



A Socio-Legal Study on Vaccine Tourism in the Context of Covid-19 Travel Restrictions

Mohammad Owais Farooqui ^{1*}, Shadi A. Alshdaifat ¹, Mohd Imran Siddiquei ²

¹ Department of Public Law, College of Law, University of Sharjah, United Arab Emirates.

² Department of Business Administration, University of the People, Pasadena, California, United States.

Abstract

The COVID-19 pandemic has affected the tourism industry harshly. The most effective way to steer clear of the virus is global vaccination. A novel concept of vaccine tourism arises from vaccine manufacturing corporations' limited stock and production capacity. The current paper aims to demystify the socio-legal and ethical underpinnings of vaccine tourism as well as analyze the restrictions on international travel imposed by major countries. The research critically examines key issues considering the literature's current arguments and integrates the current developments and challenges in the field of vaccine tourism. The paper addresses the fact that, in the current circumstances of travel restrictions, insufficiency of raw materials, ambiguous policies, vaccine passport authenticity, skewed distribution, and scarcity of vaccines around the world, the implementation of vaccine tourism is a big challenge. The study tries to understand the emerging concept of vaccine tourism and the major challenges to its growth. Vaccine tourism may be an instrument to revive the tourism sector post-COVID; therefore, understanding the current emerging issues around it would be significant for tourism literature.

Keywords:

Vaccine; COVID-19;
Tourism; Law;
Vaccination;
Policies.

Article History:

Received:	01	September	2022
Revised:	21	August	2023
Accepted:	03	September	2023
Published:	01	October	2023

1- Introduction

The COVID-19 outbreak has had a substantial influence on the global economy. The COVID-19 epidemic hindered international travel and wreaked havoc on the tourism industry. International arrivals have declined by 70% to 75% for the whole of 2020 [1]. The second wave of COVID has been rampant, with millions of new cases and the loss of loved ones [2]. Vaccination against the virus was one of the initial few steps undertaken by governments worldwide. Experts and medical personnel advised getting vaccinated at the earliest possible time [3]. To control the impact of the pandemic, mass immunization has been considered to play a key role. Vaccines are useful to prevent the infection and dissemination of bacteria or viruses [4]. Vaccination as a mechanism has been used by humankind in the past to reduce the loss of life from communicable diseases [5]. The effects of the pandemic have been studied to understand the shocks to the global economy [6]. The widespread availability of various vaccines has proved to be a crucial instrument in the fight against COVID-19. Eight such vaccines are manufactured by Pfizer-BioNTech, AstraZeneca-Oxford, and Sinopharm [7].

Vaccination has positively impacted global health, which in turn is beneficial to the travel industry as well. A study argued that travel is indispensable to modern human life [8]. The presence of high numbers of COVID-19 cases in the destination had the strongest negative and deterring effect on the booking intentions of domestic tourists [9]. In response, numerous nations have made COVID-19 immunization a prerequisite for international travel.

* **CONTACT:** mfarooqui@sharjah.ac.ae

DOI: <http://dx.doi.org/10.28991/ESJ-2023-07-05-012>

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Many nations have debated whether COVID-19 immunization should be required for foreign travel. The World Travel and Tourism Council condemns the necessity of COVID-19 vaccinations for international travel [10]. An additional phrase has gained traction in the current discussion regarding vaccines, which is 'Vaccine Tourism'. Vaccine tourism has appeared multiple times in the news. The phrase gained popularity around the end of the year 2020, and it has recently resurfaced after a draft of a vaccination tour package for Delhi-Moscow, created by a Dubai-based travel firm called Arabian Nights Tours, was covered by the media [11]. The tour package was sold out, and many people expressed interest in it, according to the company. The package included two shots of Russia's Sputnik V vaccine as well as a certificate of immunization.

