Repertorio Bibliografico Italiano di Medicina del Lavoro

a cura del Comitato Scientifico SIML

Giugno 2024

Presentazione

La prima parte del numero 1-024 del Repertorio è composta dalle sintesi in italiano redatte dai singoli componenti del CS, dei lavori pubblicati fino al maggio 2024 connotati, a loro esclusivo giudizio e per l'area di competenza specifica nel CS, da rilievo, originalità, trattazione di temi attuali, proposta di tipo metodologico, e quindi meritevoli di essere segnalati ai soci attraverso un succinto commento critico.

Nella seconda parte viene riportata la raccolta degli indici dei fascicoli 2024 (fino a maggio-giugno) delle riviste internazionali più importanti e rappresentative della nostra disciplina di cui alla tabella sotto riportata.

Riviste più rappresentative della Medicina del Lavoro, con Journal Impact Factor (JIF) 2022 e CiteScore (CS) del 2023 (tracking 5 Oct)

	Link to online issue	Country	JIF	CS	Owner/Publisher
American Journal of Industrial Medicine	Am J Ind Med	US	3.5	5.4	Wiley-Liss Inc.
Ergonomics	Ergonomics	UK	2.4	4.6	Taylor & Francis
International Archives of Environmental and Occupational Health	Int Arch Environ Occup Med	DE	3.0	5.0	Springer Verlag
International Journal of Occupational Medicine and Environmental Health	Int J Occup Med Environ Health	PL	2.0	3.4	Nofer Institute
Journal of Occupational Health	JOH	JA	3.0	4.9	Japan SOH
Journal of Occupational Medicine and Toxicology	J Occup Med Toxicol	UK	3.0	n.a.	BioMed Central Ltd.
Journal of Occupational and Environmental Medicine	JOEM	US	3.2	3.8	ACOEM
La Medicina del Lavoro	Med Lav	IT	2.7	4.2	SIML/Mattioli1885
Occupational and Environmental Medicine	OEM	UK	4.9	8.0	BMJ Publishing Group
Occupational Medicine	Occupational Medicine	UK	5.1	5.8	Oxford
Safety and Health at Work	SH@W	SK	3.5	6.0	Elsevier BV
Scandinavian Journal of Work, Environment and Health	SJWEH	FI	6.3	7.4	Finnish Institute of OH

Si precisa che per gli articoli con più di tre autori è stata fatta la scelta, in analogia al metodo seguito da alcune delle riviste scrutinate, di riportare il primo secondo ed ultimo autore, rimandando all'articolo originale, per la lista completa.

Parte prima

ARTICOLI SELEZIONATI DAI SINGOLI COMPONENTI DEL COMITATO SCIENTIFICO SIML

Prof Paolo Durando

Highly Pathogenic Avian Influenza A(H5N1) Virus Infection in a Dairy Farm Worker

Uyeki TM, Milton S, Abdul Hamid C, Reinoso Webb C, Presley SM, Shetty V, Rollo SN, Martinez DL, Rai S, Gonzales ER, Kniss KL, Jang Y, Frederick JC, De La Cruz JA, Liddell J, Di H, Kirby MK, Barnes JR, Davis CT.

N Engl J Med. 2024 Jun 6;390(21):2028-2029. doi: 10.1056/NEJMc2405371.

Infezioni umane sporadiche da virus A(H5N1) dell'influenza aviaria ad alta patogenicità (HPAI), con un ampio spettro di gravità clinica e una mortalità cumulativa dei casi superiore al 50%, sono state segnalate in 23 Paesi per oltre 20 anni. I virus HPAI A(H5N1) clade 2.3.4.4b si sono diffusi ampiamente tra gli uccelli selvatici in tutto il mondo a partire dal 2020-2021, provocando epidemie nel pollame e in altri animali. Recentemente, i virus HPAI A(H5N1) clade 2.3.4.4b sono stati identificati nelle bovine da latte e in campioni di latte non pastorizzato in diversi stati degli Stati Uniti. Riportiamo un caso di infezione da virus HPAI A(H5N1) in un lavoratore di un'azienda casearia in Texas.

Alla fine del marzo 2024, un lavoratore di un'azienda lattiero-casearia ha manifestato arrossamento e fastidio all'occhio destro. Al momento della visita, nell'occhio destro sono stati osservati un'emorragia subcongiuntivale e un essudato sieroso. Non vi erano alterazioni dei segni vitali, in assenza di segni di dispnea e con una saturazione di ossigeno del 97% con respirazione in aria ambiente. L'auscultazione ha rivelato polmoni liberi. All'anamnesi, non riferiti precedenti di febbre o febbricola, sintomi respiratori, alterazioni della vista o altri sintomi.

Il lavoratore ha riferito di non essere entrato in contatto con uccelli selvatici, pollame o altri animali malati o morti, ma ha riferito di essere stato esposto direttamente e in maniera ravvicinata a bovine da latte in apparente stato di benessere, nonché a bovine malate che mostravano gli stessi segni di malattia delle mucche di altre aziende lattiero-casearie nella stessa area del Texas settentrionale con infezione da virus HPAI A(H5N1) confermata (ad esempio, diminuzione della produzione di latte, riduzione dell'appetito, letargia, febbre e disidratazione). Il lavoratore ha riferito di aver indossato i guanti durante lo svolgimento della mansione che prevedeva contatto diretto con le mucche, ma di non aver utilizzato alcuna protezione per le vie respiratorie o per gli occhi.

Sono stati ottenuti campioni di tampone nasofaringeo e congiuntivale dall'occhio destro per il test dell'influenza. I risultati dei test di reazione a catena della polimerasi a trascrizione inversa (RT-PCR) in tempo reale sono risultati presuntivi per il virus dell'influenza A e A(H5) in entrambi i campioni. Sulla base di un risultato presuntivo di A(H5), è stato raccomandato l'isolamento domiciliare ed è stato fornito oseltamivir orale (75 mg due volte al giorno per 5 giorni) per il trattamento del lavoratore e per la profilassi post-esposizione per i contatti domiciliari dello stesso. Il giorno successivo, il lavoratore non ha riferito alcun sintomo, tranne un fastidio a entrambi gli occhi; una nuova valutazione ha rivelato un'emorragia subcongiuntivale in entrambi gli occhi, senza danni alla vista (Figura 1). Nei giorni successivi, il lavoratore ha riferito la risoluzione della congiuntivite senza sintomi respiratori e i contatti domestici sono rimasti in buona salute.

Figura 1. Congiuntivite con emorragia sottocongiuntivale in entrambi gli occhi

Sulla base della RT-PCR in tempo reale e del sequenziamento, i *Centers for Disease Control and Prevention* (CDC) hanno confermato l'infezione da virus HPAI A(H5N1) nei campioni di tampone congiuntivale e nasofaringeo ottenuti il giorno dell'insorgenza dei sintomi. Altri campioni clinici non erano disponibili per l'analisi dell'influenza. Sebbene l'RNA virale purificato dal campione del tampone nasofaringeo (valore di soglia del ciclo [Ct], 33) non abbia prodotto ampliconi PCR sufficienti per il sequenziamento, le sequenze complete del genoma del campione del tampone congiuntivale (valore Ct, 18) hanno confermato che il virus apparteneva al clade 2.3.4.4b (genotipo B3.13) e l'isolamento del virus da entrambi i campioni del tampone congiuntivale e nasofaringeo ha prodotto virus identici. Tutti i segmenti genici erano strettamente correlati ai virus rilevati nei bovini da latte del Texas e ad altri virus di genotipo B3.13 rilevati negli uccelli selvatici in Texas nel marzo 2024. I dati di sequenziamento dei bovini presumibilmente infetti nell'allevamento in cui il lavoratore è stato esposto non erano disponibili per l'analisi.

Le sequenze virali dei bovini e dell'operaio hanno mantenuto caratteristiche genetiche prevalentemente aviarie e non presentano cambiamenti nel gene dell'emoagglutinina che potrebbero influenzare la specificità del legame ai recettori (ad esempio, il legame con i recettori dell'acido sialico legati all'α2-6, principalmente localizzati nel tratto respiratorio superiore dell'uomo) e il rischio di trasmissione all'uomo. Il virus identificato nel campione del lavoratore presentava una modifica (PB2 E627K) che è stata associata all'adattamento virale agli ospiti mammiferi e rilevata in precedenza nell'uomo e in altri mammiferi infettati da virus HPAI A(H5N1) e da altri sottotipi di virus dell'influenza aviaria A, compresi A(H7N9) e A(H9N2). Non sono stati identificati marcatori genetici associati a una ridotta suscettibilità ai farmaci antivirali per l'influenza approvati dalla Food and Drug Administration. L'emoagglutinina del virus è risultata strettamente correlata a due virus candidati al vaccino del clade 2.3.4.4b A(H5N1). Poiché i virus dell'influenza A(H5N1) hanno un potenziale pandemico, questi virus candidati al vaccino sono a disposizione dei produttori e potrebbero essere utilizzati per produrre vaccini se necessario.

Commento

Il lavoratore, a seguito di esposizione professionale a capi bovini infettati, ha presentato segni e sintomi di congiuntivite, mostrando pronta guarigione dopo la somministrazione di oseltamivir.

Recentemente, il virus dell'influenza aviaria ad alta patogenicità (HPAI) ha infettato bovine da latte in diverse parti degli Stati Uniti e dell'Europa, determinando diversi *cluster* epidemici nei capi di bestiame [1,2]. Il presente studio rappresenta il primo caso di infezione umana con influenza A(H5N1) acquisita dal contatto con un mammifero infetto. Ulteriori due casi di infezioni umane, avvenute in lavoratori di aziende lattiero-casearia, sono stati riportati dai CDC, con l'ultimo caso notificato nello stato del Michigan in data 30 maggio 2024 che ha manifestato sintomi respiratori acuti [3].

La manifestazione clinica è avvenuta a seguito dello svolgimento della mansione con esposizione diretta e ripetuta con bovine da latte che presentavano segni di malattia. Il rapido processo diagnostico effettuato con tamponi congiuntivali e nasofaringei ha dimostrato positività sia all'influenza A sia all'HPAI A(H5N1).

Il sequenziamento del virus del paziente ha confermato l'appartenenza al clade 2.3.4.4b (genotipo B3.13) ed era strettamente correlato ai virus identificati in bovini da latte e in uccelli selvatici del Texas. Non sono state riscontrate alterazioni nel gene dell'emoagglutinina tali da suggerire una maggiore propensione a infettare gli esseri umani, né mutazioni indicanti una resistenza antivirale. L'emoagglutinina del virus era simile a quella dei virus vaccinali candidati che potrebbero essere utilizzati per produrre un vaccino, se necessario.

Al momento della redazione di questo documento, a livello internazionale, gli esperti stanno dibattendo sul reale rischio per la salute umana comportato dalla rapida diffusione dell'HPAI tra gli uccelli domestici, la fauna selvatica, e ora i bovini da latte. Una delle molte lezioni impartite dall'esperienza COVID-19 è che la preparazione alle pandemie richiede una sorveglianza continua, con l'uso diffuso di test diagnostici per determinare l'estensione dell'infezione e le vie di trasmissione, insieme alla capacità di sviluppare e distribuire rapidamente contromisure, compresi vaccini e terapie [4]. In questo contesto, in continuità con il ruolo determinante acquisito durante il periodo pandemico, i Medici del Lavoro possono rappresentare la figura chiave per la pronta identificazione, gestione e segnalazione di casi sospetti di HPAI, in particolar modo nei lavoratori di aziende lattiero-casearie e avicole, in stretta collaborazione con specialisti di sanità pubblica e infettivologi. È importante ricordare come in tutti i casi notificati, i lavoratori non indossavano i dispositivi di protezione individuale (DPI) necessari, e pertanto si evidenzia

la necessità di raccomandare i DPI come importante strumento, non solo protettivo del lavoratore, ma anche preventivo per la diffusione tra gli individui che lavorano negli allevamenti bovini e avicoli.

Il possibile contributo è reso ulteriormente cruciale dal fatto che nella popolazione generale vi sia una minima, se non nulla, immunità preesistente nei confronti del virus dell'influenza aviaria H5N1 circolante negli allevamenti di bovini e avicoli [5]. Pertanto, in una prospettiva di *Global Health*, tramite la sorveglianza effettuata per la tutela della salute della popolazione lavorativa, il Medico del Lavoro assume il duplice ruolo di attore di prima linea anche per il controllo del rischio infettivo per il livello comunitario, identificando precocemente i possibili casi incidenti.

Bibliografia

1. Garg S, Reed C, Davis CT, Uyeki TM, Behravesh CB, Kniss K, Budd A, Biggerstaff M, Adjemian J, Barnes JR, Kirby MK, Basler C, Szablewski CM, Richmond-Crum M, Burns E, Limbago B, Daskalakis DC, Armstrong K, Boucher D, Shimabukuro TT, Jhung MA, Olsen SJ, Dugan V. Outbreak of Highly Pathogenic Avian Influenza A(H5N1) Viruses in U.S. Dairy Cattle and Detection of Two Human Cases - United States, 2024. MMWR Morb Mortal Wkly Rep. 2024 May 30;73(21):501-505. doi: 10.15585/mmwr.mm7321e1
2. European Centre for Disease Prevention and Control. Surveillance report. Weekly Communicable Disease Threats Report, Week 22, 25 - 31 May 2024. Disponibile su: https://www.ecdc.europa.eu/sites/default/files/documents/Communicable-disease-threats-report-week-22-2024.pdf
3. Centers for Disease Control and Prevention. CDC Confirms Second Human H5 Bird Flu Case in Michigan; Third Case Tied to Dairy Outbreak. Disponibile su: https://www.cdc.gov/media/releases/2024/p0530-h5-human-case-michigan.html
4. Durando P, Rahmani A, Montecucco A, Dini G. Learning from the Experience of the COVID-19 Pandemic: A New Paradigm for Occupational Biohazard Assessment and Management. Med Lav. 2023 Dec 7;114(6):e2023056. doi: 10.23749/mdl.v114i6.15452
5. Centers for Disease Control and Prevention. CDC A(H5N1) Bird Flu Response Update June 14, 2024. Disponibile su: https://www.cdc.gov/bird-flu/spotlights/h5n1-response-06142024.html

Prof Ivo Iavicoli

1

Responsible development of emerging technologies: extensions and lessons from nanotechnology for worker protection.

Schulte PA, Leso V, Iavicoli I.

J Occup Environ Med. 2024 Apr 8. doi: 10.1097/JOM.0000000000003100.

Riassunto
Questo studio identifica gli approcci allo sviluppo responsabile di tecnologie emergenti per garantire la sicurezza e la salute dei lavoratori. Un'analisi retrospettiva è stata effettuata per descrivere il percorso per lo sviluppo responsabile della protezione dei lavoratori dai nanomateriali ingegnerizzanti. Gli insegnamenti derivati da tale esperienza sono stati estesi e applicati alle tecnologie emergenti, valutando tre possibili contesti di applicazione: la manifattura avanzata, la biologia sintetica, l'intelligenza artificiale. Gli stessi principi utilizzati per supportare lo sviluppo responsabile delle nanotecnologie possono essere applicati ad altre tecnologie emergenti. Sono stati identificati cinque criteri di azione che includono tali principi. Lo sviluppo responsabile delle tecnologie emergenti richiede di anticipare pericoli, rischi e problematiche di carattere etico ad esse correlate. Gli specialisti della salute occupazionale ed ambientale sono spesso chiamati a fornire indicazioni sulle tecnologie emergenti e l'approccio descritto può caratterizzare una base per fornire tale orientamento.

Sintesi
Il requisito essenziale per uno sviluppo tecnologico responsabile e sostenibile è che tutte le parti sociali coinvolte adottino adeguate strategie di valutazione e gestione dei rischi al fine di limitare l'esposizione e i possibili effetti avversi sui lavoratori, i consumatori e l'ambiente (Figura 1).
Questo approccio è stato applicato al contesto delle nanotecnologie secondo cinque criteri d'azione: 1) anticipazione, identificazione e tracciamento di nanomateriali potenzialmente pericolosi per i lavoratori; 2) valutazione dell'esposizione dei lavoratori ai nanomateriali; 3) valutazione e comunicazione dei pericoli e dei rischi ai lavoratori; 4) gestione dei rischi; 5) promozione dello sviluppo sicuro delle nanotecnologie e realizzazione dei benefici sociali ed economici attesi. Le nuove tecnologie cui possono essere applicati i criteri suindicati includono la manifattura avanzata, la biologia sintetica e l'intelligenza artificiale (IA) [1].
Per manifattura avanzata intendiamo i "…recenti cambiamenti tecnologici nella manifattura, compreso l'uso di nuovi materiali, tecnologie, processi e metodi di produzione soggetti a modulazioni rapide e frequenti" centrate sul processo o sui materiali [2]. Al fine di identificare i pericoli in tale attività, è importante considerare i differenti processi produttivi e i materiali impiegati e adottare la "gerarchia dei controlli" per la gestione dei rischi, un modello ampiamente utilizzato nell'ambito delle nanotecnologie.
La biologia sintetica applica i principi dell'ingegneria chimica e della progettazione per ingegnerizzare sistemi biologici per applicazioni biotecnologiche che trovano utilizzo nella manifattura e in medicina, in agricoltura, nel settore dell'energia rinnovabile [3]. Howard e coll. [3], per garantire la sicurezza e la salute dei lavoratori coinvolti, hanno raccomandato di: migliorare le strategie di gestione del rischio; disporre di una valutazione proattiva del rischio; applicare i principi della "prevenzione attraverso la progettazione" ai nuovi metodi di biocontenimento; sviluppare linee guida specifiche per la sicurezza nei processi di biologia sintetica; attenzionare tutte le condizioni di post-esposizione a vettori virali; maggiore coinvolgimento degli Istituti di Ricerca e degli Enti Regolatori in materia di salute e sicurezza sul lavoro.
L'uso dell'IA nell'ambito lavorativo implica un'estensione delle capacità umane, con un ritorno in termine di efficienza, guadagni ed innovazione [4]. L'IA può "riconfigurare" le relazioni "datore di lavoro-dipendente", fornendo nuove opportunità di impiego, ma anche mettendo a rischio i posti di lavoro più facilmente automatizzabili

mediante l'IA. Uno sviluppo responsabile di tale tecnologia richiede un'anticipazione delle problematiche etiche di interesse occupazionale, come è stato fatto nell'ambito delle nanotecnologie, e un'implementazione "uomo-centrica" della tecnologia. I principi che possono pertanto guidare lo sviluppo dell'IA sono la:

- *Non maleficenza*: l'IA non deve arrecare danno ai lavoratori (es. infortuni; criticità nei momenti decisionali, violazione della privacy, possibili disuguaglianze);
- *Beneficenza*: l'IA dovrebbe essere vantaggiosa per la comunità e promuovere il benessere dei lavoratori e il lavoro dignitoso;
- *Autonomia*: l'IA non dovrebbe influenzare negativamente l'autonomia gestionale dei lavoratori, impattando anche sulla loro sfera emotiva (IA emotiva);
- *Giustizia*: i benefici dell'IA dovrebbero essere adeguatamente distribuiti tra i lavoratori;
- *Esplicabilità*: necessità di rendere edotti i produttori, i datori di lavoro e i lavoratori sul funzionamento dei sistemi di IA e i possibili effetti avversi correlati [5].

Commento e conclusioni

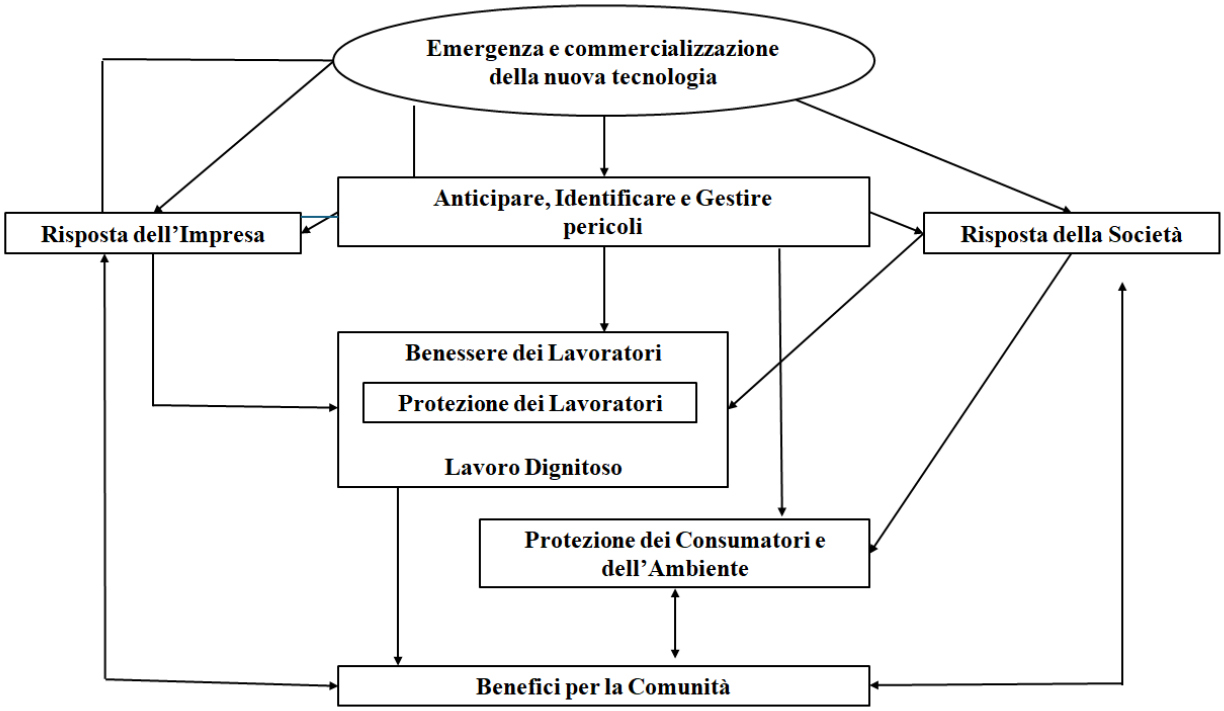
L'importanza di anticipare pericoli e rischi delle nuove tecnologie richiede esperienza nell'ambito della "previsione strategica ed etica" [6] basata su metodologie analitiche finalizzate ad affrontare problematiche di carattere etico in maniera pro-attiva. Tale approccio consiste in una serie di analisi che dovranno includere nella valutazione dello sviluppo responsabile delle nuove tecnologie anche aspetti relativi al lavoro e alla salute e sicurezza occupazionali. Una tecnologia non può essere sviluppata in maniera responsabile se non si tiene in considerazione la sicurezza dei lavoratori.

In tale prospettiva, è importante considerare come le conoscenze nell'ambito delle nuove tecnologie si strutturino nel corso dell'applicazione delle stesse, secondo un approccio di "costruzione sociale" dei sistemi tecnologici, in cui sono proprio le necessità della società e degli utilizzatori a guidare lo sviluppo tecnologico. La tecnologia va intesa pertanto come un "insieme eterogeneo di elementi sociali, materiali e astratti, ed ogni cambiamento può avvenire in qualsiasi nodo della rete: nei materiali, nei sistemi economici, nei sistemi di regolamentazione, negli utilizzatori, nella società in generale". L'estensione di un modello di sviluppo responsabile dalle nanotecnologie ad altre forme di innovazione richiede l'anticipazione, il riconoscimento, la valutazione e il controllo dei pericoli. Tuttavia, la numerosità e la varietà delle nuove tecnologie (fisiche, digitali o miste), oltre che la funzionalità delle stesse che si estende oltre il singolo lavoratore, gruppi di lavoratori o la stessa realtà aziendale, rendono complessa tale implementazione. La tutela della sicurezza e della salute dei lavoratori in un contesto di sviluppo di nuove tecnologie richiede l'anticipazione e la valutazione dei rischi, nonché adeguate politiche e pratiche per gestirli. Tali azioni rientrano tra le responsabilità dei datori di lavoro, sebbene anche le Autorità governative e i lavoratori, come pure le Agenzie assicurative, le Associazioni di categoria, oltre ai progettisti di sistemi possono avere un ruolo chiave.

I principi etici aiutano a identificare su quali aspetti dovrebbero concentrarsi le strategie di valutazione e gestione dei rischi considerando che l'impatto delle nuove tecnologie è determinato, non solo dalle caratteristiche intrinseche alle stesse, ma anche dalla definizione degli scopi sociali per cui vengono impiegate. Strategie di previsione etica potrebbero supportare Aziende, Enti Regolatori e lavoratori nell'identificazione precoce dell'impatto etico delle nuove tecnologie e dovrebbero essere strutturate in maniera tale da includere aspetti di carattere occupazionale fin dalla fase di progettazione della nuova tecnologia.

In conclusione, sarebbe opportuno coinvolgere rappresentanze datoriali e dei lavoratori nella valutazione dell'applicazione e delle possibili conseguenze delle nuove tecnologie in ambito occupazionale. Questo approccio appare importante, in particolare, nel contesto di tecnologie convergenti, tra cui le scienze cognitive, le tecnologie di informazione, le biotecnologie e le nanotecnologie che possono esercitare un impatto contemporaneo ed inatteso sui lavoratori. Lo sviluppo responsabile delle nuove tecnologie dovrà inoltre avere come obiettivi la promozione del benessere dei lavoratori e il raggiungimento di un lavoro dignitoso per tutti.

Figura 1. Percorso per uno sviluppo responsabile di una nuova tecnologia



Bibliografia

1. Schulte PA, Geraci CL, Murashov V, Kuempel ED, Zumwalde RD, Castan, Hoover MD, Hodson L, Martinex KF. Occupational safety and health criteria for responsible development of nanotechnology. J Nanopart Res. 2014;16:2153. doi: 10.1007/s11051-013-2153-9.

2. Pomeroy-Carter CA, Geraci CL, Tinkle SS. Advanced manufacturing implications for occupational safety and health. Informatics, electronics and microsystems: TechConnect. 2018:143–146.

3. Howard J, Murashov V, Schulte P. Synthetic biology and occupational risk. J Occup Environ Hyg. 2017;14(3):224–236.

4. Kellogg KC, Valentine MA, Christin A. Algorithms at work: the new contested terrain of control. Acad Manag Annals. 2020;14:366–410.

5. Floridi L, Cowls J, Beltrammeti M, et al. AI4People: an ethical framework for a good AI society: opportunities, risks, principles, recommendations. Mind and Machines, J Artif Intell, Philos Cog Sci. 2018;28:689.

6. Floridi L, Strait A. Ethical foresight analysis: what it is and why is it needed. Mind and Machines. 2020;30:77–97.

****

Prof Ivo Iavicoli
2

Fout years follow-up of surface contamination by antineoplastic drugs in a compounding unit

Saint-Lorant G, Vasseur M, Allorge D, Beauval N, Simon N, Odou P.

Occup Environ Med. 2023 Mar;80(3):146-153. doi: 10.1136/oemed-2022-108623.

Riassunto

Scopo dello studio è stato valutare la contaminazione da farmaci antineoplastici sulle superfici di lavoro di una Unità di Preparazione (Unit of Compounding), che effettuava una media di circa 45.000 preparazioni di farmaci chemioterapici all'anno, durante i primi quattro anni dalla sua attivazione. Ventitre punti di campionamento sono stati oggetto di monitoraggi mensili effettuati durante lo svolgimento di attività routinarie di preparazione. La contaminazione da nove farmaci antineoplastici su salviette (ciclofosfamide, ifosfamide, dacarbazina, 5-fluorouracile, metotrexato, gemcitabina, citarabina, irinotecano e doxorubicina) è stata determinata mediante cromatografia liquida accoppiata alla spettrometria di massa tandem. La percentuale di contaminazione (PC,%) è stata valutata prospetticamente, ogni mese, durante l'intero periodo di studio. Sono stati registrati eventuali incidenti occorsi e le misure di prevenzione e protezione adottate durante il periodo di analisi. Su un totale di 1104 campioni prelevati tra marzo 2016 e marzo 2020, la PC è risultata pari al 18.5%. Se analizziamo tale dato, non considerando i tre incidenti registrati nel periodo, la PC è risultata leggermente inferiore rispetto a quanto riportato in letteratura. Una significativa riduzione della PC [dal 42.39% all'11.52% ($p<0.001$)] è stata determinata tra i primi otto mesi di monitoraggio e il periodo successivo. La contaminazione era limitata all'area dedicata alle attività di preparazione. Tale studio, pertanto, ha dimostrato che la contaminazione era limitata ai punti di campionamento superficiale più vicini all'area di preparazione degli antineoplastici e ha permesso di determinare i principali farmaci a somministrazione endovenosa e i punti di campionamento su cui concentrare i programmi di monitoraggio.

Sintesi

Nel periodo compreso tra marzo 2016 e marzo 2020, la variazione della contaminazione superficiale di un'Unità di Preparazione è stata valutata mediante il monitoraggio di nove farmaci antineoplastici: ciclofosfamide, citarabina, dacarbazina, doxorubicina, 5-fluorouracile (5-FU), gemcitabina, ifosfamide, irinotecano e metotrexato, che corrispondevano ai farmaci preparati più frequentemente. I campioni sono stati prelevati mensilmente e sempre a metà giornata (fine mattinata) in relazione al processo di preparazione, comprendendo anche i giorni della settimana con minore attività e situazioni eccezionali come in corso di attività di manutenzione o di eventi accidentali. I campioni sono stati prelevati strofinando le superfici quattro volte orizzontalmente e poi verticalmente fino ad asciugatura con una salvietta di 5 cm x 5 cm di grandezza umidificata con 0.1 ml di acqua per preparazioni iniettabili. I ventitre diversi punti di campionamento monitorati erano ubicati presso i locali di disimballaggio e stoccaggio, la sala di preparazione, la sala controllo qualità, i locali adibiti a deposito di rifiuti e alle spedizioni, lo spogliatoio, il guardaroba, l'ufficio e sala relax. La contaminazione da farmaci antiblastici è stata determinata mediante cromatografia liquida accoppiata alla spettrometria di massa tandem (LC-MS/MS), intendendo la percentuale di contaminazione (PC, %), come il rapporto tra il numero di campioni con una quantità rilevabile di farmaco (ovvero, superiore al limite di rilevabilità (LOD)) e il numero di campioni misurati.
Duecentoquattro su 1104 campioni analizzati hanno presentato un risultato positivo per la presenza di farmaci antineoplastici contaminanti (18.5%). I contaminanti determinati più frequentemente sono risultati: 5-FU, citarabina, ifosfamide, ciclofosfamide e gemcitabina con una PC pari al 4.26%, 6.25%, 2.36%, 3.71% e 7.79% dei campioni analizzati, rispettivamente. La PC differiva significativamente in relazione agli ambienti investigati, con valori più elevati nelle aeree di preparazione e controllo qualità (24.00%), più bassi negli ambienti dedicati al disimballaggio e

allo stoccaggio (16.52%) e ancora inferiori negli uffici e nelle aree spogliatoio e relax (7.00%) ($p<0.0001$). In merito all'andamento temporale, la PC era significativamente più elevata nei primi 8 mesi di follow-up (42.39%) rispetto ai mesi successivi (11.52%) ($p<0.0001$), indipendentemente dagli ambienti esplorati. Per quanto riguarda l'analisi delle concentrazioni, i valori medi di 5-FU, citarabina, ciclofosfamide, ifosfamide e gemcitabina, determinati nelle aree di disimballaggio e stoccaggio sono risultati pari a 0.266, 0.380, 0.025, 0.032 e 0.042 ng/cm^2, rispettivamente. Negli ambienti di preparazione e controllo qualità le concentrazioni medie determinate per gli stessi farmaci sono state di 0.230, 0.118, 0.099, 0.127 e 0.090 ng/cm^2, mentre nello spogliatoio, negli uffici ed area relax, i livelli medi sono risultati: 0.100, 0.093, 0.011, 0 e 0.026 ng/cm^2, rispettivamente.
Nel corso dello studio si sono verificati tre diversi incidenti: la rottura di una fiala di ciclofosfamide (quindicesimo mese di monitoraggio), la perdita da un tubo di scarico di un analizzatore (ventesimo mese) e il ritrovamento di una fiala rotta di citarabina (quindicesimo mese), senza però tracce di perdite nella sala di disimballaggio. Nelle prime due situazioni, significative contaminazioni sono state determinate, con un ritorno ai livelli basali al ventitreesimo mese di monitoraggio.

