



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Commentary

Standardizing shared vaccination responsibilities among specialists to improve vaccination rates of immunosuppressed patients



Shubha Bhat^{a,*}, Freddy Caldera^b, Francis A. Farraye^c

^a Departments of Pharmacy & Gastroenterology, Digestive Diseases Institute, Cleveland, OH, USA

^b Department of Medicine, Division of Gastroenterology and Hepatology, University of Wisconsin–Madison, School of Medicine & Public Health, Madison, WI, USA

^c Inflammatory Bowel Disease Center, Division of Gastroenterology and Hepatology, Mayo Clinic, Jacksonville, FL, USA

Immunocompromised patients (ICP) comprise 3% of the general population and are at an increased risk for morbidity and mortality from infections [1]. Thus, to prevent infections, vaccine administration in this cohort is critical. However, despite the availability of targeted vaccination guidelines, vaccination rates in ICP remain suboptimal at 20–40% [2,3]. This is a significant concern given (1) the cost-effectiveness of vaccines in preventing morbidity and mortality and (2) growing prevalence of ICP in the setting of additional immunosuppressive treatments being incorporated into daily practice.

Several barriers contribute to suboptimal vaccination rates in the ICP cohort. A prior study assessed determinants of vaccination uptake in certain populations at high risk and identified the following factors to be associated with lower vaccination uptake with ICP: (1) perception that vaccines are unsafe, may exacerbate underlying conditions, or carry serious side effects, (2) lack of understanding regarding infection risk, (3) lack of recommendation by healthcare providers, (4) uncertainty about where and how to receive vaccines, and (5) obtaining unvalidated or incorrect information about vaccines online [2].

The SARS-CoV-2 pandemic had created two additional barriers to vaccination efforts: virtual care and vaccine hesitancy. To minimize propagation of the virus and enforce adequate social distancing, routine immunizations were temporarily suspended, and many outpatient sites of care transitioned to delivery of care via telehealth. Prior studies indicate that with these efforts, 73% of countries noted a decline in immunization demand and overall, there was a decrease in orders for vaccines post declaration of a national emergency [4]. Given that telehealth has been favorably perceived by both patients and healthcare providers and increased access to subspecialties, it is likely to remain as a mode of healthcare deliver post-pandemic; however, this platform requires additional coordination of care and alternative arrangements for vaccine administration. Additionally, telehealth is not accessible to all patients and may lead to even lower vaccination immunization rates in underrepresented minorities and those without access

to reliable internet or technology [5]. Thus, virtual care has decreased immunization rates and efforts to address this are needed.

In addition to barriers associated with virtual care, the development and availability of COVID-19 vaccines has highlighted another barrier to immunization: vaccine hesitancy. Defined as a “delay in acceptance or refusal of vaccines despite availability of vaccination services”, vaccine hesitancy has led to suboptimal immunization rates [6]. Furthermore, outright COVID-19 vaccine refusal and vaccine hesitancy has been noted in individuals with poor compliance to past vaccination recommendations [7]. In the ICP cohort, hesitancy regarding COVID-19 vaccines is prevalent given the exclusion of this population from clinical trials. Thus, studies addressing immunization efficacy, timing relative to taking immunosuppressive agents, need to hold immunosuppressive agents, and vaccine hesitancy when caring for ICP will be instrumental.

One potential solution to reduce existing barriers to optimal immunization rates in ICP as listed above is to promote and standardize shared vaccination responsibilities among specialists (such as gastroenterologists, hepatologists, rheumatologists, organ transplant clinicians and oncologists) who are involved in care of ICP. Given the association of vaccinations with preventative care, specialists may perceive primary care providers (PCP) to have the full responsibility of ensuring that their patients are up-to-date on vaccines. However, PCPs may be uncertain of vaccination recommendations in ICP due to specific considerations (e.g. live vaccines) and their designation as a special population. Now in the era of telehealth, even PCPs are seeing less patients in the office. In order to optimize immunization rates in a population at high risk of experiencing complications from vaccine-preventable diseases, it is critical for specialists to assume shared vaccination responsibilities.

In assuming shared vaccination responsibilities, specialists should oversee and capitalize on administering vaccines at any in-person visits within their practice, whether it be in the office, endoscopy suite, laboratory, or infusion center [8]. Moreover, specialists should optimize their practice by including several tools, such as provider reminders, standing orders (i.e., protocol in place that permits non-physician providers to order and administer

* Corresponding author at: Clinical Pharmacy Specialist – Gastroenterology, Cleveland Clinic, 9500 Euclid Avenue, Cleveland, OH 44195, USA.

