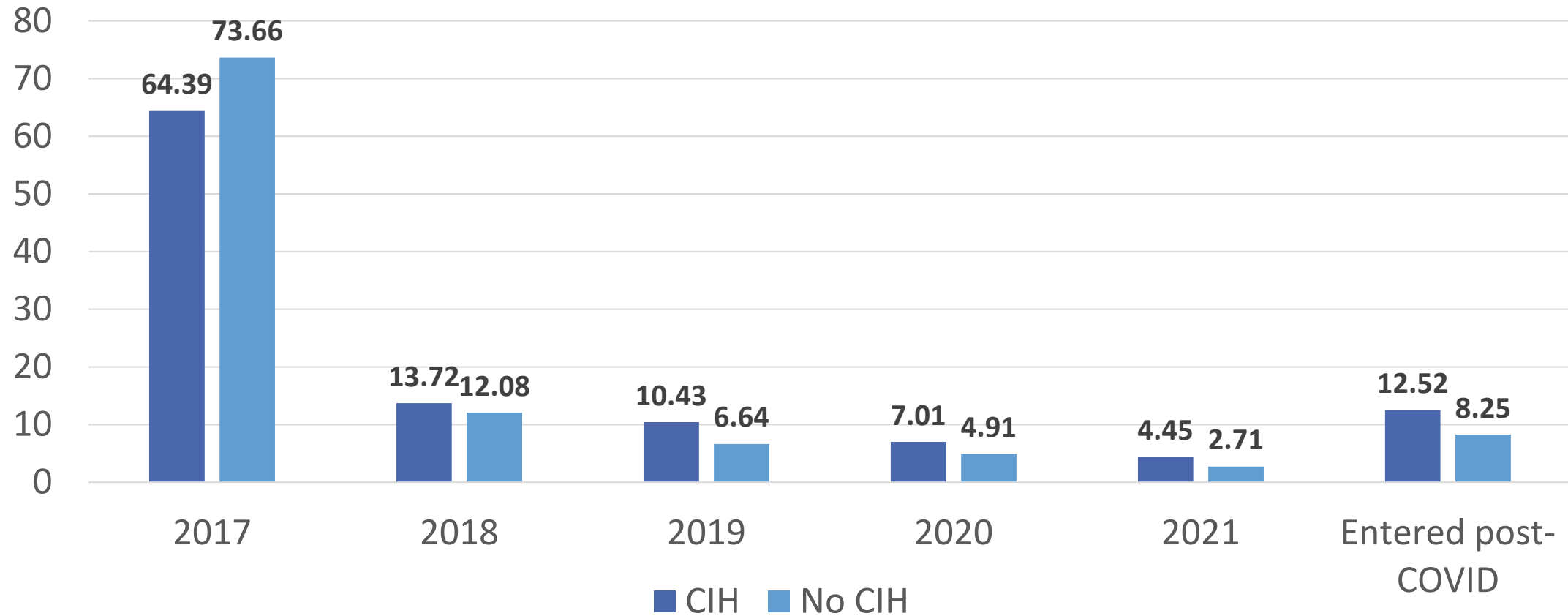| CIH and other WH service use	
Any CIH use N (%)	29,902 (10%)
Intensive (4+) CIH use N (%)	17,479 (6%)
Acupuncture	9,656 (3%)
Chiropractic	13,241 (4%)
Yoga	851 (<1%)
Massage	2846 (1%)
Other CIH modality	2950 (1%)
Physical Therapy N (%)	107,785 (34%)
Whole Health activities N (%)	8,788 (3%)
Whole Health clinical N (%)	6,391 (2%)
Whole Health coaching N (%)	3,073 (1%)

