# Evidence Search Service Results of your search request

## In-situ simulation being used to stress-test systems and to shape or change clinical guidance - [COVID-19]

**ID of request:** 23713  
**Date of request:** 11th June, 2020  
**Date of completion:** 15th June, 2020

If you would like to request any articles or any further help, please contact:  Kevin Burgoyne at [kevin.burgoyne@nhs.net](mailto:kevin.burgoyne@nhs.net)

Please acknowledge this work in any resulting paper or presentation as: Evidence search: In-situ simulation being used to stress-test systems and to shape or change clinical guidance - [COVID-19]. Kevin Burgoyne. (15th June, 2020). BRIGHTON, UK: Brighton and Sussex Library and Knowledge Service.

**Sources searched**  
EMBASE (4)  
MEDLINE (7)  
NICE Evidence Search (0)

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

Scoping search - NICE Evidence: in-situ simulation; in situ simulation covid

Scoping search revealed search needs to differentiate between the majority of studies which are looking at CPD / Education of individuals, and the ones where simulation changes organisational, departmental practice. Studies may evaluate both -

Further terms identified: evaluation of practice / Quality improvement cycle / patient safety / latent threats / environmental factors /

For full search strategy Medline / Embase see below. Adapted from related question on cpr for same requester. Results screened for relevance.

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

## Summary of Results

In situ simulation to stress-test processes during Covid-19 outbreak is recommended in consensus guidance from anaesthetist organisations, and as part of the RCP 'never too busy to learn' guidance recently published.

Various other specialties also describe their use of in-situ simulation for this purpose, however no paper looking specifically at CPR, Covid and in-situ simulation specifically has been found.

A further list of published papers on simulation and covid can also be found on the Norweigan www.safer.net website:

https://www.safer.net/sim-covid-19-beredskap/?lang=en

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## A. National and International Guidance

#### Royal College of Anaesthetists (RCoA)

**Consensus guidelines for managing the airway in patients with COVID-19** (2020)

Simulation: Due to the uncertainties inherent in the new processes to be adopted, we recommend regular and full in-situ simulation of planned processes, to facilitate familiarity and identification of otherwise unidentified problems, before these processes are used in urgent and emergent patient care situations.

## B. Institutional Publications

#### Royal College of Physicians (RCP)

**Never too busy to learn – a pandemic response** (2020)

"Never too busy to learn – a pandemic response’ highlights ways that teams can continue to learn and grow together, acknowledging the exceptionally challenging context that we currently face. The tips and guidance below will support your delivery of vital teaching and learning during the COVID-19 pandemic." Includes section on in-situ simulation and states: "In situ simulation may be helpful in identifying latent errors in the workplace, particularly where spaces have been rapidly adapted to meet evolving demands"

## C. Original Research

1. **A simulation training course for family medicine residents in China managing COVID-19.**  
   Shi Dandan Australian journal of general practice 2020;49(6):364-368.

BACKGROUND AND OBJECTIVESAs a result of the pandemic, family physicians face the additional challenge of navigating COVID-19. The aim of this study was to provide simulated training for best-practice management of COVID-19 presentations for residency program trainees in Shanghai, China.METHODA simulated suspected COVID-19 case was designed on the basis of a real patient. The simulation included: pre‑ and post-simulation surveys, a PowerPoint presentation, simulation practice, debriefing and reflection. Improvement in survey outcomes was assessed using a paired t-test.RESULTSA total of 25 trainees participated in the simulation, consisting of first-, second- and third-year family medicine residents. Significant improvement was observed in their knowledge of COVID-19, and sub-analysis showed that all three grades of residents improved their knowledge significantly. Ninety-six per cent of participants believed the simulation was very helpful.DISCUSSIONThe simulation scenario improves crisis management skills for family physicians managing the high risk of transmission of respiratory infectious diseases. Higher-order learning outcomes will be explored in future training programs.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=2ab3a11883dafc16d1683b24fcd2c8bb)

1. **Assessing Operating Room Preparedness for COVID-19 Patients through In-Situ Simulations.**  
   Tong Qian Jun Anesthesia and analgesia 2020;:No page numbers.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=82589f711720e2153af5542010ee7f70)

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=dd41bd57c3245f2b8fa895a763ca0f45)

1. **COVID-19 Outbreak Response for an Emergency Department Using In Situ Simulation.**  
   Jee Marcus Cureus 2020;12(4):e7876.

