

Association of Farm-Related Occupations with Psychological Distress & Mortality



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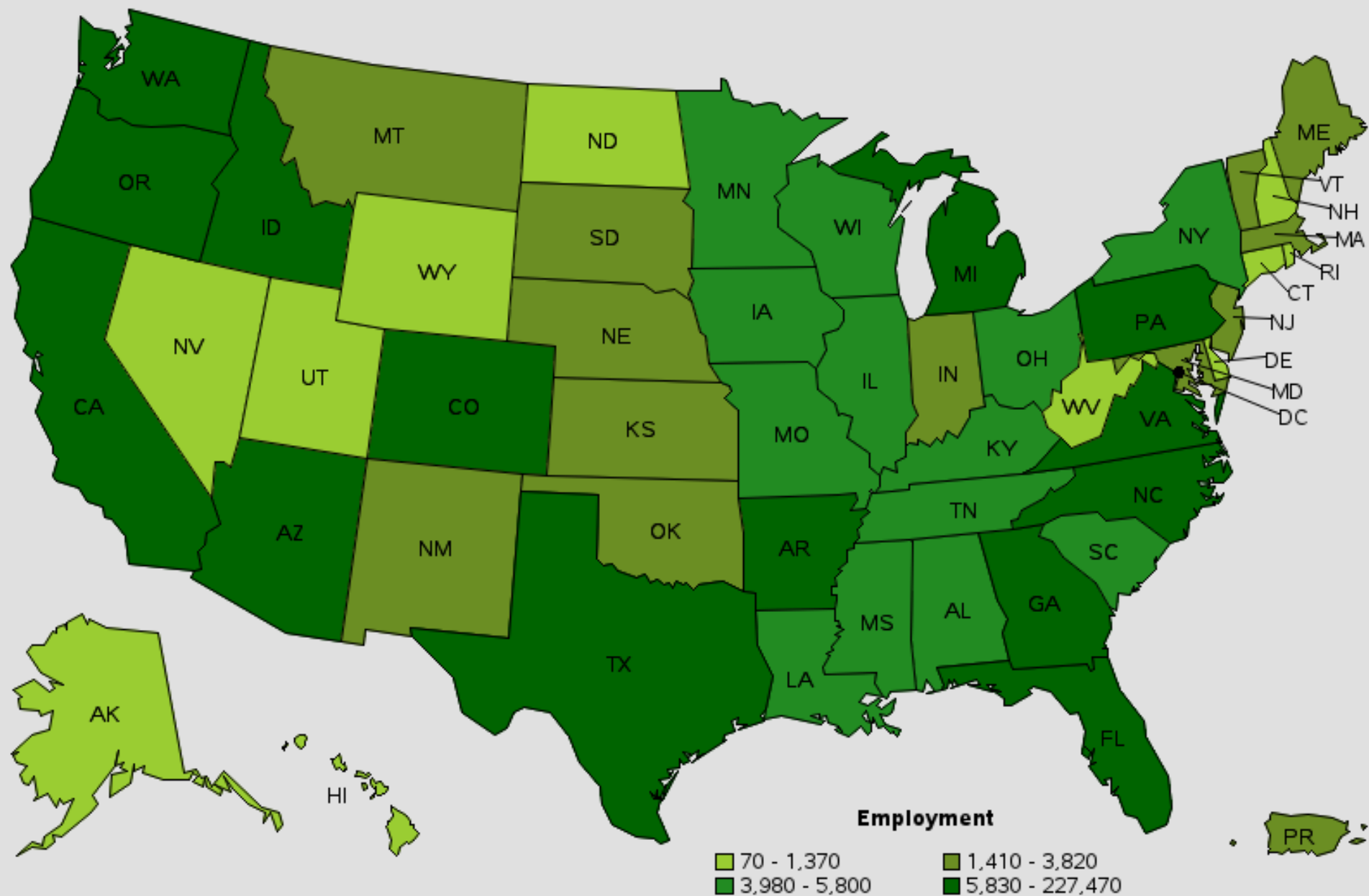
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Farming, Fishing, and Forestry Occupations

- 480,130 people work in farming, fishing, and forestry occupations
- It includes agricultural workers, fishing and hunting workers, forest and conservation workers, and logging workers
- The Agriculture, Forestry, and Fishing sector has approximately 2.3 million workers
- It is one of the lowest paid occupational groups



Employment of farming, fishing, and forestry occupations, by state, May 2018



Blank areas indicate data not available.