2- Methodology

The study examines the concept of vaccine tourism, current travel policies, global occurrences, and their associated challenges. As the concept was emerging and novel, the researchers collected data from various sources, including academic articles, journals, news reports, government websites, and tourism service providers (Figure 1). After analyzing the concepts, current guidelines, and challenges, implications were drawn for the tourism sector.

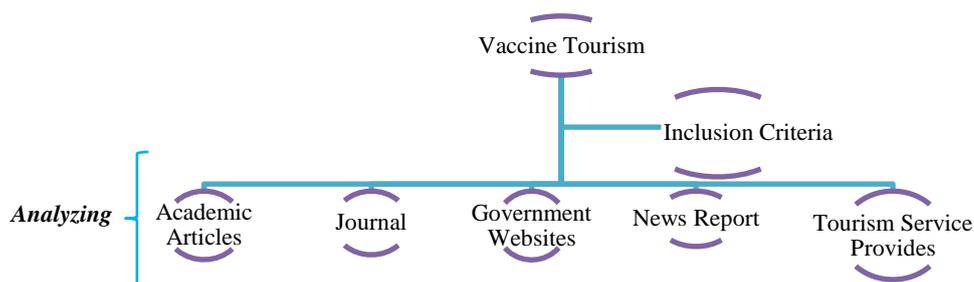


Figure 1. Inclusion Criteria

3- Vaccine Tourism

Medical tourism entails traveling overseas to obtain treatment or an operation that is either unavailable or considerably more expensive in one's native country [12]. People thus travel to other nations for medical treatments such as IVF and breast implants [13]. However, 'vaccine tourism' with the COVID-19 vaccine is an entirely new notion. By the end of 2020, several tour operators had begun marketing packages to the United States that included a vaccine; thus, the phrase 'vaccine tourism' gained traction [14]. Vaccine tourism refers to the practice of traveling from one country or state to another to obtain a vaccine that is not easily accessible. Vaccine tourism is similar to "jumping the line," with the exception that you are "going to another nation or state to receive vaccines." [15]. One such phenomenon has been observed: Americans are getting back on the road, but they are not going to Disney World; they are planning a trip to other states to get their vaccines. Vaccine tourism for the current time has been focused on the COVID-19 vaccine. The delivery of the vaccines had been impacted, which led to a sluggish rollout in many regions, affecting accessibility on a global scale.

3-1- Vaccine Tourism Operation

Americans are getting vaccinated across state boundaries [16]. People are even going from nearby countries, such as Venezuela and Mexico, to obtain the vaccine, according to some reports. Due to the state's original "open policy," however, Florida has seen one of the most attractive campaigns for vaccination tourism. Approximately 50,000 vaccinations were given to out-of-state recipients [17]. There are many examples of vaccination tourism being practiced in specific regions, which may be a driving force for growth in the tourism sector.

3-2- Vaccine Tourism across the World

Vaccine tourism, a growing global trend, involves individuals traveling to different countries to receive COVID-19 vaccinations, capitalizing on varying vaccine availability and distribution strategies (see Table 1).

3-3- Challenges of Vaccine Tourism

Tourism associated with medical care includes vaccine tourism; however, in the case of the COVID-19 vaccines, vaccine tourism highlights the privilege of small priority groups over the general public [12]. Vaccine tourism has the probability of amplifying socioeconomic and racial disparities [14] and poses severe ethical and legal concerns, calling the idea into doubt. Due to production problems and the prioritization of some segments of the population, a lucky number of people throughout the world are "traveling" and "jumping the queue" to be immunized [15]. There are certain challenges associated with vaccine tourism for both governments and citizens.

