# Evidence Search Service Results of your search request

## COVID-related surgical mortality

**ID of request:** 23201  
**Date of request:** 13th May, 2020  
**Date of completion:** 27th May, 2020

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-related surgical mortality. Tom Roper. (27th May, 2020). BRIGHTON, UK: Brighton and Sussex Library and Knowledge Service.

**Sources searched**  
EMBASE (6)  
MEDLINE (9)  
medRxiv (0)

**Date range used** (5 years, 10 years): 2019 onwards   
**Limits used** (gender, article/study type, etc.): None   
**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.

To explain the way the search works, using the MEDLINE strategy, lines 1-11 find papers on  COVID-19, lines 12-14 hip fractures and lines 16-21 surgical mortality. These are then combined to find all those papers that either discuss hip fracture and COVID-19 or all papers that discuss hip fracture and surgical mortality. Requiring all three concepts to be present proved over-restrictive.

As well as MEDLINE and EMBASE, medRxiv, a pre-print repository, was also searched, but yielded no further papers.

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

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### [B. Search History](#SearchHistory)

## A. Original Research

1. **Covid-19 and perioperative mortality; where do we stand?**  
   Shakiba B. EClinicalMedicine 2020;22:100364.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=508a93148cd119a1b8d5b8323a4c4282)

1. **Disruption of joint arthroplasty services in Europe during the COVID-19 pandemic: an online survey within the European Hip Society (EHS) and the European Knee Associates (EKA).**  
   Thaler M. Knee surgery, sports traumatology, arthroscopy : official journal of the ESSKA 2020;:No page numbers.

PURPOSE: The aim of the present study was to evaluate the impact of the coronavirus (COVID-19) pandemic on joint arthroplasty service in Europe by conducting an online survey of arthroplasty surgeons., METHODS: The survey was conducted in the European Hip Society (EHS) and the European Knee Associates (EKA). The survey consisted of 20 questions (single, multiple choice, ranked). Four topics were addressed: (1) origin and surgical experience of the participant (four questions); (2) potential disruption of arthroplasty surgeries (12 questions); (3) influence of the COVID-19 pandemic on the particular arthroplasty surgeon (four questions); (4) a matrix provided 14 different arthroplasty surgeries and the participant was asked to state whether dedicated surgery was stopped, delayed or cancelled., RESULTS: Two-hundred and seventy-two surgeons (217 EHS, 55 EKA) from 40 different countries participated. Of the respondents, 25.7% stated that all surgeries were cancelled in their departments, while 68.4% responded that elective inpatient procedures were no longer being performed. With regard to the specific surgical procedures, nearly all primary TJA were cancelled (92.6%) as well as aseptic revisions (94.7%). In most hospitals, periprosthetic fractures (87.2%), hip arthroplasty for femoral neck fractures and septic revisions for acute infections (75.8%) were still being performed., CONCLUSION: During the current 2020 COVID-19 pandemic, we are experiencing a near-total shutdown of TJA. A massive cutback was observed for primary TJA and revision TJA, even in massively failed TJA with collapse, dislocation, component failure or imminent dislocation. Only life-threatening pathologies like periprosthetic fractures and acute septic TJA are currently undergoing surgical treatment., LEVEL OF EVIDENCE: V.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=ae50dbc061d2e0e9d8e50c1a1ab5af44)

1. **Epidemiologic characteristics of traumatic fractures in elderly patients during the outbreak of coronavirus disease 2019 in China**  
   Zhu Y. International Orthopaedics 2020;:No page numbers.

