# Evidence Search Service Results of your search request

## Reinfection with COVID-19

**ID of request:** 24687  
**Date of request:** 10th August, 2020  
**Date of completion:** 11th August, 2020

If you would like to request any articles or any further help, please contact:  Jason Curtis at [jason.curtis1@nhs.net](mailto:jason.curtis1@nhs.net)

Please acknowledge this work in any resulting paper or presentation as: Evidence search: Reinfection with COVID-19. Jason Curtis. (11th August, 2020). SHREWSBURY, UK: Shrewsbury and Telford Health Libraries.

**Sources searched**  
EMBASE (5)  
MEDLINE (14)  
TRIP Database (1)  
UpToDate (1)

**Date range used** (5 years, 10 years): 2020 -   
**Limits used** (gender, article/study type, etc.): English-language only   
**Search terms and notes** (full search strategy for database searches below):

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

Searched: Medline, EMBASE, TRIP Database, Cochrane Library, CEBM COVID-19 search bank

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

## Contents

[A. Synopses or Summaries](#Content2)

Health Information and Quality Authority, Ireland

[Evidence summary of immunity response following infection with COVID-19](#Research720765)

UpToDate

[Coronavirus disease 2019 (COVID-19): Epidemiology, virology, and prevention](#Research720763)

[B. Original Research](#Content5)

1. [A case of a readmitted patient who recovered from COVID-19 in Chengdu, China](#Research720761)
2. [A case presentation for positive SARS-CoV-2 RNA recurrence in a patient with a history of type 2 diabetes that had recovered from severe COVID-19.](#Research720748)
3. [A case report of possible novel coronavirus 2019 reinfection.](#Research720751)
4. [Clinical characteristics of severe acute respiratory syndrome coronavirus 2 reactivation.](#Research720746)
5. [Clinical recurrences of COVID-19 symptoms after recovery: viral relapse, reinfection or inflammatory rebound?](#Research720753)
6. [COVID-19 Reinfection: Myth or Truth?](#Research720759)
7. [Direct Observation of Repeated Infections With Endemic Coronaviruses.](#Research720755)
8. [Efficacy of Serology Testing in Predicting Reinfection in Patients with SARS-CoV-2](#Research720758)
9. [Positive SARS-CoV-2 RNA recurs repeatedly in a case recovered from COVID-19: dynamic results from 108 days of follow-up.](#Research720745)
10. [Positive SARS-Cov-2 test in a woman with COVID-19 at 22 days after hospital discharge: A case report](#Research720762)
11. [Recurrence of COVID-19 after recovery: a case report from Italy.](#Research720757)
12. [Recurrence of positive SARS-CoV-2 in patients recovered from COVID-19](#Research720760)
13. [Recurrence of positive SARS-CoV-2 RNA in COVID-19: A case report.](#Research720747)
14. [Recurrence of positive SARS-CoV-2 viral RNA in recovered COVID-19 patients during medical isolation observation.](#Research720749)
15. [Recurrence or Relapse of COVID-19 in Older Patients: A Description of Three Cases.](#Research720752)
16. [Recurrent pneumonia in a patient with new coronavirus infection after discharge from hospital for insufficient antibody production: a case report.](#Research720750)
17. [Retest positive for SARS-CoV-2 RNA of "recovered" patients with COVID-19: Persistence, sampling issues, or re-infection?](#Research720744)
18. [Seven discharged patients turning positive again for SARS-CoV-2 on quantitative RT-PCR.](#Research720754)
19. [The treatment and follow-up of 'recurrence' with discharged COVID-19 patients: data from Guizhou, China.](#Research720756)

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

## A. Synopses or Summaries

#### Health Information and Quality Authority, Ireland

**Evidence summary of immunity response following infection with COVID-19** (2020)

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=c3ceada725347e0a136bbf17bd40d546)

Among the conclusions, the report (written in May 2020) finds 'it is not yet possible to conclude whether reinfection following recovery from SARS-CoV-2 occurs.'

#### UpToDate

**Coronavirus disease 2019 (COVID-19): Epidemiology, virology, and prevention** (2020)

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=d3562608b9a0db5537bc8dcc88810840)

See section on 'Immunity and risk of infection' which states that the 'the short-term risk of reinfection (e.g., within the first few months after initial infection) appears low'.