Table 1. Vaccine tourism schemes

Name of Country	Service Provider	Descriptions	Source
Russia	Arabian nights travel agency	From Delhi to Moscow, a 24-day package tour is available. Under this package, they will transport visitors to Russia and provide them with two doses of the Sputnik V vaccine, as well as the certificates.	[18-20]
Maldives	Maldives Ministry of Tourism	The Maldives is embarking on a "3V tourism" initiative that will allow visitors to "Visit, Vaccinate, and Vacation."	[18, 20-22]
New York City, USA	State's Government	To offer visitors free vaccines, tourism from Texas to Florida and from Mexico and other countries fly to the U.S. for a shot in the arm.	[15, 18, 22]
India	Gem Tours & Travels PVT	A three-day stay in New York for a first vaccination and another trip several weeks later for a second shot	[15, 18-21, 23, 24]
Thailand	My journey travel	Tours to the United States and Russia for vaccines, including a 10-day journey to San Francisco for a Johnson & Johnson jab.	[18, 21, 25]
Alaska	Alaska's Government	Get a vaccine shot at one of the state's major airports. Travelers will be able to get their first dose of the Pfizer-BioNTech or Moderna vaccine	[26, 27]
German	Fit Reisen Group	Encourage Germans to enjoy the sun and surf with the highly desired COVID-19 vaccine.	[18, 21]
Norway	World Visitor	Vacations to Russia for coronavirus vaccination. Customers may pick from a variety of trip packages, all of which include the Sputnik V vaccination, which is developed in Russia.	[21]
Russia	Country's Tourism Authority	"Vaccination tours" three-week vaccine tour for foreigners	[15, 18, 21, 23, 24]
United Arab Emirates	Government	The UAE has quietly launched vaccine tourism offering free jabs to everyone with an entry visa. In Abu Dhabi's healthcare app, Emiratis and residents and visitors can register either for the US-German Pfizer/BioNTech jab or the Chinese-made vaccine Sinopharm.	[15, 18, 21, 23, 24]

3-4- Hesitancy for Vaccine

The public's readiness to adopt a vaccination was dynamic; it was extremely responsive to existing knowledge and attitude towards the COVID-19 vaccine, as well as the condition of the pandemic and the perceived danger of getting the infection [28]. There was a lack of desire to get the COVID-19 vaccination, and numerous factors were linked to this [29]. Psychological factors such as personality traits, analytical reasoning, and altruism, to name a few, are linked to COVID-19 vaccination reluctance [30]. Negative views regarding vaccines, as well as apprehension or refusal to get vaccinations, are also challenges for vaccine tourism [31]. The country's management of the COVID-19 pandemic helps construct beliefs regarding a destination [32].

3-5- Travel Restrictions

Traveling contains extensive health concerns at the level of the pandemic, including the transmission of the virus at the destination as well as in the country of origin after traveling [33]. Unvaccinated passengers boarding planes or trains to be immunized also had strong implications. Only vaccinated persons had been certified by the CDC for widespread travel in the summers [34]. Any threat of 'importing' COVID infections was to be determined by the volume of tourist arrivals and the percentage of those arriving with COVID infection [35]. Vaccine tourism permits people to travel, attend big events, and enter public places without jeopardizing their own safety or public health [36]. Countries that rely majorly on tourism to revitalize their economies adopted a "risk-based" strategy, which could potentially result in the recurrence of the viral pandemic due to high percentages of asymptomatic flight passengers [37].

3-6- Insufficiency of Raw Material

A scarcity of vaccine raw materials had caused concern among worldwide vaccine manufacturers [38]. Raw material constraints in production scaling, manufacturing quality assurance issues, cold-chain logistics, and storage management obstacles, rising personnel demands, and IT hurdles were key development concerns for COVID vaccine implementation [39, 40]. Outside of the United States, the vaccine industry faced a scarcity of plastic bags, filters, and media solutions, which were crucial in the production of the COVID-19 vaccine. All vaccine manufacturers are experiencing input supply issues [41, 42].

