Letters

RESEARCH LETTER

Risk of Severe COVID-19 Among Workers and Their Household Members

Employment-related exposure to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) can endanger not only workers, but also their household members.[1,2] Using prepandemic data, we examined the prevalence of Centers for Disease Control and Prevention (CDC) risk factors for severe coronavirus disease 2019 (COVID-19). We then estimated how many adults at increased risk of severe COVID-19 held essential jobs and could not work at home (WAH) or who lived in households with such workers.

Methods | We used deidentified data from the 2014-2017 Medical Expenditure Panel Survey (MEPS), an in-person household survey of the US civilian noninstitutionalized population.[3] The research was approved under an Agency for Healthcare Research and Quality Institutional Review Board protocol for MEPS research. The MEPS is the only nationally representative data set providing detailed information on health and employment for all household members. It draws participants from the National Health Interview Survey, with a 62.9% average response rate (National Health Interview Survey response rates averaged 74.0%).

Essential workers were identified using federal guidance.[4] Because of the difficulty of determining which restaurant workers were essential, we classified the entire restaurant sector as nonessential. Ability to WAH was imputed from the American Time Use Survey.[5]

Following CDC guidelines,[6] persons at increased risk of severe illness had obesity (body mass index of 30 or higher; calculated as weight in kilograms divided by height in meters squared), age of 65 years or older, or any of the following treated conditions: diabetes, emphysema or other chronic obstructive pulmonary disease, kidney disease, cancer (other than nonmelanoma skin cancers), or coronary heart disease.[2] To implement the CDC's broader guidelines for possibly being at increased risk, we created a second variable that also included current smoking, treated asthma, or treated hypertension. We implemented these definitions in MEPS by combining data that were self-reported by each adult with data reported for each adult by a single family respondent.

All analyses used Stata, version 16.0 (StataCorp). Standard errors and 2-tailed *t* tests were adjusted for the complex design of MEPS. Results were statistically significant at $P < .05$ unless otherwise noted.

Results | The MEPS sample contained 100 064 adult observations. Of the 157.3 million workers, 112.4 million (71.5%) were

Table 1. Weighted Prevalence of Adults Meeting Main and Broader CDC Definitions for Increased Risk of Severe COVID-19 Illness, by Employment Characteristics[a]

			% (95% CI)[b]	
	Unweighted No.	Population, millions (95% CI)	Meets main CDC guidelines for increased risk of severe COVID-19	Meets broader CDC guidelines for increased risk of severe COVID-19
All adults	100 064	248.0 (239.0-257.0)	49.7 (48.9-50.4)	61.0 (60.1-61.9)
Nonworkers	40 192	90.8 (87.0-94.5)	67.4 (66.5-68.3)	75.8 (74.9-76.7)
Workers	59 872	157.3 (151.0-163.5)	39.4 (38.6-40.3)[c]	52.4 (51.5-53.4)[c]
Essential workers	42 437	112.4 (107.8-116.9)	41.0 (40.0-42.0)[c]	54.4 (53.4-55.4)[c]
Health	6470	17.0 (15.9-18.0)	41.7 (39.6-43.9)[d]	54.4 (52.4-56.4)[c]
Food	3354	7.0 (6.4-7.7)	42.3 (39.0-45.7)[e]	56.6 (53.2-60.0)[c]
Other, cannot WAH	22 611	57.2 (54.7-59.6)	42.0 (40.8-43.2)[c]	56.5 (55.3-57.6)[c]
Other, can WAH	10 002	31.2 (29.5-33.0)	38.6 (37.0-40.2)	50.0 (48.4-51.7)[d]
Nonessential workers	17 435	44.9 (42.7-47.0)	35.4 (34.0-36.8)	47.6 (46.1-49.1)
Cannot WAH	10 185	23.0 (21.9-24.1)	33.6 (31.9-35.2)[c]	48.0 (46.1-49.8)
Can WAH	7250	21.9 (20.5-23.3)	37.3 (35.5-39.1)	47.1 (45.3-49.0)

Abbreviations: CDC, Centers for Disease Control and Prevention; COVID-19, coronavirus disease 2019; WAH, work at home.

