BANCA DATI BIBLIOGRAFICI SARS CoV-2

ANTICIPO AGGIORNAMENTO PER OPERATORI SANITA'

Il comitato scientifico di SIML nella sua riunione del 30 ottobre 2020 ha deciso di anticipare la parte dell'aggiornamento della banca bibliografica SARS CoV-2, previsto per il dicembre prossimo venturo, relativamente alle problematiche più direttamente riguardanti gli operatori della sanità. Ad essa alleghiamo anche l'ultimo documento sul tema prodotto da WHO, con importanti indicazioni in merito alla prevenzione, identificazione e gestione di infezioni da SARS-CoV-2 in questa popolazione lavorativa.

Riteniamo infatti che, a fronte dell'aggravarsi della situazione pandemica, un costante e rapido aggiornamento delle principali evidenze scientifiche sull'argomento possa rappresentare un contributo importante di SIML ai propri soci.

Metodologia di Ricerca

È stato condotto un aggiornamento della letteratura in merito all'incidenza e gestione delle infezioni di SARS-COV-2 su personale medico sanitario sui lavori pubblicati nel periodo giugno-novembre 2020.

Visto l'enorme mole di articoli scientifici sull'argomento "COVID-19", è stata messa a punto una stringa di ricerca al fine di selezionare quelli che hanno come *topic* la popolazione di lavoratori del settore medico/sanitario.

Al fine di interrogare le banche dati disponibili è stata utilizzata la stringa di ricerca: " (COVID-19 OR SARS-COV-2 OR COVID) AND (occupational health OR healthcare workers OR protecting health-care workers OR prevention OR diagnostic protocol)" e applicato un filtro per la specifica selezione di riviste di Medicina del Lavoro (Ann Occup Environ Med, Int J Occup Med Environ Health, Occup Environ Med, J Occup Health, Occup Med, J Occup Environ Hyg, Ann Occup Hyg, J Occup Environ Med, J Occup Environ Health, Arch Environ Health, Arch Environ Occup Health) e su riviste generali ad alto impact factor (Lancet, Nature, Science, Jama, N Engl J Med, Br Med J). Questa prima ricerca ha prodotto circa 200 voci bibliografiche e fra queste 44 pertinenti con la *query* di ingresso.

Una seconda ricerca è stata fatta sull'intero panorama della letteratura scientifica internazionale utilizzando la medesima stringa e applicando un filtro per la selezione di sole *Review*, metanalisi e revisioni sistematiche, su 628 voci bibliografiche sono stati selezionati 19 lavori ritenuti pertinenti.

Di seguito sono riportati gli abstract dei lavori ritenuti di interesse, per i lavori sprovvisti di abstract è disponibile il link per accedere al testo integrale del lavoro ed a seguire quelli comunque selezionati con link per testo quando possibile.

ARTICOLI SELEZIONATI ED IN EVIDENZA

1. Van Loon N, Verbrugghe M, Cartuyvels R, Ramaekers D.

Diagnosis of COVID-19 Based on Symptomatic Analysis of Hospital Healthcare Workers in Belgium.

Observational study in a large Belgian tertiary care center during early COVID-19 outbreak.

[Diagnosi di COVID-19 basata sull'analisi sintomatica degli operatori sanitari ospedalieri in Belgio.

Studio osservazionale in un grande centro di assistenza terziaria belga durante le prime fasi dell'epidemia di COVID-19.**]**

J Occup Environ Med. 2020 Aug 26. doi: 10.1097/JOM.0000000000002015.

Full Text:

https://journals.lww.com/joem/Abstract/9000/Diagnosis_of_COVID_19_Based_on_Symptomatic.98097.aspx

OBIETTIVO: identificare i primi sintomi dell'infezione con SARS-CoV-2 in modo da consentire una rapida valutazione tra gli operatori sanitari di un grande ospedale belga.

METODI: Operatori sanitari con sintomi lievi da infezione acuta del tratto respiratorio sono stati sistematicamente valutati per caratteristiche cliniche compatibili con COVID-19. È stato prelevato un tampone rinofaringeo e analizzato tramite real-time RT-PCR.

RISULTATI: Il 50% dei 373 lavoratori è risultato positivo al COVID-19. I sintomi tosse (82%), mal di testa (78%), mialgia (70%), perdita dell'olfatto o del gusto (40%) e febbre ≥37,5°C (76%) erano significativamente più alte tra il personale risultato positivo al test.

CONCLUSIONE: Sebbene ogni sintomo contribuisca alla valutazione clinica di una possibile infezione, la combinazione dei sintomi di COVID-19 può portare ad una rapida valutazione diagnostica della malattia in contesti ad alta prevalenza. Il controllo precoce della trasmissione è di fondamentale importanza per il contenimento dell'epidemia.

2. Bielicki JA, Duval X, Gobat N, Goossens H, Koopmans M, Tacconelli E, van der Werf S.
Monitoring approaches for health-care workers during the COVID-19 pandemic. [Approcci di monitoraggio per gli operatori sanitari durante la pandemia di COVID-19.]
Lancet Infect Dis. 2020 Oct;20(10):e261-e267. doi: 10.1016/S1473-3099(20)30458-8.
Full Text: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7377794/pdf/main.pdf

Gli operatori sanitari sono fondamentali per qualsiasi sistema sanitario. Durante la pandemia COVID-19 in corso, questi lavoratori corrono un rischio sostanzialmente maggiore di contrarre l'infezione da SARS-CoV-2 e potrebbero subire danni considerevoli. A seconda della fase della pandemia, i pazienti con COVID-19 potrebbero non essere la principale fonte di infezione da SARS-CoV-2 e gli operatori sanitari potrebbero essere esposti a pazienti atipici, familiari, contatti e colleghi infetti o vivere in comunità con trasmissione attiva. Strategie chiare per sostenere e gestire adeguatamente gli operatori sanitari esposti ed infetti sono necessarie per garantire una gestione efficace del personale e per creare fiducia nel luogo di lavoro. Queste strategie di gestione dovrebbero concentrarsi sulla stratificazione del rischio, sull'adeguato monitoraggio clinico, sull'accesso prioritario alla diagnostica e sul processo decisionale circa allontanamento da e rientro al lavoro. I decisori politici devono sostenere le strutture sanitarie nell'interpretazione delle indicazioni durante una pandemia che sarà probabilmente caratterizzata da un'incidenza locale di infezione da SARS-CoV-2 fluttuante al fine di mitigare l'impatto di questa pandemia sulla loro forza lavoro.

3. Pallett SJC, Rayment M, Patel A, Fitzgerald-Smith SAM, Denny SJ, Charani E, Mai AL, Gilmour KC, Hatcher J, Scott C, Randell P, Mughal N, Jones R, Moore LSP, Davies GW**.**

Point-of-care serological assays for delayed SARS-CoV-2 case identification among health-care workers in the UK: a prospective multicentre cohort study.

[Saggi sierologici *point-of-care* (saggio presso il punto di assistenza o cura) per l'identificazione dei casi di SARS-CoV-2 tra gli operatori sanitari nel Regno Unito: uno studio di coorte multicentrico prospettico.]

Lancet Respir Med. 2020 Sep;8(9):885-894. doi: 10.1016/S2213-2600(20)30315-5.

