

Hepatitis of unknown origin in children

Factsheet and news

UPDATE OF 26 AUGUST 2022

This document is composed of 3 different tabs : General information, Scientific reports, Relevant news
The content and presentation of this document are subject to change as the situation evolves.
Every information presented comes from a valid and credible source.

The redaction of this document is coordinated by:

Erica Telford (ANRS | Emerging Infectious Diseases)

The "General information" tab presents an overview, working case definitions, recommendations for clinicians, reported cases

Overview on hepatitis of unknown origin in children (WHO, ECDC)

| | |
|--|--|
| Timeline and observations | <p>First notified to the WHO on 5th April 2022, 10 cases in central Scotland. By 8th April 2022, 74 cases had been notified in the UK.</p> <p>As of 08 July 2022, 35 countries in five WHO Regions have reported 1010 probable cases of severe acute hepatitis of unknown aetiology in children, which fulfill the WHO case definition, including 22 deaths and 46 individuals needing liver transplant.</p> |
| Etiology | <p>Etiology remains unknown to date.</p> <p>Hepatitis virus A, B, C, E and D where applicable have been excluded after laboratory testing. A link with Adenovirus infection is the leading hypothesis, possibly with a cofactor rendering patients more susceptible to severe symptoms. An effect of SARS-CoV-2 is still under investigation.</p> <p>No link with Covid-19 vaccines (the majority of sick children were unvaccinated)</p> |
| Epidemiological and microbiological factors | <p>- A link with an infectious agent is considered the most likely based on the epidemiological and clinical features of cases. A link with an adenovirus (particularly type F-41) is one of the leading hypothesis. However, no adenovirus has been detected in biopsies, and these do not show any typical features of a liver inflammation due to adenovirus. Further examination is ongoing.</p> <p>WHO strongly encourage Member States to identify, investigate and report potential cases fitting the case definition above. WHO recommends that genetic characterization of viruses to be undertaken to determine any potential associations between cases. Toxicology analysis from the UKHSA likely exclude paracetamol and fluconazole, mycotoxins although further investigation is ongoing.</p> |

ECDC (TESSy) Working case definitions

Source : <https://www.ecdc.europa.eu/en/publications-data/hepatitis-unknown-origin-reporting-protocol-2022>

| | |
|-------------------|--|
| Confirmed | N/A |
| Possible | A person presenting with an acute hepatitis (non hepatitis viruses A, B, C, D and E*) with aspartate transaminase (AST) or alanine transaminase (ALT) over 500 IU/L, who is 16 years old or younger, since 1 October 2021. |
| Epi-linked | A person presenting with an acute hepatitis (non hepatitis viruses A, B, C, D and E*) of any age who is a close contact of a confirmed case, since 1 October 2021. |
| Discarded | A subject previously classified as case, that following further onvestigations did not meet the case definition criteria. |

Santé publique France Case Definition

Source : <https://www.santepubliquefrance.fr/media/files/01-maladies-et-traumatismes/hepatites-virales/hepatite-aigue-pediatrique/definition->

Definition of a suspected case:

A child who is 18 years old or younger, presenting with acute hepatitis with cytolysis (AST and/or ALT) >500 IU/l, since 1 January 2022, for whom is found:

1) An infection with Adenovirus or SARS-CoV-2

OR

2) No aetiology (confirmed or strongly suspected) after a first assessment that included testing for:

- Hepatotoxicity related to a drug listed on the international "LiverTox" website: <https://www.ncbi.nlm.nih.gov/books/NBK547852/>
- An infection with a virus classically responsible for acute hepatitis: HAV, HBV, HCV, HDV, HEV, HSV
- Hepatopathy (α1AT deficiency, Wilson's disease, autoimmune hepatitis, progressive familial intrahepatic cholestasis) metabolic disease, acute leukaemia, liver shock, hypoxic hepatitis (neonatal anoxo ischaemia) shock, hypoxic hepatitis (especially neonatal anoxo-ischaemia), traumatic causes traumatic cause

Recommendations and guidelines

| | | |
|------------|---|---|
| 06/04/2022 | Clinicians | https://gp-website-cdn-prod.s3.amazonaws.com/news-images/1649679961-72c99b95fd94121c2acd01adf53f42da.pdf |
| 08/04/2022 | UK Health Security Agency recommended investigations of infectious agents on suspected cases | https://www.gov.uk/government/publications/hepatitis-increase-in-acute-cases-of-unknown-aetiology-in-children/increase-in-acute-hepatitis-cases-of-unknown-aetiology-in-children |
| 21/04/2022 | Recommendations for Adenovirus Testing and Reporting of Children with Acute Hepatitis of Unknown Etiology | https://emergency.cdc.gov/han/2022/han00462.asp |
| 29/04/2022 | TESSy - The European Surveillance System. Hepatitis of unknown origin, Reporting Protocol 2022, Version 2.1 | https://www.ecdc.europa.eu/en/publications-data/hepatitis-unknown-origin-reporting-protocol-2022 |
| 11/05/2022 | Updated Recommendations for Adenovirus Testing and Reporting of Children with Acute Hepatitis of Unknown Etiology (Update of HAN of 21/04/2022) | https://emergency.cdc.gov/han/2022/han00465.asp |
| 23/05/2022 | Définition d'un cas possible et Conduite à tenir pour l'investigation de cas pédiatriques d'hépatite aiguë sévère "d'étiologie inconnue" | https://www.santepubliquefrance.fr/media/files/01-maladies-et-traumatismes/hepatites-virales/hepatite-aigue-pediatrique/conduite-a-tenir |

Reported cases (12.07)

Of note: As information is coming from different sources and in a scattered manner, data on adenovirus testing results are not systematically updated or referred to all detected cases.

<https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON400>

| Country | Cases (liver transplant) [death] | Adenovirus positive by PCR (When information is available. Data do not refer to all detected cases) |
|------------|----------------------------------|---|
| Argentina | 3 (1) | 2 |
| Austria | 3 | 0/3 |
| Belgium | 14 | 2/7 |
| Brazil | 2 | 0 |
| Bulgaria | 1 | 0/1 |
| Canada | 21 (2) | 3/18 |
| Colombia | 2 | 1 |
| Costa Rica | 3 | 3 |
| Cyprus | 2 | 1/2 |

Literature Review - Hepatitis

| | | |
|-----------------------------|-----------------------------|---------|
| Denmark | 8 | 0/7 |
| France | 8 | 4/6 |
| Greece | 12 | 2/10 |
| Indonesia | 18 | |
| Ireland | 17 (2) | 9/16 |
| Israel | 5 | 1/2 |
| Italy | 36 (1) | 11/25 |
| Japan | 67 | 5/58 |
| Latvia | 1 | 1/1 |
| Luxembourg | 1 | 0/1 |
| Maldives | 1 | |
| Mexico | 69 | |
| Republic of Moldova | 1 | 0/1 |
| Netherlands | 15 (3) | 4/9 |
| Norway | 5 | 2/5 |
| Palestine | 1 | |
| Panama | 1 | |
| Poland | 11 | 2/5 |
| Portugal | 19 | 2/13 |
| Qatar | 1 | 1 |
| Serbia | 1 (1 awaiting) | 1/1 |
| Singapore | 3 | 1 |
| Spain | 40 (1) | 5/28 |
| Sweden | 12 (2 including 1 awaiting) | 4/9 |
| UK | 272 (12) | 142/216 |
| USA | 3334 (30) | |
| Total cases reported | 1010 (46) [22] | |

Hepatitis of unknown origin in children

Factsheet and news

UPDATE OF 26 AUGUST 2022

This document is composed of 3 different tabs : General information, Scientific reports, Relevant news
The content and presentation of this document are subject to change as the situation evolves.
Every information presented comes from a valid and credible source.

