**What tools or ‘gold standards’ exist for capturing lessons learnt from COVID-19 and previous public health emergencies? A summary**

**Strategy**

The database, Medline, was searched using the following terms:

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Database** | **Search term** | **Results** |
| 1 | Medline | (COVID-19).ti,ab | 2469 |
| 2 | Medline | CORONAVIRUS/ | 1913 |
| 3 | Medline | "SARS VIRUS"/ | 2930 |
| 4 | Medline | "MIDDLE EAST RESPIRATORY SYNDROME CORONAVIRUS"/ | 987 |
| 5 | Medline | EBOLAVIRUS/ | 3153 |
| 6 | Medline | (1 OR 2 OR 3 OR 4 OR 5) | 11079 |
| 7 | Medline | ("lessons learnt").ti,ab | 2332 |
| 8 | Medline | ("lessons learned").ti,ab | 18530 |
| 9 | Medline | (7 OR 8) | 20814 |
| 10 | Medline | (6 AND 9) | 71 |

Twenty-eight studies were selected for their relevance and currency (last ten years).

An internet search was completed for relevant tools and techniques, relating to knowledge management.

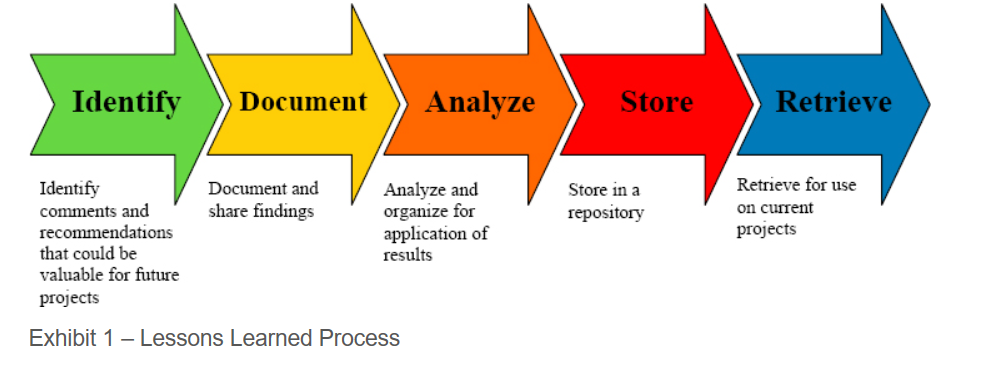
**Summary of evidence**

The selected literature analyses information from the early research on COVID-19 and on previous epidemics, including:

* Lessons learnt from the past epidemics of coronaviruses such as the Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS), were not enough and thus left us ill-prepared to deal with the challenges that COVID-19 pandemic is currently posing. However, as little is currently known about COVID-19, it is likely that lessons learned from these major epidemics can be applied to the new pandemic, including the use of novel immunosuppressive drugs.
* Epidemiologic and demographic features from previous viruses (SARS-CoV-1 and MERS-CoV)
* Lessons learned from the experience of an emergency physician in Northern Italy, where the current outbreak has devastated the healthcare system
* Evidence on transmission and prevention through safe use of PPE
* Evidence and advice on SARS-CoV-2 testing and co=infection
* Management options
* Airway management options
* Steps for rapid sequence intubation in the ED and managing disaster ventilation
* Information on managing paediatric and pregnant patients
* The COVID-19 outbreak alerts us that a carefully planned stockpile of PPE and other essentials is key to effective infectious disease preparedness. In addition, it is also important to set up a centralized and coordinated network of emergent PPE supply among central and local governments, healthcare facilities, and medical equipment, so as to meet the demand for consumable and durable supplies when a wide spread epidemic lasts long.
* Reflective journaling can help reduce the stress of an unexpected clinical situation involving nursing students and encourages immediate coping strategies for those affected.
* Studies highlighted the importance of a rigorous planning process, robust infection prevention practices, and coalitions between public and private health sectors.

**Lessons Learned – is there a gold standard?**

Although a ‘gold standard’ for recording lessons learned does not seem to exist, there are useful templates and protocols for capturing knowledge and learning. For example:



From: <https://www.pmi.org/learning/library/lessons-learned-next-level-communicating-7991>

Capturing lessons learned by the use of a series of an [After Action Review](https://improvement.nhs.uk/resources/after-action-review/) is also recommended. This tool asks four questions:

* What went well?
* What didn’t go so well?
* What helped?
* What hindered?

There is a COVID-19 simulation community on [Future NHS](https://future.nhs.uk/)   - designed for the health and care workforce to share experiences and examples of education and learning during Covid-19 pandemic. Registration is free and request can be submitted to join one of the [CoVid work streams](https://future.nhs.uk/Covid19simulation/groupHome)

A list of other Knowledge Management tools can be found at:

<https://www.libraryservices.nhs.uk/document_uploads/CKOs/KM_Tools_&_techniques_Cox_CKO_1_Dec_2009.pdf>

and at

<https://kfh.libraryservices.nhs.uk/knowledge-management/>

Specifically, a *retrospect* ‘captures’ the learning and practices after an event:

<https://kfh.libraryservices.nhs.uk/wp-content/uploads/2019/11/KM-Framework-Postcards-retrospect-2019.pdf>

Here is an example of a KM tool in action:

<https://kfh.libraryservices.nhs.uk/knowledge-management/knowledge-management-story/knowledge-capture-tools-at-phe/>

Also, an example of lessons learnt from an NHS Trust:

<https://www.leedsth.nhs.uk/assets/Uploads/762f7a32ff/Summary-of-Lessons-Learned-December-2018.pdf>

There are also helpful tools/templates in the realm of Project Management in which Lessons Learned can be recorded in a spreadsheet under the following headings:

* Project Name
* Workstream Area
* Challenge / Success
* Impact on Project(s)
* Recommendations for future projects