Full Text: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7380925/pdf/main.pdf

INTRODUZIONE: Gli operatori sanitari costituiscono una popolazione ad alto rischio per l'acquisizione di infezione da SARS-CoV-2. La capacità di effettuare diagnosi tramite test PCR per gli individui con infezione da SARS-CoV-2 da lieve a moderata è stata limitata nella fase iniziale della pandemia COVID-19 e una parte sostanziale degli operatori sanitari con sospetta infezione non è stata sottoposta a test. Il nostro obiettivo era quello di indagare le prestazioni dei test sierologici *point-of-care* e di laboratorio e la loro utilità nell'identificazione tardiva dei casi e di stimare la sieroprevalenza di SARS-CoV-2. METODI: Abbiamo condotto uno studio di coorte prospettico multicentrico tra l'8 aprile e il 12 giugno 2020, in due fasi. Gli operatori sanitari sintomatici con sintomi da lievi a moderati sono stati inclusi nello studio 14 giorni dopo l'insorgenza dei sintomi di COVID-19, secondo la definizione di caso fornita da Public Health England (PHE). Gli operatori sanitari sono stati reclutati nella coorte di asintomatici se non avevano sviluppato sintomi COVID-19 secondo la definizione di PHE dal 1° dicembre 2019. Nella fase 1, due saggi sierologici a flusso laterale, Onsite CTK Biotech COVID-19 split IgG/IgM Rapid Test (CTK Bitotech, Poway, CA, USA) e Encode SARS-CoV-2 split IgM/IgG One Step Rapid Test Device (Zhuhai Encode Medical Engineering, Zhuhai, Cina), sono stati valutati per le prestazioni comparati a un test immunologico di laboratorio (EDI Novel Coronavirus COVID-19 IgG ELISA kit [Epitope Diagnostics, San Diego, CA, USA]) in 300 campioni di operatori sanitari e 100 campioni di controllo negativo pre-COVID-19. Nella fase 2 (n=6440), la sierosorveglianza è stata effettuata su 1299 (93,4%) di 1391 operatori sanitari che hanno riportato sintomi, e in un sottoinsieme di operatori sanitari asintomatici (405 [8,0%] di 5049).

RISULTATI: È stata riscontrata una variazione nelle prestazioni tra i saggi sierologici a flusso laterale; tuttavia, il test Encode ha mostrato una ragionevole sensibilità IgG (127 su 136; 93,4% [95% CI 87,8-96,9]) e specificità (99 su 100; 99,0% [94,6-100,0]) tra i casi confermati dalla PCR e un buon accordo (282 su 300; 94,0% [91,3-96,7]) con il test sierologico di laboratorio. Al contrario, il saggio Onsite aveva ridotta sensibilità (120 su 136; 88,2% [95% CI 81,6-93,1]) e specificità (94 su 100; 94,0% [87,4-97,8]) e

concordanza (254 su 300; 84,7% [80,6-88,7]). Cinque (7%) di 70 casi positivi alla PCR sono risultati negativi in tutti i saggi. Cambiamenti tardivi nelle bande di test sierologici a flusso laterale sono stati registrati in 74 (9,3%) di 800 cassette (35 [8,8%] di 400 test Encode; 39 [9,8%] di 400 test Onsite), ma solo sette (tutti test Onsite) di questi cambiamenti sono risultati concordanti con il test immunologico di laboratorio. Nella fase 2, la sieroprevalenza nella forza lavoro è stata stimata pari al 10,6% (95% CI 7,6-13,6) negli operatori sanitari asintomatici e al 44,7% (42,0-47,4) negli operatori sanitari sintomatici. La sieroprevalenza nell'intera forza lavoro è stata stimata al 18,0% (95% CI 17,0-18,9). INTERPRETAZIONE: Sebbene sia stato osservato un buon valore predittivo positivo sia con i saggi sierologici a flusso laterale sia con l'ELISA, questo accordo si è verificato solo se la probabilità pre-test era modificata da una rigorosa definizione del caso clinico. Lo sviluppo tardivo delle bande nei saggi sierologici a flusso laterale precluderebbe le strategie postali e potenzialmente i test a domicilio. L'identificazione di risultati falsi negativi tra gli operatori sanitari in tutti i saggi suggerisce cautela nell'interpretazione dei risultati delle IgG in questa fase; al momento attuale sembrerebbe opportuno condurre questi test in contesto sanitario.

4. Arons MM, Hatfield KM, Reddy SC, Kimball A, James A, Jacobs JR, Taylor J, Spicer K, Bardossy AC, Oakley LP, Tanwar S, Dyal JW, Harney J, Chisty Z, Bell JM, Methner M, Paul P, Carlson CM, McLaughlin HP, Thornburg N, Tong S, Tamin A, Tao Y, Uehara A, Harcourt J, Clark S, Brostrom-Smith C, Page LC, Kay M, Lewis J, Montgomery P, Stone ND, Clark TA, Honein MA, Duchin JS, Jernigan JA for the Public Health – Seattle e King County and CDC COVID-19 Investigation Team. **Presymptomatic SARS-CoV-2 Infections and Transmission in a Skilled Nursing Facility. [Infezioni e trasmissione presintomatiche di SARS-CoV-2 in una residenza sanitaria assistenziale specializzata.**]
N Engl J Med. 2020 May 28;382(22):2081-2090. doi: 10.1056/NEJMoa2008457. Epub 2020 Apr 24. PMID: 32329971; PMCID: PMC7200056
Full Text: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7200056/pdf/NEJMoa2008457.pdf

INTRODUZIONE: L'infezione da SARS-CoV-2 può diffondersi rapidamente all'interno di residenza sanitaria assistenziale specializzata. Dopo l'identificazione di un caso di COVID-19 in una struttura assistenziale, abbiamo valutato la trasmissione e l'adeguatezza dello screening basato sui sintomi finalizzato ad identificare le infezioni nei residenti.

METODI: Abbiamo condotto due indagini seriali di prevalenza-puntuale, a distanza di 1 settimana l'una dall'altra, in cui i residenti della struttura che hanno fornito assenso sono stati sottoposti a test rinofaringei e orofaringei per la SARS-CoV-2, inclusa rRT-PCR, la coltura virale e il sequenziamento. I sintomi presenti durante i 14 giorni precedenti sono stati raccolti. I residenti asintomatici che sono risultati positivi sono stati rivalutati 7 giorni dopo. I residenti con infezione da SARS-CoV-2 sono stati classificati come sintomatici con sintomi tipici (febbre, tosse, o mancanza di respiro), sintomatici con sintomi solo atipici, presintomatici, o asintomatici.

RISULTATI Ventitre giorni dopo il primo test positivo di un residente in questa struttura di assistenza infermieristica specializzata, 57 di 89 residenti (64%) sono risultati positivi per SARS-CoV-2. Su 76 residenti che hanno partecipato a indagini di prevalenza puntuale, 48 (63%) sono risultati positivi. Di questi 48 residenti, 27 (56%) erano asintomatici al momento del test; 24 hanno successivamente sviluppato sintomi (tempo mediano di insorgenza, 4 giorni). I campioni di questi 24 residenti presintomatici avevano un valore di soglia mediano dei cicli di amplificazione rRT-PCR di 23,1 e il virus vitale è stato recuperato da 17 residenti. Al 3 aprile, dei 57 residenti con infezione da SARS-CoV-2, 11 erano stati ricoverati in ospedale (3 in terapia intensiva) e 15 erano morti (mortalità, 26%). Dei 34 residenti i cui campioni sono stati sequenziati, 27 (79%) avevano sequenze che si inserivano in due cluster con una differenza di un nucleotide.

CONCLUSIONE: È stata dimostrata una trasmissione rapida e diffusa di SARS-CoV-2 in questa struttura assistenziale. Più della metà dei residenti con risultati positivi erano asintomatici al momento del test e molto probabilmente hanno contribuito alla trasmissione. Le strategie di controllo dell'infezione focalizzate esclusivamente sui residenti sintomatici non sono state sufficienti a prevenire la trasmissione dopo l'introduzione della SARS-CoV-2 in questa struttura

5. Chou R, Dana T, Buckley DI, Selph S, Fu R, Totten AM.

Epidemiology of and Risk Factors for Coronavirus Infection in Health Care Workers. A Living Rapid Review.

[Epidemiologia e fattori di rischio per l'infezione da Coronavirus negli operatori sanitari. Una revisione rapida.]