The redaction of this document is coordinated by:

Erica Telford (ANRS | Emerging Infectious Diseases)

The "Scientific reports" tab presents articles (of any type) that were published in scientific journals

| Date | Journal | Type of publication | Title | Key facts | Link |
|------------|-----------------------|---------------------|--|---|---|
| 18/08/2022 | | Review | A review on acute, severe hepatitis of unknown origin in children: A call for concern | A review on acute, severe hepatitis of unknown origin in children, and what is known so far. | https://doi.org/10.1016/j.amsu.2022.104457 |
| 15/08/2022 | CMAJ | Research article | Severe acute hepatitis of unknown cause in children | Overview on cases of severe hepatitis of unknown aetiology in children as of 08 July 2022. | https://www.cmaj.ca/content/194/31/E1089 |
| 04/08/2022 | EuroSurveillance | Research article | Hepatitis of unknown aetiology in children – epidemiological overview of cases reported in Europe, 1 January to 16 June 2022 | This study provides insights into the characteristics of children with hepatitis of unknown aetiology, including significant differences between cases in the UK and those in other countries, which warrant further investigation. Well-designed and coordinated analytical studies are necessary to identify risk factors and the aetiological agents involved in this syndrome. | https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2022.27.31.2200483 |
| 27/07/2022 | Lancet Child Adolesc. | Editorial | Severe acute hepatitis in children | The ESPGHAN and WHO approaches are complementary to understanding the full picture of this epidemic. Now paediatricians must once again work together, drawing on the expertise and innovation that have defined the past 2 years. | https://doi.org/10.1016/S2352-4642(22)00221-8 |
| 26/07/2022 | BMJ | Editorial | Paediatric hepatitis is linked to infection with two viruses, studies find | Coinfection with two viruses—AAV2 and an adenovirus, or less often the herpes virus HHV6—may offer the best explanation for the recent cases of acute hepatitis seen in children. | https://doi.org/10.1136/bmj.o1876 |
| 25/07/2022 | Science | Editorial | Mystery hepatitis cases in kids linked to unexpected viral suspect | Two preliminary studies finding adeno-associated viruses in pediatric hepatitis cases suggest a child's genetic background and other viruses all act in concert | https://www.science.org/content/article/mystery-hepatitis-cases-in-kids-linked-to-unexpected-viral-suspect |
| 19/07/2022 | medRxiv | Research article | Adeno-associated virus 2 infection in children with non-A-E hepatitis | Acute non-A-E paediatric hepatitis is associated with the presence of AAV2 infection, which could represent a primary pathogen or a useful biomarker of recent HAdV or HHV6B infection. | https://doi.org/10.1101/2022.07.19.22277425 |
| 19/07/2022 | medRxiv | Research article | Genomic investigations of acute hepatitis of unknown aetiology in children | Adeno-associated virus 2 (AAV2), although not previously associated with disease, may, together with AdV-F41 and/or HHV-6, be causally implicated in the outbreak of unexplained hepatitis. | https://www.medrxiv.org/content/10.1101/2022.07.28.22277963v1 |
| 13/07/2022 | NEJM | Research article | A Case Series of Children with Acute Hepatitis and Human Adenovirus Infection | Human adenovirus viremia was present in the majority of children with acute hepatitis of unknown cause admitted to Children's of Alabama from October 1, 2021, to February 28, 2022, but whether human adenovirus was causative remains unclear. Sequencing results suggest that if human adenovirus was causative, this was not an outbreak driven by a single strain. | https://www.nejm.org/doi/full/10.1056/NEJMoa2206294?query=featured_home |