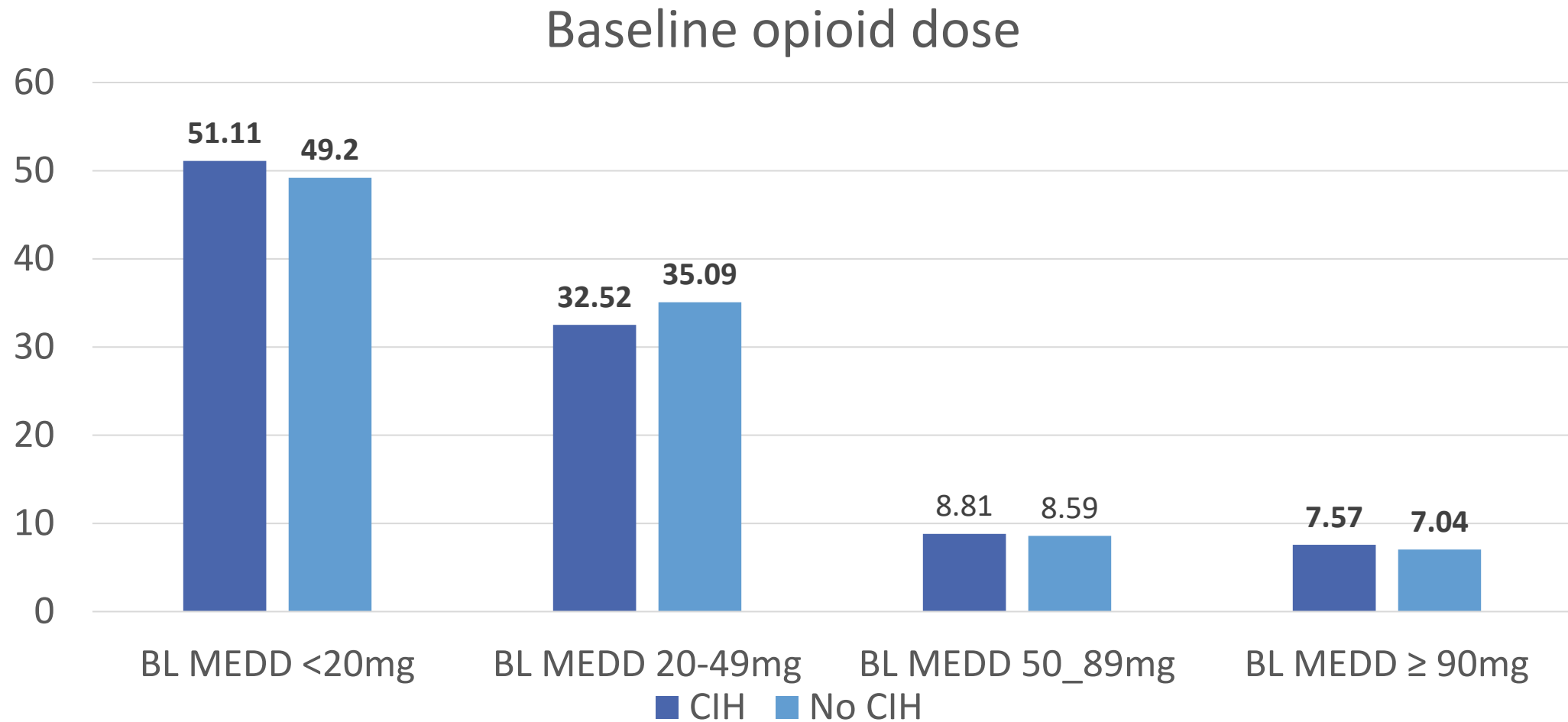# Covariates by CIH exposure

Demographic characteristics

Bar chart comparing CIH vs No CIH across demographic characteristics:

Characteristic	CIH	No CIH
Male	86.56	92.69
Black/African-...	15.48	15.94
Other race	3.55	2.85
Hispanic	5.32	4.34
Married	52.46	52.65
Divorced/Sep/Wid	36.03	37.91
Age	58.77	63.66