In January 2020, the WHO declared COVID-19 an epidemic in China and the possibility of evolving into a pandemic. During early phases, most emergency departments did not have contingency plans for an outbreak of this scale and therefore necessitating adequate preparation. This study aims to describe the utility of in situ simulation in identifying system errors and latent safety hazards in response to preparation for the expected COVID-19 surge. We also aim to describe the corrective measures taken to improve our outbreak response locally. We hope that others may be able to use this information as foresight in preparing their own departments for this outbreak. The emergency department and anesthesiology department of Galway University Hospital conducted a series of multidisciplinary, in situ simulations to rapidly identify operational errors and latent safety hazards in response to this outbreak. Each simulation involved an interdisciplinary response to a suspected/COVID-19 patient. The cases were used as a training opportunity for staff and ultimately a platform to expeditiously implement system changes in response to deficits identified during the simulations. Conclusively, with the complexities and intricate structure of every emergency department, we understood that preparation for an outbreak requires evaluation of the current system before implementing any changes. It is not a "one size fits all" concept. Therefore, conducting in situ simulations and the use of foresight, is pivotal as it could prevent loss of resources and time in preparing for an outbreak.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=5ad0230a6d16af9332b64acc2582b1a3)

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[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=834f3eb8f529dabdaba35bbf020dd9d9)

1. **Improving Stroke Care in Times of the COVID-19 Pandemic Through Simulation: Practice Your Protocols!**  
   Kurz M.W. Stroke 2020;:No page numbers.

During the coronavirus disease 2019 (COVID-19) pandemic, infectious disease control is of utmost importance in acute stroke treatment. This is a new situation for most stroke teams that often leads to uncertainty among physicians, nurses, and technicians who are in immediate contact with patients. The situation is made even more complicated by numerous new regulations and protocols that are released in rapid succession. Herein, we are describing our experience with simulation training for COVID-19 stroke treatment protocols. One week of simulation training allowed us to identify numerous latent safety threats and to adjust our institution-specific protocols to mitigate them. It also helped our physicians and nurses to practice relevant tasks and behavioral patterns (eg, proper donning and doffing PPE, where to dispose potentially contaminated equipment) to minimize their infectious exposure and to adapt to the new situation. We therefore strongly encourage other hospitals to adopt simulation training to prepare their medical teams for code strokes during the COVID-19 pandemic.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=a9566f61d43e0ad161108fab45aba896)

1. **Just-in-Time Simulation to Guide Workflow Design for Coronavirus Disease 2019 Difficult Airway Management.**  
   Daly Guris Rodrigo J. Pediatric critical care medicine : a journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies 2020;:No page numbers.

OBJECTIVESThe coronavirus disease 2019 pandemic has required that hospitals rapidly adapt workflows and processes to limit disease spread and optimize the care of critically ill children.DESIGN AND SETTINGAs part of our institution's coronavirus disease 2019 critical care workflow design process, we developed and conducted a number of simulation exercises, increasing in complexity, progressing to intubation wearing personal protective equipment, and culminating in activation of our difficult airway team for an airway emergency.PATIENTS AND INTERVENTIONSIn situ simulations were used to identify and rework potential failure points to generate guidance for optimal airway management in coronavirus disease 2019 suspected or positive children. Subsequent to this high-realism difficult airway simulation was a real-life difficult airway event in a patient suspected of coronavirus disease 2019 less than 12 hours later, validating potential failure points and effectiveness of rapidly generated guidance.MEASUREMENTS AND MAIN RESULTSA number of potential workflow challenges were identified during tabletop and physical in situ manikin-based simulations. Experienced clinicians served as participants, debriefed, and provided feedback that was incorporated into local site clinical pathways, job aids, and suggested practices. Clinical management of an actual suspected coronavirus disease 2019 patient with difficult airway demonstrated very similar success and anticipated failure points. Following debriefing and assembly of a success/failure grid, a coronavirus disease 2019 airway bundle template was created using these simulations and clinical experiences for others to adapt to their sites.CONCLUSIONSIntegration of tabletop planning, in situ simulations, and debriefing of real coronavirus disease 2019 cases can enhance planning, training, job aids, and feasible policies/procedures that address human factors, team communication, equipment choice, and patient/provider safety in the coronavirus disease 2019 pandemic era.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=437372416659e088e017d1ec6cd18fb6)

