

High-risk US International Travelers Seeking Pretravel Consultation During the COVID-19 Pandemic

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Background. To assess the implications of coronavirus disease 2019 (COVID-19)-related travel disruptions, we compared demographics and travel-related circumstances of US travelers seeking pretravel consultation regarding international travel at US Global TravEpiNet (GTEN) sites before and after the initiation of COVID-19 travel warnings.

Methods. We analyzed data in the GTEN database regarding traveler demographics and travel-related circumstances with standard questionnaires in the pre-COVID-19 period (January–December 2019) and the COVID-19 period (April 2020–March 2021), excluding travelers from January to March 2020. We conducted descriptive analyses of differences in demographics, travel-related circumstances, routine and travel-related vaccinations, and medications.

Results. Compared with 16 903 consultations in the pre-COVID-19 period, only 1564 consultations were recorded at GTEN sites during the COVID-19 period (90% reduction), with a greater proportion of travelers visiting friends and relatives (501/1564 [32%] vs 1525/16 903 [9%]), individuals traveling for >28 days (824/1564 [53%] vs 2522/16 903 [15%]), young children (6 mo–<6 y: 168/1564 [11%] vs 500/16 903 [3%]), and individuals traveling to Africa (1084/1564 [69%] vs 8049/16 903 [48%]). A smaller percentage of vaccine-eligible travelers received vaccines at pretravel consultations during the COVID-19 period than before, except for yellow fever and Japanese encephalitis vaccinations.

Conclusions. Compared with the pre-COVID-19 period, a greater proportion of travelers during the COVID-19 period were young children, were planning to visit friends and relatives, were traveling for >28 days, or were traveling to Africa, which are circumstances that contribute to high risk for travel-related infections. Fewer vaccine-eligible travelers were administered travel-related vaccines at pretravel consultations. Counseling and vaccination focused on high-risk international travelers must be prioritized during the COVID-19 pandemic.

Keywords. international travel; COVID-19; global travEpiNet.

INTRODUCTION

In response to the global spread of severe acute respiratory syndrome coronavirus (SARS-CoV-2), the World Health Organization (WHO) released a series of travel guidelines throughout 2020 [1]. The US Centers for Disease Control and Prevention (CDC), along with international public health agencies and other national governments, also issued multiple recommendations and warnings regarding travel-associated coronavirus disease 2019 (COVID-19) risks during the same period in

order to contain or mitigate the global spread of SARS-CoV-2. International travel from the United States declined precipitously by 66.3% in 2020 compared with 2019 amidst the increasing global spread of SARS-CoV-2 [2]. The proportion of international travel to destinations other than Mexico or Canada was particularly affected, accounting for 44.4% of all international departures in 2015–2019 but only 29.4% of 2020 departures [2].

Pretravel health consultations help to identify, communicate, and mitigate health risks faced by international travelers [3]. Consultations can include counseling, vaccine administration, and prescribing of prophylactic medications, with the goal of improving the health of international travelers and reducing the global spread of communicable diseases [4]. Pretravel consultations are especially beneficial for high-risk travelers, which is a classification based on age, destination(s), duration and reason for travel, and preexisting health conditions [5–9]. An important reason for travel that increases the risk of travel-related illness is visiting friends and relatives [6].

We sought to describe the profile of US international travelers seeking pretravel consultation at Global TravEpiNet

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(GTEN) sites in the United States before and after the start of the COVID-19 pandemic. The aim of the analysis was to assess such changes in pretravel clinical and health care-seeking behaviors, as these changes might affect health risks and the need for health services associated with international travel.

METHODS

We analyzed data regarding demographic and travel-related characteristics in US residents seeking pretravel consultation for international travel at GTEN clinics before and after the onset of the COVID-19 pandemic. GTEN is a CDC-sponsored consortium of US sites that provide pretravel health consultations and collect data on traveler demographics, itineraries, and pretravel health care of US international travelers [5].

For this analysis, we defined the year from January 1 to December 31, 2019, as the *pre-COVID-19 period* (2019 Q1, January–March; 2019 Q2, April–June; 2019 Q3, July–September; 2019 Q4, October–December) and the year from April 1, 2020, to March 31, 2021, as the *COVID-19 period* (2020 Q2, April–June; 2020 Q3, July–September; 2020 Q4, October–December; 2021 Q1, January–March). We excluded pretravel visits that occurred during the 3 months between January 1 and March 31, 2020, from the analysis, as our objective was to evaluate travelers who sought pretravel advice and planned to travel despite COVID-19 travel warnings and government restrictions [10, 11]. We excluded children <6 months of age (pre-COVID-19: n = 10; during COVID-19: n = 6) as they are not eligible for most travel-related vaccines or medications.

