Program Project IV: The Biology of Chronic Disease Emergence







Overview

- Add Health Program Project IV: The Biology of Chronic Disease Emergence
 - context for project inception
 - motivation for its development
 - knowledge gaps
 - introduction to the study intent on filling them
 - aims
 - cohort surveillance initiative
 - preliminary findings
 - summary





Context

• As of 2013, cardiovascular disease (CVD) mortality in the U.S. had been slowly declining







INA POPULATION

CENTER

U.S. Age-Standardized CVD Death Rates, 2000-2013

Source: CDC, NCHS.



Context

- However, at that time in the U.S., CVD events were still
 - occurring every 34-40 seconds
 - accounting for ~ 610-660k new cases / year
 - costing us ~ \$317 billion / year
- So the national burden of CVD remained quite high...













Major Causes of Death by Sex, 2013







NA

CENTER



Motivation

- Although ~ 70% of CVD can be averted or delayed via prevention, screening & intervention
 - CVD risk reduction in U.S. adults is challenging
 - 69% overweight/obese
 - 33% hypertensive
 - 17% currently smoking
 - 13% hypercholesterolemic
 - 12% diabetic

- temporal evolution of CVD burden was .:. anticipated





Motivation

- Although young adults can be mischaracterized as unburdened by CVD & other chronic diseases
 - the challenge of CVD risk reduction isn't peculiar to older U.S. adults
 - Add Health Wave IV illustrated this...





Anthropometric Risk Factors







Cardiovascular Risk Factors









Metabolic Risk Factors





Motivation

- - brain
 - heart
 - abdomen
 - kidneys
 - lower extremities
- The risk often culminates in later life as overt CVD with obvious implications for public health
 - carotid artery disease, TIA, stroke
 - CHD, MI, HF
 - AAA, dissection, ischemic bowel
 - renal artery stenosis, CKD, ESRD
 - PAD, critical limb ischemia





Motivation

- Generally, to study emergence of CVD & other chronic diseases in U.S. adults at risk
- Specifically, to study emergence of CVD & other chronic diseases in the Add Health cohort through Wave V, despite its current focus on younger adults





Knowledge Gaps

- CVD & other chronic disease risk factors had not been thoroughly examined in a contemporary or nationally representative study capable of documenting changes in & manifestations of those risks from adolescence through 4th decade of life, after which virtually no one has ideal CV health
- Their examination awaited greater availability, diversity & generalizability of longitudinal data capable of supporting epidemiologic inferences about chronic disease risk to the larger population of young adults





Introduction

- Enter
 Add Health Program Project IV: The Biology of Chronic Disease Emergence
- http://www.cpc.unc.edu/projects/addhealth
- <u>https://projectreporter.nih.gov/</u> (subproject ID: 5096)





Aims

- (1) Design protocols for collecting bio data / specimens
- (2) Monitor & control field / lab operations so as to ensure high quality bio data & specimens
- (3) Estimate prevalence / incidence of societally burdensome chronic diseases & disparities in their distributions
- (4) Serve as the bio data resource to the program & the entire scientific community
- (5) Implement a scalable surveillance system for chronic disease events





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- Implement a scalable surveillance system for chronic disease events
 - ascertainment
 - review
 - adjudication
 - classification
- Begin w/ participant deaths due to e.g.
 - accidents
 - CVD
 - cancer
- Thereby position the study for
 - ongoing surveillance of mortality
 - potential expansion to morbidity





- How do you do that?
 - assemble experienced team





Surveillance Team







Surveillance Team







Surveillance Team







- How do you do that?
 - assemble experienced team
 - develop standardized protocol





Surveillance Protocol





- How do you do that?
 - assemble experienced team
 - develop standardized protocol
 - NDI matching
 - CPC scoring
 - MOC investigation
 - MD review, classification & adjudication





- NDI matching Determine if Add Health & NDI agree re ≥ 1 of:
 - SSN
 - month & ±1 year of birth, 1st & last name
 - month & ± 1 year of birth, 1st & mid initial, last name
 - month & day of birth, 1st & last name
 - month & day of birth, 1st & mid initials, last name





CPC scoring*

Assign points based on match of:

- -1^{st} name or initial (0;1) -SSN (0-9)
- middle initial (0;1)
- last name (0;2)
- sex (0;1)
- state of residence (0;1)

Sum & group scores, as follows:

Total	Group
0-11	non-match
12-19	potential match, investigate
20-21	match



- -birth day (0;2)
 - birth month (0;2)
 - birth year (0;2)



- MOC investigation Assemble, abstract & enter into DES
 - cohort history (automatic)
 - obituary
 - death certificate
 - health provider Q
 - ME/coroner report
 - next-of-kin interview
 - hospital records
- MD review, classification
 & adjudication





Preliminary Findings



Case Status	Wave 3	Wave 4	Wave 5	Total
Deceased or Unlocatable	96	131	43	270
Matched (1:1)	80 (83%)	115 (88%)	40 (93%)	235 (87%)





Preliminary Findings (n=235)







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- Per NDI, underlying cause of death
 - external (73%)
 - cancer (6%)
 - cardiovascular (5%)
 - respiratory (5%)
 - infectious / parasitic (2%)
 - endocrine / nutritional / metabolic (2%)
 - digestive (1%)
 - other (7%)





Preliminary Findings







Summary

- Add Health Program Project IV: The Biology of Chronic Disease Emergence
- Scalable surveillance system for chronic disease events
- Our hope is that the data it generates will help
 - support your research
 - generate actionable, timely knowledge for public health professionals at the local, state, regional & national levels
 - assess the latest DHHS & AHA prevention efforts
 - by 2016, to thwart 1 million MIs & strokes
 - by 2020, to ↑ CV health of the US population to ↓ CVD deaths by 20%