Literature Review - Hepatitis

| | | | | | |
|------------|--------------------------------|------------------|---|--|---|
| 13/07/2022 | NEJM | Editorial | Acute Hepatitis in Children in 2022 — Human Adenovirus 41? | Discussion on clinical manifestations of hepatitis of unknown origin in children and potential role of Human Adenovirus 41 | https://www.nejm.org/doi/full/10.1056/NEJMe2208409 |
| 13/07/2022 | NEJM | Research article | Clinical Spectrum of Children with Acute Hepatitis of Unknown Cause | In this series involving 44 young children with acute hepatitis of uncertain cause, human adenovirus was isolated in most of the children, but its role in the pathogenesis of this illness has not been established. | https://www.nejm.org/doi/full/10.1056/NEJMoa2206704?query=featured_home |
| 13/07/2022 | Frontiers in Pharmacology | Research article | Potential Protective Benefits of Schisandrin B against Severe Acute Hepatitis in Children during COVID-19 Epidemic based on Network Pharmacology Analyses | Schisandrin B may offer similar protection targets and mechanisms against acute hepatitis caused by an adenovirus or by SARS-CoV-2 in children during the COVID-19 pandemic. | https://www.frontiersin.org/articles/10.3389/fphar.2022.969709/abstract |
| 01/07/2022 | Nature Reviews | Comment | Sudden onset hepatitis in children | This comment discusses emerging evidence and leading causal hypotheses of unexplained acute hepatitis in children, in context with potential long-term effects of the COVID-19 pandemic for young children. | https://www.nature.com/articles/d41591-022-00077-1 |
| 29/06/2022 | World Journal of Pediatrics | Editorial | Acute severe hepatitis of unknown origin in children: considerations from the perspective of immunology | It should be speculated reasonably that children with acute severe hepatitis may have underlying immunodeficiencies, which can be a genetic defect or transiently secondary to infection of other pathogens or other factors. Accordingly, genetic test, MHC molecular phenotyping and immune functional assays should be performed. | https://link.springer.com/article/10.1007/s12519-022-00580-y |
| 24/06/2022 | MMRW | Research article | Interim Analysis of Acute Hepatitis of Unknown Etiology in Children Aged <10 Years — United States, October 2021–June 2022 | During October 1, 2021–June 15, 2022, 296 U.S. pediatric patients received a diagnosis of hepatitis of unknown etiology, with adenovirus detected among 45%. Preliminary analyses have not identified common exposures. Current U.S. data do not suggest an increase in pediatric hepatitis of unknown etiology or percent positivity for adenovirus types 40/41 over baseline levels. | https://www.cdc.gov/mmwr/volumes/71/wr/mm7126e1.htm |
| 22/06/2022 | Red Book Online - AAP | Editorial | Red Book Online Outbreaks: Hepatitis Cases Possibly Associated with Adenoviral Infection | Overview, clinical guidance, and reporting of hepatitis of unknown origin in children | https://publications.aap.org/redbook/resources/20171?autologincheck=redirected |
| 17/06/2022 | MMRW | Research article | Trends in Acute Hepatitis of Unspecified Etiology and Adenovirus Stool Testing Results in Children — United States, 2017–2022 | Data from four large administrative databases were analyzed to assess trends in pediatric hepatitis and percentage of stool specimens positive for adenovirus type 40/41. Current data do not suggest an increase in pediatric hepatitis or adenovirus types 40/41 above pre-COVID-19 pandemic baseline levels. | https://www.cdc.gov/mmwr/volumes/71/wr/mm7124e1.htm |
| 16/06/2022 | Lancet Gastroenterol. Hepatol. | Editorial | Use of cidofovir in recent outbreak of adenovirus-associated acute liver failure in children | Discussion on use of cidofovir in recent outbreak of adenovirus-associated acute liver failure in children | https://doi.org/10.1016/S2468-1253(22)00199-6 |
| 15/06/2022 | Acta Paediatrica | Editorial | Acute hepatitis of unknown origin – What we know so far | This overview on UK cases concludes that the UK is experiencing a clear increase in numbers of cases with acute severe hepatitis of unknown aetiology, including those with acute liver failure and need for liver transplantation. | https://onlinelibrary.wiley.com/doi/full/10.1111/apa.16452 |
| 10/06/2022 | JPGN | Research article | Long COVID-19 Liver Manifestation in Children | Report of two distinct patterns of potentially long COVID-19 liver manifestations in children with common clinical, radiological, and histopathological characteristics after a thorough workup excluded other known etiologies. | https://journals.lww.com/jpgn/Abstract/9900/Long_COVID_19_Liver_Manifestation_in_Children.84.aspx |

Literature Review - Hepatitis

| | | | | | |
|------------|--------------------------------|----------------|--|--|---|
| 09/06/2022 | Lancet | Editorial | Hunting down the cause of acute hepatitis in children | Adenovirus subtype 41F has been identified in most cases where tested (72%). Histopathology of explanted livers and liver biopsies show a non-specific pattern of mild hepatocellular injury to hepatic necrosis, but no evidence of adenovirus in hepatocytes. This injury could be secondary to an aberrant immune response from the resident immune system of the liver, a phenomenon observed in children with acute liver failure of unknown cause. | https://doi.org/10.1016/S0140-6736(22)00946-1 |
| 24/05/2022 | MDPI | Preprint | Hepatitis of Unknown Origin and Etiology (Acute Non HepA-E Hepatitis) among Children in 2021/2022: Review of the Current Findings | An overview of the situation and cases of hepatitis of unknown origin and etiology in children, from the ESCMID Study Group for Viral Hepatitis—(ESGVH) | https://www.mdpi.com/2227-9032/10/6/973 |
| 23/05/2022 | bioRxiv | Preprint | SARS-CoV-2 ORF1abA1061S potentiate autoreactive T cell responses via epitope mimicry: an explanation to hepatitis of unknown cause | These preliminary results raised a possibility that infection by SARS-CoV-2 ORF1abVVNASN variant might elicit an autoimmune T cell response via epitope mimicry and is associated with the outbreak of unknown hepatitis. | https://www.biorxiv.org/content/10.1101/2022.05.16.491922v3 |
| 19/05/2022 | Science | Editorial | What's sending kids to hospitals with hepatitis—coronavirus, adenovirus, or both? | Discussion on possible causes, focusing on adenovirus and/or SARS-CoV-2. UKHSA is expected to publish today the methodology for a study that will compare adenovirus prevalence in children hospitalized with the mysterious hepatitis with that in children hospitalized for other reasons. | https://www.science.org/content/article/what-s-sending-kids-hospitals-hepatitis-coronavirus-adenovirus-or-both |
| 17/05/2022 | Clin. Microbiol. Infect. | Editorial | Acute severe hepatitis of unknown aetiology in children: a new non-A-E hepatitis virus on horizon? | ESCMID Study Group for Viral Hepatitis (ESGVH) comment on possible causes: a combination of prolonged decreased exposure to paucisymptomatic viral infections during lockdown, and/or prior infection with SARS-CoV-2 may have altered the host immune responses to subsequent exposure to an infectious agent, toxin, drug or environmental agent in children with a possibly particular genetic backgrounds, resulting in liver immunopathology. | https://doi.org/10.1016/j.cmi.2022.05.001 |
| 17/05/2022 | BMJ | Editorial | Acute hepatitis of unknown origin in children | Discussion on possible causes and working hypothesis | https://doi.org/10.1136/bmj.o1197 |
| 13/05/2022 | Lancet Gastroenterol. Hepatol. | Correspondence | Severe acute hepatitis in children: investigate SARS-CoV-2 superantigens | We hypothesise that the recently reported cases of severe acute hepatitis in children could be a consequence of adenovirus infection with intestinal tropism in children previously infected by SARS-CoV-2 and carrying viral reservoirs. | https://doi.org/10.1016/S2468-1253(22)00166-2 |
| 12/05/2022 | Lancet Infect. Dis. | Editorial | Explaining the unexplained hepatitis in children | Lancet Infectious Diseases' comment on ongoing situation and possible causes | https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(22)00296-1/fulltext |
| 12/05/2022 | Int. J. Infect. Dis. | Article | High population burden of Omicron variant (B.1.1.529) is associated with the emergence of severe hepatitis of unknown etiology in children | Statistical association between the detection of at least one hepatitis case among children and the cumulative number of Omicron cases (B.1.1.529) was examined in 39 countries. Prior exposure to Omicron variant may be associated with an increased risk of severe hepatitis among children, indicating a critical need to conduct cofactor studies. | https://doi.org/10.1016/j.ijid.2022.05.028 |
| 12/05/2022 | EuroSurveillance | Article | Case numbers of acute hepatitis of unknown aetiology among children in 24 countries up to 18 April 2022 compared to the previous 5 years | Results of a rapid online survey among members to assess the extent and geographical distribution of the suspected outbreak from 1 January until 18 April 2022 in comparison to the incidence in the previous 5 years. | https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2022.27.19.2200370 |
| 06/05/2022 | BMJ | Comment | Acute hepatitis is identified in more children, but cause remains elusive | Short comment of acute hepatitis in children and discussion on possible causes | https://doi.org/10.1136/bmj.o1156 |
| 06/05/2022 | Journal of Hepatology | Comment | The recent outbreak of acute severe hepatitis in children of unknown origin – what is known so far | This review focuses on the available information concerning this recent outbreak and introduces some of the discussed hypotheses for its development. | https://doi.org/10.1016/j.jhep.2022.05.001 |
| 03/05/2022 | Pediatric Reports | Editorial | Acute, Severe Hepatitis of Unknown Origin: Should We Really Be Afraid of Another Obscure Enemy of Our Children? | Editorial providing an overview of the situation and discussing open questions | https://doi.org/10.3390/pediatric14020029 |