1. **Preparedness for COVID-19: in situ simulation to enhance infection control systems in the intensive care unit**  
   Choi G.Y.S. British Journal of Anaesthesia 2020;:No page numbers.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=33d8996ecfbf0ba43a790da0432c5f5d)

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=0d0dd0deecf18d907fd89801f9b940f4)

1. **The aerosol box for intubation in COVID-19 patients: an in-situ simulation crossover study**  
   Begley J.L. Anaesthesia 2020;:No page numbers.

The COVID-19 pandemic has led to the manufacturing of novel devices to protect clinicians from the risk of transmission, including the aerosol box for use in intubation. We evaluated the impact of two aerosol boxes (an early-generation box and a latest-generation box) on intubations in patients with severe COVID-19 with an in-situ simulation crossover study. The simulated process complied with the Safe Airway Society COVID-19 airway management guidelines. The primary outcome was intubation time; secondary outcomes included first-pass success and breaches to personal protective equipment. All intubations were performed by specialist (consultant) anaesthetists and video recorded. Twelve anaesthetists performed 36 intubations. Intubation time with no aerosol box was significantly shorter than with the early-generation box ((median (IQR [range])) 42.9 (32.9-46.9 [30.9-57.6]) seconds vs. 82.1(45.1-98.3 [30.8-180.0]) seconds, p=0.002) and the latest-generation box (52.4(43.1-70.3 [35.7-169.2]) seconds, p=0.008). No intubations without a box took more than one minute, whereas 14 (58%) intubations with a box took over one minute and 4 (17%) took over two minutes (including one failure). Without an aerosol box, all anaesthetists obtained first-pass success. With the early-generation and latest-generation boxes, 9 (75%) and 10 (83%) participants obtained first-pass success respectively. One breach of personal protective equipment occurred using the early-generation box and seven breaches occurred using the latest-generation box. Aerosol boxes may increase intubation times and therefore expose patients to the risk of hypoxia. They may cause damage to conventional personal protective equipment and therefore place clinicians at risk of infection. Further research is required before these devices can be considered safe for clinical use.<br/>Copyright This article is protected by copyright. All rights reserved.

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[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=cf79c60b8b0cd89a559c04f1ff950f16)

1. **The impact of COVID-19 related lockdown on ophthalmology training programs in India - Outcomes of a survey**  
   Mishra D. Indian journal of ophthalmology 2020;68(6):999-1004.

Purpose: In 2020, in response to the emergence and global spread of the disease COVID-19, caused by a new variant of coronavirus 2019-nCoV, the government of India ordered a nationwide lockdown for 21 days, which was then extended to a total of over 50 days. The aim of this study is to assess the effect of the lockdown on ophthalmic training programs across India. <br/>Method(s): An online survey was sent across to trainee ophthalmologists across India through various social media platforms. <br/>Result(s): In all, 716 trainees responded; the average age was 29.1 years. Results showed that majority of the respondents were enrolled in residency programs (95.6%; 685/716) and the others were in fellowship programs. About 24.6% (176/716) of the trainees had been deployed on 'COVID-19 screening' duties. Nearly 80.7% (578/716) of the trainees felt that the COVID-19 lockdown had negatively impacted their surgical training. Furthermore, 54.8% (392/716) of the trainees perceived an increase in stress levels during the COVID-19 lockdown and 77.4% (554/716) reported that their family members had expressed an increased concern for their safety and wellbeing since the lockdown began. In all, 75.7% (542/716) of the respondents felt that online classes and webinars were useful during the lockdown period. <br/>Conclusion(s): Our survey showed that majority ophthalmology trainees across the country felt that the COVID-19 lockdown adversely affected their learning, especially surgical training. While most found online classes and webinars useful, the trainees' perceived stress levels were higher than normal during the lockdown. Training hospitals should take cognizance of this and reassure trainees; formulate guidelines to augment training to compensate for the lost time as well as mitigate the stress levels upon resumption of regular hospital services and training. Going ahead, permanent changes such as virtual classrooms and simulation-based training should be considered.