**Studies included in results:**

**1. COVID-19, cytokines and immunosuppression: what can we learn from severe acute respiratory syndrome?**

**Author(s):** Sarzi-Puttini, Piercarlo; Giorgi, Valeria; Sirotti, Silvia; Marotto, Daniela; Ardizzone, Sandro; Rizzardini, Giuliano; Antinori, Spinello; Galli, Massimo

**Source:** Clinical and experimental rheumatology; 2020; vol. 38 (no. 2); p. 337-342

**Publication Date:** 2020

**Publication Type(s):** Journal Article Review

**PubMedID:** 32202240

**Abstract:**A severe outbreak of coronavirus disease 2019 (COVID-19) emerged in China in December 2019, and spread so rapidly that more than 200,000 cases have so far been reported worldwide; on January 30, 2020, the WHO declared it the sixth public health emergency of international concern. The two previously reported coronavirus epidemics (severe acute respiratory syndrome [SARS] and Middle East respiratory syndrome [MERS]) share similar pathogenetic, epidemiological and clinical features as COVID-19. As little is currently known about SARS-CoV-2, it is likely that lessons learned from these major epidemics can be applied to the new pandemic, including the use of novel immunosuppressive drugs.

**Database:** Medline

**2. Novel 2019 coronavirus SARS-CoV-2 (COVID-19): An updated overview for emergency clinicians**

**Author(s):** Giwa, A L; Desai, Akash; Duca, Andrea

**Source:** Emergency medicine practice; May 2020; vol. 22 (no. 5); p. 1-28

**Publication Date:** May 2020

**Publication Type(s):** Journal Article

**PubMedID:** 32207910

**Abstract:**The novel coronavirus, COVID-19, has quickly become a worldwide threat to health, travel, and commerce. This overview analyzes the best information from the early research, including epidemiologic and demographic features from SARS-CoV-1 and MERS-CoV viruses; lessons learned from the experience of an emergency physician in Northern Italy, where the outbreak has devastated the healthcare system; evidence on transmission and prevention through safe use of PPE; evidence and advice on SARS-CoV-2 testing and co-infection; management options; airway management options; steps for rapid sequence intubation in the ED and managing disaster ventilation; and information on managing pediatric and pregnant patients.

**Database:** Medline

**3. COVID-19 Infection in italian people with diabetes: lessons learned for our future (an experience to be used).**

**Author(s):** Gentile, Sandro; Strollo, Felice; Ceriello, Antonio

**Source:** Diabetes research and clinical practice; Apr 2020 ; p. 108137

**Publication Date:** Apr 2020

**Publication Type(s):** Journal Article

**PubMedID:** 32259611

Available at [Diabetes research and clinical practice](https://auth.elsevier.com/ShibAuth/institutionLogin?entityID=https://idp.eng.nhs.uk/openathens&appReturnURL=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.diabres.2020.108137) - from ClinicalKey

**Database:** Medline

**4. Lessons Learned From Korea: Covid-19 Pandemic.**

**Author(s):** Moradi, Hazhir; Vaezi, Atefeh

**Source:** Infection control and hospital epidemiology; Apr 2020 ; p. 1-5

**Publication Date:** Apr 2020

**Publication Type(s):** Journal Article

**PubMedID:** 32241308

Available at [Infection control and hospital epidemiology](https://www.cambridge.org/core/services/aop-cambridge-core/content/view/CCF02FCBC168614E7BE5F9BC60263EA8/S0899823X2000104Xa.pdf/div-class-title-lessons-learned-from-korea-covid-19-pandemic-div.pdf) - from Unpaywall

**Database:** Medline

**5. Preparedness and Lessons Learned from the Novel Coronavirus Disease.**

**Author(s):** Gudi, Sai Krishna; Tiwari, Komal Krishna

**Source:** The international journal of occupational and environmental medicine; Apr 2020; vol. 11 (no. 2); p. 108-112

**Publication Date:** Apr 2020

**Publication Type(s):** Journal Article

**PubMedID:** 32218558

Available at [The international journal of occupational and environmental medicine](https://www.theijoem.com/ijoem/index.php/ijoem/article/download/1977/1214) - from Unpaywall

**Abstract:**In a short span, a novel coronavirus (SARS-CoV-2) has captured global consciousness by significantly affecting the day-to-day life of humans and emerged as a public health emergency. Undoubtedly, it indicates that lessons learnt from the past epidemics of coronaviruses such as the Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS), had not enough and thus left us ill-prepared to deal with the challenges that COVID-19 pandemic is currently posing. Currently, as a global pandemic, COVID-19 poses major challenges and thus forcing the entire world to lockdown. However, the disease has prepared humankind in facing such outbreaks at present as well as in the future. Besides, it has also taught numerous lessons that are worth considering and implementing to make the world a better reality.

**Database:** Medline

**6. Lessons learned from first COVID-19 cases in the United States.**

**Author(s):** Landau, Ruth; Bernstein, Kyra; Mhyre, Jill

**Source:** Anesthesia and analgesia; Mar 2020

**Publication Date:** Mar 2020

**Publication Type(s):** Journal Article

**PubMedID:** 32243298

Available at [Anesthesia and analgesia](https://journals.lww.com/anesthesia-analgesia/Citation/publishahead/Lessons_learned_from_first_COVID_19_cases_in_the.95721.aspx) - from Unpaywall

**Database:** Medline

**7. Lessons Learned During the COVID-19 Virus Pandemic.**

**Author(s):** Sterpetti, Antonio V

**Source:** Journal of the American College of Surgeons; Mar 2020

**Publication Date:** Mar 2020

**Publication Type(s):** Journal Article

**PubMedID:** 32229297

Available at [Journal of the American College of Surgeons](https://auth.elsevier.com/ShibAuth/institutionLogin?entityID=https://idp.eng.nhs.uk/openathens&appReturnURL=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.jamcollsurg.2020.03.018) - from ClinicalKey

Available at [Journal of the American College of Surgeons](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7102528) - from Unpaywall