Ann Intern Med. 2020 Jul 21;173(2):120-136. doi: 10.7326/M20-1632. Epub 2020 May 5. PMID: 32369541; PMCID: PMC7240841

Full Text: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7240841/pdf/aim-olf-M201632.pdf

INTRODUZIONE: Gli operatori sanitari sono a rischio di infezione da SARS-CoV-2.

SCOPO: esaminare l'incidenza di SARS-CoV-2, SARS-CoV-1 e MERS-CoV su operatori sanitari e relativi fattori di rischio per l'infezione, attraverso una *rapid and living review* della letteratura.

FONTI DEI DATI: *database* elettronici, incluso il *database* dell'OMS di pubblicazioni sulla malattia da coronavirus e sull'archivio di *pre-print* medRxiv (dal 2003 fino al 27 marzo 2020, e revisione fino al 24 aprile 2020) e relativi elenchi di riferimento.

SELEZIONE DEGLI STUDI: Sono stati selezionati studi pubblicati senza filtro linguistico che riportano l'incidenza di infezione o esiti associati ad infezioni da coronavirus negli operatori sanitari e studi sull'associazione tra fattori di rischio (caratteristiche demografiche, ruolo, esposizioni, fattori ambientali e amministrativi e utilizzo di dispositivi di protezione individuale [DPI]) e infezioni nel personale sanitario.

ESTRAZIONE DEI DATI: Un revisore ha effettuato l'estrazione dei dati e la valutazione dei limiti metodologici, un secondo revisore ha effettuato la verifica.

SINTESI DEI DATI: 64 studi hanno soddisfatto i criteri di inclusione; 43 studi hanno esaminato l'incidenza di infezioni nel personale sanitario (15 su SARS-CoV-2) e 34 studi hanno valutato i fattori di rischio (3 su SARS-CoV-2). Gli operatori sanitari rappresentano una percentuale significativa di infezioni da coronavirus e possono avere un'incidenza di infezioni particolarmente elevata in seguito a esposizioni non protette. La gravità della malattia era inferiore rispetto a individui non-sanitari.

La depressione, l'ansia e il disagio psicologico sono fattori comuni negli operatori sanitari durante l'epidemia di COVID-19.

L'evidenza di maggiore forza sui fattori di rischio era tra l'utilizzo di DPI e la riduzione del rischio di infezione. L'associazione era più coerente per mascherine ma è stato osservato anche per guanti, camici, protezione per gli occhi e lavaggio delle mani; le evidenze suggerivano una relazione dose-risposta. Nessuno studio ha valutato il riutilizzo dei DPI.

Alcune esposizioni (come partecipazione nelle operazioni di intubazione, contatto diretto con il paziente, o contatto con le secrezioni corporee) sono stati associati a un aumento del rischio di infezione. La formazione sul controllo delle infezioni è stata associata a una riduzione del rischio.
LIMITI: Gli studi sui fattori di rischio per SARS-CoV-2 sono pochi, con limiti metodologici, e sono stati usati metodi di revisione rapida.
CONCLUSIONE: Gli operatori sanitari hanno mostrato incidenze significative di infezioni da coronavirus, incluso SARS-CoV-2. L'uso di DPI e un programma di formazione sul controllo delle infezioni sono associati a un ridotto rischio di infezione, e alcune esposizioni sono associate ad un rischio maggiore.

6. Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsi E, Katsaounou P.

Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis.

[Prevalenza di depressione, ansia e insonnia tra gli operatori sanitari durante la pandemia COVID-19: una revisione sistematica e una meta-analisi.]

Brain Behav Immun. 2020 Aug;88:901-907. doi: 10.1016/j.bbi.2020.05.026. Epub 2020 May 8. PMID: 32437915; PMCID: PMC7206431

Full Text: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7206431/pdf/main.pdf

INTRODUZIONE: La pandemia COVID-19 può potenzialmente influenzare in modo significativo la salute mentale degli operatori sanitari, che sono in prima linea in questa crisi. È quindi una priorità immediata monitorare i tassi di disturbi dell'umore, del sonno e di altri problemi di salute mentale al fine di comprendere i fattori mediatori e programmare interventi su misura. Lo scopo di questa revisione è quello di sintetizzare e analizzare le evidenze esistenti sulla prevalenza di depressione, ansia e insonnia tra gli operatori sanitari durante l'epidemia di COVID-19.

METODI: È stata condotta una revisione sistematica della letteratura fino al 17 aprile 2020. Due revisori hanno valutato in modo indipendente gli articoli a testo integrale secondo criteri predefiniti. Il rischio di *bias* per ogni singolo studio è stato valutato e i dati sono stati aggregati tramite meta-analisi ad effetti casuali per stimare la prevalenza di specifici problemi di salute mentale. Il protocollo di revisione è registrato in PROSPERO ed è disponibile online.

RISULTATI: Tredici studi sono stati inclusi nell'analisi con un totale di 33.062 partecipanti. L'ansia è stata valutata in 12 studi, con una prevalenza combinata del 23,2% e la depressione in 10 studi, con una prevalenza del 22,8%. Un'analisi di sottogruppo ha rivelato differenze di genere e professionali, con operatori di genere femminile e il personale infermieristico che hanno dimostrato prevalenze più elevate di sintomi affettivi rispetto al genere maschile e il personale medico, rispettivamente. Infine, la prevalenza dell'insonnia è stata stimata al 38,9% in 5 studi.

INTERPRETAZIONE: Le prime evidenze indicano che una parte considerevole degli operatori sanitari soffre di disturbi dell'umore e del sonno durante questa epidemia, sottolineando la necessità di stabilire modalità per mitigare i rischi per la salute mentale e adattare gli interventi nelle condizioni pandemiche.

7. Gómez-Ochoa SA, Franco OH, Rojas LZ, Raguindin PF, Roa-Díaz ZM, Wyssmann BM, Guevara SLR, Echeverría LE, Glisic M, Muka T.

COVID-19 in Healthcare Workers: A Living Systematic Review and Meta-analysis of Prevalence, Risk Factors, Clinical Characteristics, and Outcomes.

[COVID-19 negli operatori sanitari: una revisione sistematica vivente e meta-analisi della prevalenza, dei fattori di rischio, delle caratteristiche cliniche e degli esiti.]

Am J Epidemiol. 2020 Sep 1:kwaa191. doi:.1093/aje/kwaa191.

Full Text: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7499478/pdf/kwaa191.pdf

Gli operatori sanitari sono in prima linea nella risposta alla nuova malattia da coronavirus 2019 (COVID-19), essendo a più alto rischio di contrarre la malattia e, di conseguenza, di esporre pazienti e colleghi. Sono state effettuate ricerche in otto database bibliografici per esaminare sistematicamente le evidenze sulla prevalenza, i fattori di rischio, le caratteristiche cliniche e la prognosi dell'infezione da SARS-CoV-2 tra gli operatori sanitari. Novantasette studi (tutti pubblicati nel 2020), con 230.398 operatori sanitari, hanno soddisfatto i criteri di inclusione. Dallo screening degli operatori tramite RT-PCR e dalla presenza di anticorpi, la prevalenza stimata dell'infezione da SARS-CoV-2 è stata rispettivamente dell'11% (95%CI; 7%-15%) e del 7% (95% CI; 4%-11%). Il personale più frequentemente colpito è stato il personale infermieristico (48%. 95%CI; 41%-56%), mentre la maggior parte del personale medico positivo al COVID-19 lavorava in reparti di degenza ordinaria/non emergenza (43%, 95%CI; 28%-59%). Anosmia, febbre e mialgia sono stati identificati come gli unici sintomi associati alla positività al SARS-CoV-2. Tra gli operatori positivi al RT-PCR, il 40% (95%CI; 17%-65%) non ha mostrato sintomi al momento della diagnosi. Infine, il 5% (95%CI;3%-8%) del personale con COVID-19 ha sviluppato gravi complicazioni cliniche, e lo 0,5% (95% CI; 0,02%-1,3%) è deceduto. Il personale sanitario subisce un importante carico patologico a causa del COVID-19, con il personale operante nei reparti di ospedalizzazione/non di emergenza e gli infermieri maggiormente infetti.