3-7- Ambiguous Policies

There are no legal agreements in place with international authorities to ensure that these "vaccine tourists" get the entire experience they've been promised, including the shot in the arm [15]. The preferential treatment demanded by priority groups who can afford to go to a different state or nation for the vaccine raised concerns for the regular residents' chance to get the vaccine [43]. It is legal if visitors have a visa or are permitted to lawfully visit the United States, but

there is no assurance that they will obtain the shot. The government had no policy in place that guaranteed a COVID-19 vaccine. If a visitor went to the United States for a shot, it was advised to be aware that the possibility exists that they might not receive it [43]. Thus, great caution was recommended

3-8- Vaccine Passport Authenticity

Every identity document brings its dystopia [44]. COVID vaccination passport also appeared to be oblivious to the significant regulatory, ethical, and technical issues. To be authenticated and used, any such certificate or passport requires two things: access to a country's official immunization records and a secure way of identifying an individual and connecting them to their medical record [45]. When such a digital certificate was to be acknowledged by another country's border agency, it must certainly have to comply with common criteria established by organizations such as the WHO or the EU. While the benefits of vaccination passports are obvious, their acceptance has both ethical and practical implications. One such responsibility is to negate any bias against vulnerable sections of the society such as the poor, the less technically adept, or those from low and medium-income nations [36].

3-9- Skewed Distribution

The crisis in India heightened the fear of vaccine poverty. The result of which could have affected national and local health inequity [46]. When a pandemic occurs, many nations must rely on others for vaccination supply to preserve lives. This paves the way to vaccine nationalism, in which each government strives to use its buying power to acquire vaccination doses for its population, leaving poorer nations behind [47]. The use of vaccination as a tourist attraction has some disadvantages. To begin with, its whole existence is based on an unequal distribution of vaccinations. Certain wealthy countries' big vaccination purchases have created a scarcity mindset, which has unduly boosted vaccine demand. Figure 2 presents the percentage of the population fully vaccinated.