**Database:** Medline

**8. A midpoint perspective on the COVID-19 pandemic.**

**Author(s):** Hsu, Li Yang; Chia, Po Ying; Vasoo, Shawn

**Source:** Singapore medical journal; Mar 2020

**Publication Date:** Mar 2020

**Publication Type(s):** Journal Article

**PubMedID:** 32211911

Available at [Singapore medical journal](http://europepmc.org/search?query=(DOI:10.11622/smedj.2020036)) - from Europe PubMed Central - Open Access

Available at [Singapore medical journal](https://doi.org/10.11622/smedj.2020036) - from Unpaywall

**Abstract:**The SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) epidemic has spread to virtually every continent in the world. Despite Singapore's efforts, sustained community transmission of the virus has continued. We herein describe several key experiences and lessons learnt during the early course of the outbreak. First, it is critical to evaluate the outbreak objectively based on its own characteristics and not those of past epidemics. Second, the great advancements in speed and power of science and international collaboration have been critical in providing knowledge about the virus and disease. Third, public risk communications and the need to combat false information and rumours are even more crucial in this age of social media and viral information spread. Lastly, outbreak control and mitigation goes beyond the healthcare sector. The many lessons learnt will serve as a blueprint for dealing with future pandemics, but a sustainable new normal is required for the immediate future.

**Database:** Medline

**9. Practical considerations for performing regional anesthesia: lessons learned from the COVID-19 pandemic.**

**Author(s):** Lie, Sui An; Wong, Sook Wai; Wong, Loong Tat; Wong, Theodore Gar Ling; Chong, Shin Yuet

**Source:** Canadian journal of anaesthesia = Journal canadien d'anesthesie; Mar 2020

**Publication Date:** Mar 2020

**Publication Type(s):** Journal Article Review

**PubMedID:** 32212103

Available at [Canadian journal of anaesthesia = Journal canadien d'anesthesie](https://link.springer.com/content/pdf/10.1007/s12630-020-01637-0.pdf) - from Unpaywall

**Abstract:**Coronavirus disease (COVID-19) was declared a pandemic by the World Health Organization on 11 March 2020 because of its rapid worldwide spread. In the operating room, as part of hospital outbreak response measures, anesthesiologists are required to have heightened precautions and tailor anesthetic practices to individual patients. In particular, by minimizing the many aerosol-generating procedures performed during general anesthesia, anesthesiologists can reduce exposure to patients' respiratory secretions and the risk of perioperative viral transmission to healthcare workers and other patients. To avoid any airway manipulation, regional anesthesia should be considered whenever surgery is planned for a suspect or confirmed COVID-19 patient or any patient who poses an infection risk. Regional anesthesia has benefits of preservation of respiratory function, avoidance of aerosolization and hence viral transmission. This article explores the practical considerations and recommended measures for performing regional anesthesia in this group of patients, focusing on control measures geared towards ensuring patient and staff safety, equipment protection, and infection prevention. By doing so, we hope to address an issue that may have downstream implications in the way we practice infection control in anesthesia, with particular relevance to this new era of emerging infectious diseases and novel pathogens. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is not the first, and certainly will not be the last novel virus that will lead to worldwide outbreaks. Having a well thought out regional anesthesia plan to manage these patients in this new normal will ensure the best possible outcome for both the patient and the perioperative management team.

**Database:** Medline

**10. Protecting healthcare personnel from 2019-nCoV infection risks: lessons and suggestions.**

**Author(s):** Zhang, Zhiruo; Liu, Shelan; Xiang, Mi; Li, Shijian; Zhao, Dahai; Huang, Chaolin; Chen, Saijuan

**Source:** Frontiers of medicine; Mar 2020

**Publication Date:** Mar 2020

**Publication Type(s):** Journal Article

**PubMedID:** 32212058

Available at [Frontiers of medicine](https://link.springer.com/content/pdf/10.1007/s11684-020-0765-x.pdf) - from Unpaywall

**Abstract:**The outbreak of a novel Coronavirus disease (COVID-19, caused by the 2019-nCoV infection) in December 2019 is one of the most severe public health emergencies since the founding of People's Republic of China in 1949. Healthcare personnel (HCP) nationwide are facing heavy workloads and high risk of infection, especially those who care for patients at the epicenter of the outbreak, Hubei Province. Sadly, as of February 20, 2020, over two thousand COVID-19 cases are confirmed among HCP from 476 hospitals nationwide, with nearly 90% of them from Hubei Province. Based on literature search and interviews with some HCP working at Wuhan, capital city of Hubei, we have summarized some of the effective measures taken to reduce infection among HCP, and also made suggestions for improving occupational safety during an infectious disease outbreak. The experience and lessons learned should be a valuable asset for international health community to contain the ongoing COVID-19 epidemic around the world.

**Database:** Medline

**11. Interrupting transmission of COVID-19: lessons from containment efforts in Singapore.**

**Author(s):** Lee, Vernon J; Chiew, Calvin J; Khong, Wei Xin

**Source:** Journal of travel medicine; Mar 2020

**Publication Date:** Mar 2020

**Publication Type(s):** Journal Article

**PubMedID:** 32167146

Available at [Journal of travel medicine](https://academic.oup.com/jtm/advance-article-pdf/doi/10.1093/jtm/taaa039/32902254/taaa039.pdf) - from Unpaywall

**Abstract:**Despite multiple importations resulting in local chains of transmission, Singapore has been able to control the COVID-19 outbreak without major disruption to daily living. In this article, we describe the combination of measures taken by Singapore to contain COVID-19 and share some early lessons learnt from the experience.