8. Shah ASV, Wood R, Gribben C, Caldwell D, Bishop J, Weir A, Kennedy S, Reid M, Smith-Palmer A, Goldberg D, McMenamin J, Fischbacher C, Robertson C, Hutchinson S, McKeigue P, Colhoun H, McAllister DA.

Risk of hospital admission with coronavirus disease 2019 in healthcare workers and their households: nationwide linkage cohort study.

[Rischio di ricovero ospedaliero con COVID-19 negli operatori sanitari e nelle loro famiglie: studio di coorte di collegamento a livello nazionale.]

BMJ. 2020 Oct 28;371:m3582. doi: 10.1136/bmj.m3582.

Full text: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7591828/pdf/bmj.m3582.pdf

OBIETTIVO: Valutare il rischio di ricovero in ospedale per la malattia da coronavirus 2019 (COVID-19) tra gli operatori sanitari prestanti assistenza diretta a pazienti e non, e i loro familiari.

DESIGN: Studio di coorte di collegamento a livello nazionale.

SETTING: Scozia, Regno Unito, dal 1° marzo al 6 giugno 2020.

PARTECIPANTI: Operatori sanitari di età compresa tra i 18 e i 65 anni, le loro famiglie e altri membri della popolazione in generale.

PRINCIPALE ESITO DELLO STUDIO: Ricovero in ospedale con covid-19.

RISULTATI: La coorte comprendeva 158 445 operatori sanitari, la maggior parte dei quali (90 733; 57,3%) prestante assistenza diretta a pazienti, e 229 905 familiari. Di tutti i ricoveri ospedalieri per COVID-19 nella popolazione in età lavorativa (18-65 anni), il 17,2% (360/2097) era costituito da operatori sanitari o dai loro familiari. Dopo la correzione per età, sesso, etnia, condizione socioeconomica e comorbilità, il rischio di ricovero dovuto al COVID-19 negli operatori sanitari senza contatto diretto con pazienti e nelle loro famiglie era simile al rischio nella popolazione generale (Hazard Ratio 0,81 (IC del 95% da 0,52 a 1,26) e 0,86 (da 0,49 a 1,51), rispettivamente). Nei modelli corretti per le stesse covariate, tuttavia, gli operatori sanitari che si trovano ad assistere i pazienti, rispetto a quelli non direttamente a contatto, sono più a rischio (HR 3,30, 2,13 a 5,13), così come i loro familiari (1,79, 1,10 a 2,91). Dopo la suddivisione del personale sanitario assistente pazienti in personale "all'accesso", in terapia intensiva e in ambienti non di terapia intensiva ma dove si eseguono procedure generanti aerosol e in altri ambienti, quelli che lavoravano all'accesso erano più a rischio (HR 2,09, 1,49 a 2,94). Per la maggior parte del personale assistente pazienti e i loro familiari, il rischio assoluto stimato di ricovero ospedaliero con COVID-19 era inferiore allo 0,5%, ma era dell'1% e oltre negli uomini più anziani con comorbosità.

CONCLUSIONI: Gli operatori sanitari e le loro famiglie hanno contribuito con un sesto dei casi di COVID-19 ricoverati in ospedale. Sebbene il rischio assoluto di ricovero fosse complessivamente basso, gli

operatori sanitari assistenti pazienti e i loro familiari avevano un rischio di ricovero per COVID-19 rispettivamente triplicato e raddoppiato.

9. Coggon D, Croft P, Cullinan P, Williams A.
Assessment of workers' personal vulnerability to covid-19 using 'covid-age'
[Valutazione della vulnerabilità dei lavoratori al covid-19 utilizzando 'covid-age'.]
Occup Med (Lond). 2020 Oct 27;70(7):461-464. doi: 10.1093/occmed/kqaa150.
Abstract non disponibile
Full Text
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Prevention, identification and management of health worker infection in the context of COVID-19

Interim guidance

30 October 2020

World Health Organization

Key points

- Health workers in contact with and/or who care for COVID-19 patients are at a higher risk of infection than the general population. Mitigating and reducing this risk is essential to protecting their well-being and reducing the spread of COVID-19.
- Available scientific evidence suggests that appropriate personal protective equipment use, hand hygiene best practices, implementation of universal masking policies in health care facilities and adequate infection prevention and control (IPC) training and education are associated with decreased risk of COVID-19 among health workers.
- The prevention of SARS-CoV-2 infections in health workers requires a multi-pronged integrated approach that includes occupational health and safety (OHS) measures as well as IPC. All health-care facilities should establish or strengthen and implement (a) IPC programmes and (b) Occupational Health and Safety programmes with protocols to ensure HW safety and prevent HW infections while in the work environment. Ensuring adequate clinical staffing levels is recommended to prevent the transmission of health care-associated infections.
- Early detection of SARS-CoV-2 infection among health workers can be achieved through syndromic surveillance and/or laboratory testing and is a key strategy to prevent secondary transmission from health workers to patients, between health workers throughout health-care settings and from health workers to contacts outside of health facilities. A national and/or local surveillance and testing strategy should be developed and implemented.
- A system for managing exposures based on risk assessment should be in place to promote and support health workers' reporting of occupational and non-occupational exposures to or symptoms of COVID-19.
- A system for managing suspected infections, including measures for health workers who test positive for SARS-CoV-2 and those who are symptomatic and test negative for SARS-CoV-2, should be in place.
- Clear criteria for returning to work should be established according to the WHO principles for discontinuing isolation for COVID-19.
- Health systems and facilities should maintain a blame-free culture with regards to COVID-19 infections in health workers.
- WHO has provided several tools for surveillance and studies to better understand the extent of infections and risk factors for SARS-CoV-2 infection among health workers.

Background

Health workers,[1] in particular those in contact with and/or who care for COVID-19 patients, are at higher risk of being infected with SARS-CoV-2 than the general population.(1,2) Data collected by the World Health Organization (WHO) global surveillance for COVID-19, primarily from European and American countries, estimate that approximately 14% of COVID-19 cases reported to WHO are among health workers. Transmission of the SARS-CoV-2 virus to health workers has been documented to occur in both acute care and long-term care settings; from patients and residents to health workers as well as among health workers, also potentially associated with exposures to infected co-workers in common areas and breakrooms.(3–7)

As the pandemic evolves, studies indicate that transmission involving health workers is also occurring in community settings (such as in households) in addition to health care settings.(6,8–12) COVID-19 infections among health workers may lead to a depleted workforce during a time when the demand on the health care system has increased. In addition, health workers who are infected are at risk of transmitting SARS-CoV-2 virus to others in households and other community settings. For more information on evidence of the epidemiology and risk factors of health worker infections see Box 1. An understanding of the transmission of SARS-CoV-2, as described in the WHO Transmission of SARS-CoV-2: implications for infection prevention precautions(1) a key element to implementing appropriate infection prevention measures.