Literature Review - Hepatitis

| | | | | | |
|------------|--------------------------------------|---------------------|--|--|---|
| 29/04/2022 | Lancet Gastroenterol. Hepatol. | News | Mystery outbreak of severe acute hepatitis in children | News article exploring the potential etiologic causes of hepatitis cases, and specifically the adenovirus + co-factor option | https://doi-org.proxy.insermbiblio.inist.fr/10.1016/S2468-1253(22)00159-5 |
| 29/04/2022 | CDC MMRW | Article | Acute Hepatitis and Adenovirus Infection Among Children — Alabama, October 2021–February 2022 | Report on 9 cases detected in Alabama, USA, between October 2021 and February 2022, and suggestion that adenovirus should be considered in differential diagnosis. - No epidemiological link was identified among patients. - All patients were positive for adenovirus. 5/9 samples that were sequenced were identified as type 41. - Biopsies (6 patients): various degrees of hepatitis with no viral inclusions observed, no immunohistochemical evidence of adenovirus, or no viral particles identified by electron microscopy. | http://dx.doi.org/10.15585/mmwr.mm7118e1 |
| 26/04/2022 | BMJ | News | Hepatitis in children: What's behind the outbreaks? | Divulgate article on the situation and reported cases | https://doi.org/10.1136/bmj.o1067 |
| 15/04/2022 | Science | News | Mysterious hepatitis outbreak sickens young children in Europe as CDC probes cases in Alabama | Overview of situation and cases in EU and Alabama as of 15.04, mention of link with adenovirus(-41) | https://www.science.org/content/article/mysterious-hepatitis-outbreak-sickens-young-children-europe-cdc-probes-cases-alabama |
| 14/04/2022 | EuroSurveillance | Rapid communication | Investigation into cases of hepatitis of unknown aetiology among young children, Scotland, 1 January 2022 to 12 April 2022 | Report on a cluster of cases of severe hepatitis of unknown origin in Scotland, mainly affecting children between the ages of 3–5 years. | https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2022.27.15.2200318 |

Hepatitis of unknown origin in children

Factsheet and news

UPDATE OF 26 AUGUST 2022

This document is composed of 3 different tabs : General information, Scientific reports, Relevant news
The content and presentation of this document are subject to change as the situation evolves.
Every information presented comes from a valid and credible source.

The redaction of this document is coordinated by:

Erica Telford (ANRS | Emerging Infectious Diseases)

The "Relevant news" tab presents official reports from health agencies and rapidly reported information from reliable news sources

| Date | Source | Type of publication | Title | Key facts | Link |
|------------|----------|---------------------|---|---|---|
| 26/08/2022 | ECDC/WHO | Report | Joint ECDC-WHO Regional Office for Europe Hepatitis of Unknown Origin in Children Surveillance Bulletin | As of 25 August 2022, 513 cases of acute hepatitis of unknown aetiology have been reported by 21 countries. Since the last surveillance bulletin, which used data as of 29 July 2022, five new cases have been reported from two countries (Ireland (two), and Poland (three)). | https://www.ecdc.europa.eu/en/hepatitis/joint-hepatitis-unknown-origin-children-surveillance-bulletin |
| 29/07/2022 | ECDC | Report | Communicable disease threats report, 24-30 July, week 30 | As of 28 July 2022, 506 cases of acute hepatitis of unknown aetiology among children aged 16 years and under have been reported to TESSy from the World Health Organization European Region. Two recent studies suggest that as a result of disruption in normal childhood mixing patterns, resulting from the pandemic restrictions, children were not exposed to AAV2 or AdV infections and that the AdV outbreaks that followed the lifting of restrictions, together with AAV2 infection, triggered an immune-mediated hepatitis in genetically susceptible children. | https://www.ecdc.europa.eu/en/publications-data/communicable-disease-threats-report-24-30-july-week-30 |
| 29/07/2022 | ECDC/WHO | Report | Joint ECDC-WHO Regional Office for Europe Hepatitis of Unknown Origin in Children Surveillance Bulletin | As of 28 July 2022, 508 cases of acute hepatitis of unknown aetiology have been reported by 21 countries. Since the last surveillance bulletin, which used data as of 1 July 2022, 48 new cases have been reported from 12 countries. The number of cases reported increased sharply starting in week 12 and remained stable between 26 and 39 cases per week up to and including week 18. However, the recent decrease is difficult to interpret. | https://www.ecdc.europa.eu/en/hepatitis/joint-weekly-hepatitis-unknown-origin-children-surveillance-bulletin |
| 28/07/2022 | UKHSA | Report | Acute hepatitis: technical briefing | Description of the current situation in the UK, with 274 cases identified as of 04 July, and discussions on the new data suggesting a role of Adeno-associated Virus 2 in the pathogenesis. | https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1094573/acute-hepatitis-technical-briefing-4.pdf |
| 28/07/2022 | UKHSA | News | Hepatitis (liver inflammation) cases in children – latest updates | As of 19 July, there have been 270 confirmed cases of hepatitis in children aged 10 and under. Of these children, 15 have received a liver transplant; none has died. The rate at which new cases are reported has now declined. | https://www.gov.uk/government/news/hepatitis-liver-inflammation-cases-in-children-latest-updates |
| 26/07/2022 | SpF | Report | Hépatites aiguës pédiatriques sévères d'origine inconnue : point de situation au 26 juillet 2022 | Neuf cas possibles ont été signalés et un est en cours d'investigation par les équipes médicales en charge des patients, en lien avec Santé publique France. La survenue de ces cas n'est pas inattendue et ne témoigne pas, à ce stade, d'un excès de cas en France. | https://www.santepubliquefrance.fr/les-actualites/2022/hepatites-aigues-pediatriques-severes-d-origine-inconnue-point-de-situation-au-26-juillet-2022 |
| 20/07/2022 | US CDC | Report | Updates - Pediatric hepatitis of unknown cause | Numbers of persons under investigation (PUI): 355 | https://www.cdc.gov/ncird/investigation/hepatitis-unknown-cause/updates.html |
| 12/07/2022 | WHO | Report | Severe acute hepatitis of unknown aetiology in children - Multi-country | As of 8 July 2022, 35 countries in five WHO Regions have reported 1010 probable cases of severe acute hepatitis of unknown aetiology in children, which fulfill the WHO case definition, including 22 deaths. WHO has launched a global survey with an aim to estimate the incidence. This Disease Outbreak News provides updates on the epidemiology of the outbreak, as well as updates on the response to this event. | https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON400 |
| 07/07/2022 | UKHSA | Report | Increase in hepatitis (liver inflammation) cases in children under investigation | UKHSA report on hepatitis cases of unknown etiology in children - Updated regularly | https://www.gov.uk/government/news/increase-in-hepatitis-liver-inflammation-cases-in-children-under-investigation |
| 01/07/2022 | EDCD | Report | Communicable disease threats report, 26 June-2 July 2022, week 26 | As of 30 June 2022, 473 total cases of acute hepatitis of unknown aetiology among children aged 16 years and under have been reported to TESSy worldwide. 198 are from 17 European countries, 268 from the UK, 5 from Israel, 1 from Serbia and Moldova, respectively. According to WHO, at least 45 children worldwide have required liver transplants and 18 deaths have occurred. | https://www.ecdc.europa.eu/en/publications-data/communicable-disease-threats-report-26-june-2-july-2022-week-26 |