■ CIH   ■ No CIH

Covariates by CIH exposure

Year of cohort entry

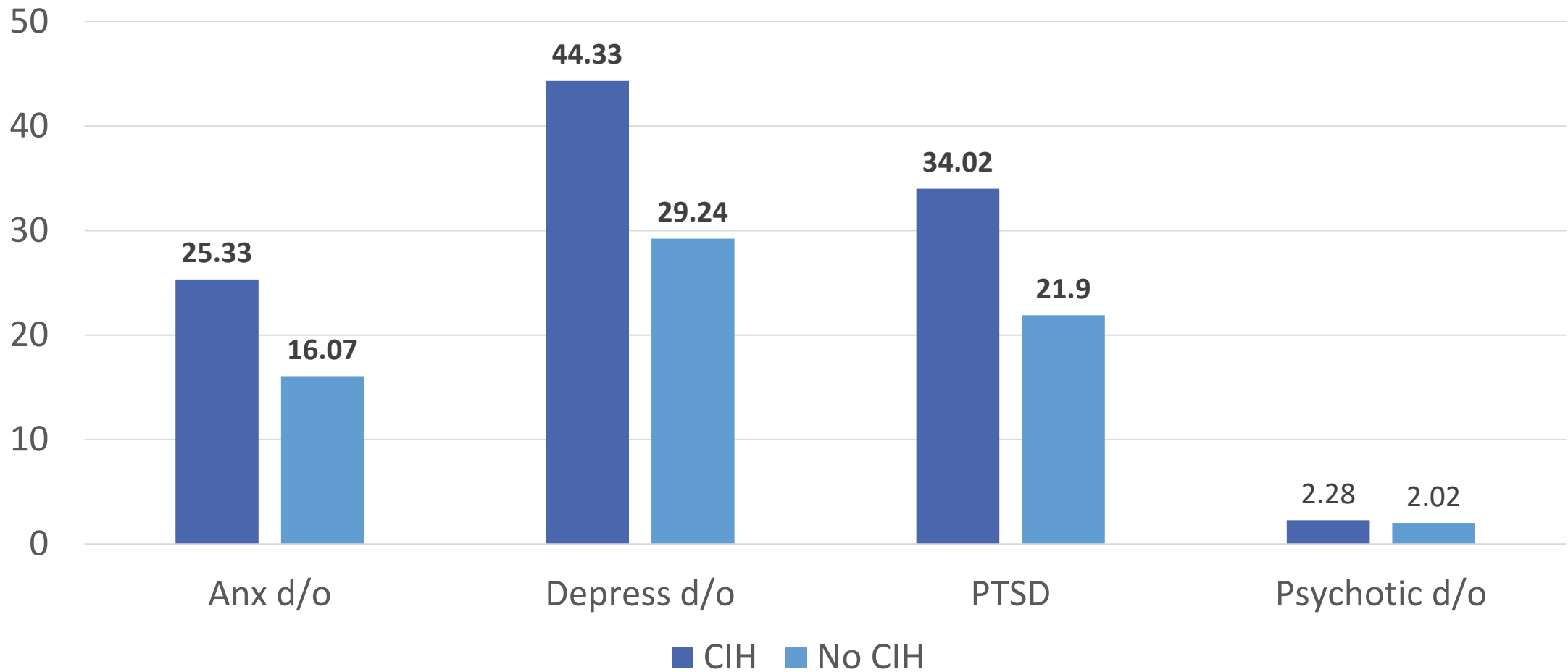# Covariates by CIH exposure

Baseline opioid dose

Covariates by CIH exposure

Pain-related disorders
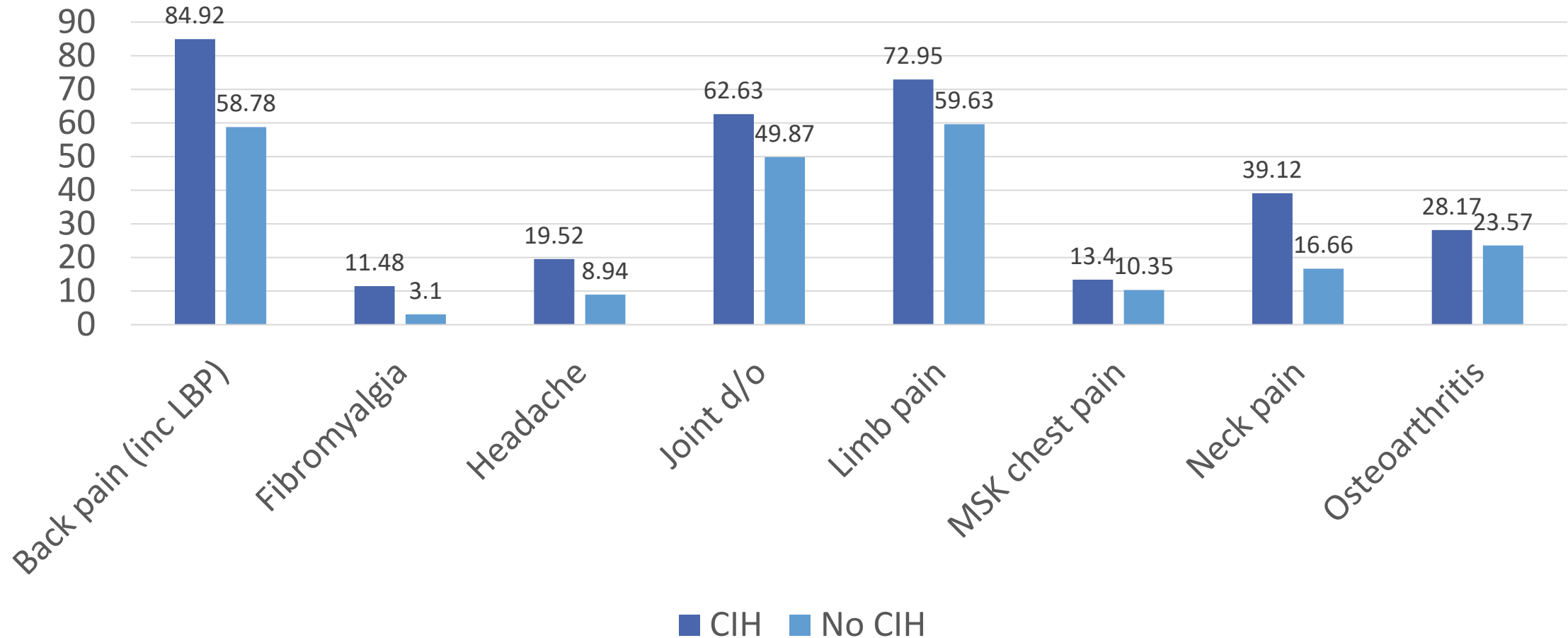
Covariates by CIH exposure
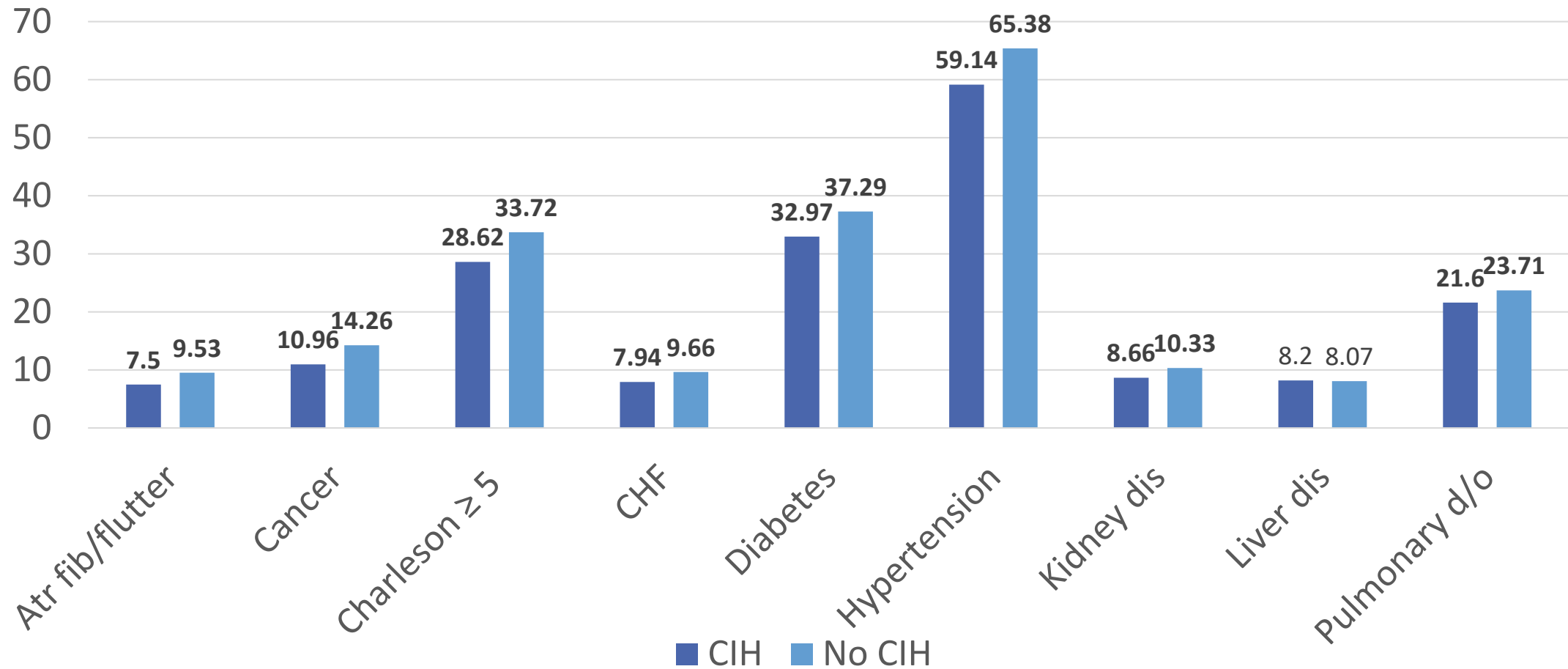