**Database:** Medline

**12. Diagnosis and Management of First Case of COVID-19 in Canada: Lessons applied from SARS.**

**Author(s):** Marchand-Senécal, Xavier; Kozak, Rob; Mubareka, Samira; Salt, Natasha; Gubbay, Jonathan B; Eshaghi, Alireza; Allen, Vanessa; Li, Yan; Bastien, Natalie; Gilmour, Matthew; Ozaldin, Omar; Leis, Jerome A

**Source:** Clinical infectious diseases : an official publication of the Infectious Diseases Society of America; Mar 2020

**Publication Date:** Mar 2020

**Publication Type(s):** Journal Article

**PubMedID:** 32147731

Available at [Clinical infectious diseases : an official publication of the Infectious Diseases Society of America](https://academic.oup.com/cid/advance-article-pdf/doi/10.1093/cid/ciaa227/32863728/ciaa227.pdf) - from Unpaywall

**Abstract:**We report diagnosis and management of the first laboratory-confirmed case of coronavirus disease 2019 (COVID-19) hospitalized in Toronto, Canada. No healthcare-associated transmission occurred. In the face of a potential pandemic of COVID-19, we suggest sustainable and scalable control measures developed based on lessons learned from SARS.

**Database:** Medline

**13. The deadly coronaviruses: The 2003 SARS pandemic and the 2020 novel coronavirus epidemic in China.**

**Author(s):** Yang, Yongshi; Peng, Fujun; Wang, Runsheng; Guan, Kai; Jiang, Taijiao; Xu, Guogang; Sun, Jinlyu; Chang, Christopher

**Source:** Journal of autoimmunity; Mar 2020 ; p. 102434

**Publication Date:** Mar 2020

**Publication Type(s):** Journal Article Review

**PubMedID:** 32143990

Available at [Journal of autoimmunity](https://auth.elsevier.com/ShibAuth/institutionLogin?entityID=https://idp.eng.nhs.uk/openathens&appReturnURL=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.jaut.2020.102434) - from ClinicalKey

Available at [Journal of autoimmunity](https://doi.org/10.1016/j.jaut.2020.102434) - from Unpaywall

**Abstract:**The 2019-nCoV is officially called SARS-CoV-2 and the disease is named COVID-19. This viral epidemic in China has led to the deaths of over 1800 people, mostly elderly or those with an underlying chronic disease or immunosuppressed state. This is the third serious Coronavirus outbreak in less than 20 years, following SARS in 2002-2003 and MERS in 2012. While human strains of Coronavirus are associated with about 15% of cases of the common cold, the SARS-CoV-2 may present with varying degrees of severity, from flu-like symptoms to death. It is currently believed that this deadly Coronavirus strain originated from wild animals at the Huanan market in Wuhan, a city in Hubei province. Bats, snakes and pangolins have been cited as potential carriers based on the sequence homology of CoV isolated from these animals and the viral nucleic acids of the virus isolated from SARS-CoV-2 infected patients. Extreme quarantine measures, including sealing off large cities, closing borders and confining people to their homes, were instituted in January 2020 to prevent spread of the virus, but by that time much of the damage had been done, as human-human transmission became evident. While these quarantine measures are necessary and have prevented a historical disaster along the lines of the Spanish flu, earlier recognition and earlier implementation of quarantine measures may have been even more effective. Lessons learned from SARS resulted in faster determination of the nucleic acid sequence and a more robust quarantine strategy. However, it is clear that finding an effective antiviral and developing a vaccine are still significant challenges. The costs of the epidemic are not limited to medical aspects, as the virus has led to significant sociological, psychological and economic effects globally. Unfortunately, emergence of SARS-CoV-2 has led to numerous reports of Asians being subjected to racist behavior and hate crimes across the world.

**Database:** Medline

**14. Immune responses in COVID-19 and potential vaccines: Lessons learned from SARS and MERS epidemic.**

**Author(s):** Prompetchara, Eakachai; Ketloy, Chutitorn; Palaga, Tanapat

**Source:** Asian Pacific journal of allergy and immunology; Mar 2020; vol. 38 (no. 1); p. 1-9

**Publication Date:** Mar 2020

**Publication Type(s):** Journal Article Review

**PubMedID:** 32105090

Available at [Asian Pacific journal of allergy and immunology](https://doi.org/10.12932/ap-200220-0772) - from Unpaywall

**Abstract:**As the world is witnessing the epidemic of COVID-19, a disease caused by a novel coronavirus, SARS-CoV-2, emerging genetics and clinical evidences suggest a similar path to those of SARS and MERS. The rapid genomic sequencing and open access data, together with advanced vaccine technology, are expected to give us more knowledge on the pathogen itself, including the host immune response as well as the plan for therapeutic vaccines in the near future. This review aims to provide a comparative view among SARS-CoV, MERS-CoV and the newly epidemic SARS-CoV-2, in the hope to gain a better understanding of the host-pathogen interaction, host immune responses, and the pathogen immune evasion strategies. This predictive view may help in designing an immune intervention or preventive vaccine for COVID-19 in the near future.

**Database:** Medline

**15. The SARS, MERS and novel coronavirus (COVID-19) epidemics, the newest and biggest global health threats: what lessons have we learned?**

**Author(s):** Peeri, Noah C; Shrestha, Nistha; Rahman, Md Siddikur; Zaki, Rafdzah; Tan, Zhengqi; Bibi, Saana; Baghbanzadeh, Mahdi; Aghamohammadi, Nasrin; Zhang, Wenyi; Haque, Ubydul

**Source:** International journal of epidemiology; Feb 2020

**Publication Date:** Feb 2020

**Publication Type(s):** Journal Article

**PubMedID:** 32086938

Available at [International journal of epidemiology](https://academic.oup.com/ije/advance-article-pdf/doi/10.1093/ije/dyaa033/32568087/dyaa033.pdf) - from Unpaywall