GTEN sites with available data from the study period contributed to this analysis: 22 sites from 4 US census regions (Northeast [8 sites], Midwest [1 site], West [8 sites], and South [5 sites]) that were categorized into academic centers (12 sites) and nonacademic centers (10 sites), such as primary care practices, public health clinics, and pharmacies. Travelers self-reported their demographic information and travel-related circumstances using a standard, web-based questionnaire before the consultation. At the pretravel consultation, which could be performed in person or via telemedicine, providers confirmed these data and recorded medications prescribed and vaccines recommended; vaccines could be administered during an in-person consultation or after a telemedicine consultation at a subsequent nursing visit [5].

We categorized reports of planned duration of travel into 4 groups: <15 days, 15–28 days, 29–180 days, and >6 months. We sorted travel destinations into 6 WHO-defined regions: Africa, Americas, Southeast Asia, Western Pacific, Europe, and Eastern Mediterranean [12]. We also categorized planned travel destinations as nonendemic or endemic areas for the following diseases, based on current CDC classifications: yellow fever, Japanese encephalitis, and malaria [4]. Travelers specified their reasons for travel, which we categorized into 6 mutually exclusive categories in the following rank order: visiting friends and

relatives (VFR), business, humanitarian service (including providing medical care, nonmedical service work, and missionary work), research/education, leisure, and other [5]. For example, travelers who selected both VFR and leisure contributed only to the VFR category. For pediatric travelers, parents or guardians provided the self-reported information, including the reason for family travel, which could include any of the reasons above.

We compared providers' recommendations for routine and travel-related vaccinations in the pre-COVID-19 period compared with the COVID-19 period; COVID-19 vaccinations were not widely available during the study periods. For each vaccine, we first categorized travelers into 3 categories: preexisting immunity, medical contraindication, and vaccine-eligible. For the vaccine-eligible travelers, we determined whether the vaccine was recommended at the pretravel consultation and grouped the reasons for nonvaccination into 4 categories: provider decision, referral to another provider, traveler refusal, and other [13, 14]. We conducted bivariate analyses of differences in the distribution of demographics, travel-related circumstances, vaccinations, and medications between the 2 time periods using the 2-sided chi-square test or Fisher exact test in SAS, version 9.4 (SAS Institute Inc., Cary, NC, USA). Institutional review boards at each of the 22 participating sites either approved the study or considered it exempt from review.

RESULTS

In the pre-COVID-19 period, 16 903 consultations occurred at 22 GTEN sites, whereas 1564 consultations took place at 18 GTEN sites during the COVID-19 period. The number of consultations remained consistent throughout each of the 4 quarters of 2019 (pre-COVID-19 period; 2019 Q1–4: 3893–4730 consultations/quarter) before declining sharply in the COVID-19 period (2020 Q2: 157 consultations) and then gradually increasing again (2020 Q3: 316 consultations; 2020 Q4: 565 consultations; 2021 Q1: 526 consultations) (Figure 1).

While total numbers of pretravel consultations declined markedly in the COVID-19 period compared with the pre-COVID-19 period, traveler demographics and travel-related circumstances also differed between the pre-COVID-19 and COVID-19 periods, with an increase in the proportion of high-risk travelers in the COVID-19 period. Travelers aged 6 months to 6 years comprised 500 of 16 903 (3%) travelers in the pre-COVID-19 period but 168 of 1564 travelers (11%) in the COVID-19 period (relative increase, 263%), whereas travelers older than 55 years comprised 2062 of 16 903 travelers (12%) in the pre-COVID-19 period, declining to 75 of 1564 travelers (5%) in the COVID-19 period (61% relative reduction) (Table 1). Travelers during the COVID-19 period were more likely to report plans to travel for longer durations; 2522 of 16 903 (15%) travelers during the pre-COVID-19 period reported itineraries of >28 days, compared 824 of 1564 (53%) travelers