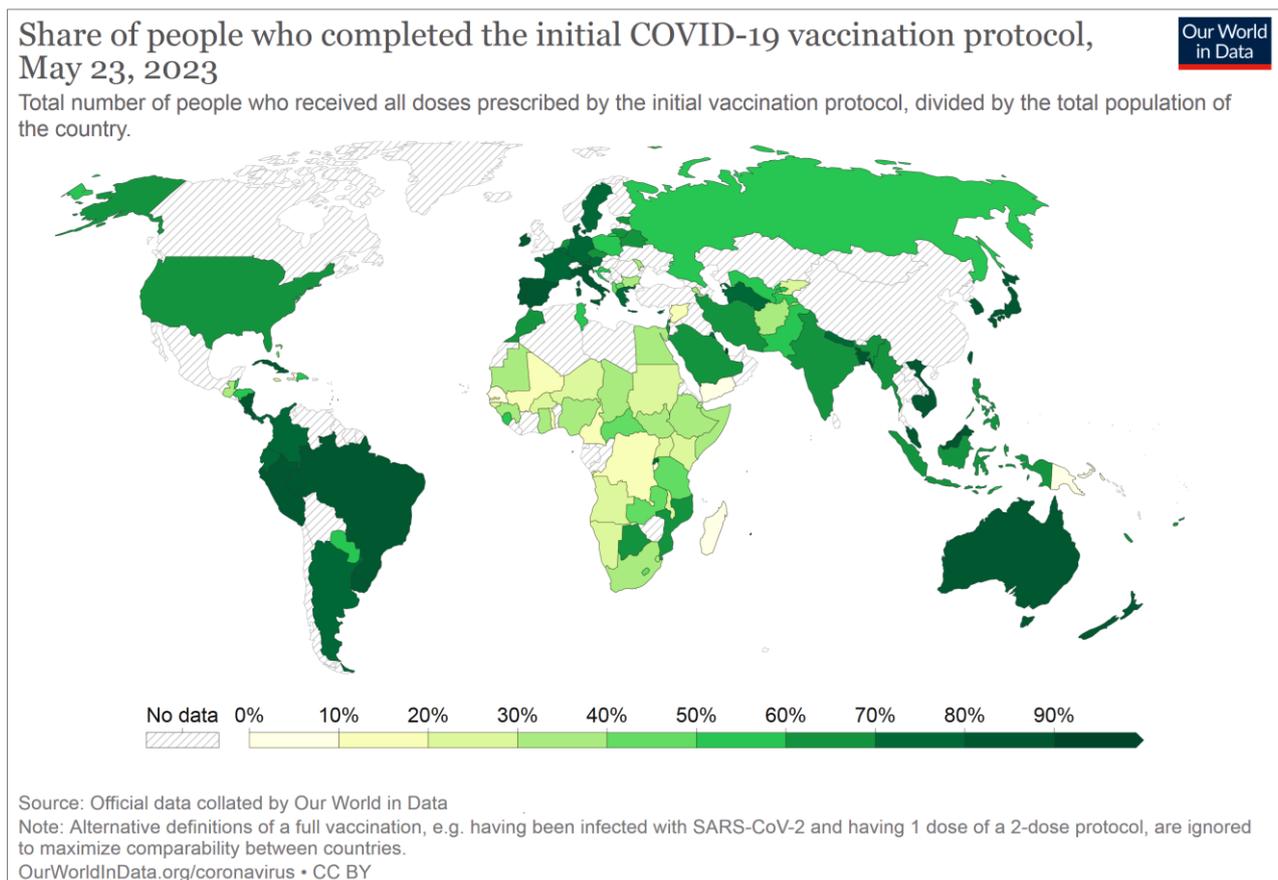


Figure 2. Share of the Population Fully Vaccinated (Bloomberg Vaccine Tracker & ourworldindata.org [48])

Over 2.66 billion vaccine doses had been delivered globally, which equated to 35 doses for every 100 individuals. Some countries, like the UAE, USA, and India, have achieved more than 80 percent vaccination rates, while some African countries are still in the mid-30 to 40 percent vaccination range. There was already a significant disparity in vaccination efforts in various nations, with some failing to provide even a single dosage (Figure 1) [49]. While people from high- and upper-middle-income nations received over 40% of all doses delivered globally, they account for less than 16% of the world's population. It should also be mentioned that the world's wealthiest 70 countries accounted for

45 percent of all vaccines provided by 2021, despite accounting for just 23% of the world's population. Accessibility to life-saving vaccinations and toolkits is clearly neither fair nor equitable [50].

3-10-Scarcity of Vaccine Around the World

To vaccinate 70% of the world's population, or the approximated threshold required for herd immunity, around 11 billion injections are required. However, only a small portion of it had been manufactured by 2021 [51]. The infrastructure requirements to set up vaccine manufacturing labs as well as the availability of a highly skilled workforce trained specifically in the area have led to bottlenecks in production [52]. Companies had swiftly ramped up production, with Pfizer leading the pack with 119 million doses, followed by Sinovac with 91 million and AstraZeneca with 83 million. Up to March 3, 2021, a total of 413 million doses had been manufactured. China has produced the most, with 141.6 million, followed by the United States, which created 103 million vaccines. Germany and Belgium have generated a total of 70.5 million more, while India has created 42.4 million [53]. The COVAX facility, co-led by the WHO, the Vaccine Alliance (GAVI), and the Coalition for Epidemic Preparedness Innovation (CEPI), had fallen short of its commitment of two billion doses to 92 of the world's poorest countries [54], owing in part to its over-reliance on the Serum Institute of India for vaccines, which was swamped by heightened demands during the second wave [41]. Even with distribution networks in place, it would only benefit around 20% of individuals in low- and middle-income nations [47]. Nearly a dozen countries, many of them in Africa, were still waiting to get vaccines until early 2021 [55]. (Any statistics on the situation in Africa as of now?).

3-11-Guidelines for COVID-19 Travel: Legal Issues

Navigating the legal landscape of COVID-19 travel guidelines has become crucial for both travelers and governments. Issues such as quarantine requirements, vaccination mandates, and documentation standards pose legal challenges, prompting the need for clear, universally applicable guidelines to ensure safe and compliant international travel.