Mental health disorders

Covariates by CIH exposure

Substance use

Covariates by CIH exposure

Comorbidities

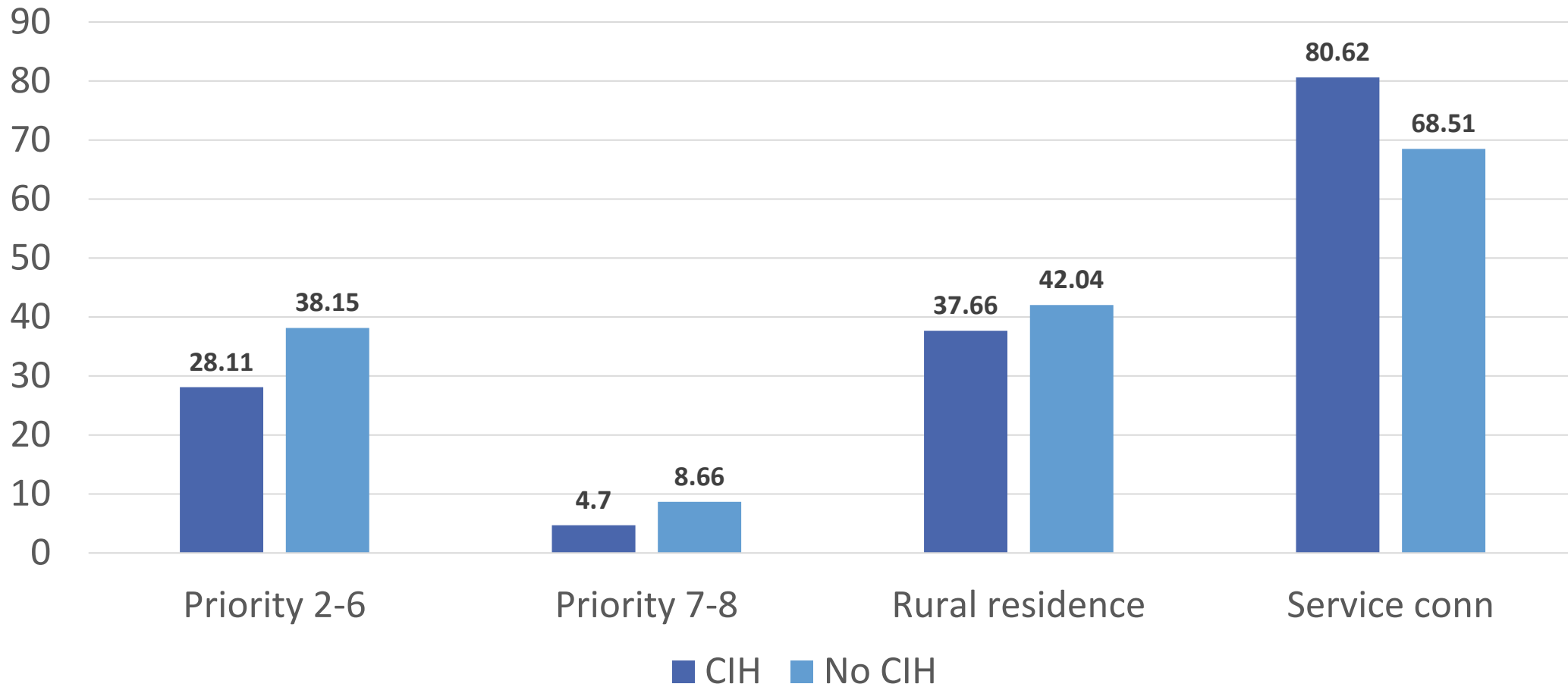|	CIH	No CIH
Asthma	6.03	3.96
Obesity	54.47	49.15
