

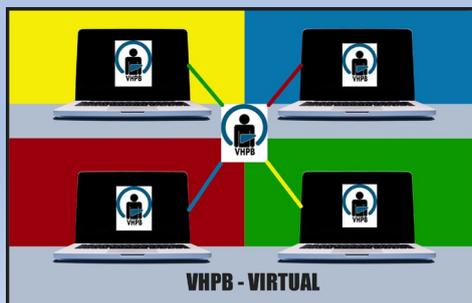


## VHPB TECHNICAL MEETING

# **The impact of COVID-19 on the (1) prevention of viral hepatitis (2) WHO elimination goals**

### *Background document*

**18 & 25 March 2021** – 16h30 until 20h00



Prepared by Greet Hendrickx & Sara Valckx

VHPB Secretariat

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## MEETING OBJECTIVES

The impact of COVID-19 on the prevention of viral hepatitis

- Evaluate the impact of the COVID-19 pandemic on National/regional vaccination and prevention programs for viral hepatitis
- Discuss how increasing vaccine hesitancy due to the pandemic may endanger the high coverage rates of hepatitis B vaccination
- Evaluate lessons learnt from existing catch up programmes
- Discuss the scale up of the public health needs to improve prevention and immunization of viral hepatitis which were negatively influenced by the pandemic
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The impact of COVID-19 on the viral hepatitis elimination goals

- Evaluate the impact of the COVID-19 pandemic on viral hepatitis, screening, control & treatment in Europe
- What is the influence of the COVID-19 pandemic on the elimination goals, regionally and on country level
- Review the possible implementation of control measures, new prevention strategies and monitoring systems during and after a pandemic, lessons learnt.
- Assess the (extra) needs to achieve the goal of eliminating viral hepatitis as a major public health threat in Europe by 2030 as defined by WHO's Regional office for Europe. Discuss successes, issues and the new challenges

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## PARTICIPANTS (± 100/MEETING)

- Viral Hepatitis representatives in first instance, opinion leaders, policymakers, representatives of the ministers of health, public health and health care professionals, Responsible for National hepatitis plan, civil society in Europe
- VHPB advisors
- Some selected observers

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## INTENDED IMPACT

- Emphasizing the burden of the COVID-19 pandemic on immunization and prevention programs and discuss the way to restart/reboot national/regional programs.
- Putting Prevention and lemoine
- control of viral hepatitis on the European public health agenda in times of the COVID-19 pandemic, list the most important challenges, opportunities and the way forward to eliminate viral hepatitis in Europe by 2030

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## OUTLINE OF THE MEETING

Presentations on selected topics about the impact of COVID-19 on the prevention of Viral Hepatitis and on the Viral Hepatitis Elimination goals are pre-recorded by the speakers and if possible made available at least one week before the meeting. Both topics will be covered in separate 3h sessions, 1 week apart.

*NOTE: This pre-meeting document contains general background information on the topic of the VHPB meeting. It contains a list of selected abstracts/references from a Pubmed MEDLINE search on different search terms depending on the topic discussed in a session of the meeting. The references are sorted by publication year (most recent first). This document should guide you in the preparation of the meeting, it should not be considered as complete literature review, but hopefully, it will give an overview of what has been published on the topics of the meeting. Please note that the literature review for this specific meeting was finalized in February 2021 and new publications on the topic are likely available at the time of the meeting.*

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## THE IMPACT OF COVID-19 ON THE PREVENTION AND CARE OF VIRAL HEPATITIS

WHO. [Coronavirus dashboard](#).

WHO. [Guiding principles for immunization activities during the COVID-19 pandemic](#) – 26 MARCH 2020

[WHO and UNICEF warn of a decline in vaccinations during COVID-19](#) – 15 JULY 2020

Unicef. [Immunization coverage – are we losing ground?](#) – JULY 2020

Pan American Health Organisation. [Hepatitis and COVID-19](#) – JULY 2020

[World Hepatitis Alliance](#) – latest news. (last update JULY 2020)

- EASL and European Reference Network Rare Liver (ERN) create COVID-19 toolkit for liver patient associations ([view here](#)) and a lay-version of EASL's position paper on care of patients with liver disease ([view here](#))
- World Hepatitis Alliance hosts global town hall with civil society and global health experts to discuss and share experiences of the impact of COVID-19 on hepatitis services ([view here](#))
- Coalition for Global Hepatitis Elimination (CGHE) release a COVID-19 and Clinical Liver Disease series ([view here](#))
- World Hepatitis Alliance CEO discusses impact of COVID-19 on civil society-delivered hepatitis services and people living with viral hepatitis during EASL and World Health Organization webinar ([view here](#))
- World Hepatitis Alliance host webinar about COVID-19 for people living with viral hepatitis ([view here](#))
- FNETH host video conference about COVID-19 and liver transplants ([view here in Spanish](#))
- ASHM Taskforce on BBVs release interim recommendations for people in prison during the COVID-19 pandemic, including people living with viral hepatitis ([view here](#))
- AASLD update clinical insights document on 16 April with new advice on hepatitis B and C ([view here](#))
- Integrate release COVID-19 statement ([view here](#))
- Gilead announce philanthropic fund to support nonprofit organizations impacted by COVID-19 ([read more](#))
- United Nations office on Drugs and Crime issue new information ([view here](#))
- EASL and ESCMID release Position Paper on care of patients with liver disease ([view here](#))
- The Coalition for Global Hepatitis Elimination release synthesis ([view here](#))
- AASLD hold webinar with information for doctors ([view here](#))
- WHA member CATIE hold webinar ([view here](#))
- National Viral Hepatitis Roundtable release webinar ([view here](#))

T Boettler, T Marjot, PN Newsome, MU Mondelli, M Maticic, E Cordero, R Jalan, R Moreau, M Cornberg, T Berg. [Impact of COVID-19 on the care of patients with liver disease: EASL-ESCMID position paper after 6 months of the pandemic](#). JHEP/reports EASL – AUG 2020

During the early stages of the coronavirus disease 2019 (COVID-19) pandemic, EASL and ESCMID published a position paper to provide guidance for physicians involved in the care of patients with chronic liver disease. While some healthcare systems are returning to a more normal routine, many countries and healthcare systems have been, or still are, overwhelmed by the pandemic, which is significantly impacting on the care of these patients. In addition, many studies have been published focusing on how COVID-19 may affect the liver and how pre-existing liver diseases might influence the clinical course of COVID-19. While many aspects remain poorly understood, it has become increasingly evident that pre-existing liver diseases and liver injury during the disease course must be kept in mind when caring for patients with COVID-19. This review should serve as an update on the previous position paper, summarising the evidence for liver disease involvement during COVID-19 and providing recommendations on how to return to routine care wherever possible.

D Simões, AR Stengaard, L Combs, D Raben, EuroTEST COVID-19 impact assessment consortium of partners (2020). "[Impact of the COVID-19 pandemic on testing services for HIV, viral hepatitis and sexually transmitted infections in the WHO European Region, March to August 2020](#)." *Euro Surveill* **25**(47). – NOV 2020 (data until AUG 2020)

We present preliminary results of a coronavirus disease (COVID-19) impact assessment on testing for HIV, viral hepatitis and sexually transmitted infections in the WHO European Region. We analyse 98 responses from secondary care (n = 36), community testing sites (n = 52) and national level (n = 10). Compared to pre-COVID-19, 95% of respondents report decreased testing volumes during March-May and 58% during June-August 2020. Reasons for decreases and mitigation measures were analysed.

Public Health England. [The impact of the COVID-19 pandemic on prevention, testing, diagnosis and care for sexually transmitted infections, HIV and viral hepatitis in England](#). SEPT 2020

2020 Goalkeeper report – BMGF. [COVID-19 a global perspective](#). SEPT 2020

“...the Institute for Health Metrics and Evaluation (IHME), found that in 2020 coverage is dropping to levels last seen in the 1990s. In other words, we’ve been set back about 25 years in about 25 weeks.”

WHO Euro (webinar). [Addressing TB, HIV and Viral Hepatitis during the COVID-19 Pandemic](#) – National TB, HIV and Viral Hepatitis Programme Managers and Partners Meeting. 23–24 September 2020, online.

HepVu. [COVID-19 & Viral Hepatitis Care in the US](#) (infographic). (data collection JUN-SEPT 2020)

In collaboration with the National Viral Hepatitis Roundtable (NVHR), the Hepatitis Education Project (HEP), NASTAD, Hep B United, and Hepatitis B Foundation, HepVu deployed a survey to measure the impact of the COVID-19 pandemic on viral hepatitis, and the experiences of clinical providers, community-based organizations, and health departments during COVID-19. The findings show significant reduction in viral hepatitis testing, vaccination, linkage to care, and outreach across all settings, and offer suggestions on the top resources needed to support these vital viral hepatitis programs

AASLD. [Webinar: Impact of COVID-19 on global elimination of viral hepatitis: the US perspective](#). – view recording [here](#). 22 OCT 2020

WHO Euro

<https://apps.who.int/iris/bitstream/handle/10665/334248/WHO-EURO-2020-1086-40832-55187-eng.pdf?sequence=1&isAllowed=y>

Mitigating the impact of COVID-19 on control of vaccine-preventable diseases: a health risk management approach focused on catch-up vaccination

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## EFFECT ON CHILDHOOD VACCINATIONS

T Kitano, H Aoki (2021). "[A model for the incremental burden of invasive Haemophilus influenzae type b due to a decline of childhood vaccination during the COVID-19 outbreak: A dynamic transmission model in Japan.](#)" *Vaccine* **39**(2): 343-349.