Purpose: This study aimed to describe the epidemiologic characteristics of fracture in the elderly during the COVID-19. Method(s): This was a retrospective multi-centre study, which included patients who sustained fractures between 20 January and 19 February 2020. The collected data included patients' demographics (age and gender), injury-related (injury type, fracture location, injury mechanism, places where fracture occurred), and treatment modality. SPSS 23.0 was used to describe the data and perform some analysis. Result(s): A total of 436 patients with 453 fractures were included; there were 153 males and 283 females, with an average age of 76.2 years (standard deviation, SD, 7.7 years; 65 to 105). For either males or females, 70-74 years was the most commonly involved age group. A total of 317 (72.7%) patients had their fractures occurring at home. Among 453 fractures, there were 264 (58.3%) hip fractures, accounting for 58.3%. Fall from standing height was the most common cause of fracture, making a proportion of 89.4% (405/453). Most fractures (95.8%, 434/453) were treated surgically, and 4.2% (19/453) were treated by plaster fixation or traction. Open reduction and internal fixation (ORIF) was the most used surgical method, taking a proportion of 49.2% (223/453). Conclusion(s): These findings highlighted the importance of primary prevention (home prevention) measures and could be used for references for individuals, health care providers, or health administrative department during the global pandemic of COVID-19.Copyright © 2020, SICOT aisbl.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=2aefcc9de0e99e0f6292ce79833b6a51)

1. **Hazardous Postoperative Outcomes of Unexpected COVID-19 Infected Patients: A Call for Global Consideration of Sampling all Asymptomatic Patients Before Surgical Treatment.**  
   Nahshon Chen World journal of surgery 2020;:No page numbers.

BACKGROUND: In December 2019, a novel coronavirus was identified as the cause of many pneumonia cases in China and eventually declared as a pandemic as the virus spread globally. Few reports were published on the outcome of surgical procedures in diagnosed COVID-19 patients and even fewer on the surgical outcomes of asymptomatic undiagnosed COVID-19 surgical patients. We aimed to review all published data regarding surgical outcomes of preoperatively asymptomatic untested coronavirus disease 2019 (COVID-19) patients., METHODS: This report is a review on the perioperative period in COVID-19 patients who were preoperatively asymptomatic and not tested for COVID-19. Searches were conducted in PubMed April 4th, 2020. All publications, of any design, were considered for inclusion., RESULTS: Four reports were identified through our literature search, comprising 64 COVID-19 carriers, of them 51 were diagnosed only in the postoperative period. Synthesis of these reports, concerning the postoperative outcomes of patients diagnosed with COVID-19 during the perioperative period, suggested a 14/51 (27.5%) postoperative mortality rate and severe mostly pulmonic complications, as well as medical staff exposure and transmission., CONCLUSIONS: COVID-19 may have potential hazardous implications on the perioperative course. Our review presents results of unacceptable mortality rate and a high rate of severe complications. These observations warrant further well-designed studies, yet we believe it is time for a global consideration of sampling all asymptomatic patients before surgical treatment.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=9458b62089e53658b8f15ecb829b3224)

1. **Impact of COVID-19 on maxillofacial surgery practice: a worldwide survey.**  
   Maffia F. International journal of oral and maxillofacial surgery 2020;:No page numbers.

The outbreak of coronavirus disease 2019 (COVID-19) is rapidly changing our habits. To date, April 12, 2020, the virus has reached 209 nations, affecting 1.8 million people and causing more than 110,000 deaths. Maxillofacial surgery represents an example of a specialty that has had to adapt to this outbreak, because of the subspecialties of oncology and traumatology. The aim of this study was to examine the effect of this outbreak on the specialty of maxillofacial surgery and how the current situation is being managed on a worldwide scale. To achieve this goal, the authors developed an anonymous questionnaire which was posted on the internet and also sent to maxillofacial surgeons around the globe using membership lists from various subspecialty associations. The questionnaire asked for information about the COVID-19 situation in the respondent's country and in their workplace, and what changes they were facing in their practices in light of the outbreak. The objective was not only to collect and analyse data, but also to highlight what the specialty is facing and how it is handling the situation, in the hope that this information will be useful as a reference in the future, not only for this specialty, but also for others, should COVID-19 or a similar global threat arise again. Copyright © 2020 International Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=ea2b3516232e78697f0d926ad7968f11)

1. **Impact of the coronavirus (COVID-19) pandemic on surgical practice - Part 2 (surgical prioritisation).**  
   Al-Jabir Ahmed International journal of surgery (London, England) 2020;:No page numbers.