Psychological distress

- State of emotional suffering characterized by symptoms of depression and anxiety
- Mental health problems
- Prevalence – 5%-30% in general population
- 1 out of 5 worker
- K-6 scale

Occupational factors contributing to psychological distress

- Occupational stress, limited control at work
- Economic factors: low pay or inadequate health insurance
- Transient work increases unemployment and makes income less consistent
- Low occupational prestige
- Lack of valued respect in the workplace
- Long work hours
- Social isolation at work
- Mental health problems

Objectives and Hypotheses

We studied associations between occupations with psychological distress & all cause mortality in the United States using nationally representative National Health Interview Survey (NHIS), the largest ongoing cross-sectional health survey in the U.S. We used NHIS Public-use Linked Mortality Files (LMF).

Hypotheses:

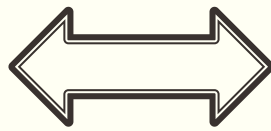
1. People in farm occupations have higher mortality
2. People in farm occupations are more likely to develop psychological distress

National Health Interview Survey

- The largest in-person household health survey in the U.S.
- Started in 1957
- Cross-sectional household interview survey
- Provides information on the health of the U.S. civilian noninstitutionalized population through confidential interviews conducted in households.
- Complex stratified multistage cluster probability design
- NHIS sample is drawn from each state and the District of Columbia
- ~35,000 Households, ~85,000 individuals
- It is conducted by National Center for Health Statistics



