



HAL
open science

Comparison Between a Self-Reported Job Exposure Matrix (JEM CONSTANCES) to an Expertise-Based Job Exposure Matrix (MADE) for Biomechanical Exposures

Alexis Descatha, Bradley A Evanoff, Johann H Andersen, Matthew Baca, Skye Buckner-Petty, Marc Fadel, Laure Ngabirano, Yves Roquelaure, Ann Marie Dale

► **To cite this version:**

Alexis Descatha, Bradley A Evanoff, Johann H Andersen, Matthew Baca, Skye Buckner-Petty, et al.. Comparison Between a Self-Reported Job Exposure Matrix (JEM CONSTANCES) to an Expertise-Based Job Exposure Matrix (MADE) for Biomechanical Exposures. *Journal of Occupational and Environmental Medicine*, 2019, 61 (9), pp.e399-e400. 10.1097/JOM.0000000000001654. hal-02179390

HAL Id: hal-02179390

<https://univ-rennes.hal.science/hal-02179390>

Submitted on 8 Dec 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



HHS Public Access

Author manuscript

J Occup Environ Med. Author manuscript; available in PMC 2020 September 01.

Published in final edited form as:

J Occup Environ Med. 2019 September ; 61(9): e399–e400. doi:10.1097/JOM.0000000000001654.

Comparison between a self-reported job exposure matrix (JEM CONSTANCES) to an expertise-based job exposure matrix (MADE) for biomechanical exposures

ALEXIS DESCATHA, MD*,

Univ Angers, CHU Angers, Univ Rennes, Inserm, EHESP, Irset (Institut de recherche en santé, environnement et travail) - UMR_S 1085, F-49000 Angers, France; Occupational Health Unit U1168 UMS011, Paris Hospital, Versailles University, Poincaré site, F92380 Garches, France

BRADLEY A. EVANOFF, MD,

Division of General Medical Sciences, Washington University School of Medicine in St. Louis, St Louis, USA

JOHAN H. ANDERSEN, MD,

Occupational Medicine, University Research Clinic, Herning, Denmark

MATTHEW BACA, MSc,

Division of General Medical Sciences, Washington University School of Medicine in St. Louis, St Louis, USA

SKYE BUCKNER-PETTY, MPH,

Division of General Medical Sciences, Washington University School of Medicine in St. Louis, St Louis, USA

MARC FADEL, MD [resident],

Occupational Health Unit U1168 UMS011, Paris Hospital, Versailles University, Poincaré site, F92380 Garches, France

LAURE NGABIRANO, MPH,

Univ Angers, Univ Rennes, Inserm, EHESP, Irset (Institut de recherche en santé, environnement et travail) - UMR_S 1085, F-49000 Angers, France; U1168, Inserm, Villejuif, France

YVES ROQUELAURE, MD,

Univ Angers, CHU Angers, Univ Rennes, Inserm, EHESP, Irset (Institut de recherche en santé, environnement et travail) - UMR_S 1085, F-49000 Angers,

ANN MARIE DALE, PhD

Division of General Medical Sciences, Washington University School of Medicine in St. Louis, St Louis, USA

*Corresponding author: alexis.descatha@inserm.fr Tel: + 33147107764 Fax + 33147107768.

Conflict of interest. None, authors are paid by their institutions (and AD is editor in chief of *Archives des maladies professionnelles et de l'environnement*).

All authors have participated significantly.

Sir

Job exposure matrices are becoming more and more widely used,(1) including use for estimation of biomechanical exposures.(2) In the context of providing exposure data available for international research, an international team created an employment exposure matrix from the first available data from the Constances cohort, called “JEM Constances”. (3) As part of ongoing efforts to compare different JEMs,(4) we compared similar exposure variables from JEM Constances to those assigned in a JEM used for public health purposes in the same country, the French “MADE” (“*Matrice Associant Difficultés physiques au travail et Emploi*”, French for “difficult physical conditions and job matrix”).(5,6) We studied the correlation and the agreement of exposure estimates for different job titles between these two matrices.

Briefly, the Constances cohort created a JEM based on self-reported exposures to 27 different biomechanical factors at the level of the job, using the French “PCS 2003” national job codes.(3) The MADE matrix coded 17 different exposures using consensus estimates from occupational health experts, using the same PCS codes.(5) The relevant variables were crossed to obtain Spearman correlation coefficients for JEM Constances and MADE, using the PCS2003 code as a unit and using the subject by applying the two matrices on available data on Constances cohort. Three categories for variables of both JEM Constances and MADE were also obtained based on the tertiles of the distribution using Constances cohort. Thus, a calculation of a Kappa agreement was also performed with similar units.

The results on the selected variables are fairly good (Table 1) except for exposures to the neck and to work in cold environment (<10°C), where some coefficients were lower than 0.5.

These results confirm that a matrix based on a self-reported assessment exposure matrix and one based on expert estimates of exposure provide similar overall results. Although the statistical analyses were simple, using only an overall evaluation of correlation and agreement between the two approaches, the demonstration of broadly similar results using two different exposure methods may aid the comparison of studies using different exposure methods.