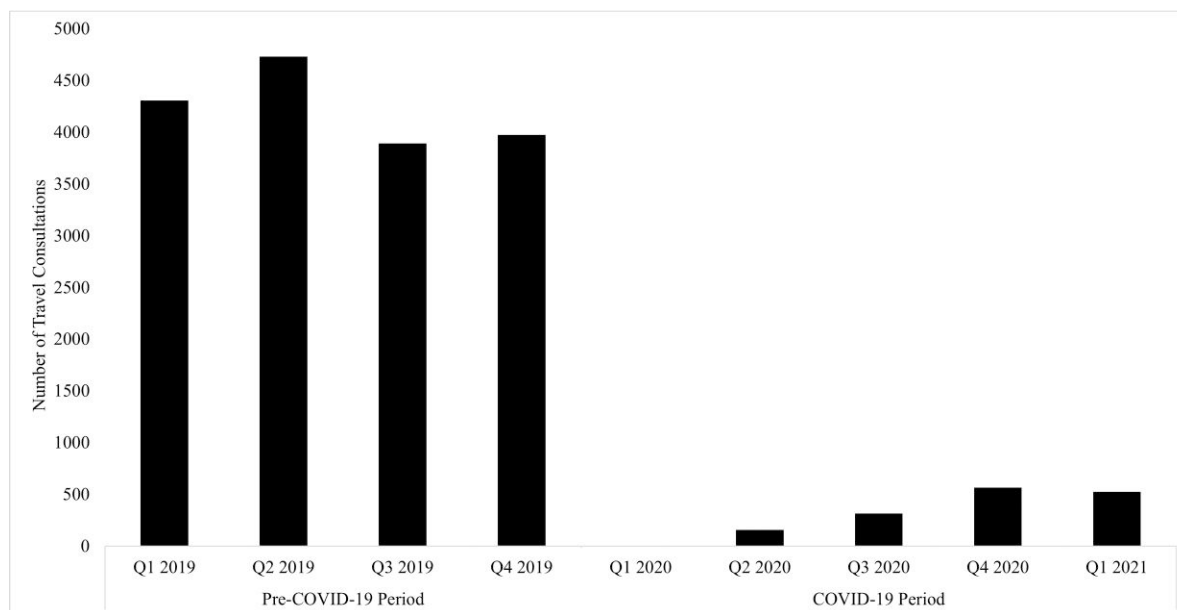


Figure 1. Changes in the number of pretravel consultations at Global TravEpiNet (GTEN) sites during the pre-COVID-19 and COVID-19 periods, stratified by calendar quarter. We excluded pretravel consultations from the first quarter of 2020 (January 1, 2020–March 31, 2020) due to traveler uncertainty, travel disruptions, and government restrictions. Abbreviation: COVID-19, coronavirus disease 2019.

during the COVID-19 period (relative increase, 253%). Although travel to all international destinations decreased during the COVID-19 period, the proportion of travel to Southeast Asia (3082/16 903 [18%] vs 65/1564 [4%]; relative reduction, -77%) and the Western Pacific (2381/16 903 [14%] vs 78/1564 [5%]; relative reduction, -65%) decreased by the greatest amount, and travel to Africa increased proportionally (8049/16 903 [48%] vs 1084/1564 [69%]; relative increase, 46%). Leisure was reported as the reason for travel by 9322 of 16 903 (55%) travelers in the pre-COVID period and decreased to 395 of 1564 (25%) travelers in the COVID period (relative reduction, -54%). In contrast, traveling to visit friends and relatives (VFR; 1525/16 903 [9%] vs 501/1564 [32%]; relative increase, 255%) was reported significantly more frequently as the reason for travel during the COVID-19 period. Additionally, the proportion of travelers planning to visit regions endemic for yellow fever during the COVID-19 period increased by 35% (9967/16 903 [59%] vs 245/1564 [80%]). Although fewer travelers were evaluated at GTEN sites overall in the COVID-19 period, the proportion evaluated at nonacademic centers decreased by 64% (6453/16 903 [38%] vs 214/1564 [14%]).

Because travelers in the COVID-19 period included a greater proportion of young children, we examined this subgroup in detail. During the COVID-19 period, pediatric travelers aged 6 months to 6 years of age were also more likely to be traveling for >28 days compared with the pre-COVID-19 period (252/500 [50%] vs 135/168 [80%]; relative increase, 60%) and to report VFR (262/500 [52%] vs 120/168 [71%]; relative increase,

36%) (Supplementary Table 1). Additionally, more pediatric travelers aged 6 months to 6 years were traveling to Africa (323/500 [65%] vs 152/168 [90%]; relative increase, 40%) during the COVID-19 period than in the pre-COVID-19 period. The proportion of children under the age of 6 years traveling to malaria-endemic countries was the same in the 2 time periods (488/500 [98%] vs 165/168 [98%]), but the percentage of children prescribed antimalarial drugs was greater during the COVID-19 period (306/488 [63%] vs 134/165 [81%]; relative increase, 30%). Among pediatric travelers eligible for malaria prophylaxis, a lower proportion of those assessed in the pre-COVID-19 period were planning travel to Africa (246/488 [80%]) compared with the COVID-19 period (125/165 [93%]); similar proportions were VFR (220/488 [72%] vs 96/165 [72%]) or evaluated at an academic center (270/488 [88%] vs 122/165 [91%]) during the 2 time periods.

During the COVID-19 period, more travelers evaluated at GTEN sites were prescribed antimalarial drugs (10 067 [63%] vs 1022 [71%]), but fewer travelers were prescribed empiric antibiotics for travelers' diarrhea (11 666 [69%] vs 653 [42%]) or altitude sickness (1040 [6%] vs 38 [2%]) (Table 1).