[1] Health workers are defined by WHO as all people engaged in actions with the primary intent of enhancing health, including social care workers who often have roles in the provision of care in long-term care facilities and in community settings. (61)

This document offers guidance for the prevention, surveillance and testing of COVID-19 in health workers[1] including the management following exposure and eventual safe return to work of health workers who have had suspected or confirmed SARS-CoV-2 infections. In the WHO surveillance database, the term health worker includes physicians, nurses, allied health workers (x-ray, laboratory staff, physiotherapists etc.), and administrative and support staff, such as cleaning and laundry personnel, admission/reception clerks, patient transporters and catering staff.(13)

Prevention of infection in the workplace requires a multi-pronged, integrated approach that includes IPC and occupational health and safety (OHS) measures plus adherence to public health and social measures in the community. Syndromic surveillance is a process that is often used by public health surveillance systems for early outbreak detection and focuses on early symptom identification.(14) Since early in the COVID-19 pandemic, laboratories have been using nucleic acid amplification tests (NAATs), such as real time reverse transcription polymerase chain reaction (rRT-PCR) assays, to detect SARS-CoV-2, the virus that causes COVID-19 disease. Antigen-detecting tests (Ag-RDTs) are now entering the armamentarium of tools that can play a significant role in guiding patient management, public health decision making and surveillance of COVID-19.(15)

This guidance document complements the WHO Risk assessment questionnaire,(16) on management of health workers' infections in the context of COVID-19 and Coronavirus disease (COVID-19) outbreak: rights, roles and responsibilities of health workers, including key considerations for occupational safety and health: interim guidance.(17) This guidance is intended for both the national and facility levels, for public health authorities, health facility administrators, occupational health departments and infection prevention and control (IPC) departments or focal points[2] and may be adapted according to national and local contexts.

Rapid literature reviews were conducted to gather the evidence basis for the development of this document, in particular regarding epidemiology of and risk factors for SARS-CoV-2 infections among health workers and on effectiveness of active and passive syndromic surveillance and routine laboratory testing. This guidance document has been developed by consulting the WHO ad-hoc COVID-19 IPC Guidance Development Group (COVID-19 IPC GDG), as well as external experts and WHO staff with expertise in the field of occupational health and health work forces' rights and development. These groups reviewed the available evidence, considered various country experiences and formulated this consensus-based advice for syndromic surveillance and testing of health workers.

Box 1: Evidence on the epidemiology of and risk factors for health worker infection

Limited data are available globally and at country level about SARS-CoV-2 infection among health workers. WHO has recently produced a summary of health worker SARS-CoV-2 infections.(18) Briefly, WHO global surveillance for COVID-19, primarily in countries in the WHO European and American Regions, indicate that approximately 14% of COVID-19 cases reported to WHO are identified as occurring in health workers. Even among countries with >75% completion of variables for the data submitted related to health worker status, the proportions of health workers infected varied broadly, ranging from 2-35%. Timing of reporting, fluctuation of community transmission patterns and facility implementation of IPC measures had an impact on occurrence of health workers' infections. A recent report from the International Council of Nurses, who conducted a survey of 50 countries, mostly from the Europe and the Americas, found that health worker infections ranged from 1-32% of all confirmed COVID-19 cases.(19)

Limited availability of published data on health worker infections can be attributed in part to difficulties in distinguishing infection acquisition in community outbreaks from that in health-care settings and differences in data confidentiality aspects of health worker surveillance. In general, there are limitations to obtaining comprehensive data, such as high variability in the completeness of the information.

Studies cited in a living rapid review commissioned by WHO on the epidemiology and risk factors for COVID-19 and other coronaviruses (SARS-CoV-1 and MERS-CoV), in health workers,(3) found that estimates of SARS-CoV-2 infections among health workers vary significantly across studies. The incidence of SARS-CoV-2 infection (PCR-positive) ranged from 0.4% to 49.6%, and the prevalence of SARS-CoV-2 seropositivity ranged from 1.6% to 31.6%, depending on the study.

- Appropriate personal protective equipment use, hand hygiene best practices, implementation of universal masking policies in health-care facilities, and adequate infection prevention and control (IPC) training and education for all HWs are associated with decreased risk of infection in health workers.
- Available evidence does not find an association between age and sex or health worker role (e.g. nurse versus physician) and risk of SARS-CoV-2 infection.
- SARS-CoV-2 infections have been observed in various hospital departments and health workers performing in different roles, including those without direct patient contact.
- Certain exposures (e.g., performing intubations, direct patient contact, and contact with bodily secretions) and inconsistent/incomplete use of PPE are associated with increased risk of coronavirus infections in health workers.

Transmission of the SARS-CoV-2 virus to health workers has been documented in acute care and long-term care settings: from patients and residents to health workers from one health worker to another, including possible exposures in common areas and break rooms.(3–7) Seroprevalence and genomic studies have been and are currently being conducted among health workers.

[2] IPC focal point is defined as a professional appointed to be in charge of IPC at the national, sub-national or facility/organization level.(62)

Studies indicate that transmission involving health workers also occurs in community settings (such as households) in addition to health care settin2

gs.(6,8–12)

While appropriate use of PPE is one critical protective measure for health workers, strategies to mitigate harms associated with prolonged and reuse of PPE and other identified risk factors are described in the WHO interim guidance: Coronavirus disease (COVID-19) outbreak: rights, roles and responsibilities of health workers, including key considerations for occupational safety and health: interim guidance. (17)

Key principles for preventing infections in health workers

The prevention of SARS-CoV-2 infections in health workers requires a multi-pronged integrated approach of IPC and occupational health and safety (OHS) measures.(17,20)WHO recommends that all health care facilities should establish and implement IPC programmes and OHS programmes with protocols to ensure health worker safety and prevent infections with COVID-19 in the work environment.(20)

Studies report that health workers in areas impacted by COVID-19 experience high levels of depression, anxiety, and psychological distress.(21–23) Health worker shortages and long shifts without adequate rest periods and shortages of personal protective equipment are important determinants leading to fatigue, and inadequate adherence to infection prevention practices.(21,22) This has been highlighted by WHO in guidelines, in which adequate staffing levels and adequate IPC training are strongly recommended as a core components of effective IPC programmes to prevent health care-associated infections, including those spread through outbreaks.(20) Lack of adequate social health protection measures such as health monitoring, sick leave for quarantine and "stay home if unwell" policies for certain groups of health workers (e.g. self-employed private providers, community health workers and lay providers) has also been reported. Therefore, WHO has previously recommended the establishment of national IPC and OHS programmes at the national level and in all health care facilities.(24)

Below is a list of existing and new recommendations to prevent SARS-CoV-2 health worker infections.

1. Establish an infection prevention and control programme

The WHO Guidelines on core components of infection prevention and control programmes at national and acute health care facility levels (20) are the foundation of WHO strategies to prevent current and future threats from infection and antimicrobial resistance in health care. A facility level IPC programme with a dedicated and trained IPC team, or at minimum an IPC focal point, should be in place and supported by the national and facility senior management.(20) Ensuring adequate clinical staffing levels is recommended as a core component to prevent the transmission of health care-associated infections, in particular spread through outbreaks. Minimum requirements(25) have been identified to facilitate the step-wise implementation of the WHO core components for IPC programmes, in particular in countries where IPC is limited or non-existent.(25) Achieving the IPC minimum requirements and more robust and comprehensive IPC programmes according to all WHO IPC core components across the whole health system in all countries, is essential to sustaining efforts to control the COVID-19 pandemic and other emerging infectious diseases and prevent health care-associated infections and antimicrobial resistance.(20,25)

Long-term care services have been identified as high risk for transmission of COVID-19 between residents and staff.(7,26) WHO guidance specific to these settings has been developed: Preventing and managing COVID-19 across long-term care services; policy brief,(27) Preventing and managing COVID-19 across long-term care services web annex(28) and Infection prevention and control guidance for long-term care facilities in the context of COVID-19.(29) They should be utilized in addition to the above IPC documents.

Specific IPC measures, recommended by WHO, to reduce transmission of SARS-CoV-2 among health workers are described in a number of key IPC technical guidance documents,(2,29–33) and include the following:

- Ensure triage, early recognition, and source control (isolating suspected and confirmed COVID-19 cases including long-term care residents,
- Apply standard IPC precautions for all patients, with special attention to appropriate hand hygiene and environmental cleaning,
- Implement additional precautions (droplet and contact and, wherever applicable, for aerosol-generating procedures, airborne precautions) for suspected and confirmed cases of COVID-19 universal medical masking by health workers in health-care facilities, including in common areas where health workers interact,
- Implement administrative controls, such as IPC policies and procedures, including appropriate behaviours and compliance with key IPC measures in common areas,
- Use or introduce environmental and engineering controls such as appropriate ventilation.

