

## Summary Measures of Occupational History: A Comparison of Latest Occupation and Industry with Usual Occupation and Industry

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**Abstract:** The utility of using latest occupational information as a summary of work history is assessed by comparing it to usual occupation and industry. We analyzed 5,734 complete occupational histories obtained by telephone interview as part of an ongoing occupational cancer surveillance study. Of these, 73.6 per cent reported the same usual occupation as latest occupation and 76.6 per cent the same usual industry as latest industry. Differences in match rates by race and sex, occupation and industry titles and categories suggest that bias may result in studies using latest occupation or industry as a summary measure of occupational exposures. (*Am J Public Health* 1987;77:1532-1534.)

### Introduction

Several large occupational surveillance studies have examined cancer morbidity and mortality patterns among various industries and occupations.<sup>1</sup> The majority of these studies utilize occupational information as recorded on death certificates—a reasonably good source of occupational information.<sup>2-5</sup> Other studies have considered alternative sources of occupational data such as hospital records,<sup>6</sup> city directories,<sup>7</sup> the Social Security Administration,<sup>8,9</sup> the Internal Revenue Service,<sup>10</sup> and the Census Bureau.<sup>11,12</sup> Since many of these sources report a person's current or latest occupation, an issue of concern is how well the occupational information available represents a valid and reliable summary of an individual's work experience. Of 11 major occupational cancer surveillance studies conducted between 1950 and 1973, five used latest occupation as their exposure measure.<sup>13-17</sup> The best single measure of occupation, for studies of cancer etiology, is the usual or lifetime occupation—the occupation in which a person has been employed over most of his or her working life. This report examines how well latest occupation serves as a summary of a person's occupational history by comparing it to usual occupation in one population.

### Methods

The Occupational Cancer Incidence Surveillance System (OCISS) is a population-based study of occupational factors in the etiology of cancer in the metropolitan Detroit, Michigan area. OCISS is integrated with the Metropolitan Detroit Cancer Surveillance System (MDCSS), a founding participant in the National Cancer Institute's SEER (Surveillance, Epidemiol-

ogy, and End Results) program.<sup>18</sup> Cases are selected through the MDCSS rapid reporting system, which identifies them for interview within two weeks of diagnosis. Complete lifetime occupational histories are obtained by telephone interview for Black and White males and females between the ages of 40-84 with incident cancers of the urinary bladder, colon, esophagus, eye, liver, lung, rectum, salivary gland, or mesothelioma. There are 5,734 cases included in this analysis, 92.6 per cent of all cases eligible for the study between November 1984 and August 1986; 58.8 per cent of these interviews were with the case and 41.2 per cent with proxies, usually either the spouse (47%) or child of the case (25%).

Occupations and industries are coded according to the 1980 US Census Bureau codes,<sup>19</sup> then grouped in terms of known or suspected exposure similarities. For example, all 17 codes for agricultural workers are grouped together as are the 23 codes for clerical workers. Usual industry and occupation are arrived at by summing the total number of months a person was employed in a specific industry or occupation over the entire work history.

We defined a match as occurring when the same industry or occupation grouping was used for both the latest and usual jobs. Individual match rates are presented for industries and occupations in those groups including at least 10 cases. These match rates are reported as the percentage of all individuals for whom the latest industry or occupation was identical to the usual industry or occupation. The denominator for these calculations is the total number of individuals having latest employment in the group of interest. Thus, the match rates show how well a study based on latest occupation and industry titles would approximate the usual occupations and industries in the population studied.

### Results

In this study, 29.1 per cent of the latest occupations represent less than 10 years of an individual's occupational history, while for usual occupation, only 3.7 per cent account for less than 10 years of employment. Thus, information on latest occupation provides a much smaller "window" of exposure than does the information on usual occupation. In addition, 90 per cent of those interviewed indicated that they held more than one job over their entire lifetime. Consequently, one would expect discrepancies between latest and usual occupation and industry.