## B. Original Research

1. **A case of a readmitted patient who recovered from COVID-19 in Chengdu, China**  
   Li X.-J. Critical Care 2020;24(1):No page numbers.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=5405e53307ce8b3dc06ae798b8ab847c)

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[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=3c4c2ce0c48433656d13b481c30ec296)

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=e029b8279441ee0b467b31e225acddfe)

1. **A case presentation for positive SARS-CoV-2 RNA recurrence in a patient with a history of type 2 diabetes that had recovered from severe COVID-19.**  
   Dou Chengyun Diabetes research and clinical practice 2020;166:108300.

Coronavirus disease 2019 (COVID-19) is considered to be spread primarily by people who have tested positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Here, we discuss a patient with severe COVID-19 and a history of type 2 diabetes who had a recurrence of positive SARS-CoV-2 ribonucleic acid (RNA) after recovering. The patient was initially discharged after two consecutive negative SARS-CoV-2 RNA tests and partially absorbed bilateral lesions on chest computed tomography (CT). However, at his first follow-up, reverse transcription-polymerase chain reaction (RT-PCR) assay with an oropharyngeal swab sample was positive for SARS-CoV-2. Despite this, he displayed no obvious clinical symptoms and improved chest CT. The patient was prescribed anti-viral medication. Eight consecutive RT-PCR assays on oropharyngeal swab specimens were conducted after he was re-admitted to our hospital. The results tested positive on the 12th, 14th, 19th, 23rd and 26th of March and negative on the 28th of March, and 6th and 12th of April. After his second discharge, he has tested negative for 5 weeks. This case highlights the importance of active surveillance of SARS-CoV-2 RNA during the follow-up period so that an infectivity assessment can be made.

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1. **A case report of possible novel coronavirus 2019 reinfection.**  
   Duggan Nicole M. The American journal of emergency medicine 2020;:No page numbers.

Since December 2019, COVID-19, the clinical syndrome associated with SARS-CoV-2 infection, has infected more than 6.2 million people and brought the function of the global community to a halt. As the number of patients recovered from COVID-19 rises and the world transitions toward reopening, the question of acquired immunity versus the possibility of reinfection are critical to anticipating future viral spread. Here, we present a case of a patient previously recovered from COVID-19 who re-presents with new respiratory, radiographical, laboratory, and RT-PCR findings concerning for re-infection. We review this case in the context of the evolving discussion and theories surrounding dynamic RT-PCR results, prolonged viral shedding, and the possibility of developed immunity.

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1. **Clinical characteristics of severe acute respiratory syndrome coronavirus 2 reactivation.**  
   Ye Guangming The Journal of infection 2020;80(5):e14.

OBJECTIVESPrevious studies on the pneumonia outbreak caused by the 2019 novel coronavirus disease (COVID-19) were based on information from the general population. However, limited data was available for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) reactivation. This study aimed to evaluate the clinical characteristics of the SARS-CoV-2 reactivation.METHODSClinical records, laboratory results, and chest CT scans were retrospectively reviewed for 55 patients with laboratory-confirmed COVID-19 pneumonia (i.e., with throat swab samples that were positive for SARS-CoV-2) who were admitted to Zhongnan Hospital of Wuhan University, Wuhan, China, from Jan. 8 to Feb. 10, 2020.RESULTSAll 55 patients had a history of epidemiological exposure to COVID-19, and 5 (9%) patients who discharged from hospital presented with SARS-CoV-2 reactivation. Among the 5 reactivated patients, other symptoms were also observed, including fever, cough, sore throat, and fatigue. One of the 5 patients had progressive lymphopenia (from 1.3 to 0.56 × 109 cells per L) and progressive neutrophilia (from 4.5 to 18.28 × 109 cells per L). All 5 reactivated patients presented normal aminotransferase levels. Throat swab samples from the 5 reactivated patients were tested for SARS-CoV-2, indicating all positive for the virus.CONCLUSIONSFindings from this small group of cases suggested that there was currently evidence for reactivation of SARS-CoV-2 and there might be no specific clinical characteristics to distinguish them.

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1. **Clinical recurrences of COVID-19 symptoms after recovery: viral relapse, reinfection or inflammatory rebound?**  
   Batisse Dominique The Journal of infection 2020;:No page numbers.

For the first 3 months of COVID-19 pandemic, COVID-19 was expected to be an immunizing non-relapsing disease. We report a national case series of 11 virologically-confirmed COVID-19 patients having experienced a second clinically- and virologically-confirmed acute COVID-19 episode. According to the clinical history, we discuss either re-infection or reactivation hypothesis. Larger studies including further virological, immunological and epidemiologic data are needed to understand the mechanisms of these recurrences.

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1. **COVID-19 Reinfection: Myth or Truth?**  
   Roy S. SN Comprehensive Clinical Medicine 2020;2(6):710-713.

