Knowledge, attitudes and practices regarding the use of mobile travel health apps

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The uptake of mobile technologies in medicine and public health has progressed rapidly in recent years.1,2 The widespread use of smartphones offers the possibility for mobile applications (i.e. ‘apps’) to be used to address health needs of international travellers. A recent review of mobile apps related to travel health on the Apple App Store identified 44 such applications that provided a range of services for travellers, including information about foreign drug equivalents and up-to-date immunization requirements for various countries.1 Public health surveillance can also benefit from the real-time collection of health data from international travellers through the use of apps; such an approach reduces recall bias and offers the opportunity to link health data with location when illness develops.3,5 Despite these potential benefits, there are important gaps in knowledge regarding how international travellers view the use of apps; these gaps relate to limited engagement of potential users during app development, a lack of clarity on the objectives of an app and a lack of understanding of app features most preferred by users.7

In this study, we assessed the knowledge, attitudes and practices of US international travellers with regard to mobile technologies for travel health.

We developed an electronic survey to collect the perspectives of US international travellers regarding mobile technologies related to health. Using free response, checkbox and single-answer multiple choice questions, we collected participating travellers’ self-reported responses about the priority level of their personal health while travelling abroad, histories of medical emergencies during trips, smartphone usage habits and internet accessibility while travelling, past experiences using other mobile health technologies, features they would want in a travel health app, and privacy and security concerns regarding the use of travel health mobile technologies. Participants were recruited using one of three methods: (i) Rally—an online platform offered by the Mass General Brigham hospital network that allows any member of the public to participate in research studies of Mass General Brigham investigators; (ii) a solicitation in a monthly electronic newsletter produced by Heading Home Healthy (www.HeadingHomeHealthy.org)—an outreach programme to US international travellers; and (iii) an invitation to US international travellers attending a pre-travel health consultation at sites in Global TravEpiNet (GTEN).† The survey was approved by the Mass General Brigham IRB (IRB number 2008P001508) and all survey responses were de-identified.

Between January and November 2022, 261 travellers completed the survey; 104 individuals were recruited through Rally or the Heading Home Healthy newsletter, and 157 individuals were recruited through GTEN. Demographic data were only available from a subset of 136 participants; of these, 2 (<2%) were under 18 years old, 100 (74%) were between 18 and 64 years of age, and the remaining 34 (25%) were over age
65 years. Eighty-nine (65%) of the 136 participants identified as female, and 47 (35%) identified as male.

Of the 261 total participants, 246 (94%) reported always carrying a smartphone or mobile device during international travel. When asked about internet accessibility, 38 (15%) reported always having access while travelling. One hundred and fifty-six (60%) reported ‘often’ having internet coverage when travelling abroad, and 64 (25%) reported ‘sometimes’ having access. Three (1%) individuals reported never having access to the internet during international travel.

Regarding participants’ concerns about personal health while travelling, 121 (46%) categorized their concerns as ‘high’ or ‘very high’. Nearly all participants (99%) reported carrying health-related documents during their travel, with COVID-19 vaccine card (30%), COVID-19 test results (19%), list of vaccinations (18%), list of medications (17%) and list of medical conditions (12%) as the most commonly carried documents. One hundred and seventeen participants (45%) responded that it would be helpful to have these documents in electronic form, and all survey participants were interested in receiving health information via a travel health app. The majority (95%) of the participants reported never having used a travel health app before.

Table 1 summarizes the preferred features of a travel health app as ranked by survey respondents.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Number of respondents selecting the associated feature: n (%)</th>
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<tbody>
<tr>
<td>Real time alerts about local outbreaks</td>
<td>238 (91)</td>
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<tr>
<td>Information about nearby medical facilities and how to access them</td>
<td>222 (85)</td>
</tr>
<tr>
<td>Local emergency contacts (e.g., consulate, US Department of State)</td>
<td>220 (84)</td>
</tr>
<tr>
<td>COVID-19 travel-related restrictions and regulations</td>
<td>214 (82)</td>
</tr>
<tr>
<td>Location of local pharmacies and what services they provide</td>
<td>211 (81)</td>
</tr>
<tr>
<td>How to manage an illness, like diarrhoea or injury</td>
<td>180 (69)</td>
</tr>
<tr>
<td>Medical translation</td>
<td>164 (63)</td>
</tr>
<tr>
<td>How to convert US prescriptions into local prescriptions</td>
<td>128 (49)</td>
</tr>
</tbody>
</table>

Forty-six participants suggested additional features that had not been included in the survey checkbox options described in Table 1; these suggested additional features included pre-travel medical recommendations, information about endemic diseases at the travel destination, cost estimates of medical services for uninsured travellers and a centralized storage system for all personal health-related documents.

Symptom tracking is a feature of health apps that can allow public health researchers to conduct participatory surveillance; 163 (62%) of survey participants responded that they would be willing to take a short daily survey to provide information about symptoms while travelling for research purposes. We also assessed participants’ perspectives on having a travel health app track their geographical location for research purposes, and 162 (62%) agreed this would be acceptable. One hundred and forty-seven (56%) participants responded that they would be interested in using digital contact tracing on a mobile app for notification when they have had contact with someone who has been diagnosed with an infectious disease. In contrast, 109 (42%) of survey participants responded that they had privacy, safety and other concerns related to using a travel health app. Commonly-reported concerns were security and storage of personal data, potential third-party access to users’ information, misuse and/or commercialization of personal data, and the invasion of personal privacy through GPS tracking.

Here, we present the results of a survey of international travellers regarding their experience and interest in mobile applications for health. We found that many people carry smartphones and are interested in receiving health information from a mobile app when they travel abroad. Travellers also report a broad desire for access to information about local outbreaks when travelling. Although many travellers reported a potential acceptance of GPS tracking for health research purposes, concerns exist about data security and the safeguarding of personal information. Our work augments understanding of travellers’ perspectives about the use of mobile apps for health and supports further work in the development of such technology. As our study participants may not be representative of the diversity of international travellers, future studies should address this limitation.

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Author Contributions
All authors contributed substantially to this work. Study conceptualization and design [Y.D., A.G., H.H., E.O., A.C., R.C.L.],
data acquisition [E.O., R.C.L.], formal analysis [M.M., E.O., R.L.], literature review [M.M., Y.D., A.C., R.C.L.], writing—original draft [M.M., E.O., R.C.L.] and writing—review and editing (all authors).

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Data Availability Statement
The data underlying this paper will be provided upon request to the corresponding author.

References