In the COVID-19 period, a greater proportion of travelers were eligible for measles-mumps-rubella (MMR) and influenza vaccines compared with the pre-COVID-19 period (MMR: 2775/16 903 [16%] vs 309/1546 [20%]; influenza: 7753/16 903 [46%] vs 783/1564 [50%]), whereas a smaller proportion of travelers were eligible for hepatitis A (8252/16 903 [49%] vs 626/1564 [40%]) (Table 2). The same

Table 1. Demographics and Travel-Related Circumstances of International Travelers Seeking Pretravel Consultation at Global TravEpiNet Sites Before and During the COVID-19 Pandemic

Characteristics	Pre-COVID-19: January 1, 2019, to December 31, 2019 (n = 16 903)	During COVID-19: April 1, 2020, to March 15, 2021 (n = 1564)	Relative Percent Change	P Value ^a
Sex, No. (Col. %)				<.001
Male	7080 (41.9)	827 (52.9)	26	...
Female	9823 (58.1)	737 (47.1)	-19	...
Age, No. (Col. %)				<.001
6 mo–<6 y	500 (3.0)	168 (10.7)	263	...
6–<18 y	1776 (10.5)	169 (10.8)	3	...
18–55 y	12 565 (74.3)	1152 (73.7)	-1	...
>55 y	2062 (12.2)	75 (4.8)	-61	...
Duration of travel, No. (Col. %) ^b				<.001
<15 d	9740 (57.6)	455 (29.1)	-50	...
15–28 d	4636 (27.4)	281 (18.0)	-34	...
29–180 d	2107 (12.5)	536 (34.3)	175	...
>6 mo	415 (2.5)	288 (18.4)	650	...
Region of travel, No. (Col. %) ^c				<.001
Africa	8049 (47.6)	1084 (69.3)	46	<.001
Americas	4370 (25.9)	295 (18.9)	-27	<.001
Southeast Asia	3082 (18.2)	65 (4.2)	-77	<.001
Western Pacific	2381 (14.1)	78 (5.0)	-65	<.001
Europe	805 (4.8)	69 (4.4)	-7	.532
Eastern Mediterranean	988 (5.8)	141 (9.0)	54	<.001
Disease-endemic travel destination, No. (%)				<.001
Yellow fever	9967 (59.0)	1245 (79.6)	35	<.001
Japanese encephalitis	3069 (18.2)	57 (3.6)	-80	<.001
Malaria	15 931 (94.2)	1431 (91.5)	-3	<.001
Reason for travel, No. (Col. %) ^d				<.001
VFR	1525 (9.0)	501 (32.0)	255	...
Business	1948 (11.5)	239 (15.3)	33	...
Humanitarian service work	2347 (13.9)	284 (18.2)	31	...
Research/education	1146 (6.8)	35 (2.2)	-67	...
Leisure	9322 (55.1)	395 (25.3)	-54	...
Other	615 (3.6)	110 (7.0)	93	...
Medication prescriptions, No. (%)				<.001
Antimalarial drugs	10 067 (63.2)	1022 (71.4)	13	<.001
Travelers' diarrhea	11 666 (69.0)	653 (41.8)	-40	<.001
Altitude sickness	1040 (6.2)	38 (2.4)	-61	<.001
US census region of clinic site, No. (Col. %)				<.001
Northeast	9078 (53.7)	720 (46.0)	-14	...
Midwest	421 (2.5)	0 (.0)	-100	...
South	4488 (26.6)	519 (33.2)	25	...
West	2916 (17.3)	325 (20.8)	20	...
Type of clinic, No. (Col. %) ^e				<.001
Academic center	10 450 (61.8)	1350 (86.3)	40	...
Nonacademic center	6453 (38.2)	214 (13.7)	-64	...

Abbreviations: COVID-19, coronavirus disease 2019; VFR, visiting friends and relatives.

^aP values based on chi-square tests.

^bDuration of travel data was missing for 5 pretravel consultations pre-COVID-19 and 4 consultations during COVID-19.

^cTravelers can contribute to >1 region if their itinerary includes multiple countries.

^dTravelers who noted >1 reason for travel are put into 1 category within this order (top to bottom).

^eAcademic centers are affiliated with university hospitals or medical schools; nonacademic centers include 7 public health clinics, 2 primary care clinics, 1 health network, and 1 pharmacy.

proportion of travelers were eligible for typhoid vaccination, although fewer travelers had preexisting immunity, and providers considered a greater proportion to have a medical contraindication (Table 2).

A smaller proportion of vaccine-eligible travelers received MMR, hepatitis A, influenza, or typhoid vaccines at their pretravel consultations during the COVID-19 period than in the pre-COVID-19 period (Figure 2). Referral to another provider

Table 2. Vaccine Eligibility of International Travelers at Pretravel Consultations at Global TravEpiNet (GTEN) Sites Before and During the COVID-19 Pandemic