**BACKGROUND:** The current coronavirus disease 2019 (COVID-19) outbreak has caused a persistent decline in childhood vaccination coverage, including Haemophilus influenzae type b (Hib) vaccine, in some countries. Our objective was to evaluate the impact of decreased Hib vaccination due to COVID-19 on invasive Hib disease burden in Japan. **METHODS:** Using a deterministic dynamic transmission model (susceptible-carriage-infection-recovery model), the incidence rates of invasive Hib disease in under 5 year olds in rapid vaccination recovery and persistent vaccination declined scenarios were compared for the next 10 years after 2020. The national Hib vaccination rate after the impact of COVID-19 reduced to 87% and 73% in 2020 from approximately 97% each in 2013-2019 for primary and booster doses. **RESULTS:** While the persistent decline scenarios revealed an increase in invasive Hib disease incidence to 0.50/100,000 children under 5 years old, the incidence of the rapid recovery scenario slightly increased with a consistent decline of incidence after 2021. The shorter the duration of the decline in vaccination rate was, the smaller the incremental disease burden observed in the model. Compared to the rapid recovery scenario, the permanent decline scenario showed a 296.87 cumulative incremental quality-adjusted life years (QALY) loss for the next 10 years. **CONCLUSIONS:** The persistent decline of Hib vaccination rate due to COVID-19 causes an incremental disease burden irrespective of the possible decline of Hib transmission rate by COVID-19 mitigation measures. A rapid recovery of vaccination coverage rate can prevent this possible incremental disease burden.

K Abbas, SR Procter, K van Zandvoort, A Clark, S Funk, T Mengistu, D Hogan, E Dansereau, M Jit, S Flasche, LSHTM CMMID COVID-19 Working Group (2020). "[Routine childhood immunisation during the COVID-19 pandemic in Africa: a benefit-risk analysis of health benefits versus excess risk of SARS-CoV-2 infection.](#)" *Lancet Glob Health* **8**(10): e1264-e1272.

**BACKGROUND:** National immunisation programmes globally are at risk of suspension due to the severe health system constraints and physical distancing measures in place to mitigate the ongoing COVID-19 pandemic. We aimed to compare the health benefits of sustaining routine childhood immunisation in Africa with the risk of acquiring severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection through visiting routine vaccination service delivery points. **METHODS:** We considered a high-impact scenario and a low-impact scenario to approximate the child deaths that could be caused by immunisation coverage reductions during COVID-19 outbreaks. In the high-impact scenario, we used previously reported country-specific child mortality impact estimates of childhood immunisation for diphtheria, tetanus, pertussis, hepatitis B, Haemophilus influenzae type b, Streptococcus pneumoniae, rotavirus, measles, meningitis A, rubella, and yellow fever to approximate the future deaths averted before 5 years of age by routine childhood vaccination during a 6-month COVID-19 risk period without catch-up campaigns. In the low-impact scenario, we approximated the health benefits of sustaining routine childhood immunisation on only the child deaths averted from measles outbreaks during the COVID-19 risk period. We assumed that contact-reducing interventions flattened the outbreak curve during the COVID-19 risk period, that 60% of the population will have been infected by the end of that period, that children can be infected by either vaccinators or during transport, and that upon child infection the whole household will be infected. Country-specific household age structure estimates and age-dependent infection-fatality rates were applied to calculate the number of deaths attributable to the vaccination clinic visits. We present benefit-risk ratios for routine childhood immunisation, with 95% uncertainty intervals (UIs) from a probabilistic sensitivity analysis. **FINDINGS:** In the high-impact scenario, for every one excess COVID-19 death attributable to SARS-CoV-2 infections acquired during routine vaccination clinic visits, 84 (95% UI 14-267) deaths in children could be prevented by sustaining routine childhood immunisation in Africa. The benefit-risk ratio for the vaccinated children is 85 000 (4900-546 000), for their siblings (<20 years) is 75 000 (4400-483 000), for their parents or adult carers (aged 20-60 years) is 769 (148-2700), and for older adults (>60 years) is 96 (14-307). In the low-impact scenario that approximates the health benefits to only the child deaths averted from measles outbreaks, the benefit-risk ratio to the households of vaccinated children is 3 (0-10); if the risk to only the vaccinated children is considered, the benefit-risk ratio is 3000 (182-21 000). **INTERPRETATION:** The deaths prevented by sustaining routine childhood immunisation in Africa outweigh the excess risk of COVID-19 deaths associated with vaccination clinic visits, especially for the vaccinated children. Routine childhood immunisation should be sustained in Africa as much as possible, while

considering other factors such as logistical constraints, staff shortages, and reallocation of resources during the COVID-19 pandemic. FUNDING: Gavi, the Vaccine Alliance; Bill & Melinda Gates Foundation.

AA Adamu, RI Jalo, D Habonimana, CS Wiysonge (2020). "[COVID-19 and routine childhood immunization in Africa: Leveraging systems thinking and implementation science to improve immunization system performance.](#)" *Int J Infect Dis* **98**: 161-165.

One of the routine health services that is being disrupted by coronavirus disease 2019 (COVID-19) in Africa is childhood immunization. This is because the immunization system relies on functioning health facilities and stable communities to be effective. Its disruption increases the risk of epidemics of vaccine-preventable diseases, which could increase child mortality. Therefore, policymakers must quickly identify robust and context-specific strategies to rapidly scale-up routine immunization in order to mitigate the impact of COVID-19 on their national immunization performance. To achieve this, we propose a paradigm shift towards systems thinking and use of implementation science in immunization decision-making. Systems thinking can inform a more nuanced and holistic understanding of the interrelationship between COVID-19, its control strategies, and childhood immunization. Tools like causal loop diagrams can be used to explicitly illustrate the systems structure by identifying feedback loops. Once mapped and leverage points for interventions have been identified, implementation science can be used to guide the rapid uptake and utilization of multifaceted evidence-based innovations in complex practice settings. As Africa re-strategizes for the post-2020 era, these emerging fields could contribute significantly in accelerating progress towards universal access to vaccines for all children on the continent despite COVID-19.

M Alsuhaibani, A Alaqeel (2020). "[Impact of the COVID-19 Pandemic on Routine Childhood Immunization in Saudi Arabia.](#)" *Vaccines (Basel)* **8**(4).

The COVID-19 pandemic is impacting national and international public health. Routine childhood immunization may be adversely affected by COVID-19 mitigation measures. We aimed to identify the prevalence of delayed immunization and explore the reasons and barriers for delayed immunization during the COVID-19 pandemic in the Qassim region, Saudi Arabia. We conducted a cross-sectional study using an online self-administered questionnaire for parents of children under two years of age during the period from 1 May to 30 June 2020. Most of the 749 participants (82.6%) were mothers, with 31 to 40 years being the most common age group (49.8%). Nearly three-quarters (73.2%) of the parents had appointments scheduled for their child's vaccination during the pandemic, and approximately 23.4% of the parents reported a delay of more than one month in the immunization of their child. The most common reason for the delay was the fear of being infected by COVID-19 (60.9%). Large household size and lack of insurance were risk factors for immunization delay. The COVID-19 pandemic has affected the timeliness of routine childhood immunization in Saudi Arabia. Childhood immunization should be prioritized, as well as the implementation of focused strategies to achieve significant and sustainable vaccination rates during pandemics.

A Bechini, G Garamella, B Giammarco, B Zanella, V Flori, P Bonanni, S Boccalini (2020). "[Paediatric activities and adherence to vaccinations during the COVID-19 epidemic period in Tuscany, Italy: a survey of paediatricians.](#)" *J Prev Med Hyg* **61**(2): E125-e129.

INTRODUCTION: The global COVID-19 pandemic is placing a heavy burden on health services. One result could be a general reduction in routine vaccination activities. In Tuscany (Central Italy), paediatricians (in agreement with the regional health service) administer and register paediatric vaccinations of their patients. The aim of the present study was to evaluate the impact of the COVID-19 epidemic on paediatric vaccinations administered by Tuscan paediatricians, as a proxy of adherence to vaccinations during this epidemic period. METHODS: Four hundred members of the Tuscany section of the Italian Federation of Paediatricians (FIMP) were invited to participate in a semi-structured online survey. RESULTS: During the COVID-19 pandemic, almost all (98.2%) of the 223 respondents reported a general decline in outpatient paediatric visits; 65.8% reported a more than 60% reduction (144 answers) in comparison with the situation before the COVID-19 pandemic. A total of 208 paediatricians (93.3%) continued to vaccinate in the period considered: 66/208 (31.7%) reported a reduction in parents' compliance with mandatory vaccination (hexavalent and MMRV vaccines), and 88/208 (42.3%) reported a reduction in compliance with non-mandatory vaccinations. Almost all paediatricians declared having taken preventive actions to counter the spread of SARS-CoV-2. DISCUSSION AND CONCLUSIONS: Although the majority of Tuscan paediatricians continued to vaccinate during the lock-down, some parents decided to postpone their children's scheduled vaccinations, mainly owing to fears concerning the safety of access to health services. When Italian immunization coverage data on the first months of 2020 become available, it will be possible to assess the

real impact of the COVID-19 pandemic on paediatric vaccinations. It is crucial to continue vaccinating against preventable infectious diseases in order to avoid other possible epidemic outbreaks. The pandemic must not be seen as an obstacle to compliance with the vaccination schedule, but rather as an excellent opportunity to underline the importance of all recommended vaccinations.

B Beric-Stojisic, J Kalabalik-Hoganson, D Rizzolo, S Roy (2020). "[Childhood Immunization and COVID-19: An Early Narrative Review.](#)" *Front Public Health* **8**: 587007.