Commento e conclusioni

Il monitoraggio quadriennale, continuativo, della contaminazione superficiale di un'Unità di Preparazione di farmaci antiblastici ha dimostrato una PC piuttosto elevata, verosimilmente correlata alla rilevante attività del centro. La contaminazione variava in modo causale da un mese all'altro, un riscontro che richiede attenzione nella definizione di programmi di monitoraggio adeguati per frequenza dei campionamenti e durata del periodo di osservazione.
Se si esclude l'incidente correlato alla rottura della fiala di ciclofosfamide, la PC determinata nella camera ad atmosfera controllata appare leggermente inferiore rispetto a quanto riportato in letteratura [1,2]. L'utilizzo degli isolatori e dei sistemi a ciclo chiuso per il trasferimento dei farmaci hanno contribuito al controllo di tale contaminazione. Il confronto con studi precedenti, sebbene interessante, deve tenere in considerazione le differenze nelle tecniche analitiche utilizzate e i differenti livelli di rilevabilità, oltre che i diversi metodi di campionamento adottati, i farmaci antitumorali preparati, le differenze nell'organizzazione del lavoro [3]. La tipologia di follow-up descritta nello studio (studio longitudinale della durata di 4 anni; 23 punti di campionamento; 9 farmaci antiblastici analizzati), presenta il vantaggio di offrire una valutazione "continuativa" e non una "singola" analisi della contaminazione ambientale. Tale approccio consente la definizione di possibili relazioni tra le misure di prevenzione adottate e i livelli di contaminazione superficiale. Come riportato in letteratura, le differenze tra i diversi contaminanti, potrebbero essere correlate alle caratteristiche intrinseche dei farmaci [4,5], all'efficacia delle operazioni di pulizia [6] oltre che alle procedure seguite dagli stessi operatori. La contaminazione delle fiale negli ambienti di disimballaggio e stoccaggio, il ruolo degli isolatori nelle aree di preparazione, oltre che le difficoltà nell'indossare e rimuovere correttamente i dispositivi di protezione individuale devono essere valutati come possibili fonti di contaminazione.
Tra i limiti del lavoro va considerata la natura monocentrica e retrospettica dello studio, seppure basato su dati raccolti prospetticamente. L'analisi effettuata non ha permesso di definire alcuna relazione tra le misure di contenimento della contaminazione e i livelli di monitoraggio mensili. Non è stato possibile effettuare parallelamente il monitoraggio biologico degli operatori. Infine, la metodologia di monitoraggio ha permesso un confronto all'interno del centro, ma non tra centri differenti. Il monitoraggio effettuato in maniera regolare e la tempestiva comunicazione dei risultati al gruppo di lavoratori coinvolti, ha consentito l'attuazione di diverse azioni correttive che sono consistite, in particolare, in costanti richiami alle procedure di pulizia e al lavaggio delle mani, oltre che alla pulizia specifica dei sistemi a ciclo chiuso. Durante lo studio, le misure per ridurre la contaminazione sono state implementate e adattate sulla base dei risultati del monitoraggio.
In conclusione, lo studio ha permesso di "mappare" i contaminanti più frequentemente riscontrati e i punti di campionamento rilevanti per l'analisi, informazioni utili per la definizione di appropriati e mirati programmi di monitoraggio che potrebbero essere applicati anche in altre Unità tra cui quelle di cura.

Bibliografia

1. Colombo M, Jeronimo M, Astrakianakis G, Apte C, Hon CY. Wipe Sampling Method and Evaluation of Environmental Variables for Assessing Surface Contamination of 10 Antineoplastic Drugs by Liquid

Chromatography/Tandem Mass Spectrometry. Ann Work Expo Health. 2017 Oct 1;61(8):1003-1014. doi: 10.1093/annweh/wxx070.

2. Simon N, Vasseur M, Pinturaud M, Soichot M, Richeval C, Humbert L, Lebecque M, Sidikou O, Barthelemy C, Bonnabry P, Allorge D, Décaudin B, Odou P. Effectiveness of a Closed-System Transfer Device in Reducing Surface Contamination in a New Antineoplastic Drug-Compounding Unit: A Prospective, Controlled, Parallel Study. PLoS One. 2016 Jul 8;11(7):e0159052. doi: 10.1371/journal.pone.0159052.

3. Sottani C, Grignani E, Cornacchia M, Negri S, Cuna FSRD, Cottica D, Bruzzese D, Severi P, Strocchi D, Verna G, Leso V, Iavicoli I. Occupational Exposure Assessment to Antineoplastic Drugs in Nine Italian Hospital Centers over a 5-Year Survey Program. Int J Environ Res Public Health. 2022 Jul 14;19(14):8601. doi: 10.3390/ijerph19148601.

4. Le LMM, Reitter D, He S, Bonle FT, Launois A, Martinez D, Prognon P, Caudron E. Safety analysis of occupational exposure of healthcare workers to residual contaminations of cytotoxic drugs using FMECA security approach. Sci Total Environ. 2017 Dec 1;599-600:1939-1944. doi: 10.1016/j.scitotenv.2017.05.066.

5. Connor TH, Zock MD, Snow AH. Surface wipe sampling for antineoplastic (chemotherapy) and other hazardous drug residue in healthcare settings: Methodology and recommendations. J Occup Environ Hyg. 2016 Sep;13(9):658-67. doi: 10.1080/15459624.2016.1165912.

6. Hon CY, Chua PP, Danyluk Q, Astrakianakis G. Examining factors that influence the effectiveness of cleaning antineoplastic drugs from drug preparation surfaces: a pilot study. J Oncol Pharm Pract. 2014 Jun;20(3):210-6. doi: 10.1177/1078155213497070. ++

Prof Stefano Mattioli
+

Sci Rep. 2021 Dec 14;11(1):23983.

A case control study of occupation and cardiovascular disease risk in Japanese men and women.

Fukai K, Furuya Y, Nakazawa S, Kojimahara N, Hoshi K, Toyota A, Tatemichi M.

Riassunto

Premessa

Qualche mese fa, nel numero precedente del Repertorio, facendo considerazioni relative ad un recente articolo che trattava del carico di salute perduta nel mondo a causa delle malattie da lavoro (Takala 2023) ci si era soffermati sulle patologie cardiovascolari "professionali". L'articolo che qui viene discusso, benchè pubblicato al di fuori del circuito delle riviste dell'ambito della Medicina del Lavoro, è sicuramente di interesse per quel che riguarda il rapporto tra cardiovasculopatie ed attività lavorativa ed è stato presentato in un recente *Journal Club* della Scuola di Ferrara dal dott. Mattia Roberto Nocilla.

Scopo

Scopo di questo grande studio caso-controllo è quello di esaminare l'eventuale associazione tra alcune patologie cardio- e cerebro-vascolari (ictus ischemico ed emorragico, infarto del miocardio) e le attività lavorative di soggetti adulti, sia di sesso maschile che di sesso femminile.

Metodi

Gli autori hanno cercato di raggiungere il loro obiettivo tramite uno studio caso-controllo multicentrico che si basa sui dati raccolti nel periodo 2005-2015 dai degenti di un gruppo di 34 ospedali giapponesi rappresentativi di tutto il Paese e con un totale di circa 13.000 posti-letto.

I dati utilizzati nello studio sono stati raccolti tramite anamnesi da tutti i pazienti con età superiore ai 15 anni e che non fossero deceduti entro 24 ore dall'inizio del ricovero. Dai pazienti sono state ottenute informazioni su abitudine al fumo di sigaretta, consumo di alcolici, pregressa diagnosi di ipertensione e storia lavorativa (ultima mansione e le tre precedenti, compresa la loro durata).

La diagnosi definitiva del ricovero è stata codificata utilizzando la ICD-10 (WHO 2019), mentre le mansioni sono state codificate tramite la Japan Standard Occupational Classification (MIC 2009), le cui categorie a due e tre cifre sono sostanzialmente sovrapponibili a quelle della International Standard Classification of Occupations 2008 (ILO 2012).

Dallo studio sono stati esclusi i soggetti con età inferiore ai 20 anni, con mansioni non classificate o non classificabili, i soggetti non occupati (con disoccupazione prevalente sull'occupazione), gli studenti, le casalinghe ed i ricoverati per altre patologie dell'apparato cardiovascolare.

Dal punto di vista dell'analisi dei dati, è stata utilizzata la regressione logistica multivariata. Il gruppo di riferimento scelto è stato quello degli impiegati, genericamente intesi. Per i due sessi, sono stati prodotti 4 modelli: il primo non aggiustato, il secondo aggiustato per età, anno e ospedale di ricovero, il terzo aggiustato anche per abitudine al fumo, consumo di alcool ed ipertensione, il quarto aggiustato anche per lavoro su turni. È stata infine effettuata un'analisi di sensibilità, che ha incluso i soli partecipanti la cui mansione attuale era anche la mansione prevalente.

Risultati

I partecipanti allo studio erano quasi 830000. I casi reclutati erano 23792, in particolare: 12826 casi di ictus cerebrale ischemico (ICD-10 163), 4905 casi di emorragia intracerebrale (ICD-10 161), 1641 casi di emorragia subaracnoidea (ICD-10 160) e 4420 casi di infarto miocardico acuto (ICD-10 121). Anche il numero dei controlli (senza altre patologie cardiovascolari) era elevatissimo: 539110.

Tra gli esclusi spiccano 77895 disoccupati e 118973 casalinghe.

I risultati vengono presentati dagli autori in diverse tabelle e figure (anche supplementari) relative ai tanti modelli ed alle caratteristiche di questa imponente massa di casi e di controlli.

NOTA 1: è consigliabile esaminare con attenzione (e curiosità) tabelle e figure, anche quelle supplementari, per comprendere la vastità dello studio, i suoi risultati, i suoi limiti e le sue potenzialità.

Si considerino i risultati ottenuti con il quanto modello (aggiustato per lavoro su turni), sovrapponibili d'altronde a quelli del terzo modello: rispetto agli impiegati generici, tra i soggetti di sesso maschile, emerge un aumento di rischio: di ictus ischemico per 15 categorie di lavoratori, di emorragia intracerebrale per 20 categorie, di emorragia subaracnoidea per 26 categorie. Un aumento del rischio nei soggetti di sesso maschile per tutte e 3 le patologie vascolari cerebrali (ictus cerebrale ischemico, emorragia intracerebrale e subaracnoidea) era presente tra addetti alla preparazione di alimenti e bevande, addetti del settore della pesca, autisti, tecnici dell'edilizia, addetti al trasporto delle merci, manovali generici.

Nel caso dei soggetti di sesso femminile, in cui da figure e tabelle si evince un minor numero di categorie di lavoratrici a maggior rischio di ictus cerebrale ischemico od emorragico, solo la categoria delle addette a lavori manovali generici risultava a rischio per tutte e tre le forme di ictus cerebri.

Per quel che riguarda l'infarto acuto del miocardio, i risultati sono caratterizzati, nel caso del sesso maschile, da 6 categorie di lavoratori a minor rischio: operai della ceramica, minatori, metalmeccanici, addetti al montaggio, agricoltori ed edili. Una sola risultava la categoria a maggior rischio: addetti ad attività manageriale.

Diverso il risultato per i soggetti di sesso femminile. Erano a maggior rischio di infarto del miocardio ben 10 categorie di lavoratrici comprendenti non solo addette ad attività manageriale, ma anche addette ai servizi, al commercio ed all'industria. Nessuna categoria risultava aver un minor rischio rispetto a quella delle impiegate.

L'analisi di sensibilità relativa ai soggetti in cui la mansione attuale era la stessa rispetto a quella prevalente non ha portato a risultati diversi da quelli dell'analisi principale.

Discussione

Secondo gli autori, i risultati dello studio permettono di ipotizzare che lo stress lavoro-correlato, anche tramite l'ipertensione arteriosa indotta da questa situazione, possa aumentare il rischio di ictus cerebrale emorragico. Anche l'attività fisica svolta sul lavoro potrebbe, se eccessiva, essere un'altra causa di ictus emorragico, anche se la stessa appare avere un effetto di protezione dall'infarto del miocardio, nel sesso maschile. Lo stress, secondo gli autori, potrebbe essere invece la causa dell'aumentato rischio di infarto miocardico in alcune categorie di lavoratrici.

Per l'ictus ischemico viene portata in discussione il suo possibile legame con l'ipotensione ortostatica, cosa che non spiegherebbe però perché di questa patologia possano soffrirne maggiormente anche tecnici e dirigenti.

Viene inoltre sottolineata l'esposizione a fumo passivo come causa, per alcune categorie, di incremento del rischio di cardiovasculopatie maggiori.

Sempre secondo gli autori, i risultati portano a confermare quelli di studi precedenti ed in particolare sottolineano l'importanza di questioni socioeconomiche, mettendo in evidenza che generalmente le classi di lavoratori manuali siano a maggior rischio di ictus cerebrale ed infarto del miocardio.

Tra i limiti dello studio, riconosciuti dagli autori, vi sono il *bias* di Berkson, implicito nella struttura di un caso-controllo ospedaliero e legato al fatto che i controlli siano ospedalizzati e quindi non corrispondenti pienamente alle caratteristiche della popolazione generale.

Nota 2: il Berkson's bias è una distorsione che, per diversi fattori, porta a sottostimare l'entità del ruolo di alcuni fattori di rischio. I controlli ricoverati, benchè ospedalizzati per malattie differenti da quella in studio ed anche se scelti tra pazienti affetti da patologie non riconducibili ai fattori di rischio in esame, sono comunque stati "esposti", più che i soggetti della popolazione generale, a quei fattori di rischio che possono essere determinanti di tante patologie cardiovascolari, neoplastiche, cronico-degenerative. Tra queste "esposizioni", vanno annoverati:fumo di sigaretta, eccessivo consumo di alcolici, eccesso ponderale, limitata attività fisica, basso livello di classe socioeconomica. Considerando questo, i risultati di questo studio potrebbero essere sottostimati per quel che riguarda le mansioni svolte da persone di basso livello socioeconomico e sovrastimati, al contrario, per quel che riguarda le mansioni corrispondenti ad alto livello socioeconomico.

Gli autori quindi riportano di non aver avuto la possibilità di correggere le stime per variabili riferibili allo stato socioeconomico o a fattori di rischio quali ipercolesterolemia o diabete mellito. Ammettono inoltre di non aver eseguito analisi relative all'impatto di un cambio di mansione o all'insieme di tutte le mansioni svolte nella vita lavorativa di casi e controlli.

Considerazioni

Si è voluto portare all'attenzione dei colleghi quanto sfuggito probabilmente a molti e cioè un articolo che riferisce di uno studio molto interessante ma pubblicato su di una rivista generalista, una rivista *open-access* del gruppo Springer Nature, che pubblica resoconti di studi e ricerche con carattere di novità, ma relativi ai campi più disparati, non solo della medicina e delle scienze naturali.

La rilevanza dello studio sta in primo luogo nell'ingente massa di dati raccolti negli anni dagli autori giapponesi, evidentemente non al solo scopo di studiare l'associazione tra lavoro e malattie cardiovascolari (si veda ad esempio quanto pubblicato dagli stessi autori su Occupational Environmental Medicine circa neoplasie e lavoro svolto con esposizione a sostanze chimiche: Fukai 2023). L'altra ragione per cui l'articolo è considerevole sta proprio nell'aver applicato questa enorme banca-dati all'esame dell'associazione tra alcune importanti patologie vascolari e le attività lavorative. Non si ricordano al riguardo studi di simili dimensioni.

Alcune critiche possono essere rivolte all'articolo. Ad esempio i controlli non sono stati appaiati per età ai casi, e le analisi non sono state eseguite tenendo in considerazione solo l'ultima mansione svolta. Molto probabilmente i revisori di una delle nostre migliori riviste avrebbero insistito su diversi punti, determinando un generale incremento della qualità delle sezioni dedicate a risultati e discussione, tuttavia gli autori hanno eseguito uno studio encomiabile, soprattutto perchè ciò ha permesso di valutare, su grandi numeri, la possibile associazione tra ischemia (cerebrale e cardiaca) ed attività lavorativa, considerando non solo sesso ed età, ma anche abitudini voluttuarie. Si potrebbe rilevare che, visto la massa di informazioni raccolte, si sarebbe potuto anche avere informazioni su peso ed altezza dei soggetti, ma invece complimentiamoci con questi colleghi che già tanto hanno fatto.

Infine, l'articolo permette di ragionare intorno ai tanti aspetti che contraddistinguono l'intreccio tra malattie cardiovascolari, mansioni lavorative e compiti del Medico Competente. Compiti nei quali si individuano, in

particolare per queste patologie, non solo aspetti etiologici, bensì anche preventivi, di promozione della salute e di idoneità alla mansione.

Bibliografia

Fukai K, Furuya Y, Nakazawa S, Kojimahara N, Hoshi K, Toyota A, Tatemichi M. Length of employment in workplaces handling hazardous chemicals and risk of cancer among Japanese men. Occup Environ Med. 2023 Aug;80(8):431-438.

ILO ISCO-08 International Standard Classification of Occupations 2008 (published on May 2012): https://www.ilo.org/publications/international-standard-classification-occupations-2008-isco-08-structure

MIC Ministry of Internal affairs and Communications, Japan Standard Occupational Classification (Rev. 5th, December 2009): https://www.soumu.go.jp/english/dgpp_ss/seido/shokgyou/index09.htm

Takala J, Hämäläinen P, Sauni R, Nygård CH, Gagliardi D, Neupane S. Global-, regional- and country-level estimates of the work-related burden of diseases and accidents in 2019. Scand J Work Environ Health. 2023 Nov 12:4132

WHO, ICD-10 International Statistical Classification of Diseases and Related Health Problems 10th Revision: https://icd.who.int/browse10/2019

S3 Table. Odds ratios for intracerebral hemorrhage by occupations among men and women.

	Model 1	Model 2	Model 3	Model 4
Men				
Professional and engineering				
Researchers	1.40 (0.57, 3.40)	1.57 (0.64, 3.84)	1.54 (0.63, 3.79)	1.55 (0.63, 3.81)
Agriculture, forestry, and fishery engineers	2.15 (1.01, 4.59)	1.51 (0.70, 3.23)	1.58 (0.74, 3.40)	1.60 (0.74, 3.43)
Food engineers	1.46 (0.36, 5.91)	1.66 (0.41, 6.74)	1.64 (0.40, 6.71)	1.65 (0.40, 6.73)
Machinery and electrical engineers	0.82 (0.59, 1.14)	0.95 (0.69, 1.32)	0.96 (0.69, 1.34)	0.96 (0.69, 1.34)
Industrial engineers	0.45 (0.21, 0.95)	0.50 (0.24, 1.07)	0.51 (0.24, 1.08)	0.51 (0.24, 1.08)
Other manufacturing engineers	0.65 (0.21, 2.04)	0.93 (0.29, 2.91)	0.96 (0.30, 3.00)	0.96 (0.30, 3.01)
Architects, civil engineers, surveyors	0.99 (0.74, 1.33)	1.13 (0.85, 1.52)	1.13 (0.84, 1.51)	1.13 (0.84, 1.51)
Data processing engineers	0.50 (0.29, 0.87)	0.80 (0.46, 1.38)	0.83 (0.48, 1.44)	0.82 (0.48, 1.42)
Communication network engineers	0.23 (0.03, 1.67)	0.31 (0.04, 2.20)	0.31 (0.04, 2.24)	0.31 (0.04, 2.23)
Other engineers	0.74 (0.23, 2.31)	0.92 (0.29, 2.90)	0.92 (0.29, 2.89)	0.92 (0.29, 2.89)
Doctors, dentists, veterinarians, pharmacists	0.86 (0.52, 1.43)	0.87 (0.52, 1.45)	0.87 (0.52, 1.46)	0.88 (0.53, 1.47)
Public health nurses, midwives, nurses	0.89 (0.28, 2.78)	1.05 (0.33, 3.31)	1.08 (0.34, 3.41)	1.27 (0.40, 4.00)
Medical technicians	1.00 (0.49, 2.03)	1.15 (0.56, 2.33)	1.24 (0.61, 2.53)	1.25 (0.62, 2.55)
Other health care workers	1.17 (0.58, 2.38)	1.22 (0.60, 2.48)	1.29 (0.63, 2.62)	1.30 (0.64, 2.65)
Social welfare specialists	0.92 (0.43, 1.96)	1.19 (0.56, 2.55)	1.27 (0.59, 2.71)	1.35 (0.63, 2.88)
Legal workers	0.61 (0.15, 2.45)	0.57 (0.14, 2.30)	0.58 (0.14, 2.36)	0.58 (0.14, 2.36)
Finance and insurance professionals	1.36 (0.70, 2.66)	1.38 (0.71, 2.71)	1.36 (0.69, 2.66)	1.35 (0.69, 2.65)
Teachers	1.27 (0.98, 1.63)	1.16 (0.90, 1.49)	1.16 (0.90, 1.50)	1.16 (0.90, 1.50)
Workers in religious organisations	1.34 (0.66, 2.73)	1.03 (0.51, 2.11)	1.09 (0.53, 2.22)	1.09 (0.54, 2.23)
Authors, journalists, editors	0.21 (0.03, 1.50)	0.24 (0.03, 1.71)	0.24 (0.03, 1.72)	0.24 (0.03, 1.73)
Artists, designers, photographers, film operators	1.36 (0.72, 2.58)	1.52 (0.80, 2.89)	1.58 (0.83, 2.99)	1.57 (0.83, 2.98)
Musicians, stage designers	No cases	No cases	No cases	No cases
Other specialist professionals	0.85 (0.52, 1.39)	0.98 (0.60, 1.62)	1.04 (0.63, 1.70)	1.04 (0.63, 1.71)
Administrative and managerial workers				
Management staff of government officials	1.14 (0.56, 2.32)	0.97 (0.47, 1.97)	0.98 (0.48, 1.99)	0.98 (0.48, 2.00)
Officers of organisations	1.07 (0.84, 1.37)	0.97 (0.75, 1.24)	0.96 (0.75, 1.23)	0.96 (0.75, 1.23)
Management staff of organisations	0.75 (0.53, 1.08)	0.86 (0.60, 1.23)	0.84 (0.59, 1.20)	0.84 (0.59, 1.21)
Other managerial workers	1.36 (0.85, 2.17)	1.46 (0.91, 2.35)	1.51 (0.94, 2.42)	1.51 (0.94, 2.42)
Clerical workers				
General clerical workers	reference	reference	reference	reference
Accounting clerks	0.91 (0.62, 1.35)	0.96 (0.65, 1.41)	0.95 (0.65, 1.41)	0.96 (0.65, 1.41)
Production-related clerical workers	0.70 (0.43, 1.11)	0.72 (0.45, 1.15)	0.71 (0.44, 1.13)	0.71 (0.44, 1.13)
Sales clerks	1.45 (1.11, 1.91)	1.62 (1.23, 2.13)	1.59 (1.21, 2.10)	1.59 (1.21, 2.09)
Outdoor service workers	1.28 (0.41, 4.03)	1.16 (0.37, 3.68)	1.19 (0.37, 3.75)	1.19 (0.38, 3.78)
Transport and post clerical workers	1.47 (1.00, 2.17)	1.16 (0.79, 1.72)	1.18 (0.80, 1.74)	1.21 (0.82, 1.79)
Office appliance operators	No cases	No cases	No cases	No cases
Sales workers				
Merchandise sales workers	1.74 (1.43, 2.11)	1.60 (1.32, 1.94)	1.64 (1.35, 1.99)	1.65 (1.36, 2.01)
Quasi-sales workers	1.23 (1.02, 1.47)	1.36 (1.13, 1.64)	1.36 (1.13, 1.64)	1.36 (1.13, 1.64)
Service workers				
Domestic support service workers	No cases	No cases	No cases	No cases
Care service workers	0.67 (0.21, 2.11)	1.02 (0.33, 3.22)	1.09 (0.35, 3.44)	1.26 (0.40, 3.97)
Domestic hygiene service workers	1.41 (0.92, 2.18)	1.33 (0.86, 2.05)	1.36 (0.88, 2.10)	1.37 (0.88, 2.11)
Food and drink preparatory workers	1.76 (1.36, 2.29)	1.83 (1.41, 2.37)	1.86 (1.43, 2.42)	1.88 (1.45, 2.45)
Customer service workers	1.31 (0.90, 1.90)	1.44 (0.99, 2.09)	1.52 (1.05, 2.21)	1.56 (1.07, 2.27)
Residential facilities management personnel	1.33 (0.66, 2.70)	1.47 (0.72, 2.99)	1.47 (0.72, 3.01)	1.52 (0.75, 3.10)
Other service workers	1.60 (0.82, 3.12)	1.75 (0.89, 3.44)	1.83 (0.93, 3.60)	1.87 (0.95, 3.67)
Security workers				
Self-defense officials	0.66 (0.38, 1.13)	0.56 (0.33, 0.97)	0.58 (0.33, 0.99)	0.59 (0.34, 1.01)
Judicial police staff	0.94 (0.57, 1.54)	1.06 (0.65, 1.74)	1.06 (0.65, 1.74)	1.13 (0.69, 1.87)
Other public security workers	1.27 (0.90, 1.81)	1.32 (0.93, 1.87)	1.32 (0.93, 1.88)	1.46 (1.03, 2.08)
Agriculture, forestry, and fishery workers				
Agriculture	2.44 (2.04, 2.93)	1.33 (1.10, 1.60)	1.42 (1.18, 1.72)	1.43 (1.18, 1.72)
Forestry	1.94 (1.08, 3.48)	1.22 (0.68, 2.19)	1.28 (0.71, 2.31)	1.28 (0.71, 2.31)
Fishery	2.13 (1.63, 2.80)	1.57 (1.19, 2.08)	1.66 (1.26, 2.19)	1.66 (1.26, 2.20)
Transport workers				
Railway drivers	1.72 (0.98, 3.02)	1.40 (0.79, 2.46)	1.39 (0.79, 2.45)	1.44 (0.82, 2.54)
Motor vehicle drivers	1.49 (1.24, 1.79)	1.39 (1.15, 1.67)	1.39 (1.15, 1.67)	1.41 (1.18, 1.70)
Ship and aircraft operators	1.96 (1.23, 3.14)	1.62 (1.01, 2.60)	1.68 (1.05, 2.70)	1.74 (1.08, 2.80)
Other transport workers	1.42 (0.95, 2.12)	1.21 (0.81, 1.81)	1.25 (0.83, 1.87)	1.28 (0.85, 1.92)
Communication workers	1.11 (0.41, 3.01)	1.11 (0.41, 2.99)	1.13 (0.42, 3.06)	1.15 (0.42, 3.12)

