# Evidence Search Service Results of your search request

## COVID-19 and human factors

**ID of request:** 26781  
**Date of request:** 21st December, 2020  
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If you would like to request any articles or any further help, please contact:  Tom Roper at [tom.roper@nhs.net](mailto:tom.roper@nhs.net)

Please acknowledge this work in any resulting paper or presentation as: Evidence search: COVID-19 and human factors. Tom Roper. ( 8th January, 2021). BRIGHTON, UK: Brighton and Sussex Library and Knowledge Service.

**Sources searched**  
Cochrane Library (0)  
Google Scholar (0)  
MEDLINE / Embase (19)  
NICE Evidence Search (0)  
TRIP Database (0)

**Date range used** (5 years, 10 years): 2019 onwards   
**Limits used** (gender, article/study type, etc.): English language   
**Search terms and notes** (full search strategy for database searches below):

Relevant natural language and controlled vocabulary terms were selected and combined. Thesaurus terms were adapted for different databases. Final result sets were de-duplicated and reviewed for relevance by the searcher, irrelevant results being discarded.

For more information about the resources please go to: <https://www.bsuh.nhs.uk/library/>.

## Summary of Results

There is little in the literature that specifically discusses human factors in a surgical setting in the COVID-19 pandemic. Since the most recent paper, Britton et al (2021), is easily available, I downloaded a copy and attach it with this report.

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## A. Original Research

1. **Awareness of Human Factors in the operating theatres during the COVID-19 pandemic**  
   Britton Carolina Relvas Journal of perioperative practice 2021;31:44-50.

One of the priorities at our large Operating Theatres Department is to support awareness and basic education of the multi-disciplinary teams in clinical Human Factors, to help build competence and capacity in healthcare towards a resilient system. From May 2019 until February 2020, our Human Factors Champions embarked on a project called Observation of Non-technical Skills and Teamwork in the operating theatres (ONSeT), to monitor and evaluate the benefits of local Human Factors education. In September 2020, six months after the COVID-19 pandemic hit the UK and caused a major disruption of surgical services, we decided to investigate the usefulness of the project and the impact of COVID-19 in the operating theatres, looking through the eyes of the Human Factors Champions. Results pointed to a consensus about ONSeT having helped during the pandemic, with regards to how teams worked and in enabling team leaders to be more responsive. Human Factors Champions found that feedback on performance was received in a non-threatening way and observation of performance became 'second nature'. As organisations need to develop critical thinking, we think that the ONSeT project has helped us build some capacity for this, from the front-line onwards.

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1. **Are you surgically current? Lessons from aviation for returning to non-urgent surgery following COVID-19**  
   Hardie J. A. British Journal of Oral and Maxillofacial Surgery 2020;58:843-847.

The COVID-19 crisis has caused many issues across healthcare. In surgery, many operations have been cancelled with some surgeons losing their regular operating lists. During this time, technical expertise and decision making can deteriorate. In aviation after a prolonged period of absence from flying, this deficit in keeping skills and thinking up to date is known as being "out of currency" or "not current". Although aviation and healthcare cannot be compared, numerous human factors concepts are applicable to both. In this article, we explore the likely impact of potentially prolonged absences in operating on surgical skills and psyche, and introduce the concept of a Surgical Skills Currency Barometer. We also discuss a "task-o-meter" thought experiment, and suggest practices which could be adopted to help protect surgeon workload from exceeding surgical capability when returning to operating following a period of prolonged absence.Copyright © 2020 The British Association of Oral and Maxillofacial Surgeons

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1. **Author commentary on Srivathsan Ravindran et al**  
   Anonymous Endoscopy 2020;52:v39.

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1. **COVID-19 and surgery: A thematic analysis of unintended consequences on performance, practice and surgical training**  
   Whelehan D. F. The surgeon : journal of the Royal Colleges of Surgeons of Edinburgh and Ireland 2020;:No page numbers.