**Abstract:**OBJECTIVESTo provide an overview of the three major deadly coronaviruses and identify areas for improvement of future preparedness plans, as well as provide a critical assessment of the risk factors and actionable items for stopping their spread, utilizing lessons learned from the first two deadly coronavirus outbreaks, as well as initial reports from the current novel coronavirus (COVID-19) epidemic in Wuhan, China.METHODSUtilizing the Centers for Disease Control and Prevention (CDC, USA) website, and a comprehensive review of PubMed literature, we obtained information regarding clinical signs and symptoms, treatment and diagnosis, transmission methods, protection methods and risk factors for Middle East Respiratory Syndrome (MERS), Severe Acute Respiratory Syndrome (SARS) and COVID-19. Comparisons between the viruses were made.RESULTSInadequate risk assessment regarding the urgency of the situation, and limited reporting on the virus within China has, in part, led to the rapid spread of COVID-19 throughout mainland China and into proximal and distant countries. Compared with SARS and MERS, COVID-19 has spread more rapidly, due in part to increased globalization and the focus of the epidemic. Wuhan, China is a large hub connecting the North, South, East and West of China via railways and a major international airport. The availability of connecting flights, the timing of the outbreak during the Chinese (Lunar) New Year, and the massive rail transit hub located in Wuhan has enabled the virus to perforate throughout China, and eventually, globally.CONCLUSIONSWe conclude that we did not learn from the two prior epidemics of coronavirus and were ill-prepared to deal with the challenges the COVID-19 epidemic has posed. Future research should attempt to address the uses and implications of internet of things (IoT) technologies for mapping the spread of infection.

**Database:** Medline

**16. COVID-19: A critical care perspective informed by lessons learnt from other viral epidemics.**

**Author(s):** Ling, Lowell; Joynt, Gavin M; Lipman, Jeff; Constantin, Jean-Michel; Joannes-Boyau, Olivier

**Source:** Anaesthesia, critical care & pain medicine; Feb 2020

**Publication Date:** Feb 2020

**Publication Type(s):** Editorial

**PubMedID:** 32088344

Available at [Anaesthesia, critical care & pain medicine](https://auth.elsevier.com/ShibAuth/institutionLogin?entityID=https://idp.eng.nhs.uk/openathens&appReturnURL=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.accpm.2020.02.002) - from ClinicalKey

Available at [Anaesthesia, critical care & pain medicine](https://doi.org/10.1016/j.accpm.2020.02.002) - from Unpaywall

**Database:** Medline

**17. Ebola virus - epidemiology, diagnosis, and control: threat to humans, lessons learnt, and preparedness plans - an update on its 40 year's journey.**

**Author(s):** Singh, Raj Kumar; Dhama, Kuldeep; Malik, Yashpal Singh; Ramakrishnan, Muthannan Andavar; Karthik, Kumaragurubaran; Khandia, Rekha; Tiwari, Ruchi; Munjal, Ashok; Saminathan, Mani; Sachan, Swati; Desingu, Perumal Arumugam; Kattoor, Jobin Jose; Iqbal, Hafiz M N; Joshi, Sunil Kumar

**Source:** The veterinary quarterly; Dec 2017; vol. 37 (no. 1); p. 98-135

**Publication Date:** Dec 2017

**Publication Type(s):** Journal Article Review

**PubMedID:** 28317453

Available at [The veterinary quarterly](https://www.tandfonline.com/doi/pdf/10.1080/01652176.2017.1309474?needAccess=true) - from Unpaywall

**Abstract:**Ebola virus (EBOV) is an extremely contagious pathogen and causes lethal hemorrhagic fever disease in man and animals. The recently occurred Ebola virus disease (EVD) outbreaks in the West African countries have categorized it as an international health concern. For the virus maintenance and transmission, the non-human primates and reservoir hosts like fruit bats have played a vital role. For curbing the disease timely, we need effective therapeutics/prophylactics, however, in the absence of any approved vaccine, timely diagnosis and monitoring of EBOV remains of utmost importance. The technologically advanced vaccines like a viral-vectored vaccine, DNA vaccine and virus-like particles are underway for testing against EBOV. In the absence of any effective control measure, the adaptation of high standards of biosecurity measures, strict sanitary and hygienic practices, strengthening of surveillance and monitoring systems, imposing appropriate quarantine checks and vigilance on trade, transport, and movement of visitors from EVD endemic countries remains the answer of choice for tackling the EBOV spread. Herein, we converse with the current scenario of EBOV giving due emphasis on animal and veterinary perspectives along with advances in diagnosis and control strategies to be adopted, lessons learned from the recent outbreaks and the global preparedness plans. To retrieve the evolutionary information, we have analyzed a total of 56 genome sequences of various EBOV species submitted between 1976 and 2016 in public databases.

**Database:** Medline

**18. Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome: Current Therapeutic Options and Potential Targets for Novel Therapies.**

**Author(s):** Dyall, Julie; Gross, Robin; Kindrachuk, Jason; Johnson, Reed F; Olinger, Gene G; Hensley, Lisa E; Frieman, Matthew B; Jahrling, Peter B

**Source:** Drugs; Dec 2017; vol. 77 (no. 18); p. 1935-1966

**Publication Date:** Dec 2017

**Publication Type(s):** Journal Article Review

**PubMedID:** 29143192

Available at [Drugs](http://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=48368&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=0012-6667&volume=77&issue=18&spage=1935) - from ProQuest (Health Research Premium) - NHS Version

Available at [Drugs](https://link.springer.com/content/pdf/10.1007/s40265-017-0830-1.pdf) - from Unpaywall

**Abstract:**No specific antivirals are currently available for two emerging infectious diseases, Middle East respiratory syndrome (MERS) and severe acute respiratory syndrome (SARS). A literature search was performed covering pathogenesis, clinical features and therapeutics, clinically developed drugs for repurposing and novel drug targets. This review presents current knowledge on the epidemiology, pathogenesis and clinical features of the SARS and MERS coronaviruses. The rationale for and outcomes with treatments used for SARS and MERS is discussed. The main focus of the review is on drug development and the potential that drugs approved for other indications provide for repurposing. The drugs we discuss belong to a wide range of different drug classes, such as cancer therapeutics, antipsychotics, and antimalarials. In addition to their activity against MERS and SARS coronaviruses, many of these approved drugs have broad-spectrum potential and have already been in clinical use for treating other viral infections. A wealth of knowledge is available for these drugs. However, the information in this review is not meant to guide clinical decisions, and any therapeutic described here should only be used in context of a clinical trial. Potential targets for novel antivirals and antibodies are discussed as well as lessons learned from treatment development for other RNA viruses. The article concludes with a discussion of the gaps in our knowledge and areas for future research on emerging coronaviruses.