The COVID-19 pandemic has evolved into arguably the largest global public health crisis in recent history—especially in the absence of a safe and effective vaccine or an effective anti-viral treatment. As reported, the virus seems to less commonly infect children and causing less severe symptoms among infected children. This narrative review provides an inclusive view of scientific hypotheses, logical derivation, and early analyses that substantiate or refute such conjectures. At the completion of a relatively less restrictive search of this evolving topic, 13 articles—all published in 2020, were included in this early narrative review. Directional themes arising from the identified literature imply the potential relationship between childhood vaccination and COVID-19—either based on the potential genomic and immunological protective effects of heterologous immunity, or based on observational associations of cross-immunity among vaccines and other prior endemic diseases. Our review suggests that immune response to the SARS-CoV-2 virus in children is different than in adults, resulting in differences in the levels of severity of symptoms and outcomes of the disease in different age groups. Further clinical investigations are warranted of at least three childhood vaccines: BCG, MMR, and HEP-A for their potential protective role against the SARS-CoV-2 virus.

P Bonanni, IF Angelillo, A Villani, P Biasci, S Scotti, R Russo, T Maio, G Vitali Rosati, M Barretta, E Bozzola, P Castiglia, G Chiamenti, G Conforti, M Conversano, A Ferro, F Francia, P G Macri, C Azzari (2020). "[Maintain and increase vaccination coverage in children, adolescents, adults and elderly people: Let's avoid adding epidemics to the pandemic: Appeal from the Board of the Vaccination Calendar for Life in Italy: Maintain and increase coverage also by re-organizing vaccination services and reassuring the population.](#)" *Vaccine*.

The Board of the Vaccination Calendar for Life (Bonanni et al., 2014, 2017) [1,2]), a coalition of four major scientific and professional societies of public health physicians, pediatricians and general practitioners in Italy, made an appeal to health authorities in order to sustain vaccination in COVID-19 times. The five pillars to maintain and increase vaccination coverage at all ages are described as follows: 1) Guarantee paediatric vaccination coverage to all newborns and paediatric boosters and adolescent immunizations, not interrupting active calls and scheduled sessions. 2) Re-organise the way paediatric and adolescent vaccinations are offered. 3) Set-up recovery programs for vaccinations not carried out after the start of the COVID-19 emergency. 4) Provide the preparation of tenders for the supply of flu vaccines with suitable quantities to increase coverage in all Regions and Autonomous Provinces with extreme urgency. 5) Prepare plans to increase coverage for influenza, pneumococcal, tetanus diphtheria and shingles. The Board of the Calendar for Life appeals to the National and Local Health Authorities for a strong and coordinated commitment in favor of the widest offer and acceptance of vaccinations, whose vital importance for collective health is now even more evident to all, in order to avoid that delays in the necessary initiatives should add damage from other epidemics to those suffered by our population due to the COVID-19 pandemic.

Bramer CA, Kimmins LM, Swanson R, Kuo J, Vranesich P, Jacques-Carroll LA, Shen AK (2020) [Decline in Child Vaccination Coverage During the COVID-19 Pandemic - Michigan Care Improvement Registry, May 2016-May 2020.](#) *MMWR Morb Mortal Wkly Rep.* 2020 May 22;69(20):630-631. doi: 10.15585/mmwr.mm6920e1. PMID: 32437340

On March 13, 2020, the United States declared a national state of emergency to control the pandemic spread of SARS-CoV-2, the virus that causes coronavirus disease 2019 (COVID-19) (1). Public health response measures to mitigate the pandemic have centered on social distancing and quarantine policies, including shelter-in-place and stay-at-home orders. Michigan implemented a stay-at-home order on March 23, 2020, to facilitate social distancing (2). Such strategies might result in decreased accessibility to routine immunization services, leaving children at risk for vaccine-preventable diseases and their complications (3). To evaluate whether vaccination coverage has changed during the pandemic, data from the Michigan Care Improvement Registry (the state's immunization information system) (MCIR) were analyzed. Changes in vaccine doses administered to children and the effects of those changes on up-to-date status were examined for vaccinations recommended at milestone ages corresponding to the end of

an Advisory Committee on Immunization Practices (ACIP) recommendation period for one or more vaccines (4).

C Carias, M Pawaskar, M Nyaku, JH Conway, CS Roberts, L Finelli, YT Chena (2020). "[Potential impact of COVID-19 pandemic on vaccination coverage in children: A case study of measles-containing vaccine administration in the United States \(US\)](#)." *Vaccine*.

BACKGROUND: The COVID-19 pandemic and stay-at-home orders have caused an unprecedented decrease in the administration of routinely recommended vaccines. However, the impact of this decrease on overall vaccination coverage in a specific birth cohort is not known. METHODS: We projected measles vaccination coverage for the cohort of children becoming one year old in 2020 in the United States, for different durations of stay-at-home orders, along with varying catch-up vaccination efforts. RESULTS: A 15% sustained catch-up rate outside stay-at-home orders (compared to what would be expected via natality information) is necessary to achieve projected vaccination coverage similar to previous years. Permanent decreases in vaccine administration could lead to projected vaccination coverage levels below 80%. CONCLUSION: Modeling measles vaccination coverage under a range of scenarios provides useful information about the potential magnitude and impact of under-immunization. Sustained catch-up efforts are needed to assure that measles vaccination coverage remains high.

CDC. [Information for Pediatric Healthcare Providers](#).

This guidance is intended to inform pediatric healthcare providers of up-to-date information about children with suspected or confirmed COVID-19 and about caring for children during the pandemic. Children are defined as age 1 month to 18 years for the purpose of this document.

EC Dinleyici, R Borrow, M Aurélio P Safadi, P van Damme & FM Munoz (2020). "[Vaccines and routine immunization strategies during the COVID-19 pandemic](#)." *Hum Vaccin Immunother*: 1-8.

Severe acute respiratory syndrome coronavirus 2 related disease (COVID-19) is now responsible for one of the most challenging and concerning pandemics. By August 2020, there were almost 20 million confirmed cases worldwide and well over half-million deaths. Since there is still no effective treatment or vaccine, non-pharmaceutical interventions have been implemented in an attempt to contain the spread of the virus. During times of quarantine, immunization practices in all age groups, especially routine childhood vaccines, have also been interrupted, delayed, re-organized, or completely suspended. Numerous high-income as well as low- and middle-income countries are now experiencing a rapid decline in childhood immunization coverage rates. We will, inevitably, see serious consequences related to suboptimal control of vaccine-preventable diseases (VPDs) in children concurrent with or following the pandemic. Routine pediatric immunizations of individual children at clinics, mass vaccination campaigns, and surveillance for VPDs must continue as much as possible during pandemic.

AM Kazi, SA Qazi, S Khawaja, N Ahsan, RM Ahmed, F Sameen, MAK Mughal, M Saqib, S Ali, H Kaleemuddin, Y Rauf, M Raza, S Jamal, M Abbasi, LK Stergioulas (2020). "[An Artificial Intelligence-Based, Personalized Smartphone App to Improve Childhood Immunization Coverage and Timelines Among Children in Pakistan: Protocol for a Randomized Controlled Trial](#)." *JMIR Res Protoc* **9**(12): e22996.

BACKGROUND: The immunization uptake rates in Pakistan are much lower than desired. Major reasons include lack of awareness, parental forgetfulness regarding schedules, and misinformation regarding vaccines. In light of the COVID-19 pandemic and distancing measures, routine childhood immunization (RCI) coverage has been adversely affected, as caregivers avoid tertiary care hospitals or primary health centers. Innovative and cost-effective measures must be taken to understand and deal with the issue of low immunization rates. However, only a few smartphone-based interventions have been carried out in low- and middle-income countries (LMICs) to improve RCI. OBJECTIVE: The primary objectives of this study are to evaluate whether a personalized mobile app can improve children's on-time visits at 10 and 14 weeks of age for RCI as compared with standard care and to determine whether an artificial intelligence model can be incorporated into the app. Secondary objectives are to determine the perceptions and attitudes of caregivers regarding childhood vaccinations and to understand the factors that might influence the effect of a mobile phone-based app on vaccination improvement. METHODS: A mixed methods randomized controlled trial was designed with intervention and control arms. The study will be conducted at the Aga Khan University Hospital vaccination center. Caregivers of newborns or infants visiting the center for their children's 6-week vaccination will be recruited. The intervention arm will have access to a smartphone app with text, voice, video, and pictorial messages regarding RCI. This app will be developed

based on the findings of the pretrial qualitative component of the study, in addition to no-show study findings, which will explore caregivers' perceptions about RCI and a mobile phone-based app in improving RCI coverage. RESULTS: Pretrial qualitative in-depth interviews were conducted in February 2020. Enrollment of study participants for the randomized controlled trial is in process. Study exit interviews will be conducted at the 14-week immunization visits, provided the caregivers visit the immunization facility at that time, or over the phone when the children are 18 weeks of age. CONCLUSIONS: This study will generate useful insights into the feasibility, acceptability, and usability of an Android-based smartphone app for improving RCI in Pakistan and in LMICs. TRIAL REGISTRATION: ClinicalTrials.gov NCT04449107; <https://clinicaltrials.gov/ct2/show/NCT04449107>. INTERNATIONAL REGISTERED REPORT IDENTIFIER (IRRID): DERR1-10.2196/22996.

A Khan, A Bibi, KS Khan, AR Butt, HA Alvi, AZ Naqvi, S Mushtaq, YH Khan, N Ahmad (2020). "[Routine Pediatric Vaccination in Pakistan During COVID-19: How Can Healthcare Professionals Help?](#)" *Front Pediatr* **8**: 613433.