Metal products	1.69 (1.42, 2.01)	1.24 (1.04, 1.48)	1.28 (1.07, 1.53)	1.30 (1.08, 1.55)
Machine assembly	1.49 (1.13, 1.97)	1.44 (1.09, 1.90)	1.46 (1.10, 1.94)	1.47 (1.11, 1.95)
Chemical products	1.29 (0.94, 1.76)	1.06 (0.77, 1.46)	1.08 (0.79, 1.49)	1.13 (0.82, 1.55)
Ceramic products	1.16 (0.78, 1.74)	1.04 (0.70, 1.56)	1.06 (0.71, 1.59)	1.08 (0.72, 1.61)
Electro-mechanic assembly	1.06 (0.75, 1.49)	1.05 (0.74, 1.48)	1.08 (0.76, 1.53)	1.12 (0.79, 1.58)
Transportation machine assembly	1.10 (0.84, 1.44)	1.03 (0.78, 1.35)	1.06 (0.81, 1.39)	1.08 (0.82, 1.41)
Other mechanical assembly	0.73 (0.23, 2.28)	0.72 (0.23, 2.27)	0.74 (0.23, 2.32)	0.74 (0.24, 2.34)
Food manufacturing	1.79 (1.32, 2.42)	1.59 (1.17, 2.15)	1.63 (1.20, 2.21)	1.65 (1.22, 2.24)
Beverage and cigarette	2.30 (1.01, 5.20)	1.54 (0.68, 3.51)	1.47 (0.64, 3.35)	1.50 (0.66, 3.42)
Apparel products	2.06 (1.32, 3.19)	1.52 (0.97, 2.37)	1.61 (1.03, 2.52)	1.63 (1.05, 2.55)
Wooden products	1.72 (1.29, 2.29)	1.18 (0.88, 1.58)	1.22 (0.91, 1.63)	1.24 (0.93, 1.66)
Printing and bookbinding	1.40 (0.84, 2.33)	1.41 (0.84, 2.35)	1.45 (0.87, 2.42)	1.47 (0.88, 2.46)
Rubber and plastic products	1.37 (0.81, 2.31)	1.36 (0.80, 2.31)	1.40 (0.82, 2.37)	1.43 (0.85, 2.43)
Jewelry products	0.78 (0.32, 1.91)	0.77 (0.32, 1.88)	0.82 (0.33, 1.99)	0.83 (0.34, 2.02)
Manufacturing-related workers	1.36 (0.99, 1.86)	1.31 (0.96, 1.79)	1.37 (1.00, 1.88)	1.37 (1.00, 1.88)
Construction machinery operators	0.90 (0.63, 1.27)	0.82 (0.58, 1.17)	0.81 (0.57, 1.16)	0.83 (0.58, 1.18)
Electrical workers	1.54 (1.18, 2.00)	1.43 (1.10, 1.87)	1.45 (1.11, 1.89)	1.45 (1.11, 1.90)
Mine workers	0.91 (0.53, 1.56)	1.25 (0.72, 2.17)	1.33 (0.77, 2.30)	1.34 (0.78, 2.33)
Skeleton construction workers	0.68 (0.41, 1.11)	0.68 (0.41, 1.11)	0.71 (0.43, 1.16)	0.70 (0.43, 1.15)
Construction workers	1.87 (1.56, 2.24)	1.63 (1.36, 1.95)	1.69 (1.41, 2.03)	1.69 (1.41, 2.02)
Civil engineer workers	1.62 (1.27, 2.07)	1.35 (1.05, 1.72)	1.40 (1.09, 1.79)	1.39 (1.09, 1.78)
Cargo workers	1.46 (1.13, 1.89)	1.39 (1.07, 1.80)	1.44 (1.11, 1.86)	1.45 (1.12, 1.88)
Other manual workers	1.74 (1.29, 2.34)	1.72 (1.27, 2.32)	1.80 (1.33, 2.43)	1.81 (1.34, 2.45)
Women				
Professional and engineering				
Researchers	1.47 (0.20, 10.54)	2.47 (0.34, 17.90)	2.72 (0.37, 19.72)	2.72 (0.37, 19.74)
Agriculture, forestry, and fishery engineers	No cases	No cases	No cases	No cases
Food engineers	2.03 (0.28, 14.60)	3.46 (0.47, 25.71)	3.85 (0.52, 28.63)	3.85 (0.52, 28.68)
Machinery and electrical engineers	No cases	No cases	No cases	No cases
Industrial engineers	0.79 (0.11, 5.63)	1.54 (0.21, 11.10)	1.55 (0.21, 11.23)	1.55 (0.21, 11.24)
Other manufacturing engineers	No cases	No cases	No cases	No cases
Architects, civil engineers, surveyors	0.70 (0.10, 5.01)	1.18 (0.16, 8.53)	1.23 (0.17, 8.86)	1.23 (0.17, 8.88)
Data processing engineers	No cases	No cases	No cases	No cases
Communication network engineers	No cases	No cases	No cases	No cases
Other engineers	No cases	No cases	No cases	No cases
Doctors, dentists, veterinarians, pharmacists	0.80 (0.33, 1.96)	0.95 (0.39, 2.33)	0.95 (0.39, 2.32)	0.95 (0.39, 2.32)
Public health nurses, midwives, nurses	0.68 (0.46, 0.98)	0.65 (0.45, 0.95)	0.65 (0.45, 0.95)	0.65 (0.44, 0.95)
Medical technicians	0.51 (0.19, 1.39)	0.81 (0.30, 2.20)	0.88 (0.33, 2.39)	0.88 (0.33, 2.39)
Other health care workers	0.82 (0.48, 1.39)	0.86 (0.51, 1.47)	0.87 (0.51, 1.47)	0.86 (0.51, 1.47)
Social welfare specialists	0.72 (0.46, 1.13)	0.77 (0.49, 1.22)	0.78 (0.49, 1.23)	0.78 (0.49, 1.23)
Legal workers	No cases	No cases	No cases	No cases
Finance and insurance professionals	No cases	No cases	No cases	No cases
Teachers	1.33 (0.95, 1.88)	1.03 (0.73, 1.46)	1.04 (0.74, 1.47)	1.04 (0.74, 1.47)
Workers in religious organisations	5.44 (1.71, 17.27)	2.58 (0.80, 8.37)	2.60 (0.80, 8.43)	2.60 (0.80, 8.42)
Authors, journalists, editors	No cases	No cases	No cases	No cases
Artists, designers, photographers, film operators	0.62 (0.15, 2.51)	1.04 (0.26, 4.24)	1.07 (0.26, 4.33)	1.07 (0.26, 4.34)
Musicians, stage designers	2.09 (0.52, 8.50)	3.55 (0.86, 14.71)	3.79 (0.91, 15.71)	3.79 (0.91, 15.72)
Other specialist professionals	1.23 (0.75, 2.00)	1.10 (0.67, 1.79)	1.12 (0.69, 1.83)	1.12 (0.69, 1.83)
A lministrative and managerial workers				
Management staff of government officials	No cases	No cases	No cases	No cases
Officers of organisations	3.11 (1.93, 5.01)	1.40 (0.86, 2.28)	1.38 (0.85, 2.25)	1.38 (0.85, 2.25)
Management staff of organisations	2.48 (0.91, 6.71)	2.16 (0.79, 5.91)	2.04 (0.74, 5.59)	2.04 (0.74, 5.59)
Other managerial workers	1.96 (0.62, 6.17)	1.58 (0.50, 5.03)	1.48 (0.46, 4.73)	1.48 (0.46, 4.73)
Cl erical workers				
General clerical workers				
Accounting clerks	1.15 (0.82, 1.61)	0.89 (0.63, 1.26)	0.89 (0.63, 1.25)	0.89 (0.63, 1.25)
Production-related clerical workers	0.55 (0.17, 1.71)	0.50 (0.16, 1.56)	0.48 (0.15, 1.52)	0.48 (0.15, 1.52)
Sales clerks	0.47 (0.23, 0.95)	0.63 (0.31, 1.28)	0.64 (0.31, 1.30)	0.64 (0.31, 1.30)
Outdoor service workers	1.28 (0.41, 4.03)	0.90 (0.28, 2.83)	0.89 (0.28, 2.80)	0.88 (0.28, 2.80)
Transport and post clerical workers	0.95 (0.30, 2.98)	0.79 (0.25, 2.49)	0.78 (0.25, 2.48)	0.78 (0.25, 2.47)
Office appliance operators	0.23 (0.03, 1.67)	0.32 (0.05, 2.31)	0.31 (0.04, 2.25)	0.31 (0.04, 2.25)
S les workers				
Merchandise sales workers	1.67 (1.34, 2.07)	1.24 (1.00, 1.55)	1.23 (0.99, 1.54)	1.23 (0.99, 1.54)
Quasi-sales workers	1.51 (1.06, 2.16)	1.33 (0.93, 1.89)	1.31 (0.92, 1.87)	1.31 (0.92, 1.87)
Service workersomestic support service	1.23 (0.68, 2.21)	1.03 (0.57, 1.85)	1.02 (0.57, 1.84)	1.02 (0.56, 1.84)

workers				
Care service workers	0.99 (0.55, 1.78)	1.27 (0.70, 2.30)	1.27 (0.70, 2.30)	1.26 (0.69, 2.28)
Domestic hygiene service workers	1.48 (1.02, 2.16)	1.06 (0.72, 1.54)	1.07 (0.73, 1.56)	1.07 (0.73, 1.56)
Food and drink preparatory workers	2.00 (1.54, 2.60)	1.25 (0.96, 1.64)	1.20 (0.92, 1.56)	1.20 (0.92, 1.56)
Customer service workers	1.38 (1.03, 1.84)	1.05 (0.78, 1.40)	0.99 (0.74, 1.33)	0.99 (0.74, 1.33)
Residential facilities management personnel	2.16 (0.88, 5.27)	1.24 (0.50, 3.05)	1.23 (0.50, 3.03)	1.23 (0.50, 3.03)
Other service workers	0.78 (0.29, 2.12)	0.87 (0.32, 2.36)	0.87 (0.32, 2.37)	0.87 (0.32, 2.37)
Security workers				
Self-defense officials	No cases	No cases	No cases	No cases
Judicial police staff	No cases	No cases	No cases	No cases
Other public security workers	1.10 (0.15, 7.92)	1.08 (0.15, 7.83)	1.03 (0.14, 7.44)	1.03 (0.14, 7.42)
Agriculture, forestry, and fishery workers				
Agriculture	4.36 (3.58, 5.31)	1.02 (0.82, 1.27)	1.05 (0.84, 1.30)	1.04 (0.84, 1.30)
Forestry	1.80 (0.25, 12.94)	0.58 (0.08, 4.22)	0.55 (0.08, 4.02)	0.55 (0.08, 4.03)
Fishery	1.73 (0.71, 4.21)	0.58 (0.24, 1.43)	0.59 (0.24, 1.44)	0.59 (0.24, 1.44)
Transport workers				
Railway drivers	No cases	No cases	No cases	No cases
Motor vehicle drivers	2.15 (0.95, 4.87)	1.90 (0.83, 4.34)	1.75 (0.76, 4.00)	1.75 (0.76, 3.99)
Ship and aircraft operators	No cases	No cases	No cases	No cases
Other transport workers	No cases	No cases	No cases	No cases
Communication workers	0.98 (0.40, 2.39)	0.73 (0.30, 1.78)	0.74 (0.30, 1.82)	0.74 (0.30, 1.81)
Manufacturing process workers				
Metal products	3.59 (2.54, 5.06)	1.14 (0.79, 1.65)	1.12 (0.77, 1.62)	1.12 (0.77, 1.62)
Machine assembly	0.93 (0.23, 3.78)	0.68 (0.17, 2.78)	0.68 (0.17, 2.77)	0.68 (0.17, 2.77)
Chemical products	1.01 (0.32, 3.17)	0.74 (0.24, 2.34)	0.73 (0.23, 2.32)	0.73 (0.23, 2.32)
Ceramic products	1.82 (0.74, 4.43)	0.99 (0.40, 2.44)	0.97 (0.39, 2.40)	0.97 (0.39, 2.40)
Electro-mechanic assembly	1.49 (0.89, 2.49)	1.04 (0.62, 1.75)	1.05 (0.62, 1.76)	1.04 (0.62, 1.75)
Transportation machine assembly	1.76 (0.72, 4.29)	1.40 (0.57, 3.45)	1.35 (0.55, 3.32)	1.35 (0.55, 3.32)
Other mechanical assembly	1.78 (0.44, 7.23)	1.54 (0.38, 6.27)	1.58 (0.39, 6.44)	1.58 (0.39, 6.44)
Food manufacturing	2.35 (1.77, 3.13)	1.24 (0.93, 1.66)	1.23 (0.92, 1.65)	1.23 (0.92, 1.65)
Beverage and cigarette	1.87 (0.26, 13.49)	0.74 (0.10, 5.40)	0.74 (0.10, 5.45)	0.74 (0.10, 5.45)
Apparel products	1.84 (1.28, 2.62)	0.74 (0.52, 1.07)	0.73 (0.51, 1.06)	0.73 (0.51, 1.05)
Wooden products	3.27 (1.95, 5.48)	1.38 (0.82, 2.32)	1.39 (0.82, 2.35)	1.39 (0.82, 2.35)
Printing and bookbinding	0.82 (0.20, 3.30)	0.59 (0.15, 2.39)	0.57 (0.14, 2.31)	0.57 (0.14, 2.31)
Rubber and plastic products	1.78 (0.73, 4.36)	1.13 (0.46, 2.79)	1.07 (0.44, 2.64)	1.07 (0.44, 2.64)
Jewelry products	2.26 (1.00, 5.11)	1.17 (0.51, 2.69)	1.17 (0.51, 2.67)	1.16 (0.51, 2.67)
Manufacturing-related workers	1.37 (0.60, 3.09)	1.16 (0.51, 2.64)	1.15 (0.50, 2.62)	1.15 (0.50, 2.61)
Construction machinery operators	No cases	No cases	No cases	No cases
Electrical workers	No cases	No cases	No cases	No cases
Mine workers	7.96 (1.08, 58.87)	3.12 (0.40, 24.45)	2.69 (0.34, 21.29)	2.69 (0.34, 21.29)
Skeleton construction workers	No cases	No cases	No cases	No cases
Construction workers	5.42 (2.65, 11.11)	2.58 (1.25, 5.35)	2.51 (1.21, 5.22)	2.51 (1.21, 5.22)
Civil engineer workers	3.72 (2.01, 6.88)	1.41 (0.75, 2.63)	1.39 (0.74, 2.61)	1.39 (0.74, 2.61)
Cargo workers	2.03 (1.32, 3.12)	1.46 (0.95, 2.25)	1.43 (0.93, 2.21)	1.43 (0.93, 2.21)
Other manual workers	2.47 (1.92, 3.17)	1.47 (1.14, 1.90)	1.46 (1.13, 1.88)	1.45 (1.12, 1.88)

Model 1: Unadjusted.
Model 2: Adjusted for age, admission date, and hospital.
Model 3: Adjusted for the factors in Model 2 plus smoking, alcohol consumption, and hypertension.
Model 4: Adjusted for the factors in Model 3 plus shift-work.

S2 Table. Odds ratios for cerebral infarction by occupations among men and women.

	Model 1	Model 2	Model 3	Model 4
Men				
Professional and engineering				
Researchers	0.77 (0.40, 1.50)	0.88 (0.45, 1.72)	0.90 (0.46, 1.76)	0.90 (0.46, 1.76)
Agriculture, forestry, and fishery engineers	1.23 (0.70, 2.14)	0.79 (0.45, 1.39)	0.83 (0.47, 1.45)	0.83 (0.47, 1.45)
Food engineers	1.12 (0.46, 2.73)	1.34 (0.55, 3.30)	1.40 (0.57, 3.45)	1.40 (0.57, 3.45)
Machinery and electrical engineers	0.72 (0.60, 0.88)	0.88 (0.72, 1.06)	0.89 (0.73, 1.08)	0.89 (0.73, 1.08)
Industrial engineers	0.90 (0.67, 1.22)	0.99 (0.73, 1.34)	0.99 (0.73, 1.35)	0.99 (0.73, 1.35)
Other manufacturing engineers	0.67 (0.36, 1.00)	0.84 (0.44, 2.00)	0.86 (0.45, 2.00)	0.86 (0.45, 2.00)
Architects, civil engineers, surveyors	0.83 (0.70, 0.99)	0.99 (0.83, 1.18)	0.97 (0.81, 1.15)	0.97 (0.81, 1.15)
Data processing engineers	0.38 (0.27, 0.53)	0.93 (0.65, 1.31)	0.99 (0.70, 1.40)	0.99 (0.70, 1.40)
Communication network engineers	0.43 (0.19, 0.97)	0.65 (0.29, 1.47)	0.65 (0.29, 1.48)	0.65 (0.29, 1.48)
Other engineers	0.53 (0.25, 1.12)	0.74 (0.35, 1.57)	0.73 (0.34, 1.55)	0.73 (0.34, 1.55)
Doctors, dentists, veterinarians, pharmacists	1.59 (1.28, 1.98)	1.53 (1.23, 1.91)	1.56 (1.25, 1.95)	1.56 (1.25, 1.95)
Public health nurses, midwives, nurses	0.55 (0.24, 1.22)	0.93 (0.41, 2.10)	0.93 (0.41, 2.10)	0.94 (0.42, 2.14)
Medical technicians	0.96 (0.64, 1.44)	1.30 (0.86, 1.96)	1.37 (0.91, 2.07)	1.37 (0.91, 2.07)
Other health care workers	1.31 (0.90, 1.91)	1.49 (1.01, 2.18)	1.51 (1.03, 2.22)	1.51 (1.03, 2.22)
Social welfare specialists	0.28 (0.13, 0.60)	0.53 (0.25, 1.13)	0.55 (0.26, 1.18)	0.56 (0.26, 1.18)
Legal workers	0.65 (0.31, 1.38)	0.54 (0.25, 1.15)	0.56 (0.26, 1.19)	0.56 (0.26, 1.19)
Finance and insurance professionals	0.74 (0.45, 1.23)	0.72 (0.44, 1.20)	0.71 (0.43, 1.18)	0.71 (0.43, 1.18)
Teachers	1.13 (0.97, 1.31)	0.98 (0.85, 1.14)	1.00 (0.86, 1.17)	1.00 (0.86, 1.17)
Workers in religious organisations	1.60 (1.11, 2.31)	1.11 (0.76, 1.61)	1.11 (0.76, 1.61)	1.11 (0.76, 1.61)
Authors, journalists, editors	1.49 (0.97, 2.27)	1.65 (1.07, 2.54)	1.62 (1.05, 2.49)	1.62 (1.05, 2.49)
Artists, designers, photographers, film operators	0.59 (0.34, 1.00)	0.70 (0.41, 1.20)	0.71 (0.42, 1.22)	0.71 (0.41, 1.22)
Musicians, stage designers	0.61 (0.27, 1.36)	0.99 (0.44, 2.24)	1.03 (0.45, 2.33)	1.03 (0.45, 2.32)
Other specialist professionals	0.81 (0.61, 1.08)	1.02 (0.77, 1.36)	1.05 (0.79, 1.40)	1.05 (0.79, 1.40)
Administrative and managerial workers				
Management staff of government officials	0.70 (0.43, 1.16)	0.51 (0.31, 0.85)	0.51 (0.31, 0.85)	0.51 (0.31, 0.85)
Officers of organisations	1.26 (1.11, 1.44)	1.04 (0.91, 1.19)	1.02 (0.89, 1.17)	1.02 (0.89, 1.17)
Management staff of organisations	0.81 (0.67, 0.99)	0.89 (0.73, 1.08)	0.87 (0.72, 1.06)	0.87 (0.72, 1.06)
Other managerial workers	1.38 (1.07, 1.80)	1.35 (1.04, 1.76)	1.34 (1.02, 1.75)	1.34 (1.02, 1.75)
Clerical workers				
General clerical workers	reference	reference	reference	reference
Accounting clerks	0.89 (0.72, 1.11)	0.91 (0.73, 1.14)	0.91 (0.73, 1.13)	0.91 (0.73, 1.14)
Production-related clerical workers	0.79 (0.61, 1.01)	0.84 (0.66, 1.08)	0.83 (0.64, 1.06)	0.83 (0.64, 1.06)
Sales clerks	0.84 (0.70, 1.02)	1.09 (0.90, 1.32)	1.07 (0.89, 1.30)	1.07 (0.89, 1.30)
Outdoor service workers	1.58 (0.88, 2.82)	1.30 (0.72, 2.36)	1.28 (0.71, 2.33)	1.28 (0.71, 2.33)
Transport and post clerical workers	1.20 (0.95, 1.52)	0.88 (0.69, 1.12)	0.88 (0.69, 1.12)	0.88 (0.69, 1.12)
Office appliance operators	0.54 (0.20, 1.00)	1.03 (0.38, 3.00)	1.11 (0.41, 3.00)	1.11 (0.41, 3.00)
Sales workers				
Merchandise sales workers	1.39 (1.24, 1.56)	1.28 (1.14, 1.44)	1.27 (1.13, 1.43)	1.27 (1.13, 1.43)
Quasi-sales workers	0.93 (0.83, 1.04)	1.10 (0.99, 1.24)	1.09 (0.97, 1.22)	1.09 (0.97, 1.22)
Service workers				
Domestic support service workers	0.30 (0.04, 2.00)	0.64 (0.09, 5.00)	0.64 (0.09, 5.00)	0.65 (0.09, 5.00)
Care service workers	0.21 (0.07, 0.64)	0.49 (0.16, 1.52)	0.51 (0.16, 1.59)	0.51 (0.16, 1.61)
Domestic hygiene service workers	1.45 (1.15, 1.85)	1.36 (1.06, 1.73)	1.35 (1.06, 1.72)	1.35 (1.06, 1.72)
Food and drink preparatory workers	1.13 (0.95, 1.35)	1.31 (1.10, 1.56)	1.27 (1.06, 1.51)	1.27 (1.07, 1.52)
Customer service workers	0.95 (0.75, 1.21)	1.25 (0.98, 1.60)	1.24 (0.97, 1.58)	1.24 (0.98, 1.59)
Residential facilities management personnel	1.38 (0.93, 2.04)	1.45 (0.98, 2.16)	1.40 (0.94, 2.09)	1.40 (0.94, 2.09)
Other service workers	1.47 (1.00, 2.18)	1.87 (1.26, 2.79)	1.91 (1.28, 2.85)	1.91 (1.28, 2.85)
Security workers				
Self-defense officials	0.88 (0.67, 1.14)	0.81 (0.62, 1.07)	0.82 (0.63, 1.07)	0.82 (0.63, 1.07)
Judicial police staff	0.93 (0.71, 1.23)	1.10 (0.83, 1.45)	1.11 (0.83, 1.46)	1.11 (0.84, 1.47)
Other public security workers	1.11 (0.90, 1.37)	1.21 (0.98, 1.50)	1.18 (0.96, 1.46)	1.19 (0.96, 1.47)
Agriculture, forestry, and fishery workers				
Agriculture	2.15 (1.93, 2.39)	1.02 (0.91, 1.13)	1.03 (0.92, 1.15)	1.03 (0.92, 1.15)
Forestry	0.94 (0.60, 1.50)	0.60 (0.37, 0.95)	0.59 (0.37, 0.94)	0.59 (0.37, 0.94)
Fishery	1.93 (1.65, 2.26)	1.32 (1.12, 1.55)	1.30 (1.10, 1.53)	1.30 (1.10, 1.53)
Transport workers				
Railway drivers	1.71 (1.24, 2.00)	1.14 (0.83, 2.00)	1.13 (0.81, 2.00)	1.13 (0.82, 2.00)
Motor vehicle drivers	1.40 (1.27, 1.56)	1.37 (1.23, 1.52)	1.31 (1.18, 1.46)	1.32 (1.18, 1.46)
Ship and aircraft operators	1.56 (1.16, 2.09)	1.12 (0.83, 1.50)	1.13 (0.84, 1.52)	1.13 (0.84, 1.53)
Other transport workers	1.63 (1.32, 2.02)	1.26 (1.02, 1.57)	1.25 (1.01, 1.55)	1.26 (1.01, 1.56)
Communication workers	0.51 (0.23, 1.15)	0.48 (0.21, 1.08)	0.49 (0.22, 1.10)	0.49 (0.22, 1.10)
Manufacturing process workers				

Metal products	1.38 (1.24, 1.52)	0.93 (0.84, 1.04)	0.92 (0.83, 1.03)	0.92 (0.83, 1.03)
Machine assembly	0.90 (0.75, 1.09)	0.91 (0.75, 1.10)	0.90 (0.74, 1.09)	0.90 (0.74, 1.09)
Chemical products	1.17 (0.97, 1.41)	0.93 (0.77, 1.12)	0.93 (0.77, 1.12)	0.93 (0.77, 1.12)
Ceramic products	1.06 (0.84, 1.34)	0.86 (0.68, 1.09)	0.85 (0.67, 1.08)	0.85 (0.67, 1.08)
Electro-mechanic assembly	1.10 (0.91, 1.32)	1.23 (1.01, 1.49)	1.23 (1.02, 1.50)	1.24 (1.02, 1.50)
Transportation machine assembly	1.03 (0.88, 1.20)	0.99 (0.84, 1.15)	0.98 (0.84, 1.15)	0.99 (0.84, 1.15)
Other mechanical assembly	1.27 (0.78, 2.07)	1.33 (0.81, 2.19)	1.34 (0.81, 2.20)	1.34 (0.81, 2.20)
Food manufacturing	1.30 (1.07, 1.58)	1.18 (0.97, 1.44)	1.15 (0.95, 1.41)	1.16 (0.95, 1.41)
Beverage and cigarette	2.12 (1.31, 3.42)	1.42 (0.87, 2.32)	1.35 (0.82, 2.20)	1.35 (0.83, 2.21)
Apparel products	1.49 (1.12, 1.99)	1.03 (0.77, 1.38)	1.04 (0.78, 1.39)	1.04 (0.78, 1.40)
Wooden products	1.48 (1.25, 1.75)	0.99 (0.83, 1.18)	1.00 (0.84, 1.19)	1.00 (0.84, 1.20)
Printing and bookbinding	0.89 (0.62, 1.26)	0.87 (0.61, 1.25)	0.87 (0.61, 1.25)	0.87 (0.61, 1.25)
Rubber and plastic products	1.04 (0.74, 1.45)	1.01 (0.72, 1.42)	1.01 (0.72, 1.41)	1.01 (0.72, 1.42)
Jewelry products	1.59 (1.12, 2.27)	1.36 (0.95, 1.96)	1.37 (0.95, 1.98)	1.37 (0.95, 1.98)
Manufacturing-related workers	1.01 (0.83, 1.23)	1.07 (0.88, 1.31)	1.06 (0.87, 1.30)	1.06 (0.87, 1.30)
Construction machinery operators	1.14 (0.95, 1.36)	1.07 (0.89, 1.28)	1.03 (0.86, 1.23)	1.03 (0.86, 1.24)
Electrical workers	1.20 (1.02, 1.42)	1.13 (0.96, 1.34)	1.11 (0.94, 1.32)	1.12 (0.94, 1.32)
Mine workers	0.94 (0.69, 1.26)	1.02 (0.75, 1.39)	1.04 (0.77, 1.41)	1.04 (0.77, 1.42)
Skeleton construction workers	1.04 (0.83, 1.31)	1.17 (0.93, 1.48)	1.12 (0.89, 1.41)	1.12 (0.89, 1.41)
Construction workers	1.21 (1.08, 1.35)	1.07 (0.96, 1.20)	1.06 (0.94, 1.19)	1.06 (0.94, 1.19)
Civil engineer workers	1.56 (1.35, 1.79)	1.30 (1.12, 1.49)	1.26 (1.09, 1.45)	1.26 (1.09, 1.45)
Cargo workers	1.33 (1.14, 1.54)	1.32 (1.13, 1.53)	1.30 (1.12, 1.51)	1.30 (1.12, 1.52)
Other manual workers	1.39 (1.15, 1.66)	1.46 (1.21, 1.75)	1.44 (1.19, 1.74)	1.44 (1.20, 1.74)
Women				
Professional and engineering				
Researchers	1.76 (0.43, 7.13)	3.81 (0.92, 15.84)	4.08 (0.98, 16.96)	4.09 (0.98, 17.00)
Agriculture, forestry, and fishery engineers	No cases	No cases	No cases	No cases
Food engineers	No cases	No cases	No cases	No cases
Machinery and electrical engineers	0.92 (0.23, 3.73)	2.21 (0.54, 9.04)	2.33 (0.57, 9.55)	2.33 (0.57, 9.57)
Industrial engineers	0.47 (0.07, 3.36)	1.18 (0.16, 8.51)	1.20 (0.16, 8.69)	1.20 (0.16, 8.70)
Other manufacturing engineers	No cases	No cases	No cases	No cases
Architects, civil engineers, surveyors	0.42 (0.06, 2.99)	0.89 (0.12, 6.41)	0.93 (0.13, 6.69)	0.93 (0.13, 6.70)
Data processing engineers	0.26 (0.07, 1.06)	1.10 (0.27, 4.44)	1.17 (0.29, 4.72)	1.17 (0.29, 4.73)
Communication network engineers	No cases	No cases	No cases	No cases
Other engineers	3.52 (0.48, 25.70)	8.39 (1.10, 64.14)	8.45 (1.10, 64.70)	8.45 (1.10, 64.66)
Doctors, dentists, veterinarians, pharmacists	0.96 (0.51, 1.81)	1.14 (0.60, 2.17)	1.14 (0.60, 2.16)	1.13 (0.60, 2.16)
Public health nurses, midwives, nurses	0.99 (0.78, 1.27)	1.01 (0.78, 1.29)	0.99 (0.77, 1.28)	0.98 (0.76, 1.27)
Medical technicians	0.31 (0.11, 0.83)	0.64 (0.24, 1.73)	0.69 (0.26, 1.86)	0.69 (0.26, 1.87)
Other health care workers	0.85 (0.57, 1.27)	0.96 (0.64, 1.44)	0.96 (0.64, 1.44)	0.95 (0.63, 1.43)
Social welfare specialists	0.90 (0.66, 1.24)	1.15 (0.83, 1.58)	1.15 (0.84, 1.59)	1.15 (0.83, 1.59)
Legal workers	No cases	No cases	No cases	No cases
Finance and insurance professionals	0.73 (0.10, 5.20)	0.70 (0.10, 5.12)	0.74 (0.10, 5.40)	0.74 (0.10, 5.41)
Teachers	1.13 (0.85, 1.50)	0.78 (0.59, 1.04)	0.79 (0.59, 1.05)	0.79 (0.59, 1.05)
Workers in religious organisations	2.17 (0.53, 8.83)	0.71 (0.17, 2.98)	0.72 (0.17, 2.99)	0.72 (0.17, 2.99)
Authors, journalists, editors	0.52 (0.07, 3.75)	1.02 (0.14, 7.37)	1.07 (0.15, 7.79)	1.07 (0.15, 7.81)
Artists, designers, photographers, film operators	0.56 (0.18, 1.75)	1.11 (0.35, 3.52)	1.13 (0.36, 3.56)	1.13 (0.36, 3.56)
Musicians, stage designers	No cases	No cases	No cases	No cases
Other specialist professionals	1.19 (0.81, 1.74)	0.92 (0.62, 1.36)	0.93 (0.63, 1.38)	0.93 (0.63, 1.38)
Administrative and managerial workers				
Management staff of government officials	No cases	No cases	No cases	No cases
Officers of organisations	2.45 (1.62, 3.70)	0.93 (0.61, 1.41)	0.90 (0.59, 1.37)	0.90 (0.59, 1.37)
Management staff of organisations	1.11 (0.36, 3.49)	0.88 (0.28, 2.79)	0.84 (0.26, 2.66)	0.84 (0.26, 2.65)
Other managerial workers	5.09 (2.89, 8.97)	2.91 (1.63, 5.21)	2.80 (1.56, 5.02)	2.80 (1.56, 5.01)
Clerical workers				
General clerical workers	reference	reference	reference	reference
Accounting clerks	1.29 (1.00, 1.66)	0.94 (0.72, 1.21)	0.93 (0.72, 1.20)	0.93 (0.72, 1.20)
Production-related clerical workers	1.53 (0.89, 2.62)	1.38 (0.80, 2.38)	1.33 (0.77, 2.30)	1.33 (0.77, 2.30)
Sales clerks	0.70 (0.44, 1.10)	1.20 (0.76, 1.90)	1.21 (0.76, 1.92)	1.21 (0.76, 1.92)
Outdoor service workers	1.28 (0.53, 3.12)	0.76 (0.31, 1.87)	0.75 (0.31, 1.84)	0.75 (0.31, 1.84)
Transport and post clerical workers	1.52 (0.75, 3.08)	1.09 (0.53, 2.23)	1.09 (0.53, 2.23)	1.08 (0.53, 2.23)
Office appliance operators	0.70 (0.29, 1.70)	1.14 (0.46, 2.78)	1.10 (0.45, 2.70)	1.10 (0.45, 2.70)
Sales workers				
Merchandise sales workers	1.75 (1.48, 2.06)	1.13 (0.96, 1.35)	1.11 (0.93, 1.31)	1.10 (0.93, 1.31)
Quasi-sales workers	1.55 (1.18, 2.04)	1.30 (0.99, 1.72)	1.26 (0.95, 1.66)	1.26 (0.95, 1.66)
Service workers				

Domestic support service workers	1.78 (1.21, 2.61)	1.49 (1.01, 2.20)	1.45 (0.98, 2.15)	1.45 (0.98, 2.14)
Care service workers	0.69 (0.40, 1.18)	0.93 (0.54, 1.60)	0.90 (0.52, 1.55)	0.89 (0.51, 1.53)
Domestic hygiene service workers	1.81 (1.38, 2.36)	1.14 (0.87, 1.50)	1.12 (0.86, 1.48)	1.12 (0.86, 1.48)
Food and drink preparatory workers	2.18 (1.79, 2.66)	1.21 (0.99, 1.48)	1.15 (0.94, 1.41)	1.15 (0.94, 1.41)
Customer service workers	1.87 (1.53, 2.28)	1.36 (1.11, 1.67)	1.28 (1.04, 1.57)	1.27 (1.04, 1.57)
Residential facilities management personnel	3.88 (2.29, 6.56)	2.03 (1.18, 3.47)	1.96 (1.14, 3.35)	1.95 (1.14, 3.35)
Other service workers	0.94 (0.46, 1.90)	1.09 (0.53, 2.22)	1.07 (0.52, 2.19)	1.07 (0.52, 2.19)
Security workers				
Self-defense officials	No cases	No cases	No cases	No cases
Judicial police staff	1.11 (0.16, 8.00)	1.93 (0.25, 14.65)	1.79 (0.23, 13.79)	1.78 (0.23, 13.69)
Other public security workers	No cases	No cases	No cases	No cases
Agriculture, forestry, and fishery workers				
Agriculture	7.64 (6.64, 8.78)	1.29 (1.11, 1.51)	1.29 (1.10, 1.50)	1.28 (1.10, 1.50)
Forestry	4.31 (1.58, 11.75)	1.27 (0.46, 3.52)	1.25 (0.45, 3.45)	1.25 (0.45, 3.45)
Fishery	5.38 (3.57, 8.10)	1.52 (1.00, 2.31)	1.49 (0.98, 2.27)	1.49 (0.98, 2.27)
Transport workers				
Railway drivers	No cases	No cases	No cases	No cases
Motor vehicle drivers	1.50 (0.71, 3.20)	1.35 (0.63, 2.89)	1.21 (0.56, 2.60)	1.21 (0.56, 2.60)
Ship and aircraft operators	No cases	No cases	No cases	No cases
Other transport workers	4.41 (1.39, 14.00)	3.16 (0.95, 10.52)	3.18 (0.95, 10.56)	3.17 (0.95, 10.53)
Communication workers	1.18 (0.62, 2.22)	0.75 (0.39, 1.42)	0.75 (0.40, 1.43)	0.75 (0.40, 1.43)
Manufacturing process workers				
Metal products	4.46 (3.49, 5.70)	0.99 (0.76, 1.29)	0.96 (0.74, 1.26)	0.96 (0.74, 1.26)
Machine assembly	2.24 (1.10, 4.55)	1.44 (0.70, 2.96)	1.41 (0.68, 2.90)	1.41 (0.68, 2.90)
Chemical products	2.62 (1.49, 4.59)	1.68 (0.95, 2.97)	1.65 (0.93, 2.92)	1.65 (0.93, 2.92)
Ceramic products	2.18 (1.15, 4.11)	1.04 (0.55, 1.99)	1.02 (0.53, 1.94)	1.02 (0.53, 1.94)
Electro-mechanic assembly	1.90 (1.32, 2.71)	1.33 (0.93, 1.91)	1.34 (0.93, 1.93)	1.34 (0.93, 1.93)
Transportation machine assembly	0.63 (0.20, 1.97)	0.48 (0.15, 1.50)	0.45 (0.14, 1.41)	0.45 (0.14, 1.41)
Other mechanical assembly	3.74 (1.75, 8.00)	3.53 (1.63, 7.68)	3.54 (1.63, 7.70)	3.54 (1.63, 7.70)
Food manufacturing	2.92 (2.38, 3.59)	1.44 (1.16, 1.78)	1.39 (1.13, 1.73)	1.39 (1.13, 1.72)
Beverage and cigarette	4.49 (1.65, 12.25)	1.67 (0.60, 4.69)	1.67 (0.59, 4.70)	1.67 (0.59, 4.69)
Apparel products	3.95 (3.21, 4.87)	1.22 (0.98, 1.51)	1.19 (0.96, 1.48)	1.19 (0.96, 1.48)
Wooden products	4.04 (2.80, 5.83)	1.39 (0.95, 2.02)	1.38 (0.95, 2.01)	1.38 (0.95, 2.01)
Printing and bookbinding	1.71 (0.81, 3.64)	1.08 (0.50, 2.31)	1.05 (0.49, 2.25)	1.05 (0.49, 2.25)
Rubber and plastic products	1.71 (0.84, 3.47)	0.87 (0.43, 1.78)	0.82 (0.40, 1.68)	0.82 (0.40, 1.68)
Jewelry products	3.15 (1.83, 5.43)	0.97 (0.56, 1.69)	0.95 (0.54, 1.65)	0.94 (0.54, 1.65)
Manufacturing-related workers	0.68 (0.28, 1.65)	0.54 (0.22, 1.33)	0.53 (0.22, 1.30)	0.53 (0.22, 1.29)
Construction machinery operators	6.79 (2.12, 21.80)	5.19 (1.55, 17.40)	4.55 (1.35, 15.30)	4.55 (1.35, 15.30)
Electrical workers	No cases	No cases	No cases	No cases
Mine workers	9.55 (2.26, 40.26)	3.01 (0.68, 13.31)	2.54 (0.57, 11.34)	2.54 (0.57, 11.34)
Skeleton construction workers	No cases	No cases	No cases	No cases
Construction workers	4.06 (2.14, 7.70)	1.57 (0.81, 3.03)	1.46 (0.76, 2.82)	1.46 (0.76, 2.82)
Civil engineer workers	3.85 (2.41, 6.17)	1.09 (0.67, 1.77)	1.05 (0.65, 1.70)	1.05 (0.65, 1.70)
Cargo workers	2.08 (1.49, 2.89)	1.33 (0.95, 1.86)	1.30 (0.93, 1.82)	1.30 (0.93, 1.82)
Other manual workers	2.88 (2.39, 3.47)	1.49 (1.23, 1.80)	1.45 (1.20, 1.75)	1.44 (1.19, 1.75)

Model 1: Unadjusted.
Model 2: Adjusted for age, admission date, and hospital.
Model 3: Adjusted for the factors in Model 2 plus smoking, alcohol consumption, and hypertension.
Model 4: Adjusted for the factors in Model 3 plus shift-work.