National Health Interview Survey



Linked-Mortality File
Public-use

Family Core
component

Sample Adult Core
component

Sample Child Core
component

All adult members
of the household

One randomly selected
adult member

One randomly
selected child

1997-2014

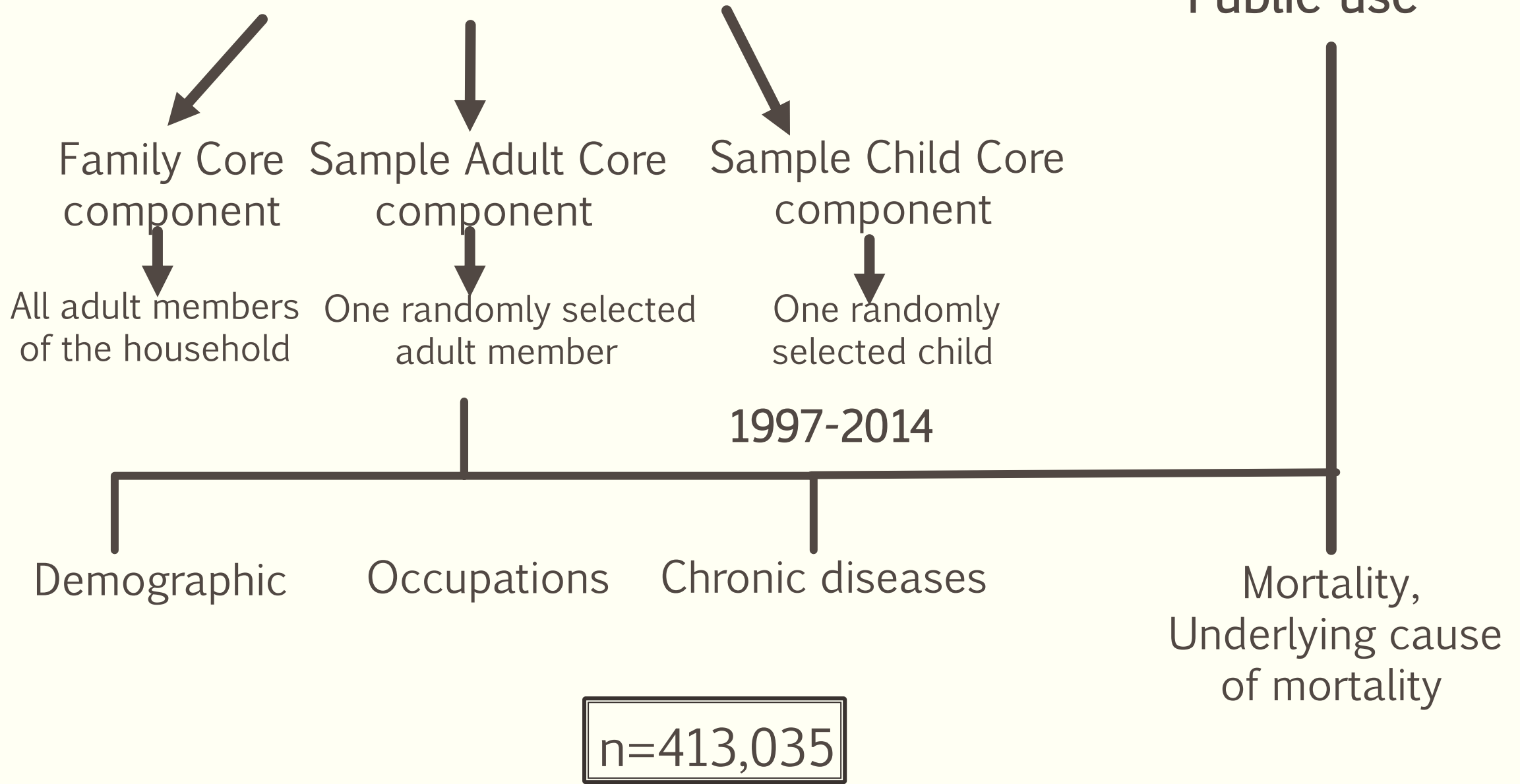
Demographic

Occupations

Chronic diseases

Mortality,
Underlying cause
of mortality

n=413,035



Outcome variables

- Mortality
- Psychological distress – K6 scale
 - Kessler et al. (2002) K6 index of psychological distress
 - Score of ≥ 13 indicator of psychological distress
 - Separate questions asked, “How often in the past month did you feel:” “nervous;” “hopeless;” “restless or fidgety;” “everything was an effort;” “so sad nothing could cheer you up;” and “worthless.” Responses from “1. All the time” to “5. None of the time.” Responses scored in that order from 4 to 0 points, $\geq 13 =$ distress

Exposure: Defined in two ways

Binary variable

- Worked in Farming, Forestry, Fishing occupations at time of NHIS interview, coded as 1
- Worked in other occupations at time of NHIS interview, coded as 0

Categorical/Nominal variable:

- Worked in low-risk occupations at time of NHIS interview, coded as 0
 - Worked in Farming, Forestry, Fishing occupations at time of NHIS interview, coded as 1
 - Worked in other high-risk occupations at time of NHIS interview, coded as 2
-

Low risk occupations

- Managers and administrators, except public administration
- Officials and administrators, public administration
- Management related occupations
- Engineers
- Architects and surveyors
- Natural mathematical and computer scientists
- Health diagnosing occupations
- Health assessment and treating occupations
- Teachers, librarians, and counselors
- Writers, artists, entertainers, and athletes
- Other professional specialty occupations
- Technologists, technicians, except health
- Supervisors and proprietors
- Sales representatives, commodities, and finance
- Computer equipment operators
- Police and firefighters
- Construction laborers

Other High-risk occupations

- Health technologists and technicians
- Other sales
- Mail carriers, ba
- Secretaries, stenographers, and typists
- Financial records processing occupations
- Other administrat
- Private household occupations
- Other protective service occupations
- Food service
- Cleaning and building service
- Health service
- Personal service
- Mechanics and repairers
- Construction and extractive trades
- Precision production occupations
- Machine operators and tenderers, except precision
- Fabricators, assemblers, inspectors, and samplers
- Motor vehicle operators
- Other transportation, except motor vehicles
- Material-moving equipment operators
- Freight, stock and material handlers