The Coronavirus (COVID-19) Pandemic represents a once in a century challenge to human healthcare with 2.4 million cases and 165,000 deaths thus far. Surgical practice has been significantly impacted with all specialties writing guidelines for how to manage during this crisis. All specialties have had to triage the urgency of their daily surgical procedures and consider non-surgical management options where possible. The Pandemic has had ramifications for ways of working, surgical techniques, open vs minimally invasive, theatre workflow, patient and staff safety, training and education. With guidelines specific to each specialty being implemented and followed, surgeons should be able to continue to provide safe and effective care to their patients during the COVID-19 pandemic. In this comprehensive and up to date review we assess changes to working practices through the lens of each surgical specialty. Copyright © 2020 IJS Publishing Group Ltd. Published by Elsevier Ltd. All rights reserved.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=5dce83999055f5a9727ed88901c79d43)

1. **Impact of the COVID-19 Pandemic on an Emergency Traumatology Service: Experience at a Tertiary Trauma Centre in Spain**  
   Nunez J.H. Injury 2020;:No page numbers.

Introduction: The severe disruptions caused by the SARS-CoV-2 coronavirus have necessitated a redistribution of resources to meet hospitals' current service needs during this pandemic. The aim of this study was to provide an overview of the impact of the pandemic, and its corresponding State of Emergency, on a tertiary traumatology emergency service. Method(s): An observational study was performed at a tertiary hospital within the Spanish National Health System. Four different periods were studied, including the first 20 days of Spain's current State of Emergency, from March 14 to April 02, 2020 (Period 4). This period was compared to the 20-day period prior to the State of Emergency (Period 3), and to matching periods in the two previous years (Periods 1 and 2). A total of 6,565 patient visits were analyzed: 1909 in Period 1 (29.1%), 2161 in Period 2 (32.9%), 1983 in Period 3 (30.2%), and 512 in Period 4 (7.8%). Variables collected included patient age and sex, insurance type, discharge destination and reason for hospital admission. Result(s): The patients' mean age was 55.1 years old (Standard Deviation (SD): 22.1), and 51.8% were women (3495/6565). During the COVID-19 pandemic, there were significant reductions in total visits to the trauma emergency department, workplace accidents, traffic accidents and number of hospital admissions, particularly during Period 4. However, no statistically-significant differences were found in the number of osteoporotic hip fractures admitted between the four periods. The numbers of hospital admissions for osteoporotic hip fracture were 42 during Period 1, 41 during Period 2, 43 during Period 3 and 36 during Period 4. Conclusion(s): While most traumatological presentations decreased in frequency over the course of the outbreak, the number of osteoporotic hip fractures remained stable. Thus, contingency plans in times of crisis need to be carefully targeted, and to keep in mind certain public health issues that do not decrease, despite a State of Emergency, like osteoporotic hip fractures.Copyright © 2020 Elsevier Ltd

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1. **Limiting spread of COVID-19 in an orthopaedic department - A perspective from Spain**  
   Gomez-Barrena E. Journal of Surgical Case Reports 2020;2020(4):1-3.

Besides national and international recommendations, orthopaedic departments face significant changes in daily activity and serious issues to maintain their standards in musculoskeletal care during the pandemic Covid-19 crisis that we are facing. This report retrospectively addresses measures that were progressively put in place to modify in a week time the activity of a busy orthopaedic department in a large tertiary university hospital in face of the pandemic. Surgical priorities and surgical outcomes are key aspects to consider. The experience may offer some insight to areas where the spread of the disease may be slower or delayed. Abrupt stop of scheduled surgery and clinics is useful to adapt an orthopaedic department to the overall hospital resource reorganization. Orthopaedic surgeons need to be aware of the risks to patients and personnel in view of underdiagnosed cases, which make pre-operative Covid-19 evaluation mandatory for all surgical cases.Copyright © The Author(s) 2020.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=4740f0a83a9d92b406dd961f934d9eb9)

1. **Mitigating the risk of aerosol generation from power tools during the COVID-19 pandemic.**  
   Williams M. Annals of the Royal College of Surgeons of England 2020;102(5):393-394.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=e15d76b063a61bf9155e9a1e41209984)

1. **Mortality Rates of Patients with Proximal Femoral Fracture in a Worldwide Pandemic: Preliminary Results of the Spanish HIP-COVID Observational Study.**  
   Munoz Vives Josep Maria The Journal of bone and joint surgery. American volume 2020;:No page numbers.

