Tobacco use and its relationship to socioeconomic status in occupational radiation cohorts

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Abstract

The purpose of this study was to examine the relationship between tobacco use and different measures of socioeconomic status (SES) in cohorts of radiation workers. Often, tobacco use information is unavailable in occupational studies, so measures of SES are commonly used as a surrogate. However, there is not a standard measure of SES that is used across occupational studies, nor is there a full understanding of how SES is related to tobacco use in these unique groups. Specifically, this study hypothesized that there will be a relationship between tobacco use and SES, but it is expected that this relationship may change as tobacco use patterns shift over time. For this study, data were obtained from the Comprehensive Epidemiologic Data Resource (CEDR) for three previously published cohorts each with a different SES measure. All analyses were completed in SAS 9.3 and R. Job category was the tobacco use surrogate for 492 white males employed at the Hanford Site, while highest level of education was the SES measure for 456 white males from the Lindsay Chemical Company, and pay category was used for 564 males and 46 females from the Tennessee Eastman Corporation. There were slight differences in birth cohorts between the three sites although all three shared overlapping periods. Without adjustment for birth cohort, the job category and pay category did not show significant associations with tobacco use in the chi-square analysis. There was a significant relationship between education level and tobacco use in the Lindsay Chemical Company workers at 95% confidence level. A simple logistic regression showed the odds of using tobacco are lower in those with graduate education compared to those with less than high school education, and this association persisted once adjusted for birth cohort.

Background

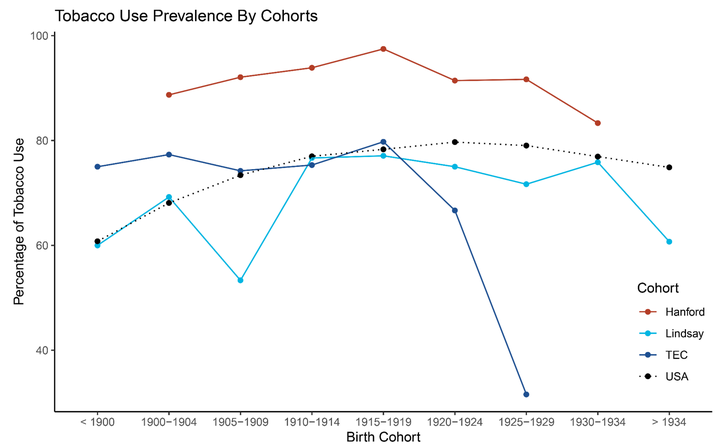
- Tobacco use is an important confounder for many chronic conditions
- In studies of radiation workers, tobacco use information is rarely available. Measures of socioeconomic status (SES) are typically used as surrogates.
- However, there is no standardized measure of SES used across occupational radiation cohorts, nor is there is a full understanding of how SES is related to tobacco use in these unique groups.
- The objective of this study is to assess if there is an association between tobacco use in SES in the occupational cohorts of radiation workers.

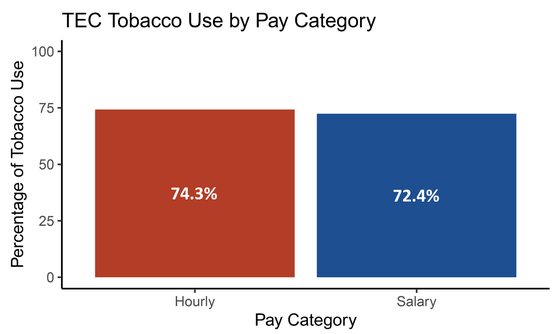
Methods

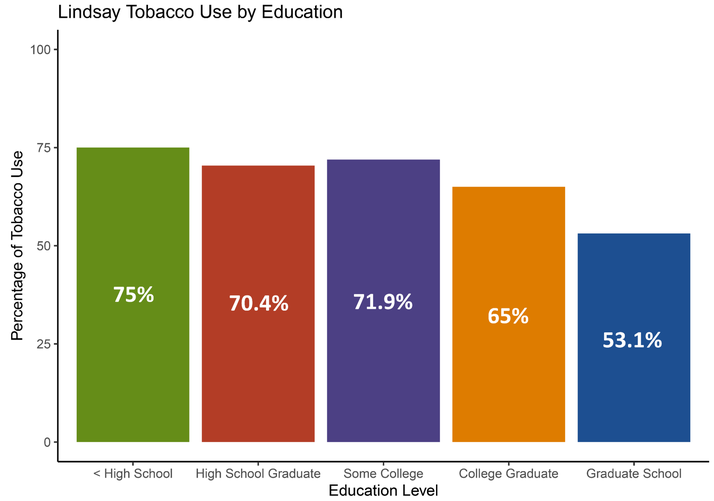
- Using data publicly available on the Comprehensive Epidemiologic Data Resource, three different cohorts were selected. Each cohort included tobacco status and a different measure of socioeconomic status (SES).
- Tobacco use was recorded for each cohort as ever used or never used tobacco. Only records with tobacco use and SES were used.
- For SES, the Hanford site used job category, Lindsay Chemical Corporation used highest level of education, and Tennessee Eastman Corporation used pay category.
- Prevalence by birth cohort was calculated for each cohort, and compared to the prevalence in the United States for each birth cohort in 1979, which was the median of year of data collection for tobacco use between occupational cohorts.
- Chi-square analysis was used to determine if there was an association between SES and tobacco use for each cohort.
- If the chi-square analysis was significant at 95% confidence, a logistic regression model was run with tobacco use as the dependent variable with SES as the independent variable. A separate model was run with adjustment for year of birth.

