

Future CVD Research using the Combined WTC Rescue/Recovery Cohort

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Background

WTC exposure has been defined in many ways

For example:

1. 9/11 dust cloud exposure (intense, some, none)
2. 9/11 dust cloud exposure (intense, minimal/none)
3. Time of arrival (9/11 on pile, 9/11 other WTC site, 9/12-9/17, 9/18-6/2002)
4. Time of arrival (morning 9/11, afternoon 9/11, 9/12-9/24)
5. Duration of work (working \geq 6 months vs $<$ 6 months)
6. Damage to home (heavy layer of dust/damage, damage without dust, none)
7. Damage to workplace (heavy layer of dust/damage, damage without dust, none)
8. Composite (arrival on 9/11+dust cloud exposure, arrival on 9/11 no dust cloud exposure, arrival on or after 9/12)
9. Composite (arrival morning 9/11+ pile work and/or worked $>$ 90 days starting week 1, worked starting week 2 + did not work pile + worked $<$ 30 days + not present morning 9/11, neither of above)
10. Composite (report \geq 2 WTC-related injuries + did not evacuate, reported no WTC-related injuries + evacuated, neither of above)

Background

CVD outcomes have been defined in many ways

For example:

1. Self-reported angina, MI, or “any heart condition” diagnosis
2. Self-reported diagnosis or under current treatment for CAD, MI, stroke, or CHF
3. Self-reported diagnosis of CAD (MI, angina, or CAD), stroke (stroke/CVA, TIA), or either
4. Medical records for heart-related hospitalizations (hypertension, acute CAD, chronic CAD, CHF)
5. Medical records for cerebrovascular hospitalizations
6. Medical records for ischemic stroke/TIA, hemorrhagic stroke
7. Medical records for MI, stroke, unstable angina, coronary artery surgery or angioplasty, or CVD death
8. Medical records for MI, stroke, unstable angina, coronary artery surgery or angioplasty, CVD death, TIA, stable angina, cardiomyopathy, aortic aneurysm, peripheral arterial vascular intervention, carotid artery surgery

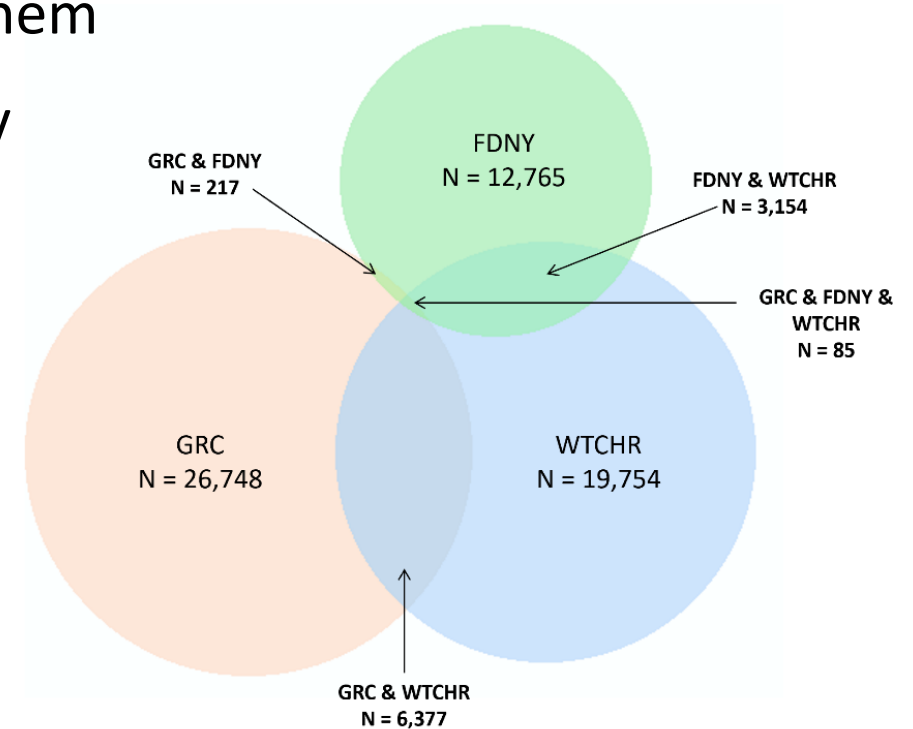
Background

- In 2010 researchers from FDNY, GRC, WTCHR, and WTC Survivor Cohort (Environmental Health Center) convened a working group to create harmonized common exposure measures.