BACKGROUND: The outbreak of coronavirus disease 2019 (COVID-19), caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2), in December 2019 in Wuhan, People's Republic of China, has developed into an unprecedented pandemic with enormous pressure on health-care providers around the world. A higher mortality rate has been described in older infected individuals. Patients with hip fracture are a particularly vulnerable population during this pandemic because older age is associated with a higher mortality rate. Our aim was to describe the early mortality rate and demographic variables in a hip fracture sample population in Spain during the coronavirus pandemic., METHODS: This is a multicenter, observational, retrospective, descriptive study. We collected data from 13 major hospitals in Spain from the beginning of the national state of alarm (declared on March 14, 2020, by the Spanish government) until the end of our study period on April 4, 2020. All patients who were >=65 years of age, presented to the Emergency Department of the participating hospitals during this period with a diagnosis of proximal femoral fracture, and had a minimum follow-up of 10 days were included in the cohort. In addition to mortality, demographic and other potential prognostic variables were also collected., RESULTS: In this study, 136 patients with a hip fracture were included. Of these patients, 124 underwent a surgical procedure and 12 were managed nonoperatively. The total mortality rate was 9.6%. Sixty-two patients were tested for COVID-19, with 23 patients being positive. The mortality rate for these 23 patients was 30.4% (7 of 23 patients) at a mean follow-up of 14 days. The mortality rate was 10.3% (4 of 39) for patients who had been tested and had a negative result and 2.7% (2 of 74) for patients who had not been tested. Of the 12 patients who were managed nonoperatively, 8 (67%) died, whereas, of the 124 patients who were surgically treated, 5 (4%) died. Results differed among centers., CONCLUSIONS: There is a higher mortality rate in patients with a hip fracture and an associated positive test for COVID-19., LEVEL OF EVIDENCE: Prognostic Level IV. See Instructions for Authors for a complete description of levels of evidence.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=14b7b00f3e79f0df2ef06b566b9bb38b)

1. **Prehabilitation May Help Mitigate an Increase in COVID-19 Peri-Pandemic Surgical Morbidity and Mortality**  
   Silver J.K. American journal of physical medicine & rehabilitation 2020;:No page numbers.

As physicians specializing in rehabilitation medicine consider sequelae from the novel coronavirus pandemic that began in 2019, one issue that should be top of mind is the physiologic effect that large scale social distancing had on the health of patients in general, but more specifically on pre-operative patients who had their surgeries delayed or will have newly scheduled procedures during the peri-pandemic period. Predictably, as the virus becomes less prevalent, there will be a tremendous motivation to move forward with scheduling operations from both patient care and institutional perspectives. However, one can anticipate a pandemic-related increase in surgical morbidity and mortality above pre-pandemic levels, particularly in older or medically frail patients even if they did not have COVID-19. Therefore, now is the time to consider wider adoption of prehabilitation for patients awaiting surgery-physical and psychological assessments that establish a baseline functional level, identify impairments, and provide interventions that promote physical and psychological health to reduce the incidence and/or severity of future impairments.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=891e6e539ad14e189afa8b0d3cccfdef)

1. **Preventive strategy for the clinical treatment of hip fractures in the elderly during the COVID-19 outbreak: Wuhan's experience**  
   Liu J. Aging 2020;12:No page numbers.

Hip fractures in the elderly account for more than half of osteoporotic fractures and represent a substantial economic and social burden. Novel coronavirus pneumonia (COVID-19), which began to spread in December 2019, has created challenges in the management of elderly hip fracture patients, not only by influencing the choice of operation and postoperative rehabilitation methods, but also by generating new risks for the medical staff. During this period, our infection and orthopedic treatment unit in the center of the epidemic area effectively treated 82 elderly patients with hip fracture, and no cross-infection occurred. Therefore, our experience in prevention and treatment is worth recommending to frontline anti-epidemic personnel.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=a4967199b47ca1e54340811e903b5270)

1. **Proximal femur fractures in COVID-19 emergency: the experience of two Orthopedics and Traumatology Departments in the first eight weeks of the Italian epidemic.**  
   Maniscalco Pietro Acta bio-medica : Atenei Parmensis 2020;91(2):89-96.