The novel coronavirus disease (COVID-19) has posed a large problem to this world and has exposed the skeleton of healthcare system all over. There have been reports of patients getting reinfected with COVID-19 as they tested positive for the virus again after discharge. We try to address the issue of this reinfection and want to clarify whether this entity actually exists or is it just a myth.<br/>Copyright &#xa9; 2020, Springer Nature Switzerland AG.

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1. **Direct Observation of Repeated Infections With Endemic Coronaviruses.**  
   Galanti Marta The Journal of infectious diseases 2020;:No page numbers.

BACKGROUNDAlthough the mechanisms of adaptive immunity to pandemic severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) are still unknown, the immune response to the widespread endemic coronaviruses HKU1, 229E, NL63, and OC43 provide a useful reference for understanding repeat infection risk.METHODSHere we used data from proactive sampling carried out in New York City from fall 2016 to spring 2018. We combined weekly nasal swab collection with self-reports of respiratory symptoms from 191 participants to investigate the profile of recurring infections with endemic coronaviruses.RESULTSDuring the study, 12 individuals tested positive multiple times for the same coronavirus. We found no significant difference between the probability of testing positive at least once and the probability of a recurrence for the betacoronaviruses HKU1 and OC43 at 34 weeks after enrollment/first infection. We also found no significant association between repeat infections and symptom severity, but found strong association between symptom severity and belonging to the same family.CONCLUSIONSThis study provides evidence that reinfections with the same endemic coronavirus are not atypical in a time window shorter than 1 year and that the genetic basis of innate immune response may be a greater determinant of infection severity than immune memory acquired after a previous infection.

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1. **Efficacy of Serology Testing in Predicting Reinfection in Patients with SARS-CoV-2**  
   Chaturvedi R. Disaster medicine and public health preparedness 2020;:1-7.

In many parts of the United States, SARS-CoV-2 cases have reached peak infection rates, prompting administrators to create protocols to resume elective cases. As elective procedures and surgeries get scheduled, ASCs must implement some form of widespread testing in order to ensure the safety of both the ASC staff as well as the patients being seen. The CDC recently announced the approval of new serological testing for SARS-CoV-2, a test that can indicate the presence of IgM and IgG antibodies in the serum against viral particles. However, the possibility for reinfection raises questions about the utility of this new serological test, as the presence of IgG may not correspond to long-term immunity. The coronavirus has been known to form escape mutations, which may correspond to reduction in immunoglobulin binding capacity. Patients who develop more robust immune responses with formation of memory CD8+ T-cells and helper CD4+ T-cells will be the most equipped if exposed to the virus, but unfortunately the serology test will not help us in distinguishing those individuals. Given the inherent disadvantages of serological testing, antibody testing alone should not be used when deciding patient care and should be combined with PCR testing.

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1. **Positive SARS-CoV-2 RNA recurs repeatedly in a case recovered from COVID-19: dynamic results from 108 days of follow-up.**  
   Liu Fang Pathogens and disease 2020;78(4):No page numbers.

The evidence of long-term clinical dynamic on Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) RNA re-positive case are less. We performed a 108 days follow-up on dynamic clinical presentations in a case, who hospitalized three times due to the positive recurrence of SARS-CoV-2 RNA after discharge, to understand the prognosis of the 2019-Coronavirus disease (COVID-19). In this case, positive SARS-CoV-2 recurred even after apparent recovery (normal CT imaging, no clinical symptoms, negative SARS-CoV-2 on stool sample and negative serum IgM test) from COVID-19, viral shedding duration lasted for 65 days, the time from symptom onset to disappearance was up to 95 days. Erythrocyte-associated indicators, liver function and serum lipid metabolism presented abnormal throughout during the observation period. Awareness of atypical presentations such as this one is important to prompt the improvement of the management of COVID-19.

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1. **Positive SARS-Cov-2 test in a woman with COVID-19 at 22 days after hospital discharge: A case report**  
   Luo A. Journal of Traditional Chinese Medical Sciences 2020;:No page numbers.

Background: In a few discharged patients with coronavirus disease 2019 (COVID-19), the nucleic acid test shows positive results again. Whether this is due to relapse of the disease, reinfection by the virus, or a false-positive result at hospital discharge is worth exploring. Case presentation: A woman with COVID-19 was discharged from the hospital after integrative treatment with traditional Chinese and Western medicine because she met the discharge standards. However, she obtained positive results on a nucleic acid test 22 days later. <br/>Conclusion(s): Based on this positive test result in a discharged patient with COVID-19, anal tests and coronavirus antibody tests should be combined with throat swab tests to further develop the diagnosis and discharge standards for patients with COVID-19.<br/>Copyright &#xa9; 2020 Beijing University of Chinese Medicine

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1. **Recurrence of COVID-19 after recovery: a case report from Italy.**  
   Loconsole Daniela Infection 2020;:No page numbers.