S5 Table. Odds ratios for acute myocardial infarction by occupations among men and women.

	Model 1	Model 2	Model 3	Model 4
Men				
Professional and engineering				
Researchers	0.74 (0.28, 1.99)	0.74 (0.28, 2.00)	0.77 (0.29, 2.09)	0.77 (0.28, 2.08)
Agriculture, forestry, and fishery engineers	1.02 (0.42, 2.48)	0.87 (0.36, 2.12)	0.89 (0.36, 2.18)	0.89 (0.36, 2.18)
Food engineers	0.48 (0.07, 3.46)	0.57 (0.08, 4.06)	0.60 (0.08, 4.33)	0.60 (0.08, 4.33)
Machinery and electrical engineers	0.83 (0.63, 1.08)	0.84 (0.64, 1.10)	0.84 (0.65, 1.10)	0.84 (0.65, 1.10)
Industrial engineers	0.63 (0.38, 1.07)	0.69 (0.41, 1.16)	0.71 (0.42, 1.20)	0.71 (0.42, 1.20)
Other manufacturing engineers	0.43 (0.14, 1.35)	0.31 (0.10, 0.98)	0.34 (0.11, 1.06)	0.33 (0.11, 1.05)
Architects, civil engineers, surveyors	0.91 (0.72, 1.17)	0.94 (0.73, 1.20)	0.92 (0.72, 1.18)	0.93 (0.72, 1.19)
Data processing engineers	0.81 (0.57, 1.16)	1.16 (0.81, 1.67)	1.18 (0.82, 1.69)	1.19 (0.83, 1.71)
Communication network engineers	0.62 (0.23, 1.67)	0.76 (0.28, 2.04)	0.75 (0.28, 2.03)	0.75 (0.28, 2.03)
Other engineers	0.33 (0.08, 1.31)	0.44 (0.11, 1.79)	0.43 (0.11, 1.75)	0.43 (0.11, 1.75)
Doctors, dentists, veterinarians, pharmacists	1.22 (0.85, 1.74)	1.14 (0.80, 1.63)	1.18 (0.82, 1.68)	1.17 (0.82, 1.67)
Public health nurses, midwives, nurses	0.78 (0.29, 2.11)	1.02 (0.38, 2.77)	0.96 (0.36, 2.61)	0.86 (0.32, 2.33)
Medical technicians	0.83 (0.44, 1.56)	0.97 (0.51, 1.82)	0.95 (0.50, 1.79)	0.94 (0.50, 1.78)
Other health care workers	0.68 (0.32, 1.44)	0.70 (0.33, 1.48)	0.67 (0.32, 1.42)	0.66 (0.31, 1.41)
Social welfare specialists	0.35 (0.13, 0.94)	0.44 (0.16, 1.18)	0.43 (0.16, 1.15)	0.41 (0.15, 1.10)
Legal workers	1.01 (0.41, 2.44)	0.87 (0.36, 2.11)	0.90 (0.37, 2.19)	0.90 (0.37, 2.19)
Finance and insurance professionals	0.90 (0.46, 1.76)	0.84 (0.43, 1.63)	0.83 (0.43, 1.63)	0.84 (0.43, 1.63)
Teachers	0.97 (0.77, 1.22)	0.90 (0.72, 1.13)	0.93 (0.74, 1.18)	0.94 (0.74, 1.18)
Workers in religious organisations	1.23 (0.67, 2.24)	1.02 (0.56, 1.87)	1.02 (0.55, 1.87)	1.02 (0.55, 1.87)
Authors, journalists, editors	0.84 (0.37, 1.88)	0.84 (0.37, 1.89)	0.82 (0.36, 1.85)	0.81 (0.36, 1.84)
Artists, designers, photographers, film operators	1.27 (0.74, 2.17)	1.33 (0.77, 2.28)	1.27 (0.74, 2.19)	1.28 (0.74, 2.20)
Musicians, stage designers				
Other specialist professionals	0.96 (0.66, 1.41)	1.04 (0.71, 1.52)	1.03 (0.70, 1.51)	1.03 (0.70, 1.51)
Administrative and managerial workers				
Management staff of government officials	0.85 (0.44, 1.66)	0.85 (0.43, 1.65)	0.87 (0.45, 1.70)	0.87 (0.44, 1.69)
Officers of organisations	1.12 (0.92, 1.37)	0.96 (0.78, 1.17)	0.94 (0.77, 1.15)	0.94 (0.77, 1.15)
Management staff of organisations	1.14 (0.89, 1.46)	1.23 (0.97, 1.58)	1.22 (0.95, 1.56)	1.21 (0.95, 1.55)
Other managerial workers	1.61 (1.13, 2.30)	1.54 (1.08, 2.20)	1.47 (1.02, 2.10)	1.46 (1.02, 2.10)
Clerical workers				
General clerical workers	reference	reference	reference	reference
Accounting clerks	0.90 (0.65, 1.24)	0.86 (0.62, 1.18)	0.85 (0.62, 1.17)	0.85 (0.62, 1.17)
Production-related clerical workers	1.04 (0.76, 1.44)	0.99 (0.72, 1.36)	0.95 (0.69, 1.31)	0.95 (0.69, 1.31)
Sales clerks	0.76 (0.57, 1.01)	0.89 (0.67, 1.19)	0.87 (0.65, 1.17)	0.87 (0.65, 1.17)
Outdoor service workers	1.13 (0.42, 3.06)	1.10 (0.41, 2.97)	1.04 (0.38, 2.83)	1.04 (0.38, 2.83)
Transport and post clerical workers	1.28 (0.91, 1.79)	1.10 (0.78, 1.54)	1.09 (0.78, 1.54)	1.07 (0.76, 1.50)
Office appliance operators	0.88 (0.28, 2.76)	0.99 (0.31, 3.11)	0.97 (0.31, 3.07)	0.97 (0.31, 3.04)
Sales workers				
Merchandise sales workers	1.04 (0.87, 1.25)	0.98 (0.81, 1.18)	0.93 (0.77, 1.11)	0.92 (0.76, 1.11)
Quasi-sales workers	1.07 (0.91, 1.25)	1.05 (0.89, 1.22)	1.04 (0.88, 1.21)	1.04 (0.88, 1.21)
Service workers				
Domestic support service workers	No cases	No cases	No cases	No cases
Care service workers	0.30 (0.07, 1.20)	0.41 (0.10, 1.65)	0.37 (0.09, 1.51)	0.33 (0.08, 1.35)
Domestic hygiene service workers	0.90 (0.58, 1.38)	0.82 (0.53, 1.26)	0.77 (0.50, 1.19)	0.77 (0.50, 1.19)
Food and drink preparatory workers	1.00 (0.77, 1.31)	1.03 (0.79, 1.34)	0.98 (0.75, 1.28)	0.97 (0.74, 1.27)
Customer service workers	0.87 (0.60, 1.25)	0.95 (0.66, 1.37)	0.89 (0.62, 1.29)	0.88 (0.61, 1.26)
Residential facilities management personnel	0.99 (0.51, 1.93)	0.99 (0.51, 1.94)	0.94 (0.48, 1.83)	0.92 (0.47, 1.80)
Other service workers	1.41 (0.79, 2.52)	1.58 (0.88, 2.83)	1.47 (0.82, 2.65)	1.45 (0.81, 2.61)
Security workers				
Self-defense officials	0.87 (0.59, 1.28)	0.80 (0.54, 1.18)	0.84 (0.57, 1.24)	0.82 (0.56, 1.22)
Judicial police staff	0.77 (0.49, 1.20)	0.82 (0.53, 1.28)	0.82 (0.53, 1.28)	0.78 (0.50, 1.22)
Other public security workers	0.94 (0.68, 1.30)	1.01 (0.73, 1.40)	0.95 (0.68, 1.31)	0.88 (0.63, 1.23)
Agriculture, forestry, and fishery workers				
Agriculture	1.23 (1.02, 1.47)	0.84 (0.70, 1.01)	0.82 (0.68, 0.99)	0.82 (0.68, 0.99)
Forestry	0.64 (0.29, 1.45)	0.59 (0.26, 1.34)	0.60 (0.27, 1.36)	0.60 (0.27, 1.35)
Fishery	0.72 (0.51, 1.02)	0.83 (0.58, 1.19)	0.78 (0.55, 1.12)	0.78 (0.55, 1.12)
Transport workers				
Railway drivers	1.23 (0.72, 2.11)	1.03 (0.60, 1.77)	0.99 (0.58, 1.71)	0.96 (0.56, 1.66)
Motor vehicle drivers	1.12 (0.95, 1.31)	1.09 (0.93, 1.29)	1.01 (0.85, 1.18)	0.99 (0.84, 1.17)
Ship and aircraft operators	0.62 (0.32, 1.20)	0.54 (0.28, 1.05)	0.54 (0.28, 1.06)	0.53 (0.27, 1.03)
Other transport workers	0.94 (0.64, 1.40)	0.79 (0.53, 1.18)	0.78 (0.53, 1.17)	0.77 (0.52, 1.14)
Communication workers	0.74 (0.27, 1.99)	0.74 (0.27, 2.00)	0.76 (0.28, 2.06)	0.75 (0.28, 2.03)
Manufacturing process workers				

Metal products	0.99 (0.84, 1.16)	0.80 (0.68, 0.94)	0.77 (0.65, 0.91)	0.76 (0.64, 0.90)
Machine assembly	0.82 (0.61, 1.10)	0.75 (0.56, 1.01)	0.73 (0.55, 0.98)	0.73 (0.54, 0.98)
Chemical products	0.85 (0.63, 1.16)	0.85 (0.63, 1.16)	0.85 (0.62, 1.16)	0.83 (0.61, 1.13)
Ceramic products	0.63 (0.41, 0.97)	0.60 (0.39, 0.93)	0.59 (0.38, 0.91)	0.58 (0.38, 0.90)
Electro-mechanic assembly	1.02 (0.76, 1.35)	1.06 (0.80, 1.41)	1.03 (0.77, 1.37)	1.01 (0.76, 1.35)
Transportation machine assembly	0.85 (0.66, 1.08)	0.84 (0.66, 1.08)	0.81 (0.64, 1.04)	0.81 (0.63, 1.03)
Other mechanical assembly	1.77 (0.97, 3.25)	1.62 (0.88, 2.99)	1.58 (0.86, 2.90)	1.56 (0.85, 2.88)
Food manufacturing	0.94 (0.68, 1.30)	0.94 (0.68, 1.30)	0.90 (0.64, 1.24)	0.89 (0.64, 1.23)
Beverage and cigarette	1.02 (0.38, 2.74)	0.87 (0.32, 2.34)	0.83 (0.31, 2.26)	0.82 (0.30, 2.22)
Apparel products	1.18 (0.74, 1.88)	0.85 (0.53, 1.36)	0.80 (0.50, 1.28)	0.79 (0.49, 1.26)
Wooden products	1.03 (0.77, 1.37)	0.83 (0.62, 1.12)	0.83 (0.62, 1.11)	0.82 (0.61, 1.10)
Printing and bookbinding	0.81 (0.48, 1.39)	0.83 (0.48, 1.42)	0.79 (0.46, 1.35)	0.77 (0.45, 1.33)
Rubber and plastic products	1.21 (0.77, 1.91)	1.10 (0.70, 1.74)	1.08 (0.68, 1.71)	1.06 (0.67, 1.67)
Jewelry products	1.56 (0.93, 2.63)	1.36 (0.80, 2.30)	1.31 (0.78, 2.23)	1.31 (0.77, 2.21)
Manufacturing-related workers	1.09 (0.82, 1.44)	1.04 (0.78, 1.37)	1.00 (0.75, 1.32)	1.00 (0.75, 1.32)
Construction machinery operators	1.14 (0.88, 1.48)	1.09 (0.84, 1.41)	1.05 (0.80, 1.36)	1.03 (0.79, 1.34)
Electrical workers	0.87 (0.66, 1.14)	0.83 (0.63, 1.10)	0.82 (0.63, 1.08)	0.82 (0.63, 1.08)
Mine workers	0.95 (0.61, 1.46)	0.56 (0.36, 0.87)	0.59 (0.38, 0.93)	0.59 (0.38, 0.92)
Skeleton construction workers	0.77 (0.53, 1.13)	0.85 (0.58, 1.25)	0.79 (0.54, 1.16)	0.80 (0.54, 1.17)
Construction workers	0.91 (0.76, 1.08)	0.85 (0.71, 1.01)	0.83 (0.70, 1.00)	0.84 (0.70, 1.00)
Civil engineer workers	1.05 (0.83, 1.33)	1.04 (0.82, 1.32)	0.98 (0.77, 1.24)	0.98 (0.77, 1.24)
Cargo workers	1.05 (0.82, 1.33)	1.02 (0.81, 1.30)	0.99 (0.78, 1.25)	0.98 (0.77, 1.25)
Other manual workers	1.22 (0.92, 1.61)	1.20 (0.91, 1.60)	1.14 (0.86, 1.52)	1.14 (0.86, 1.51)
Women				
Professional and engineering				
Researchers	No cases	No cases	No cases	No cases
Agriculture, forestry, and fishery engineers	No cases	No cases	No cases	No cases
Food engineers	No cases	No cases	No cases	No cases
Machinery and electrical engineers	No cases	No cases	No cases	No cases
Industrial engineers	No cases	No cases	No cases	No cases
Other manufacturing engineers	No cases	No cases	No cases	No cases
Architects, civil engineers, surveyors	No cases	No cases	No cases	No cases
Data processing engineers	No cases	No cases	No cases	No cases
Communication network engineers	No cases	No cases	No cases	No cases
Other engineers	No cases	No cases	No cases	No cases
Doctors, dentists, veterinarians, pharmacists	1.00 (0.24, 4.12)	0.99 (0.24, 4.08)	0.98 (0.24, 4.06)	0.99 (0.24, 4.07)
Public health nurses, midwives, nurses	1.41 (0.86, 2.31)	1.45 (0.88, 2.39)	1.35 (0.82, 2.23)	1.38 (0.83, 2.28)
Medical technicians	0.81 (0.20, 3.31)	1.63 (0.39, 6.71)	1.83 (0.44, 7.57)	1.83 (0.44, 7.56)
Other health care workers	0.68 (0.25, 1.89)	0.71 (0.26, 1.97)	0.68 (0.25, 1.89)	0.69 (0.25, 1.91)
Social welfare specialists	0.64 (0.28, 1.50)	0.80 (0.34, 1.87)	0.80 (0.34, 1.87)	0.81 (0.35, 1.89)
Legal workers	No cases	No cases	No cases	No cases
Finance and insurance professionals	No cases	No cases	No cases	No cases
Teachers	1.42 (0.79, 2.56)	1.02 (0.56, 1.84)	1.05 (0.58, 1.90)	1.05 (0.58, 1.90)
Workers in religious organisations	No cases	No cases	No cases	No cases
Authors, journalists, editors	No cases	No cases	No cases	No cases
Artists, designers, photographers, film operators	No cases	No cases	No cases	No cases
Musicians, stage designers	No cases	No cases	No cases	No cases
Other specialist professionals	1.28 (0.55, 2.98)	0.92 (0.40, 2.15)	0.92 (0.40, 2.16)	0.92 (0.40, 2.16)
Administrative and managerial workers				
Management staff of government officials	7.50 (1.03, 54.81)	3.72 (0.49, 28.08)	3.74 (0.49, 28.44)	3.74 (0.49, 28.44)
Officers of organisations	3.07 (1.32, 7.15)	1.03 (0.44, 2.43)	0.92 (0.39, 2.17)	0.92 (0.39, 2.18)
Management staff of organisations	5.82 (1.81, 18.69)	4.25 (1.31, 13.79)	3.64 (1.12, 11.85)	3.64 (1.12, 11.87)
Other managerial workers	8.19 (2.95, 22.73)	3.95 (1.40, 11.15)	3.32 (1.17, 9.42)	3.33 (1.17, 9.45)
Clerical workers				
General clerical workers	reference	reference	reference	reference
Accounting clerks	1.54 (0.90, 2.62)	1.11 (0.65, 1.90)	1.09 (0.64, 1.87)	1.09 (0.64, 1.87)
Production-related clerical workers	0.57 (0.08, 4.12)	0.49 (0.07, 3.59)	0.46 (0.06, 3.34)	0.46 (0.06, 3.34)
Sales clerks	0.55 (0.17, 1.76)	0.71 (0.22, 2.28)	0.71 (0.22, 2.28)	0.71 (0.22, 2.28)
Outdoor service workers	5.36 (1.93, 14.85)	3.15 (1.13, 8.78)	3.12 (1.12, 8.71)	3.13 (1.12, 8.73)
Transport and post clerical workers	1.98 (0.48, 8.15)	1.54 (0.37, 6.36)	1.43 (0.34, 5.93)	1.43 (0.35, 5.95)
Office appliance operators	1.46 (0.36, 6.02)	1.77 (0.43, 7.32)	1.70 (0.41, 7.05)	1.70 (0.41, 7.04)
Sales workers				
Merchandise sales workers	2.38 (1.68, 3.39)	1.62 (1.13, 2.31)	1.49 (1.04, 2.13)	1.49 (1.05, 2.14)
Quasi-sales workers	2.50 (1.49, 4.17)	1.90 (1.13, 3.19)	1.70 (1.01, 2.86)	1.71 (1.02, 2.86)
Service workers				

Domestic support service workers	2.88 (1.42, 5.84)	2.33 (1.14, 4.74)	2.03 (1.00, 4.14)	2.04 (1.00, 4.16)
Care service workers	0.77 (0.24, 2.47)	1.16 (0.36, 3.74)	1.03 (0.32, 3.31)	1.05 (0.32, 3.41)
Domestic hygiene service workers	1.97 (1.09, 3.55)	1.32 (0.73, 2.38)	1.18 (0.65, 2.13)	1.18 (0.65, 2.13)
Food and drink preparatory workers	2.83 (1.87, 4.28)	1.59 (1.04, 2.42)	1.41 (0.92, 2.14)	1.41 (0.93, 2.15)
Customer service workers	2.85 (1.91, 4.26)	2.03 (1.36, 3.05)	1.71 (1.13, 2.57)	1.71 (1.14, 2.58)
Residential facilities management personnel	5.40 (1.95, 14.96)	2.51 (0.90, 7.01)	2.26 (0.81, 6.33)	2.27 (0.81, 6.34)
Other service workers	1.23 (0.30, 5.04)	1.35 (0.33, 5.58)	1.24 (0.30, 5.11)	1.24 (0.30, 5.12)
Security workers				
Self-defense officials	No cases	No cases	No cases	No cases
Judicial police staff	No cases	No cases	No cases	No cases
Other public security workers	No cases	No cases	No cases	No cases
Agriculture, forestry, and fishery workers				
Agriculture	4.55 (3.22, 6.42)	0.92 (0.64, 1.34)	0.90 (0.62, 1.30)	0.90 (0.62, 1.31)
Forestry	5.63 (0.77, 41.00)	2.16 (0.29, 15.99)	1.97 (0.27, 14.65)	1.97 (0.27, 14.65)
Fishery	6.48 (2.78, 15.12)	2.54 (1.07, 6.03)	2.43 (1.02, 5.76)	2.43 (1.03, 5.77)
Transport workers				
Railway drivers	No cases	No cases	No cases	No cases
Motor vehicle drivers	1.12 (0.15, 8.12)	1.07 (0.15, 7.79)	0.80 (0.11, 5.86)	0.80 (0.11, 5.87)
Ship and aircraft operators	No cases	No cases	No cases	No cases
Other transport workers	No cases	No cases	No cases	No cases
Communication workers	1.23 (0.30, 5.05)	0.76 (0.19, 3.15)	0.74 (0.18, 3.07)	0.75 (0.18, 3.08)
Manufacturing process workers				
Metal products	3.83 (2.13, 6.91)	1.24 (0.67, 2.32)	1.16 (0.62, 2.17)	1.16 (0.62, 2.17)
Machine assembly	No cases	No cases	No cases	No cases
Chemical products	4.21 (1.52, 11.66)	3.17 (1.14, 8.85)	3.08 (1.10, 8.61)	3.08 (1.10, 8.62)
Ceramic products	1.14 (0.16, 8.23)	0.51 (0.07, 3.71)	0.46 (0.06, 3.38)	0.46 (0.06, 3.39)
Electro-mechanic assembly	3.20 (1.67, 6.13)	2.40 (1.25, 4.62)	2.35 (1.22, 4.51)	2.35 (1.22, 4.52)
Transportation machine assembly	2.20 (0.53, 9.03)	1.63 (0.39, 6.74)	1.46 (0.35, 6.04)	1.46 (0.35, 6.05)
Other mechanical assembly	2.79 (0.38, 20.26)	2.61 (0.36, 19.08)	2.57 (0.35, 18.80)	2.56 (0.35, 18.79)
Food manufacturing	3.01 (1.90, 4.78)	1.71 (1.07, 2.75)	1.56 (0.97, 2.51)	1.56 (0.97, 2.51)
Beverage and cigarette	No cases	No cases	No cases	No cases
Apparel products	3.73 (2.30, 6.03)	1.28 (0.78, 2.09)	1.21 (0.74, 1.97)	1.21 (0.74, 1.98)
Wooden products	2.56 (0.93, 7.08)	1.00 (0.36, 2.78)	0.94 (0.34, 2.62)	0.94 (0.34, 2.62)
Printing and bookbinding	1.28 (0.18, 9.26)	0.79 (0.11, 5.73)	0.76 (0.10, 5.52)	0.76 (0.10, 5.52)
Rubber and plastic products	No cases	No cases	No cases	No cases
Jewelry products	1.18 (0.16, 8.52)	0.50 (0.07, 3.65)	0.46 (0.06, 3.37)	0.46 (0.06, 3.38)
Manufacturing-related workers	0.71 (0.10, 5.15)	0.51 (0.07, 3.70)	0.48 (0.07, 3.47)	0.48 (0.07, 3.48)
Construction machinery operators	No cases	No cases	No cases	No cases
Electrical workers	No cases	No cases	No cases	No cases
Mine workers	24.92 (3.33, 186.46)	8.19 (1.05, 63.91)	6.34 (0.81, 49.93)	6.35 (0.81, 49.99)
Skeleton construction workers	No cases	No cases	No cases	No cases
Construction workers	6.36 (1.98, 20.45)	3.25 (1.00, 10.58)	2.72 (0.84, 8.88)	2.73 (0.84, 8.88)
Civil engineer workers	2.12 (0.52, 8.70)	0.85 (0.21, 3.53)	0.68 (0.16, 2.83)	0.68 (0.16, 2.83)
Cargo workers	2.65 (1.35, 5.20)	1.87 (0.95, 3.69)	1.70 (0.86, 3.36)	1.70 (0.86, 3.37)
Other manual workers	2.89 (1.90, 4.41)	1.50 (0.98, 2.29)	1.34 (0.88, 2.06)	1.35 (0.88, 2.06)

Model 1: Unadjusted.
Model 2: Adjusted for age, admission date, and hospital.
Model 3: Adjusted for the factors in Model 2 plus smoking, alcohol consumption, and hypertension.
Model 4: Adjusted for the factors in Model 3 plus shift-work.

S4 Table. Odds ratios for subarachnoid hemorrhage by occupations among men and women.

	Model 1	Model 2	Model 3	Model 4
Men				
Professional and engineering				
Researchers	1.73 (0.24, 12.62)	1.75 (0.24, 12.82)	1.86 (0.25, 13.65)	1.86 (0.25, 13.66)
Agriculture, forestry, and fishery engineers	5.71 (1.75, 18.58)	4.56 (1.40, 14.92)	4.71 (1.44, 15.43)	4.72 (1.44, 15.45)
Food engineers	No cases	No cases	No cases	No cases
Machinery and electrical engineers	1.42 (0.74, 2.73)	1.40 (0.73, 2.69)	1.42 (0.74, 2.74)	1.42 (0.74, 2.74)
Industrial engineers	1.58 (0.56, 4.43)	1.67 (0.59, 4.70)	1.72 (0.61, 4.85)	1.72 (0.61, 4.86)
Other manufacturing engineers	No cases	No cases	No cases	No cases
Architects, civil engineers, surveyors	2.27 (1.33, 3.87)	2.29 (1.34, 3.93)	2.20 (1.28, 3.76)	2.20 (1.28, 3.76)
Data processing engineers	1.56 (0.70, 3.51)	1.44 (0.64, 3.26)	1.57 (0.70, 3.57)	1.57 (0.69, 3.56)
Communication network engineers	No cases	No cases	No cases	No cases
Other engineers	No cases	No cases	No cases	No cases
Doctors, dentists, veterinarians, pharmacists	1.34 (0.48, 3.75)	1.35 (0.48, 3.81)	1.46 (0.52, 4.10)	1.46 (0.52, 4.11)
Public health nurses, midwives, nurses	3.66 (0.88, 15.22)	2.74 (0.65, 11.47)	2.84 (0.68, 11.88)	2.89 (0.68, 12.22)
Medical technicians	3.10 (1.10, 8.71)	2.63 (0.93, 7.41)	2.94 (1.04, 8.30)	2.95 (1.04, 8.31)
Other health care workers	1.81 (0.44, 7.54)	1.61 (0.39, 6.72)	1.71 (0.41, 7.14)	1.72 (0.41, 7.16)
Social welfare specialists	No cases	No cases	No cases	No cases
Legal workers	No cases	No cases	No cases	No cases
Finance and insurance professionals	0.94 (0.13, 6.83)	0.97 (0.13, 7.09)	1.01 (0.14, 7.41)	1.01 (0.14, 7.40)
Teachers	1.79 (1.03, 3.12)	1.78 (1.02, 3.10)	1.89 (1.08, 3.29)	1.89 (1.08, 3.29)
Workers in religious organisations	2.08 (0.50, 8.63)	1.82 (0.44, 7.57)	1.89 (0.45, 7.87)	1.89 (0.45, 7.87)
Authors, journalists, editors	1.30 (0.18, 9.50)	1.36 (0.19, 9.96)	1.32 (0.18, 9.67)	1.32 (0.18, 9.68)
Artists, designers, photographers, film operators	2.53 (0.78, 8.23)	2.42 (0.74, 7.89)	2.50 (0.77, 8.16)	2.50 (0.77, 8.15)
Musicians, stage designers	4.07 (0.98, 16.95)	4.12 (0.98, 17.24)	4.32 (1.03, 18.11)	4.32 (1.03, 18.09)
Other specialist professionals	1.54 (0.61, 3.93)	1.44 (0.57, 3.68)	1.53 (0.60, 3.91)	1.53 (0.60, 3.91)
Administrative and managerial workers				
Management staff of government officials	No cases	No cases	No cases	No cases
Officers of organisations	1.68 (0.99, 2.84)	1.74 (1.02, 2.96)	1.66 (0.97, 2.82)	1.66 (0.97, 2.82)
Management staff of organisations	1.33 (0.66, 2.68)	1.52 (0.76, 3.07)	1.43 (0.71, 2.89)	1.43 (0.71, 2.89)
Other managerial workers	0.44 (0.06, 3.23)	0.59 (0.08, 4.32)	0.57 (0.08, 4.20)	0.57 (0.08, 4.20)
Clerical workers				
General clerical workers	reference	reference	reference	reference
Accounting clerks	0.20 (0.03, 1.42)	0.21 (0.03, 1.51)	0.21 (0.03, 1.53)	0.21 (0.03, 1.53)
Production-related clerical workers	1.36 (0.57, 3.22)	1.36 (0.57, 3.22)	1.30 (0.55, 3.10)	1.31 (0.55, 3.10)
Sales clerks	1.96 (1.07, 3.57)	2.02 (1.10, 3.69)	1.94 (1.06, 3.55)	1.93 (1.06, 3.54)
Outdoor service workers	7.94 (2.43, 25.88)	8.82 (2.69, 28.94)	8.85 (2.69, 29.10)	8.86 (2.69, 29.13)
Transport and post clerical workers	2.51 (1.17, 5.40)	2.29 (1.06, 4.93)	2.28 (1.06, 4.91)	2.29 (1.06, 4.93)
Office appliance operators	2.73 (0.37, 19.99)	2.44 (0.33, 17.89)	2.60 (0.35, 19.13)	2.61 (0.35, 19.16)
Sales workers				
Merchandise sales workers	1.75 (1.09, 2.83)	1.58 (0.98, 2.54)	1.57 (0.97, 2.54)	1.57 (0.98, 2.54)
Quasi-sales workers	1.82 (1.20, 2.77)	1.73 (1.14, 2.63)	1.66 (1.09, 2.53)	1.66 (1.09, 2.53)
Service workers				
Domestic support service workers	No cases	No cases	No cases	No cases
Care service workers	4.16 (1.28, 13.55)	3.52 (1.07, 11.56)	3.77 (1.15, 12.39)	3.84 (1.16, 12.71)
Domestic hygiene service workers	2.66 (1.19, 5.98)	2.50 (1.11, 5.61)	2.54 (1.13, 5.72)	2.54 (1.13, 5.73)
Food and drink preparatory workers	2.27 (1.26, 4.08)	2.00 (1.11, 3.60)	1.88 (1.04, 3.39)	1.88 (1.04, 3.39)
Customer service workers	2.27 (1.10, 4.72)	1.87 (0.90, 3.89)	1.88 (0.90, 3.91)	1.89 (0.91, 3.93)
Residential facilities management personnel	1.03 (0.14, 7.51)	1.18 (0.16, 8.63)	1.13 (0.15, 8.28)	1.14 (0.16, 8.32)
Other service workers	2.19 (0.53, 9.12)	1.89 (0.45, 7.88)	1.87 (0.45, 7.79)	1.87 (0.45, 7.81)
Security workers				
Self-defense officials	2.61 (1.26, 5.41)	1.79 (0.86, 3.74)	1.84 (0.88, 3.84)	1.85 (0.88, 3.86)
Judicial police staff	1.03 (0.32, 3.33)	1.00 (0.31, 3.23)	1.01 (0.31, 3.28)	1.02 (0.31, 3.32)
Other public security workers	2.35 (1.20, 4.60)	2.16 (1.10, 4.24)	2.14 (1.09, 4.20)	2.17 (1.09, 4.29)
Agriculture, forestry, and fishery workers				
Agriculture	1.72 (1.04, 2.82)	1.44 (0.87, 2.38)	1.51 (0.91, 2.51)	1.52 (0.91, 2.51)
Forestry	No cases	No cases	No cases	No cases
Fishery	3.06 (1.70, 5.51)	2.42 (1.33, 4.40)	2.38 (1.31, 4.35)	2.39 (1.31, 4.35)
Transport workers				
Railway drivers	No cases	No cases	No cases	No cases
Motor vehicle drivers	2.35 (1.56, 3.54)	2.12 (1.40, 3.20)	1.96 (1.30, 2.96)	1.97 (1.30, 2.97)
Ship and aircraft operators	1.92 (0.59, 6.23)	1.71 (0.52, 5.56)	1.74 (0.53, 5.66)	1.75 (0.54, 5.69)
Other transport workers	1.30 (0.46, 3.66)	1.24 (0.44, 3.48)	1.22 (0.43, 3.43)	1.22 (0.43, 3.44)
Communication workers	3.45 (0.83, 14.35)	3.45 (0.83, 14.41)	3.59 (0.86, 15.00)	3.60 (0.86, 15.04)
Manufacturing process workers				