Characteristic	Pre-COVID-19: January 1, 2019, to December 31, 2019 (n = 16 903)	During COVID-19: April 1, 2020, to March 15, 2021 (n = 1564)	P Value ^a
MMR			.002
Preexisting immunity	14 093 (83.4)	1254 (80.2)	...
Medical contraindication	35 (0.2)	1 (0.1)	...
Vaccine eligible	2775 (16.4)	309 (19.8)	...
Hepatitis A			<.0001
Preexisting immunity	8604 (50.9)	929 (59.4)	...
Medical contraindication	47 (0.3)	9 (0.6)	...
Vaccine eligible	8252 (48.8)	626 (40.0)	...
Influenza			.004
Preexisting immunity	9132 (54.0)	779 (49.8)	...
Medical contraindication	18 (0.1)	2 (0.1)	...
Vaccine eligible	7753 (45.9)	783 (50.1)	...
Typhoid			<.0001
Preexisting immunity	2634 (15.6)	208 (13.3)	...
Medical contraindication	137 (0.8)	50 (3.2)	...
Vaccine eligible	14 132 (83.6)	1306 (83.5)	...
Japanese encephalitis^b			.16
Preexisting immunity	58 (1.9)	3 (5.3)	...
Medical contraindication	4 (0.1)	0 (0.0)	...
Vaccine eligible	3007 (98.0)	54 (94.7)	...
Yellow fever^c			<.0001
Preexisting immunity	1553 (15.6)	281 (22.6)	...
Medical contraindication	315 (3.2)	42 (3.4)	...
Vaccine eligible	8099 (81.3)	922 (74.1)	...

Abbreviations: COVID-19, coronavirus disease 2019; MMR, measles-mumps-rubella.

^aP values based on Fisher exact tests.

^bTravelers in 3069 pretravel health consultations from the pre-COVID-19 period had itineraries where Japanese encephalitis vaccination might be recommended by a provider compared with 57 consultations in the COVID-19 period.

^cTravelers in 9967 pretravel health consultations from the pre-COVID-19 period had itineraries where yellow fever vaccination might be recommended by a provider compared with 1245 consultations in the COVID-19 period.

was the most commonly reported reason for nonvaccination with MMR (167/230 [73%]), hepatitis A (229/349 [66%]), and influenza vaccines (235/639 [37%]), whereas traveler refusal was the most commonly reported reason for nonvaccination with the typhoid vaccine (237/373 [64%]). Very few vaccine-eligible travelers were not vaccinated due to unavailability of the vaccine in the pre-COVID-19 or COVID-19 periods (MMR: 3 vs 0; hepatitis A: 0 vs 0; influenza: 947 vs 80; typhoid: 3 vs 1; Japanese encephalitis: 7 vs 0; yellow fever: 18 vs 2). The Japanese encephalitis and yellow fever vaccines were the only travel-related vaccines that were administered to a greater proportion of eligible travelers during the COVID-19 period compared with the pre-COVID-19 period (188/3007 [6%] vs 7/54 [13%] and 6124/8119 [75%] vs 835/923 [90%], respectively). For Japanese encephalitis, a 2-dose vaccine, 81 (3%) travelers reported insufficient time to complete the vaccine series as a reason for nonvaccination compared with 1 (2%) during the COVID-19 period. Among the 1564 travelers who received pretravel consultations during the COVID-19 period, 50 (3%) reported having received at least 1 dose of COVID-19 vaccine.

In the pre-COVID-19 period, the proportion of pretravel consultations that evaluated travelers with different durations of travel (Figure 3A, above) and reasons for travel (Figure 3B, below) did not differ substantially by time of year. However, early in the COVID-19 period (2020 Q2), most travelers were planning long-term travel (29–180 days, 44/155 [28%]; >6 months, 51/155 [33%]) (Figure 3A, above). Over the next 3 quarters, more travelers were anticipating shorter-term travel, although travel for ≤7 days remained rare. In terms of reasons for travel, a greater proportion of travelers reported that they were traveling for humanitarian service work or business in 2020 Q2 (54/157 [34%] vs 655/4730 [14%] and 21/157 [13%] vs 496/4730 [11%], respectively), and a smaller proportion of travelers stated that they were traveling for leisure (42/157 [27%] vs 2457/4730 [52%]) compared with pre-COVID-19 period travelers in Q2 2019 (Figure 3B, right). By 2020 Q4 and 2021 Q1, the proportion of travelers who self-reported VFR status had increased markedly from 2020 Q2 and 2020 Q3 (Q2 2020: 18/157 [12%]; Q3 2020: 80/316 [25%]; Q4 2020: 233/565 [41%]; Q1 2021: 170/526 [32%]), while the proportion of travelers self-reporting leisure and business travel remained stable.