2. Establish an occupational health and safety programme

All health services should have an occupational health and safety policy and programme including occupational health focal point or occupational health service; labour-management committee for health and safety; regular workplace risk assessment covering all hazards and the effectiveness of their controls; immunizations; blame-free reporting of accidental/unprotected exposures to pathogens and incidents; medical surveillance, education and training of workers; and hygiene measures.(34) Specific measures to protect health workers from occupational risks amplified by the COVID-19 pandemic are described in the WHO interim guidance "COVID-19: Occupational health and safety of health workers, right and responsibilities" (forthcoming)" and WHO/ILO "Occupational safety and health in public health emergencies: a manual for protecting health workers and responders".(35)

A key element for transmission prevention and control in health care settings is the application of engineering, environmental and administrative controls in addition to individual behaviours and PPE. In addition to the core elements of IPC and OHS programmes described above, the following measures should be included to prevent health worker infections:

- Regular assessment of risks and effectiveness of control measures, including compliance with IPC and safety protocols and occupational risk assessment,
- Education and training of all staff on IPC measures and occupational health and safety, including regular refresher training,
- Access to and appropriate use of supplies for IPC such as hand hygiene supplies and PPE (medical masks, respirators, eye protection, gloves, gowns), that should be available in sufficient quantity and size ranges, and meeting quality standards,
- Monitoring of IPC procedures and regular feedback to various audiences including clinical staff, supported by mentoring and supervision for practice; and reinforcement of skills to establish strong social norms related to IPC adherence,(36)
- Monitoring behavioural and social barriers and enablers for health worker adherence, such as perceptions about the value of procedures, confidence about following procedures and perceptions about available support, (36)
- Occupational health and safety policies and procedures including:
  - staff screening and testing, staff illness protocols and safe return-to-work polices
  - policies to allow staff to stay home if unwell, without loss of income
  - procedures for blame-free reporting and investigation of unprotected exposures and contacts with suspected or confirmed COVID-19 cases
  - management protocols to ensure sufficient staff; safe staff-to-patient ratios; appropriate shifts; rest periods in areas with adequate space and ventilation; and reminders to staff to continue adherence to IPC procedures
- Regular communication between staff and senior management, including staff participation in planning,
- Cooperation between employers and sub-contractors operating in the same health facility in developing and implementing safety protocols and protective measures.

Early detection of SARS-CoV-2 infections in health workers to prevent further transmission

Early detection of COVID-19 infection among health workers can be achieved through syndromic surveillance and/or laboratory testing and is a key strategy to prevent secondary transmission to patients, between health workers and throughout health-care settings.

Syndromic surveillance can be conducted using passive methods (e.g. relying on self-reporting of symptoms or illness by HWs) or active methods (e.g. that involves interviewing or assessing HWs to identify suspected cases of the disease under surveillance.(14,37)

Fever is a common symptom of COVID-19. A systematic review found that fever, myalgia or arthralgia, fatigue, and headache are common among COVID-19 patients.(38,39) Loss of taste (ageusia) and smell (anosmia), ocular pain, general malaise, and extreme tiredness have also been reported.(6,7) Some cases have not reported any symptoms.(40)

Limited available studies have found that PCR testing is more frequently positive among symptomatic health workers compared to those without symptoms (odds ratio ranging from 3.5-19.4).(12,41–44)The proportion of health workers who tested positive while asymptomatic has been found to range between 12- 23.1%.(11,26,41,43,44)

A small study from Scotland, United Kingdom, in which health workers who reported symptoms were promptly tested for COVID-19, rather than quarantined for up to 14 days, noted that testing may have saved the health system approximately 8573 lost workdays due to reduced staff absences.(45) A recent large multicenter study of long-term care facilities conducted in the United States of America found that 1.3 cases of COVID-19 were found in health workers for every 3 cases identified among residents. This finding is consistent with other studies conducted in long-term care settings that found cases of COVID-19 in health workers when a wide testing strategy for all health workers was implemented once a resident was identified as positive for COVID-19(7).

In general, while studies show that testing health workers on a regular schedule is likely to identify infection, clear intervals for routine testing or time points have not been identified.(46–49)

Based on available evidence, WHO advises the following:

1. Syndromic surveillance of health workers for COVID-19 symptoms should be performed before they enter the workplace. This should include:

- Passive surveillance: encourage health workers to report symptoms to the occupational health professional or another designated officer in the facility before their shift (including via routine digital reporting forms where available), and during or after their shift.
- Active surveillance: establish a confidential process for ensuring health workers are screened for symptoms of COVID-19, including fever, and any potential exposure risks on arrival for their shift.

Passive surveillance may be the only option when resources are limited, but active syndromic surveillance should be considered if human resources and logistics permit it. All efforts to institute active syndromic surveillance are recommended when there are clusters of transmission in the health facility or in the areas where the health facility is

located. If there is community transmission [3] , syndromic surveillance is critical.

Symptoms to be monitored for syndromic surveillance of health workers should include, at minimum: fever, dry cough, myalgia, arthralgia, fatigue, headache, shortness of breath, anosmia and ageusia. Staff with any of the above symptoms or who fail the screening process should contact their OHS for further instructions. Employment policies should be in place, such as sick leave and ability to stay home if unwell, that grant confidentiality and are non-punitive for health workers who become contacts[4], or infected with SARS-CoV-2.(17)

Table 1. Examples of syndromic surveillance approaches

COVID-19 Transmission scenario (50)	**Type of syndromic surveillance for health workers**	**Possible approach**
No cases or Sporadic cases	Implement passive syndromic surveillance	• Staff self-report to occupational health or other designated officer if they experience any symptoms including fever.
Clusters of cases	Implement passive syndromic surveillance, consider active surveillance if resources available	• Staff self-report to occupational health or other designated officer if they experience any symptoms including fever. • If resources are available, consider a process to actively monitor staff for symptoms including fever.
Community transmission	Implement active syndromic surveillance	• A process is put in place in which staff temperatures are monitored and staff are assessed actively (screened) for symptoms at the beginning of each shift at minimum.

2. National and sub-national testing strategies for health workers for detection of SARS-CoV-2 infections should be developed and implemented.

Adequate laboratory testing for SARS-CoV-2 infections is another element needed to more accurately identify SARS-CoV-2 transmission among health workers.(15,51) When considering a testing strategy, the following contextual factors should be taken into account: effectiveness of the facility's occupational health and IPC programmes (including protocols fully implemented by employers/management and demonstrated staff adherence to protocols), the local transmission scenario, available resources and infrastructures for testing, and the impact of COVID-19 on the health workforce (e.g. potential absences due to sick leave, self - isolation or quarantine). In settings with limited resources in areas of community transmission, WHO recommends that health workers be prioritized for testing, regardless of whether they are a contact of a confirmed case (to protect health workers and reduce the risk of nosocomial transmission).(52)

WHO provides recommendations for RT-PCR and antigen-based testing for the diagnosis of SARS CoV-2.(15,51)

The testing strategy should include:

a) Testing health workers following exposure to SARS-CoV-2

Health workers in a health-care facility who are contacts[4] of a suspected or confirmed case(53), as a result of an unprotected exposure at work or in the community, should consult the occupational health focal point to be assessed using the WHO risk assessment and management of exposure of health care workers tool.(16) WHO recommends that all contacts with high-risk exposure should be tested for SARS-CoV-2.

b) Routine testing of health workers for COVID-19 surveillance

The need for routine testing should be decided using a risk-based approach and the following factors should be taken into account:

- The intensity of transmission in the setting of the health facility(ies), for example in the presence of community transmission or intense outbreaks of COVID-19.
- The capacities of the facility and laboratories to conduct the testing including financial and human resources available, as well as availability of testing materials and laboratory capacity.
- The volume of patients identified as positive for SARS-CoV-2, admitted to the facility or being assessed by health workers.
- The positivity rate among staff.