**Database:** Medline

**19. Mental health care during the Ebola virus disease outbreak in Sierra Leone.**

**Author(s):** Kamara, Stania; Walder, Anna; Duncan, Jennifer; Kabbedijk, Antoinet; Hughes, Peter; Muana, Andrew

**Source:** Bulletin of the World Health Organization; Dec 2017; vol. 95 (no. 12); p. 842-847

**Publication Date:** Dec 2017

**Publication Type(s):** Journal Article

**PubMedID:** 29200525

Available at [Bulletin of the World Health Organization](http://europepmc.org/search?query=(DOI:10.2471/BLT.16.190470)) - from Europe PubMed Central - Open Access

Available at [Bulletin of the World Health Organization](http://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=48368&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=0042-9686&volume=95&issue=12&spage=842) - from ProQuest (Health Research Premium) - NHS Version

Available at [Bulletin of the World Health Organization](https://doi.org/10.2471/blt.16.190470) - from Unpaywall

**Abstract:**ProblemReported levels of mental health and psychosocial problems rose during the 2014-2015 Ebola virus disease outbreak in Sierra Leone.ApproachAs part of the emergency response, existing plans to create mental health units within the existing hospital framework were brought forward. A nurse-led mental health and psychosocial support service, with an inpatient liaison service and an outpatient clinic, was set up at the largest government hospital in the country. One mental health nurse trained general nurses in psychological first aid, case identification and referral pathways. Health-care staff attended mental well-being workshops on coping with stigma and stress.Local settingMental health service provision in Sierra Leone is poor, with one specialist psychiatric hospital to serve the population of 7 million.Relevant changesFrom March 2015 to February 2016, 143 patients were seen at the clinic; 20 had survived or had relatives affected by Ebola virus disease. Half the patients (71) had mild distress or depression, anxiety disorders and grief or social problems, while 30 patients presented with psychosis requiring medication. Fourteen non-specialist nurses received mental health awareness training. Over 100 physicians, nurses and auxiliary staff participated in well-being workshops.Lessons learntA nurse-led approach within a non-specialist setting was a successful model for delivering mental health and psychosocial support services during the Ebola outbreak in Sierra Leone. Strong leadership and partnerships were essential for establishing a successful service. Lack of affordable psychotropic medications, limited human resources and weak social welfare structures remain challenges.

**Database:** Medline

**20. Diagnostic preparedness for infectious disease outbreaks.**

**Author(s):** Perkins, Mark D; Dye, Christopher; Balasegaram, Manica; Bréchot, Christian; Mombouli, Jean-Vivien; Røttingen, John-Arne; Tanner, Marcel; Boehme, Catharina C

**Source:** Lancet (London, England); Nov 2017; vol. 390 (no. 10108); p. 2211-2214

**Publication Date:** Nov 2017

**Publication Type(s):** Journal Article

**PubMedID:** 28577861

Available at [Lancet (London, England)](https://auth.elsevier.com/ShibAuth/institutionLogin?entityID=https://idp.eng.nhs.uk/openathens&appReturnURL=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2FS0140-6736(17)31224-2) - from ClinicalKey

Available at [Lancet (London, England)](http://gateway.proquest.com/openurl?ctx_ver=Z39.88-2004&res_id=xri:pqm&req_dat=xri:pqil:pq_clntid=48368&rft_val_fmt=ori/fmt:kev:mtx:journal&genre=article&issn=0140-6736&volume=390&issue=10108&spage=2211) - from ProQuest (Health Research Premium) - NHS Version

Available at [Lancet (London, England)](http://www.thelancet.com/article/S0140673617312242/pdf) - from Unpaywall

**Abstract:**Diagnostics are crucial in mitigating the effect of disease outbreaks. Because diagnostic development and validation are time consuming, they should be carried out in anticipation of epidemics rather than in response to them. The diagnostic response to the 2014-15 Ebola epidemic, although ultimately effective, was slow and expensive. If a focused mechanism had existed with the technical and financial resources to drive its development ahead of the outbreak, point-of-care Ebola tests supporting a less costly and more mobile response could have been available early on in the diagnosis process. A new partnering model could drive rapid development of tests and surveillance strategies for novel pathogens that emerge in future outbreaks. We look at lessons learned from the Ebola outbreak and propose specific solutions to improve the speed of new assay development and ensure their effective deployment.

**Database:** Medline

**21. The Ebola outbreak, 2013-2016: old lessons for new epidemics.**

**Author(s):** Coltart, Cordelia E M; Lindsey, Benjamin; Ghinai, Isaac; Johnson, Anne M; Heymann, David L

**Source:** Philosophical transactions of the Royal Society of London. Series B, Biological sciences; May 2017; vol. 372 (no. 1721)

**Publication Date:** May 2017

**Publication Type(s):** Journal Article Review

**PubMedID:** 28396469

Available at [Philosophical Transactions of the Royal Society B: Biological Sciences](http://europepmc.org/search?query=(DOI:10.1098/rstb.2016.0297)) - from Europe PubMed Central - Open Access

Available at [Philosophical Transactions of the Royal Society B: Biological Sciences](https://royalsocietypublishing.org/doi/10.1098/rstb.2016.0297) - from HighWire - Free Full Text

Available at [Philosophical Transactions of the Royal Society B: Biological Sciences](https://royalsocietypublishing.org/doi/pdf/10.1098/rstb.2016.0297) - from Unpaywall

**Abstract:**Ebola virus causes a severe haemorrhagic fever in humans with high case fatality and significant epidemic potential. The 2013-2016 outbreak in West Africa was unprecedented in scale, being larger than all previous outbreaks combined, with 28 646 reported cases and 11 323 reported deaths. It was also unique in its geographical distribution and multicountry spread. It is vital that the lessons learned from the world's largest Ebola outbreak are not lost. This article aims to provide a detailed description of the evolution of the outbreak. We contextualize this outbreak in relation to previous Ebola outbreaks and outline the theories regarding its origins and emergence. The outbreak is described by country, in chronological order, including epidemiological parameters and implementation of outbreak containment strategies. We then summarize the factors that led to rapid and extensive propagation, as well as highlight the key successes, failures and lessons learned from this outbreak and the response.This article is part of the themed issue 'The 2013-2016 West African Ebola epidemic: data, decision-making and disease control'.