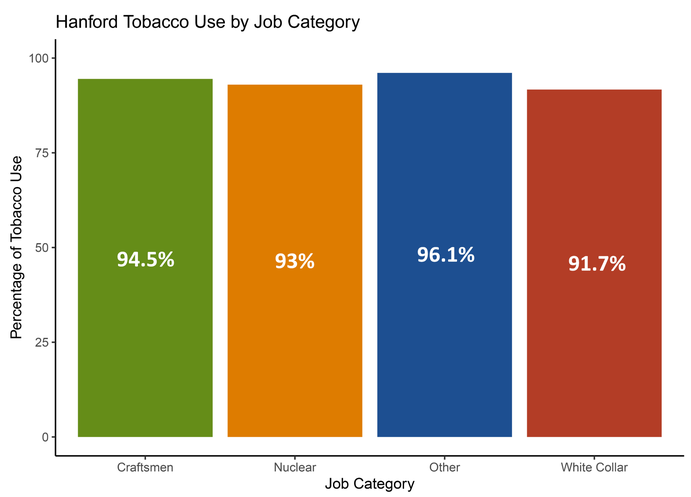
	Hanford	Lindsay	TEC	Total
Total People	492	465	610	1,567
Tobacco Status				
Tobacco Use	461	320	451	1,232
No Tobacco Use	31	145	159	335
Birth Cohort				
< 1900	0	5	80	85
1900 – 1904	62	13	97	172
1905 – 1909	101	15	128	244
1910 – 1914	147	30	154	331
1915 – 1919	79	48	84	211
1920 – 1929	35	68	48	151
1925 – 1929	12	60	19	91
1930 – 1934	6	58	0	64
>1934	0	168	0	168

Results



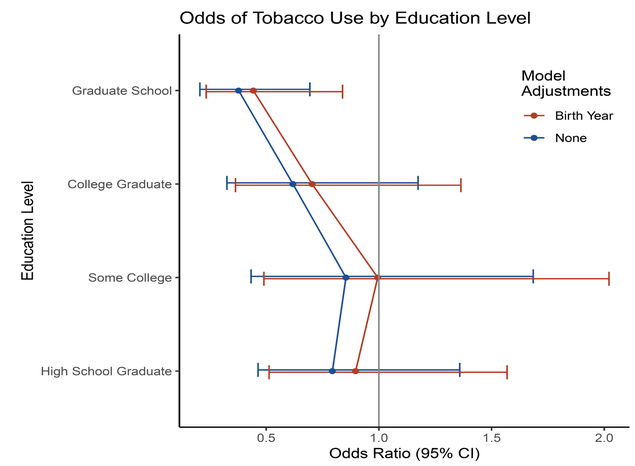






	Chi-square	DF	p-value
Education	11.0357	4	0.0262
Pay Category	0.1719	1	0.6785
Job Category	2.3371	3	0.5054

Results Cont.



Discussion

- Overall, the study was limited by small sample size. Specifically, a lack of women (n=46) and non-white participants.
  - Both the Hanford and Lindsay studies only included white males.
  - The number of people who did not use tobacco is small in each cohort compared to tobacco users.
- Tobacco use prevalence by occupational cohort show declines in later birth cohorts while the prevalence in the greater USA does not show the declines.
  - The observed declines could be the result smaller number of people with tobacco use information available in the later birth cohorts
- Of the three different types of SESs, only education level showed a statistically significant difference in tobacco use.
  - Both Hanford (31/492, 6.3%) and TEC (159/610, 26.1%) had relatively small proportions of non-tobacco users
- In the logistic regression, only the comparison of graduate school education to less than high school education had a significantly relationship
- More research is needed to determine if different measures of SES are reasonable estimates of tobacco use in occupational cohorts of radiation workers.

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