[3] Community transmission is described as outbreaks with the inability to relate confirmed cases through chains of transmission for a large number of cases, or by increasing positive tests through sentinel samples(50)

[4] A contact is a person who has experienced any one of the following unprotected exposures during the 2 days before and the 14 days after the onset of symptoms of a probable or confirmed case: 1. face-to-face contact with a probable or confirmed case within 1 metre and for at least 15 minutes 2. direct physical contact with a probable or confirmed case 3. direct care for a patient with probable or confirmed COVID-19 disease without using recommended personal protective equipment OR 4. other situations as indicated by local risk assessments(53)

- The number of staff who are ill but not diagnosed with COVID-19 and in quarantine as contacts for COVID-19, leading to inability to provide adequate and safe staffing levels.

c) Testing health workers in long-term care facilities

Irrespective of the COVID-19 transmission scenario, health workers staffing or working with long- term care facilities should be considered for routine testing, and at a minimum be tested for COVID-19 as soon as a positive case of COVID-19 is identified in either residents or staff.

Table 2 provides some examples of scenarios for the application of a risk-based approach.

Table 2: Examples of scenarios and testing strategies for health workers

Health-care Setting	**Transmission scenario**(50)	**Possible testing strategy target to consider (where resources allow)**
Acute care	No cases or Sporadic cases	• Symptomatic health workers • Health worker identified as a contact of a SARS-CoV-2 case – Health workers associated with transmission to or from a patient or resident or with an outbreak investigation
	Clusters or Community transmission	• Symptomatic health workers • Health worker identified as a contact of a SARS-CoV-2 case – Health workers associated with transmission to or from a patient, a cluster, or with an outbreak investigation • Health workers working in any clinical area, identifying priority areas based on risk assessment (e.g. triage, emergency services or COVID-19 wards) where resources are limited • All health workers who work in COVID-19 services or facilities
Long-term care	All transmission scenarios	• Symptomatic health workers • Health workers identified as a contact of a SARS-CoV-2 case • Testing of all health workers when a positive case of SARS-CoV-2 is identified in a resident or staff member • Routine testing of health workers, if feasible

The frequency of health worker testing will depend on the level of transmission within a facility and surrounding areas, objective(s) of the testing strategy (i.e. surveillance versus outbreak control), capacity of the facility and relevant laboratories to conduct the testing and national and local guidance. During an outbreak of COVID-19, testing should be conducted regularly (e.g. weekly, if resources allow) until there are no cases of COVID-19 in health workers or residents in the facility.(7,26,48)

Managing health worker exposures, infections and safe return to work

A blame-free system for managing health worker exposures to COVID-19 should be in place to promote and support reporting of exposures or symptoms. Organizations providing health care should have paid sick leave policies for health workers that are non-punitive, not associated with any financial disincentives, confidential, flexible and consistent with public health guidance. OHS focal points should keep confidential records of health workers who are exposed to COVID-19 and monitor those who develop or report symptoms or test positive.

A key element for developing policies for managing health worker exposures, infections and the safe return to work is available evidence about the duration of viral shedding among COVID-19 patients and in particular the timeframe within which replication-competent virus can be isolated. The WHO scientific brief Criteria for releasing COVID-19 patients from isolation(54) provides an overview of the evidence.

Accordingly, the following guidance is based on several studies showing that in patients with mild to moderate COVID-19, replication-competent virus has not been recovered after 10 days following symptom onset.

WHO provides the following advice:

1. Health workers should be encouraged to report both occupational and non-occupational exposures to COVID-19.

If a health worker reports an unprotected exposure to COVID-19, fails syndromic screening on arrival or develops symptoms during their shift, clear policies and procedures should be in place outlining the steps that should be taken, which include:

- Instructions for the health worker to immediately stop working, put on a medical mask if not already wearing one, report to their OHS officer and self-isolate.
- OHS should meet with the health worker to conduct an assessment and exposure history where resources permit, or ask the health worker to complete and submit the form for the WHO Risk assessment and management of exposure of health care workers in the context of COVID-19.

- OHS should identify a risk categorization based on the risk assessment tool for a health worker who has had an unprotected exposure and determine appropriate management, including the health worker's ability to return to work.
- OHS should contact local public health authorities to notify them about health workers who report both occupational- and non-occupational related exposures and to arrange appropriate follow-up and monitoring.
- The occupational disease should be reported according to OHS Acts.
- Strategies to mitigate workforce shortages should be in place.(17,34,55,56)

Further information on risk assessment and management of COVID-19 exposures among health workers can be found here.(16) The approach indicated in this guidance distinguishes exposures with high and low risk for COVID-19 infection. The key advice for different situations is summarized in Table 3.

Based on risk classification post-exposure, the occupational health and safety department can advise the health worker to:

- Continue to work depending on ability to do so and the exposure risk assessment,
- Provide recommendations to monitor symptoms and for additional follow-up as needed,
- Arrange for testing for SARS-CoV-2 according to the national and local testing strategy,
- Consider quarantine, depending on the nature of the exposure.

Table 3: Health worker exposure risk and advised actions

Exposure type	Health worker status	Advice
Lower risk exposure in the workplace: • provided direct care to COVID -19 patient while wearing required PPE and following IPC precautions, • present during an AGP on a patient with COVID-19 while wearing required PPE and following IPC precautions, • exposure to colleague who is a suspect or COVID-19 positive case at work while wearing a mask.	No symptoms (asymptomatic)	• May continue to work following IPC measures including local requirements for wearing of masks. • Test for SARS-CoV-2, if resources available. Follow guidance for Diagnostic Testing for SARS CoV-2.(51) • Reinforce IPC measures (physical distancing, hand hygiene, PPE and use of masks. • Self-monitor for symptoms for 14 days and report immediately to OHS if any symptoms develop. • If positive, identify contacts and follow up according to contact tracing procedures.
	Symptomatic	• Staff member self isolates. • Monitor with OHS. • Test for SARS-CoV-2. Follow guidance for Diagnostic Testing for SARS CoV-2.(51) • If positive, identify contacts and follow up according to contact tracing procedures.
Higher risk exposure in the workplace: • provided direct care to COVID-19 patient with no or inappropriate PPE, or a breach in PPE integrity or other IPC precautions not followed (i.e. hand hygiene not performed as per the WHO 5 moments, lack of cleaning and disinfection of surface/environment), • present during an AGP without or inappropriate PPE, breach in PPE integrity, or other IPC precautions not followed (e.g. hand hygiene not performed per the WHO 5 moments, lack of cleaning and disinfection of surface/environment), • exposure (>15 min face-face contact, < 1m) to a colleague who is identified as positive for COVID-19 with no masks (e.g. in a break room, while eating etc.), • exposure to splash or spray of body fluids/blood and/or a puncture/sharp injury.	No symptoms (asymptomatic)	• Staff to quarantine for 14 days after last exposure. • Staff to remain off work for 14 days from last exposure. • Test for SARS CoV-2. Follow guidance for Diagnostic Testing for SARS CoV-2(51) • If positive, identify contacts and follow up according to contact tracing procedures. • Monitor daily for symptoms and notify OHS.
	Symptomatic	• Staff member self-isolates. • Test for SARS-CoV-2. Follow guidance for Diagnostic Testing for SARS-CoV-2.(51) • Identify contacts and follow up according to contact tracing procedures. • See guidance below for return to work.

Non-occupational exposure (e.g. contact[4] with a confirmed cases who is a family or community member).	Asymptomatic	• Quarantine for 14 days after the last exposure. • If positive, identify contacts and follow up according to contact tracing procedures.
	Symptomatic	• Staff member to isolate. • Test for SARS-CoV-2. • Follow guidance for Diagnostic Testing for SARS-CoV-2. • If positive, identify contacts and follow up according to contact tracing procedures. • See the guidance below for return to work.