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[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=02b731855f157780568c3c3f64f9de57)

1. **The use of simulation to prepare and improve responses to infectious disease outbreaks like COVID-19: practical tips and resources from Norway, Denmark, and the UK.**  
   Dieckmann Peter Advances in simulation (London, England) 2020;5:3.

In this paper, we describe the potential of simulation to improve hospital responses to the COVID-19 crisis. We provide tools which can be used to analyse the current needs of the situation, explain how simulation can help to improve responses to the crisis, what the key issues are with integrating simulation into organisations, and what to focus on when conducting simulations. We provide an overview of helpful resources and a collection of scenarios and support for centre-based and in situ simulations.

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[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=652839fbe73c6f9bb8dba8977b237913)

1. **Translational simulation for rapid transformation of health services, using the example of the COVID-19 pandemic preparation.**  
   Brazil Victoria Advances in simulation (London, England) 2020;5:9.

Healthcare simulation has significant potential for helping health services to deal with the COVID-19 pandemic. Rapid changes to care pathways and processes needed for protection of staff and patients may be facilitated by a translational simulation approach-diagnosing changes needed, developing and testing new processes and then embedding new systems and teamwork through training. However, there are also practical constraints on running in situ simulations during a pandemic-the need for physical distancing, rigorous infection control for manikins and training equipment and awareness of heightened anxiety among simulation participants. We describe our institution's simulation strategy for COVID-19 preparation and reflect on the lessons learned-for simulation programs and for health services seeking to utilise translational simulation during and beyond the COVID-19 pandemic. We offer practical suggestions for a translational simulation strategy and simulation delivery within pandemic constraints. We also suggest simulation programs develop robust strategies, governance and relationships for managing change within institutions-balancing clinician engagement, systems engineering expertise and the power of translational simulation for diagnosing, testing and embedding changes.

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[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=5d73ae2434fd477e321806a00b40d1ec)

1. **Use of in situ simulation to evaluate the operational readiness of a high-consequence infectious disease intensive care unit.**  
   Fregene T. E Anaesthesia 2020;75(6):733-738.

On 30 January 2020, the World Health Organization (WHO) declared that the outbreak of a coronavirus disease-2019 (COVID-19) was a public health emergency of international concern. The WHO guidance states that patients with (COVID-19) should be managed by staff wearing appropriate personal protective equipment; however, working whilst wearing personal protective equipment is unfamiliar to many healthcare professionals. We ran high-fidelity, in-situ simulation of high-risk procedures on patients with COVID-19 in a negative-pressure side room on our intensive care unit (ICU). Our aim was to identify potential problems, test the robustness of our systems and inform modification of our standard operating procedures for any patients with COVID-19 admitted to our ICU. The simulations revealed several important latent risks and allowed us to put corrective measures in place before the admission of patients with COVID-19. We recommend that staff working in clinical areas expected to receive patients with COVID-19 conduct in-situ simulation in order to detect their own unique risks and aid in the creation of local guidelines of management of patients with COVID-19.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=9219ffbcf03a534956d17834ab7b73c5)

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### Opening Internet Links

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### Full text papers

Links are given to full text resources where available. For some of the papers, you will need an **NHS OpenAthens Account**. If you do not have an account you can [register online](https://openathens.nice.org.uk/).

You can then access the papers by simply entering your username and password. If you do not have easy access to the internet to gain access, please let us know and we can download the papers for you.

### Guidance on searching within online documents

Links are provided to the full text of each document. Relevant extracts have been copied and pasted into these results. Rather than browse through lengthy documents, you can search for specific words as follows:

**Portable Document Format / pdf / Adobe**  
Click on the Search button (illustrated with binoculars). This will open up a search window. Type in the term you need to find and links to all of the references to that term within the document will be displayed in the window. You can jump to each reference by clicking it.