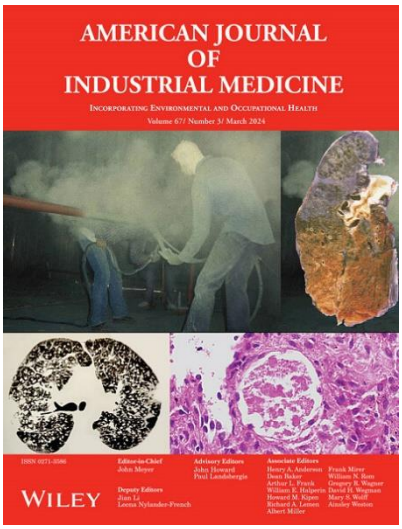
Metal products	2.81 (1.90, 4.17)	2.25 (1.51, 3.35)	2.19 (1.47, 3.26)	2.20 (1.47, 3.27)
Machine assembly	1.88 (1.00, 3.54)	1.65 (0.87, 3.11)	1.59 (0.84, 3.00)	1.59 (0.84, 3.01)
Chemical products	1.69 (0.84, 3.41)	1.62 (0.80, 3.28)	1.61 (0.80, 3.26)	1.62 (0.80, 3.29)
Ceramic products	1.33 (0.52, 3.39)	1.27 (0.50, 3.24)	1.24 (0.49, 3.17)	1.24 (0.49, 3.18)
Electro-mechanic assembly	2.58 (1.42, 4.71)	2.19 (1.20, 4.00)	2.20 (1.20, 4.01)	2.21 (1.21, 4.04)
Transportation machine assembly	3.07 (1.90, 4.94)	2.48 (1.54, 4.02)	2.44 (1.51, 3.95)	2.45 (1.51, 3.96)
Other mechanical assembly	1.50 (0.21, 10.98)	1.40 (0.19, 10.27)	1.43 (0.20, 10.46)	1.43 (0.20, 10.48)
Food manufacturing	2.77 (1.47, 5.21)	2.28 (1.21, 4.30)	2.25 (1.19, 4.25)	2.26 (1.20, 4.26)
Beverage and cigarette	No cases	No cases	No cases	No cases
Apparel products	1.16 (0.28, 4.80)	1.07 (0.26, 4.47)	1.09 (0.26, 4.56)	1.09 (0.26, 4.57)
Wooden products	2.71 (1.48, 4.93)	2.15 (1.18, 3.94)	2.16 (1.18, 3.95)	2.17 (1.18, 3.97)
Printing and bookbinding	0.54 (0.07, 3.96)	0.51 (0.07, 3.71)	0.51 (0.07, 3.71)	0.51 (0.07, 3.72)
Rubber and plastic products	1.69 (0.52, 5.50)	1.60 (0.49, 5.22)	1.61 (0.49, 5.25)	1.62 (0.50, 5.27)
Jewelry products	2.91 (0.90, 9.47)	3.26 (1.00, 10.65)	3.35 (1.03, 10.95)	3.36 (1.03, 10.97)
Manufacturing-related workers	1.93 (0.98, 3.78)	1.60 (0.82, 3.15)	1.53 (0.78, 3.02)	1.53 (0.78, 3.02)
Construction machinery operators	0.92 (0.39, 2.19)	0.85 (0.36, 2.02)	0.79 (0.33, 1.89)	0.80 (0.34, 1.89)
Electrical workers	2.74 (1.60, 4.68)	2.50 (1.46, 4.28)	2.40 (1.40, 4.11)	2.40 (1.40, 4.11)
Mine workers	0.80 (0.19, 3.33)	1.50 (0.36, 6.29)	1.56 (0.37, 6.54)	1.57 (0.37, 6.56)
Skeleton construction workers	1.98 (0.92, 4.25)	1.58 (0.73, 3.40)	1.42 (0.66, 3.07)	1.42 (0.66, 3.07)
Construction workers	1.93 (1.24, 3.00)	1.67 (1.07, 2.61)	1.60 (1.02, 2.49)	1.60 (1.02, 2.49)
Civil engineer workers	2.65 (1.58, 4.43)	2.36 (1.40, 3.95)	2.22 (1.32, 3.72)	2.22 (1.32, 3.72)
Cargo workers	2.27 (1.31, 3.91)	1.96 (1.13, 3.38)	1.94 (1.12, 3.35)	1.94 (1.12, 3.36)
Other manual workers	2.59 (1.38, 4.88)	2.39 (1.27, 4.51)	2.35 (1.25, 4.44)	2.36 (1.25, 4.44)
Women				
Professional and engineering				
Researchers	1.98 (0.28, 14.28)	2.47 (0.34, 17.89)	2.69 (0.37, 19.62)	2.69 (0.37, 19.62)
Agriculture, forestry, and fishery engineers	No cases	No cases	No cases	No cases
Food engineers	No cases	No cases	No cases	No cases
Machinery and electrical engineers	No cases	No cases	No cases	No cases
Industrial engineers	No cases	No cases	No cases	No cases
Other manufacturing engineers	No cases	No cases	No cases	No cases
Architects, civil engineers, surveyors	No cases	No cases	No cases	No cases
Data processing engineers	0.60 (0.15, 2.41)	0.93 (0.23, 3.78)	1.00 (0.25, 4.09)	1.00 (0.24, 4.08)
Communication network engineers	No cases	No cases	No cases	No cases
Other engineers	No cases	No cases	No cases	No cases
Doctors, dentists, veterinarians, pharmacists	0.22 (0.03, 1.55)	0.25 (0.04, 1.80)	0.27 (0.04, 1.96)	0.27 (0.04, 1.96)
Public health nurses, midwives, nurses	0.86 (0.58, 1.27)	0.83 (0.56, 1.24)	0.81 (0.55, 1.21)	0.82 (0.55, 1.23)
Medical technicians	0.17 (0.02, 1.25)	0.22 (0.03, 1.57)	0.24 (0.03, 1.74)	0.24 (0.03, 1.74)
Other health care workers	0.74 (0.39, 1.41)	0.75 (0.39, 1.43)	0.72 (0.38, 1.38)	0.73 (0.38, 1.39)
Social welfare specialists	0.74 (0.44, 1.25)	0.75 (0.45, 1.27)	0.76 (0.45, 1.28)	0.76 (0.45, 1.29)
Legal workers	No cases	No cases	No cases	No cases
Finance and insurance professionals	No cases	No cases	No cases	No cases
Teachers	1.10 (0.71, 1.69)	0.99 (0.64, 1.53)	1.06 (0.69, 1.63)	1.06 (0.69, 1.63)
Workers in religious organisations	2.45 (0.34, 17.68)	1.66 (0.23, 12.12)	1.60 (0.22, 11.68)	1.60 (0.22, 11.69)
Authors, journalists, editors	2.36 (0.58, 9.61)	3.03 (0.74, 12.42)	3.07 (0.75, 12.62)	3.07 (0.75, 12.61)
Artists, designers, photographers, film operators	0.42 (0.06, 3.01)	0.57 (0.08, 4.06)	0.57 (0.08, 4.07)	0.57 (0.08, 4.07)
Musicians, stage designers	No cases	No cases	No cases	No cases
Other specialist professionals	0.74 (0.36, 1.51)	0.72 (0.35, 1.47)	0.74 (0.36, 1.51)	0.74 (0.36, 1.51)
Administrative and managerial workers				
Management staff of government officials	No cases	No cases	No cases	No cases
Officers of organisations	0.88 (0.33, 2.40)	0.59 (0.22, 1.61)	0.55 (0.20, 1.51)	0.55 (0.20, 1.51)
Management staff of organisations	No cases	No cases	No cases	No cases
Other managerial workers	0.88 (0.12, 6.34)	1.01 (0.14, 7.30)	0.84 (0.12, 6.11)	0.84 (0.12, 6.11)
Clerical workers				
General clerical workers	reference	reference	reference	reference
Accounting clerks	0.81 (0.52, 1.28)	0.71 (0.45, 1.11)	0.70 (0.44, 1.10)	0.70 (0.44, 1.10)
Production-related clerical workers	1.48 (0.65, 3.35)	1.36 (0.59, 3.09)	1.25 (0.55, 2.87)	1.25 (0.55, 2.86)
Sales clerks	0.32 (0.12, 0.86)	0.36 (0.13, 0.98)	0.36 (0.13, 0.98)	0.36 (0.13, 0.97)
Outdoor service workers	0.58 (0.08, 4.15)	0.49 (0.07, 3.49)	0.48 (0.07, 3.42)	0.48 (0.07, 3.43)
Transport and post clerical workers	0.43 (0.06, 3.07)	0.38 (0.05, 2.76)	0.36 (0.05, 2.61)	0.36 (0.05, 2.62)
Office appliance operators	0.95 (0.30, 2.99)	1.11 (0.35, 3.49)	1.07 (0.34, 3.37)	1.07 (0.34, 3.37)
Sales workers				
Merchandise sales workers	1.23 (0.93, 1.61)	1.05 (0.80, 1.38)	0.98 (0.74, 1.29)	0.98 (0.74, 1.30)
Quasi-sales workers	1.19 (0.75, 1.87)	1.13 (0.72, 1.78)	1.00 (0.63, 1.58)	1.00 (0.63, 1.58)
Service workers				

Domestic support service workers	1.38 (0.72, 2.63)	1.27 (0.66, 2.42)	1.13 (0.59, 2.16)	1.13 (0.59, 2.17)
Care service workers	0.78 (0.36, 1.67)	0.94 (0.43, 2.02)	0.83 (0.38, 1.78)	0.83 (0.38, 1.81)
Domestic hygiene service workers	1.46 (0.94, 2.26)	1.21 (0.78, 1.88)	1.13 (0.73, 1.76)	1.13 (0.73, 1.76)
Food and drink preparatory workers	2.06 (1.52, 2.78)	1.57 (1.16, 2.14)	1.39 (1.02, 1.89)	1.39 (1.02, 1.90)
Customer service workers	1.26 (0.89, 1.78)	1.07 (0.76, 1.51)	0.88 (0.62, 1.25)	0.88 (0.62, 1.25)
Residential facilities management personnel	0.58 (0.08, 4.18)	0.43 (0.06, 3.10)	0.40 (0.06, 2.85)	0.40 (0.06, 2.86)
Other service workers	0.53 (0.13, 2.15)	0.57 (0.14, 2.31)	0.51 (0.13, 2.09)	0.52 (0.13, 2.09)
Security workers				
Self-defense officials	No cases	No cases	No cases	No cases
Judicial police staff	No cases	No cases	No cases	No cases
Other public security workers	1.49 (0.21, 10.73)	1.41 (0.19, 10.16)	1.12 (0.15, 8.10)	1.12 (0.15, 8.12)
Agriculture, forestry, and fishery workers				
Agriculture	2.35 (1.80, 3.06)	0.93 (0.70, 1.25)	0.92 (0.68, 1.23)	0.92 (0.68, 1.23)
Forestry	No cases	No cases	No cases	No cases
Fishery	3.27 (1.52, 7.02)	1.56 (0.72, 3.40)	1.52 (0.70, 3.31)	1.52 (0.70, 3.31)
Transport workers				
Railway drivers	No cases	No cases	No cases	No cases
Motor vehicle drivers	1.94 (0.71, 5.26)	1.72 (0.63, 4.68)	1.24 (0.45, 3.39)	1.24 (0.45, 3.40)
Ship and aircraft operators	No cases	No cases	No cases	No cases
Other transport workers	No cases	No cases	No cases	No cases
Communication workers	1.06 (0.39, 2.88)	0.97 (0.36, 2.63)	0.94 (0.35, 2.56)	0.94 (0.35, 2.57)
Manufacturing process workers				
Metal products	1.77 (1.04, 3.04)	0.82 (0.46, 1.43)	0.77 (0.44, 1.35)	0.77 (0.44, 1.35)
Machine assembly	0.63 (0.09, 4.53)	0.51 (0.07, 3.70)	0.49 (0.07, 3.50)	0.49 (0.07, 3.50)
Chemical products	1.82 (0.67, 4.94)	1.62 (0.59, 4.41)	1.57 (0.57, 4.27)	1.57 (0.57, 4.27)
Ceramic products	No cases	No cases	No cases	No cases
Electro-mechanic assembly	1.13 (0.57, 2.23)	0.88 (0.45, 1.74)	0.85 (0.43, 1.67)	0.85 (0.43, 1.68)
Transportation machine assembly	2.37 (0.97, 5.82)	2.00 (0.81, 4.93)	1.77 (0.72, 4.38)	1.77 (0.72, 4.38)
Other mechanical assembly	No cases	No cases	No cases	No cases
Food manufacturing	1.93 (1.35, 2.75)	1.22 (0.85, 1.76)	1.13 (0.78, 1.63)	1.13 (0.78, 1.63)
Beverage and cigarette	2.53 (0.35, 18.28)	1.57 (0.21, 11.42)	1.60 (0.22, 11.67)	1.60 (0.22, 11.68)
Apparel products	1.88 (1.24, 2.83)	1.06 (0.69, 1.61)	1.02 (0.67, 1.55)	1.02 (0.67, 1.55)
Wooden products	0.28 (0.04, 1.98)	0.16 (0.02, 1.13)	0.15 (0.02, 1.11)	0.15 (0.02, 1.11)
Printing and bookbinding	1.10 (0.27, 4.48)	0.90 (0.22, 3.67)	0.86 (0.21, 3.48)	0.86 (0.21, 3.48)
Rubber and plastic products	1.45 (0.46, 4.56)	1.11 (0.35, 3.50)	1.00 (0.32, 3.16)	1.00 (0.32, 3.17)
Jewelry products	2.03 (0.75, 5.52)	1.41 (0.52, 3.88)	1.33 (0.48, 3.65)	1.33 (0.48, 3.66)
Manufacturing-related workers	0.62 (0.15, 2.49)	0.55 (0.13, 2.22)	0.51 (0.12, 2.06)	0.51 (0.12, 2.06)
Construction machinery operators	No cases	No cases	No cases	No cases
Electrical workers	4.86 (0.67, 35.34)	3.87 (0.52, 28.62)	3.67 (0.50, 27.27)	3.68 (0.50, 27.29)
Mine workers	10.77 (1.45, 79.75)	7.60 (1.00, 58.11)	6.23 (0.80, 48.53)	6.23 (0.80, 48.55)
Skeleton construction workers	No cases	No cases	No cases	No cases
Construction workers	1.83 (0.45, 7.44)	1.26 (0.31, 5.16)	1.04 (0.25, 4.25)	1.04 (0.25, 4.25)
Civil engineer workers	0.91 (0.23, 3.71)	0.53 (0.13, 2.14)	0.48 (0.12, 1.98)	0.49 (0.12, 1.98)
Cargo workers	2.06 (1.25, 3.38)	1.64 (0.99, 2.70)	1.43 (0.87, 2.36)	1.43 (0.87, 2.36)
Other manual workers	2.40 (1.78, 3.22)	1.77 (1.31, 2.39)	1.64 (1.21, 2.22)	1.64 (1.22, 2.22)

Model 1: Unadjusted.
Model 2: Adjusted for age, admission date, and hospital.
Model 3: Adjusted for the factors in Model 2 plus smoking, alcohol consumption, and hypertension. Model 4: Adjusted for the factors in Model 3 plus shift-work.

Parte 2

Indici degli articoli pubblicati dalle maggiori riviste internazionali gennaio-maggio giugno 2024



https://onlinelibrary.wiley.com/loi/10970274

Volume 67, Issue 1
January 2024

REVIEW ARTICLES

Is paid sick leave bad for business? A systematic review
Candice Vander Weerdt* , Patricia Stoddard-Dare , LeaAnne DeRigne
* Cleveland State University, USA

COMMENTARY

Why presumptions are important in occupational health: The example of COVID-19 infection as an occupational disease
Zoey Laskaris* & Steven B. Markowitz
*City University of New York, USA

RESEARCH ARTICLES

No accelerated 20-year hearing decline after occupational noise exposure has ceased: The HUNT study
Lisa Aarhus*, Ina Molaug & Bo Engdahl
*Department of Occupational Medicine and Epidemiology, Norway

Using a severity threshold to improve occupational injury surveillance: Assessment of a severe traumatic injury-based occupational health indicator across the International Classification of Diseases lexicon transition
Jeanne M. Sears*, Tristan M. Victoroff & Alicia Fletcher

*Department of Health Systems and Population Health, USA

Cause specific mortality in an Italian pool of asbestos workers cohorts
Daniela Ferrante, Alessia Angelini & Alessandro Marinaccio
*Department of Translational Medicine, Università del Piemonte Orientale and CPO Piemonte, Italy

Does adolescent depression modify the association between psychosocial job stressors and mental health in emergent adulthood?
Anthony D. LaMontagne*, Lay-San Too & John W. Toumbourou
*Institute for Health Transformation, , Australia

Preparing the occupational safety and health workforce for future disruptions
Jessica M. K. Streit*, Sarah A. Felknor & John Howard
* National Institute for Occupational Safety and Health, USA

HISTORICAL PERSPECTIVE

Recognizing the pleura in asbestos-related pleuropulmonary disease: Known and new manifestations of pleural fibrosis
Albert Miller*
*Icahn School of Medicine at Mount Sinai, USA

LETTERS TO THE EDITOR

A cluster of mesotheliomas reported in a case series does not implicate chrysotile asbestos-containing friction products as the cause of mesotheliomas
Stanley J. Geyer*
*Department of Pathology, USA

Volume 67, Issue 2
February 2024

RESEARCH ARTICLES

Forty-year trends in fatal occupational injuries in North Carolina
David B. Richardson*, Amelia T. Martin & Stephen Marshall
*Department of Environmental and Occupational Health, USA

Using the Functional Comorbidity Index with administrative workers' compensation data: Utility, validity, and caveats
Jeanne M. Sears*, Sean D. Rundell & Gary M. Franklin
*Department of Health Systems and Population Health, USA

Assessing the effectiveness of mitigating pesticide-related disease risk among pesticide-spraying drone operators in Taiwan
Wei-Te Wu*, Jyun-Ming Chen & Yu-Tang Hung
*National Institute of Environmental Health Sciences, Taiwan

Exploring the characteristics and health outcomes of working from home: Analysis of 2021 California Health Interview Survey data
Sungwon Park*, Chang Gi Park & OiSaeng Hong
*Department of Health Behavior and Biological Sciences, USA

Assessing the role of social determinants of health in health disparities: The need for data on work
Sharon R. Silver*, Marie H. Sweeney & Michael A. Flynn
*National Institute of Environmental Health Sciences, Taiwan

Occupational stressors and mental illness in healthcare work: An intersection between gender, race, and class
Camila C. de Sousa*, Tânia M. Araújo & Manuela M. Maturino
*University Hospital Professor Edgard Santos, Brazil

Evaluation of the characteristics of injured workers and employer compliance with OSHA's reporting requirement for work-related amputations
Mary Jo Reilly*, Ling Wang & Kenneth D. Rosenman
*Department of Medicine, Division of Occupational and Environmental Medicine, USA

BRIEF REPORT

Prevalence of SARS-CoV-2 infection among US blood donors by industry, May–December 2021
Dallas S. Shi*, Emily McDonald & Jessica L. Rinsky
*Division of Field Studies and Engineering, USA

LETTER TO THE EDITOR

Remarks on Pass et al. Benign and Malignant Mesothelioma. In: DeVita, Hellman, and Rosemberg (Eds). Cancer. Principles & Practice of Oncology. 11th edition, 2019
Pietro Gino Barbieri*, Dario Consonni & Benedetto Terracini
*Occupational Health Unit and Mesothelioma Registry, ATS Brescia, Italy

Volume 67, Issue 3
March 2024

RESEARCH ARTICLES

Accelerated silicosis in sandblasters: Pathology, mineralogy, and clinical correlates
Judith A. Crawford*, Soma Sanyal & Jerrold L. Abraham
*Department of Pathology, USA

Prevalent occupational exposures and risk of lung cancer among women: Results from the application of the Canadian Job-Exposure Matrix (CANJEM) to a combined set of ten case–control studies
Mengting Xu*, Vikki Ho & Jack Siemiatycki
* University of Montreal Hospital Research Center (CRCHUM), Canada

25-Year fatal workplace suicide trends in North Carolina: 1992–2017
Chelsea L. Martin* Morgan Richey & Shabbar I. Ranapurwala
* Department of Epidemiology, USA

Hired crop worker injury risks on farms in the United States during three different periods between 2002 and 2015
Larry A. Layne* & Carlos Siordia
* National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), Morgantown, USA

Carpal tunnel syndrome among Manitoba workers: Results from the Manitoba Occupational Disease Surveillance System
Allen Kraut*, Elizabeth Rydz & Cheryl E. Peters
* Departments of Internal Medicine and Community Health Sciences, Canada

Mortality of older construction and craft workers employed at Department of Energy (DOE) nuclear sites: Follow-up through 2021
Knut Ringen*, John Dement & Scott Haas MJ
* CPWR - The Center for Construction Research and Training, USA

CASE REPORT

Interstitial pulmonary disease and aluminum trihydrate exposure: A single case report and detailed workplace analysis
Claudia Corwin*, Hillary Waterhouse & Michael J. Hodgson
* Department of Internal Medicine, Division of Pulmonary, USA

Volume 67, Issue 4
April 2024

COMMENTARY

Occupational lung cancer screening: A Collegium Ramazzini statement
Steven Markowitz*, Knut Ringen & Albert Miller
*Barry Commoner Center for Health & the Environment, USA

REVIEW ARTICLE

Work–rest regimens for work in hot environments: A scoping review
Thomas A. Deshayes*, Hsen Hsouna & Daniel Gagnon
*Montreal Heart Institute, Canada

RESEARCH ARTICLES

Mortality and cancer incidence in perfluorooctanesulfonyl fluoride production workers
Bruce H. Alexander*, Andrew Ryan & Perry W. Logan
*Division of Environmental Health Sciences, USA

Risk of subsequent SARS-CoV-2 infection among vaccinated employees with or without hybrid immunity acquired early in the Omicron-predominant era of the COVID-19 pandemic
Mark A. Jacobson*, Paul D. Blanc & James E. McNicholas
*Department of Medicine, Division of Occupational, Environmental, and Climate Medicine, USA

The effect of power stretchers on occupational injury rates in an urban emergency medical services system
Rob Pryce*, Erin Weldon & Ryan Sneath
*Department of Kinesiology and Applied Health, Canada

"…full of opportunities, but not for everyone": A narrative inquiry into mechanisms of labor market inequity among precariously employed gay, bisexual, and queer men
David J. Kinitz*, Lori E. Ross & Dionne Gesink; Dalla Lana School of Public Health, Canada

COVID-19 mortality among Massachusetts workers and the association with telework ability, 2020
Kathleen Fitzsimmons*, Malena Hood & Emily Sparer-Fine
*Massachusetts Department of Public Health, USA

BRIEF REPORT

Acute occupational inhalation injuries—United States, 2011–2022
Nirmala T. Myers*, Katelynn E. Dodd & Noemi B. Hall
*Respiratory Health Division, Centers for Disease Control and Prevention, USA

Volume 67, Issue 5
May 2024

REVIEW ARTICLE

Work outcomes in public safety personnel after potentially traumatic events: A systematic review
Shannon L. Wagner*, Nicole White & Alex Fraess-Phillips
* Thompson Rivers University, Canada

RESEARCH ARTICLES

"Breaking down in tears, soaked in sweat, and sick from the heat": Media-based composite narratives of first responders working during the 2021 Heat Dome
Emily J. Tetzlaff MHK*, Casey Cassan & Glen P. Kenny
* University of Ottawa, Canada

Protective action in the workplace in the time of COVID-19: The role of worker representation
Laia Ollé-Espluga*, Raúl Payá Castiblanque & Albert Navarro-Giné
* Universitat Autònoma de Barcelona (UAB), Spain

Agreement between measured and self-reported physiological strain in males and females during simulated occupational heat stress
Fergus K. O'Connor*, Robert D. Meade & Glen P. Kenny
* University of Ottawa, Canada

Short-acting opioid prescriptions and Workers' Compensation using the National Ambulatory Medical Care Survey
Hannah M. Thompson*, Usha Govindarajulu & Ismail Nabeel
* Icahn School of Medicine at Mount Sinai, USA

Prevalence and predictors of colon and prostate cancer screening among volunteer firefighters: The United States Firefighter Cancer Assessment and Prevention Study

Nimit N. Shah MPH*, Michael B. Steinberg & Judith M. Graber
* The State University of New Jersey, USA

Volume 67, Issue 6

June 2024

https://www.tandfonline.com/journals/terg20

Volume 67, Issue 1 (2024)

REVIEW ARTICLES

A retrospective analysis of the evolution of ergonomics for environmental sustainability (2011–2021)
Bhawana Rathore*, Baidyanath Biswas & Indranil Biswas
*GLA University, Mathura, India

RESEARCH ARTICLE

Home office shift and sedentary behaviour in Germany during the COVID-19 pandemic: descriptives and related socioecological correlates
Birgit Wallmann-Sperlich*& Ingo Froboese
*University of Wuerzburg, Germany

King of the castle: organisational influences on authority gradients between network controllers and other team members
Bridie Luva* & Anjum Naweed
*School of Health, Medical and Applied Sciences Australia

A multifactorial fall risk assessment system for older people utilizing a low-cost, markerless Microsoft Kinect
Taekyoung Kim*, Xiaoqun Yu & Shuping Xiong
*Department of Industrial and Systems Engineering, Republic of Korea

Effects of lane-change scenarios on lane-change decision and eye movement
Yali Sun* & Shumin Feng
*School of Transportation Science and Engineering, Harbin Institute of Technology, China

Visual and steering behaviours during lane departures: a longitudinal study of interactions between lane departure warning system, driving task and driving experience
Jordan Navarro*, Emanuelle Reynaud & Damien Schnebelen
*Laboratoire d'Etude des Mécanismes Cognitifs, France

Exploring the physiological benefits of carrying a suspended backpack versus a traditional backpack
J. Heredia-Jimenez* & E. Orantes-Gonzalez
*University of Granada, Spain

Investigating the effects of age, task load, task complexity, and input device on monitoring performance for smart manufacturing in the oil refining industry
Chao Shi* & Ling Rothrock
* Binghamton University, USA

Identifying the most important, frequent, and physically demanding tasks of Brazilian firefighters
Diogo Vilela Ferreira*, Eduardo Marins & Amilton Vieira
* Universidade de Brasília, Brazil

Cross-cultural comparison of body dimensions and trends: an analysis of ANSUR and Size Korea datasets for automotive seating design
Jiyeong Kang*, Haein Jeon & Chris Lee
*University of Windsor, Republic of Korea

Volume 67, Issue 2 (2024)

LETTER TO THE EDITOR

Regarding "does intra-lumbar flexion during lifting differ in manual workers with and without a history of low back pain? A cross-sectional laboratory study" (Ergonomics 65 1380-1396 2022)
Samuel J. Howarth*
*Canadian Memorial Chiropractic College, Canada

RESEARCH ARTICLES

Occupational exposure to whole-body vibration and neck pain in the Swedish general population
Albin Stjernbrandt*, Hans Pettersson, Per Vihlborg, Jens Wahlström & Charlotte Lewis
*Umeå University, Umeå, Sweden

"It helps and it doesn't help": maternal perspectives on how the use of smartphones and tablet computers influences parent-infant attachment
Rebecca Hood*, Juliana Zabatiero, & Leon Straker
*School of Allied Health, Curtin University, Australia

Exploring improvisations in road safety in a low-income setting
Imrul Kayes Shafie*, Ripon Chandra Das & Neville A. Stanton
*University of Engineering and Technology, Bangladesh

Flexible sensor-based biomechanical evaluation of low-back exoskeleton use in lifting
Wei Yin*, Yinong Chen & Xudong Zhang
*Texas A&M University, USA

No large effects on cognitive performance in high versus low solar green-flag WBGT conditions
Lisa Klous*, Jikke Reinten & Boris Kingma
*Organization for Applied Scientific Research (TNO), The Netherlands

Equivalent contact temperature (ECT) for personal comfort assessment – analytical description and definition of comfort limits
Alexander Warthmann*, Itsuhei Kohri, & Christoph van Treeck
*RWTH Aachen University, Germany

Team communication patterns during real and simulated trauma resuscitation—a social network analysis
Liselott Fornander*, Kati Laukkanen, & Peter Berggren
* Linköping University, Linköping, Sweden