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1. **Recurrence of positive SARS-CoV-2 in patients recovered from COVID-19**  
   Hoang V.T. Journal of Medical Virology 2020;:No page numbers.

Recurrence of positive SARS CoV-2 PCR has been described in patients discharged from hospital after 2 consecutive negative PCR. We discuss possible explanations including false negative, reactivation and re-infection and propose different strategy to solve this issue. Prolonged SARS-CoV-2 RNA shedding and recurrence of viral RNA shedding in asymptomatic patients remain unknown. Transmission of SARS-CoV-2 by asymptomatic carriers had been documented. Considering the significance of this ongoing global public health emergency, it is necessary to carry out large studies to better understand the issue of potential SARS-CoV-2 recurrence in COVID-19 patients. This article is protected by copyright. All rights reserved.

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1. **Recurrence of positive SARS-CoV-2 RNA in COVID-19: A case report.**  
   Chen Dabiao International journal of infectious diseases : IJID : official publication of the International Society for Infectious Diseases 2020;93:297-299.

The ongoing outbreak of COVID-19 that began in Wuhan, China, has constituted a Public Health Emergency of International Concern, with cases confirmed in multiple countries. Currently, patients are the primary source of infection. We report a confirmed case of COVID-19 whose oropharyngeal swab test of SARS-CoV-2 RNA turned positive in convalescence. This case highlights the importance of active surveillance of SARS-CoV-2 RNA for infectivity assessment.

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1. **Recurrence of positive SARS-CoV-2 viral RNA in recovered COVID-19 patients during medical isolation observation.**  
   Yuan Bo Scientific reports 2020;10(1):11887.

Recently, the recurrence of positive SARS-CoV-2 viral RNA in recovered COVID-19 patients is receiving more attention. Herein we report a cohort study on the follow-up of 182 recovered patients under medical isolation observation. Twenty (10.99%) patients out of the 182 were detected to be SARS-CoV-2 RNA positive (re-positives), although none showed any clinical symptomatic recurrence, indicating that COVID-19 responds well to treatment. Patients aged under 18 years had higher re-positive rates than average, and none of the severely ill patients re-tested positive. There were no significant differences in sex between re-positives and non-re-positives. Notably, most of the re-positives turned negative in the following tests, and all of them carried antibodies against SARS-CoV-2. This indicates that they might not be infectious, although it is still important to perform regular SARS-CoV-2 RNA testing and follow-up for assessment of infectivity. The findings of this study provide information for improving the management of recovered patients, and for differentiating the follow-up of recovered patients with different risk levels.

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[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=32f980ec63af175b0db5b14772174d79)

1. **Recurrence or Relapse of COVID-19 in Older Patients: A Description of Three Cases.**  
   Lafaie Ludovic Journal of the American Geriatrics Society 2020;:No page numbers.

BACKGROUNDThe coronavirus disease 2019 (COVID-19) has infected millions of people worldwide, particularly in older adults. The first cases of possible re-infection by SARS-CoV-2 were reported in April 2020 among older adults.DESIGN/SETTINGIn this brief report, we present three geriatric cases with two episodes of SARS-CoV-2 infection separated by a symptom-free interval.

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1. **Recurrent pneumonia in a patient with new coronavirus infection after discharge from hospital for insufficient antibody production: a case report.**  
   Zhou Xiaoxi BMC infectious diseases 2020;20(1):500.

BACKGROUNDThe rapid spread of coronavirus disease 2019 (COVID-19) was declared as an emerging public health threat by the World Health Organization. As various measures have been taken successfully to combat the epidemic caused by SARS-CoV-2, a growing number of fully recovered patients have been discharged from hospitals. However, some of them have relapsed. Little is known about the causes that triggered the relapse.CASE PRESENTATIONWe report a case of a 40 years old man who suffered from recurrent pulmonary infection with progression of lesions on chest computed tomography (CT), elevated levels of ferritin and IL2R, reduced lymphocyte count and positive oropharyngeal swab test for SARS-CoV-2 again after 5 days discharge from hospital. The anti-SARS-CoV-2 antibody level of this patient was very low at the time of relapse, suggesting a weak humoral immune response to the virus. Total exon sequencing revealed mutations in TRNT1 gene, which may be responsible for B cell immunodeficiency. Therefore, uncleared SARS-CoV-2 at his first discharge was likely to lead to his recurrence. However, viral superinfection and non-infectious organizing pneumonia could not be completely excluded.CONCLUSIONCOVID-19 relapse may occur in a part of discharged patients with low titers of anti-SARS-CoV-2 antibodies. These patients should be maintained in isolation for longer time even after discharge. A more sensitive method to detect SARS-CoV-2 needs to be established and serological testing for specific antibodies may be used as a reference to determine the duration of isolation.