INTRODUCTION: CoVID-19 (Coronavirus disease) is a worldwide infection which is causing millions of deaths. A significant number of elderly patients require hospitalization and develop serious and sometimes life-threatening complications. The aim of this study is to evaluate the preliminary impact (8 weeks) of CoVID-19, focusing on proximal femur fractures, analyzing data and results compared to the same period of 2019., MATERIALS AND METHODS: From February 22nd to April 18th, 2020 we surgically treated 121 proximal femur fractures (61 in Piacenza; 60 in Parma, 16 male, 44 female, mean age 81.1). In the same period of 2019, we treated 169 proximal femur fractures (90 in Piacenza, 33 male, 57 female, mean age 81.9; 79 in Parma, 29 males, 50 female, mean age 80.2). We had 21/61 (34.4%) patients resulted positive for COVID-19 and 11/61 in Parma (18.3%), based on nasal-pharyngeal swab, chest CT scan and/or lung US findings., RESULTS: The incidence of proximal femur fractures had a significant reduction during CoVID-19 spread in Piacenza and Parma. Authors have noticed an elevated number of deaths within 21 days after surgery. Piacenza: 4 cases in 2019 (4.4%) and 11 in 2020 (18.0%), of which 9 cases CoVID positive. In Parma in 2019 two deaths were encountered; in 2020 6 patients died and 5 cases were CoVID positive., CONCLUSION: In the first two months of the Italian epidemic, in the cities of Piacenza and Parma over 80% of deaths have occurred in patients over 70 years old. Even if preliminary, our study shows a significant increase in death in elderly patients surgically treated for proximal femur fractures, particularly in the Piacenza Hospital.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=4b6b470f899baea8f7c92a5d6b711053)

1. **Treatment of Proximal Femoral Fragility Fractures in Patients with COVID-19 During the SARS-CoV-2 Outbreak in Northern Italy.**  
   Catellani Francesco The Journal of bone and joint surgery. American volume 2020;:No page numbers.

BACKGROUND: From February 20 to April 2020, the coronavirus SARS (severe acute respiratory syndrome)-CoV-2 spread in northern Italy, drastically challenging the care capacities of the national health care system. Unprepared for this emergency, hospitals have quickly reformulated paths of assistance in an effort to guarantee treatment for infected patients. Orthopaedic departments have been focused on elderly traumatology, especially the treatment of femoral neck fractures in patients with coronavirus disease-2019 (COVID-19). The purpose of the present study was to evaluate the orthopaedic management strategy for femoral fragility fractures in COVID-19-positive patients with the hypothesis that operative treatment may contribute to the overall stability of the patient., METHODS: Sixteen patients affected by proximal femoral fracture and a recent history of fever, shortness of breath, and desaturation were admitted to the emergency room. Thoracic computed tomography (CT) and oropharyngeal swabs confirmed that they were positive for COVID-19, requiring hospitalization and prophylaxis with low-molecular-weight heparin., RESULTS: Three patients died before surgery because of severe respiratory insufficiency and multiple-organ-failure syndrome. Ten patients underwent surgery on the day after admission, whereas 3 patients had suspended their use of direct thrombin inhibitors and needed surgery to be delayed until the third day after admission. In all patients except 1, we noted an improvement in terms of O2 saturation and assisted respiration. In 9 patients, hemodynamic and respiratory stability was observed at an average of 7 days postoperatively. Four patients who underwent surgical treatment died of respiratory failure on the first day after surgery (1 patient), the third day after surgery (2 patients), or the seventh day after surgery (1 patient)., CONCLUSIONS: We noted a stabilization of respiratory parameters in 12 COVID-19-positive patients who underwent surgery treatment of proximal femoral fractures. We believe that in elderly patients with COVID-19 who have proximal femoral fractures, surgery may contribute to the overall stability of the patient, seated mobilization, improvement in physiological ventilation, and general patient comfort in bed., LEVEL OF EVIDENCE: Prognostic Level IV. See Instructions for Authors for a complete description of levels of evidence.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=5b259b218fc0d87382fabd49b4d78d34)

1. **[Consideration of surgeons participating in COVID-19 emergency medical rescue].**  
   Li S. Zhonghua wai ke za zhi [Chinese journal of surgery] 2020;58(0):E025.