PURPOSE: The shift in the national focus and allocation of resources to the management of COVID19 has led to significant changes to surgical practice including the delay of elective surgery. The aim of this study was to explore the implications of such changes on surgeons. METHOD(S): Using a qualitative study design, semi-structured interviews were conducted with general surgery consultants and non-consultant hospital doctors from a major tertiary hospital in the Dublin region between March-May 2020. Data collection proceeded iteratively using a thematic analysis approach with quality controls such as memoing and collaborative analysis. RESULT(S): Fourteen surgeons (8 male, 6 female) were interviewed. The majority (n = 11, 78.6%) were NCHDs. Significant themes determined included 'impacts' on a variety of constructs such as performance, self-reported fatigue and wellbeing. Training themes elucidated included the effects of the cancellation of elective admissions on reduced operative exposure for trainees. Senior surgical staff were particularly focused on increased complexity in patient management. New policy requirements such as personal protective equipment use and novel rotas have had implications for aspects of work engagement. The pandemic and subsequent national restrictions imposed has afforded opportunities for improved well-being but also resulted in greater solitude in surgeons. CONCLUSION(S): Rhetoric surrounding fatigue management and virus control dominates the conversation on the relationship between COVID-19 and surgery. Tipping the balance back to parity of fatigue management with service delivery in surgery will be key for sustainability of the surgical workforce.Copyright © 2020 Royal College of Surgeons of Edinburgh (Scottish charity number SC005317) and Royal College of Surgeons in Ireland. Published by Elsevier Ltd. All rights reserved.

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1. **Difficulties Encountered While Using PPE Kits and How to Overcome Them: An Indian Perspective.**  
   Agarwal Ankur Cureus 2020;12(11):e11652.

Background After a slow start due to an effective lockdown, the coronavirus disease 2019 (COVID-19) pandemic in India has been raging at a rapid pace, posing a formidable challenge to the healthcare system in the country. The personal protective equipment (PPE) undoubtedly provides a shield of protection for the healthcare workers (HCWs) fighting the disease as a valuable asset to the nation. However, there have been various problems associated with the PPE, ranging from its shortage to problems arising from heat, dehydration, etc while wearing them. There is a need to assess these problems faced by HCWs both qualitatively and quantitatively for their timely and effective redressal. Methods An electronic questionnaire survey was conducted among a cohort of HCWs who had performed COVID-19 duties and used PPE kits. The cohort consisted of different categories of doctors, nursing personnel, and other paramedical staff. Results The most common problems associated with using PPE kits was excessive sweating (100%), fogging of goggles, spectacles, or face shields (88%), suffocation (83%), breathlessness (61%), fatigue (75%), headache due to prolonged use (28%), and pressure marks on the skin at one or more areas on repeated use (19%). Occasional problems reported were skin allergy/dermatitis caused by the synthetic material of the PPE kit, face shield impinging onto the neck during intubation, and nasal pain, pain at the root of the pinna, and slipperiness of shoe covers. Various ways and means have been employed by the HCWs to actively address and solve these problems. Conclusion These plausible solutions will definitely help the HCWs to deal with and solve the problems arising out of the PPE use. Copyright © 2020, Agarwal et al.

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1. **Facilitating resilience in the return to surgical practice.**  
   Ashcroft J. The surgeon : journal of the Royal Colleges of Surgeons of Edinburgh and Ireland 2020;:No page numbers.

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1. **Fighting a common enemy: a catalyst to close intractable safety gaps.**  
   Singh Hardeep BMJ quality & safety 2020;:No page numbers.

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1. **Heat Stress and PPE during COVID-19: Impact on health care workers' performance, safety and well-being in NHS settings.**  
   Davey Sarah L. The Journal of hospital infection 2020;:No page numbers.

Personal protective equipment (PPE) can potentiate heat stress which may negatively impact wearer's performance, safety and well-being. In view of this, a survey was distributed to healthcare workers (HCWs) required to wear PPE during the COVID-19 pandemic in the UK to evaluate perceived levels of heat stress and its consequences. Respondents reported experiencing several heat-related illness symptoms and that heat stress impaired both cognitive and physical performance. The majority also reported PPE made their job more difficult. These, and additional responses, suggest that modification to current working practices is urgently required to improve HCWs' resilience to wearing PPE during pandemics. Copyright © 2020 The Healthcare Infection Society. Published by Elsevier Ltd. All rights reserved.

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1. **How to Prepare and Protect Health-Care Teams During COVID-19: Know Thyself.**  
   Freeman W. David Neurocritical care 2020;:No page numbers.

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1. **Human Factor Considerations in Using Personal Protective Equipment in the COVID-19 Pandemic Context: Binational Survey Study**  
   Parush Avi Journal of medical Internet research 2020;22:e19947.