Ergonomic investigations on novel dynamic postural estimator using blaze pose and transfer learning
Vigneswaran Chidambaram*, Madhan Mohan Gopalsamy, & Brajesh Kumar Kanchan
*PSG College of Technology, Tamilnadu, India

Assessing workload in using electromyography (EMG)-based prostheses
Junho Park*, Joseph Berman, Albert Dodson & Maryam Zahabi
* Texas A&M University, USA

Volume 67, Issue 3 (2024)

Muscle fatigue during assisted violin performance
Clara Ziane*, Etienne Goubault, & Fabien Dal Maso
*University of Montreal, Laval, Canada

Individual differences, ADHD diagnosis, and driving performance: effects of traffic density and distraction type
Alejandro A. Arca*, Mustapha Mouloua & Peter A. Hancock
* University of Central Florida, USA

Naturalistic observations of multiteam interaction networks: Implications for cognition in crisis management teams
Jukrin Moon*, Farzan Sasangohar, & Changwon Son
* University, College Station, TX, USA

Discomfort estimation for vertical whole-body vibration in the aircraft cabin considering the duration and static sitting comfort
Yu Huang* & Jingdong Li
* Shanghai Jiao Tong University, Shanghai, China

How salutogenic workplace characteristics influence psychological and cognitive responses in a virtual environment
Lisanne Bergefurt*, Rianne Appel-Meulenbroek & Theo Arentze
*Eindhoven University of Technology, The Netherlands

A video processing and machine learning based method for evaluating safety-critical operator engagement in a motorway control room
Linyi Jin*, Qingyu Ren, Val Mitchell & Andrew May
*Loughborough University, Loughborough, UK

Recognition and evaluation of mental workload in different stages of perceptual and cognitive information processing using a multimodal approach
Haizhe Jin*, Lin Zhu, Mingming Li & Vincent G. Duffy
*School of Business Administration, China

Influence of continuous edge-line delineation on drivers' lateral positioning in curves: a gaze-steering approach
Sami Mecheri*, Franck Mars & Régis Lobjois
*Institut de Recherche Biomédicale des Armées, France

Effects of background colour, polarity, and saturation on digital icon status recognition and visual search performance
Na Yu* & Ziwei Ouyang
Nanjing Forestry University, Nanjing, China

REVIEW ARTICLE
Knowledge mapping analysis of safety ergonomics: a bibliometric study
Wenjing Ji*, Hui Liu, Kai Pan & Jianhai Wang
*China Jiliang University, Hangzhou, China

Volume 67, Issue 4 (2024)

EDITORIAL

Applying E/hf systems thinking to complex global problems
A Thatcher*, P. H. P. Yeow & P. M. Salmon
* University of the Witwatersrand, South Africa

ARTICLE

Applying the sustainable system-of-systems framework: wastewater(s) in a rapidly urbanising South African settlement
Andrew Thatcher*, Geneviève S. Metson & Motshwaedi Sepeng
* University of the Witwatersrand, Johannesburg, South Africa

Sustainable system of systems at work: unravelling (some of) the complexity of farmers' transition to sustainability

Marie Chizallet*, Flore Barcellini & Lorène Prost
*Université de Paris Cité and Univ Gustave Eiffel, France

Application of the sustainable system-of-systems approach and econometric analysis to address China's decarbonisation problem
Teck Lee Yap*, Nhung T. H. Vu & Paul H. P. Yeow
*RMIT University Vietnam, Vietnam

RESEARCH ARTICLES

Managing the risks associated with technological disruption in the road transport system: a control structure modelling approach
G. J. M. Read*, S. McLean, J. Thompson, N. A. Stanton, C. Baber, T. Carden & P. M. Salmon
*University of the Sunshine Coast, Australia

Development and validation of an assessment index for quantifying cognitive task load in pilots under simulated flight conditions using heart rate variability and principal component analysis
Jinghua Yang*, Mengjun Tang & Wendong Hu
*Air Force Engineering University, Xian, China

Effects of indoor temperature on office workers' performance: an experimental study based on subjective assessments, neurobehavioral tests, and physiological measurements
Xiaona Fan & Yiyun Zhu
*Xi'an University of Technology, Xi'an, China

Association of anthropometric characteristics of law enforcement officers with perceived ratings of fit, comfort, and pain in the use of body armor
Hongwei Hsiao*
*Texas A&M University, USA

Effect of muscular fatigue on the cumulative lumbar damage during repetitive lifting task: a comparative study of damage calculation methods
Zeinab Kazemi*, Navid Arjmand & Mohammad Sadegh Ghasemi
*Clemson University, Clemson, SC, USA

REVIEW ARTICLE

State of science: refitting the human to nature
Miles Richardson & Andrew Thatcher
* University of Derby, Derby, UK

Volume 67, Issue 5 (2024)

RESEARCH ARTICLES

The impact of an active and passive industrial back exoskeleton on functional performance
Renée Govaerts*, Sander De Bock & Kevin De Pauw
*Vrije Universiteit Brussel, Brussels, Belgium

Effect of seat back angle on preferred seat pan inclination for the development of highly automated vehicles
Xuguang Wang*, Cyrille Grébonval & Philippe Beillas
*Université Claude Bernard Lyon, France

Changing perspectives: enhancing learning efficacy with the after-action review in virtual reality training for police
Lisanne Kleygrewe*, R. I. Vana Hutter & Raôul R. D. Oudejans
*Universiteit Amsterdam, Amsterdam

3D human ear modelling with parameterization technique and variation analysis
Fang Fu*, Ameersing Luximon & Yan Luximon
*Hong Kong Polytechnic University, China

Low back pain and biomechanical characteristics of back muscles in firefighters
Pui W. Kong*, Tommy Y. W. Kan & David Hostler
*Nanyang Technological University, Singapore

Evaluating adaptiveness of an active back exosuit for dynamic lifting and maximum range of motion
D. Adam Quirk*, Jinwon Chung & Conor J. Walsh
*Harvard University, Boston

The compatibility of exoskeletons in perioperative environments and workflows: an analysis of surgical team members' perspectives and workflow simulation
Alec Gonzales*, Dechristian França Barbieri & Jackie Cha
*Clemson University, Clemson, South Carolina, USA

Testing the reliability of accident analysis methods: a comparison of AcciMap, STAMP-CAST and AcciNet
Adam Hulme*, Neville A. Stanton & Paul M. Salmon
*University of the Sunshine Coast, Australia

LATEST ARTICLES

"Latest Articles" sono articoli accettati per la pubblicazione in questa rivista ma non ancora pubblicati in un volume Gli articoli vengono rimossi dall'elenco "Ultimi articoli" quando vengono pubblicati in un volume/quaderno. Gli ultimi articoli sono citabili utilizzando l'autore/i, l'anno di pubblicazione online, il titolo dell'articolo, la rivista e il DOI dell'articolo.

How does the status of errant robot affect our desire for contact? – The moderating effect of team interdependence
Shilong Liao*, Long Lin, Hairun Pei & Qin Chen
*Lanzhou Institute of Technology, Lanzhou, China
Published online: 23 May 2024

RESEARCH ARTICLE

The TACOs (time-based assessment computerized strategy) approach to evaluating occupational working postures
Daniela Colombini*, Enrico Occhipinti & Matteo Candoli
*Scientific Association EPMIES Ergonomics of Posture and Movement International Ergonomics School, Milan, Italy
Published online: 22 May 2024

Pilot implementation and evaluation of the Sit-Stand e-Guide: an e-training program on the use of sit-stand workstations
Haroun Zerguine, Venerina Johnston & Genevieve N. Healy
*The University of Queensland, Australia
Published online: 22 May 2024

Forming a view: a human factors case study of augmented reality collaboration in assembly
Valerie O'Keeffe*, Ryan Jang & John Spoehr
*Flinders University, Australia
Published online: 15 May 2024

Investigation of readymade garment fit issues and analysis of anthropometric measurements of Ethiopian young men
Berihun Bizuneh*, Abrham Destaw & Solomon Tsegaye
*Bahir Dar University, Ethiopia
Published online: 14 May 2024

REVIEW ARTICLE

Skeletal muscle fitness and physiology as determinants of firefighter performance and safety: a narrative review
Ryan A. Gordon*, Matthew L. Sokoloski & Natalie Morgan
*Missouri State University, USA
Published online: 14 May 2024

RESEARCH ARTICLE

An ergonomic evaluation using a deep learning approach for assessing postural risks in a virtual reality-based smart manufacturing context
Suman Kalyan Sardar* & Seul Chan Lee
*Hanyang University ERICA, Republic of Korea
Published online: 14 May 2024

Review and comparison of linear algorithms to quantify muscle fatigue based on sEMG signals
Giorgia Coraggio*, Mattia Cera, & Pier Paolo Valentini
*University of Rome Tor Vergata, Rome, Italy
Published online: 10 May 2024

Difference thresholds for primary and secondary ride of a vehicle on a 4-poster test rig
Cor-Jacques Kat*, Roland Peter Gräbe & Pieter Schalk Els
*Engineering, University of Pretoria, Pretoria, South Africa
Published online: 10 May 2024

REVIEW ARTICLE

The relationship of trust and dependence
Colleen E. Patton* & Christopher D. Wickens
* North Carolina State University, USA
Published online: 10 May 2024

RESEARCH ARTICLE

Sitting versus standing work postures during simulated laparoscopic surgery: in terms of user preferences, comfort, performance and biomechanics
Saif K. Al-Qaisi*, Ilham Abousaleh & Rana Sharara-Chami
*American University of Beirut, Lebanon
Published online: 09 May 2024

REVIEW ARTICLE

A systematic literature review of driver behaviour in blind spot: Assessing risk and influencing factors for enhanced ergonomics in vehicle design
Anik Barat* & Sanhita Das
*Institute of Technology Roorkee, India
Published online: 09 May 2024

RESEARCH ARTICLE

Macroergonomic components of the patient work system shaping dyadic care management during adolescence: a case study of type 1 diabetes
Rupa S. Valdez*, Sophie E. Lyon & Stephen D. Patek
* University of Virginia, USA
Published online: 07 May 2024

REVIEW ARTICLE

The human-factors' challenges of (tele)drivers of Autonomous Vehicles
Anat Meir, Einat Grimberg & Oren Musicant
*HIT Holon Institute of Technology, Holon, Israel
Published online: 02 May 2024

RESEARCH ARTICLE

Contrast sensitivity and comfort levels with different types of polarised glasses under steady glare
Jiayi Yang*, Huanhuan Guo, & Pan Zhang
Hebei Normal University, China
Published online: 30 Apr 2024

Defining human-centricity in Industry 5.0 and assessing the readiness of ergonomics/human factors communities in UK
Setia Hermawati*, Rhea Correa & Robert Houghton
*University of Nottingham, UK
Published online: 29 Apr 2024

Test conditions impact measures of visual, perceptual, and cognitive performance
Luke Wilkins*
*La Trobe University, Australia
Published online: 25 Apr 2024

Evaluation of mental load using EEG and eye movement characteristics
Xin Zheng*, Huiyu Wang & Yicheng Wang
*Northeastern University, China
Published online: 23 Apr 2024

Short-term effects of running exercise on pinch strength, grip strength, and manual dexterity of the dominant and non-dominant hands
Kristen D. Lantis*, Katherine Saul & Deanna J. Schmidt
*University San Marcos, San Marcos, California, USA
Published online: 22 Apr 2024

Exposures to select risk factors can be estimated from a continuous stream of inertial sensor measurements during a variety of lifting-lowering tasks
Sol Lim*
*Department of Industrial and Systems Engineering, USA
Published online: 22 Apr 2024

Not all uncivil behaviours are equal: exploring responses to incivility in veterinary practice using vignettes
Irwin, H. Silver-MacMahon*, L. Santos, & K. Macconnell
*
Published online: 22 Apr 2024

Metabolic demands of a simulated smoke-diving drill
P. Säynäjäkangas*, J. Halonen, S. Lusa, & A. Punakallio
*Finnish Institute of Occupational Health, Finland
Published online: 22 Apr 2024

Cognitive and physiological evaluation of virtual reality training in nursing
Richard T. Stone*, Fatima Z. Mgaedeh & Alexandria N. Pulley
*Systems Engineering, Iowa State University, USA
Published online: 20 Apr 2024

Interactive effects of users' openness and robot reliability on trust: evidence from psychological intentions, task performance, visual behaviours, and cerebral activations
Mingming Li*, Fu Guo, Zhixing Li & Vincent G. Duffy
*University of Technology, China
Published online: 18 Apr 2024

Optimum display luminance and contrast polarity of desktop head-up display under office lighting level based on visual ergonomic study
Caixin Lin*, Zhengxin Ji & Yandan Lin
*Fudan University, Shanghai, China
Published online: 17 Apr 2024

Age and gender differences in the perception and use of soft vs. rigid exoskeletons for manual material handling

Rahul Narasimhan Raghuraman*, Dechristian França Barbieri & Divya Srinivasan
*Clemson University, Clemson, SC, USA
Published online: 13 Apr 2024

Do foot type classifications differ between male and female netball players? A cluster analysis
Maddison M. Kirk*, Jessica A. Dobson & Julie R. Steele
*University of Wollongong, Wollongong, Australia
Published online: 13 Apr 2024

Swimming with a head-mounted display: dual-task costs
Kenneth M. Jackson*, Sean C. Thayer & William S. Helton
*George Mason University, USA
Published online: 13 Apr 2024

Influence of emotions on the aggressive driving behavior of online car-hailing drivers based on association rule mining
Yongfeng Ma*, Yaqian Xing, Ying Wu & Shuyan Chen
*Southeast University, China
Published online: 13 Apr 2024

Modelling attention allocation and takeover performance in two-stage takeover system via a cognitive computational model: considering the role of multiple monitoring requests
Lie Guo*, Xu Wang, Linli Xu & Longxin Guan
*University of Technology, Dalian, China
Published online: 09 Apr 2024

The importance of employee attitude in activity-based work environments and the potential role of personality
Freyr Halldorsson, Kari Kristinsson & Halldor Valgeirsson
*Reykjavik University, Reykjavik, Iceland

Published online: 08 Apr 2024

Simulated quick returns in a laboratory context and effects on sleep and pre-sleep arousal between shifts: a crossover controlled trial

Øystein Holmelid, Ståle Pallesen, & Anette Harris
*University of Bergen, Bergen, Norway
Published online: 08 Apr 2024

Human-centred explanations for artificial intelligence systems

C. Baber*, P. Kandola & E. McCormick
*University of Birmingham, Birmingham, UK
Published online: 08 Apr 2024

Influence of short bouts of stair climbing on young adults during prolonged sitting on posture, discomfort, and musculoskeletal performance outcomes: a counterbalanced pilot randomised crossover trials

Arjun K Raj*, Scott J. Pedersen & Baskaran Chandrasekaran
*Manipal Academy of Higher Education, Manipal, India
Published online: 03 Apr 2024

RESEARCH ARTICLE

Are train horns improving road safety? Road users' perspective

Grégoire S. Larue*, Danielle Villoresi & Christopher N. Watling
* Queensland University of Technology (QUT), Kelvin Grove, Australia
Published online: 03 Apr 2024

Understanding the informal aspects of medication processes to maintain patient safety in hospitals: a sociotechnical ethnographic study in paediatric units

Adam B. Sutherland*, Denham L. Phipps & Darren M. Ashcroft
* Manchester University NHS Foundation Trust, Manchester, UK
Published online: 01 Apr 2024

Training flexible spatial-cognitive estimation strategies using augmented reality

Laura Ann Matalenas & Anne Collins McLaughlin
Published online: 01 Apr 2024

An intelligent recommendation system for personalised parametric garment patterns by integrating designer's knowledge and 3D body measurements

Cheng Chi, Xianyi Zeng, Pascal Bruniaux & Guillaume Tartare
Published online: 28 Mar 2024

How will technology change people's home care in the next 20 years? A strategic foresight study

M. Pistolesi, G. Frangioni & F. Masci
*University of Florence, Florence, Italy
Published online: 27 Mar 2024

Creating augmented reality-based experiences for aviation weather training: Challenges, opportunities, and design implications for 3D authoring

Jiwon Kim*, Kexin Wang & Barrett Caldwell
*Iowa State University, USA

Published online: 21 Mar 2024

Event-related driver stress detection with smartphones in an urban environment: a naturalistic driving study

Xin Zhou*, Xing Chen & Wei Zhang
*Tsinghua University, China

Published online: 19 Mar 2024

Predicting preferred motorcycle riding postures to support human factors/ergonomic trade-off analyses within a multi-objective optimisation-based digital human model

Justin B. Davidson* & Dr. Steven L. Fischer
*University of Waterloo, Canada

Published online: 18 Mar 2024

Coupled effect of load weights and belt use on male shoulder pressure redistribution

Yanyang Dai*, Jian Li & Jun Li
*Donghua University, China

Published online: 18 Mar 2024

Human performance and automated operations: a regulatory perspective

Linn Iren Vestly Bergh*, Kristian Solheim Teigen & Fredrik Dørum
*Norwegian Ocean Industry Authority, Norway

Published online: 14 Mar 2024

In the heat of the moment: the effects of extreme temperatures on the cognitive functioning of firefighters

Catherine Thompson*, Lucy Ferrie & Martyn J. Matthews
*Liverpool Hope University, UK

Published online: 13 Mar 2024

The impact of inter-limb leg lean tissue mass asymmetry on stair climb performance in career firefighters

Nicholas A. Buoncristiani*, Gena R. Gerstner, & Eric D. Ryan
*University of North Carolina at Chapel Hill, USA

Published online: 11 Mar 2024

Comparison of multidirectional upper limb strength for non-disabled individuals and individuals with C4–C7 spinal cord injury in a seated position

George Stilwell*, Digby Symons & Jennifer Dunn
*University of Canterbury, Christchurch, New Zealand

Published online: 08 Mar 2024

Investigating the effect of emoji position on eye movements and subjective evaluations on Chinese sarcasm comprehension

Jinghua Huang*, Mingyan Wang & Mengyao Qi
*Zhejiang University, China
Published online: 06 Mar 2024

Automation function and malfunction: effects on human performance in accident handling tasks

Xiaolu Dong * & Zhizhong Li
* Ministry of Ecology and Environment, Beijing, China
Published online: 05 Mar 2024

Effects of a back-assist exosuit in lab-based approximations of construction tasks performed by novices and experienced construction workers

Yu Song*, Maja Goršič & Vesna Novak
* University of Kansas, USA
Published online: 05 Mar 2024

Clinical tests predictive of temporary low back pain development during the prolonged standing test in physical therapy students

Eric Folkins*, Erika Nelson-Wong & Sheri Silfies
* Drexel University, Philadelphia, USA
Published online: 05 Mar 2024

Improved REBA: deep learning based rapid entire body risk assessment for prevention of musculoskeletal disorders

Zeyu Jiao*, Kai Huang & Yingjie Cai
* Guangdong Academy of Sciences, China
Published online: 29 Feb 2024

The effect of a soft active back support exosuit on trunk motion and thoracolumbar spine loading during squat and stoop lifts

Jacob J. Banks*, David A. Quirk & Dennis E. Anderson
* Harvard Medical School, USA
Published online: 22 Feb 2024

REVIEW ARTICLE

The role of social support in human-automation interaction

Juergen Sauer*, Andreas Sonderegger & Norbert K. Semmer
* University of Fribourg, Switzerland
Published online: 27 Feb 2024

Cultural appropriateness of interventions to prevent and reduce musculoskeletal disorders among students: a systematic review

Maryam Afshari*, Elham Gheysvandi & Mehdi Kangavari
* Hamadan University of Medical Sciences, Iran
Published online: 15 Feb 2024

The impact of remote work using mobile information and communication technologies on physical health: a systematic review

Konstantin Wechsler*, Stephanie Griemsmann & Rolf Ellegast

* Sankt Augustin, Germany

Published online: 15 Feb 2024

RESEARCH ARTICLE

Immersive participatory design of assistive robots to support older adults

Samuel A. Olatunji*, Vy Nguyen & Harshal P. Mahajan

* University of Illinois Urbana-Champaign, USA

Published online: 14 Feb 2024

Virtual fit and design improvements of a filtering half-mask for sub-adult wearers

Martin Čuta*, Mikoláš Jurda & Petra Urbanová

* Masaryk University, Brno, Czech Republic

Published online: 13 Feb 2024

Do redundant graphical attributes reduce decision-making efficiency?

Tao Jin*, Chunpeng Chen & Xiaoxu Liu

* China University of Petroleum (East China), China

Published online: 12 Feb 2024

REVIEW ARTICLE

A systematic review of Personal Comfort Systems from a post-phenomenological view

Katherine Exss*, Paulina Wegertseder-Martínez & Maureen Trebilcock

* Universidad Católica de Valparaíso, Valparaiso, Chile

Published online: 06 Feb 2024

A systematic literature review of computer vision-based biomechanical models for physical workload estimation

Darlington Egeonu* & Bochen Jia

* University of Michigan, USA

Published online: 31 Jan 2024

RESEARCH ARTICLE

Optimising computer vision-based ergonomic assessments: sensitivity to camera position and monocular 3D pose model

Aditya Subramani Murugan* & Boubakeur Boufama

* University of Windsor, Ontario, Canada

Published online: 31 Jan 2024

REVIEW ARTICLE

Measuring cognitive workload in the nuclear control room: a review

Per Øivind Braarud*

* NEA Halden Human Technology-Organisation (HTO) Project, Norway

Published online: 26 Jan 2024

The comfort and functional performance of personal protective equipment for police officers: a systematic scoping review

Sean Hudson*, Leanne Ridland & Karen Ousey
* University of Huddersfield, Huddersfield, UK

Published online: 24 Jan 2024

RESEARCH ARTICLE

How flight experience impacts pilots' decision-making and visual scanning pattern in low-visibility approaches: preliminary evidence from eye tracking

Shan Gao* & Lei Wang
* Civil Aviation University of China, China

Published online: 22 Jan 2024

Automated vehicles for older adults with cognitive impairment: a survey study

Junho Park*, Maryam Zahabi & Wei Li
*Santa Clara University, Santa Clara,USA

Published online: 16 Jan 2024

Interactions between work-related factors, perceived fatigue and musculoskeletal disorders among handicraft artisans: structural equation model analysis

Dipayan Das* & Ashish Kumar Singh
*National Institute of Technology Sikkim, India

Published online: 08 Jan 2024

The effect of font boldness, noise disturbance and time pressure on human error in the context of cloud change operation

Shuo Peng*, Changxu Wu & Jiahao Yu
*Tsinghua University, Beijing, China

Published online: 08 Jan 2024

How to walk to reduce footstep noise in multi-story residential buildings

Woojin Yoon*, Yujin Kwon & Gwanseob Shin
*Ulsan National Institute of Science and Technology, Ulsan, South Korea

Published online: 08 Jan 2024

Understanding contributing factors to exoskeleton use-intention in construction: a decision tree approach using results from an online survey

Sunwook Kim*, Aanuoluwapo Ojelade & Maury A. Nussbaum
*Virginia Tech, Blacksburg, VA, USA

Published online: 12 Dec 2023

Determining fall risk change throughout pregnancy: the accuracy of postpartum survey and relationship to fall efficacy

Brett C. Stewart*, Shenghai Dai & Robert D. Catena
*Washington State University, Pullman, Washington, USA

Published online: 22 Dec 2023

REVIEW ARTICLE

Physiological measures of operators' mental state in supervisory process control tasks: a scoping review

Sebastian Pütz*, Alexander Mertens & Verena Nitsch
*RWTH Aachen University, Aachen, Germany

Published online: 30 Nov 2023

Exoskeleton Usability Questionnaire: a preliminary evaluation questionnaire for the lower limb industrial exoskeletons

Muhammad Hussain*, Yong-Ku Kong & Jaehyun Park
* Incheon National University (INU), Incheon, Republic of Korea
Published online: 19 Dec 2023

Quantifying the effectiveness of a passive trunk-support exosuit at reducing erector spinae muscle fatigue during a quasi-static posture maintenance task

Sang Hyeon Kang*, Laura Lynch & Gary A. Mirka
*Department of Industrial and Manufacturing Systems Engineering, USA
Published online: 18 Dec 2023

Decisional style, sleepiness, and online responsiveness

James G. Phillips*, Yang-Wai Chow & Rowan P. Ogeil
*Auckland University of Technology, New Zealand
Published online: 25 Nov 2023

Impact of firefighter hood design on range of motion, noise production and hearing

Richard M. Kesler*, Anthoney Shawn Deaton & Gavin P. Horn
* Fire Safety Research Institute, USA
Published online: 05 Dec 2023

Effects of different extreme cold exposure on heart rate variability

Boyang Sun*, Jiansong Wu & Ruotong Wang
*China University of Mining and Technology, China
Published online: 21 Nov 2023

Synthesis and validation algorithm followed by a weighting procedure to create a detailed anthropometric dataset for the German working-age population

Alexander Ackermann*, Dominik Bonin & Sascha Wischniewski
*Federal Institute for Occupational Safety and Health (BAuA), Germany
Published online: 21 Nov 2023

A stakeholder analysis of the road transport system in Tanzania using a STAMP control structure

Daudi Katopola*, Fredirick Mashili & Marie Hasselberg
*Department of Global Public Health, Karolinska Institutet, Sweden
Published online: 07 Dec 2023

Prediction model of subacromial pain syndrome in assembly workers using shoulder range of motion and muscle strength based on support vector machine

Jun-Hee Kim*, Oh-Yun Kwon & Gyeong-Tae Gwak
*Yonsei University, South Korea
Published online: 01 Dec 2023

REVIEW ARTICLE

A state-of-the-art review on biomechanical models and biodynamic responses

Veeresalingam Guruguntla* & Mohit Lal
*National Institute of Technology Rourkela, India
Published online: 27 Nov 2023

RESEARCH ARTICLE

Using HFACS to understand human error in railway dispatcher performance: a study of proactive safety inspection records
Zizheng Guo*, Huishan Pang & Chengen Li
*Southwest Jiaotong University, China
Published online: 01 Dec 2023

What can we learn from severity index on flight data monitoring? Analysis of safety resilience in flight operations during COVID-19 disruptions
Wen-Chin Li*, Arthur Nichanian & Graham Braithwaite
*Cranfield University, Bedfordshire, UK
Published online: 22 Nov 2023

Investigating the influence of keyboard inclinations on sitting and standing workstations
Victor Eghujovbo* & Eunsik Kim
*University of Windsor, Windsor, ON, Canada
Published online: 15 Nov 2023

Classification of lower limb body shapes of paralysed female wheelchair users in Hebei, China: analysis of anthropometric data using clustering approach
Lin Xing*, Norsaadah Zakaria & Wan Syazehan Ruznan
*Taylor's University, Subang Jaya, Malaysia
Published online: 04 Dec 2023

Trusting information systems in everyday work events – effects on cognitive resources, performance, and well-being
Lea S. Müller* & Guido Hertel
*University of Münster, Germany
Published online: 29 Nov 2023

Assessing between-officer variability in responses to a live-acted deadly force encounter as a window to the effectiveness of training and experience
Robert R. Horn*, William J. Lewinski & Nicholas P. Murray
* Montclair State University, Montclair, NJ, USA
Published online: 30 Nov 2023

https://link.springer.com/journal/420/volumes-and-issues

Volume 97, issue 1, Jan 2024

Association between diurnal temperature range and outpatient visits for urticaria disease in Lanzhou, China: a distributed lag nonlinear analysis
Yi Wu*, Jing Zhang & Chunrui Shi
*The First Hospital of Lanzhou University, China

What it takes to reduce sitting at work: a pilot study on the effectiveness and correlates of a multicomponent intervention
Jannik Porath*, Laura I. Schmidt & Alexander Haussmann
*Heidelberg University, Germany

Cross-sectional associations of weekly time, social context, and motivation of exercise with mental health among workers
Kazuhiro Harada*, Shuhei Izawa & Tomohide Kubo
*Kobe University, Japan

Effects of heat and personal protective equipment on thermal strain in healthcare workers: part B—application of wearable sensors to observe heat strain among healthcare workers under controlled conditions
Razan Wibowo*, Viet Do & Stefan Rakete
*Institute and Clinic for Occupational, Social and Environmental Medicine, Germany

The impact of cardiorespiratory fitness and physical workload on disability pension–a cohort study of Swedish men
Karin Berglund*, Melody Almroth & Katarina Kjellberg
*Karolinska Institutet, Sweden

Relationship between exposure to metalworking fluids and nonalcoholic fatty liver disease
Weiling Chan*, Geyang Li & Yulong Lian
*Nantong University, China

Effects of workday characteristics and job demands on recovery from work among Finnish home care nurses: a multi-source cross-sectional study
Visa Väisänen*, Salla Ruotsalainen & Timo Sinervo
*Finnish Institute for Health and Welfare, Finland

Overtime work is related to nonrestorative sleep independently of short sleep time among a Japanese occupational population
Hiromitsu Sekizuka* & Hitoshi Miyake
*Department of Internal Medicine, FUJITSU Clinic, Japan

Occupational physical activity, all-cause mortality and incidence of cardiovascular diseases: results from three Italian cohorts
Dario Fontana*, Raffaele Ceron & Angelo d'Errico
*Epidemiology Unit, Turin, Italy

Risk of obstructive sleep apnea among health workers: results of a screening in a large Italian University Hospital
Gianluca Spiteri*, Maria Grazia Lourdes Monaco & Stefano Porru
*University Hospital of Verona, Italy

Volume 97, issue 2, March 2024

Effects of ambient air pollution on the hospitalization risk and economic burden of mental disorders in Qingdao, China
Yuanyuan Cheng*, Yujie Meng & Junbo Yin
*Qingdao Mental Health Center, China

Club cell protein (CC16) in serum as an effect marker for small airway epithelial damage caused by diesel exhaust and blasting fumes in potash mining
Savo Neumann*, Swaantje Casjens & Jürgen Bünger
*Institute for Prevention and Occupational Medicine of the German Social Accident Insurance, Germany

Impact of welding occupation on serum aluminium level and its association with physical health, cognitive function, and quality of life: a cross-sectional study
Ogochukwu Kelechi Onyeso*, Arinze Kingsley Ugwu & Charles Ikechukwu Ezema
*University of Nigeria, Nigeria

Occupational exposure to vapors, gasses, dusts, and fumes in relation to causes of death during 24 years in Helsinki, Finland

Juuso Jalasto*, Ritva Luukkonen & Paula Kauppi
*Helsinki University Central Hospital and University of Helsinki, Finland

Association between occupational noise and obesity: a retrospective cohort study in China

Geyang Li*, Weile Wu & Yulong Lian
*Nantong University, China

Occupational-related exposure to diesel exhaust and risk of leukemia: systematic review and meta-analysis of cohort studies

Darshi Shah*, Vincent DeStefano & Paolo Boffetta
*Renaissance School of Medicine at Stony Brook University, USA

Sleep quality, sleep duration, and sleep disturbances among hospital night workers: a prospective cohort study

Fleur van Elk*, Bette Loef & Karen M. Oude Hengel
*Erasmus University Medical Center, The Netherlands

The combined effect of air pollution and non-optimal temperature on mortality in Shandong Province, China: establishment of air health index

Shuyue Niu*, Junli Tang & Wei Ma
*Shandong University, People's Republic of China

Female workers with long working hours are more likely to have depressive symptoms when having family-to-work conflict

Garin Lee*, Ji-Hwan Kim & Seung-Sup Kim
*Seoul National University, Republic of Korea

Association between night work and prostate cancer: a systematic review and meta-analysis

Alexander Jahn*, Mathilde Lumbye Nielsen & Annett Dalbøge
*Aarhus University Hospital, Denmark

Correction: Association between night work and prostate cancer: a systematic review and meta-analysis

Alexander Jahn*, Mathilde Lumbye Nielsen & Annett Dalbøge
*University Hospital, Denmark