Pakistan is still fighting to overcome vaccine-preventable diseases (VPD). The vaccination coverage in rural children remains unsatisfactory amid various barriers including price, hesitancy, and low level of awareness. COVID-19 has decreased the immunization rate in Pakistan due to restricted movements, shortage of vaccines, and low coverage. During the current pandemic, there are high risks that children may get VPD resulting in another infectious disease catastrophe. There is a dire need to put aggressive measures by the government of Pakistan in time to ensure the optimal vaccine coverage. Public education programs for immunization, telehealth services, the involvement of community pharmacies, and the drive-through vaccination system may help to enhance the vaccination rate during the ongoing health crisis.

T Kitano, H Aoki (2020). "[The estimated impact of decreased childhood vaccination due to COVID-19 using a dynamic transmission model of mumps in Japan](#)." *Hum Vaccin Immunother*: 1-4.

The exact impact of the decline in childhood vaccination coverage during COVID-19 outbreak has not been estimated for any vaccine-preventable diseases. Our objective was to evaluate the impact of decreased mumps vaccination due to COVID-19 on the disease burden of mumps in Japan. Using a previously validated dynamic transmission model of mumps infection in Japan, the incidence rate of mumps over the next 30 y since July 2020 was estimated. The estimated average incidences were 269.1, 302.0, and 455.4/100,000 person-years in rapid recovery, slow recovery, and permanent decline scenarios. Compared with the rapid recovery scenario, the incremental number of mumps cases, total costs, and QALYs loss over the next 30 y were 6.53 million cases, 2.63 billion USD, and 49,246 for the permanent decline scenario, respectively. In conclusion, the persistent decline of mumps vaccination rate as an impact of COVID-19 causes a significant incremental disease burden of mumps, which is consistent irrespective of the possible decline of transmission rate of mumps infection, unless the rapid recovery of coverage rate is achieved. The immediate measures to advocate the vaccination program is essential to mitigate the incremental disease burden in the COVID-19 period.

NE MacDonald, JL Comeau, È Dubé, LM Bucci (2020). "[COVID-19 and missed routine immunizations: designing for effective catch-up in Canada](#)." *Can J Public Health* **111**(4): 469-472.

COVID-19 has led to disruption in routine immunization programs around the globe and here in Canada. The National Advisory Committee on Immunization (NACI) in Canada has indicated that this sets the stage for serious outbreaks of vaccine-preventable diseases. The World Health Organization has evidence-based guidance on how to address missed opportunities for vaccination, albeit predominately applicable for low- and middle-income countries. In Canada, immunization applies beyond infant and childhood immunization, with immunization across the life course being recommended by NACI. Three components stand out and must be integrated and used concurrently for best effect on catch-up in Canada: (1) Identify who has been missed across the life course; (2) detect delivery gaps, adapt and adjust, and develop multipronged tailored strategies for catch-up; and (3) communicate, document, evaluate and readjust the immunization programs. All must be adapted to the reality of the evolving COVID-19 pandemic. We cannot go back to a pre-COVID-19 world. However, ensuring that routine immunization and catch-up programs are done well during this pandemic strengthens the immunization foundation in Canada for when COVID-19 vaccines become available.

McDonald HI, Tessier E, White JM, Woodruff M, Knowles C, Bates C, Parry J, Walker JL, Scott JA, Smeeth L, Yarwood J, Ramsay M, Edelstein M. [Early impact of the coronavirus disease \(COVID-19\) pandemic and physical distancing](#)

[measures on routine childhood vaccinations in England, January to April 2020](#). Euro Surveill. 2020 May;25(19):2000848. doi: 10.2807/1560-7917.ES.2020.25.19.2000848.

Using electronic health records, we assessed the early impact of coronavirus disease (COVID-19) on routine childhood vaccination in England by 26 April 2020. Measles-mumps-rubella vaccination counts fell from February 2020, and in the 3 weeks after introduction of physical distancing measures were 19.8% lower (95% confidence interval: -20.7 to -18.9) than the same period in 2019, before improving in mid-April. A gradual decline in hexavalent vaccination counts throughout 2020 was not accentuated by physical distancing.

VV McNally, HH Bernstein (2020). "[The Effect of the COVID-19 Pandemic on Childhood Immunizations: Ways to Strengthen Routine Vaccination](#)." *Pediatr Ann* **49**(12): e516-e522.

Primary care providers play key roles in ensuring that children and the community receive vaccines on time. Sometimes, this role includes the task of reassuring parents who are vaccine hesitant that vaccines are safe and effective. Now, because of coronavirus disease 2019 (COVID-19), providers are presented with the additional challenge of maintaining and strengthening routine vaccination during a pandemic. As COVID-19 cases increased and states implemented stay-at-home orders, outpatient visits declined significantly. As a result, childhood immunization rates also declined. Increasing communication efforts regarding the importance of vaccination will be worthwhile, as the effect of the COVID-19 pandemic has highlighted the threat of an infectious disease and has increased awareness of the vaccine development process. Prior to 2020, many parents had not seen the devastating consequences of an infectious disease. The pandemic may change a parent's perspective, particularly as it relates to the influenza vaccine. Providers should continue to promote the importance of well-child and vaccination visits.

E Mezones-Holguin, A Al-Kassab-Córdova, JL Maguiña, AJ Rodriguez-Morales (2020). "[Vaccination coverage and preventable diseases in Peru: Reflections on the first diphtheria case in two decades during the midst of COVID-19 pandemic](#)." *Travel Med Infect Dis* **40**: 101956.

FA Moraga-Llop, M Fernández-Prada, AM Grande-Tejada, LI Martínez-Alcorta, D Moreno-Pérez, JJ Pérez-Martín (2020). "[Recovering lost vaccine coverage due to COVID-19 pandemic](#)." *Vacunat* **21**(2): 129-135.

The 2019 coronavirus disease pandemic can have an alarming impact on vaccination coverage. WHO, UNICEF and Gavi warn that at least 80 million children under the age of 1 are at risk of contracting diseases such as diphtheria, measles and polio due to the interruption of routine immunization and the temporary suspension of 93 campaigns of large-scale vaccination. In Spain, a new healthcare scenario, which prioritizes telematics over in person, fear of contagion by going to health centers, and recommendations for physical distance and restricted mobility, reduce attendance at primary care centers. Despite recommendations established by the health authorities, vaccination coverage has decreased in all Autonomous Communities between 5% and 60%, depending on the age and type of vaccine. School vaccinations have been suspended and only vaccination of pregnant women against tetanus, diphtheria and pertussis has been maintained. The decrease has been more evident for non-gratuity vaccines: the first dose of meningococcal vaccine B has decreased by 68.4% in the Valencian Community, and Andalusia has observed a 39% decrease in the total doses of this vaccine and of 18% for that of rotavirus. The recovering of vaccinations should be planned, organized and carried out in the shortest possible time. This article discusses some aspects of the recovery of vaccination coverage for different groups: children, adolescents and adults, and patients at risk and in special situations.

National center for immunisation research and Surveillance (2020). [COVID-19: Impact on routine childhood vaccination uptake in Australia](#). NOV 2020

The COVID-19 pandemic has resulted in widespread illness and social disruption globally, impacting routine immunisation services in many countries. • There have been concerns that immunisation rates may have dropped in Australia during the COVID-19 response. • We monitored vaccination uptake in Australian children through monthly analysis at earlier age-based assessment time points than usual, at all National Immunisation Program schedule points. • We found no evidence of any substantial impact on vaccination uptake in children at national or state/territory level, for vaccinations due up to July 2020. • This is a welcome finding, which likely reflects consistent messaging from health authorities that it is important to maintain immunisation through the pandemic and efforts to provide COVID-19 safe vaccination services. • It will be important to continue to monitor uptake, particularly in populations where timeliness of vaccination is a known issue, such as in Aboriginal and Torres Strait Islander children. • We are also working

closely with Victorian health authorities to monitor any impact on vaccination uptake following the level 4 lockdown imposed in that state during its second epidemic wave.

OA Ogundele, AA Omotoso, AT Fagbemi (2020). "[COVID-19 outbreak: a potential threat to routine vaccination programme activities in Nigeria.](#)" *Hum Vaccin Immunother*: 1-3.

COVID-19 is an infectious disease caused by the most recently discovered coronavirus (SARS-CoV-2). The virus and disease were unknown before the outbreak began in the city of Wuhan, China, in December 2019. Nigeria and other sub-Saharan Africa countries like the rest of the world introduced several lockdown measures as part of their public health response to mitigate the spread of the virus. This, however, was not without the likelihood of consequences considering the weak health systems. The access and supply side of vaccination was more likely to have been affected by the lockdown measures. When vaccination services are disrupted even for brief periods during emergencies, the risk of outbreak-prone vaccine-preventable diseases increases, leading to excess morbidity and mortality. This highlights the importance of maintaining essential services such as vaccination in times of emergency. There is therefore an urgent need to ensure that children are protected against those diseases for which vaccines already exist. The COVID-19 outbreak has posed a new hindrance to vaccination activities in Nigeria and across Sub-Saharan Africa with associated threat to surveillance of vaccine-preventable diseases. Achieving and sustaining high levels of vaccination coverage during this period must, therefore, be a priority for all health systems.

CZ Olorunsaiye, KK Yusuf, K Reinhart, HM Salihu (2020). [COVID-19 and Child Vaccination: A Systematic Approach to Closing the Immunization Gap.](#) *Int J MCH AIDS*. 2020; 9(3): 381–385.

The COVID-19 pandemic threatens to set back major successes that have been achieved in global vaccine initiatives. We conducted a rapid review and synthesis of the literature on immunization provision and Utilization since the onset of the COVID-19 pandemic. A total of 11 papers comprising peer-reviewed articles and key policies and guidelines, published between January 1 and June 15, 2020, were analyzed. Widespread disruptions of routine immunization and vaccination campaigns were reported leaving millions of children worldwide at risk of measles outbreaks. We present an expanded model of the World Health Organization's Global Routine Immunization Strategic Plan (GRISP) action areas as a tool to help countries quickly adapt to immunization challenges in the presence of COVID-19 and close the emerging immunization coverage gaps.