Table 2. COVID-19 Travel Guidelines in Major Tourist Destinations

S. No.	Country	COVID-19 Related to Travel Guidelines	Source
01	USA	<ul style="list-style-type: none"> All fully vaccinated travelers must carry their vaccination certificates, insurance, and visa health declaration forms. A Health Declaration Form as well as a Passenger Disclosure and Attestation Form must be filled and submitted at immigration for contact tracing. Travelers will have to fill out additional forms to enter California, New York and Massachusetts. According to U.S. federal law, all passengers on any aircraft leaving from a foreign country and arriving in or connecting through the U.S. must certify that they are completely immunized or meet the requirements for an exception. A parent or other authorized person may attest on behalf of minors under the age of 17 if necessary but should choose the exempt option for children under the age of two. Each customer must submit a separate attestation. Unless exempted, all non-US citizens who are non-immigrant travelers must show the airline "Proof of Being Fully Vaccinated against COVID-19" documents in digital or paper form before boarding. 	<p><i>Non-U.S. Citizen, Non-U.S. Immigrants: Travel to and from the United States.</i> (2022). U.S. Department of Health & Human Services. https://www.cdc.gov/coronavirus/2019-ncov/travelers/noncitizens-US-air-travel.html</p>
02	UAE	<ul style="list-style-type: none"> All fully vaccinated, partially vaccinated, and non-vaccinated passengers can travel. Travelers need to follow all the registration and quarantine rules. All travelers must download and register on the ALHOSN app. Those traveling to Dubai must also download and register on the DXB Smart App. Travelers must upload passport and travel-related documents on these apps. Fully vaccinated travelers (except children below 12 years) must carry printed copies of their valid international vaccination certificates (both doses taken, and the final dose administered at least 14 days before departure). The vaccination certificate must have a QR code on it and should only be in English or Arabic. Travelers who are not immunized (except children under the age of 12) must have a printed copy of a negative RT-PCR test report that was issued no more than 48 hours before departure. The certificate issued must only be in English or Arabic and must be properly signed or stamped by pertinent authorities. Certificates that are written by hand are not allowed. The travelers' negative RT-PCR certificate must accurately state the date and time of sample collection as well as the test result, and it must have a QR code connecting it to their original test report. A Health Declaration Form and a Quarantine Undertaking Form must be downloaded and submitted to enter the UAE. 	<p><i>Traveling to the UAE.</i> (2022). The National Emergency Crisis and Disasters Management Authority. https://u.ae/en/information-and-services/justice-safety-and-the-law/handling-the-covid-19-outbreak/travelling-amid-covid-19/travelling-to-the-uae</p>