The frequencies of matches between latest and usual occupational reports are given in Table 1. Overall, 73.6 per cent of the records had identical grouped codes for usual and latest occupation and 76.6 per cent had matching codes for usual and latest industry. The per cent matching increased steadily over each 10-year age group for both industry and occupational codes. White males had the highest matching percentages. The

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**TABLE 1—Total Sample Size and Percent Matches between Latest and Usual Employment for Occupation and Industry by Age, Race, Sex, Years Spent in Latest Occupation/Industry**

Subgroup	Total N	% Matches for Occupation	% Matches for Industry
Age (years)			
40–49	290	65.5	70.3
50–59	1176	71.7	74.7
60–69	2100	73.2	76.3
70–79	1677	75.3	77.8
80–84	491	79.2	82.3
Race/Sex			
White males	2714	78.9	82.2
White females	1764	70.4	70.6
Black males	768	68.9	77.2
Black females	435	62.5	65.3
Years Spent in Latest Occupation/Industry			
<10	1393	37.5	43.0
10–19	1347	60.1	66.4
20–29	1222	93.2	94.1
30–39	1055	99.6	99.5
>40	621	100.0	100.0
Total*	5734	73.6	76.6

\*includes 53 reporting race other than Black or White and 96 with missing length of employment.

**TABLE 2—Highest and Lowest 20 Occupation Groups Ranked by Percent Matches between Latest and Usual Occupation for Males**

Occupation	N in Latest Occupation	% Matches with Usual Occupation
Barbers/hairdressers	11	100.0
Health professionals	26	96.2
Engineers	69	94.2
Plumbers	30	93.3
Electrical workers	71	92.9
Railroad workers	13	92.3
Writers	11	90.9
Lawyers	21	90.4
Military	10	90.0
Postal workers	29	89.6
Finance workers	65	89.2
Printers	18	88.8
Masons	36	88.8
Chemists	44	88.6
Metal finishers	141	87.2
Tool and die workers	186	87.1
Driver-sales	23	86.9
Food workers	58	86.2
Social workers	14	85.7
Furnace operators	41	85.4
Sales workers with potential for exposures	81	79.0
Assemblers	265	78.8
Material movers	94	78.7
Molders	14	78.5
Computer workers	24	75.0
Mechanics	100	75.0
Inspectors	16	75.0
Laborers	134	74.6
Machine operators	119	73.9
Power plant workers	19	73.6
Administrators	283	72.1
Agricultural workers	30	70.0
Sales—unexposed	106	68.8
Teachers	19	68.4
Clerical workers	58	67.2
Checkers	122	66.4
Police	67	62.7
Stock clerks	78	60.3
Real estate sales	15	46.6
Janitors	180	45.5

**TABLE 3—Highest and Lowest 20 Industry Groups Ranked by Per Cent Matches between Latest and Usual Industry for Males**

Industry	N in Latest Industry	% Matches with Usual Industry
Media and communications	20	100.0
Beauty/barber shops	12	100.0
Gas/electric utilities	52	98.1
Rubber/plastic manufacturing	25	96.0
Food store	60	95.0
Legal services	16	93.7
Automobile manufacturing	1125	90.6
Computer manufacturing	21	90.4
Food manufacturing	55	89.1
Chemical manufacturing	36	88.8
Machinery and manufacturing	180	88.3
Postal	41	87.8
Construction	267	87.3
Transportation	107	85.9
Hardware	26	84.6
Farm	19	84.2
Medical office	18	83.3
Railroad	29	82.7
Drug manufacturing	11	81.8
Laundry	16	81.2
Miscellaneous manufacturing	30	70.0
Instrument manufacturing	13	69.2
Automobile repair	39	69.2
Department store	25	68.0
Ferrous metal manufacturing	144	66.6
Drug sales	12	66.6
Entertainment	30	66.6
Engineering services	24	65.6
Oil/gas sales	29	65.5
Waste sales	15	60.0
Business services	35	62.8
Miscellaneous sales	36	61.1
Appliance/furniture sales	17	58.8
Education	72	54.2
Transport manufacturing, other than automobiles	17	52.9
Real estate	31	45.2
Hospital	41	43.9
Miscellaneous repair	13	30.8
Security services	13	30.8
Hotel	11	27.2

per cent of matches increased steadily with years spent in latest occupation and industry. Over 90 per cent of the records with at least 20 years in latest employment were matches. This pattern was consistent across all race/sex groups.