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[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=4e81274bcc1ae1a7e32bd4c76b628e74)

1. **Retest positive for SARS-CoV-2 RNA of "recovered" patients with COVID-19: Persistence, sampling issues, or re-infection?**  
   Kang Hanyujie Journal of medical virology 2020;:No page numbers.

"Retest Positive" for severe acute respiratory syndrome-related coronavirus-2 (SARS-CoV-2) from "recovered" coronavirus disease-19 (COVID-19) has been reported and raised several important questions for this novel coronavirus and COVID-19 disease. In this commentary, we discussed several questions: (a) Can SARS-CoV-2 re-infect the individuals who recovered from COVID-19? This question is also associated with other questions: whether or not SARS-CoV-2 infection induces protective reaction or neutralized antibody? Will SARS-CoV-2 vaccines work? (b) Why could some recovered patients with COVID-19 be re-tested positive for SARS-CoV-2 RNA? (c) Are some recovered pwith atients COVID-19 with re-testing positive for SARS-CoV-2 RNA infectious? and (d) How should the COVID-19 patients with retest positive for SARS-CoV-2 be managed?

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[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=8752395508193e78efa9ae5831bcc2d0)

1. **Seven discharged patients turning positive again for SARS-CoV-2 on quantitative RT-PCR.**  
   Peng Jianhui American journal of infection control 2020;48(6):725-726.

[Available online at this link](https://www.knowledgeshare.nhs.uk/index.php?PageID=link_resolver&link=e5456f5fdc14bb438ea91675f304be05)

1. **The treatment and follow-up of 'recurrence' with discharged COVID-19 patients: data from Guizhou, China.**  
   Tian Maolu Environmental microbiology 2020;:No page numbers.

We reported 20 cases of discharged COVID-19 patients whose RT-PCR test results showed 're-positive'. After finding 're-positive', these patients were admitted to hospital for the second time and were followed up until the end of May 2020. We recorded detailed treatment and follow-up process, and collected relevant data. The possible causes and potential clinical significance of this phenomenon are discussed.

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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.

## C. Search History

## Reviewer’s note 24/8/20:

## Consider truncating reinfection/recurrence and other terms (reinfect\*/recur\* etc.)

|  | **Source** | **Criteria** | **Results** |
| --- | --- | --- | --- |
| 1. | Medline | exp CORONAVIRUS/ | 12178 |
| 2. | Medline | exp "CORONAVIRUS INFECTIONS"/ | 10589 |
| 3. | Medline | (coronavirus OR "corona virus" OR covid19 OR covid-19 OR wuhan OR hubei OR "novel coronavirus" OR "2019-nCoV" OR "SARS-Cov").ti,ab | 19704 |
| 4. | Medline | (1 OR 2 OR 3) | 61804 |
| 5. | Medline | RECURRENCE/ | 182810 |
| 6. | Medline | (reinfection OR recurrence OR re-infection OR reinfected OR re-infected).ti,ab | 298188 |
| 7. | Medline | (5 OR 6) | 437386 |
| 8. | Medline | (4 AND 7) | 264 |
| 9. | Medline | 8 [DT FROM 2020] [Languages English] | 114 |
| 10. | EMBASE | exp CORONAVIRUS/ | 17286 |
| 11. | EMBASE | exp "CORONAVIRUS INFECTIONS"/ | 17989 |
| 12. | EMBASE | (coronavirus OR "corona virus" OR covid19 OR covid-19 OR wuhan OR hubei OR "novel coronavirus" OR "2019-nCoV" OR "SARS-Cov").ti,ab | 56665 |
| 13. | EMBASE | RECURRENCE/ | 152896 |
| 14. | EMBASE | (reinfection OR recurrence OR re-infection OR reinfected OR re-infected).ti,ab | 450594 |
| 15. | EMBASE | (10 OR 11 OR 12) | 67685 |
| 16. | EMBASE | (13 OR 14) | 552772 |
| 17. | EMBASE | (15 AND 16) | 317 |
| 18. | EMBASE | 17 [DT FROM 2020] [English language] | 138 |

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