Literature Review - Hepatitis

| | | | | | |
|------------|-----------------------------------|------------|--|--|---|
| 24/06/2022 | WHO | Report | Severe acute hepatitis of unknown aetiology in children - Multi-country | As of 22 June 2022, 33 countries in five WHO Regions have reported 920 probable cases of severe acute hepatitis of unknown aetiology in children which fulfill the WHO case definition. Since the previous Disease Outbreak News published on 27 May 2022, 270 new probable cases have been reported to WHO, including from four new countries. | https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON394 |
| 24/06/2022 | Lancet Child Adolesc | Twitter | Special session on hepatitis of unknown origin in children at ESPGHAN22 | Prof. Giuseppe Indolfi on evidence and experience around acute hepatitis of unknown cause in children. Likely new epi phenotype: UK cases differ to rest of Europe. Additional waves likely. Collaboration crucial. | https://twitter.com/LancetChildAdol/status/1540265712073187329 |
| 22/06/2022 | US CDC | Report | Technical Report: Acute Hepatitis of Unknown Cause | This report reviews what is currently known about acute hepatitis with unknown cause in children under the age of 11 years, and describes the investigations that CDC and state, local, tribal, and territorial partners are conducting. As of June 22, 2022, 305 patients under investigation (PUIs) have been reported from 42 jurisdictions. | https://www.cdc.gov/ncird/investigation/hepatitis-unknown-cause/technical-report.html |
| 21/06/2022 | PAHO | Guidelines | New PAHO guidelines seek to contribute to research into the cause of hepatitis of unknown origin in children | The Pan American Health Organization (PAHO) made new guidance available to laboratories in the region to contribute to investigations into the causes of hepatitis of unknown origin in children. | https://www.paho.org/en/news/21-6-2022-new-paho-guidelines-seek-contribute-research-cause-hepatitis-unknown-origin-children |
| 17/06/2022 | UKHSA | Report | Investigation into acute hepatitis of unknown aetiology in children in England: case update | As of 13 June 2022, 260 cases (251 confirmed and 9 possible) cases have been identified in the UK, since 1 January 2022. While new cases continue to be identified across the UK, there is an overall decline in the number of new cases reported per week, even allowing for reporting lags. | https://www.gov.uk/government/publications/acute-hepatitis-technical-briefing/investigation-into-acute-hepatitis-of-unknown-aetiology-in-children-in-england-case-update |
| 17/06/2022 | ECDC/WHO | Report | Joint ECDC-WHO Regional Office for Europe Hepatitis of Unknown Origin in Children Surveillance Bulletin | As of 16 June 2022, 449 cases of acute hepatitis of unknown aetiology have been reported by 20 countries. Since the last surveillance bulletin, which used data as of 17 June 2022, 48 new cases have been reported from eight countries. The majority (76.6%) of cases are five years old or younger. Of 279 cases with available information, 87 (31.2%) required admission to an intensive care unit. Of the 227 cases for which this information is available, 19 (8.4%) have received a liver transplant. Overall, 313 cases were tested for adenovirus by any specimen type and had a valid positive or negative result. Of these, 164 (52.4%) tested positive. | https://www.ecdc.europa.eu/en/hepatitis/joint-weekly-hepatitis-unknown-origin-children-surveillance-bulletin |
| 09/06/2022 | ECDC | News | Increase in severe acute hepatitis cases of unknown aetiology in children | 402 cases of acute hepatitis of unknown aetiology in children aged 16 years and below have been reported from the European region, of which 402 were classified as probable and none as epidemiologically linked, by 20 countries. | https://www.ecdc.europa.eu/en/increase-severe-acute-hepatitis-cases-unknown-aetiology-children |
| 07/06/2022 | Santé publique France | Report | Hépatites aiguës pédiatriques sévères d'origine inconnue : point de situation au 7 juin 2022 | Sept cas possibles ont été signalés et 6 sont en cours d'investigation par les équipes médicales, en lien avec Santé publique France. La survenue de ces cas n'est pas inattendue et ne témoigne pas, à ce stade, d'un excès de cas en France. | https://www.santepubliquefrance.fr/les-actualites/2022/hepatites-aigues-pediatriques-severes-d-origine-inconnue-point-de-situation-au-7-juin-2022 |
| 31/05/2022 | ECDC/WHO | Report | Joint ECDC-WHO Regional Office for Europe Hepatitis of Unknown Origin in Children Surveillance Bulletin | As of 31 May 2022, 305 cases have been reported. The majority (76.1%) of cases are five years old or younger. Of 199 cases tested for adenovirus and with a valid result, 118 (59.3%) tested positive. Of 204 cases PCR tested for SARS-CoV-2, 24 (11.8%) tested positive. | https://cdn.ecdc.europa.eu/novhep-surveillance/ |
| 31/05/2022 | ECDC | News | Increase in severe acute hepatitis cases of unknown aetiology in children | 305 cases in 14 EU/EAA countries. The complete disease pathogenesis is not clear yet. The disease is rare and evidence around human-to-human transmission remains unclear; cases in the EU/EEA are almost entirely sporadic. | https://www.ecdc.europa.eu/en/increase-severe-acute-hepatitis-cases-unknown-aetiology-children |
| 27/05/2022 | WHO | Report | Acute hepatitis of unknown aetiology in children - Multi-country | - As of 26 May 2022, 650 probable cases have been reported to WHO from 33 countries, with 99 additional cases pending classification. - At least 38 (6%) children have required transplants, and nine (1%) deaths have been reported to WHO. - 181 cases were tested for adenovirus by any specimen type, of which 110 (60.8%) tested positive. Of the 188 cases PCR tested for SARS-CoV-2, 23 (12.2%) tested positive. Serology results for SARS-CoV-2 were only available for 26 cases, of which 19 (73.1%) were positive. - Of the 188 cases PCR tested for SARS-CoV-2, 23 (12.2%) tested positive. Serology results for SARS-CoV-2 were only available for 26 cases, of which 19 (73.1%) were positive. | https://www.who.int/emergencies/disease-outbreak-news/item/DON-389 |
| 26/05/2022 | American Society for Microbiology | News | Investigating Acute Hepatitis of Unknown Origin in Children | Description of current outbreak, of adenovirus in children, and the outbreak investigation process | https://asm.org/Articles/2022/May/Investigating-Acute-Hepatitis-of-Unknown-Origin-in |
| 23/05/2022 | Santé publique France | News | Hépatites aiguës pédiatriques sévères d'origine inconnue : nouvelle définition de cas et point de situation au 23 mai 2022 | Adaptation de la définition de cas pour améliorer sa sensibilité et être en mesure d'identifier des cas moins sévères, et donc potentiellement plus nombreux. En complément, la conduite à tenir a été mise à jour. En France, deux cas possibles ont été signalés et 4 sont en cours d'investigation | https://www.santepubliquefrance.fr/les-actualites/2022/hepatites-aigues-pediatriques-severes-d-origine-inconnue-nouvelle-definition-de-cas-et-point-de-situation-au-23-mai-2022 |

