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A standardized process for using O*NET to estimate the association between work exposures and chronic disease occurrence

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Presenter Disclosures

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Does long-term exposure to occupational conditions over a working lifetime create a risk for chronic disease later in life?

Chronic diseases such as diabetes, asthma, arthritis, chronic respiratory diseases, hypertension, non-skin cancer, chronic heart disease

How can this question be studied?

Few employers maintain records of exposure assessment over a period of many decades

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O*NET – The Occupational Information Network
U.S. Department of Labor, Employment and Training Administration

974 occupational classifications, 277 job descriptors in each classification

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Each job descriptor is rated according to a 0-100 scale, for example:

Work Activities — Handling and Moving Objects [Save Table \(XLSX\)](#)

Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things.

Level	Code	Description
10	13-2011.01	Accountants
47	27-2011.00	Actors
70	29-1199.01	Acupuncturists
71	29-1141.01	Adult Care Nurses
81	25-2059.01	Adapted Physical Education Specialists
94	51-9191.00	Adhesive Bonding Machine Operators and Tenders
14	23-1021.00	Administrative Law Judges, Adjudicators, and Hearing Officers
46	11-3011.00	Administrative Services Managers
47	25-3011.00	Adult Basic and Secondary Education and Literacy Teachers and Instructors
27	29-1141.02	Advanced Practice Psychiatric Nurses
24	11-2011.00	Advertising and Promotions Managers
18	41-3011.00	Advertising Sales Agents
15	17-3021.00	Aerospace Engineering and Operations Technicians
33	17-2011.00	Aerospace Engineers
21	13-1011.00	Agents and Business Managers of Artists, Performers, and Athletes
32	17-2021.00	Agricultural Engineers
77	45-2091.00	Agricultural Equipment Operators

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Research Design:

Used each of five selected O*NET job descriptors:

- “Handling and Moving Objects”
- “Spends Time Kneeling, Crouching, Stooping, or Crawling”
- “Spends Time Bending or Twisting the Body”
- “Work in Cramped Work Space, or Awkward Postures”
- “Performing General Physical Activities”

Independent Variable:

A “mean intensity level” (MIL) was calculated for each of the five O*NET job descriptors by averaging the O*NET intensity level for every week that the cohort member worked on a full-time basis in a job during the 32-year study period (1979 – 2010).

Research Design:

Dependent Variable:

National Longitudinal Survey of Youth – 1979 (NLSY79)
 Self-report of “arthritis or rheumatism”
 Question: “Have you ever had, or has a doctor ever told you that you have arthritis or rheumatism?”

Outcome Assessment:

32-year study period, 1979 – 2010

Findings

	Handling and Moving Objects	Spend Time Kneeling, Crouching, Stooping, or Crawling	Spend Time Bending or Twisting the Body	Cramped Work Space, Awkward Positions	Performing General Physical Activities
MIL	1.29**	1.27**	1.48***	1.30**	1.33**
High vs. Low	(1.08, 1.53)	(1.07, 1.51)	(1.23, 1.77)	(1.08, 1.55)	(1.12, 1.58)
1st quartile	1.00	1.00	1.00	1.00	1.00
2nd quartile	1.27* (1.01, 1.61)	1.15 (0.91, 1.45)	1.11 (0.88, 1.41)	1.05 (0.84, 1.32)	1.31* (1.04, 1.65)
3rd quartile	1.47*** (1.17, 1.86)	1.33* (1.06, 1.68)	1.51*** (1.19, 1.92)	1.38** (1.11, 1.73)	1.59*** (1.27, 2.00)
4th quartile	1.46** (1.12, 1.90)	1.42** (1.11, 1.82)	1.64*** (1.27, 2.11)	1.22 (0.93, 1.61)	1.46** (1.12, 1.89)
Continuous per 10 MIL points	1.10*** (1.04, 1.17)	1.10* (1.02, 1.19)	1.11*** (1.05, 1.17)	1.08 (0.99, 1.17)	1.10** (1.03, 1.18)

Regression models are adjusted for age (in 2010), gender, education level, and co-occurring conditions (0 or ≥ 1).
 * p<0.05, ** p<0.01, *** p<0.001

Implications

1. This study demonstrates the use of a novel method for assessing the association between long-term job exposure and the onset of chronic disease later in life.
2. This study also shows how O*NET can successfully be used as a surrogate measure for occupational exposure even when direct exposure measurement is not feasible.
3. This same methodology can be extended to study the relationship between occupational exposures and a variety of chronic diseases, such as asthma, diabetes, chronic lung disease, hypertension, non-skin cancer, mental health conditions, and chronic heart disease (all available in NLSY79).
4. This study reinforced the importance of identifying and controlling known risk factors for occupational arthritis, such as handling of heavy materials, working in awkward postures, and performing strenuous physical activities.
5. The detection of relatively consistent dose-response relationships helps to further validate the potential usefulness of this approach for studying associations between long-term job exposure and chronic disease.

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