Acknowledgements

This study was supported by research funding from the American National Institute for Occupational Safety and Health (NIOSH R01OH011076). The French CONSTANCES Cohort is supported by the French National Research Agency (ANR-11-INBS-0002), Caisse Nationale d’Assurance Maladie des travailleurs salariés-CNAMTS, and is funded by the Institut de Recherche en Santé Publique/Institut Thématique Santé Publique, and the following sponsors: Ministère de la santé et des sports, Ministère délégué à la recherche, Institut national de la santé et de la recherche médicale, Institut national du cancer et Caisse nationale de solidarité pour l’autonomie, as well as Institute for research in public health (IReSP, CapaciT project).

References

1. Siemiatycki J, Lavoué J. Availability of a New Job-Exposure Matrix (CANJEM) for Epidemiologic and Occupational Medicine Purposes. *J. Occup. Environ. Med.* 2018 7;60(7):e324–8. [PubMed: 29642096]

2. Evanoff B, Zeringue A, Franzblau A, Dale AM. Using job-title-based physical exposures from O*NET in an epidemiological study of carpal tunnel syndrome. *Hum. Factors*. 2014 2;56(1):166–77. [PubMed: 24669551]
3. Evanoff BA, Yung M, Buckner-Petty S, Roquelaure Y., Descatha A, Dale AM. The CONSTANCES Job Exposure Matrix Based on Self-Reported Exposure to Physical Risk Factors: Development & Evaluation. *Occup EnvironMed*. 2019 6;76(6):398–406
4. Evanoff BA, Yung M, Buckner-Petty S, Roquelaure Y., Descatha A, Dale AM. Cross-National Comparison of Two General Population Job Exposure Matrices for Physical Work Exposures. *Occup EnvironMed*. 2019;in press.
5. Descatha A, Despréaux T, Petit A, Bodin J, Andersen JH, Dale A-M, et al. [Development of a French Job exposure matrix “MADE” for biomechanical exposure evaluation]. *Santé Publique*. 2018;30(3):333–7. [PubMed: 30541262]
6. Kerbrat J, Descatha A. [The recognition of health consequences of difficult working conditions in France and its evaluation with the use of a job-exposure matrix]. *Arch. Mal. Prof. Environ*. 2018 9 1;79(4):493–500.

Table 1.

Correlation and agreement between JEM-Constances (Self-report assessed in Constances Cohort) and MADE (expert based matrix)

Variables JEM Constances	Variables MADE	Spearman Rhos, job code as units	Spearman Rhos, subject as unit	Kappas, job code as unit	Kappas, subject as unit
Physical intensity	<i>Effort</i>	0.84	0.69	0.79	0.66
	<i>Very heavy lifting</i>	0.80	0.68	0.75	0.67
	<i>Static strength</i>	0.87	0.84	0.82	0.83
	<i>Heavy lifting</i>	0.85	0.79	0.82	0.78
	<i>Dynamic strength</i>	0.85	0.78	0.81	0.77
Working with repetition	<i>Repetition</i>	0.73	0.73	0.66	0.73
Kneeling or squatting	<i>Kneeling or squatting</i>	0.72	0.63	0.65	0.55
	<i>Very heavy lifting</i>	0.72	0.63	0.65	0.55
	<i>Heavy lifting</i>	0.78	0.75	0.72	0.67
Carry loads 10-25 kg	<i>Very heavy lifting</i>	0.81	0.71	0.74	0.76
	<i>Heavy lifting</i>	0.55	0.83	0.74	0.87
Carry loads > 25 kg	<i>Very heavy lifting</i>	0.81	0.72	0.77	0.71
	<i>Heavy lifting</i>	0.85	0.82	0.82	0.81
Using vibrating tool	<i>Vibrating tool use</i>	0.79	0.62	0.70	0.63
Using computer screen	<i>Computer use</i>	0.86	0.87	0.78	0.79
Using keyboard or scanner	<i>Computer use</i>	0.85	0.88	0.78	0.78
Bending neck	<i>Cervical constraints</i>	0.51	0.30	0.45	0.31
Working with arms above shoulder	<i>Shoulder abducted >90°</i>	0.74	0.53	0.70	0.54
Working with arms abducted	<i>Shoulder abducted >90°</i>	0.81	0.72	0.76	0.77
Bending elbow	<i>Elbow constraints</i>	0.85	0.69	0.80	0.72
Rotating forearm	<i>Turn the hand (e.g. screwing)</i>	0.84	0.76	0.77	0.70
	<i>Press base of hand</i>	0.81	0.69	0.77	0.68
	<i>Grip</i>	0.82	0.69	0.71	0.65
Bending wrist	<i>Turn the hand (e.g. screwing)</i>	0.86	0.75	0.78	0.73
	<i>Press base of hand</i>	0.83	0.69	0.77	0.72
	<i>Grip</i>	0.84	0.72	0.71	0.69
Pressing base of hand	<i>Turn the hand (e.g. screwing)</i>	0.79	0.61	0.72	0.54
	<i>Press base of hand</i>	0.79	0.52	0.72	0.47
	<i>Grip</i>	0.80	0.65	0.68	0.52
Finger pinching	<i>Turn the hand (e.g. screwing)</i>	0.80	0.72	0.74	0.66
	<i>Press base of hand</i>	0.76	0.63	0.72	0.56
	<i>Grip</i>	0.76	0.53	0.64	0.46
Working outdoors	<i>Work in cold environment (<10°C)</i>	0.55	0.50	0.49	0.50