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Introduction

With the global incidence of COVID-19 at present levels, travel risks remain important considerations for minimizing transmission. Travel out of the local area presents potential risks to the traveler, and to their family members or coworkers on return. In the absence of universal COVID-19 vaccination, optimal prevention from COVID-19 exposure mandates minimal or no travel. Should travel be undertaken, some combination of quarantine (and self-isolation at home) and testing may be advisable.

Patronus Medical has developed a COVID-19 Travel Risk Assessment Tool for the traveler to assess his risk of contracting COVID-19 during the travel experience. Unlike other electronic methods, this tool does not require any special internet or app access nor is frequent modification necessary.

This tool does not assess the traveler's risk of severe disease if he does contract COVID-19. There should be little doubt that those individuals who are considered vulnerable to severe disease should avoid any situation that places them at risk of contracting COVID-19. Age, gender, ethnicity, certain comorbidities, and other conditions, such as gender, pregnancy, smoking, and ethnicity, have been identified as contributory to significant morbidity and mortality. Some, but not all, may also increase susceptibility to contracting COVID-19 in the first place.

Given that current data analysis may be subject to change in the future, certain diseases and conditions do not appear to increase susceptibility to COVID-19: age, diabetes, obesity, allergic asthma, and pregnancy. There is speculation that those with cardiovascular disease, including hypertension, are also more susceptible to infection. However, to date, no study has demonstrated this. On the other hand, male gender, non-Caucasian ethnicity, chronic renal disease, or COPD may increase one's susceptibility to COVID-19.

For all travelers, the following factors should be considered when making a risk/benefit decision on travel and return to work/home after travel:

1. Origin and Destination Governmental/Jurisdictional Travel Restrictions

Some countries and states in the US have specific travel restriction requirements, or may reimpose those restrictions at any time, and may extend down to the county or city level. Since these restrictions can change at any time, it is important to maintain situational awareness at all times, even during travel. Such jurisdictional restrictions take precedence over any corporate or business restrictions.

2. Origin Work Place and/or Home Settings

An individual may work in a group setting, or live in a congregate residence, in which he may unwittingly put others at risk if he is asymptomatic but infected. However, someone whose responsibilities or living arrangements do not place him in close or prolonged physical proximity to others is at much lower risk of disease transmission on return.

3. Modes of Travel

The airline industry has been successful in minimizing disease spread. Whether railway services have been as successful has yet to be determined. With few exceptions, most have applied minimum requirements and may not have modified ventilation systems. Crowded subway cars or mass transit busses should be avoided. Taxis or the equivalent mode of transportation such as ride share appear to be reasonably safe, if standard COVID-19 precautions are employed. These include back seat riding, single or family unit riding only, with windows open to increase ventilation, and including wear of approved masks, minimized talking, and hand sanitizer use before entry into and after exit from the vehicles. Use of personal vehicles with accompanying family members only are currently the safest modes of travel. As a worst-case travel example, shipboard travel accompanied by sleeping and dining quarters can present significant risk for rapid COVID-19 transmission.

4. Relative Risk of Contracting COVID-19 at Travel Destination

If the COVID-19 transmission risks are comparably low at a travel destination, an individual is not more likely to contract COVID-19 than at origin location. If infection risk at destination is in a higher category (using a measure of <5, 5-10, 10-25, and >25 new cases/100K population/day), then travel destination can be considered as a minimal, low, medium, or high-risk factor for bringing disease back to a work place.

5. Destination "Environments"

The specific environments where the individual stays or visits at the travel destination have a significant impact on the risk of COVID-19 transmission. Hotel rooms are generally safe, although daily hotel cleaning practices vary greatly. Hotels may be favored over home-sharing options. If restaurants are following local COVID-19 health protocols, these are relatively safe for patrons (although less so for restaurant employees). Bars are still considered high risk environments. Outside dining or food takeout is preferred to indoor dining. Attendance at mass gathering events, such as conferences, concerts, sporting events, religious services, or weddings, may pose extreme risks, not only because of the difficulties in maintaining social/barrier distancing, but also because the attendees may come from other high-risk areas.

6. Travel Duration: Time Spent at the Travel Destination

Obviously, the longer an employee remains at a higher risk destination, the greater the probability of being exposed to COVID-19.