**Word documents**  
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.

## D. Search History

|  | **Source** | **Criteria** | **Results** |
| --- | --- | --- | --- |
| 1. | Medline | exp "SIMULATION TRAINING"/ | 8695 |
| 2. | Medline | (simulation\* ADJ3 (in-situ OR real-life OR real-world)).ti,ab | 873 |
| 3. | Medline | (1 OR 2) | 9407 |
| 4. | Medline | (coronavir\* OR "Corona vir\*" OR ncov\* OR "n-cov\*" OR COVID\*).ti,ab | 32172 |
| 5. | Medline | ("2019-nCoV" OR "SARS-CoV\*" OR "MERS-CoV\*" OR "Severe Acute Respiratory Syndrome" OR "Middle East Respiratory Syndrome").ti,ab | 12875 |
| 6. | Medline | exp CORONAVIRUS/ OR exp "CORONAVIRUS INFECTIONS"/ | 20074 |
| 7. | Medline | exp CORONAVIRUS/ OR exp "CORONAVIRUS INFECTIONS"/ | 20074 |
| 8. | Medline | (4 OR 5 OR 6 OR 7) | 41450 |
| 9. | Medline | (3 AND 8) | 17 |
| 10. | Medline | "QUALITY IMPROVEMENT"/ | 23966 |
| 11. | Medline | "RISK MANAGEMENT"/ | 18067 |
| 12. | Medline | "SAFETY MANAGEMENT"/ OR "ORGANIZATIONAL CULTURE"/ OR "PATIENT SAFETY"/ | 52949 |
| 13. | Medline | ((system\* OR latent OR organi#ation\* OR environment\* OR underlying OR root OR stress OR workflow\* OR procedure\*) ADJ3 (safe\* OR problem\* OR hazard\* OR defect\* OR risk\* OR error\* OR test\* OR manage\* OR vulnerab\*)).ti,ab | 376937 |
| 14. | Medline | ((quality OR practice OR guideline OR policy) ADJ3 (improve\* OR develop OR enhance\*)).ti,ab | 177338 |
| 15. | Medline | "PRACTICE GUIDELINES AS TOPIC"/ | 116797 |
| 16. | Medline | (10 OR 11 OR 12 OR 13 OR 14 OR 15) | 721042 |
| 17. | Medline | (9 AND 16) | 3 |
| 18. | EMBASE | exp "SIMULATION TRAINING"/ | 4933 |
| 19. | EMBASE | (simulation\* ADJ3 (in-situ OR real-life OR real-world)).ti,ab | 1050 |
| 20. | EMBASE | (18 OR 19) | 5854 |
| 21. | EMBASE | (coronavir\* OR "Corona vir\*" OR ncov\* OR "n-cov\*" OR COVID\*).ti,ab | 38429 |
| 22. | EMBASE | ("2019-nCoV" OR "SARS-CoV\*" OR "MERS-CoV\*" OR "Severe Acute Respiratory Syndrome" OR "Middle East Respiratory Syndrome").ti,ab | 15837 |
| 23. | EMBASE | exp "CORONAVIRUS INFECTIONS"/ OR exp CORONAVIRINAE/ | 28363 |
| 24. | EMBASE | exp "CORONAVIRUS INFECTIONS"/ OR exp CORONAVIRINAE/ | 28363 |
| 25. | EMBASE | (21 OR 22 OR 23 OR 24) | 52833 |
| 26. | EMBASE | (20 AND 25) | 23 |
| 27. | EMBASE | "TOTAL QUALITY MANAGEMENT"/ | 64297 |
| 28. | EMBASE | "PATIENT SAFETY"/ OR "SAFETY CLIMATE"/ OR "SAFETY CULTURE"/ | 114302 |
| 29. | EMBASE | "RISK MANAGEMENT"/ | 42328 |
| 30. | EMBASE | ((system\* OR latent OR organi#ation\* OR environment\* OR underlying OR root OR stress) ADJ3 (safe\* OR problem\* OR hazard\* OR defect\* OR risk\* OR error\* OR test\* OR manage\* OR vulnerab\*)).ti,ab | 321225 |
| 31. | EMBASE | ((quality OR practice OR guideline OR policy) ADJ3 (improve\* OR develop OR enhance\*)).ti,ab | 235887 |
| 32. | EMBASE | "PRACTICE GUIDELINE"/ OR "CLINICAL PATHWAY"/ OR "CLINICAL PROTOCOL"/ OR "NURSING PROTOCOL"/ | 514977 |
| 33. | EMBASE | (27 OR 28 OR 29 OR 30 OR 31 OR 32) | 1186471 |
| 34. | EMBASE | (26 AND 33) | 5 |

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