Literature Review - Hepatitis

| | | | | | |
|------------|------------------------|--------|---|---|---|
| 20/05/2022 | UKHSA | Report | Investigation into acute hepatitis of unknown aetiology in children in England - Technical briefing 3 | Further analysis of adenovirus, update of working hypothesis, update on planned investigations revision of case definitions, end of investigation on dogs, further toxicology analysis indicating that paracetamol and fluconazole unlikely are the causative agent while mycotoxins are under investigation. | https://www.gov.uk/government/publications/acute-hepatitis-technical-briefing |
| 20/05/2022 | Reuters | News | U.S. CDC says adenovirus leading hypothesis for severe hepatitis in children | Infection with adenovirus is leading hypothesis. CDC is continuing to investigate whether 180 cases identified in 36 states and territories since last October represent an increase in the rate of pediatric hepatitis or whether an existing pattern has been revealed though improved detection. | https://www.reuters.com/world/us/us-cdc-says-adenovirus-leading-hypothesis-severe-hepatitis-children-2022-05-20/ |
| 19/05/2022 | ECDC | Report | Epidemiological update issued 19 May 2022: hepatitis of unknown aetiology in children | Update of cases identified in the European Union/European Economic Area (EU/EEA) and worldwide. | https://www.ecdc.europa.eu/en/news-events/epidemiological-update-issued-19-may-2022-hepatitis-unknown-aetiology-children |
| 18/05/2022 | US CDC | Report | Persons Under Investigation - Children with Acute Hepatitis of Unknown Etiology | Report on patients under investigation for hepatitis on unknown etiology - Updated weekly | https://www.cdc.gov/ncird/investigation/hepatitis-unknown-cause/updates.html |
| 18/05/2022 | US CDC | News | Update on Children with Acute Hepatitis of Unknown Cause | Update of the situation in the US. Adenovirus has been detected in nearly half of the children and continues to be a strong lead. CDC will begin posting regular online updates specific to the number of patients under investigation on a weekly basis. | https://www.cdc.gov/media/releases/2022/s0518-acute-hepatitis.html |
| 13/05/2022 | ECDC/WHO | Report | Joint ECDC-WHO Regional Office for Europe Hepatitis of Unknown Origin in Children Surveillance Bulletin | Surveillance bulletin on the first 232 cases reported through the TESSy system | https://cdn.ecdc.europa.eu/novhep-surveillance/ |
| 11/05/2022 | ECDC | Report | Epidemiological update: Hepatitis of unknown aetiology in children | Update on cases in Europe and worldwide | https://www.ecdc.europa.eu/en/news-events/epidemiological-update-hepatitis-unknown-aetiology-children |
| 10/05/2022 | CIDRAP | News | Unexplained hepatitis cases in kids rise to 348 in 20 nations | Phillipa Easterbrook, senior scientist with the WHO, said 70 more cases from 13 countries are pending confirmation. Cases reflect a mix of new and retrospective cases and that 6 countries have reported more than 5 cases. | https://www.cidrap.umn.edu/news-perspective/2022/05/unexplained-hepatitis-cases-kids-rise-348-20-nations |
| 09/05/2022 | UKHSA | News | An increase in Hepatitis Cases in Children | Informative blog post for the general public and parents | https://ukhsa.blog.gov.uk/2022/05/09/an-increase-in-hepatitis-cases-in-children/ |
| 06/05/2022 | US CDC | News | Children with Hepatitis of Unknown Cause | Information on CDC ongoing investigation and update of the situation in the US | https://www.cdc.gov/ncird/investigation/hepatitis-unknown-cause/overview-what-to-know.html |
| 06/05/2022 | Public Health Scotland | News | Update on the ongoing investigation into higher than usual rates of hepatitis in children | Update on situation in Scotland | https://publichealthscotland.scot/news/2022/may/update-on-the-ongoing-investigation-into-higher-than-usual-rates-of-hepatitis-in-children/ |
| 06/05/2022 | UKHSA | Report | Investigation into acute hepatitis of unknown aetiology in children in England - Technical briefing 2 | Technical briefing no. 2, thorough description of ongoing investigations in the UK. Fine-tuning of working hypothesis. | https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1073704/acute-hepatitis-technical-briefing-2.pdf |
| 06/05/2022 | CIDRAP | News | Probe of unexplained hepatitis in kids expands to 24 states, Puerto Rico | Telebriefing, Jay Butler, MD, CDC's deputy director of infectious diseases: - Following its alert, CDC received 109 reports of unexplained hepatitis in young children from 24 states and Puerto Rico - Cases have been reported over the past 7 months. Of the sick children, 90% were hospitalized and 14% needed liver transplants. Five children died. Most children have recovered - More than half had confirmed adenovirus infections, though the virus might not be a cause of the hepatitis; investigators are casting a wide net as they search for a cause. | https://www.cidrap.umn.edu/news-perspective/2022/05/probe-unexplained-hepatitis-kids-expands-24-states-puerto-rico |
| 06/05/2022 | ECDC | Report | Communicable disease threats report, 01-07 May 2022, week 18 | Update on cases and their geography in the UK, EU/EEA (95 cases in 15 countries, 13 HAdV(+), 5 liver transplants), and Non-EU /EEA (approximately 60 cases in 10 countries). | https://www.ecdc.europa.eu/en/publications-data/communicable-disease-threats-report-1-7-may-2022-week-18 |