Covariates

Age, sex, race/ethnicity, poverty level, marital status, insurance, body mass index, lung diseases, cancer, hypertension, diabetes, and heart disease

Statistical analysis

- Frequency distribution
- Age-adjusted mortality rates
- Age-adjusted psychological distress rates
- Age standardized cause-specific mortality rates
- Cox proportional hazards regression
- Logistic regression
- Stata Statistical software (version 16.1) - complex survey design

Results: Descriptive

| Characteristics | Weighted % | Farm-Related Occupations Weighted % |
|---------------------------------|-----------------|--|
| Age Groups | Mean=45.7 years | Mean=43.6 years |
| 18-34 | 30.5 | 35.2 |
| 35-49 | 30.4 | 29.7 |
| 50-64 | 23.8 | 21.7 |
| 65+ | 15.3 | 13.3 |
| Male | 47.6 | 76.8 |
| Race/Ethnicity | | |
| Non-Hispanic White | 73.3 | 62.7 |
| Non-Hispanic Black | 11.8 | 6.8 |
| Non-Hispanic Other/Multirace | 4.3 | 2.4 |
| Hispanic | 10.5 | 28.1 |

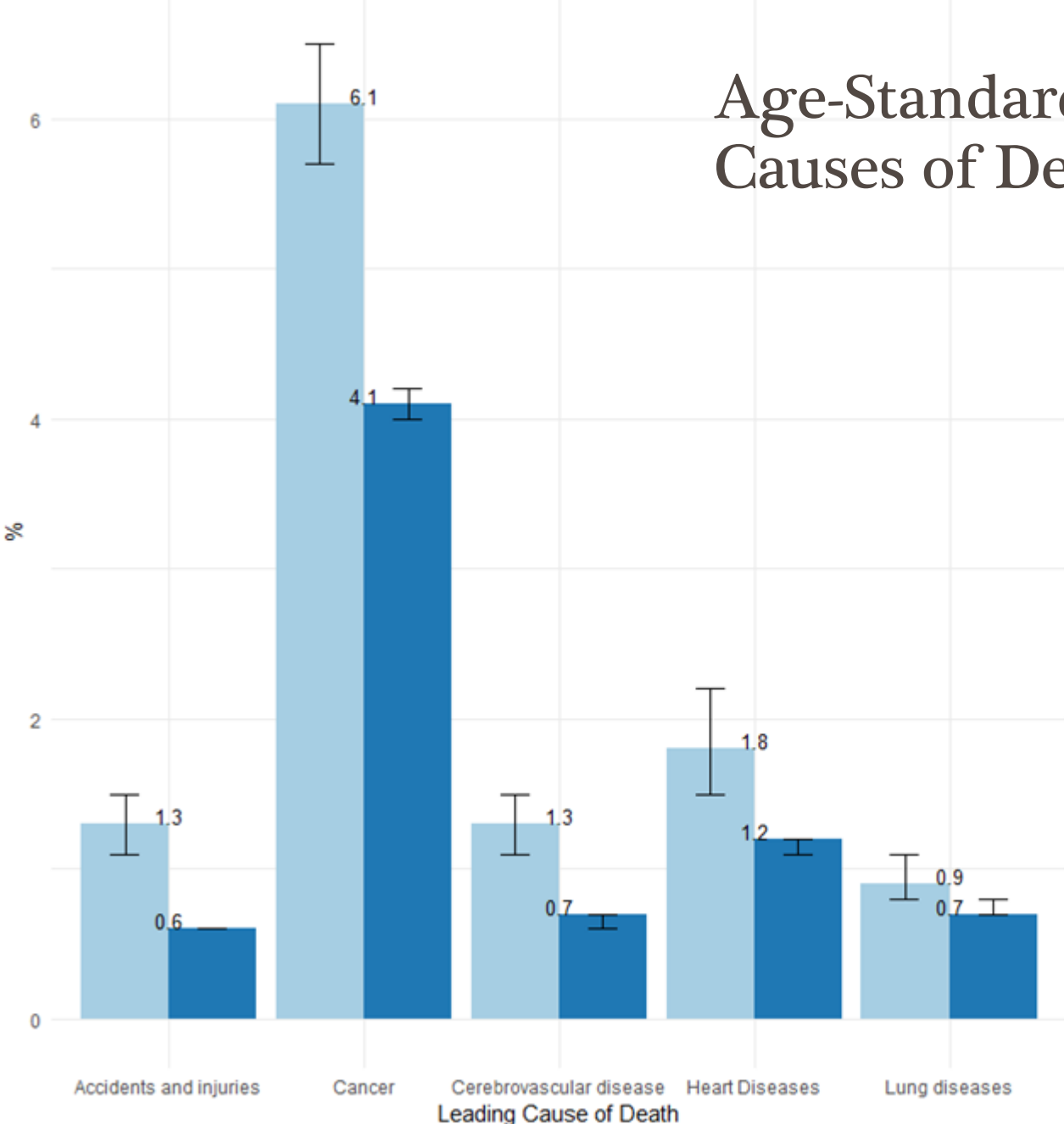
| Characteristics | Weighted % All | Farm-Related Occupations Weighted % | Non-Farm-Related Occupations Weighted % | P-value |
|---------------------------|-------------------|---|---|---------|
| Below Poverty Level | 12.2 | 26.6 | 12.0 | <0.001 |
| No Insurance | 14.8 | 35.7 | 14.5 | <0.001 |
| BMI | | | | <0.001 |
| Underweight | 1.1 | 0.9 | 1.1 | |
| Overweight | 36.4 | 40.6 | 36.3 | |
| Obese | 24.8 | 22.9 | 24.8 | |
| Lung diseases | 14.7 | 11.3 | 14.8 | <0.001 |
| Cancer | 7.6 | 5.1 | 7.6 | <0.001 |
| Hypertension | 27.0 | 24.0 | 27.0 | <0.001 |
| Diabetes | 8.4 | 8.1 | 8.4 | 0.374 |
| Heart disease | 11.0 | 9.4 | 10.9 | <0.001 |
| Psychological distress | 2.9 | 3.5 | 2.9 | 0.001 |
| Assumed Dead | 7.6 | 10.5 | 7.5 | <0.001 |