Correction to: Effect of inhaled anaesthetics gases on cytokines and oxidative stress alterations for the staff health status in hospitals

Khaled A. AL-Rasheedi*, Abdulmajeed A. Alqasoumi & Ashraf M. Emara
*Qassim University, Saudi Arabia

Volume 97, issue 3, April 2024

Risk of bladder, kidney and prostate cancer from occupational exposure to welding fumes: a systematic review and meta-analysis

Giulia Collatuzzo*, Maha Hamdani & Paolo Boffetta
*University of Bologna, Italy

Occupational exposure to silica and risk of gastrointestinal cancers: a systematic review and meta-analysis of cohort studies

Jiyuan Shao*, Pengfei Fu & Xin Zhang
*Shanxi University, China

The effects of an interdisciplinary employment program on paid employment and mental health among persons with severe mental disorders

R. W. Hijdra*, S. J. W. Robroek & M. Schuring
*Erasmus University Medical Center Rotterdam, The Netherlands

Flourish, fight or flight: health in self-employment over time—associations with individual and business resources

Claudia Bernhard-Oettel*, Louise Bergman & Susanna Toivanen
*Stockholm University, Sweden

Association of second-hand smoking with sleep quality among adults in Ibadan, Nigeria: a cross-sectional evaluation of data from the COMBAT-CVDs study

Akinkunmi Paul Okekunle*, Osahon Jeffery Asowata & the COMBAT-CVDs team
*University of Ibadan, Nigeria

Pesticide use patterns and their association with cytokine levels in Mexican flower workers

Brenda Mélany Godínez-Pérez*, Astrid Schilmann & Marina Lacasaña
*National Institute of Public Health of Mexico, Mexico

Association between lead and circulating markers of inflammation among traffic enforcers in Metro Manila, Philippines: the MMDA traffic enforcer's health study

Zypher Jude G. Regencia*, Wenyuan Zhao & Emmanuel S. Baja
*University of the Philippines Manila, Philippines

The impact of short-term exposure to meteorological factors on the risk of death from hypertension and its major complications: a time series analysis based on Hefei, China

Xu Zhang*, Tao Zhang & Faming Pan
*Anhui Medical University, China

Environmental exposure to per- and polyfluoroalkyl substances mixture and asthma in adolescents

Yi-Fan Wang*, Li Li & Ying-Xue Zou
*Tianjin Medical University, China

Reducing sickness absence among public-sector healthcare employees: the difference-making roles of managerial and employee participation

M. Akerstrom*, J. Severin & M. Roczniewska
* The Sahlgrenska Academy at University of Gothenburg, Sweden

Volume 97, issue 4, May 2024

Agricultural exposures and DNA damage in PBMC of female farmers measured using the alkaline comet assay

P. Evenden*, Q. Vandoolaeghe & M. Meryet-Figuière
* Université de Caen Normandie, France

Prevalence and predictors of high-frequency hearing loss among mine workers in Gujarat, western India: a cross-sectional study on the need to implement a comprehensive hearing conservation program

Nitishkumar D. Tank*, Mihir P. Rupani & Sarang V. Dhatrak
* ICMR - National Institute of Occupational Health (NIOH), India

Relationship between night work and health-related quality of life: an analysis based on profiles and cumulative duration of exposure to night work among French workers in the CONSTANCES cohort

Maud Gédor*, Ève Bourgkard & Stéphanie Boini
* French Research and Safety Institute for the Prevention of Occupational Accidents and Diseases, France

Metal and oxidative potential exposure through particle inhalation and oxidative stress biomarkers: a 2-week pilot prospective study among Parisian subway workers

Jean-Jacques Sauvain*, Maud Hemmendinger & Irina Guseva Canu

* University Lausanne, Switzerland

Effects of occupational exposure to metal fume PM2.5 on lung function and biomarkers among shipyard workers: a 3-year prospective cohort study

Huan Minh Tran*, Ching-Huang Lai & Hsiao-Chi Chuang

* Da Nang University of Medical Technology and Pharmacy, Vietnam

Objective and subjective measures of air pollution and self-rated health: the evidence from Chile

Yenniel Mendoza* & Ricardo E. González

* Universidad de la Frontera, Chile

Precarious employment and mental health in the Belgian service voucher system: the role of working conditions and perceived financial strain

Christophe Vanroelen*, Eva Padrosa Sayeras & Kim Bosmans
* Vrije Universiteit Brussel, Belgium

Association between physical fitness and perceived work ability among Finnish population: a cross-sectional study

Valtteri Pohjola*, Katariina Sarttila & Jouni Lahti
* Finnish Institute for Health and Welfare, Finland

Effects of chronotype on sleep, mood and cardiovascular circadian rhythms in rotating night shift medical workers

Jinzhen Jiang*, Guohua Chen & Junhua Mei
* Hubei University of Chinese Medicine, People's Republic of China

Associations of coal mine dust exposure with arterial stiffness and atherosclerotic cardiovascular disease risk in chinese coal miners

Xuezan Huang*, Min Mu & Weihong Chen
* Huazhong University of Science and Technology, China

http://ijomeh.eu/Current-issue

6/2023 vol. 36

REVIEW PAPER

Symmetry and asymmetry in atherosclerosis
Oliwia Kolaszyńska*& Jacek Lorkowski
*Department of Internal Medicine, Germany

Time series analysis in environmental epidemiology: challenges and considerations
Sandra Gudziunaite*, Zana Shabani & Hanns Moshammer
* Medical University of Vienna, Austria

ORIGINAL PAPER

Current incidence of professional burnout among Ukrainian oncologists in Kharkiv
Irina Böckelmann*, Igor Zavgorodnij & Beatrice Thielmann
*Otto von Guericke University Magdeburg, Germany
Julia Haponiuk-Skwarlińska*, Agata Antoniak & Maciej Janiszewski

Work for the Prison Service: selected health consequences – investigating the role of personal resources, job demands, work stress, and burnout
Ewa Sygit-Kowalkowska*, Katarzyna Orlak & Mikołaj Stolarski
*Kazimierz Wielki University in Bydgoszcz, Poland

Factors influencing the mental health status of support nurses and their workload during the COVID-19 epidemic
Zhen-Juan Dai, Shen-Ting Xu & Xue-Min Wang
*Shanghai Songjiang District Central Hospital, China

The impact of dietary nitrates and acrylamide intake on systemic redox status in healthy young adults
Agnieszka Piwowar*, Ewa Żurawska-Płaksej & Anna Prescha
*Wroclaw Medical University, Poland

The relationship between working time mismatch and depression according to actual hours worked
Ji Ho Kim*, Shin Goo Park & Sang Hee Hwang
*Inha University Hospital, South Korea

Construction and validation of the Areas of Academic Life Scale to measure organizational risk factors for student burnout
Teresa Chirkowska-Smolak*, Magdalena Piorunek & Żaneta Garbacik
*Adam Mickiewicz University, Poland

Association of the cytochrome P450 and arylamine N-acetyltransferase gene polymorphisms with the incidence of head and neck cancer in Polish population
Monika Gogolewska*, Jacek Kabziński, Ireneusz Majsterek
*Medical University of Lodz, Poland

1/2024 vol. 37

REVIEW PAPER

Rehabilitation of sick-listed LBP patients in occupational health with collaboration of the workplace
Valtteri Kokkonen*, Anne Lamminpää & Jaana Kuoppala
*University of Helsinki, Helsinki, Finland

ORIGINAL PAPER

The use of LA-ICP-MS as an auxiliary tool to assess the pulmonary toxicity of molybdenum(IV) sulfide (MoS2) nano- and microparticles
Renata Kuraś*, Maciej Stępnik & Beata Janasik
*Nofer Institute of Occupational Medicine, Poland

Distribution of sleep components while working remotely
Magdalena Janc*, Agnieszka Jankowska & Kinga Polanska
*Nofer Institute of Occupational Medicine, Poland

Effectiveness of prevention exercises protocol among office workers with symptoms of carpal tunnel syndrome
Patrycja Łach, Anna Katarzyna Cygańska
*Central Institute for Labor Protection – National Research Institute, Poland

Occupational daily walking steps have inverse relationship with papillary thyroid cancer risk and progression: a retrospective analysis
Chunling Zhang*, Li Zhang & Qin Huan
*Shandong University, Jinan, China

Fatigue based on the subjective feeling of people representing selected medical professions
Ewa Puszczalowska-Lizis*, Dominik Szymanski & Joanna Krajewska

*University of Rzeszów, Rzeszów, Poland

Analysis of the relationship between emotion intensity and electrophysiology parameters during a voice examination of opera singers
Paulina Krasnodębska*, Agata Szkiełkowska & Andrzej Mitas
*Institute of Physiology and Pathology of Hearing, Poland

Assessment of quality of life, job insecurity and work ability among nurses, working either under temporary or permanent terms
Maria Katsaouni*, Gregory Tripsianis & Evangelia Nena
*University General Hospital of Alexandroupolis, Greece

The association between air pollutions and emergency hospitalizations due to COPD and asthma across 16 Polish cities: population-based study
Monika Ścibor*, Katarzyna Leoszkiewicz & Roman Topór-Mądry
*Jagiellonian University Medical College, Poland

Assessment of buccal mucosa genotoxicity in insecticide-exposed urban fumigators in Cali, Colombia
Elizabeth Londoño-Velasco*, Helberg Asencio-Santofimio & Enrique Vergara-Escudero
*Pontificia Universidad Javeriana Cali, Colombia

2/2024 vol. 37

REVIEW PAPER

Zoonotic bacteria in the vicinity of animal farms as a factor disturbing the human microbiome: a review
Anna Kozajda* Emilia Miśkiewicz, Karolina Jeżak
*Nofer Institute of Occupational Medicine, Poland

ORIGINAL PAPER

Effects of a mobile health intervention on health-related outcomes in Japanese office workers: a pilot study
Takumi Meguro* Fuminori Takayama & Masaru Honjo
*KDDI Research, Inc., Saitama, Japan

Evaluating the association between effort-reward imbalance and suboptimal health status among hospital nurses: a cross-sectional study
Leilei Yu*, Weiting Liu & Zheng Guo
*Tai'an City Central Hospital of Qingdao University, China

Work-related behavior and experience patterns of music educators – a basis for intervention
Beatrice Thielmann*, Marieke Kirsch & Irina Böckelmann
*Otto von Guericke University Magdeburg, Magdeburg, Germany

Effects of participatory action-oriented training (PAOT) intervention for hypertension management among intercity van drivers

Thanawan Songprasert* Surintorn Kalampakorn & Sirirat Leelacharas
*KDDI Research, Inc., Saitama, Japan

An improvement of body surface area formulas using the 3D scanning technique

Grzegorz Redlarski*, Sławomir Kozieł & Leszek Sławomir Litzbarski
*Gdansk University of Technology, Poland

The role of innovative human resource management practices, organizational support and knowledge worker effort in counteracting job burnout in the Polish business services sector

Anna Rogozińska-Pawełczyk*
*University of Lodz, Łódź, Poland

Did safety-engineered device implementation contribute to reducing the risk of needlestick and sharps injuries? Retrospective investigation of 20 years of observation in a specialist tertiary referral hospital

Anna Szczypta*, Anna Różańska & Katarzyna Talaga-Ćwiertnia
*Andrzej Frycz Modrzewski Krakow University, Poland

https://academic.oup.com/joh?login=false

Volume 66, Issue 1 January/December 2024 (in progress)

A prospective cohort study of presenteeism and increased risk of unemployment among Japanese workers during the COVID-19 pandemic
Yoshihisa Fujino*, Makoto Okawara &Tomohiro Ishimaru
*University of Occupational and Environmental Health, Japan

Short-term economic evaluation of physical activity-based corporate health programs: a systematic review
Lorenzo Bonatesta*, Stefano Palermi & Felice Sirico
*Medical Partner Scuderia Ferrari, Italy

ORIGINAL ARTICLES

Job demands and temporomandibular disorders: mediating and moderating effects of psychological distress and recovery experiences
Naana Mori*, Masahito Tokita & Michiko Kawada
*Research Institute at SFC, Japan

Beyond working hours: the association between long working hours, the use of work-related communication devices outside regular working hours, and anxiety symptoms
Shinhyeong Kim*, Seunghon Ham & Wanhyung Lee *
Gachon University Gil Medical Center, Republic of Korea

Questionnaire-based scoring system for screening moderate-to-vigorous physical activity in middle-aged Japanese workers
Takuji Adachi*, Hironobu Ashikawa & Sumio Yamada
* Nagoya University Graduate School of Medicine, Japan

Perceptions of interprofessional team collaboration among professionals working in the occupational health service in Sweden
Anna-Karin Mouazzen*, Karin Blomberg & Maria Jaensson
* Örebro University, Sweden

Lifestyle factors associated with presenteeism among city government office workers: a cross-sectional study
Tsubasa Otsubo*, Aya Kinjo & Yoneatsu Osaki
* Tottori University, Japan

Association between the telecommuting environment and somatic symptoms among teleworkers in Japan
Satoru Kanamori*, Takahiro Tabuchi & Yuko Kai
*Teikyo University, Japan

Clinical effectiveness of trigger point acupuncture on chronic neck and shoulder pain (katakori) with work productivity loss in office workers: a randomized clinical trial
Yoichi Minakawa*, Shogo Miyazaki & Kazunori Itoh
*Teikyo Heisei University, Japan

Exploring wearable technology use and importance of health monitoring in the hazardous occupations of first responders and professional drivers
Sarah Tucker*, Soundarya Jonnalagadda &Ann Fruhling
*University of Nebraska Medical Center, United States

Psychosocial work conditions and traffic safety among minibus and long-bus drivers
Mustapha Amoadu*, Edward Wilson Ansah & Jacob Owusu Sarfo
*University of Cape Coast, Ghana

Relationship between physical activity and locomotive syndrome among young and middle-aged Japanese workers
Kazuhiko Watanabe* Shota Masuda & Takahiko Katoh
* University, Kumamoto, Japan

Stress experienced by dental students performing clinical training in different dental disciplines: a cross-sectional study
Rasha A Alamoush*, Sereen Al-sawaeir & Mahmoud K. AL-Omiri
*The University of Jordan, Jordan

REVIEW ARTICLE

Association between health-related physical fitness indicators and working ability: a systematic review
Veruscka Leso*, Luca Scalfi & Ivo Iavicoli
*University of Naples Federico II, Italy

Work engagement among older workers: a systematic review
Koji Mori*, Kiminori Odagami & Hisashi Eguchi
*University of Occupational and Environmental Health, Japan

Experiences of working from home: umbrella review
Charlotte E. Hall*, Samantha K. Brooks & Dale Weston
*Weston Education Centre, United Kingdom

Artificial intelligence in advancing occupational health and safety: an encapsulation of developments
Immad A Shah* & SukhDev Mishra
*National Institute of Occupational Health, India

Organizational and occupational health issues with working remotely during the pandemic: a scoping review of remote work and health
Lynnette-Natalia Lyzwinski
*McGill University, Canada

https://occup-med.biomedcentral.com/

Volume 2023 : 18

Pulmonary function assessment after COVID-19 in vaccinated healthcare workers
Lorenzo Ippoliti*, Luca Coppeta & Antonio Pietroiusti
*University of Rome Tor Vergata, Italy
Published online: 15 December 2023

Healthy working in inclusive companies – a study protocol of the GAIN project
Fabian Holzgreve*, Bettina Bredereck & Daniela Ohlendorf
* Goethe-University Frankfurt, Germany
Published online: 15 December 2023

Physical workload and cardiopulmonary parameters in relation to individual capacity of bulk waste workers – a cross-sectional field-study
Alexander Michael Kraft*, Marcial Velasco Garrido & Alexandra Marita Preisser
* University Medical Center Hamburg-Eppendorf, Germany
Published online: 15 December 2023

Rudolph, the kids' ward reindeer: a scoping review of the effects of support animals on the well-being of healthcare staff
Thomas C. Erren*, Jonas Wallraff, Ursula Wild & Philip Lewis
* University Hospital of Cologne, Cologne, Germany
Published online: 12 December 2023

Volume 2024 : 19

Reduced protein levels in latex gloves may play an alternative approach to lowering latex sensitization risks among health workers; a cross-sectional analytical study

Chatpong Ngamchokwathana*, Naesinee Chaiear & Prapassorn Khajornpipat
* Division of Community Family and Occupational Medicine, Thailand

Published on: 3 June 2024

Construction of a mortality risk prediction model for patients with acute diquat poisoning based on clinically accessible data

Mingxiu Lv* & Yu Du
* West China School of Public Health and West China Fourth Hospital, China

Published on: 21 May 2024

Same job, same working conditions? A cross-sectional study to examine the similarities and differences of the working situation in ambulatory and residential youth welfare workers

Maren Kersten*, Sylvie Vincent-Höper & Albert Nienhaus
* Institution for Statutory Accident Insurance and Prevention in the Healthcare and Welfare Services (BGW), Germany

Published on: 17 May 2024

Epidemiology of work-related injuries, musculoskeletal disorders and dermatitis among hospital food service workers in a tertiary hospital in Asia

Kenneth Bao Ren Leong*, Qin Xiang Ng &John Wah Lim
* Department of Occupational and Environmental Medicine, Singapore

Published on: 17 May 2024

The recovery processes among paramedics who encountered violence during work—a narrative interview study

Veera Kamaja* & Hilla Nordquist
* Jokilaakson Terveys Oy, Sairaalantie 11, Jämsä, 42100, Finland

Published on: 16 May 2024

Assessment of subjective well-being of healthcare workers in response to heat and personal protective equipment under controlled conditions using a standardized protocol

Caroline Quartucci*, Razan Wibowo & Stefan Rakete * LMU University Hospital, Germany

Published on: 15 May 2024

Guideline for the application of heart rate and heart rate variability in occupational medicine and occupational health science

Stefan Sammito*, Beatrice Thielmann & Irina Böckelmann
* Otto-von-Guericke University Magdeburg, Germany

Published on: 13 May 2024

Physically demanding occupations among females and sex-related differences to develop osteoarthritis of the hip: a systematic review and meta-analysis

Susanne Unverzagt*, Annekatrin Bergmann & Johannes Weyer
* Faculty of Medicine, Germany

Published on: 6 May 2024

Seafarers' attitudes and chances to improve the nutrition on merchant ships from the crews' and cooks' perspective

Felix Alexander Neumann*, Lukas Belz & Birgit-Christiane Zyriax
* University Medical Center Hamburg-Eppendorf (UKE), Germany

Published on: 2 May 2024

Prevalence of obesity and associated health risks in soldiers of the German Armed Forces

Lorenz Scheit*, Jan Schröder & Manuela Andrea Hoffmann
* Bundeswehr Hospital Hamburg, Germany

Published on: 15 April 2024

Bridging the knowledge gap! Health outcomes in informal e-waste workers

Béla Eckhardt* and Andrea Kaifie
*RWTH Aachen University, Germany

Published on: 15 April 2024

Discriminative potential of exhaled breath condensate biomarkers with respect to chronic obstructive pulmonary disease

Romain Freund*, Jean-Jacques Sauvain & Irina Guseva Canu
* University of Lausanne, Switzerland

Published online: 04 April 2024

Impact of sitting at work on musculoskeletal complaints of German workers - results from the study on mental health at work (S-MGA)

T. H. An Dang*, Karla Romero Starke & Janice Hegewald
* Technische Universität Dresden, Germany

Published online: 27 March 2024

Quality of life and work functionality in severe asthma patients: the impact of biological therapies

Veruscka Leso, Claudio Candia & Maniscalco and Ivo Iavicoli
*University of Naples Federico II, Italy

Published online: 20 March 2024

Hand eczema and skin complaints in particulate matter-exposed occupations - firefighters, chimney sweepers, and ferrosilicon smelter workers in Norway

Krister Aune Teigen, Anje Christina Höper & Marit Nøst Hegseth
* University Hospital of North Norway, Norway

Published online: 14 March 2024

Differences in upper body posture between patients with lumbar spine syndrome and healthy individuals under the consideration of sex, age and BMI

Fabian Holzgreve*, Celine Nazzal & Daniela Ohlendorf
* Goethe University Frankfurt, Germany

Published online: 14 February 2024

Correction: Acute occupational exposures reported to the Dutch Poisons Information Center: a prospective study on the root causes of incidents at the workplace

Anja P. G. Wijnands*, Irma de Vries and Saskia J. Rietjens
* Utrecht University, the Netherlands

Published online: 14 February 2024

Stunt performers' reluctance to self-report head trauma: a qualitative study

Jeffrey A. Russell*, Elizabeth A. Beverly & Ariana B. Senn
* Ohio University, USA
Published online: 31 January 2024

Occupational exposure to crystalline silica in a sample of the French general population

Pierre-Marie Wardyn*, Jean-Louis Edme & Sébastien Hulo
* IMPact de l'Environnement Chimique sur la Santé humaine, France
Published online: 31 January 2024

Exploring the working conditions of disabled employees: a scoping review

Sophie Teborg*, Lena Hünefeld & Tomke S. Gerdes
* Federal Institute for Occupational Safety and Health, Germany
Published online: 30 January 2024

The environmental health impacts of Russia's war on Ukraine

Daniel Hryhorczuk*, Barry S. Levy & Timothy B. Erickson
* University of Illinois School of Public Health, USA
Published online: 05 January 2024

https://journals.lww.com/joem/Pages/issuelist.aspx

December 2023 - Volume 65 - Issue 12

Work-Life Balance and Mental Health Outcomes for Generation Z in Germany
Adedeji, Adekunle*; Langel, Carlotta & Hanft-Robert, Saskia
*Hamburg University of Applied Sciences, Germany

Perceived Workplace Health Support and Severe Psychological Distress Among Japanese Workers: A Prospective Cohort Study
Ikegami, Kazunori*; Ando, Hajime & Ogami, Akira
* University of Occupational and Environmental Health, Japan

Association Between Weight Reduction and Employees' Healthcare Cost
Peasah, Samuel K.*; Drnach, Alek & Good, Chester B
*Center for Value-Based Pharmacy Initiatives, USA

For-Profit Businesses as Public Health Partners to Promote COVID-19 Vaccination: A Multiple Case Study
McHugh, Megan*; Harris, Alexandra & Holl, Jane L.
* Northwestern University, USA

Managers' Influence on the Prevention of Common Mental Disorders in the Workplace: A Cross-Sectional Study Among Swedish Managers
Hultqvist, Jenny*; Zhang, Peiran & Bertilsson, Monica
*University of Gothenburg, Sweden

The Role and Value of Corporate Medical Directors in Employer Benefits Management: Current Perceptions of Corporate Medical Directors and Benefits Professionals
Stave, Gregg M.* & Burton, Wayne N.
* Duke University, USA

Effect of Ambient Temperature on Hospital Admissions for Respiratory Disease in Suburban Rural Villages of a Semi-Arid Region in Northwest China
Zhang, Yanan*; Luo, Xiaofeng; Ma, Li & Zhang, Benzhong
*Lanzhou University, Lanzhou, China

Creative Arts Therapy for Healthcare Professionals Is Associated With Long-Term Improvements in Psychological Distress
Avallone Mantelli, Rafaela*; Forster, Jeri & Moss, Marc Less
*University of Colorado School of Medicine, USA

Working Status of First-Time Postpartum Mothers and Telomere Length—A 1-Year Prospective Study
Houminer-Klepar, Nourit*; Bord, Shiran & Baron-Epel, Orna Less
*University of Haifa, Mount Carmel, Israel

Epidemiology of Work-Related Traumatic Brain Injury and COVID-19 Pandemic Lockdown Consequences: Experience in a Reference Center in Chile
Wimmer Del Solar*, Jonathan; Rojas-Líbano, Daniel & Estefanía Less
* Asociación Chilena de Seguridad, Chile

Body Mass Index and Waist Circumference Correlates With Lifestyle and Health in Long-Haul Truck Drivers
Shaw, Keely A.*; Zello, Gordon A. & Crizzle, Alexander M.
* University of Saskatchewan, Canada

Determining Unmet Needs Among Workers' Compensation Stakeholders to Prevent Work Disability in the State of Vermont
Peterik, Kara*; Kennedy, Deborah & Huyck, Kare
*Dartmouth Institute for Health Policy and Clinical Practice, USA

Do Sleep Problems Explain the Association Between Work Stress and the Trajectories of Work Ability From Midlife to Pensionable Age?
Kontturi, Marika*; KC, Prakash & Marianna Less
*University of Eastern Finland, Finland

A Study on Vascular Regulators as Early Biomarkers of Hand Arm Vibration Syndrome
Yang, Hongyu*; Chen, Ziyu & Qingsong Less
*Guangdong Pharmaceutical University, China

Comparing Longitudinal Measures of Cholinesterase as Biomarkers for Insecticide Exposure Among Latinx Children in Rural Farmworker and Urban Nonfarmworker Communities in North Carolina
Quandt, Sara A.*; Smith, Sydney A & Paul J. Less
*University School of Medicine, USA
ONLINE-ONLY

ORIGINAL ARTICLES

A Qualitative Study Exploring White-Collar Employee/Manager Experiences of Mental Health and Well-being Initiatives in Corporate Environments
Young, Paul*; Chow, Vivien & Barker, Jamie
*Loughborough University, United Kingdom

Stress and Work Performance Responses to a Multicomponent Intervention for Reducing and Breaking up Sitting in Office Workers: A Cluster Randomized Controlled Trial
Maylor, Benjamin D.*; Hough, John & Bailey, Daniel P
*University of Bedfordshire, United Kingdom

Volume 66, January 2024, Issue 1

EDITORIALS

ORIGINAL ARTICLES

Volume 66, February 2024, Issue 2

ORIGINAL ARTICLES

Why Don't Employees Participate in Well-being Programs? A Research-Informed Systems-Based Model
Sherman, Bruce W.*; Stiehl, Emily & Pratap, Preethi Lakshmi
*Case Western Reserve University, USA

Home Care Workers' Objective and Subjective Recovery From Work
Säynäjäkangas, Pihla*; Mänttäri, Satu & Laitinen, Jaana
*Finnish Institute of Occupational Health, Finland

Assessing COVID-19 Vaccine Hesitancy and Trust in Home Health Workers in New York City: A Pilot Study
McCabe, Chelsea Aleo*; Venkatram, Chinmayi & Oliver, Kristin
*Icahn School of Medicine at Mount Sinai, USA

The Impact of Personal Protective Equipment on Cognitive and Emotional Aspects of Health Care Work
Judd, Belinda K.*; Whelehan, Dale F. & Baillie, Andrew J
* University of Sydney, Australia

Cluster Analysis of World Trade Center Related Lower Airway Diseases
De la Hoz, Rafael E.*; Jeon, Yunho & Celedón, Juan C
* Icahn School of Medicine at Mount Sinai, USA

ONLINE-ONLY

FAST TRACK ARTICLE

Long COVID Among Wisconsin Workers in the Workers' Compensation System: Associations With Sociodemographics, Vaccination, and Predominant Variant Period From March 1, 2020 to July 31, 2022
Modji, Komi K.S.*; McCoy, Katherine E. & Tomasallo, Carrie D.
*University of Wisconsin, USA

ORIGINAL ARTICLES

Occupational Health Providers' Perceptions of Employee Vaccine Hesitancy
Dooley, Cara E.*; Saif, Nadia T. & Cloeren, Marianne
* University of Maryland School of Medicine, USA

Examining the Effect of SARS-CoV-2 Pandemic-Induced Stress and Anxiety on Humoral Immunity in Health Care Workers
Stark, Valerie S.*; Williams, Erin C. & Pahwa, Savita
* University of Miami Miller School of Medicine, USA

Work Ability and Its Correlates With Workers Aging Among Blue-Collar Workers in a Manufacturing Company: A Cross-sectional Study
Bacci, Giulia*; Viotti, Sara; Guidetti & Converso, Daniela
*University of Turin, Italy

The Managerial Role and Psychosocial Factors of Job Satisfaction: A Cross-sectional Study Among Wittyfit's Users
Colin-Chevalier*, Rémi; Pereira, Bruno & Dutheil, Frédéric
* Université Clermont Auvergne, France

Examining the Relationship Between Workplace Industry and COVID-19 Infection: A Cross-sectional Study of Canada's Largest Rapid Antigen Screening Program
Gatov, Evgenia*; Sennik, Sonia & Rosella, Laura
* University of Toronto, Toronto, Canada

ONLINE-ONLY

LETTER TO THE EDITOR

The Case for a Performance-Based Approach to Mental Health Screening in Aviation
Miranda, Elijah E.*; Hoffman, William R. & Tvaryanas, Anthony
*University of North Dakota, USA

Volume 66, March 2024, Issue 3

ORIGINAL ARTICLES

Exploring the Relationship Between Techno-Unreliability at Work and Burnout
Meyer, Sophie-Charlotte* & Tisch, Anita
* Federal Institute for Occupational Safety and Health, Germany.

Mortality Risk After a Major Cancer Surgery Is Associated With Preoperative Exposure to Air Pollution: A Nationwide Cohort Study in South Korea
Oh, Tak Kyu; Song, In-Ae
* Seoul National University Bundang Hospital, South Korea

Exposure to Fine Particulate Matter Increases Risk of Diabetes Mellitus: A Population-Based Cohort Study
Chung, Wei-Sheng; Lin, Cheng-Li
*Ministry of Health and Welfare, Taichung, Taiwan

Comparison of Serum Per- and Polyfluoroalkyl Substances Concentrations in Incumbent and Recruit Firefighters and Longitudinal Assessment in Recruits
Nematollahi, Amy J.*; Fisher, Julia M. & Burgess, Jefferey L. Less
* The University of Arizona, USA

Wellness Program Participation and its Association With Illness-Related Absenteeism and Turnover: One University's Story
Jenkins, Kristi Rahrig
* University of Michigan, USA

Experiences With Work-Family Conflict, Breastfeeding, and Perinatal Mental Health Among Women Returning to Work After Giving Birth: A Mixed Methods Study
McCardel, Rachel; Callands, Tamora & Padilla, Heather
*University of Georgia, USA

Productivity Loss Among Opioid and Benzodiazepine Users in the United States: A Medical Expenditure Panel Survey From 2010 to 2019
Thornton, J. Douglas*; Varisco, Tyler & Shen, Chan
* University of Houston, Texas

A Description of Exercise Programs Implemented During a Firefighter Training Academy
Mang, Zachary A.*; Beam, Jason R. & Martinez, Adam H.
* Los Alamos National Laboratory, USA

Assessing the Physical and Psychological Well-being of Construction Workers During the COVID-19 Pandemic: A Prospective Study in Italy
Tobia, Loreta*; Muselli, Mario & Fabiani, Leila
* University of Study of L'Aquila, Italy.

Mortality Among Individuals Diagnosed With Chronic Beryllium Disease and Beryllium Sensitization
TenHarmsel, Hailey*; Wang, Ling & Rosenman, Kenneth D.
* Michigan State University, USA

The Price of Pain: Workers Compensation Costs for Musculoskeletal Claims in the State of Kansas, 2014–2022
Manning, Christin & Jorgensen, Michael
* Wichita State University, Kansas.

Liposomal-Associated Phospholipase A2 Is More Effective in Predicting Cardiac Risk in Law Enforcement Than Framingham Risk Score and Coronary Artery Calcium Score Calculation
Sheinberg, Jonathan*; Rajaram, Pranav & Callaway, Joshua
* Baylor Scott and White Healthcare, Texas.