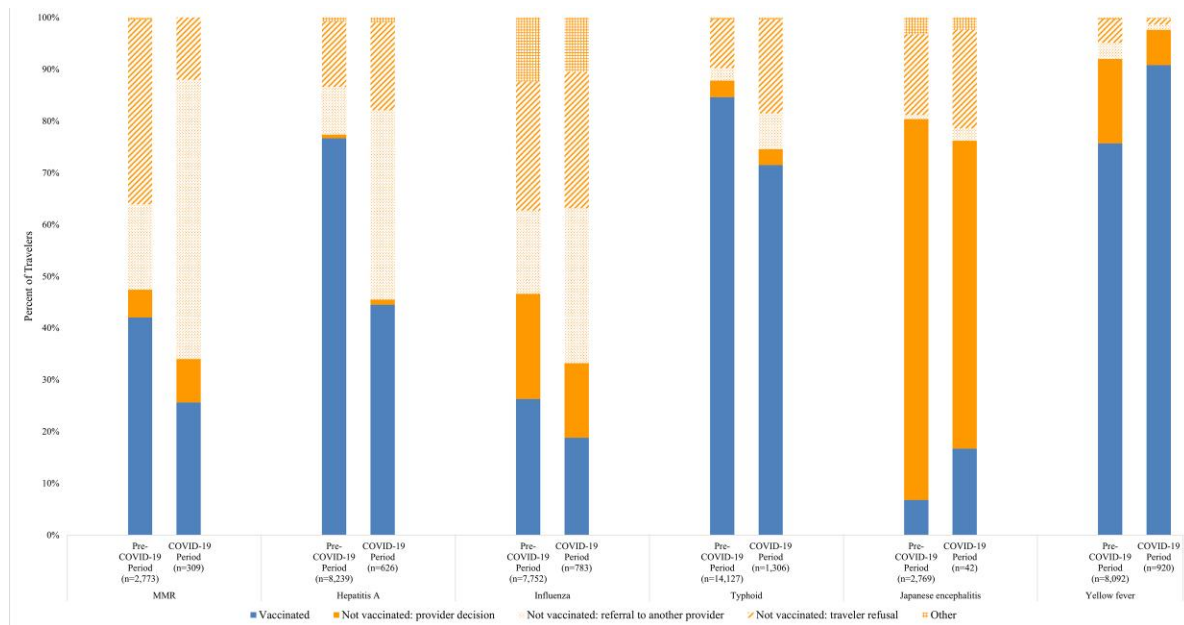


Figure 2. Administration of vaccines and reasons for nonvaccination among vaccine-eligible international travelers evaluated at pretravel consultations at Global TravelEpiNet (GTEN) sites during the pre-COVID-19 and COVID-19 periods. For each type of travel-related vaccination, vaccine-eligible travelers were categorized into those vaccinated at the pretravel consultation (blue) and not vaccinated (orange). We then categorized reasons for nonvaccination into provider decision (solid), referral to another provider (dots), traveler refusal (striped), or other (hatched). Abbreviations: COVID-19, coronavirus disease 2019; MMR, measles-mumps-rubella.

DISCUSSION

In this multisite study of pretravel health consultations in the United States, we observed a 90% reduction in pretravel consultations in association with the first year of the COVID-19 pandemic and a notable shift in the distribution of traveler characteristics and destinations during the COVID-19 period. Compared with the pre-COVID-19 period, a greater proportion of international travelers during the pandemic were VFR, children aged 6 months to 6 years, traveling for longer durations, or traveling to Africa. These traveler demographics and travel-related circumstances have previously been associated with a higher incidence of travel-related illness, which may relate to an increased likelihood of staying in rural areas, increased contact with local populations, and consumption of high-risk food and beverages [15, 16]. Despite fewer people traveling in the first year of the COVID-19 pandemic, these data support that travelers at high risk for travel-related illness continued to travel; it is therefore critical that pretravel advice be targeted to such high-risk groups even during times of disrupted international travel.

We observed a marked increase in the proportion of individuals traveling for periods >28 days during the COVID-19 period, as well as an increase in travelers visiting friends and relatives. This finding was observed among adult travelers, as well as pediatric travelers aged 6 months to 6 years. We also observed a sharp decline in travelers planning itineraries to Southeast Asia and the Western Pacific, which is consistent

with the overall decline in air travel to Asia-Pacific and with many countries refusing entry to travelers during 2020 [17]. Most travelers seen during the COVID-19 period were planning travel to Africa, including yellow fever–endemic areas for which specialty consultation is recommended and typically cannot be provided at most primary care sites [18, 19]. A greater proportion of children ages 6 months to 6 years traveling to countries endemic for malaria were prescribed antimalarial drugs during the COVID-19 period, which is most likely due to an increase in travel to Africa and countries that are holoendemic for malaria. These descriptive findings suggest that some travelers at high risk for travel-related infections other than COVID-19 persisted with their travel plans despite widespread recommendations to avoid nonessential travel.