Age-Standardized Mortality Rates by Gender, 1997-2014

| | All% (95% CI) | Male % (95% CI) | Female % (95% CI) |
|------------------------------|------------------|--------------------|----------------------|
| Overall mortality | 8.4 (8.2-8.5) | 9.8 (9.6-10.0) | 7.2 (7.0-7.3) |
| Farm-Related Occupations | 11.9 (11.1-12.8) | 13.1 (12.1-14.1) | 8.4 (7.1-10.0) |
| Non-Farm-Related Occupations | 8.3 (8.2-8.4) | 9.7 (9.6-9.9) | 7.1 (7.0-7.3) |

*Standardized to U.S. 2000 standard population using Direct method

Age-Standardized Mortality Rates (%) of Leading Causes of Death, 1997-2014



Group
Farm-Related Occupations
Non Farm-Related Occupations

*Standardized to U.S. 2000 standard population using Direct method

Age-Standardized Psychological Distress Rates by Gender, 1997-2014

| | All % (95% CI) | Male % (95% CI) | Female % (95% CI) |
|------------------------------|-------------------|--------------------|----------------------|
| Psychological distress | 2.9 (2.8-3.0) | 2.2 (2.2-2.3) | 3.5 (3.4-3.6) |
| Farm-Related Occupations | 3.5 (3.1-4.0) | 3.0 (2.6-3.6) | 5.1 (4.1-6.3) |
| Non-Farm-Related Occupations | 2.9 (2.8-2.9) | 2.2 (2.1-2.3) | 3.5 (3.4-3.6) |