Public Health England (2020). [Impact of COVID-19 on childhood vaccination counts to week 43, and vaccine coverage to September 2020 in England: interim analyses.](#)

Reliefweb – press release (14 JUL 2020): [How WHO is supporting ongoing vaccination efforts during the COVID-19 pandemic.](#)

**As one deadly disease spreads throughout the world, immunization efforts must continue to prevent outbreaks of other diseases**

As COVID-19 continues to spread around the world, people in all countries are being encouraged to take precautions to prevent transmission, including in many countries by staying at home and physical distancing. But a pandemic does not erase other diseases and their impact. While many services, including some health services, are being scaled back, the risk of further outbreaks of infectious diseases grows. The healthcare disruptions caused by COVID-19 could have a devastating impact on child mortality.

In 2020 80 million children under one year of age, live in a country that has reported some kind of disturbance to the immunization programme largely due to limited access to health centres, low availability of PPE for healthcare workers and fear of contracting COVID-19. WHO is helping countries as they balance the threat of COVID-19 with the threat of vaccine-preventable disease outbreaks and deaths that could result. With global and regional guidance, as well as by facilitating the delivery of essential health supplies, WHO is providing knowledge and assistance to immunization programmes worldwide, throughout a rapidly evolving situation.

Here are some examples of how countries are working to achieve or maintain high vaccination coverage in the midst of the global pandemic.

[Italy](#), one of the countries hardest hit by COVID-19 was forced to repurpose much of its health-care personnel as COVID-19 cases mounted starting in late February 2020. However, wherever possible, the country's regions and provinces maintained childhood immunization as part of the essential health services, prioritizing primary vaccine doses, while ensuring strict infection prevention and control measures,

such as time slots and physical distancing in waiting rooms. The authorities also emphasized the importance of registering the children who had missed their routine doses and prioritizing them as soon as services were available again.

In [Syria](#), WHO and UNICEF supported a 5-day national immunization campaign in June to close vaccination gaps among children. During the campaign, with infection, prevention and control measures in place, health workers vaccinated more than 210 100 children and reviewed the vaccination status of 900 000 children to determine the vaccines they still needed.

[Burkina Faso](#) also conducted mass vaccinations in July, with a 4-day polio immunization campaign. Across two districts in the country's Centre-East region, 174 304 were vaccinated against polio, in line with WHO guidelines and maintaining infection prevention and control measures.

Across 39 countries and territories in the Americas, with lockdown restrictions easing, vaccination services that had been suspended in some countries are resuming. Vaccination services increased from 57% normal functionality to 79% in the same period. This was facilitated by using innovative approaches like mobile vaccination centres, drive through vaccinations, and vaccinating at schools and directly in homes.

The risk of outbreaks of vaccine-preventable diseases continues as the pandemic grows in many areas around the world. In January 2020, as [Cambodia](#) confirmed its first COVID-19 case, it also [confirmed 84 cases of measles](#). 341 measles cases were recorded in Cambodia in the first four months of 2020.

As COVID-19 has taken hold, it has been vital that immunization efforts against measles continue. As a result, mobile outreach teams have visited communities, giving catch-up vaccinations to children least likely to visit health centres and hospitals. In high-risk communities, health workers have gone door to door and boat to boat in order to administer lifesaving vaccines to the most vulnerable.

Due to the ongoing work of the outreach immunization programme, communities are familiar with health workers and have developed trust in them. This has led to the same health workers providing COVID-19 guidance directly to communities that may not understand the complexities of the virus and what is needed to stay safe.

After months of resilient work from outreach teams who safely continued immunization programmes during the pandemic, Cambodia saw fewer cases of measles recorded in May 2020 than in each of the previous months.

Amidst challenges to resuming immunization services, there is encouraging news from the Maldives and Sri Lanka. The two countries were verified as having eliminated rubella, a vaccine-preventable disease, in early July. They are now the first two countries in the WHO South-East Asia region to eliminate both rubella and measles before the 2023 target.

Countries across the South-East Asia region are making concerted efforts to resume disrupted immunization programmes with precautionary measures in place. National action plans on maintaining immunization services in the context of the COVID-19 transmission dynamics have been developed in all countries of the region. In Sri Lanka, health clinics have extended hours as one means to comply with physical distancing and have limited the number of children being served per hour. Health workers have been advised to vaccinate all children in a family needing vaccines in one visit if possible and to administer multiple catch-up vaccinations to each child according to vaccine-specific recommendations.

In the [Rohingya camps in Bangladesh](#) one of the world's largest refugee camp with over 850 000 people living in extremely crowded conditions, maintaining critical health services among vulnerable populations is a priority. The immunization strategy for the camps is revised periodically to ensure vaccinations can continue despite fresh challenges to prevent outbreaks of other communicable diseases.

A mass vaccination campaign with measles-rubella vaccine in Nepal that was halted mid-way in April was resumed in June with infection prevention measures in place.

The world is in the midst of a pandemic. In continuing to administer vaccines whenever safely possible, countries are taking innovative steps to prevent a further burden on families and health systems that could be caused by outbreaks of vaccine-preventable diseases.

JM Santoli, MC Lindley, MB DeSilva, EO Kharbanda, MF Daley, L Galloway, J Gee, M Glover, B Herring, Y Kang, P Lucas, C Noblit, J Tropper, T Vogt, E Weintraub (2020). [Effects of the COVID-19 Pandemic on Routine Pediatric Vaccine Ordering and Administration — United States, 2020](#). CDC

On March 13, 2020, the president of the United States declared a national emergency in response to the coronavirus disease 2019 (COVID-19) pandemic (1). With reports of laboratory-confirmed cases in all 50 states by that time (2), disruptions were anticipated in the U.S. health care system's ability to continue providing routine preventive and other nonemergency care. In addition, many states and localities issued shelter-in-place or stay-at-home orders to reduce the spread of COVID-19, limiting movement outside the home to essential activities (3). On March 24, CDC posted guidance emphasizing the importance of routine

well child care and immunization, particularly for children aged  $\leq 24$  months, when many childhood vaccines are recommended.\*

Two data sources were examined to assess the impact of the pandemic on pediatric vaccination in the United States: Vaccines for Children Program (VFC) provider order data from CDC's Vaccine Tracking System and Vaccine Safety Datalink (VSD) vaccine administration data. Vaccination coverage is the traditional metric used to assess vaccine usage; however, provider orders and doses administered represent two immediately available proxy measures.

VFC is a national program that provides federally purchased vaccines to approximately 50% of U.S. children aged 0–18 years.<sup>†</sup> Cumulative doses of VFC-funded vaccines ordered by health care providers at weekly intervals during two periods (January 7, 2019–April 21, 2019 [period 1] and January 6, 2020–April 19, 2020 [period 2]) were tallied, and differences in cumulative weekly vaccine doses ordered between period 2 and period 1 were calculated for all noninfluenza vaccines<sup>§</sup> that the Advisory Committee on Immunization Practices (ACIP) recommends for children and, as an example, for measles-containing-vaccines.<sup>¶</sup> VSD is a collaborative project between CDC's Immunization Safety Office and eight U.S. health care organizations serving publicly and privately insured patients.\*\* Aggregate counts of measles-containing vaccine doses administered each week at VSD sites during period 2 were compared between two pediatric age groups: children aged  $\leq 24$  months and those aged  $> 24$  months through 18 years.

Vaccine Tracking System data indicate a notable decrease in orders for VFC-funded, ACIP-recommended noninfluenza childhood vaccines and for measles-containing vaccines during period 2 compared with period 1 (Figure). The decline began the week after the national emergency declaration; similar declines in orders for other vaccines were also observed. VSD data show a corresponding decline in measles-containing vaccine administrations beginning the week of March 16, 2020. The decrease was less prominent among children aged  $\leq 24$  months than among older children (Figure). The subsequent increase in vaccine administrations observed in late March was more prominent in younger than older children.

The substantial reduction in VFC-funded pediatric vaccine ordering after the COVID-19 emergency declaration is consistent with changes in vaccine administration among children in the VSD population receiving care through eight large U.S. health care organizations. The smaller decline in measles-containing vaccine administration among children aged  $\leq 24$  months suggests that system-level strategies to prioritize well child care and immunization for this age group are being implemented. Increases in vaccine administration to children aged  $\leq 24$  months beginning in late March might reflect early success of strategies implemented by VSD health care organizations to promote childhood vaccinations in the context of the pandemic, including outreach to patients overdue for vaccinations and changing office workflows to minimize contact between patients (4). Assessment of state and local vaccination coverage is needed to quantify the impact among U.S. children of all ages and prioritize areas for intervention.

The ongoing COVID-19 pandemic is a reminder of the importance of vaccination. The identified declines in routine pediatric vaccine ordering and doses administered might indicate that U.S. children and their communities face increased risks for outbreaks of vaccine-preventable diseases. Parental concerns about potentially exposing their children to COVID-19 during well child visits might contribute to the declines observed (5). To the extent that this is the case, reminding parents of the vital need to protect their children against serious vaccine-preventable diseases, even as the COVID-19 pandemic continues, is critical. As social distancing requirements are relaxed, children who are not protected by vaccines will be more vulnerable to diseases such as measles. In response, continued coordinated efforts between health care providers and public health officials at the local, state, and federal levels will be necessary to achieve rapid catch-up vaccination.