Our results highlight the importance of pretravel consultations, recommendations to mitigate infections and illness during and after travel, and post-travel transmission mitigation guidance during global public health emergencies. Developing and implementing targeted messaging that encourages pretravel consultations and reduces structural barriers to attending such consultations should be rapidly deployed, especially during periods of disrupted international travel, as they are essential public health interventions for travelers who are VFR, humanitarian workers, and travelers visiting certain destinations that are higher risk for infectious diseases. The pretravel consultation also provides an opportunity to reinforce COVID-19 prevention recommendations and requirements such as vaccination,

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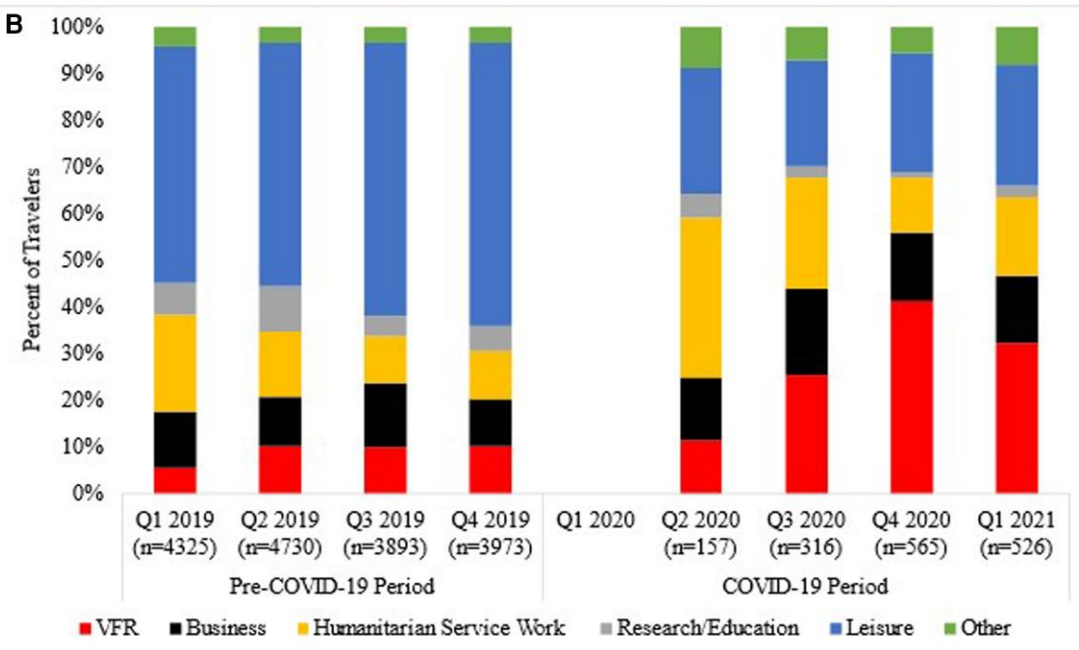
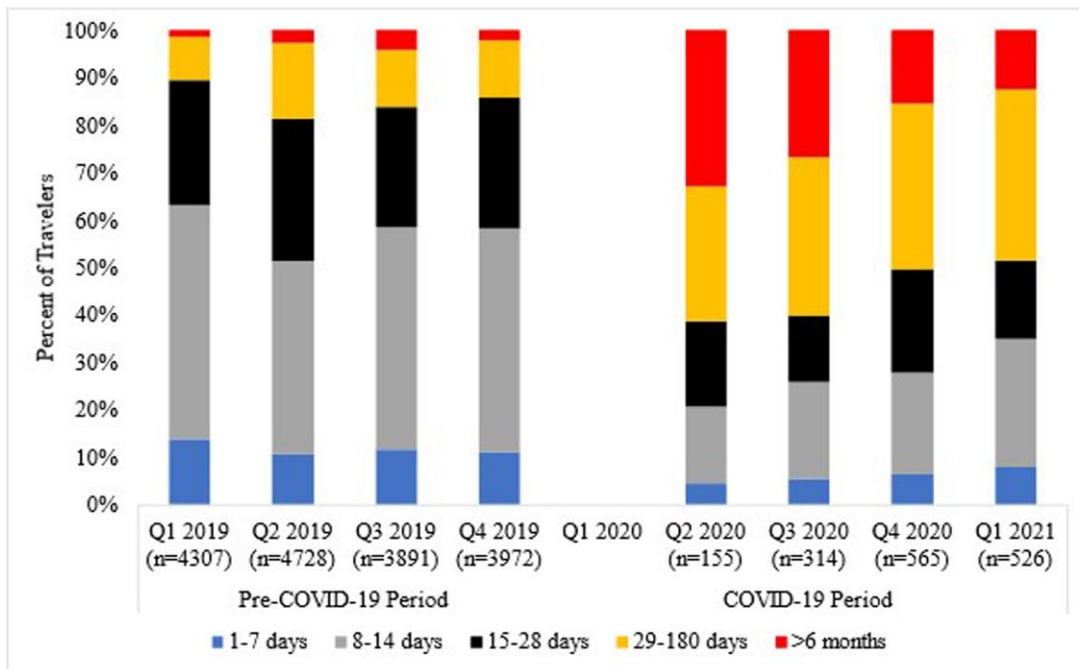