Literature Review - Hepatitis

| | | | | | |
|------------|---------------------------|---------------|---|--|---|
| 03/05/2022 | Santé publique France | News | Hépatites aiguës pédiatriques sévères d'origine inconnue : point de situation au 29 avril 2022 | <ul style="list-style-type: none"> - Retrospective analysis of France data: i) No excess of cases of ER visits or hospitalisations linked to acute hepatitis in children have been detected since 01 Jan 2022 as compared to previous years (2018-2021); ii) Two cases in France are under investigation, not confirmed yet. - A national circuit for reporting and investigating possible cases is now formalised. It relies on a network of clinicians and laboratories, including the 4 liver transplant centres, and the pediatric ICUs. - A case definition (more specific than the one from UK) and a document on actions to be taken for clinicians have been published. | https://www.santepubliquefrance.fr/les-actualites/2022/hepatites-aigues-pediatriques-severes-d-origine-inconnue-point-de-situation-au-29-avril-2022 |
| 29/04/2022 | ECDC | Report | Communicable disease threats report, 24-30 April 2022, week 17 | Update on cases and their geography in the UK, EU/EEA (14 countries), USA (6 states), Palestina, Japan | https://www.ecdc.europa.eu/en/publications-data/communicable-disease-threats-report-24-30-april-2022-week-17 |
| 28/04/2022 | ECDC | Report | Rapid Risk Assessment - Increase in severe acute hepatitis cases of unknown aetiology in children | <p>A detailed report from ECDC on European and global situation. Includes background, epidemiological update, disease background, risk assessment, options for response. Definition by ECDC of this event as a public health event of concern, due to the unknown aetiology, the affected paediatric population, and the potential severe outcome,</p> <p>* France: two cases reported under 10 years, with onset of symptoms in mid-March. Both cases presented as severe acute hepatitis, but no liver transplantations were required. One case tested positive for adenovirus. A metabolic disorder and an underlying genetic liver disease are suspected in both children. Investigations are ongoing. At present, no signal of increased cases of hepatitis of unknown origin has been detected from the network of paediatric hepatologists. Syndromic surveillance in emergency units has not observed any signal either, and data from the transplant agency have not shown an increase in transplanted cases or in cases requiring a liver transplantation.</p> | https://www.ecdc.europa.eu/en/publications-data/increase-severe-acute-hepatitis-cases-unknown-aetiology-children |
| 26/04/2022 | Public Health Scotland | Blog | Recognising the signs - Investigating a global upsurge in severe hepatitis among young children | The experience of Scotland in detecting the first cases and the public health response | https://publichealthscotland.scot/our-blog/2022/april/recognising-the-signs-investigating-a-global-upsurge-in-severe-hepatitis-among-young-children/ |
| 25/04/2022 | UKHSA | Report | Investigation into acute hepatitis of unknown aetiology in children in England - Technical briefing | A detailed report on the 84 cases identified in England (as of 20 April 2022), including epidemiology and clinical data, pathogen investigations, working hypothesis. | https://www.gov.uk/government/publications/acute-hepatitis-technical-briefing |
| 25/04/2022 | Twitter Lancet Gastro Hep | Tweet | Mougkou outlines the next steps from @ECDC_EU #ECCMID2022 | <ul style="list-style-type: none"> - Publication of Rapid Risk Assessment by 28 April 2022 - Regular outputs with updates such as the weekly Communicable Disease Threats Report and news items - New system for reporting national data on cases by EU/EEA and WHO EURO region countries to the European Surveillance System (TESSy) at ECDC | https://twitter.com/LancetGastroHep/status/1518504261625204737 |
| 25/04/2022 | Twitter Lancet Gastro Hep | Tweet | Chand presents working hypotheses for these cases of acute #hepatitis of unknown aetiology. #ECCMID2022 | <p>See slide on tweet</p> <p>A cofactor affecting young children that is rendering normal adenovirus infection more severe; A novel variant adenovirus; Environmental exposure; Novel pathogen; New SARS-CoV-2 variant</p> | https://twitter.com/LancetGastroHep/status/1518510469832757251 |
| 23/04/2022 | WHO | News | Multi-Country – Acute, severe hepatitis of unknown origin in children | <ul style="list-style-type: none"> - Cases are aged 1 month to 16 years old. 17 children (approximately 10%) have required liver transplantation; at least one death has been reported. - Adenovirus has been detected in at least 74 cases, 18 of which have been identified as F type 41. SARS-CoV-2 was identified in 20 cases of those that were tested. 19 were detected with a SARS-CoV-2 and adenovirus co-infection. - Increased circulation of adenovirus observed in UK and Netherlands, although this could be due to increased testing. - WHO recommends testing of blood, serum, urine, stool, and respiratory samples, liver biopsy samples (when available), with further virus characterization including sequencing. | https://www.who.int/emergencies/disease-outbreak-news/item/multi-country-acute-severe-hepatitis-of-unknown-origin-in-children |
| 21/04/2022 | US CDC | Media release | CDC Alerts Providers to Hepatitis Cases of Unknown Origin | <p>CDC nationwide health alert to notify clinicians and public health authorities about a cluster of children identified with hepatitis and adenovirus infection – and to ask all physicians to be on the lookout for symptoms and to report any suspected cases of hepatitis of unknown origin. [...]</p> <p>Upon investigation, a review of hospital records identified four additional cases [in addition to the 9 detected in Alabama], all of whom had liver injury and adenovirus infection; laboratory tests identified that some of these children had adenovirus type 41</p> | https://www.cdc.gov/media/releases/2022/s0421-hepatitis-alert.html |

Literature Review - Hepatitis

| | | | | | |
|------------|------|--------|---|--|---|
| 15/04/2022 | WHO | Report | Acute hepatitis of unknown aetiology – the United Kingdom of Great Britain and Northern Ireland | First WHO report. Description of cases, public health response, WHO risk assessment and advice | https://www.who.int/emergencies/disease-outbreak-news/item/acute-hepatitis-of-unknown-aetiology--the-united-kingdom-of-great-britain-and-northern-ireland |
| 12/04/2022 | ECDC | Report | Increase in acute hepatitis of unknown origin among children – United Kingdom | First ECDC report after UK notification of hepatitis of unknown origin in children. | https://www.ecdc.europa.eu/en/news-events/increase-acute-hepatitis-unknown-origin-among-children-united-kingdom |
| | | | | | |

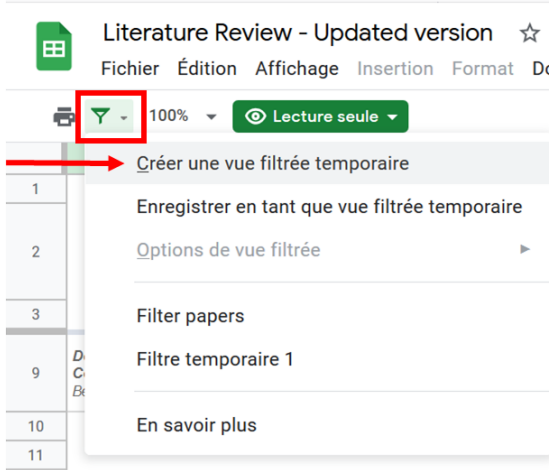
Notice - How to filter this Google Sheet and download your own selection

You can access this file as a "viewer".