[a] Authors' calculations using 2014-2017 Medical Expenditure Panel Survey. All estimates computed using survey weights, with survey-adjusted CIs in parentheses. Health workers, all assumed unable to WAH, include workers employed in hospitals, outpatient clinics, physician offices, nursing homes, and other residential treatment facilities, as well as home health care workers and ambulance drivers. The food worker category includes workers in all food-related industries, from agriculture to food processing and groceries, with the exception of any nonrestaurant food workers who are able to WAH (classified as other essential, able to WAH); because of difficulty determining which restaurant workers were essential, we classified the entire restaurant sector as nonessential.

[b] Statistically significant differences noted from reference groups using 2-tailed *t* tests. Reference groups are nonworkers (for workers), nonessential workers (for essential workers), and nonessential workers able to WAH for other worker groups.

[c] $P \leq .001$.

[d] $P \leq .01$.

[e] $P \leq .05$.

Table 2. Adults by Risk Type Who Were or Who Lived With Essential Employees Unable to Work at Home (WAH)[a]

	Unweighted No.	Population, millions (95% CI)	Adults who were essential workers unable to WAH, % (95% CI)	Adults who lived with or who were essential workers unable to WAH, %	
				(95% CI)	Millions, No. (95% CI)
All adults	100 064	248.0 (239.0-257.0)	32.7 (32.1-33.4)	54.4 (53.5-55.3)	134.9 (129.4-140.5)
Adults meeting main CDC definition of increased risk of severe COVID-19	49 806	123.2 (118.3-128.0)	27.7 (26.8-28.5)	46.1 (44.9-47.3)	56.7 (54.1-59.4)
Adults meeting broader CDC definition of increased risk of severe COVID-19	60 529	151.3 (145.5-157.0)	30.0 (29.3-30.9)	49.1 (48.0-50.2)	74.3 (71.0-77.6)

Abbreviations: CDC, Centers for Disease Control and Prevention; COVID-19, coronavirus disease 2019.

[a] Authors' calculations using 2014-2017 Medical Expenditure Panel Survey (N = 100 064). All estimates computed using survey weights, with survey-adjusted CIs in parentheses. See notes to Table 1 for the definition of essential workers.

essential, and of these, only 31.2 million could WAH (**Table 1**). Among all adults, 49.7% (123.2 million of 248.0 million) were at increased risk of severe COVID-19 using the main CDC guidelines (61.0% using the broader CDC guidelines). Although workers were at lower risk than nonworkers, 41.0% (46.1 million) and 54.4% (61.1 million) of the 112.4 million essential workers met the main and broader CDC increased-risk guidelines, respectively.

Table 2 shows that 123.2 million adults met the main CDC increased-risk guidelines. Of these increased-risk adults, 27.7% (34.1 million) held essential jobs and could not WAH. Incorporating other household members, 46.1% (56.7 million) increased-risk adults either lived with or were themselves essential employees who could not WAH. Using the broader CDC definition increased this total to 74.3 million.

Discussion | Between 56.7 and 74.3 million increased-risk US adults lived with or were themselves essential workers who could not WAH. These estimates were driven by 3 factors: First, 49.7% to 61.0% of all adults were at increased risk of severe COVID-19 if infected with SARS-CoV-2 (depending on the CDC definition used). Second, 71.5% of workers held essential jobs, and many were unable to WAH. Third, we measured not only the number of adults with increased risk who were essential workers and unable to WAH, but also the many increased-risk adults living with such workers. One limitation is that the study's prepandemic data do not reflect current employment levels, changes in ability to WAH, or local infection rates. Additionally, risk factors were reported by MEPS participants rather than measured by medical professionals, likely causing an underestimate of risk. Policy makers seeking to make efficient and equitable decisions about reopening the economy and about vaccine distribution should consider the health risks not only of workers, but also of those with whom they live.

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