03	Australia	<ul style="list-style-type: none"> Travel is open for only fully vaccinated visa holders. Unvaccinated visa holders need to be in an exempt category to travel to Australia. All travelers must submit the Digital Passenger Declaration (DPD). It must be submitted within 72 hours before departure for Australia. Travelers who do not make the declaration before they board their flight may be delayed/denied travel to Australia. Parents or guardians are requested to complete the declaration for their children under 16 years of age. 	<i>International travel and COVID-19.</i> (2022). Department of Health and Aged Care. https://www.health.gov.au/health-alerts/covid-19/international-travel
04	UK	<ul style="list-style-type: none"> All International travelers can enter the UK without any vaccination report or COVID-19 tests. 	<i>Travel to England from another country during the coronavirus (COVID-19).</i> (2022). Department for Transport and Department of Health and Social Care. https://www.gov.uk/guidance/travel-to-england-from-another-country-during-coronavirus-covid-19#history
05	Canada	<ul style="list-style-type: none"> Travelers with the required vaccinations are welcome to visit Canada. To be regarded as fully immunized, a traveler must have had 14 days since the last injection. Fully immunized tourists are not obliged to undergo any pre-departure testing. The random testing of visitors to Canada will nevertheless go on. A negative RT-PCR test result (performed within 72 hours of departure) or a negative RAT test result is required for non-immunized travelers (taken at most 24 hours before departure). As an alternative, people who have recently recovered from COVID-19 are excluded from testing requirements and may show proof of a positive molecular test result that was issued at least 10 but no more than 180 days before arrival. The ONLY non-vaccinated travelers who can currently enter Canada are minors traveling with their fully vaccinated parents. 	<i>Travel to Canada: Requirements for COVID-19 vaccinated travelers.</i> (2022). Government of Canada. https://travel.gc.ca/travel-covid/travel-restrictions/covid-vaccinated-travellers-entering-canada
06	China	<ul style="list-style-type: none"> Foreign travel is prohibited to China. Nationals, residents, and those in possession of legal visas are exempt. Those in possession of a valid visa are exempt from the border shutdown. Tourism-related travel is prohibited. 	<i>China Travel Restrictions & Travel Advisory.</i> (2022). China Highlights. https://www.chinahighlights.com/travelguide/china-travel-reopen-restrictions.htm
07	Germany	<ul style="list-style-type: none"> Non-vaccinated tourists may be allowed to enter Germany if there is an emergency, but they must bring a negative PCR test report that is no older than 72 hours. Travel to Germany is available to fully vaccinated travelers. They must also have a current immunization record with them. Children under the age of 12 who have not yet had their vaccinations are permitted entry into the country with proof of a negative test result (PCR test or antigen test), as long as at least one parent is properly immunized. Proof of a negative test result is not necessary for children under the age of six. Quarantine is no longer required upon arrival in Germany. 	<i>Traveling during the COVID-19 pandemic – entry restrictions mostly lifted.</i> (2022). Federal Foreign Office. https://www.auswaertiges-amt.de/en/coronavirus/2317268
08	France	<ul style="list-style-type: none"> Travel to France is open who are fully vaccinated. They must provide evidence of their vaccination status (vaccination certificate). Travelers who are not immunized must either carry a recovery certificate (a positive PCR or antigen (lateral flow) test dated more than 11 days and less than six months before departure) or a negative RT-PCR test from less than 72 hours and with a QR Code, or an antigen (lateral flow) test, with a sample taken less than 48 hours before departure. Children under 12 years of age are exempted from these requirements. 	<i>COVID 19: International travel.</i> (2022). Ministry of the Interior and Overseas. https://www.interieur.gouv.fr/covid-19-international-travel
09	India	<ul style="list-style-type: none"> All travelers to India are required to submit either a vaccination certificate attesting to their completion of all required vaccinations at least 15 days before arrival or a negative COVID-19 RTPCR report for a test performed within 72 hours of travel. When arriving at the airport, passengers are randomly tested. After submitting their samples, passengers who were chosen for testing will be permitted to exit the airport. Passengers who test positive shall be handled/isolated by the most recent recommendations. Testing requirements for both pre-departure and on-arrival are waived for children under the age of five. 	<i>Guidelines for International Arrivals.</i> (2022). Ministry of Health and Family Welfare. https://www.mohfw.gov.in/
10	Thailand	<ul style="list-style-type: none"> Travel to Thailand is open, whether vaccinated or not. Fully immunized passengers are no longer required to undergo the RT-PCR COVID test, and SHA+ Hotel reservations are no longer necessary. Non-vaccinated or partially vaccinated travelers can avoid quarantine if they upload to Thailand Pass documentation of a negative pre-departure RT-PCR test performed within 72 hours. 	<i>General COVID-19 Travel Advisory in Operation.</i> (2022). Department of Foreign Affairs. https://www.dfa.ie/travel/travel-advice/a-z-list-of-countries/thailand/

Certain policy implications can be derived from the summary of the various guidelines followed by nations while others were conscious of creating thorough tourism recovery plans. In addition to the urgent actions required, policymakers must draw lessons from the COVID-19 crisis to enhance crisis management plans and better position destinations and the industry at large to adapt to upcoming shocks.