Figure 3. Changes in the distribution of travel duration *A* and reason for travel *B* among international travelers evaluated at pretravel consultations at Global TravEpiNet (GTEN) sites during the pre-COVID-19 and COVID-19 periods, stratified by the calendar quarter of the consultation. Duration of travel was categorized as 1–7 d (blue), 8–14 d (gray), 15–28 d (black), 29–180 d (gold), and >6 m (red). Reason for travel was categorized as visiting friends and relatives (red), business (black), humanitarian or service work (gold), research/education (gray), leisure (blue), and other (green). Abbreviations: COVID-19, coronavirus disease 2019; VFR, visiting friends and relatives.

booster doses, predeparture and postarrival testing, mask wearing, and self-quarantine when indicated [20]. Supporting travelers with clear guidance to reduce transmission risk when they return from international travel (eg, post-travel testing 3–5 days after arrival) may also help reduce COVID-19 outbreaks

and introduction of variants of concern in US communities [21, 22].

Additionally, we observed notable differences in the prescription of medications for malaria, traveler’s diarrhea, and altitude sickness between the 2 time periods. These changes

could be due to several factors, including differences in itineraries or traveler characteristics. A greater percentage of visits to areas where malaria is endemic or a lower percentage of visits to high-altitude areas could explain the different prescribing patterns of antimalarial and altitude sickness medications during the COVID-19 period. An increase in duration of travel and fewer elderly travelers may have contributed to the decrease in antibiotic prescriptions, which may also be part of a larger trend of decreasing antibiotic prescriptions [23]. Further evaluation of prescribing patterns in the COVID-19 period is needed, especially as the COVID-19 pandemic persists and evolves.

At GTEN sites, clinical practice regarding pretravel vaccination also changed during the COVID-19 period. Although there were small differences in the proportion of international travelers eligible for vaccination with MMR, hepatitis A, influenza, and typhoid across both time periods, a substantially smaller proportion of vaccine-eligible travelers received these vaccines at their pretravel consultation during the COVID-19 period. Referral to another provider was the most commonly reported reason for nonvaccination. Because only the yellow fever vaccine, which must be given at specialty clinics and is often required for entry to countries at risk for yellow fever epidemics, was more frequently administered during the COVID-19 period compared with the prepandemic period, we hypothesize that there may have been a transition to pretravel consultations via telemedicine due to COVID-19 precautions. However, referrals to other providers for pretravel vaccinations may result in missed opportunities as additional appointments before departure may not be kept [13]. Fewer vaccinations may have been administered to vaccine-eligible travelers in travel clinic because early guidance cautioned against the administration of COVID-19 vaccines within 2 weeks of other vaccines [24, 25]. However, we do not think this would have had a meaningful impact on our findings because only 50 travelers reported receiving COVID-19 vaccination given limited availability of COVID-19 vaccines during the study period. Varying degrees of health insurance coverage may also influence who attends pretravel consultations at GTEN sites and which vaccines are given, but these data are not assessable with our data set.

Our analysis has some limitations. Although GTEN is a multisite consortium, our data may not be representative of travelers who do not seek pretravel health consultation or receive pretravel advice at non-GTEN sites, so our findings may not be generalizable to all US international travelers and cannot be analyzed regarding changes in geographic region of origin for travelers. Data were not available regarding which visits were telemedicine or in person; we could not report how many travelers received their recommended vaccinations from another provider after referral or whether these were missed opportunities for vaccination. Given that only 50 travelers received COVID-19 vaccination during the COVID-19 period, we were not able to perform any meaningful statistical

analysis on their characteristics. Because GTEN data are descriptive in nature, they do not provide a specific explanation for why a greater proportion of pretravel consultation focused on travelers who were young children, VFR, and traveling for longer durations.

Although we found a marked decrease in pretravel consultations at GTEN sites after the initiation of COVID-19 travel warnings, international travel continued in 2020, as evidenced by ongoing pretravel consultations. In the COVID-19 period, a greater proportion of travelers evaluated at GTEN sites met criteria for high risk for routine travel-related illness, including VFR travelers, young children, those traveling for >28 days, and those traveling to Africa. Routine travel-related vaccinations were administered less frequently during pretravel consultations during the COVID-19 period. To reduce the risk of infection among travelers and importation of pathogens acquired overseas into vulnerable communities, public health messaging should target high-risk travelers, encouraging them to seek pretravel medical consultation and vaccination and follow COVID-19 testing and quarantine recommendations.

Supplementary Data

Supplementary materials are available at *Open Forum Infectious Diseases* online. Consisting of data provided by the authors to benefit the reader, the posted materials are not copyedited and are the sole responsibility of the authors, so questions or comments should be addressed to the corresponding author.

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Patient consent. We obtained institutional review board (IRB) approval at all participating GTEN sites; IRBs at each participating clinical site waived the need for written or oral informed consent because the study collected only deidentified data routinely collected during a standard clinical encounter.

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