- APS Sato (2020). "[Pandemic and vaccine coverage: challenges of returning to schools.](#)" *Rev Saude Publica* **54**: 115. Since March 2020, Brazil has faced the pandemic of the coronavirus disease 2019 (Covid-19), which has severely modified the way in which the population lives and uses health services. As such, face-to-face attendance has dropped dramatically, even for child vaccination, due to measures of social distancing to mitigate the transmission of the virus. Several countries have recorded a substantial drop in vaccination coverage in children, especially of those under two years of age. In Brazil, administrative data indicate the impact of the covid-19 pandemic on this downward trend, which was already an important challenge of the National Immunization Program in recent years. Many children will be susceptible to immunopreventable diseases, which reinforces the need to assess the vaccine status of schoolchildren before returning to face-to-face classes.

S Saxena, H Skirrow, H Bedford (2020). [Routine vaccination during covid-19 pandemic response. Falls in uptake must be reversed quickly](#). BMJ 10.1136/bmj.m2392 on 16 June 2020

No abstract available.

N Spencer, R Nathawad, E Arpin, S Johnson (2020). "[Pandemics, epidemics and inequities in routine childhood vaccination coverage: a rapid review](#)." *BMJ Paediatr Open* 4(1): e000842.

Inequity in routine childhood vaccination coverage is well researched. Pandemics disrupt infrastructure and divert health resources from preventive care, including vaccination programmes, leading to increased vaccine preventable morbidity and mortality. COVID-19 control measures have resulted in coverage reductions. We conducted a rapid review of the impact of pandemics on existing inequities in routine vaccination coverage. PICO search framework: Population: children 0-18 years; Intervention/exposure: pandemic/epidemic; Comparison: inequality; Outcome: routine vaccination coverage. The review demonstrates a gap in the literature as none of the 29 papers selected for full-paper review from 1973 abstracts identified from searches met the inclusion criteria.

AA Suwantika, C Boersma, MJ Postma (2020). [The potential impact of COVID-19 pandemic on the immunization performance in Indonesia](#). *Tandfonline*, Vol 19 No 8 Pages 687-690.

No abstract available.

TM Vogt, F Zhang, M Banks, C Black, B Arthur, Y Kang, P Lucas, B Lamont (2020). "[Provision of Pediatric Immunization Services During the COVID-19 Pandemic: an Assessment of Capacity Among Pediatric Immunization Providers Participating in the Vaccines for Children Program - United States, May 2020](#)." *MMWR Morb Mortal Wkly Rep* 69(27): 859-863.

Recent reports suggest that routine childhood immunization coverage might have decreased during the coronavirus disease 2019 (COVID-19) pandemic (1,2). To assess the capacity of pediatric health care practices to provide immunization services to children during the pandemic, a survey of practices participating in the Vaccines for Children (VFC) program was conducted during May 12-20, 2020. Data were weighted to account for the sampling design; thus, all percentages reported are weighted. Among 1,933 responding practices, 1,727 (89.8%) were currently open; 1,397 (81.1%) of these reported offering immunization services to all of their patients. When asked whether the practice would likely be able to accommodate new patients to assist with provision of immunization services through August, 1,135 (59.1%) respondents answered affirmatively. These results suggest that health care providers appear to have the capacity to deliver routinely recommended childhood vaccines, allowing children to catch up on vaccines that might have been delayed as a result of COVID-19-related effects on the provision of or demand for routine well child care. Health care providers and immunization programs should educate parents on the need to return for well-child and immunization visits or refer patients to other practices, if they are unable to provide services (3).

JH Yu, HJ Jeong, SJ Kim, JY Lee, YJ Choe, EH Choi, EH Cho (2020). "[Sustained Vaccination Coverage during the Coronavirus Disease 2019 Epidemic in the Republic of Korea](#)." *Vaccines (Basel)* 9(1).

Amid the COVID-19 pandemic, vaccination coverage may decline due to limited accessibility to healthcare. We assessed the impact of the COVID-19 pandemic on vaccination coverage and the incidence of vaccine-preventable diseases (VPDs) in the Republic of Korea. National vaccination coverage of 10 essential vaccines administered to children between January-June 2019 and January-June 2020 was analyzed. The national incidence of selected VPDs was compared for the corresponding periods. During the COVID-19 outbreak, the vaccination rate in children aged 0-35 months in Korea did not decrease significantly, whereas the vaccination rate for children aged 4-6 years decreased by 1.4-1.9%. The overall incidence of VPDs decreased by 10-50% between 2019 and 2020, especially with varicella. Thus, the COVID-19 pandemic did not result in a decrease in vaccination coverage among Korean children, which prevented a surge in VPD incidence. Maintaining essential vaccination coverage without interruption is important during the response to the COVID-19 pandemic.

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## EFFECT ON VIRAL HEPATITIS ELIMINATION GOALS

S Blach, LA Kondili, A Aghemo, Z Cai, E Dugan, C Estes, I Gamkrelidze, S Ma, JM Pawlotsky, D Razavi-Shearer, H Razavi, I Waked, S Zeuzem, A Craxi 8 (2021). "[Impact of COVID-19 on global HCV elimination efforts.](#)" *J Hepatol* **74**(1): 31-36.

**BACKGROUND & AIMS:** Coronavirus disease 2019 (COVID-19) has placed a significant strain on national healthcare systems at a critical moment in the context of hepatitis elimination. Mathematical models can be used to evaluate the possible impact of programmatic delays on hepatitis disease burden. The objective of this analysis was to evaluate the incremental change in HCV liver-related deaths and liver cancer, following a 3-month, 6-month, or 1-year hiatus in hepatitis elimination programs. **METHODS:** Previously developed models were adapted for 110 countries to include a status quo or 'no delay' scenario and a '1-year delay' scenario assuming significant disruption in interventions (screening, diagnosis, and treatment) in the year 2020. Annual country-level model outcomes were extracted, and weighted averages were used to calculate regional (WHO and World Bank Income Group) and global estimates from 2020 to 2030. The incremental annual change in outcomes was calculated by subtracting the 'no-delay' estimates from the '1-year delay' estimates. **RESULTS:** The '1-year delay' scenario resulted in 44,800 (95% uncertainty interval [UI]: 43,800-49,300) excess hepatocellular carcinoma cases and 72,300 (95% UI: 70,600-79,400) excess liver-related deaths, relative to the 'no-delay' scenario globally, from 2020 to 2030. Most missed treatments would be in lower-middle income countries, whereas most excess hepatocellular carcinoma and liver-related deaths would be among high-income countries. **CONCLUSIONS:** The impact of COVID-19 extends beyond the direct morbidity and mortality associated with exposure and infection. To mitigate the impact on viral hepatitis programming and reduce excess mortality from delayed treatment, policy makers should prioritize hepatitis programs as soon as it becomes safe to do so. **LAY SUMMARY:** COVID-19 has resulted in many hepatitis elimination programs slowing or stopping altogether. A 1-year delay in hepatitis diagnosis and treatment could result in an additional 44,800 liver cancers and 72,300 deaths from HCV globally by 2030. Countries have committed to hepatitis elimination by 2030, so attention should shift back to hepatitis programming as soon as it becomes appropriate to do so.

CM Pley, AL McNaughton, PC Matthews, J Lourenço (2021). "[The global impact of the COVID-19 pandemic on the prevention, diagnosis and treatment of hepatitis B virus \(HBV\) infection.](#)" *BMJ Glob Health* **6**(1).

The COVID-19 pandemic caused by the SARS-CoV-2 virus has resulted in a myriad of interventions with the urgent aim of reducing the public health impact of this virus. However, a wealth of evidence both from high-income and low-income countries is accruing on the broader consequences of such interventions on economic and public health inequalities, as well as on pre-existing programmes targeting endemic pathogens. We provide an overview of the impact of the ongoing COVID-19 pandemic on hepatitis B virus (HBV) programmes globally, focusing on the possible consequences for prevention, diagnosis and treatment. Ongoing disruptions to infrastructure, supply chains, services and interventions for HBV are likely to contribute disproportionately to the short-term incidence of chronic hepatitis B, providing a long-term source of onward transmission to future generations that threatens progress towards the 2030 elimination goals.

WA Aldhaleei, A Alnuaimi, AS Bhagavathula (2020). "[COVID-19 Induced Hepatitis B Virus Reactivation: A Novel Case From the United Arab Emirates.](#)" *Cureus* **12**(6): e8645.

The novel coronavirus disease 2019 (COVID-19) clinically manifests as respiratory and gastrointestinal presentations, most commonly vomiting, diarrhea, and abdominal pain. Although the impaired liver function is prevalent in COVID-19, it is poorly understood. We report the first case of hepatitis B virus (HBV) reactivation caused by COVID-19 in a young adult with altered mental status and severe transaminitis. The patient was asymptomatic, hypothermic, his skin was jaundiced with the icteric sclera, with very high levels of aspartate aminotransferase (AST; 4,933 U/L), alanine aminotransferase (ALT; 4,758 U/L), and total bilirubin (183.9 mmol/L) levels. It is warranted that patients with abnormal liver functions tend to have an increased risk of COVID-19. Thus, increased attention should be paid to the care of patients with abnormal liver functions, and testing for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) RNA is warranted in the COVID era.

N Gupta, H Desalegn, P Ocama, K Lacombe, R Njouom, M Afihene, L Cunha, CW Spearman, MW Sonderup, F Kateera. "[Converging pandemics: implications of COVID-19 for the viral hepatitis response in sub-Saharan Africa.](#)" *Lancet Gastroenterol Hepatol.* 2020 Jul;5(7):634-636. doi: 10.1016/S2468-1253(20)30155-2.

No abstract available.

H Karimi-Sari, MS Rezaee-Zavareh (2020). "[COVID-19 and viral hepatitis elimination programs: Are we stepping backward?](#)" *Liver Int* **40**(8): 2042.