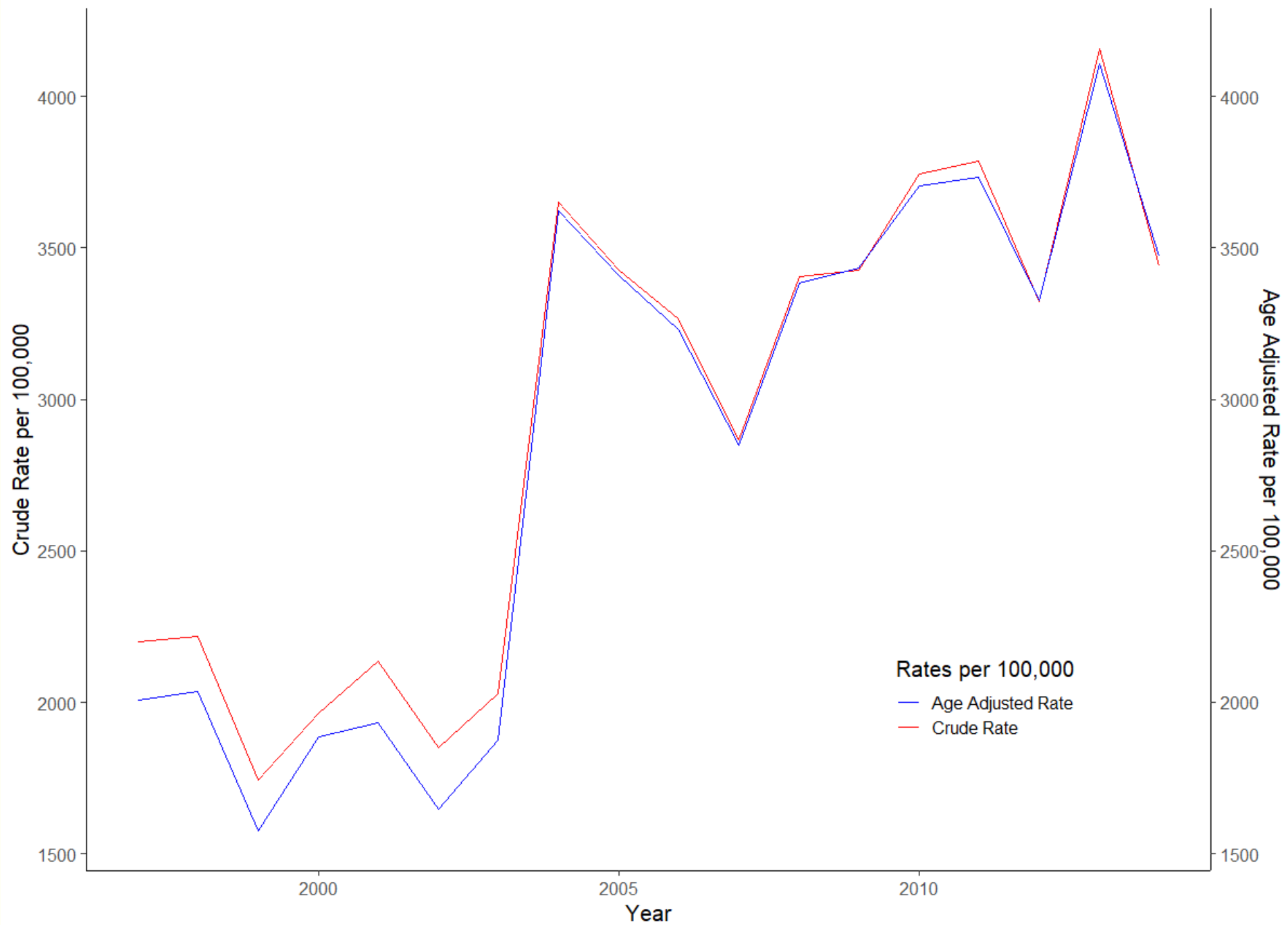
*Standardized to U.S. 2000 standard population using Direct method