Osteoporosis	2.04	1.97
RA	2.74	2.58
Sleep d/o	47.81	34.89
TMD	27.6	18.09
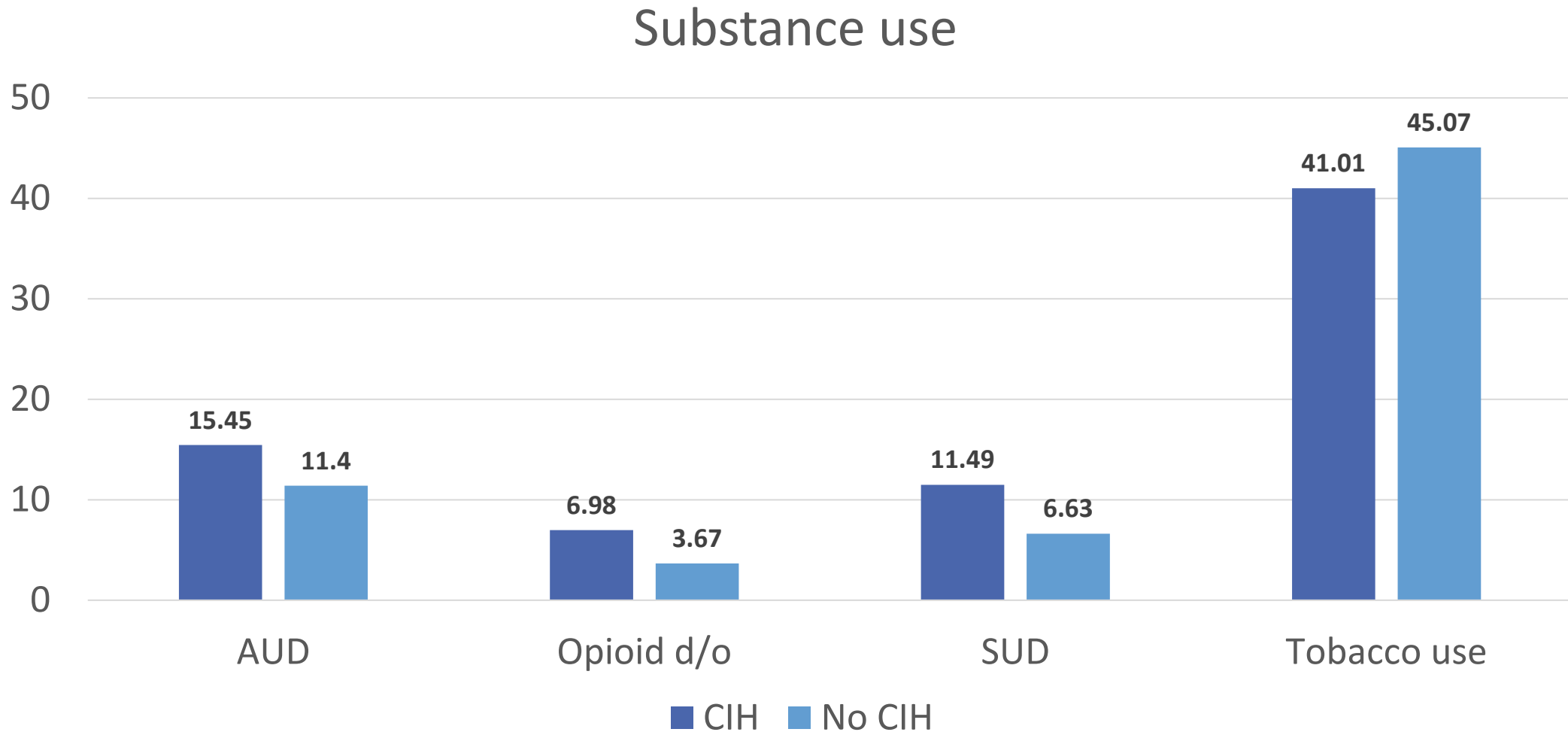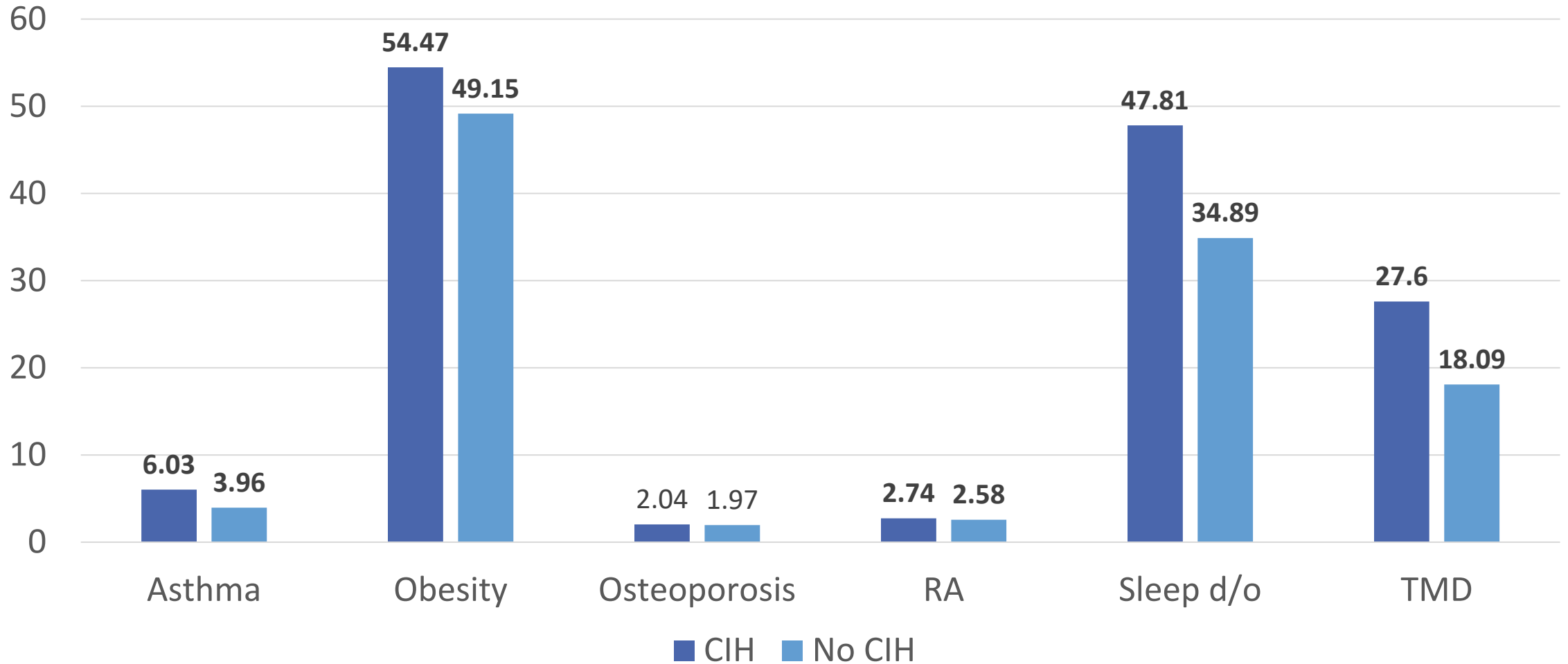
Covariates by CIH exposure
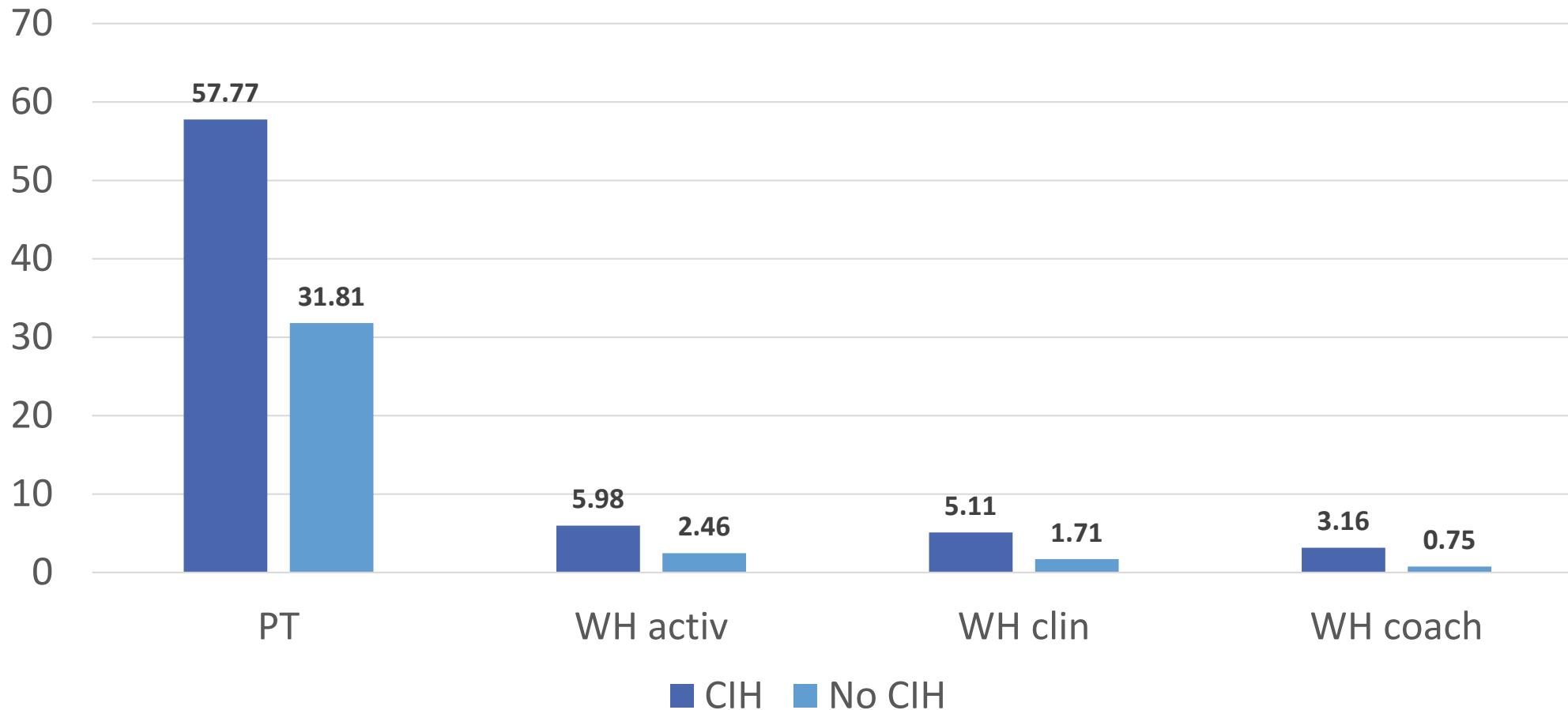