This selection of articles, news and facts is made available freely. The only objective is to help the scientific community, health-workers and public health decision makers, being up to date with the latest scientific research and news. Please, make sure to credit this selection work (logos and authors) when you use it.

If you wish to filter some of the articles :

- 1) Click on a cell from the table (for ex: A13)
- 2) Click on "Filter views" and "Create a temporary filter view"



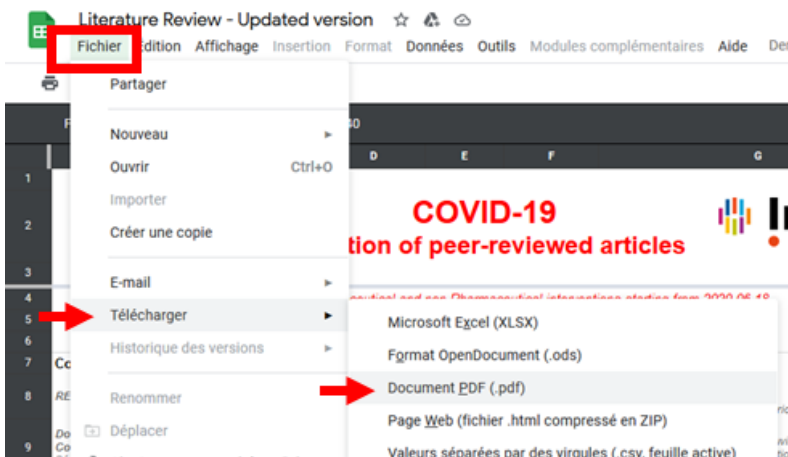
-> The filters are now in place : you can sort the table by the different columns available. This needs to be done for each table you want to sort.

The screenshot shows a table with the following columns: Journal, Date, Title, Authors and link, Country, Field of expertise, and Key facts. Red arrows point to the sorting arrows on each of these column headers.

| Journal | Date | Title | Authors and link | Country | Field of expertise | Key facts |
|---------|------------|---|---|---------|--------------------|---|
| Science | 2021.01.12 | Mosaic nanoparticles elicit cross-reactive immune responses to zoonotic coronaviruses in mice | Cohen A.A., et al. https://science.sciencemag.org/content/early/2021/01/11/science.abf6840 | USA | Immunology | Construction of homotypic nanoparticles displaying the RBD of SARS-CoV-2, or co-displaying SARS-CoV-2 RBD along with RBDs from animal betacoronaviruses (mosaic nanoparticles; 4-8 distinct RBDs). > Mice immunized with RBD-nanoparticles, but not soluble antigen, elicited cross-reactive binding and neutralization responses. > Mosaic-RBD-nanoparticles elicited antibodies with superior cross-reactive recognition of heterologous RBDs compared to sera from immunizations with homotypic SARS-CoV-2-RBD-nanoparticles or COVID-19 convalescent human plasmas. > Sera from mosaic-RBD-immunized mice neutralized heterologous pseudotyped coronaviruses equivalently or better after priming than sera from homotypic SARS-CoV-2-RBD-nanoparticle immunizations --> no immunogenicity loss against particular RBDs resulting from co- |

To download your selection of articles :

- 1) Click on "File" > "Download" > "PDF document"



Literature Review - Hepatitis

Valeurs séparées par des tabulations (.tsv, feuille active)

| Authors and link | Country | Field of expertise | Key facts |
|------------------|----------|----------------------------|--|
| ada P., et al. | Thailand | Public Health/Epidemiology | <ul style="list-style-type: none"> -> 2 women arriving in Thailand at diff January) -> The two viral genomes are identical Wuhan, while no direct link to the Huanan market -> Identical genomes of up to 30 kb are of recent transmission linkage -> Data suggest that transmission via Huanan Seafood Market is likely to have occurred in the week of January or earlier. |

2) "Export" : you can choose to export either the selected tab or the entire workbook.

NB: you can also choose to export as an Excel document.
In this case, you will only need to adjust the layout (select all > double clic on a line space)

Click here to select all

Double click on any line spacing

| Journal | Date | Title | Authors and link | Country | Field of expertise | Key facts |
|-------------------|------|---|------------------------------|------------|------------------------------|--|
| PNAS | 2020 | Modeling SARS-CoV-2 viral kinetics and maturation and | Heant N., et al. | France | Public Health / Epidemiology | Aims to characterize SARS-CoV-2 viral kinetics in hospitalized patients and its association with mortality in ICE hospitalized patients from the metropolitan area |
| Cell | 2020 | Persistence of the anti-SARS-CoV-2 antibody response | Sokal A., et al. | France | Immunology | Analysis of the longevity and functionality of the anti-SARS-CoV-2 memory B cells |
| The Lancet | 2020 | Safety and efficacy of an mRNA COVID-19 vaccine | Logunov D.Y., et al. | Russia | Vaccines | Background: The efficacy and safety of an mRNA COVID-19 vaccine in a phase 3 trial |
| Lancet Infect Dis | 2020 | Transmission of COVID-19 in 323 clusters in France | Marks M., et al. | Spain / UK | Public Health / Epidemiology | Aims to analyse data from linked index cases of COVID-19 and their contacts to understand the transmission of SARS-CoV-2 |
| Science | 2020 | Age groups that sustain SARS-CoV-2 transmission | Monod M., et al. | UK | Public Health / Epidemiology | > Understanding the age demographics driving transmission and how these affect the long-term of transmission in rural areas |
| Lancet | 2020 | RECOVERY: randomised controlled trial of azithromycin in patients with COVID-19 | RECOVERY Collaborative Group | UK | Therapeutics | Aim: to evaluate the safety and efficacy of azithromycin (500 mg once per day) in patients with COVID-19 |
| Nature | 2020 | Immunogenic BNT162b2 vaccine candidates | Vogel A.B., et al. | Germany | Immunology | > Preclinical development of two BNT162b vaccine candidates: lipid-in emulsions |