Age-Standardized Psychological Distress Rates by Gender, 1997-2014

| | All % (95% CI) | Male % (95% CI) | Female % (95% CI) |
|--------------------------------|-------------------|--------------------|----------------------|
| Low-Risk Occupations | 1.5 (1.5-1.6) | 1.2 (1.1-1.3) | 1.9 (1.8-2.0) |
| Farm-Related Occupations | 3.5 (3.1-4.0) | 3.0 (2.6-3.6) | 5.1 (4.1-6.3) |
| Other High-Risk Occupations | 3.8 (3.7-3.9) | 3.0 (2.6-3.6) | 4.5 (4.4-4.7) |

*Standardized to U.S. 2000 standard population using Direct method

Crude and Age-adjusted Rates of Psychological Stress, 1997-2014



Hazard Ratios - Mortality

| | Unadjusted HR (95%CI) | Adjusted HR (95%CI) |
|--------------------------------|--------------------------|------------------------|
| Farm vs. Non-Farm | 1.48 (1.41-1.55) | 1.04 (0.94-1.45) |
| Low-risk occupations | 1.00 | 1.00 |
| Farm-related occupations | 1.70 (1.62-1.79) | 1.21(1.09-1.33) |
| Other high-risk occupations | 1.24 (1.23-1.27) | 1.30 (1.26-1.35) |

Adjusted for age, gender, race/ethnicity, poverty level, marital status, insurance status, lung diseases, cancer, hypertension, diabetes, heart disease, and psychological stress.

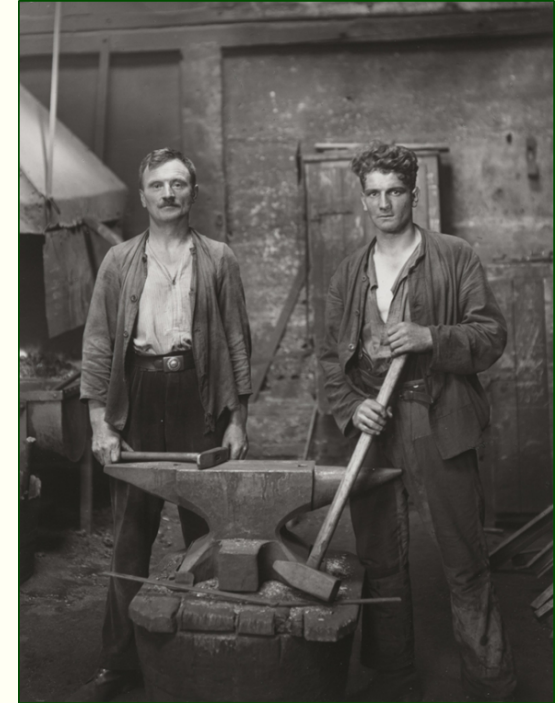
Odds Ratios - Psychological distress

| | Unadjusted OR (95%CI) | Adjusted OR (95%CI) |
|--------------------------------|--------------------------|------------------------|
| Farm vs. Non-Farm | 1.20 (1.05-1.38) | 1.11 (0.95-1.29) |
| Low-risk occupations | 1.00 | 1.00 |
| Farm-related occupations | 2.26 (1.95-2.62) | 1.83 (1.55-2.15) |
| Other high-risk occupations | 2.48 (2.36-2.61) | 1.89 (1.79-2.00) |

Adjusted for age, gender, race/ethnicity, poverty level, marital status, insurance status, lung diseases, cancer, hypertension, diabetes, heart disease, and psychological stress.

Limitations

- Data did not measure specific workplace risk factors associated with distress and mortality
e.g., chemicals
- No information on duration of employment
- No employer characteristics, e.g., size, number of employees, benefits
- Based on self-reports of principal occupation; people increasingly work in more than one occupation at given time



Conclusions

- Farm related occupations were associated with high risk of overall and cause specific mortality
- Farm related occupations were associated with high risk of psychological distress
- Providers of health care and social services should ask patients or clients about distress associated with work
- Distress can greatly affect productivity, workplace climate, employee satisfaction and retention
- Employers would benefit from programs that address workplace characteristics linked with distress



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