Harmonized WTC Exposure Variable	Response Options
Type of exposure on 9/11/2001	A=Presence in lower Manhattan on 9/11 <u>and</u> heavy exposure to dust from the cloud B=Presence in lower Manhattan on 9/11 and work on the pile resulting from the collapse C=Presence in lower Manhattan on 9/11, no pile work on 9/11, not present during period of heaviest exposure to dust from the cloud D=Not present in lower Manhattan on 9/11
Worked at site on 9/11/2001	1=yes, 0=no
Worked at site on 9/12/2001	1=yes, 0=no
Worked at site between 9/13/01 and 9/17/01	1=yes, 0=no
Worked at site between 9/18/01 and 12/31/01	1=yes, 0=no
Worked at site between 1/1/02 and 6/30/02	1=yes, 0=no
Reported digging at the WTC pile site	1=yes, 0=no
Reported firefighting at the WTC pile site	1=yes, 0=no
Reported rescue/recovery work at the WTC pile site	1=yes, 0=no
Reported welding at the WTC pile site	1=yes, 0=no

Background

- In 2016, funded (PIs C. Hall and P. Boffetta) to combine the FDNY, GRC and WTCHR responder cohorts and de-duplicate them
- Created the Combined WTC Rescue/Recovery Cohort (N=69,100)



Funded WTC U01

- In July, we were funded to use the Combined WTC Rescue/Recovery Cohort to study the association between WTC exposure and CVD.

Research team:

Rachel Zeig-Owens (PI)

Hillel Cohen (Co-investigator)

Charles Hall (Co-investigator)

David Prezant (Co-investigator)

Alexandra Mueller (Epidemiologist)

Ankura Singh (Epidemiologist)

Madeline Cannon (Biostatistician)

Tyrone Moline (Research Coordinator)

New York State Cancer Registry (Honest Broker)

GRDC & WTCHR (Collaborators)

Study Aims

Aim 1: To obtain CVD diagnosis data from New York State's SPARCS database in order to estimate the overall incidence of CVD among WTC-exposed rescue/recovery workers, and to estimate CVD incidence by WTC exposure level and occupation.

Aim 2: To estimate the temporal pattern of CVD incidence in WTC-exposed rescue/recovery workers.

Methods

WTC exposure: defined using the harmonized common exposure measures

CVD outcomes: obtained from data linkage to New York State's Statewide Planning and Research Cooperative System (SPARCS).

- SPARCS includes diagnosis for both inpatient and outpatient visits taking place in New York
- Including ICD9/ICD10 codes, admission date, discharged date, health care facility geographical area. *CVD cases will include previous study outcomes.*

Death data: Obtained via National Death Index linkage (separate funding)

Covariate data: provided from each data center/cohort

Methods

Analyses:

- Estimate the Hazard Ratio for Overall CVD and specific CVD diagnoses comparing highly exposed vs lower exposure
- Conduct change point analyses to estimate if this Hazard Ratio changes over the study period (9/11 to 2023)
- Secondary analyses/sensitivity analyses
 - Evaluate the association with PTSD
 - Exclude members who are currently living outside NY because SPARCS is only for NY
 - Among FDNY members only, compare events from SPARCS with events from self-report and FDNY medical records

Current Status

- Received IRB approval
- Submitted SPARCS application for data linkage
- Near future next steps (by end of 2024):
 - Will be in contact with the GRDC and WTCHR to start process of pulling and then receiving additional covariate data
 - Will be in contact with the NY Cancer Registry about SPARCS application status

Thank You

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- GRDC collaborators
- NYSCR collaborators

And our collaborators from the WTC Health Program, the San Francisco Fire Department, the Chicago Fire Department and the Philadelphia Fire Departments

Extra slides

Exposure for U01 analyses

Table 2: Harmonized WTC Exposure Metric Description		
Harmonized WTC Exposure Variable	Response Options	Primary/Secondary Analyses
Type of exposure on 9/11/2001	A=Presence in lower Manhattan on 9/11 and heavy exposure to dust from the cloud B=Presence in lower Manhattan and work on the pile resulting from the collapse on 9/11 C=Presence in lower Manhattan on 9/11, no pile work on 9/11, not present during period of heaviest exposure to dust from the cloud D=Not present in lower Manhattan on 9/11	Primary: High (A and B) vs Low (C and D)
Worked at site on 9/11/2001	1=yes, 0=no	Secondary: Period first worked at the site to evaluate exposure gradient (i.e., P1=9/11, P2=9/12, P3=9/13-9/17, P4=9/18-12/31/01, P5=1/1-6/30/02)
Worked at site on 9/12/2001	1=yes, 0=no	
Worked at site between 9/13/01 and 9/17/01	1=yes, 0=no	
Worked at site between 9/18/01 and 12/31/01	1=yes, 0=no	
Worked at site between 1/1/02 and 6/30/02	1=yes, 0=no	
Reported digging at the WTC pile site	1=yes, 0=no	Secondary: 1) Type of work conducted at site as individual variables and 2) Conducted any type of work at the site
Reported firefighting at the WTC pile site	1=yes, 0=no	
Reported rescue/recovery work at the WTC pile site	1=yes, 0=no	
Reported welding at the WTC pile site	1=yes, 0=no	

Opportunities for Future Research

- 1) Examine CVD incidence in non-responder WTC-exposed individuals who lived or worked in the area
- 2) CVD incidence among WTC-exposed FDNY firefighters could also be compared to incidence among non-WTC-exposed firefighters enrolled in the Career Firefighter Health Study (CFHS).