BACKGROUND: Full level 1 personal protective equipment (PPE) is used in various domains and contexts. Prior research has shown influences of such equipment on performance, comfort, and contamination levels. The coronavirus disease (COVID-19) pandemic forced a pervasive requirement of PPE, with little preparation, rushed deployment, inadequate time for training, and massive use by personnel who are inexperienced or not qualified in its effective use., OBJECTIVE: This study aims to examine the key human factors (physical and ergonomic, perceptual and cognitive) that influence the use of level 1 PPE when attending to patients with suspected or confirmed COVID-19., METHODS: The research approach consisted of a short survey disseminated to health care professionals in two countries, Israel and Portugal, with similar demographics and health care systems. The survey included 10 items with a 5-point Likert scale regarding the key human factors involved in level 1 PPE, as identified in prior research., RESULTS: A total of 722 respondents from Israel and 301 respondents from Portugal were included in the analysis. All the respondents reported using level 1 PPE with patients with COVID-19 in the range of several hours daily to several hours weekly. The Cronbach alpha was .73 for Israel and .75 for Portugal. Responses showed high levels of difficulty, with medians of 4 for items related to discomfort (n=539/688, 78% in Israel; n=328/377, 87% in Portugal), hearing (n=236/370, 64% in Portugal; n=321/642, 50% in Israel), seeing (n=697/763, 89% in Israel; n=317/376, 84% in Portugal), and doffing (n=290/374, 77% in Portugal; n=315/713, 44% in Israel). A factor analysis showed a set of strongly related variables consisting of hearing, understanding speech, and understanding the situation. This suggests that degradation in communication was strongly associated with degradation in situational awareness. A subsequent mediation analysis showed a direct effect of PPE discomfort on situational awareness (P<.001); this was also influenced (mediated) by difficulties in communicating, namely in hearing and understanding speech., CONCLUSIONS: In 2020, the COVID-19 pandemic is paving the way for updating PPE design. The use of already deployed technology affords ample opportunities to improve, adapt, and overcome caveats. The findings here suggest that the use of level 1 PPE with patients with COVID-19 has perceptual and cognitive effects, in addition to physical and ergonomic influences. Efforts should be taken to mitigate the harmful effects of such influences, both regarding the performance of medical actions and the risk of contamination to health care workers. Such efforts involve the design of PPE; the introduction of technologies to enhance vision, hearing, and communicating during the use of PPE; and training staff in using the equipment and in effective communication and teamwork protocols. Copyright ©Avi Parush, Oren Wacht, Ricardo Gomes, Amit Frenkel. Originally published in the Journal of Medical Internet Research (http://www.jmir.org), 17.06.2020.

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1. **Human factors and ergonomics at time of crises: the Italian experience coping with COVID19**  
   Albolino Sara International journal for quality in health care : journal of the International Society for Quality in Health Care 2020;:No page numbers.

Several of the key organizational issues that we have had to face with the emergence of COVID-19 crisis are related to Human Factors/Ergonomics (HFE) and the safety culture. During the crisis the main activities of the healthcare services have been profoundly affected. Patient safety and risk management units have also experienced the need to adapt rapidly. What can we do as HFE experts, now that the scenario has completely changed? We contend that:We can favour and support the heuristics that are applied to manage the load of psycho-cognitive stress;We can observe, collect strategies and develop analytic schemes, thereby creating a memory of the organization for improvement in the future;And we can support in educating and engaging the public. This crisis has forced the community of healthcare experts to broaden their reflections: for the future to come, our communities of experts in the field of risk management HF/E, quality and safety of care and public health should play together an important role from the very beginning, from the time of peace. Copyright © The Author(s) 2020. Published by Oxford University Press in association with the International Society for Quality in Health Care. All rights reserved. For permissions, please e-mail: journals.permissions@oup.com.

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1. **Impact of Personal Protective Equipment on Surgical Performance During the COVID-19 Pandemic**  
   Yanez Benitez Carlos World journal of surgery 2020;44:2842-2847.

BACKGROUND: The Severe Acute Respiratory Syndrome Coronavirus 2 pandemic has exposed surgeons to hazardous working conditions, imposing the need for personal protective equipment (PPE) use during surgery. The use of such equipment may affect their non-technical skills, augment fatigue, and affect performance. This study aimed to assess the surgeons' perceptions of the impact of wearing PPE during emergency surgery throughout the pandemic., METHODS: An international cooperation group conducted an anonymous online survey among surgeons from over 30 countries, to assess perceptions about the impact of PPE use on non-technical skills, overall comfort, decision making, and surgical performance during emergency surgery on COVID-19 patients., RESULTS: Responses to the survey (134) were received from surgeons based on 26 countries. The vast majority (72%) were males. More than half of the respondents (54%) felt that their surgical performance was hampered with PPE. Visual impairment was reported by 63%, whereas 54% had communication impediments. Less than half (48%) felt protected with the use of PPE, and the same proportion perceived that the use of such equipment influenced their decision making. Decreased overall comfort was cited by 66%, and 82% experienced increased surgical fatigue., CONCLUSIONS: Surgeons perceived impediment for both visibility and communication, and other non-technical skills while using PPE on emergency surgery in COVID-19 patients. Their perceived lack of protection and comfort and increased fatigue may have inhibited their optimal surgical performance. More attention should be placed in the design of more user-friendly equipment, given the possibility of a second wave of the pandemic.