Comorbidities

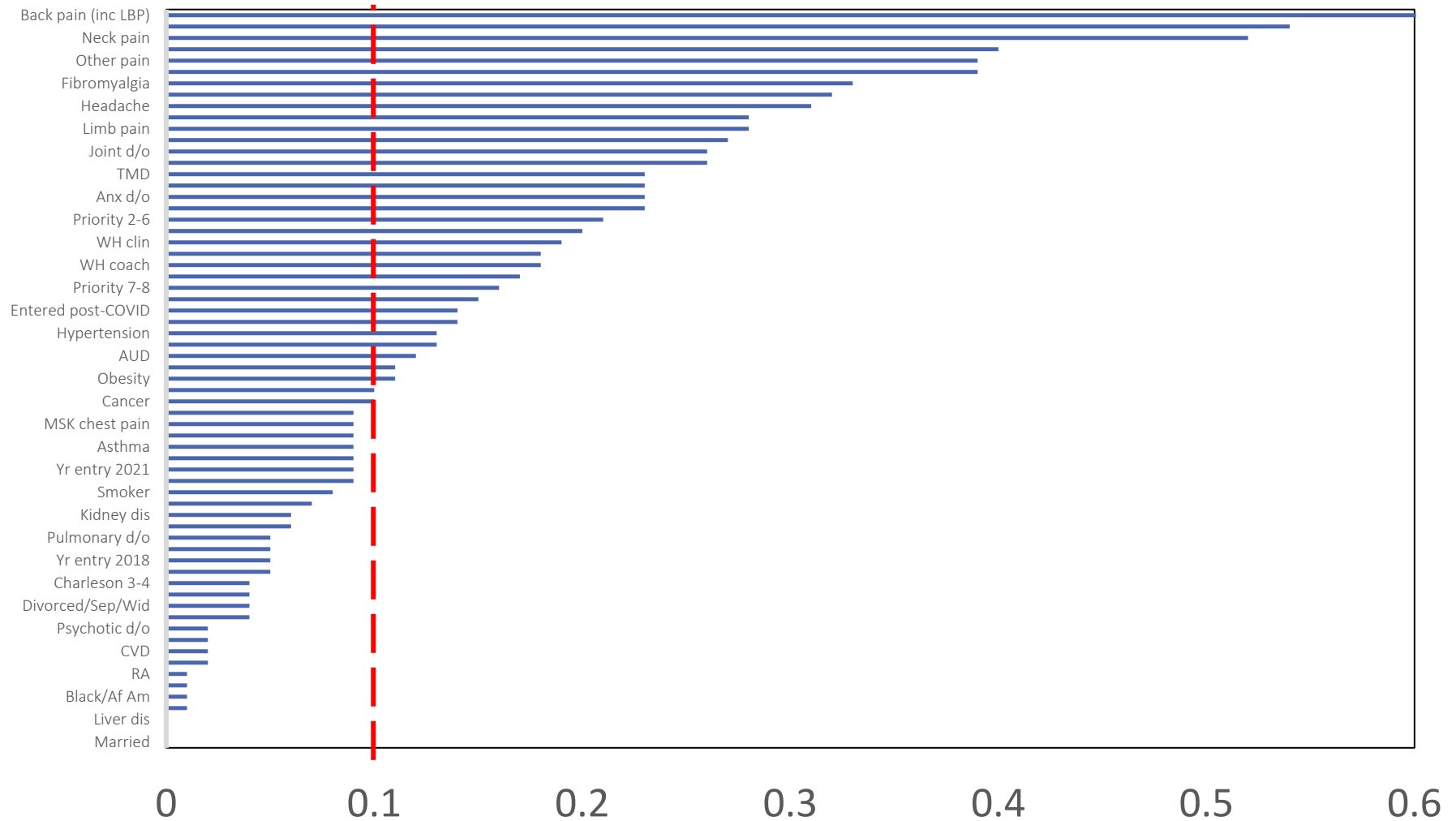# Covariates by CIH exposure

Healthcare access

Covariates by CIH exposure

Other WH-related healthcare

Standardized mean differences

Propensity score and methods to balance on covariates

Propensity score is the probability of treatment assignment conditional on observed baseline characteristics[1]

Propensity score is a balancing score

Conditional on the propensity score, the distribution of observed baseline covariates will be similar between exposed and unexposed groups[1]

Propensity score methods include:
- matching
- stratification
- covariate adjustment
- inverse probability of treatment weighting (IPTW)

[1]Austin PC. An Introduction to Propensity Score Methods for Reducing the Effects of Confounding in Observational Studies. Multivariate Behav Res. 2011 May;46(3):399-424. doi: 10.1080/00273171.2011.568786. Epub 2011 Jun 8. PMID: 21818162; PMCID: PMC3144483.

Inverse probability of treatment weighting (IPTW)

1. Generate propensity score via logistic regression with CIH as the outcome variable and the potential confounders as explanatory variables.

