exposure could account for our findings for DE given that we have found that formaldehyde exposure is associated with amyotrophic lateral sclerosis (3, 4), including in a study of occupational exposures to formaldehyde in these Danish registries (5). Importantly though, the formaldehyde job-exposure matrix (JEM) does not consider DE-exposed industries as formaldehyde-exposed, and there is no overlap between the exposed jobs in the 2 JEMs. The possibility of confounding by formaldehyde from exposures related to use of cosmetic products (data that is not in the Danish registries) is unlikely—it is not clear why that use would be associated with DE-exposed occupations, which would be needed for confounding. Further, such use would not result in misclassification of DE exposure.

We appreciate the acknowledgement of our consideration of differences by sex in the workplace (1). We stratified the analysis by sex to account for potential differences in job tasks and subsequent exposures, such as those Alquwayfili describes, which would appear as effect measure modification, but the stratification also addresses potential confounding by sex.

The issue of personal protective equipment use is certainly a good one, but that kind of data is very difficult to maintain in very large data sets like those of the Registries, a limitation we noted in the limitations section of our manuscript (1). It is important to note, however, that the JEM we used was developed by a team of exposure experts with information covering over 300 occupational categories (6). DE exposure was characterized by 2 measures: the probability of exposure and the mean level of exposure. Probability measures are based on estimates from survey data assessing risk of DE exposure, including technological advances in machinery and use of personal protective equipment in each industry (6). While we believe the significantly protective association seen among women was the result of chance—there was no consistent pattern to that finding as there was with the results in men—we cannot rule out uncontrolled confounding. But what Alquwayfili describes would not cause a confounded result, because it relates to differences in exposure by sex, while the finding was a comparison among women only.

In conclusion, we appreciate the interest in our manuscript. Certainly there are additional data that could help improve on our findings, which might be relevant to current workers in DE-exposed industries and potentially other populations with high and consistent exposures to DE. The difficulty is that

such data are often hard to come by in large enough populations for studies of amyotrophic lateral sclerosis.

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Aisha S. Dickerson^{1,2}, Johnni Hansen³, Ole Gredal³, and Marc G. Weisskopf^{1,2} (e-mail: adickerson@hsph.harvard.edu)

¹ Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, MA

² Department of Environmental Health, Harvard T.H. Chan School of Public Health, Boston, MA

³ Danish Cancer Society Research Center, Copenhagen, Denmark

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RE: "ASSOCIATIONS OF DIETARY PROTEIN INTAKE WITH FAT-FREE MASS AND GRIP STRENGTH: A CROSS-SECTIONAL STUDY IN 146,816 UK BIOBANK PARTICIPANTS"

We read with interest the article by Celis-Morales et al. (1), who concluded that there is a positive association of dietary protein intake with both fat-free body mass percentage and hand-grip strength, on the basis of data from the UK Biobank.

We are concerned that the positive association observed might have been attributable to expressing the exposure—dietary protein intake—in grams per kilogram of body weight per day (g/kg/day). Dividing protein intake by body weight meant

that participants in the top category of protein intake were people who had a high protein intake relative to their body weight, and vice versa for those in the lowest category. This approach results in participants in the top category being mostly people with a low body weight. Because of the inevitable positive correlation of body weight with body fat percentage, participants with a low body weight have a low body fat percentage. Consequently, it might be expected that participants with a high

Table 1. Fat-Free Body Mass Percentage and Hand-Grip Strength According to Dietary Intakes of Protein, Carbohydrates, Fat, and Total Energy and the Reciprocal of Body Weight Among Women in the UK Biobank, United Kingdom, 2006–2012

Variable and Outcome Measure	Quintile ^a				
	1	2	3	4	5
Protein intake, g/kg/day					
Fat-free mass, %	53.5	59.9	63.9	67.9	75.2
Grip strength, kg/kg	0.25	0.31	0.34	0.38	0.45
Carbohydrate intake, g/kg/day					
Fat-free mass, %	53.3	59.6	63.8	68.0	75.7
Grip strength, kg/kg	0.25	0.31	0.34	0.38	0.45
Fat intake, g/kg/day					
Fat-free mass, %	53.3	59.4	63.7	68.2	76.4
Grip strength, kg/kg	0.25	0.30	0.34	0.38	0.46
Energy intake, kJ/kg/day					
Fat-free mass, %	53.2	59.8	64.0	68.2	75.7
Grip strength, kg/kg	0.25	0.31	0.34	0.38	0.45
Reciprocal of body weight, 1/kg					
Fat-free mass, %	55.3	60.8	64.2	67.5	72.8
Grip strength, kg/kg	0.27	0.32	0.35	0.38	0.42

^a Mean values adjusted for month of assessment, ethnicity, Townsend deprivation index, educational level, income, smoking status, physical activity level, total energy intake (where appropriate), total fat intake (where appropriate), protein intake (where appropriate), carbohydrate intake (where appropriate), alcohol intake, oily fish intake, red meat intake, processed meat intake, total fruit and vegetable intake, and diagnosis of diabetes.

protein intake would have a high fat-free body mass percentage and higher grip strength when this is expressed as kilograms of grip strength per kilogram of total body weight. It is therefore predictable that both the high fat-free body mass percentage and the high grip strength per kilogram of body weight reported by Celis-Morales et al. in the high-protein group (1) might have been driven mostly by the lower body weight of participants in that category, rather than by differences in protein intake.

Using a data set with which we previously reported on grip strength by diet group (2), we modeled the associations of quintiles of all 3 macronutrients (protein, carbohydrates, and total fat (in g/kg/day)), energy intake (in kJ/kg/day), and the inverse of body weight (1/kg) with fat-free body mass percentage and grip strength (kg/kg) in 103,221 UK Biobank women who had completed one or more 24-hour diet reports using the Oxford WebQ (3) and had available data on both fat-free body mass and grip strength. We included covariate adjustments based

on those used by Celis-Morales et al. (1), if the same covariates were available in our data set.

As shown in Table 1, positive associations of both fat-free body mass percentage and grip strength were observed for all macronutrients and energy intake, as well as for the inverse of body weight, demonstrating the dominant role of body weight differences rather than protein intake in driving the positive associations. Essentially identical patterns were observed in men (results not shown). Therefore, we think that the analyses presented by Celis-Morales et al. do not clearly support their conclusion that a large proportion of this middle-aged population in the United Kingdom has a protein intake that is suboptimal for the maintenance of fat-free body mass and grip strength.

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The UK Biobank is an open-access health-data resource. Bona fide researchers can apply to use the UK Biobank data set by registering and applying at <http://ukbiobank.ac.uk/register-apply/>.

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Tammy Y. N. Tong¹, Kathryn E. Bradbury^{1,2}, and Timothy J. Key¹ (e-mail: tammy.tong@ndph.ox.ac.uk)

¹ Cancer Epidemiology Unit, Nuffield Department of Population Health, Medical Sciences Division, University of Oxford, Oxford, United Kingdom

² National Institute for Health Innovation, School of Population Health, Faculty of Medical and Health Sciences, University of Auckland, Auckland, New Zealand

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