Table 2 gives the highest and lowest 20 occupations ranked by per cent matches for all males. The range of per cent matches varies from a low of 45.5 per cent for janitors to a high of 100 per cent for hairdressers. Out of 52 occupation categories, 21 (40.4 per cent) had match rates exceeding 85 per cent, while only two (3.8 per cent) had match rates below 50 per cent. Thirteen of the 20 occupations with an 85 per cent or better match rate tend to be more difficult to enter (e.g., health professions, engineers, lawyers, tool and die makers, writers). The lower match rates are dominated by occupations requiring less education or skill. There are some exceptions to this predominant pattern; for example, teachers have only a 68 per cent match rate, while postal workers and food workers have a better than 85 per cent match rate.

Table 3 presents the highest and lowest 20 match rates for males by industry titles. Fourteen (24.0 per cent) of the industry titles had match rates above 85 per cent, while only 5 (8.8 per cent) had match rates below 50.0 per cent.

The overall match rate for females was dominated by the large number of women who were usually housewives, 1,386 (62.6 per cent). Among 22 occupations, only one (4.5 per

cent), bookkeepers, had a match rate above 85.0 per cent. There were five (22.7 per cent) which had match rates below 50.0 per cent, with the lowest being general service occupations at 18.2 per cent. None of the 23 industry titles observed had match rates above 85.0 per cent, while 10 (43.5 per cent) had match rates below 50.0 per cent.

### Discussion

The most important result of this report is the quantitative demonstration of some potentially important differences between latest and usual occupation and industry reports. The dilemma faced by researchers is that latest employment information is often easier to obtain from existing records, yet information regarding an individual's employment of longest duration is a more appropriate summary measure for studies of occupational cancer risks. Current or latest employment is less likely to represent usual employment for Blacks, females, and persons 40–49 years of age. In general, however, a study utilizing latest industry and occupation would accurately represent employment history of males in many categories with relatively high match rates. Those categories with lower rates might be subject to large misclassification biases. Excess risk might not be found in latest occupations because the time spent in these occupations would be less on the average than occupations with higher match rates. Some of the extremely low match rates for females could result in large biases in a study of female occupational risks which relied on latest occupation.

The results presented here indicate the need to evaluate more fully the agreement of latest and usual employment patterns when interpreting the results of large scale occupational surveillance studies. Since a substantial number of occupational epidemiologic studies rely upon death certificate information as a source of occupation and industry, it is critical to assess the extent to which these data provide current or latest employment, in contrast to usual employment.

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## Joint Commission Adopts New Name

The Joint Commission on Accreditation of Hospitals, which has served as the nation's principal health care standard setter since its establishment in 1951, has changed its name to Joint Commission on Accreditation of Healthcare Organizations. The change in name does away with the familiar "JCAH" acronym, now replaced by the new title of reference—"Joint Commission".

Commenting on the change, Charles A. McCallum, DMD, MD, chairman of the Joint Commission Board, noted that "Over the past two decades, the Joint Commission has progressively developed standards applicable to a broad spectrum of organized health care settings. Today, the five accreditation programs evaluate long-term care facilities, ambulatory care organizations, various mental health facilities and programs, and hospices, in addition to hospitals."

In 1988, the Joint Commission will initiate a new home care accreditation program, and developmental efforts are under way to explore effective methods for reviewing HMOs and IPAs.

The Joint Commission accredits more than 5,100 of the nation's 7,000 general acute and psychiatric hospitals. Additionally it accredits more than 3,100 healthcare organizations in the diverse activity settings noted above. The Joint Commission is based in Chicago, Illinois.