E-mail addresses: bhats@ccf.org (S. Bhat), fcaldera@medicine.wisc.edu (F. Caldera), farraye.francis@mayo.edu (F.A. Farraye).

vaccines), and embedded state immunization registries, to assess immunization history and needs at every encounter. If limited in resources (e.g., vaccine storage or availability), specialists have the option of writing prescriptions for vaccines and directing patients to their local pharmacy to receive these vaccines. This may be a convenient option for ICP seeking to receive vaccination services beyond traditional office hours.

In addition to standard vaccinations, specialists will be instrumental in helping ICP become vaccinated against SARS-CoV-2. This is a content area that is rapidly evolving and particularly requires an “all-hands-on-deck” approach. ICP will likely be reaching out to their specialists for specific guidance and prior studies have shown a correlation between provider recommendation and high vaccine uptake. Guidelines have been published by several organizations supporting the administration of COVID-19 vaccines in ICP [9]. However, current COVID-19 vaccine-related concerns among ICP include perception that the vaccine is not safe or may lead to disease flares. Moreover, patients may be obtaining inadequate or unvalidated information online, which is a concern given that reliance on social media has been correlated to a lower vaccination intent [10]. In light of all of this, specialists have significant roles to play in (1) dispelling vaccine-related myths and misconceptions, (2) strongly recommending patients to obtain the COVID-19 vaccine, and (3) staying up to date with emerging recommendations including additional dosing.

Given the significant impact of vaccines in protecting ICP from morbidity and mortality, current suboptimal immunization rates, and recent changes in healthcare delivery leading to additional barriers to vaccine administration, it is imperative for specialists to embrace a shared vaccination responsibility. Reviewing immunization needs (both routine and for SARS-CoV-2) and capitalizing on vaccine administration opportunities for all ICP should be incorporated into all specialists’ practice.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing

interests: ‘Dr. Freddy Caldera has received research support from Takeda Pharmaceuticals and Sanofi and has been a consultant for Takeda, Arena Pharmaceuticals, GSK, and Celgene. Dr. Francis Farraye is a consultant for BMS, Braintree Labs, Ferring, Gilead, GSK, Innovation’.

References

- [1] Harpaz R, Dahl RM, Dooling KL. Prevalence of immunosuppression among US adults, 2013. *JAMA* 2016;316:2547–8. <https://doi.org/10.1001/jama.2016.16477>.
- [2] Doornekamp L, van Leeuwen L, van Gorp E, Voeten H, Goeijenbier M. Determinants of vaccination uptake in risk populations: a comprehensive literature review. *Vaccines* 2020;8:480. <https://doi.org/10.3390/vaccines8030480>.
- [3] Paulsen MR, Natel NR, Sulis C, Farraye FA, Bhat S. Human papillomavirus, herpes zoster, and hepatitis B vaccinations in immunocompromised patients: an update for pharmacists. *J Pharm Pract* 2020. <https://doi.org/10.1177/0897190020958261> [epub ahead of print].
- [4] Huhn N. The impact of COVID-19 on routine immunizations. Johns Hopkins Bloomberg School of Public Health; 2020. Available at: <https://www.outbreakobservatory.org/outbreakthursday-1/12/10/2020/w9hy6szcwmz14zc8npym192x9k8mb>.
- [5] The NPD Group, Inc. Thirty-one percent of U.S. households lack a broadband connection; 2019. Available at: <https://www.npd.com/wps/portal/npd/us/news/press-releases/2019/thirty-one-percent-of-u-s-households-lack-a-broadband-connection/>.
- [6] MacDonald NE, SAGE Working Group on Vaccine Hesitancy. Vaccine hesitancy: definition, scope, and determinants. *Vaccine* 2015;33:4161–4. <https://doi.org/10.1016/j.vaccine.2015.04.036>.
- [7] Schwarzinger M, Watson V, Arwidson P, Alla PF, Luchini S. COVID-19 vaccine hesitancy in a representative working-age population in France: a survey experiment based on vaccine characteristics. *Lancet Public Health* 2021;6:e210–21. [https://doi.org/10.1016/S2468-2667\(21\)00012-8](https://doi.org/10.1016/S2468-2667(21)00012-8).
- [8] Bhat S, Farraye FA, Hayney MS, Caldera F. How to implement a successful vaccination program in outpatient gastroenterology practices: a focus on patients with inflammatory bowel disease and chronic liver disease. *Gastroenterology* 2021. <https://doi.org/10.1053/j.gastro.2021.01.026> [epub ahead of print].
- [9] Centers for Disease Control and Prevention. mRNA COVID-19 vaccines; 2021. Available at: <https://www.cdc.gov/vaccines/covid-19/info-by-product/clinical-considerations.html>.
- [10] Dalal RS, McClure E, Marcus J, et al. COVID-19 vaccination intent and perceptions among patients with inflammatory bowel disease. *Clin Gastroenterol Hepatol* 2021;19:1730–2. <https://doi.org/10.1016/j.cgh.2021.02.004>.