As a newly epidemic, COVID-19 with a concentrated outbreak poses a great challenge to medical treatment. The severe and critical patients are complex complicatied with the psychological problems, and the medical staff are overworked and under tremendous psychological pressure. The surgeon participated in emergency medical rescue could provide professional treatment for the patients combined with surgical diseases, specialized training for the non-surgeon crew, to reduce surgical-related mortality. With the advantages of good team consciousness, strong aseptic concept and good psychological quality, the surgeons can quickly adapt to and carry out rescue work under the premise of good self-protection. Surgeons need to develop critical care management concepts and focus on the critical care support equipment associated with the outbreak. Some suggestions are put forward for the standardized training of resident surgeons to cultivate compound talents. It is hoped that this artical can lead to the thinking of how to participate in the emergency medical rescue of infectious diseases among surgeons and provide some enlightenment for future surgical education.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=a12abceb0c629da8954f76bc7d5387d2)

### Opening Internet Links

The links to internet sites in this document are 'live' and can be opened by holding down the CTRL key on your keyboard while clicking on the web address with your mouse

### 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.

## B. Search History

|  | **Source** | **Criteria** | **Results** |
| --- | --- | --- | --- |
| 1. | MEDLINE | exp coronavirus/ | 14646 |
| 2. | MEDLINE | exp Coronavirus Infections/ | 13506 |
| 3. | MEDLINE | ((corona\* or corono\*) adj1 (virus\* or viral\* or virinae\*)).ti,ab,kw,kf. | 1093 |
| 4. | MEDLINE | (coronavirus\* or coronovirus\* or coronavirinae\* or CoV).ti,ab,kw,kf. | 21594 |
| 5. | MEDLINE | ("2019-nCoV\*" or 2019nCoV\* or "19-nCoV\*" or 19nCoV\* or nCoV2019\* or "nCoV-2019\*" or nCoV19\* or "nCoV-19\*" or "COVID-19\*" or COVID19\* or "COVID-2019\*" or COVID2019\* or "HCoV-19\*" or HCoV19\* or "HCoV-2019\*" or HCoV2019\* or "2019 novel\*" or Ncov\* or "n-cov" or "SARS-CoV-2\*" or "SARSCoV-2\*" or "SARSCoV2\*" or "SARS-CoV2\*" or SARSCov19\* or "SARS-Cov19\*" or "SARSCov-19\*" or "SARS-Cov-19\*" or SARSCov2019\* or "SARS-Cov2019\*" or "SARSCov-2019\*" or "SARS-Cov-2019\*" or SARS2\* or "SARS-2\*" or SARScoronavirus2\* or "SARS-coronavirus-2\*" or "SARScoronavirus 2\*" or "SARS coronavirus2\*" or SARScoronovirus2\* or "SARS-coronovirus-2\*" or "SARScoronovirus 2\*" or "SARS coronovirus2\*" or covid).ti,ab,kw,kf. | 16690 |
| 6. | MEDLINE | (respiratory\* adj2 (symptom\* or disease\* or illness\* or condition\*) adj5 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw,kf. | 260 |
| 7. | MEDLINE | (("seafood market\*" or "food market\*") adj10 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw,kf. | 61 |
| 8. | MEDLINE | (pneumonia\* adj3 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw,kf. | 411 |
| 9. | MEDLINE | ((outbreak\* or wildlife\* or pandemic\* or epidemic\*) adj1 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw,kf. | 236 |
