



Measuring proximity to others in the workplace[†]

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This brief uses data that score occupations by how closely workers interact with others in order to rank industries on their potential to spread disease through close contact. This report is part of a larger effort at CROWE to document and analyze the economic fallout of the COVID-19 pandemic. Updated figures and analysis are available at <https://crowe.wisc.edu/impact-of-covid19>. Updated versions of this data brief are available at <https://crowe.wisc.edu/data-briefs>.

As governments grapple with the costs of social distancing, a discussion has emerged about how “reopening” the economy might work. Most proposals suggest a staged reopening, beginning with relatively low-risk sectors. How can we identify low-risk sectors? In this brief we use data on the proximity to others while working to study this issue.

The Occupational Information Network (O*net) scores occupations by the physical proximity required to perform job tasks. The score ranges from zero to 100, with the scores benchmarked according to table 1. Occupations with very low scores include poets, painters, hunters, and trappers. Occupations with very high scores include dental hygienists, dancers, and flight attendants.¹

Table 1: O*net proximity scores.

Occupation	Score
0	I do not work near other people. (beyond 100 ft.)
25	I work with others, but not closely. (e.g., private office)
50	I work slightly close to others. (e.g., shared office)
75	I work moderately close to others. (at arm’s length)
100	I work very close to others. (near touching)

We use the O*net data, along with the distribution of employment in each occupation and industry in Wisconsin, to construct an employment-weighted average proximity score for each industry. We report the scores aggregated to the two-digit North American Industrial Classification (NAICS) sector in table 2. Not surprisingly, the healthcare industry has the highest score, followed by hospitality and food service. Manufacturing and retail are intermediate and the professional and management industries have relatively low proximity scores.

[†] *Data briefs are short, timely reports that use data to highlight economic issues of importance to policy makers, business leaders, and the public. This brief, and the data and code that underlie it, are available at crowe.wisc.edu. The views expressed herein are those of the authors and not necessarily those of the Center for Research on the Wisconsin Economy, the Department of Economics, or the University of Wisconsin.*

¹ A complete listing of occupations and scores is available at <https://www.onetonline.org/find/descriptor/result/4.C.2.a.3>

Table 2: Proximity score by industry (0 = lowest exposure).

Code	Industry	Score	Emp. share
62	Health care and social assistance	77.3	14.9
72	Accommodation and food services	71.1	8.9
48	Transportation	67.7	2.5
71	Arts, entertainment, and recreation	66.9	1.6
61	Educational services	65.6	8.0
23	Construction	65.5	4.5
81	Other services (except public administration)	64.9	2.8
44	Specialize retail	63.5	7.1
21	Mining, quarrying, and oil and gas extraction	63.0	0.1
45	General merchandise retail	62.5	3.5
99	Federal, state, local government	62.0	5.7
22	Utilities	59.0	0.3
53	Real estate and rental and leasing	58.9	0.9
49	Couriers, warehousing, storage	58.1	1.2
31	Food, textiles, apparel manufacturing	58.0	2.9
33	Metal, computer, electrical, transport manufacturing	55.9	8.7
56	Administrative support	55.4	5.2
51	Information	55.3	1.2
32	Wood, paper, petroleum, chemical, mineral manufacturing	55.2	4.8
42	Wholesale trade	54.9	4.4
52	Finance and insurance	52.9	4.4
55	Management of companies and enterprises	52.6	2.4
54	Professional, scientific, and technical services	52.5	4.0
11	Agriculture, forestry, fishing and hunting	49.8	0.1

How important are these industries in Wisconsin? In table 2, we also report the share of total employment in each industry. There are a few outliers, but the general pattern is that the industries with the highest proximity scores employ more workers. Next, we turn to a finer industry classification for more detail on which industries are driving this pattern.

We disaggregate industries to the three-digit NAICS level and plot the industry proximity scores against the share of employment accounted for by each industry in Wisconsin.² The results are presented in figure 1. The light-colored lines mark the value of the median proximity score and employment share. The industries in the top-right corner of the plot are the industries whose workers are in close proximity to others and make up a large part of the Wisconsin workforce. Two industries stand out: *food services and drinking places* (NAICS 722) and *educational services* (NAICS 611). The two industries account for almost 16 percent of Wisconsin's employment.

At the two-digit level, we observed that *accommodation and food services* (NAICS 72) had the second highest proximity score and employment share. In the disaggregated data, we see that *food services and drinking places* is dominate, accounting for 7.7 percent of Wisconsin's employment. Within the *health care and social assistance* two-digit industry, we find less heterogeneity. The cluster of industries with the highest proximity scores—*nursing and residential care facilities; hospitals; social assistance; and ambulatory health care services*—have similar proximity scores and sizes (see figure 1). These industries combine to make up almost 15 percent of employment in the state and require close contact with others.

²We report the top- and bottom-ten three-digit industries in the appendix. A complete listing of the results can be downloaded from <https://crowe.wisc.edu/data-briefs/>.