2. Managing health worker infections

Any health worker who identifies as symptomatic or tests positive for SARS-CoV-2 should:

- immediately be isolated and stop all patient care activities,
- inform their supervisor who should notify the IPC and OHS,
- seek care if feeling unwell or symptoms worsen through the appropriate referral system.

The following table outlines the advice and the management steps in the event a HW tests positive for SARS-CoV-2.

Table 4: Measures for health workers positive for SARS-CoV-2

Health worker status	**IPC Measures**
Health worker tests SARS-CoV-2 positive (with or without symptoms)	• Isolate in a health care facility, designated setting (e.g. health-care facility, non-traditional facility), or at home (51) as appropriate and according to clinical condition for a minimum of 10 days plus 3 days without symptoms (33)
Health worker is symptomatic but tests negative for SARS-CoV-2	• Follow guidance for Diagnostic Testing for SARS-CoV-2,(51) • Consult with the OHS on whether to return to work and consider if additional testing is required for alternate diagnoses according to local guidance, • Any health worker permitted to return to work should be advised of symptoms to monitor and follow infection control guidance as described above, including the use of appropriate PPE.

If a health worker's infection is related to an occupational exposure such as incorrect IPC practices, appropriate corrective measures, such as refresher training for staff on IPC measures, should be put in place to address and correct breaches. Facilities should ensure adequate supplies of appropriately fitted PPE are available for health workers and that processes are in place for monitoring and observation of IPC procedures, including fit checking of respirators, and correct order for PPE removal and disposal. There also should be workplace reminders to use hygiene measures during work activities and take adequate rest periods. Details can be found in the WHO OHS document.(17)

OHS will need to balance the risk of essential health worker shortages against the risks of exposure and implementation of work restrictions according to the transmission scenarios in the facility and community against.

3. Health worker return-to-work advice

WHO principles for discontinuing isolation for COVID-19 patients should be adopted when taking decisions about return to work of health workers who were affected by COVID-19, with some additional considerations for specific sub-populations of health workers. Current WHO criteria for releasing COVID-19 patients from isolation are as follows:(54)

- Symptomatic patients may be released from isolation 10 days after symptom onset, plus at least 3 additional days without (including without fever[5] and without respiratory symptoms).
- Asymptomatic individuals can be released from isolation 10 days after they first tested positive.

Some individuals may experience symptoms (such as a post viral cough among others) beyond the period of infectivity or minimum 13 days of isolation (54). Medical assessment on a case by case basis should determine whether health workers are fit to return to work. Additional information can be found in the WHO Clinical management of COVID-19 interim guidance.(57)

Countries may choose to continue to use PCR testing to discontinue isolation for health workers who were symptomatic and tested positive for COVID-19 to allow them to return to work when the have recovered clinically and have two negative PCR tests on sequential samples taken at least 24 hours apart.(54,57)

[5] Without the use of antipyretics(54)

Return to work should be decided on a case by case basis in collaboration with OHS and IPC and including the health worker's own preferences. Conditions for determining whether a health worker can return safely work include:

- Their unit (dedicated to COVID-19 patients, ICU or long-term care versus, direct patient care, or non-patient-facing care),
- Clinical conditions (e.g. immunocompromised) of the patients for whom the health worker may provide care,
- Facility IPC measures and use of universal masking as per WHO Advice on the use of masks in the context of COVID-19 guidance,(31)
- The health worker's general health, and severity of previous illness with COVID-19.

Health workers should adhere to the following recommendations when returning to work post- COVID-19 infection:

- Undergo refresher training on IPC practices such as hand and respiratory hygiene, fit test and fit check of respirators, PPE use, masking policies and safe physical distancing,
- Follow recommended public health measures in home and community settings (maintain physical distancing, hand hygiene, respiratory etiquette, mask use),
- Continue to self-monitor for symptoms suggestive of COVID-19 and immediately stop working, report to their OHS department, and self-isolate if new or worsening symptoms develop,
- Receive ongoing support and monitoring from OHS for longer term health complications and potential psychological implications.

Monitoring, studying and reporting health worker infections

Health-care facilities are encouraged to collect data on exposed and infected health workers to monitor, and track exposures and to identify areas for improvement. Each health worker infection should be documented and investigated to enable rapid control. A systematic data collection system should be set up at national and facility levels under the auspices of the OHS. Infections in health workers should be systematically reported into the national surveillance system. Reporting at all levels should inform rapid corrective action or additional investigation at all levels of the health system. In addition, rapid evaluations of health worker perceptions of IPC procedures at the local level can help facilities identify perceived environmental, social or behavioural barriers and enablers to staff adherence with IPC measures. (36)

WHO has developed several protocols for surveillance and studies among health workers to the extent of infection and assess of risk factors for COVID-19 infection among health workers. These tools can be used independently by facilities or in the context of WHO-supported surveillance or research.

1. Protocol for assessment of potential risk factors for COVID-19 among health workers in a health care setting (58)

WHO has developed a case-ascertained prospective investigation of all identified health care contacts working in a health care facility in which a laboratory confirmed COVID-19 infected patient receives care. The cohort study can be done in health care facilities at all three levels of a health system – not just in hospitals. It is intended to provide epidemiological and serologic information that will inform the identification of risk factors for COVID-19 infection among health workers.

Objectives of this investigation include:

- Better understand the extent of human-to-human transmission among health workers by estimating the secondary infection rate for health worker contacts at an individual level,
- Characterize the range of clinical presentation of infection and the risk factors for infection among health care workers
- Evaluate effectiveness of IPC measures among health workers,
- Evaluate effectiveness of IPC programmes at health facility and national levels.

Contact EarlyInvestigations-2019-nCoV@who.int for additional information and/or support for the use of this protocol.

2. Assessment of risk factors for coronavirus disease 2019 (COVID-19) in health workers: protocol for a case-control study (59)

WHO had developed a second protocol which aims to characterize and assess the risk factors for SARS-CoV-2 infection in health workers exposed to COVID-19 patients. The study is based on the use of incidence density sampling and should be initiated as soon as a case of SARS-CoV-2 infection is confirmed among health workers in a health care setting. Health workers with confirmed COVID-19 will be recruited as cases. Health workers exposed to COVID-19 patients in the same setting but without infection will be recruited as controls with a target of at least 2–4 controls for every case. For countries or health care facilities willing and able to participate, WHO is conducting an international multi-centre case-control study in health care settings over a one-year period.

Objectives include:

- Evaluate the effectiveness of current COVID-19 IPC measures among health workers,
- Describe the range of clinical presentation for SARS-CoV-2 infection in health workers, including the duration and severity of the disease,
- Determine serologic responses in health care personnel with confirmed SARS-CoV-2 infection and in those attending patients but without COVID-19.

Contact EarlyInvestigations-2019-nCoV@who.int for additional information and support for this protocol.

3. Surveillance protocol for SARS-CoV-2 infection among health workers (60)

WHO has developed a surveillance protocol that is to be used for the systematic collection of data among health workers, including exposure characteristics and risk factors as part of case investigations. The use of this protocol includes a Risk assessment questionnaire(16) which can be used by a health facility. Each country will need to tailor selected aspects of this protocol to align with their public health, testing and clinical systems related to health workers, according to capacity, availability of resources and cultural appropriateness.

By using this standardized protocol, surveillance data on COVID-19 infections in health workers and their epidemiological exposure can be systematically collected and rapidly shared in a format that can be easily aggregated, tabulated and analysed across settings locally, nationally and globally. This will allow for the timely investigation of COVID-19 among health workers and their related exposure, thus informing public health responses and policy decisions.

These tools and protocols will allow facilities to characterize infections that are occurring among health workers and identify areas in need of improvement.

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WHO continues to monitor the situation closely for any changes that may affect this interim guidance. Should any factors change, WHO will issue a further update. Otherwise, this interim guidance document will expire 2 years after the date of publication.

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