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1. **International cooperation group of emergency surgery during the COVID-19 pandemic**  
   Yanez Benitez C. European journal of trauma and emergency surgery : official publication of the European Trauma Society 2020;:No page numbers.

PURPOSE: The COVID-19 pandemic has changed working conditions for emergency surgical teams around the world. International surgical societies have issued clinical recommendations to optimize surgical management. This international study aimed to assess the degree of emergency surgical teams' adoption of recommendations during the pandemic. METHOD(S): Emergency surgical team members from over 30 countries were invited to answer an anonymous, prospective, online survey to assess team organization, PPE-related aspects, OR preparations, anesthesiologic considerations, and surgical management for emergency surgery during the pandemic. RESULT(S): One-hundred-and-thirty-four questionnaires were returned (N=134) from 26 countries, of which 88% were surgeons, 7% surgical trainees, 4% anesthetists. 81% of the respondents got involved with COVID-19 crisis management. Social media were used by 91% of the respondents to access the recommendations, and 66% used videoconference tools for team communication. 51% had not received PPE training before the pandemic, 73% reported equipment shortage, and 55% informed about re-use of N95/FPP2/3 respirators. Dedicated COVID operating areas were cited by 77% of the respondents, 44% had performed emergency surgical procedures on COVID-19 patients, and over half (52%), favored performing laparoscopic over open surgical procedures. CONCLUSION(S): Surgical team members have responded with leadership to the COVID-19 pandemic, with crisis management principles. Social media and videoconference have been used by the vast majority to access guidelines or to communicate during social distancing. The level of adoption of current recommendations is high for organizational aspects and surgical management, but not so for PPE training and availability, and anesthesiologic considerations.

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1. **Nonoperating room anaesthesia: safety, monitoring, cognitive aids and severe acute respiratory syndrome coronavirus 2**  
   Borshoff David C. Current opinion in anaesthesiology 2020;33:554-560.

PURPOSE OF REVIEW: With an ageing population, mounting pressure on the healthcare dollar, significant advances in medical technology, and now in the context of coronavirus disease 2019, the traditional paradigm in which operative procedures are undertaken is changing. Increasingly, procedures are performed in more distant, isolated and less familiar locations, challenging anaesthesiologists and requiring well developed situational awareness. This review looks at implications for the practitioner and patient safety, outlining considerations and steps involved in translation of systems and processes well established in the operating room to more unfamiliar environments., RECENT FINDINGS: Despite limited nonoperating room anaesthesia outcome data, analysis of malpractice claims, anaesthesia-related medical disputes and clinical outcome registries have suggested higher morbidity and mortality. Complications were often associated with suboptimal monitoring, nonadherence to recommended guidelines and sedationist or nonanaesthesiologist caregivers. More recently, clear monitoring guidelines, global patient safety initiatives and widespread implementation of cognitive aids may have contributed to nonoperating room anaesthesia (NORA) outcomes approaching that of traditional operating rooms., SUMMARY: As NORA caseloads increase, understanding structural and anaesthetic requirements is essential to patient safety. The severe acute respiratory syndrome coronavirus 2 pandemic has provided an opportunity for anaesthesiologists to implement lessons learned from previous analyses, share expertise as patient safety leaders and provide valuable input into protecting patients and caregivers.

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1. **Operating 12-Hour Staff Shifts on COVID-19 Patients: A Harmful and Unwanted Proposal.**  
   Van Zundert Tom C. R V. Anesthesia and analgesia 2020;131(6):e257-e258.

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1. **Paediatric surgery and COVID-19: urgent lessons to be learned**  
   Turner Alexander M. International journal for quality in health care : journal of the International Society for Quality in Health Care 2020;:No page numbers.