**Database:** Medline

**22. Clinical implications of and lessons learnt from external assessment of Mers-CoV diagnostics.**

**Author(s):** Pas, Suzan D; Koopmans, Marion P G; Niedrig, Matthias

**Source:** Expert review of molecular diagnostics; 2016; vol. 16 (no. 1); p. 7-9

**Publication Date:** 2016

**Publication Type(s):** Editorial

**PubMedID:** 26559930

Available at [Expert review of molecular diagnostics](https://www.tandfonline.com/doi/pdf/10.1586/14737159.2016.1116943?needAccess=true) - from Unpaywall

**Abstract:**With the emergence of new viral infections, it is necessary to set up new target-specific assays, based on existing molecular techniques such as real-time PCR, as quickly as possible. Without these diagnostic tools, the geographical spread of new infections, follow-up of the disease outbreak and analysis of the pathogenesis of the disease are not possible. Therefore, the genomic information of the emerging pathogen, diagnostic protocols and standards allowing quality control need to be available in a few days. This can only be implemented with good quality experienced laboratories having suitable infrastructure to establish in-house assays. Even though these molecular tools are available quickly, challenges still remain with what sample types to select for a proper diagnostic value.

**Database:** Medline

**23. Public health challenges and legacies of Japan's response to the Ebola virus disease outbreak in West Africa 2014 to 2015.**

**Author(s):** Saito, Tomoya

**Source:** Euro surveillance : bulletin Europeen sur les maladies transmissibles = European communicable disease bulletin; 2015; vol. 20 (no. 44)

**Publication Date:** 2015

**Publication Type(s):** Journal Article

**PubMedID:** 26559148

Available at [Euro surveillance : bulletin Europeen sur les maladies transmissibles = European communicable disease bulletin](https://www.eurosurveillance.org/deliver/fulltext/eurosurveillance/20/44/eurosurv-20-44-4.pdf?itemId=/content/10.2807/1560-7917.ES.2015.20.44.30056&mimeType=pdf&containerItemId=content/eurosurveillance) - from Unpaywall

**Abstract:**The largest outbreak of Ebola virus disease occurred in West Africa in 2014 and resulted in unprecedented transmission even in distant countries. In Japan, only nine individuals were screened for Ebola and there was no confirmed case. However, the government promoted the reinforcement of response measures and interagency collaboration, with training and simulation exercises conducted country-wide. The legacies included: publication of a communication policy on case disclosure, a protocol for collaboration between public health and other agencies, and establishing an expert committee to assemble the limited available expertise. There were challenges in taking proportionate and flexible measures in the management of people identified to be at high risk at entry points to Japan, in the decentralised medical response strategy, and in the medical countermeasures preparedness. The Ebola outbreak in West Africa provided a crucial opportunity to reveal the challenges and improve the preparedness for rare but high impact emerging diseases that are prone to be neglected. Efforts to uphold the lessons learnt and maintain public health preparedness should help prepare for future emerging diseases, including bioterrorist acts and pandemics.

**Database:** Medline

**24. The West African Ebola outbreak: finishing the job, preparing for future.**

**Author(s):** Parsons, Clare; Naeem Ahmad, Umar

**Source:** Transactions of the Royal Society of Tropical Medicine and Hygiene; Aug 2015; vol. 109 (no. 8); p. 481-482

**Publication Date:** Aug 2015

**Publication Type(s):** Journal Article

**PubMedID:** 26160255

Available at [Transactions of the Royal Society of Tropical Medicine and Hygiene](https://academic.oup.com/trstmh/article-pdf/109/8/481/5390939/trv053.pdf) - from Unpaywall

**Abstract:**As the West African Ebola Outbreak moves towards the final stages, we must consider the importance of remaining work and take heed of lessons learned in preparation for future outbreaks. Several issues pertinent to preparedness must be considered, including the remaining animal reservoir and potential for sexual transmission. Testing must be accessible and contact tracing robust to trace the last patient. Improved infection control procedures alongside education and training require guaranteed supply chains and ongoing funding. Effort must be sustained to prevent an even greater catastrophe than the one inflicted on West Africa today.

**Database:** Medline

**25. Public health response to two incidents of confirmed MERS-CoV cases travelling on flights through London Heathrow Airport in 2014 – lessons learnt.**

**Author(s):** Parry-Ford, F; Boddington, N; Pebody, R; Phin, N; Incident Management Team

**Source:** Euro surveillance : bulletin Europeen sur les maladies transmissibles = European communicable disease bulletin; May 2015; vol. 20 (no. 18)

**Publication Date:** May 2015

**Publication Type(s):** Journal Article

**PubMedID:** 25990234

Available at [Euro surveillance : bulletin Europeen sur les maladies transmissibles = European communicable disease bulletin](https://www.eurosurveillance.org/deliver/fulltext/eurosurveillance/20/18/art21114-en.pdf?itemId=/content/10.2807/1560-7917.ES2015.20.18.21114&mimeType=pdf&containerItemId=content/eurosurveillance) - from Unpaywall