| 10. | MEDLINE | "severe acute respiratory syndrome\*".ti,ab,kw,kf. | 6411 |
| 11. | MEDLINE | 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 | 38607 |
| 12. | MEDLINE | exp Hip Fractures/ | 23748 |
| 13. | MEDLINE | ((hip or femur\* or femor\*) adj3 fracture\*).ti,ab. | 37937 |
| 14. | MEDLINE | 12 or 13 | 44430 |
| 15. | MEDLINE | 11 and 14 | 10 |
| 16. | MEDLINE | exp Mortality/ | 378693 |
| 17. | MEDLINE | exp Postoperative Complications/ | 542270 |
| 18. | MEDLINE | 16 and 17 | 25711 |
| 19. | MEDLINE | ((surgery or surgical) adj3 (mortality or death\*) OR ((postoperative or post-operative) adj3 (mortality or death)).ti,ab. | 18087 |
| 20. | MEDLINE | 18 or 19 | 41858 |
| 21. | MEDLINE | 11 and 20 | 3 |
| 22. | MEDLINE | 15 or 21 | 13 |
| 23. | MEDLINE | 15 or 21 | 13 |
| 24. | MEDLINE | limit 23 to yr="2019 -Current" | 9 |
| 1. | EMBASE | exp Coronavirinae/ | 14195 |
| 2. | EMBASE | exp Coronavirus infection/ | 13494 |
| 3. | EMBASE | ("coronavirus disease 2019" or "severe acute respiratory syndrome coronavirus 2").sh,dj. | 7809 |
| 4. | EMBASE | ((corona\* or corono\*) adj1 (virus\* or viral\* or virinae\*)).ti,ab,kw. | 764 |
| 5. | EMBASE | (coronavirus\* or coronovirus\* or coronavirinae\* or CoV).ti,ab,kw. | 20773 |
| 6. | EMBASE | ("2019-nCoV\*" or 2019nCoV\* or "19-nCoV\*" or 19nCoV\* or nCoV2019\* or "nCoV-2019\*" or nCoV19\* or "nCoV-19\*" or "COVID-19\*" or COVID19\* or "COVID-2019\*" or COVID2019\* or "HCoV-19\*" or HCoV19\* or "HCoV-2019\*" or HCoV2019\* or "2019 novel\*" or Ncov\* or "n-cov" or "SARS-CoV-2\*" or "SARSCoV-2\*" or "SARSCoV2\*" or "SARS-CoV2\*" or SARSCov19\* or "SARS-Cov19\*" or "SARSCov-19\*" or "SARS-Cov-19\*" or SARSCov2019\* or "SARS-Cov2019\*" or "SARSCov-2019\*" or "SARS-Cov-2019\*" or SARS2\* or "SARS-2\*" or SARScoronavirus2\* or "SARS-coronavirus-2\*" or "SARScoronavirus 2\*" or "SARS coronavirus2\*" or SARScoronovirus2\* or "SARS-coronovirus-2\*" or "SARScoronovirus 2\*" or "SARS coronovirus2\*" or covid).ti,ab,kw. | 11378 |
| 7. | EMBASE | (respiratory\* adj2 (symptom\* or disease\* or illness\* or condition\*) adj5 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw. | 311 |
| 8. | EMBASE | (("seafood market\*" or "food market\*") adj10 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw. | 61 |
| 9. | EMBASE | (pneumonia\* adj3 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw. | 421 |
| 10. | EMBASE | ((outbreak\* or wildlife\* or pandemic\* or epidemic\*) adj1 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw. | 106 |
| 11. | EMBASE | "severe acute respiratory syndrome\*".ti,ab,kw. | 6192 |
| 12. | EMBASE | or/1-11 | 37695 |
| 13. | EMBASE | exp hip fracture/ | 37474 |
| 14. | EMBASE | ((hip or femur\* or femor\*) adj3 fracture\*).ti,ab. | 48366 |
| 15. | EMBASE | 13 or 14 | 61035 |
| 16. | EMBASE | 12 and 15 | 8 |
| 17. | EMBASE | surgical mortality/ | 53640 |
| 18. | EMBASE | ((postoperative or post-operative) adj3 (mortality or death)).ti,ab. | 26450 |
| 19. | EMBASE | ((surgery or surgical) adj3 (mortality or death\*)).ti,ab. | 23272 |
| 20. | EMBASE | 17 or 18 or 19 | 87137 |
| 21. | EMBASE | 12 and 20 | 6 |
| 22. | EMBASE | 16 or 21 | 14 |
| 23. | EMBASE | limit 22 to yr="2019 -Current" | 6 |

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