As Mendlowitz et al mentioned in a recent article,<sup>1</sup> the World Health Organization set a goal for the elimination of viral hepatitis until 2030. This means that the number of newly infected persons and related mortality should be decreased by 90% and 65% respectively. The elimination programs focus on different parts such as testing, treatment, immunization against hepatitis B virus (HBV), preventing mother to child transmission, blood safety, and harm reduction.<sup>2</sup> Now, COVID-19 is spreading fast throughout the world and more than one million people have been affected by this virus so far. While all attentions are now on providing effective medicines and vaccines for COVID-19, we should not forget other viruses and diseases.<sup>3</sup> Although COVID-19 seems to not affect some parts of the elimination program such as HBV vaccination, preventing mother to child transmission and blood safety, some other parts can severely be influenced by this infection. Quarantine and social distancing for COVID-19 can affect diagnosis, treatment and harm reduction programs. Increasing people's awareness plays an important role in viral hepatitis elimination programs as it leads to more case finding.<sup>4</sup> Hence, the diagnosis rate seems to be reduced by decreasing voluntary activities like the NoHep program.<sup>4</sup> Moreover, the incidence of viral hepatitis may be increased by the probable closing of harm reduction centres.<sup>5</sup> Furthermore, the treatment of patients with viral hepatitis can be influenced by closing private clinics and decreasing the number of non-emergent visits. Primary care settings and GPs, which have an essential role in hepatitis elimination,<sup>1, 6</sup> are now focusing on the COVID-19 pandemic and this change can reduce both diagnosis and treatment rates of hepatitis patients. Besides, published hepatitis-related research in PubMed (using the search term of "Hepatitis[tiab]" search time: 20/04/20) in the first 3 months of 2019 (n = 3763) compared to the same period in 2020 (n = 2808) shows a reduction by 955 documents. This may verify our idea about the impact of COVID-19 on viral hepatitis elimination programs.

Today, we are fighting with an important public health threat, COVID-19, which certainly needs special attention. But we should be more careful about our previous public health achievements. If we cannot have progress about them these days, at least we should keep them at their current situation and avoid stepping backward to reach the goal of viral hepatitis elimination by 2030.

LA Kondili, A Marcellusi, S Ryder, A Craxì. [Will the COVID-19 pandemic affect HCV disease burden?](#) *Dig Liver Dis*, 2020 Sep;52(9):947-949. doi: 10.1016/j.dld.2020.05.040. Epub 2020 May 29.

No abstract available.

Lazarus J, Picchio C, Nayagam S, Ratzan S, Thursz M. [Strengthening vaccine confidence during the COVID-19 pandemic: A new opportunity for global hepatitis B virus elimination.](#) *Journal of Hepatology* vol 73, issue 3, p490-492, July 27, 2020, DOI:<https://doi.org/10.1016/j.jhep.2020.06.008>

No abstract available.

M Lemoine, JU Kim, G Ndow, S Bah, K Forrest, J Rwegasha, M Bouyou, D Napon, S Somda, A Sawadogo, R Sombie, Y Shimakawa (2020). "[Effect of the COVID-19 pandemic on viral hepatitis services in sub-Saharan Africa.](#)" *Lancet Gastroenterol Hepatol* **5**(11): 966-967.

No abstract available.

A Mohammed, N Paranj, PH Chen, B Niu (2020). "[COVID-19 in Chronic Liver Disease and Liver Transplantation: A Clinical Review.](#)" *J Clin Gastroenterol* **Publish Ahead of Print.**

The coronavirus disease 2019 (COVID-19) pandemic has brought challenges to clinicians caring for patients with chronic liver disease. In the past 6 months, COVID-19 has led to over 150,000 deaths in the United States and over 660,000 deaths around the world. Mounting evidence suggests that chronic liver diseases can have an adverse effect on the clinical outcomes of patients with COVID-19. We present a comprehensive review of the latest literature on preexisting liver diseases and its interrelationship with COVID-19 infection in cirrhosis, hepatocellular carcinoma, nonalcoholic fatty liver disease, autoimmune hepatitis, and viral hepatitis B. As social distancing and telemedicine gain new footing, we synthesize

recommendations from 3 major hepatology societies [American Association for the Study of Liver Disease (AASLD), the European Association for the Study of Liver (EASL), and the Asian Pacific Association for the Study of Liver (APASL)] to present the best approaches for caring for patients with liver diseases as well as those requiring liver transplantation.

EN Odjidja, VL Longo, G Rizzatti, S Bandoh (2020). "[Coronavirus disease 2019 and viral hepatitis coinfection: Provide guidelines for integrated screening and treatment.](#)" *J Med Virol* **92**(10): 1703-1704.

The rapid spread of severe acute respiratory syndrome coronavirus 2, the virus, that causes Coronavirus disease 2019 (COVID-19) threatens global health. Emerging evidence and past experience from other coronaviruses suggests that people with underlying liver disease including viral hepatitis could be at risk of disease severity and mortality. However, with the present relatively low screening rates for the most prevalent viral hepatitis – Hepatitis B and C, many COVID-19 cases especially in low middle income countries are unlikely to be screened for viral hepatitis coinfection. Without active screening, little will be known about the clinical and epidemiological manifestations which could negatively impact public health efforts. In this commentary, we call for systematic and integrated screening of Hepatitis B and C for COVID-19 confirmed patients. We also call for guidelines for management and treatment as well as research to understand the epidemiology of coinfection. This article is protected by copyright. All rights reserved.

HY Rao, MY Li, L Wei (2020). "[Elimination of hepatitis C, our progress, challenges and hopes.](#)" *Zhonghua Gan Zang Bing Za Zhi* **28**(10): 809-811.

Hepatitis C infection is a serious public health threat, and the World Health Organization has recommended the elimination of public health threats from viral hepatitis, including hepatitis C, by 2030. Many countries and regions are actively exploring strategies and models to eliminate the public health threat of hepatitis C. It is estimated that there are at least 7.6 million cases of chronic hepatitis C in China, with both diagnosis and treatment rates far away to 2030 target. China's government, social organizations and doctors at different levels are also actively exploring the mode of eliminating the public health threat of hepatitis C in China, including the main mode supported by national standards, government-led mode, social institution undertaking and government-supported mode, medical alliance mode, screening in high-prevalence areas and services contracted with family doctors. China can have a lessons learning from international and ourselves experience, particularly as "Test and treat all based on needs and demand" strategy in Covid-19 control, finally achieve eliminate the public health threat of hepatitis C as soon as possible.

C Stasi, C Silvestri, F Voller (2020). "[Update on Hepatitis C Epidemiology: Unaware and Untreated Infected Population Could Be the Key to Elimination.](#)" *SN Compr Clin Med*: 1-8.

Globally, the World Health Organization (WHO) estimates that 71 million people have chronic hepatitis C virus (HCV) infection. A significant number of these will develop cirrhosis or liver cancer. Currently, during the COVID-19 outbreak, a high mortality rate has been found in patients with COVID-19 and cirrhosis. New direct-acting antiviral agents can cure more than 90% of HCV-infected patients. The new WHO strategy has introduced global goals against viral hepatitis, including a 30% reduction in new HCV cases and a 10% reduction in mortality by 2020. HCV transmission has changed considerably, reflecting both the evolution of medicine and health and social changes. The HCV is usually spread through blood-to-blood contact. After the discovery of HCV in 1989, antibody screening has drastically decreased the incidence of post-transfusion hepatitis. Nowadays, routine blood donor screening by nucleic acid amplification testing for the presence of HCV RNA has been introduced in many countries. It is conceivable that HCV screening could be offered to people born between 1946 and 1964 in the developed world and to people at high risk for HCV infection such as those who have received blood transfusions, blood products or organ donations before the 1990s, prisoners, health care workers, drug users and infants born to HCV-infected women. To achieve HCV elimination, health programmes should include improvement to access to health care services, increased screening and new projects to identify a submerged portion of patients with HCV infection. Submerged people with HCV infection are both people who are unaware of their condition and people diagnosed with HCV but not yet treated. Based on these premises, this review will examine and discuss the epidemiological changes in contracting HCV, highlighting the ways in which to identify a submerged portion of patients with HCV infection.

The Lancet Gastroenterology & Hepatology. [Eliminating viral hepatitis in the COVID-19 era: weighing challenge and opportunity.](#) The Lancet Gastroenterology & Hepatology, vol 5, issue 9, p789, July 27 2020, DOI:[https://doi.org/10.1016/S2468-1253\(20\)30237-5](https://doi.org/10.1016/S2468-1253(20)30237-5)

## Eliminating viral hepatitis in the COVID-19 era: weighing challenge and opportunity

World Hepatitis Day—July 28—offers a timely opportunity to turn the spotlight towards global efforts to address viral hepatitis. Worldwide, the hepatitis viruses are responsible for an estimated 1.34 million deaths a year, with a disproportionate disease burden in low-income and middle-income countries (LMICs). The ambitious WHO goal of eliminating viral hepatitis as a major public health threat by 2030 faces many obstacles, yet none are more significant than that posed by the COVID-19 pandemic.

Infection prevention is a foundational goal of efforts to eliminate viral hepatitis, particularly for hepatitis B virus (HBV), for which vaccinations are available but curative treatment does not exist. Progress in increasing birth-dose HBV vaccination rates has been hindered by the vaccine not being included in national vaccination schedules, births occurring at home, and lack of birth-dose vaccine awareness among health-care workers. Funding has also been an issue. COVID-19 is likely to place substantial further pressure on government budgets and change policy priorities; restrictions on movement and fear of infection might also increase home births and further limit immunisation access. Direct assessment of the impact of COVID-19 regulations on HBV vaccination coverage will therefore be important to ensure that they do not cause net harm.