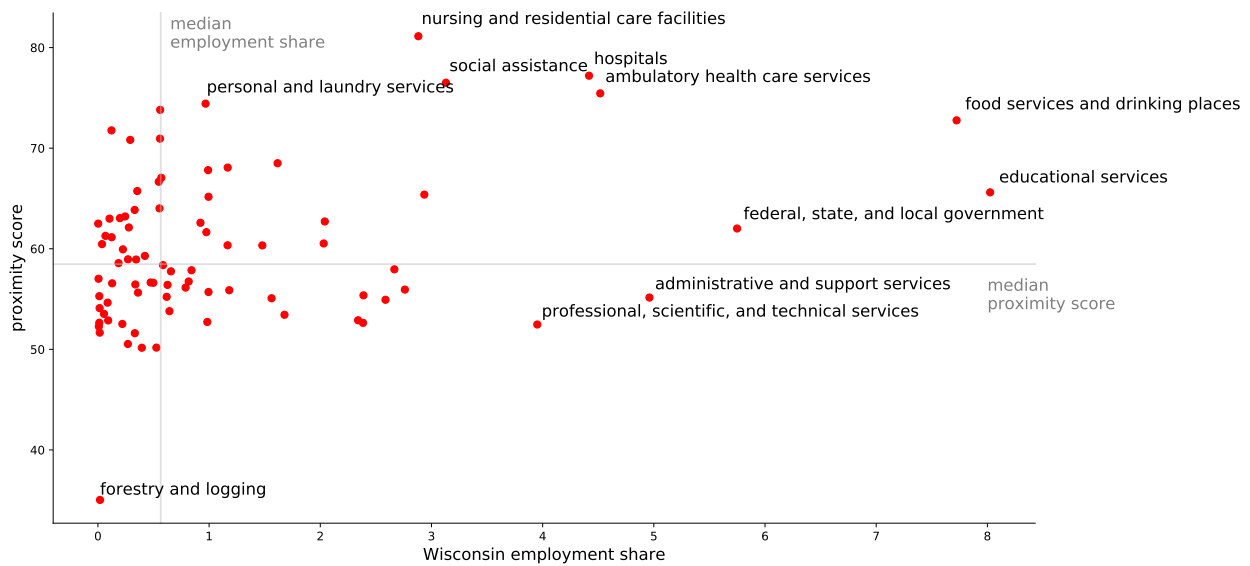


Figure 1: Proximity scores and employment in Wisconsin

Industry composition

Underlying the industry score is the composition of the workforce in the industry. As an example, consider *food services and drinking places* (NAICS 722), which has the fourth-highest proximity score (73) among the three-digit industries. More than 55 percent of employment in the industry is in occupational code 3530 which carries a proximity score of 75. Occupation 3530 includes bartenders, fast food and counter workers, and waiters and waitresses. The next largest occupation consists of cooks and food preparation workers (code 3520, proximity score 62). Food preparation supervisors make up eight percent of employment in the industry (code 3510, proximity score 88).

On the other end of the spectrum is *warehousing and storage* (NAICS 493), with a proximity score of 50. Almost 75 percent of the industry is made up of material moving workers (code 5370, proximity score 47). This occupational group includes truck and tractor operators, laborers and material movers, and tank car, truck and ship loaders. Many of these jobs involve operating equipment from inside a cab.

Concluding thoughts

The O*net data provide some insight into what kinds of occupations and industries might be easier to “reopen” than others. The proximity scores, however, tell only part of the story. Low-score industries, such as management and technical services, may also be easier to perform remotely. The potential cost of ending this remote work may outweigh the benefits. The industry-level measures also mask within-industry heterogeneity. A landscape worker at the University of Wisconsin may have a low proximity score, but the educational sector as whole (dominated by teachers, proximity score 79) works in close proximity to others.

Appendix

Table A1: Highest 10: Proximity score by industry (0 = lowest exposure).

Code	Industry	Score	Emp. share
623	Nursing and residential care facilities	81.1	2.9
622	Hospitals	77.2	4.4
624	Social assistance	76.5	3.1
621	Ambulatory health care services	75.4	4.5
812	Personal and laundry services	74.4	1.0
446	Health and personal care stores	73.8	0.6
722	Food services and drinking places	72.8	7.7
512	Motion picture and sound recording industries	71.8	0.1
485	Transit and ground passenger transportation	70.9	0.6
492	Couriers and messengers	70.8	0.3

Table A2: Lowest 10: Proximity score by industry (0 = lowest exposure).

Code	Industry	Score	Emp. share
551	Management of companies and enterprises	52.6	2.4
425	Wholesale electronic markets and agents and brokers	52.5	0.2
541	Professional, scientific, and technical services	52.5	4.0
533	Lessors of nonfinancial intangible assets (except copyrighted works)	52.3	0.0
519	Other information services	51.7	0.0
511	Publishing industries (except internet)	51.6	0.3
518	Data processing, hosting, and related services	50.5	0.3
493	Warehousing and storage	50.2	0.5
523	Securities, commodity contracts, and other financial investments and related activities	50.2	0.4
113	Forestry and logging	35.0	0.0