BACKGROUND: The dissemination of scientific data on coronavirus disease 2019 (COVID-19) continually builds but, in April 2020, could not keep up with the spread of the disease. Through technology, surgeons in Italy and the UK, representing both peak and pre-peak infective time zones, were able to communicate so that the urgent lessons on the huge expected demands of care learned in Italy could be brought to the UK in advance. This paper specifically discusses the issues related to paediatric surgery, currently under-reported in the literature., METHODS: The aim of this paper is to conjoin experience from the field to provide a framework for a safe assessment and treatment of paediatric patients by adopting a systemic approach aimed at reducing the risk of contamination. We reviewed the processes and good practices that were undertaken in contexts of emergency such as in Italy and the UK and then adapted them within the Systems Engineering Initiative for Patient Safety (SEIPS) framework to provide an assessment of how to reorganize the services in order to cope with an unexpected situation. The SEIPS model is the adopted theoretical framework, which allows to analyse the system in its main components with a human factors and ergonomics (HFE) perspective., RESULTS: The results introduce some of the good practices and recommendations developed during the emergency in the surgical scenario with a focus on the paediatric patients. They represent the lessons learned from the combination of the little existing evidence of literature and the experience from surgical teams who responded in an impromptu and unrehearsed way., CONCLUSIONS: Lessons learned from the frontline 'on the fly' during COVID-19 emergency should be consolidated and taken into the future. In order to prepare proactively for the next phases and get ahead of the curve of these hospital accesses, there is a need for a risk assessment of the new clinical pathways with a multidisciplinary approach centred on HFE with the adoption of the SEIPS model and an involvement of all the surgical teams. Copyright © The Author(s) 2020. Published by Oxford University Press on behalf of International Society for Quality in Health Care. All rights reserved. For permissions, please e-mail: journals.permissions@oup.com.

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1. **Returning to operating following COVID-19 shutdown: what can human factors tell us?**  
   Hughes Richard The bone & joint journal 2020;102-B:1277-1278.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=13128adfe85ec9a7127bf78ec0c6ce20)

1. **Surgery during the COVID-19 pandemic: operating room suggestions from an international Delphi process**  
   Welsh Surgical Research Initiative Collaborative The British journal of surgery 2020;107:1450-1458.

BACKGROUND: Operating room (OR) practice during the COVID-19 pandemic is driven by basic principles, shared experience and nascent literature. This study aimed to identify the knowledge needs of the global OR workforce, and characterize supportive evidence to establish consensus., METHODS: A rapid, modified Delphi exercise was performed, open to all stakeholders, informed via an online international collaborative evaluation., RESULTS: The consensus exercise was completed by 339 individuals from 41 countries (64.3 per cent UK). Consensus was reached on 71 of 100 statements, predominantly standardization of OR pathways, OR staffing and preoperative screening or diagnosis. The highest levels of consensus were observed in statements relating to appropriate personal protective equipment (PPE) and risk distribution (96-99 per cent), clear consent processes (96 per cent), multidisciplinary decision-making and working (97 per cent). Statements yielding equivocal responses predominantly related to technical and procedure choices, including: decontamination (40-68 per cent), laminar flow systems (13-61 per cent), PPE reuse (58 per cent), risk stratification of patients (21-48 per cent), open versus laparoscopic surgery (63 per cent), preferential cholecystostomy in biliary disease (48 per cent), and definition of aerosol-generating procedures (19 per cent)., CONCLUSION: High levels of consensus existed for many statements within each domain, supporting much of the initial guidance issued by professional bodies. However, there were several contentious areas, which represent urgent targets for investigation to delineate safe COVID-19-related OR practice. Copyright © 2020 BJS Society Ltd Published by John Wiley & Sons Ltd.

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1. **Teamworking in endoscopy: a human factors toolkit for the COVID-19 era**  
   Ravindran Srivathsan Endoscopy 2020;52:879-883.

BACKGROUND: Endoscopy services have had to rapidly adapt their working practices in response to COVID-19. As recovery of endoscopy services proceeds, our workforce faces numerous challenges that can impair effective teamworking. We designed and developed a novel toolkit to support teamworking in endoscopy during the pandemic., METHODS: A human factors model was developed to understand the impact of COVID-19 on endoscopy teams. From this, we identified a set of key teamworking goals, which informed the development of a toolkit to support several team processes. The toolkit was refined following expert input and refinement over a 6-week period., RESULTS: The toolkit consists of four cognitive aids that can be used to support team huddles, briefings, and debriefs, alongside techniques to optimize endoscopic nontechnical skills across the patient-procedure pathway. We describe the processes that local endoscopy units can employ to implement this toolkit., CONCLUSION: A toolkit of cognitive aids, based on human factors principles, may be useful in supporting teams, helping them adapt to working safely in the era of COVID-19. Copyright Thieme. All rights reserved.

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Select Edit from the menu, the Find and type in your term in the search box which is presented. The search function will locate the first use of the term in the document. By pressing 'next' you will jump to further references.

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