For HCV, prevention efforts focus on harm reduction measures (eg, needle and syringe programmes [NSPs] and education packages) for populations at high risk, such as people who inject drugs, prisoners, and men who have sex with men. COVID-19 has led to widespread disruption or closure of harm reduction services. In England, the number of people accessing NSPs fell by 36% and needles distributed to those injecting psychoactive drugs halved as a result of lockdown restrictions. In LMICs, these pressures are likely to be even more keenly felt.

Underdiagnosis of viral hepatitis is a key bottleneck in elimination efforts. Globally, an estimated 91% of individuals with chronic HBV infection and 80% of those with chronic HCV infection were undiagnosed in 2017. Surveillance and diagnosis services have been disrupted by COVID-19, owing to redeployed staff, equipment, and closed facilities. In a World Hepatitis Alliance (WHA) survey of civil society organisations and

frontline hepatitis service providers in 32 countries from March 30 to May 4, 2020, only 47 (36%) of 132 respondents reported that people were able to access testing services, with closure or avoidance of testing sites due to COVID-19 identified as key reasons. Global supply chain issues have also led to shortages of HBV and HCV test reagents, with LMICs disproportionately affected.

In individuals with a diagnosis, timely linkage to care and access to treatment is likely to be hampered by movement restrictions and suspension of centralised clinical services. The WHA survey data indicate that treatment access has been particularly affected by COVID-19 in LMICs, with 15 (52%) of 29 respondents from those countries reporting that patients are unable to access therapies. According to the HCV Action network, the impact of COVID-19 on HCV treatment in the UK has been less than feared, in part owing to expanded use of home medication delivery and telemedicine, but such an approach is likely to be less feasible in LMICs.

Despite the broad negative effects of COVID-19 on viral hepatitis elimination, there are glimmers of opportunity. From a practical perspective, developments arising from the need to rapidly decentralise elimination efforts, such as postal dried blood-spot testing and medication delivery, could enable improved care for difficult to reach populations. The ambitious possibility has also been raised of combining large-scale COVID-19 surveillance and contact tracing efforts, which have been initiated in many countries, with testing for viral hepatitis and other diseases. Politically, the pandemic has brought the use of mass testing, contact tracing, and vaccination to the fore, and there is optimism that success in these domains can be used to emphasise the tangibility of viral hepatitis elimination.

In the long-term, the negative economic effects of the pandemic will exert extra pressure on viral hepatitis-related public health initiatives, further endangering hopes of a hepatitis-free future. In the coming months and years, it will be crucial to ensure that policy makers do not lose sight of the clear benefits of viral hepatitis elimination, and that the opportunities presented by the current crisis are identified and seized upon when possible. ■ *The Lancet Gastroenterology & Hepatology*

Wingrove C, Ferrier L, James C, Wang S. [The impact of COVID-19 on hepatitis elimination](#). *The Lancet Gastroenterology & Hepatology*, vol 5, issue 9, p792-794, July 27 2020, DOI:[https://doi.org/10.1016/S2468-1253\(20\)30238-7](https://doi.org/10.1016/S2468-1253(20)30238-7)

Around the world, the communities most underserved by health systems have been among the hardest hit by the COVID-19 pandemic.<sup>1</sup> Often, these are the same groups that are disproportionately affected by viral hepatitis. With just 10 years to achieve WHO's target, adopted in 2016, to eliminate hepatitis by 2030,<sup>2</sup> has the COVID-19 pandemic put reaching that goal in greater doubt?

The World Hepatitis Alliance (WHA), a global umbrella organisation representing more than 300 member organisations across 99 countries, did a global survey to assess the effects of the COVID-19 crisis on viral hepatitis services and on people living with viral hepatitis. A 13-question online questionnaire (appendix pp 1–2) was distributed by email to WHA members and stakeholders, on the WHA social media accounts, and by civil society networks in organisational communications. From March 30 to May 4, 2020, 132 self-selecting individuals responded to the survey from 32 countries across all WHO global regions (appendix p 3). Respondents represented civil society organisations and other frontline hepatitis service providers. The survey had an over-representation of participants from the USA, with 64 (48%) responses, which was due to the promotion of the survey by civil society networks there.

Civil society organisations are a key contributor to national hepatitis elimination programmes<sup>3</sup> and 123 (94%) of 131 analysable responses reported that their services had been affected by the crisis. One participant from the USA stated that effects included a halt to in-person events, including community-based education and screening programmes. As a result, the respondent reported that many fewer people who are at high risk of viral hepatitis will be tested this year.

Only 47 (36%) of all 132 respondents reported that people were able to access viral hepatitis testing. 101 respondents gave reasons for lack of access to testing, with the main reason (indicated by 46 [46%] respondents) being closure of testing facilities. Testing facilities being closed was reported by 16 (30%) of 54 respondents outside the USA. 66 (65%) of the 101 respondents believed another key reason people were not accessing testing was because the public were avoiding going to testing facilities due to COVID-19.

23 (34%) of 68 respondents outside the USA reported that people on treatment for hepatitis were unable to access their medications at this time. Lack of access to medications was more common in low-income and middle-income countries (LMICs), with 15 (52%) of 29 respondents from those countries reporting that people were unable to access treatment. Only five (8%) of 64 respondents from the USA reported that people living with viral hepatitis were unable to access treatment during the pandemic. Inability to access medications will undoubtedly cause increased anxiety among people living with viral hepatitis, many of whom might have been left with gaps in their hepatitis B medication or a delay to starting hepatitis C curative treatment. Participants in India and Nigeria reported that travel restrictions were particularly difficult for remote communities, in which people living with viral hepatitis were unable to access medications because of government restrictions on movement.

64 respondents gave reasons for lack of access to treatment, 32 (50%) of whom (14 [64%] of 22 in LMICs) felt that the cause was people avoiding health-care facilities due to COVID-19. Of 40 respondents from outside the USA, 22 (55%) felt that travel restrictions were the main reason people were unable to access treatment. To overcome this challenge, organisations have adapted their services. A participant in India reported mobilising volunteers to deliver medication to people living in rural communities who were unable to attend medical facilities. 26 (41%) of the 64 respondents felt that services being redeployed to combat COVID-19 was a contributing factor in the reduction in access to treatment. A participant from Australia reported that they had to reduce their testing service because of this change, and not proactively seek to test people due to health staff being redeployed to the COVID-19 response.

A lack of specific information on COVID-19 for people living with viral hepatitis was also a concern. Only 39 (30%) of 131 analysable responses indicated adequate information on COVID-19 had been provided to people living with viral hepatitis in their country. One participant from the Ukraine said that no specific information had been provided for people living with viral hepatitis, although information had been provided for people living with HIV.

Despite the important role that civil society organisations have in their communities, a survey by the Civil Society Engagement Mechanism for UHC2030 found that most respondents reported minor involvement or no input of civil society organisations in the COVID-19 response of their country.<sup>4</sup> Civil society organisations are experts on their communities because they are part of those communities. They often represent the most underserved in society and those disproportionately affected by COVID-19. If governments do not use civil society organisations in their COVID-19 responses, they are likely to fail in their response for these communities.

Civil society has a central role to play in the pandemic response. Even if the numbers of deaths and new infections decrease, the fear of attending a traditional health-care setting might persist. The decentralisation of services will become a crucial method of service delivery. In November, 2019, the leading liver societies made a joint call for action to explore the ways in which hepatitis prevention, testing, and treatment services can be decentralised.<sup>5</sup> This pandemic is an opportunity to accelerate this call to action. However, many civil society organisations face an uncertain future. In the WHA survey, one participant from the USA expressed concern over their organisation's funding situation and uncertainty over what services will look like in the future.

Every opportunity should be seized to identify the 290 million people living with viral hepatitis who are unaware of their status.<sup>6</sup> As countries look to increase testing capacity for COVID-19, they must consider existing programmes led by civil society networks, to enable the rapid scale-up needed. Hepatitis community organisations can test for both COVID-19 and viral hepatitis in settings that are already trusted by their communities. From this crisis, we have an opportunity to evolve health systems to better serve us all. Hepatitis elimination must not be left behind. This World Hepatitis Day, the global community is calling on all governments to honour the commitment they made at the World Health Assembly in 2016 to eliminate viral hepatitis by 2030. An open letter led by the campaigning body NOhep is available to sign to urge governments to keep their promise of eliminating hepatitis. Civil society and the affected community stand ready to combat the dual threats of COVID-19 and viral hepatitis together.

CW, LF, and CJ report grants from Gilead, Janssen, and AbbVie, outside of the submitted work. SW reports grants from Gilead, outside the submitted work.

HE Yun, BY Ryu, YJ Choe (2020). "[Impact of social distancing on incidence of vaccine-preventable diseases, South Korea.](#)" *J Med Virol*.

While vaccination remains the cornerstone of controlling vaccine-preventive diseases (VPD), little is known about the effect of social distancing on incidence of VPDs. We investigated the impact of social distancing practiced during the coronavirus disease 2019 (COVID-19) pandemic on the incidence of selected VPDs in South Korea. National surveillance data on monthly incidence of hepatitis A, hepatitis B, varicella, mumps, invasive pneumococcal disease (IPD), and pertussis were retrieved and compared the VPD incidences in 2020 to the average of the last 4 years (2015-2019) of the corresponding months. In 2020, there were 44% decline for mumps, 44% decline for varicella, 28% decline for pertussis, 22% decline for IPD, 14% decline in incidence of hepatitis A, and no change for hepatitis B incidences, compared to baseline years (2015-2019). The largest decline of total VPDs was in April (65%) and in May (67%), during the intensified social distancing measures. In the setting of sustained vaccination coverage, social distancing may provide additional public health benefit in controlling the VPDs.

## PARTICIPANT LIST

### Part I: The impact of COVID-19 on the prevention of viral hepatitis

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