ONLINE-ONLY

ORIGINAL ARTICLES

Long COVID and Chronic Conditions in the US Workforce: Prevalence, Productivity Loss, and Disability
Bonner, Carole* & Ghouralal, Sera-Leigh
* University International, Cypres

Decreases in Employer Referrals to First-Time Substance Use Treatment for Adults From 2004 to 2020
Ware, Orrin D.; Hussong, Andrea & Jordan, Robyn
* University of North Carolina at Chapel Hill

Occupational Dust Exposure as a Risk Factor for Developing Lung Function Impairment
Saers, Johannes James*; Bryngelsson, Ing-Liss & Andersson, Lena
* Örebro University, Sweden

Improvements in Work Productivity and Activity Impairment Among Adults With Anxiety or Depressive Symptoms Participating in a Relational Agent–Delivered Digital Mental Health Intervention
Forman-Hoffman, Valerie L.*; Flom, Megan & Robinson, Athena
* Woebot Health, San Francisco, USA

Association of Work Stress With Anxiety and Depression Among Adults in Wuhan, China: The Mediating Role of Job Satisfaction
Tao, Yueqing*; Zhang, Haozhe & Li, Whenzhen
* University of Science and Technology, China

On-Duty Resting Heart Rate Variability at the Fire Station Is Related to Cardiorespiratory Fitness and Physical Activity Levels in Firefighters
Marcel-Millet, Philémon* & Gendron, Philippe
* Université du Québec à Trois-Rivières, Canada

Subclinical Measures of Cardiovascular Health Among Wildland Firefighters
Hasan, Md Zahid*; Semmens, Erin O & Noonan, Curtis W
* University of Montana, USA

LETTERS TO THE EDITOR

Comment on the Update ACOEM Guidance Statement—Role and Value of the Corporate Medical Director
Goldsmith, Robert S.* & Nezam, Hasan
* NBS Healthcare Group, Naples, USA

ONLINE-ONLY

LETTERS TO THE EDITOR

Response to Comment on the Updated ACOEM Guidance Statement—Role and Value of the Corporate Medical Director
Stave, Gregg M.* & Burton, Wayne N.
* Duke University, Durham, USA

ERRATUM

The National Institute for Occupational Safety and Health Total Worker Health® Program: The Third Decade: Erratum

Volume 66, April 2024, Issue 4

ORIGINAL ARTICLES

Work Ability and Work Nonparticipation: A Prospective Study of 2426 Participants in Germany
Conway, Paul Maurice*; Burr, Hermann & Rose, Uwe
*University of Copenhagen, Denmark

Is Arthroscopic Meniscectomy Associated With an Increased Risk of Total Knee Arthroplasty for Claimants in the Workers' Compensation System? A 10-Year Study of Workers' Compensation Claims From a Large Nationwide Workers' Compensation Insurance Carrier
Tsourmas, Nicholas F*.; Bernacki, Edward J. & Tao, Xuguang (Grant)
* Johns Hopkins School of Medicine, USA

The Intersection of Gender and Occupational Roles in Agriculture: Stress, Resilience, and Alcohol Behaviors of US Farmers
Proctor, Christina; Hopkins, Noah & Reece, Chase
*University of Georgia, USA

Outcomes for a Heat Illness Prevention Program in Outdoor Workers: A 9-Year Overview
Perkison, William B.*; Schaefer, Caroline M. & McCarthy, Ronda B.
*University of Texas Health Science Center, USA

Safety Climate in the Utility Industry: Perceptual Discrepancies Across Organizational Hierarchy
Huang, Yueng-hsiang*; Lee, Jin; Perry & Tondokoro, Tsukumi
* Oregon Health & Science University, USA

A Focus on Leadership Communication and Feeling Valued to Prevent Burnout and Turnover Among Healthcare Professionals

Young, Amy M.; Aronoff, Chloe; Goel, Sandy; Jerome, Matthew; Brower, Kirk J.
*University of Michigan, USA

Greater Emotional and Psychological Well-being Are Associated with Reduced Employee Self-report Illness-Related Absenteeism: A Multi-Industry, Cross-sectional Study Conducted During COVID-19 Pandemic

Fannin, Austin; Hooley, Cole; Nelson, Erik J.
*Brigham Young University, USA

The Relationship Between Employee Physical Activity Intensity and Workplace Burnout: A Cross-sectional Study

Albedry, Brandon; Marenus, Michele W.; Chen, Weiyun
*University of Michigan, USA

Ambient Temperature Effects on Hospitalization Risk Among Farmers: A Time-Series Study on Multiple Diseases in Vietnam

Tran, Nu Quy Linh*; Nguyen, Thi Tuong Vy & Phung, Dung
* Griffith University, Australia

Work Disability Duration Among Mobile Workers: Does Intraprovincial Mobility Matter as Much as Interprovincial Mobility?

Macpherson, Robert A.*; Tamburic, Lillian; Neis & Christopher B.
*University of British Columbia, Canada

Relationship Between Infection or Close Contact With COVID-19 and Workplace Mistreatment Among Japanese Workers: A Cross-sectional Study

Sawamoto, Naoya*; Okawara, Makoto & Fujino, Yoshihisa
*University of Occupational and Environmental Health, Japan

Comparison of Physical Activity and Sedentary Behavior between Work in Office and Work From Home: A Self-controlled Study

Tomonaga, Ryo*; Watanabe, Yuya & Hiroshi Less
* University of Occupational and Environmental Health, Japan

ACOEM GUIDANCE STATEMENT

Long COVID—ACOEM Guidance Statement

Stave, Gregg M.*; Nabeel, Ismail & Durand-Moreau, Quentin
* Duke University, USA

ONLINE-ONLY

FAST TRACK ARTICLE

Emotional Exhaustion in Healthcare Workers: Moving Beyond Coping Skills to Improve Organizational Conditions

Siddique, Sundus*; Gore, Rebecca & Punnett, Laura
*Center for the Promotion of Health in the New England Workplace, USA

ORIGINAL ARTICLE

The Impact of Involvement in Whole Health System for Veterans or Participating in It for Oneself on Job Attitudes in VA Employees
Schult, Tamara M.*; Mohr, David C. & Reddy, Kavitha P.
*Office of Patient Centered Care and Cultural Transformation, USA

EDITORIAL

***JOEM* Updates and Thank You to the 2023 Reviewers**
Brandt-Rauf,* Paul W. & Yuhasz, Stacieann
*Drexel University, USA

LETTERS TO THE EDITOR

Observatory of Pneumoconiosis in the Americas
Delgado-García*, Diemen; Andrew Cohen, Robert
*Department of Research and Postgraduate of Universidad de Aconcagua Los Andes, Chile

Integrating the Lifestyle Medicine Residency Curriculum into an Occupational Medicine Training Program
Lutchman, Kevan*; Wan, Melissa & Elizabeth Pegg
*Division of Occupational Medicine, USA

Volume 66, May 2024, Issue 4

ORIGINAL ARTICLES

Effects of the Need for Support From the Workplace and Resilience on Psychological Distress in Japanese Employees: A 1-Year Prospective Study
Eguchi, Hisashi*; Inoue, Akiomi & Fujino, Yoshihisa
*University of Occupational and Environmental Health, Japan

Occupational Medicine Physicians Transition to Retirement: An International Survey of Plans, Preparation, and Interests
Stave, Gregg M.*; Burton, Wayne N. & Thirumalai, Rajgopal
*Duke University, Durham, USA

Impact of Shifting From Office Work to Telework on Workers' Physical Health: A Longitudinal Study
Hoshi, Rena*; Kikuchi, Hiroyuki & Inoue, Shigeru
*Showa Women's University, Japan

Effects of Acute Sleep Deprivation on the Physiological Response to Woodsmoke and Exercise
Sol, Joseph A.*; Covington, Anna C. & Quindry, John C.
*University of Montana, Montana, USA

https://oem.bmj.com/content/80/5?current-issue=y

January 2024 - Volume 81 – 1

COMMENTARY

Subtle exposures, invisible outcomes, real suffering: sex, gender and occupational health

Karen Messing*

*Universite du Quebec a Montreal, Canada

ORIGINAL RESEARCH

WORKPLACE

Occupational physical demands and menstrual cycle irregularities in flight attendants and teachers

Candice Y Johnson*, Barbara Grajewski & Elizabeth A Whelan

* Duke University, Durham, USA

Benzene exposure and risk of lung cancer in the Norwegian Offshore Petroleum Worker cohort: a prospective case-cohort study

Ronnie Babigumira*, Marit B Veierød & Jo Steinson Stenehjem

* Cancer Registry of Norway, Norway

Time off work following psychological injury among health and social care workers: a population-based retrospective cohort study in New South Wales, Australia

Asmare Y Gelaw*, Luke Sheehan & Alex Collie

* Monash University, Melbourne, Australia

February 2024 - Volume 81 - 2

Epidemiology of work-related fall injuries resulting in hospitalisation: individual and work risk factors and severity
Win Wah*, Janneke Berecki-Gisolf & Karen Walker-Bone
* Monash University, Australia

Agricultural exposure and risk of ovarian cancer in the AGRIculture and CANcer (AGRICAN) cohort
Marine Renier*, Juliette Hippert & Pierre Lebailly
* INSERM, UMR1086 ANTICIPE, France

Association of firefighting exposures with lung function using a novel job exposure matrix (JEM)
David G Goldfarb*, David J Prezant & Ilias G Kavouras
* Montefiore Medical Center, USA

EXPOSURE ASSESSMENT

Identifying employee, workplace and population characteristics associated with COVID-19 outbreaks in the workplace: a population-based study
Christopher E Overton*, Rachel Abbey & Yiqun Chen
* University of Liverpool, UK

Who tests for lead and why? A 10-year analysis of blood lead screening, follow-up and CNS outcomes in a statewide US healthcare system
Aaron Reuben*, Ralph Ward & Dean G Kilpatrick
* Duke University, Durham, USA

SHORT REPORT

PRACTICE

Health Hazard Evaluations of occupational cancer cluster concerns: the USA, January 2001–December 2020
Dallas S Shi*, Jessica L Rinsky & Sophia K Chiu
* National Institute for Occupational Safety and Health, USA

March 2024 - Volume 81 - 3

ORIGINAL RESEARCH
WORKPLACE

Ethnic inequalities among NHS staff in England: workplace experiences during the COVID-19 pandemic
Rebecca Rhead*, Lisa Harber-Aschan & Stephani Hatch
* King's College London Institute of Psychiatry Psychology & Neuroscience

Notification of hand eczema as an occupational disease among Danish hairdressers: a national survey on patients' perception
Christoffer Kursawe Larsen*, Martin S Havmose & Jeanne Duus Johansen

ORIGINAL RESEARCH
WORKPLACE

Incident skin melanoma in Danish male military pilots: a nested case–control study
Julie Elbaek Pedersen * & Johnni Hansen
* Danish Cancer Society Research Center, Denmark

Mechanisms of vocational interventions for return to work from musculoskeletal conditions: a mediation analysis of the MI-NAV trial
Aidan G Cashin*, Britt Elin Øiestad & Margreth Grotle
* Centre for Pain IMPACT, Neuroscience Research Australia, Australia

Poor adherence to dust, noise and safety regulations predict injury rates in underground coal mines
Lee S Friedman*, Brett Shannon & Robert A Cohen
* University of Illinois, USA

Alterations to biomarkers related to long-term exposure to diesel exhaust at concentrations below occupational exposure limits in the European Union and the USA
Jason YY Wong*, Batel Blechter & Laura Temime
* National Heart Lung and Blood Institute, USA

Short report: Sick leave due to COVID-19 during the first pandemic wave in France, 2020
David R M Smith*, Sofía Jijón & Laura Temime
* Conservatoire National des Arts et Métiers, France

ENVIRONMENT

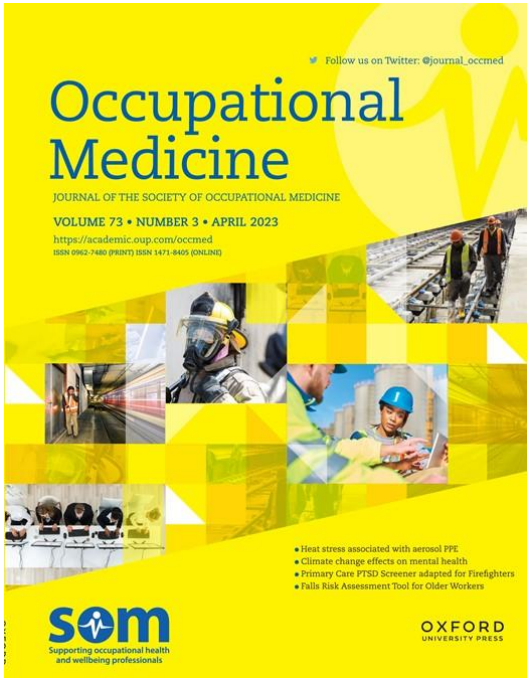
Biological risk in Italian prisons: data analysis from the second to the fourth wave of COVID-19 pandemic
Cristiano Franchi*, Riccardo Rossi & Daniele Di Giovanni
* University of Rome Tor Vergata Engineering Macro Area, Italy

METHODOLOGY

Improving trends estimates for specific work-related ill-health conditions when excess zeros are present in a voluntary health reporting scheme
Matthew Gittins*, Melanie Carder & Martie van Tongeren
* The University of Manchester Faculty of Biology Medicine and Health, UK

SYSTEMATIC REVIEW

Occupational risk factors associated with lower urinary tract symptoms among female workers: systematic review
Hyoungseob Yoo*, Jae Yoon Kim & Mo-Yeol Kang
* The Catholic University of Korea, Seoul, Korea (the Republic of)



https://academic.oup.com/occmed/issue

Volume 73, Issue 8- November 2023

Volume 73, Issue 9- December 2023

Volume 74, Issue 1- January 2024

* University of Nottingham, UK

Occupational risk of COVID-19 in foreign-born employees in Denmark
J P E Bonde*, L M Begtrup & S S Tøttenborg
* Copenhagen University Hospital Bispebjerg and Frederiksberg, Denmark

A COVID-19 monitoring process for healthcare workers utilizing occupational health
J C Crosby*, R A Lee & S Nafziger
* University of Alabama at Birmingham, USA

Lived experience of work and long COVID in healthcare staff
N Torrance*, E MacIver & A Grant
* Robert Gordon University, UK

Occupational effects in patients with post-COVID-19 syndrome
C E Green*, J S Leeds & C M Leeds
* Department of Occupational Health and Wellbeing, UK

Pandemic preparedness from the perspective of Occupational Health professionals
Y Chen*, C Ingram & E Alvarez,
* Embry-Riddle Aeronautical University, USA

Post-acute COVID-19 complications in UK doctors: results of a cross-sectional survey
D Bland*, R Evans & R Agius
* British Medical Association, UK

Sustaining work ability amongst female professional workers with long COVID
J Lunt* S Hemming & B Hanney
* University of Derby, UK

Post-traumatic stress disorder in hospital doctors after the COVID-19 pandemic
L Rollin*, O Guerin & A Commune
* Rouen University Hospital, France

Descriptive study of COVID-19 vaccinations and infections within an NHS workforce
M Ke* and others
* Clinical Infection Research Group, UK

CASE REPORT

COVID-19 associated with Raynaud's phenomenon in a vibration-exposed worker
R Cooke*
* Cooke Medical Service, UK

Volume 74, Issue 2- March 2024

EDITORIALS

The time is right to establish a Global Network for Evidence for Work
S. Curti* & S. Mattioli
* S.Orsola University Hospital, Italy

OBITUARY

OBITUARY: John Frederick Lewis ALDRIDGE
Emslie E. MacDonald

Volume 74, Issue 3- April 2024

EDITORIAL

New occupational medicine competency framework for UK undergraduate medical students

Drushca Lalloo*, Finola Ryan & Richard Peters
University of Glasgow, UK

ORIGINAL PAPERS

Psychological support during a pandemic: an intervention for hospital teams

L M Quarmby*, M Hotton & E Springham

* Oxford University Hospitals NHS Foundation Trust, UK

Culture, conditions and care support mental health of healthcare workers during crises

J L Maple*, M Whiteside & K Willis

* Victoria University, Australia

A review of the injuries caused by occupational footwear

M C Pereira-Barriga J M Borrero-Hernández & J Gómez-Salgado

* University of Huelva, Spain

Job demands and DHEA-S levels: a study on healthcare workers

F Marcatto*, E Patriarca & F Larese Filon

* University of Trieste, Italy

Assessing the profile and utility of diplomates in occupational medicine

F Johnson, I Madan, , V Parsons

* University of Leicester, UK

Job stress and burnout among Finnish municipal employees without depression or anxiety

A Kainalainen*, P Korhonen & J Liira

* University of Turku, Finland

Typology of employers offering line manager training for mental health

H Blake a J Hassard*, T Dulal-Arthur & L Thomson

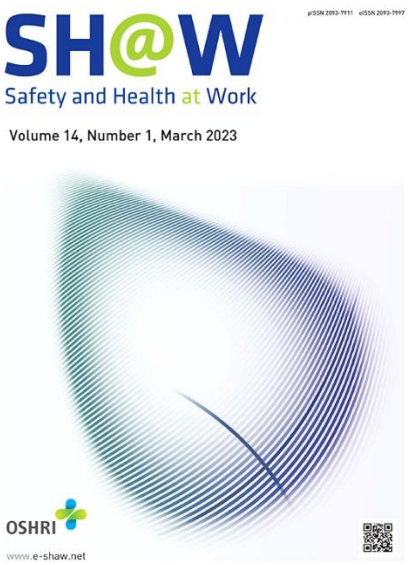
* University of Nottingham, UK

False-positive HIV screening test in a healthcare student

J Quigley*, T Hussain & C Arthur
* Consultant Occupational Physician, UK

Work Stress Induced Chronic Diseases in Construction: Discoveries Using Data Analytics

Rachel Sharp, University of Oklahoma, USA



https://www.sciencedirect.com/journal/safety-and-health-at-work/issues

Volume 14, Issue 4 (December 2023)

REVIEW ARTICLE

A Systematized Overview of Published Reviews on Biological Hazards, Occupational Health, and Safety
Alexis Descatha*, Halim Hamzaoui & Anne Oppliger
*Univ Angers, Angers

RESEARCH ARTICLE

Assessment of Questionnaire of Physical Activity at Workplace Based on the Social Cognitive Theory (PAWPQ-SCT): A Psychometric Study in Iranian Gas Refinery Workers
Kamel Ghobadi*, AhmadAli Eslami & Fatemeh Hosseini
*School of Health, Iran

Systematizing Information Use to Address Determinants of Health Worker Health in South Africa: A Cross-sectional Mixed Method Study
Muzimkhulu Zungu*, Annalee Yassi & Jerry Spiegel
*National Institute for Occupational Health, South Africa

Working Anytime and Anywhere -Even When Feeling Ill? A Cross-sectional Study on Presenteeism in Remote Work
Henrike Schmitz*, Jana F. Bauer & Mathilde Niehaus
*University of Cologne, Germany

Factors Influencing the Use of Control Measures to Reduce Occupational Exposure to Welding Fume in Australia: A Qualitative Study
Renee N. Carey*, Lin Fritschi & Timothy R. Driscoll
*Curtin University, Bentley, Australia

Global Estimates on Biological Risks at Work
Jukka Takala*, Alexis Descatha & Subas Neupane
*Tampere University, Finland

Covid-19 Occupational Risk Incidence and Working Sectors Involved During the Pandemic in Italy
Fabio Boccuni*, Bruna M. Rondinone & Alessandro Marinaccio
*Department of Occupational and Environmental Medicine, Italy

Occupational Injuries Among Construction Workers by Age and Related Economic Loss: Findings From Ohio Workers' Compensation, USA: 2007–2017
Harpriya Kaur*, Steven J. Wurzelbacher & Michael Lampl
*Centers for Disease Control and Prevention, USA

Occupational Safety & Health Management and Corporate Sustainability: The Mediating Role of Affective Commitment
Zhen Chao Tan*, Chun Eng Tan & Yuen Onn Choong
*Tunku Abdul Rahman University of Management and Technology, Malaysia

Relationship Between Occupational Safety and Health Policy Principles, Organizational Action on Work-related Stress and the Psychosocial Work Environment in Italy
Stavroula Leka*, Luis Torres & Sergio Iavicoli

Association Between Social Support, and Depressive Symptoms Among Firefighters: The Mediating Role of Negative Coping
Liang Wang*, Fengqiong Chen & Mengliang Ye
*Lancaster University, UK

Psychosocial Work Conditions During the COVID-19 Pandemic and Their Influences on Mental Health Risk and Intention to Leave Among Public Health Workers: A Cross-sectional and Follow-up Study in Taiwan
Ming-Wei Lin*, Yi-Ting Wang & Yawen Cheng
*Taichung Armed Forces General Hospital, Taiwan

Impact of COVID-19 Infection on Work Functioning in Japanese Workers: A Prospective Cohort Study
Makoto Okawara*, Keiki Hirashima & Yu Igarashi
*University of Occupational and Environmental Health, Japan

Case-Control Study of Occupational Acute Myeloid Leukemia in the Republic of Korea
Min Young Park*, Hyoung-Ryoul Kim & Mo-Yeol Kang
*The Catholic University of Korea, Republic of Korea

Water-blocking Asphyxia of N95 Medical Respirator During Hot Environment Work Tasks With Whole-body Enclosed Anti-bioaerosol Suit
Jintuo Zhu*, Qijun Jiang & Qi Hu
*China University of Mining and Technology, China

Surviving Covid-19 Diagnosis Among Registered Nurses: Reactions, Consequences, and Coping Mechanisms
Gladys Mbuthia*, Doris Machaki & Rachel W. Kimani
*Aga Khan University, Kenya

SHORT COMMUNICATION

Characteristics and Socio-Demographic Distribution of Precarious Employment Among Korean Wage Workers: A Proposition of Multidimensional Approach Using a Summative Score
Seong-Uk Baek*, Min-Seok Kim & Jong-Uk Won
*Yonsei University College of Medicine, Republic of Korea

Employment Factors Associated With Long Working Hours in France
Isabelle Niedhammer*, Elodie Pineau & Sandrine Bertrais
*INSERM, Univ Angers, France

Potential Work-related Exposure to SARS-CoV-2 by Standard Occupational Grouping Based on Pre-lockdown Working Conditions in France
Narges Ghoroubi*, Emilie Counil & Myriam Khlat
*Health and Epidemiology Research Unit, France

Volume 15, Issue 1 (March 2024)

REVIEW ARTICLE

Asbestos Exposure and Ovarian Cancer: A Meta-analysis
Seo Young Kim*, Ha Kyun Chang & Jun-Pyo Myong
*The Catholic University of Korea, Republic of Korea

RESEARCH ARTICLE

Assessing Neurobehavioral Alterations Among E-waste Recycling Workers in Hong Kong
Gengze Liao*, Feng Wang & Lap Ah Tse
*The Chinese University of Hong Kong, China

Investigation of Working Conditions and Health Status in Platform Workers in the Republic of Korea
Hyoungseob Yoo*, Munyoung Yang & Mo-Yeol Kang
*The Catholic University of Korea, Republic of Korea

Improving Remedial Measures from Incident Investigations: A Study Across Ghanaian Mines
Theophilus Joe-Asare* & Eric Stemn
*University of Mines and Technology, Ghana

Comparative Study of Exposure Assessment of Dust in Building Materials Enterprises Using ART and Monte Carlo
Wei Jiang*, Zonghao Wu & Haoguang Zhang
*School of Emergency Management and Safety Engineering, China

Development of Korean Representative Headforms for the Total Inward Leakage Testing on Filtering Facepiece Respirators
Ah Lam Lee*, Xin Cui & Heecheon You
*Kyungpook National University, Republic of Korea

https://www.sjweh.fi/index.php?page=issue

Volume 50, Issue 1
January 2024

Effects of the Labor Inspection Authority's regulatory tools on physician-certified sick leave and employee health in Norwegian home-care services – a cluster randomized controlled trial
Finnanger Garshol B*, Knardahl S & Johannessen HA
*National Institute of Occupational Health, Oslo, Norway

Parkinson's disease and occupational exposure to organic solvents in Finland: a nationwide case-control study
Sallmén M*, Burstyn I & Sainio M
*HUS Helsinki University Hospital, Finland

Volume 50, Issue 2
February 2024

EDITORIAL

What are the economic costs of a poor work environment?
Rugulies R* & Burdorf A
*University of Copenhagen, Denmark

DISCUSSION PAPER

Asbestos and disease – a public health success story?
Järvholm B* & Burdorf A
*Umeå University, Sweden

ORIGINAL ARTICLE

The labor market costs of work-related stress: A longitudinal study of 52 763 Danish employees using multi-state modeling
Pedersen J*, Graversen BK & Madsen IEH
*National Research Centre for the Working Environment, Denmark

Global-, regional- and country-level estimates of the work-related burden of diseases and accidents in 2019
Takala J*, Hämäläinen P & Neupane S
* Tampere University, Finland

The indispensable whole of work and population health: How the working life exposome can advance empirical research, policy, and action
Apostolopoulos Y*, Sönmez S & Gallos LK
* Partners in Prevention Inc, USA

Effect of retirement on self-rated oral health and dental services use: longitudinal fixed-effects instrumental variable study in 31 countries
Baumeister S-E*, Wesselmann H & Listl S
* University of Münster, Germany

Ground reaction force as a factor responsible for the topography of injuries in professional dance. An analysis of three dance styles: classical dance, modern dance, and folk dance
Gorwa J*, Nowakowska-Lipiec K & Michnik R; * Poznan University of Physical Education, Poland

Ethical value conflicts in healthcare and their effects on nurses' health, turnover intent, team effectiveness, and patient safety: a longitudinal questionnaire study
Larsman P*, Pousette A & Törner M
* University of Gothenburg, Sweden

SHORT COMMUNICATION

Impact of employment and income support interventions on the health of young adults with episodic disability: Findings from a systematic review
Jetha A*, Navaratnerajah L & Gignac MAM
* University Avenue, Canada

Volume 50, Issue 3
March 2024

EDITORIAL

Working hours and cardiovascular disease
Rugulies R*
* University of Copenhagen, Denmark

DISCUSSION PAPER

Successful prevention of organic solvent induced disorders: history and lessons
Albin M, Johanson G, Hogstedt C
*Karolinska Institutet, Sweden

ORIGINAL ARTICLE

Night shift work and cardiovascular diseases among employees in Germany: five-year follow-up of the Gutenberg Health Study
Jankowiak S*, Rossnagel K & Hegewald J
* Federal Institute for Occupational Safety and Health (BAuA), Germany

Validity of self-reported night shift work among women with and without breast cancer
Vestergaard JM* Haug JND & Kolstad HA
*Danish Ramazzini Centre, Denmark

Perceived work stressors and the transition to burnout among nurses in response to the pandemic: implications for healthcare organizations
Giusti EM*, Ferrario MM & Iacoviello L
*University of Insubria, Italy

Education and pandemic SARS-CoV-2 infections in the German working population – the mediating role of working from home
Wachtler B*, Beese F & Hoebel J
*Robert Koch Institute, Germany

Respirable crystalline silica and lung cancer in community-based studies: impact of job-exposure matrix specifications on exposure–response relationships
Ohlander J*, Kromhout H & Peters S

*Utrecht University, the Netherlands

Effects of a participatory work stress prevention approach for employees in primary education: results of a quasi-experimental study
Bakhuys Roozeboom MC*, Wiezer NM & Boot CRL
*Unit Healthy Living & Work, Netherlands

Effectiveness of a Goldilocks Work intervention in childcare workers – A cluster-randomized controlled trial
Schmidt KG*, Lerche AF & Holtermann A
*The National Research Centre for the Working Environment, Denmark

The adequacy of workplace accommodation and the incidence of permanent employment separations after a disabling work injury or illness
Mustard CA*, Orchard C & Smith PM
*Institute for Work & Health, Canada

Change in employment status and its causal effect on suicidal ideation and depressive symptoms: A marginal structural model with machine learning algorithms
Yoon J*, Kim J-H, Chung Y & Kim S-S
*Seoul National University, Republic of Korea

Volume 50, Issue 4
April 2024

EDITORIAL

Working hours and cardiovascular disease
Rugulies R*
*University of Copenhagen, Denmark

DISCUSSION PAPER

Successful prevention of organic solvent induced disorders: history and lessons
Albin M, Johanson G, Hogstedt C
*Institute of Environmental Medicine, Sweden

ORIGINAL ARTICLE

Night shift work and cardiovascular diseases among employees in Germany: five-year follow-up of the Gutenberg Health Study
Jankowiak S*, Rossnagel K & Hegewald J
*Division Work and Health, Germany

Validity of self-reported night shift work among women with and without breast cancer
Vestergaard JM*, Haug JND & Kolstad HA
* Aarhus University Hospital, Aarhus, Denmark

Perceived work stressors and the transition to burnout among nurses in response to the pandemic: implications for healthcare organizations
Giusti EM*, Ferrario MM & Iacoviello L
*University of Insubria, Italy

Education and pandemic SARS-CoV-2 infections in the German working population – the mediating role of working from home
Wachtler B*, Beese F & Hoebel J
*Robert Koch Institute, Germany.

Respirable crystalline silica and lung cancer in community-based studies: impact of job-exposure matrix specifications on exposure–response relationships
Ohlander J*, Kromhout H & Peters S
*Utrecht University, the Netherlands.

Effects of a participatory work stress prevention approach for employees in primary education: results of a quasi-experimental study
Bakhuys Roozeboom MC*, Wiezer NM & Boot CRL
*Unit Healthy Living & Work, Netherlands

Effectiveness of a Goldilocks Work intervention in childcare workers – A cluster-randomized controlled trial
Schmidt KG*, Lerche AF & Holtermann A
*The National Research Centre for the Working Environment, Denmark

The adequacy of workplace accommodation and the incidence of permanent employment separations after a disabling work injury or illness
Mustard CA*, Orchard C & Smith PM
*Institute for Work & Health, Canada

Change in employment status and its causal effect on suicidal ideation and depressive symptoms: A marginal structural model with machine learning algorithms
Yoon J*, Kim J-H & Kim S-S
*Seoul National University, Republic of Korea.

Volume 50, Issue 5
May 2024

EDITORIAL

Climate emergency and decent work
Benavides FG*, Delclos GL
*Work Ability and Work Careers, Finland

DISCUSSION PAPER

Working hours and health – key research topics in the past and future
Härmä M*, Kecklund G & Tucker P
*Work Ability and Work Careers, Finland

REVIEW

Hip osteoarthritis and occupational mechanical exposures: a systematic review and meta-analysis
Jahn A*, Andersen JH & Dalbøge A
*Aarhus University Hospital, Denmark

ORIGINAL ARTICLE

Relationship between long working hours and smoking behaviors: Evidence from population-based cohort studies in Korea
Baek S-U*, Lim M-H & Yoon J-H
*Yonsei University Health System, Seoul

Can psychosocial risk factors mediate the association between precarious employment and mental health problems in Sweden? Results from a register-based study
Méndez-Rivero F*, Matilla-Santander N & Almroth M
*Universitat Pompeu Fabra, Spain

Does country of resettlement influence the risk of labor market marginalization among refugees? A cohort study in Sweden and Norway
Amin R*, Mittendorfer-Rutz E & Hasting RL
*Division of Insurance Medicine, Stockholm, Sweden.

Associations between precarious employment trajectories and mental health among older workers in Germany: Vertical and horizontal inequalities
Rohrbacher M*, Hasselhorn HM & Matilla-Santander N
*University of Wuppertal, Germany

The role of working conditions in educational differences in all-cause and ischemic heart disease mortality among Swedish men
Almroth M, Hemmingsson T & Thern E
Karolinska Institutet, Sweden

https://mattiolihealth.com/la-medicina-del-lavoro/

Volume 115, Issue 1

REVIEWS, COMMENTARIES, PERSPECTIVES

ORIGINAL ARTICLES

Volume 115, Issue 2

Volume 115, Issue3

REVIEWS, COMMENTARIES, PERSPECTIVES

ORIGINAL ARTICLES

CASE REPORT