2. Check for overlap and similar distribution in propensity scores between exposed vs. not exposed

3. Calculate the inverse probability of treatment weight. An individual's weight is equal to the inverse of the probability of receiving the treatment that the individual received

4. Use stabilization weighting to control for highly influential propensity scores

Balancing on covariates

Covariates of CIH used in propensity score modeling

- Demographics
- Timing of cohort entry
- Pain
- Baseline LTOT dose
- Pain conditions
- Medical comorbidities
- Mental health disorders
- Substance use
- Healthcare access variables

Comparison of propensity score overlap and distributions

There was a high degree of overlap between distributions for CIH exposed vs. not exposed groups; distributions had similar shapes
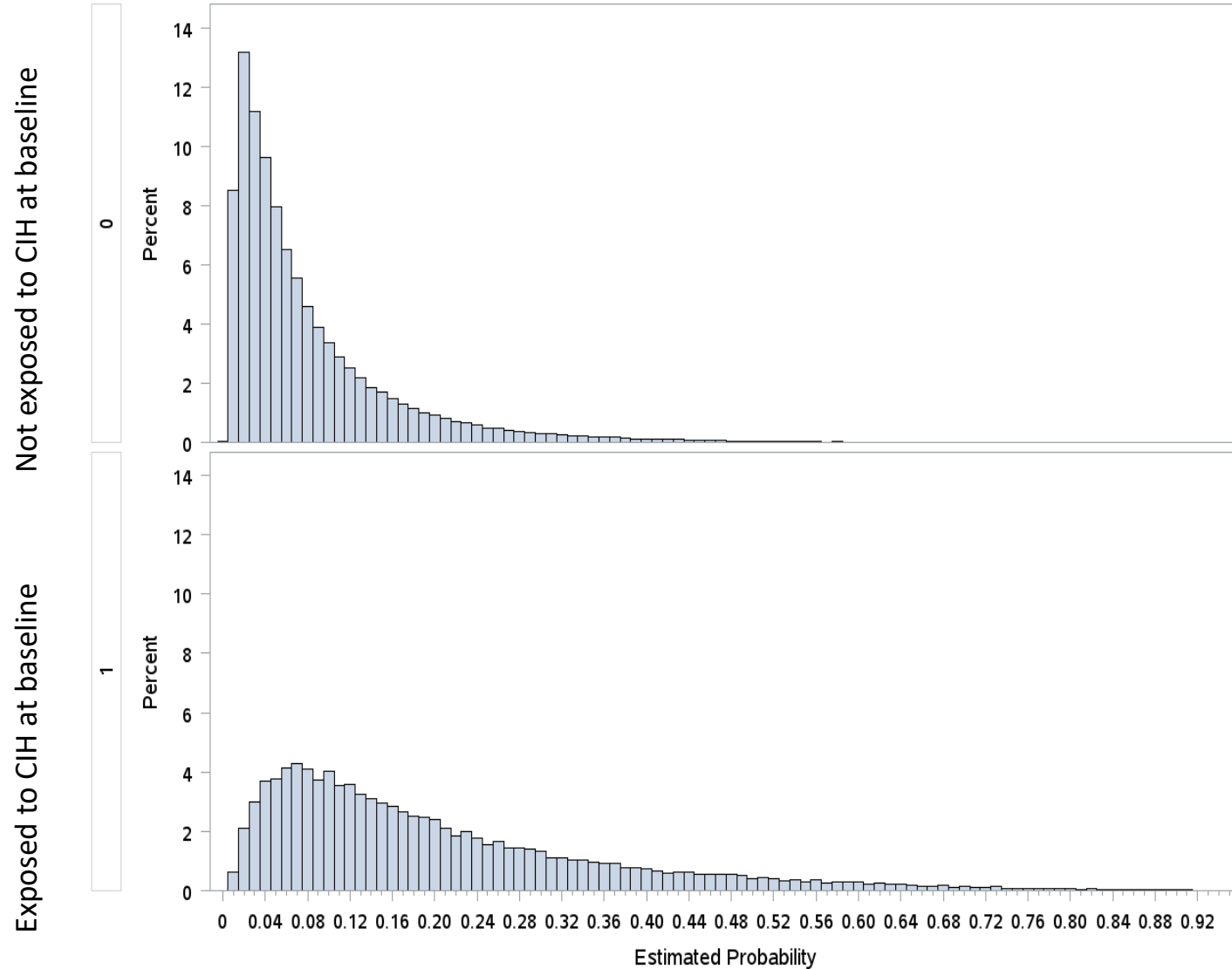
Testing covariate balance after IPTW


Absolute Standardized Difference
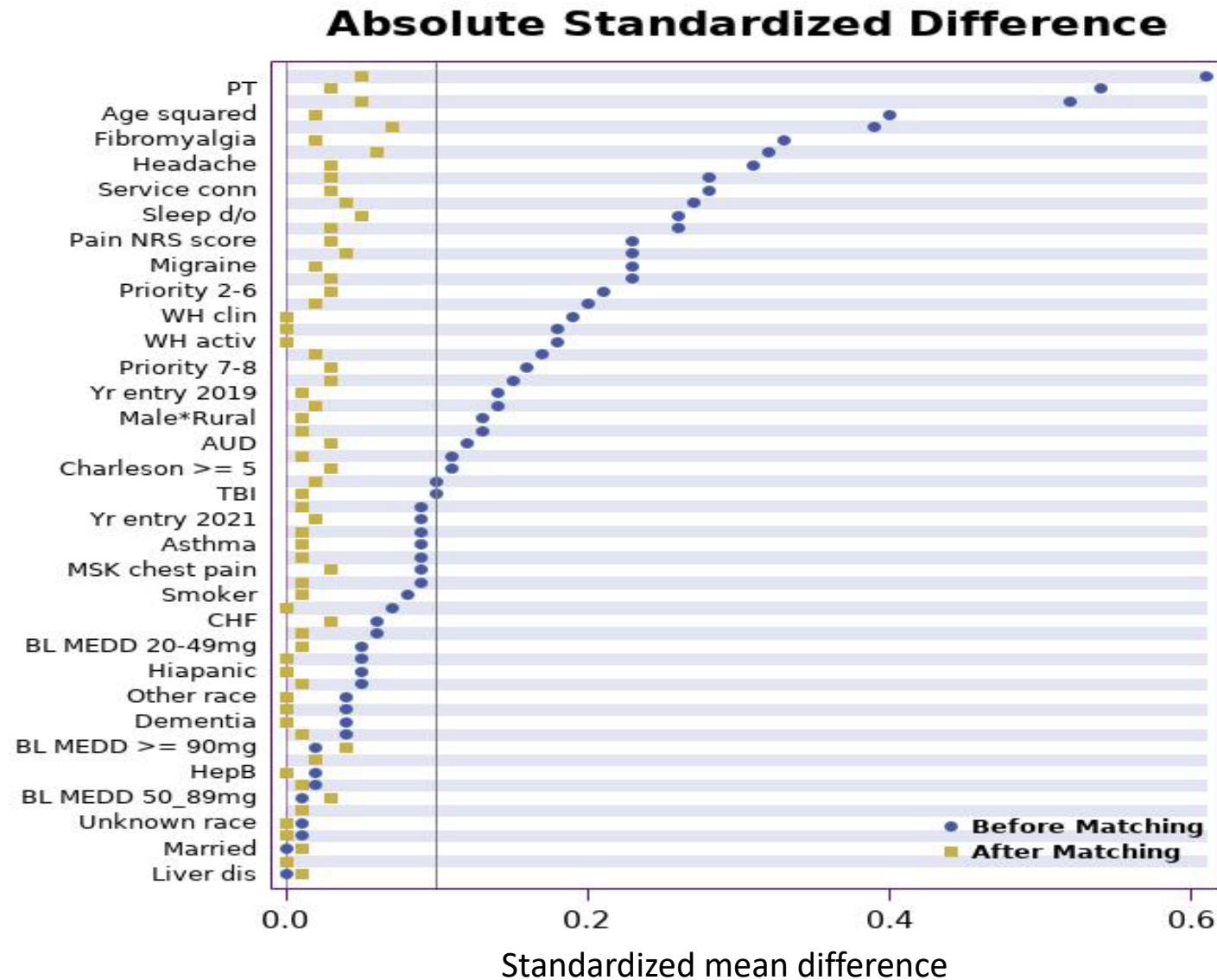
Standardized mean differences between CIH-exposed vs. not exposed Veterans across covariates were reduced to well within a 0.1 SD threshold