After the COVID-19 crisis, the public and private sectors should continue to improve their cooperation to recover stronger. The government should continue to make meaningful changes to address institutional deficiencies while working to further enhance the business environment for the private sector. To address the sector's structural concerns, prevent the recurrence of tourism management problems (such as over-tourism), and advance important goals like fostering new business models, embracing digitalization, and fostering connectivity, policy action will be required. The latter will be crucial in a post-crisis situation where social distance will still be important and travelers will seek out less crowded locations. All the industry branches that make up the tourism experience need to be supported, and comprehensive recovery measures must be taken. Governments must make sure that the industry is prepared to restart and continue to innovate and evolve. Investments will also be required to make structural and physical adjustments to meet visitors' expectations and health requirements during the initial period of recovery and over the long term. To ensure more long-term economic resilience, some nations have also put policies in place to boost innovation in SMEs.

Tourism-related firms and destinations must also modify their offerings in response to altered travel behaviours.

4- Conclusion

The COVID-19 pandemic has significantly impacted the global economy and the tourism industry. The decline in international travel and the disruption caused by the virus has led to a severe decrease in tourist arrivals. To control the effects of the pandemic, the development of herd immunity is essential. The development and distribution of COVID-19 vaccines have emerged as a crucial tool in the fight against the virus and the recovery of the tourism sector. Vaccination is the safest approach to accomplish this. Vaccine tourism presents a new dimension to medical tourism, with individuals combining sightseeing and vaccination. Several countries, including the United States, Russia, Maldives, and Dubai, have introduced vaccine tourism schemes to attract visitors. However, alongside the vaccination efforts, the concept of "vaccine tourism" has emerged, where individuals travel to different countries or states to receive the COVID-19 vaccine. Vaccine tourism is indeed an opportunity to boost the pace of vaccination and revives the tourism industry. While receiving their vaccines, people all around the world are traveling, book hotels, and contributing to more business in the hospitality sector. Despite being a boost to the tourism sector, vaccine tourism had arisen as a trend in nations where vaccines are scarce or where some people were still barred from receiving immunization. There could thus be many reasons beyond the scope of this study that would affect such decisions. Even though vaccine tourism may pose a sound opportunity to boost tourism, but, travel restrictions, insufficiency of raw material, without absolute identity, dubious vaccine passport authenticity, skewed distribution, and scarcity of vaccines around the world may pose hindrances to successful vaccine tourism.

The challenge of equitable access to vaccines is being addressed through efforts to address these challenges. Coordination, collaboration, and the sharing of resources are essential to addressing the scarcity of vaccines and promoting fair distribution. It is also essential to develop transparent policies, ethical guidelines, and reliable systems for the verification of vaccine passports to prevent exploitation and to ensure the authenticity of vaccine-related travel. There is a need to strike a balance between public health priorities, ethical considerations, and the recovery of the tourism industry as the world continues to navigate the complexities of the COVID-19 pandemic. Vaccine tourism must be carefully regulated and monitored to ensure fairness, safety, and effectiveness. As a result, a coordinated global effort and equitable access to vaccines are essential to control the pandemic and restore the tourism industry.

5- Declarations

5-1-Author Contributions

Conceptualization, M.O.F. and M.I.S.; methodology, M.O.F. and M.I.S.; software, S.A.; validation, M.O.F., S.A., and M.I.S.; formal analysis, M.O.F. and S.A.; investigation, M.O.F.; resources, M.I.S.; data curation, M.O.F. and M.I.S.; writing—original draft preparation, M.O.F. and M.I.S.; writing—review and editing, M.O.F. and S.A.; visualization, M.O.F., and S.A.; supervision, M.O.F.; project administration, M.O.F. and M.I.S.; funding acquisition, M.O.F. All authors have read and agreed to the published version of the manuscript.

5-2-Data Availability Statement

Data sharing is not applicable to this article.

5-3-Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

5-4-Institutional Review Board Statement

Not applicable.

5-5-Informed Consent Statement

Not applicable.

5-6- Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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