**Abstract:**In May 2014, Public Health England was alerted to two separate laboratory-confirmed cases of Middle East respiratory syndrome coronavirus (MERS-CoV) infection who transited through London Heathrow Airport while symptomatic on flights from Saudi Arabia to the United States of America. We present the rationale for the public health response to both incidents, and report results of contact tracing. Following a risk assessment, passengers seated two seats around the cases were prioritised for contact tracing and a proactive media approach was used to alert all passengers on the planes of their possible exposure in both incidents. In total, 64 United Kingdom (UK) residents were successfully contacted, 14 of whom were sat in the priority area two seats all around the case(s). Five passengers reported respiratory symptoms within 14 days of the flight, but all tested were negative for MERS-CoV. Details of non-UK residents were passed on to relevant World Health Organization International Health Regulation focal points for follow-up, and no further cases were reported back. Different approaches were used to manage contact tracing for each flight due to variations in the quality and timeliness of the passenger contact information provided by the airlines involved. No evidence of symptomatic onward transmission was found.

**Database:** Medline

**26. Message in a bottle: lessons learned from antagonism of STING signalling during RNA virus infection.**

**Author(s):** Maringer, Kevin; Fernandez-Sesma, Ana

**Source:** Cytokine & growth factor reviews; Dec 2014; vol. 25 (no. 6); p. 669-679

**Publication Date:** Dec 2014

**Publication Type(s):** Research Support, Non-u.s. Gov't Research Support, N.i.h., Extramural Research Support, U.s. Gov't, Non-p.h.s. Journal Article Review

**PubMedID:** 25212897

Available at [Cytokine & Growth Factor Reviews](https://auth.elsevier.com/ShibAuth/institutionLogin?entityID=https://idp.eng.nhs.uk/openathens&appReturnURL=https%3A%2F%2Fwww.clinicalkey.com%2Fcontent%2FplayBy%2Fdoi%2F%3Fv%3D10.1016%2Fj.cytogfr.2014.08.004) - from ClinicalKey

Available at [Cytokine & Growth Factor Reviews](https://doi.org/10.1016/j.cytogfr.2014.08.004) - from Unpaywall

**Abstract:**STING has emerged in recent years as an important signalling adaptor in the activation of type I interferon responses during infection with DNA viruses and bacteria. An increasing body of evidence suggests that STING also modulates responses to RNA viruses, though the mechanisms remain less clear. In this review, we give a brief overview of the ways in which STING facilitates sensing of RNA viruses. These include modulation of RIG-I-dependent responses through STING's interaction with MAVS, and more speculative mechanisms involving the DNA sensor cGAS and sensing of membrane remodelling events. We then provide an in-depth literature review to summarise the known mechanisms by which RNA viruses of the families Flaviviridae and Coronaviridae evade sensing through STING. Our own work has shown that the NS2B/3 protease complex of the flavivirus dengue virus binds and cleaves STING, and that an inability to degrade murine STING may contribute to host restriction in this virus. We contrast this to the mechanism employed by the distantly related hepacivirus hepatitis C virus, in which STING is bound and inactivated by the NS4B protein. Finally, we discuss STING antagonism in the coronaviruses SARS coronavirus and human coronavirus NL63, which disrupt K63-linked polyubiquitination and dimerisation of STING (both of which are required for STING-mediated activation of IRF-3) via their papain-like proteases. We draw parallels with less-well characterised mechanisms of STING antagonism in related viruses, and place our current knowledge in the context of species tropism restrictions that potentially affect the emergence of new human pathogens.

**Database:** Medline

**27. Lessons learned from SARS outbreak prompt rapid response to new coronavirus.**

**Author(s):** Kuehn, Bridget M

**Source:** JAMA; Apr 2013; vol. 309 (no. 15); p. 1576-1577

**Publication Date:** Apr 2013

**Publication Type(s):** News

**PubMedID:** 23592087

Available at [JAMA](https://jamanetwork.com/journals/jama/articlepdf/1679396/jmn130013_1576_1577.pdf) - from Unpaywall

**Database:** Medline

**28. Lessons learned during active epidemiological surveillance of Ebola and Marburg viral hemorrhagic fever epidemics in Africa.**

**Author(s):** Allaranga, Yokouide; Kone, Mamadou Lamine; Formenty, Pierre; Libama, Francois; Boumandouki, Paul; Woodfill, Celia J I; Sow, Idrissa; Duale, Sambe; Alemu, Wondimagegnehu; Yada, Adamou

**Source:** East African journal of public health; Mar 2010; vol. 7 (no. 1); p. 30-36

**Publication Date:** Mar 2010

**Publication Type(s):** Journal Article Review

**PubMedID:** 21413569

**Abstract:**OBJECTIVETo review epidemiological surveillance approaches used during Ebola and Marburg hemorrhagic fever epidemics in Africa in the past fifteen years. Overall, 26 hemorrhagic epidemic outbreaks have been registered in 12 countries; 18 caused by the Ebola virus and eight by the Marburg virus. About 2551 cases have been reported, among which 268 were health workers (9,3%).METHODSBased on articles and epidemic management reports, this review analyses surveillance approaches, route of introduction of the virus into the population (urban and rural), the collaboration between the human health sector and the wildlife sector and factors that have affected epidemic management.FINDINGSSeveral factors affecting the epidemiological surveillance during Ebola and Marburg viruses hemorrhagic epidemics have been observed. During epidemics in rural settings, outbreak investigations have shown multiple introductions of the virus into the human population through wildlife. In contrast, during epidemics in urban settings a single introduction of the virus in the community was responsible for the epidemic. Active surveillance is key to containing outbreaks of Ebola and Marburg virusesCONCLUSIONSCollaboration with those in charge of the conservation of wildlife is essential for the early detection of viral hemorrhagic fever epidemics. Hemorrhagic fever epidemics caused by Ebola and Marburg viruses are occurring more and more frequently in Sub-Saharan Africa and only an adapted epidemiological surveillance system will allow for early detection and effective response.

**Database:** Medline