Summary

- A minority of Veterans on LTOT had used any CIH at baseline
- Veterans who used CIH differed from Veterans who didn't on several measures
    - Demographics
    - Medical conditions
    - Mental health conditions
    - Use of other health services
    - Healthcare access variables
- Observed differences by CIH were consistent with national trends
- Propensity score weighting achieved balance on all covariates

Next steps
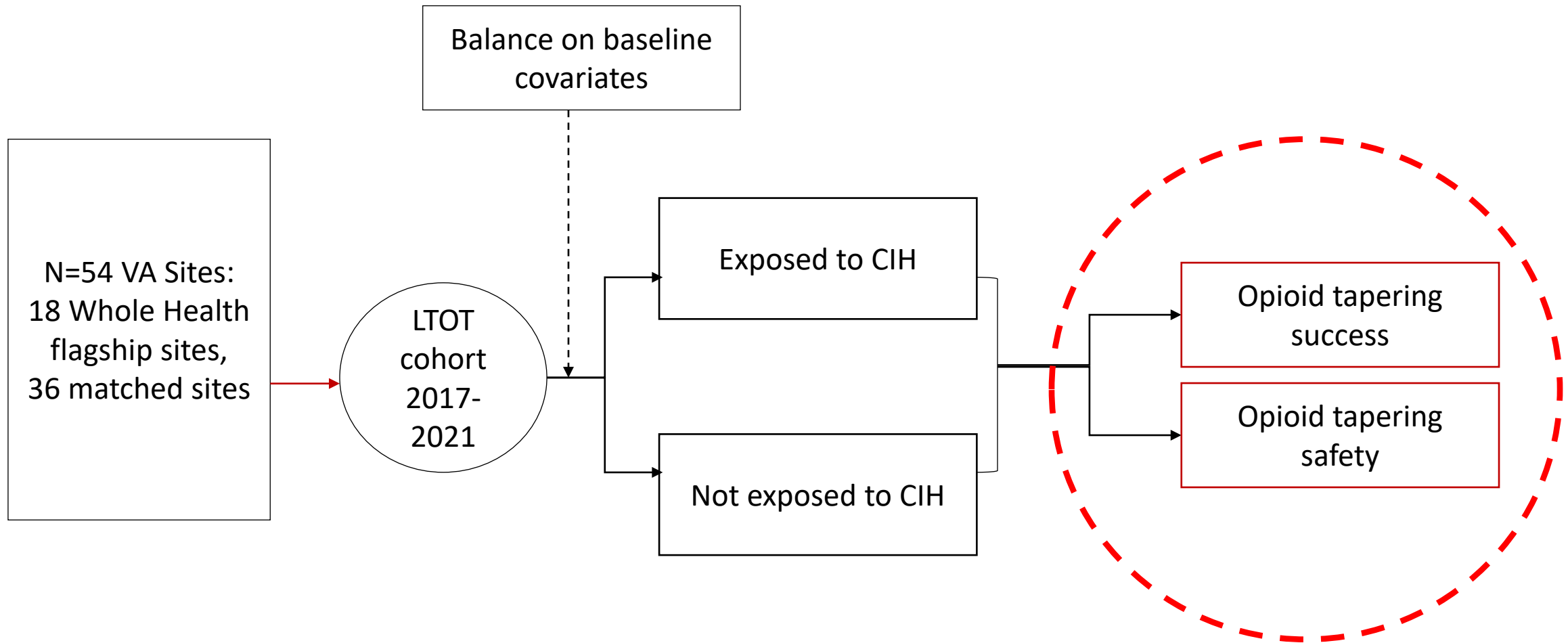
Next steps

CIH Survey

N=125 Veterans from cohort

By CIH modality
- Never heard of it
- Heard of it, but never tried
- Tried but didn't continue
- Used regularly

Among CIH modalities not used or not continued, reasons assessed in domains of
- Information
- Access
- Beliefs about effectiveness
- Sense of belonging/inclusion
- Support from others
- Format-specific
- Personal

Investigative Team

VA Connecticut

William Becker, MD (MPI)

Robert Kerns, PhD

Alicia Heapy, PhD

Erica Abel, PhD

Haseena Rajeevan, PhD

Samara Zuniga, BA

VA Puget Sound

Steven Zeliadt, PhD

Jamie Douglas, MA

Veteran Engagement Panel

Blair Curtis, M.Ed.

Ronald Kidd

Nathan Patet

Brian Schaaf

William Westmoreland, PhD

Operations Partners

Office of Patient Centered Care & Cultural Transformation

Pain Management, Opioid Safety, and Prescription Drug Monitoring Program

Pharmacy Benefits Management