7. Prior COVID-19 Infection or Vaccination

Although the actual duration of post-infection immunity will likely vary between individuals, recent research indicates that 92-98% of individuals who had recovered from COVID-19 had detectable immunity (partial or full) for at least 6 months. Post recovery re-infection is exceeding rare (less than 0.25%). Full vaccination with the Moderna or Pfizer formulations also appears to confer immunity in over 95% of recipients two weeks after final dosing. Vaccine-induced immunity is likely to last for more than one year, but a recent study determined that post-vaccination immunity lasts at least 3 months. Certainly, it appears that those who have either recovered from infection within 3 months of travel, or who have completed full vaccination more than 2 weeks but less than 3 months prior to travel, are much less likely to become re-infected during travel.

Assessment of these factors to reduce travel risk assumes that protective measures are employed. Such measures could include mandatory masking, minimized time while unmasked, increasing air flows/movement, available and frequent hand sanitizing, frequent disinfection of high touch surfaces, social distancing, screening measures implementation at key transportation nodes, and contact tracing capability at home and travel destinations.

It should be noted that the determination to travel, or to be allowed to return to work after travel, is a judgment call. This Travel Risk Assessment Tool was developed to help with such assessments and determinations. Each of the travel characteristics described above can be stratified into low, medium, and high risk. Using a point-value system (low = 1; medium = 2; high = 3), each travel situation would summate to a value from 6 to 18. Because of the protective effect of prior infection or vaccination within 3 months of travel would have the positive effect of reducing overall risk, this factor was assigned a binary 0 (no prior infection or vaccination) or -3 (prior infection or vaccination).

Traveler conditions or comorbidities should be viewed as an increased risk to the traveler. Infection with the SARS CoV-2 and other respiratory viruses. Alcohol-based skin cleansers are NOT indicated for application to the T-Zone of the face. Furthermore, while alcohol-based sanitizers kill everything on contact they have no staying power and must be frequently reapplied after touching a contaminated surface. The Theraworx Protect product appears to last as long as six hours per application in preventing contamination with numerous pathogens, particularly around the eyes, nose, and mouth. Some hospital systems have chosen to replace their alcohol-based hand sanitizers with Theraworx Protect.

Travel Risk Assessment Tool

Travel Risk	Point Value	Disposition on return
Low	6-10	No additional restrictions, if asymptomatic and no known exposure
Medium	11-14	Quarantine at home for 7 days, rapid antigen testing at Day 5
High	15-18	Quarantine at home for 14 days followed by rapid antigen testing

Note that these disposition recommendations must be in compliance with any jurisdictional (state or local) mandates that may apply at points of departure.

Conclusion

The COVID-19 Travel Risk Assessment Tool presents an easy-to-use format that can assist travelers to more completely assess their likelihood of COVID-19. All factors should be considered to develop an accurate pre-travel assessment. Given current uncertainties associated with COVID-19, it is also advisable to frequently update a personal travel risk assessment to regularly assess such risks as thoroughly as possible.

Examples of the application of this tool to different circumstances may be found on the attached Addendum A.

Addendum A.

Examples of Varying COVID-19 Risk Exposure Levels and Travel Risk Assessment Tool Application:

1. Low risk

Employee travels from Florida to Texas for a two-day in person meeting. Employee travels via an air carrier, uses rental cars, meets indoors, works very closely with others at his primary job. The employee has not had COVID-19 nor has he been vaccinated.

Factor	Risk	Points
Travel Restrictions	Low	1
Work Characteristics	High	3
Mode of Travel	Low	1
Relative Risk at Destination	Low	1
Destination Environment	Med	2
Time at Destination	Low	1
Vaccination/COVID-19 Status	No	0

Score: 9, Travel Risk = Low. Unless COVID-19 symptoms are detected, there is no compelling argument for a home quarantine or rapid antigen testing.

Addendum A.

Examples of Varying COVID-19 Risk Exposure Levels and Travel Risk Assessment Tool Application:

2. Medium risk

Employee travels from New York to Mexico for a four-day golf event with indoor and outdoor social functions. Employee travels via an air carrier, uses taxis, works closely with others at his primary job. Employee has recovered fully from COVD-19 within the previous 3 months.

Factor	Risk	Points
Travel Restrictions	Med	2
Work Characteristics	Med	2
Mode of Travel	Med	2
Relative Risk at Destination	High	3
Destination Environment	High	3
Time at Destination	Med	2
Vaccination/COVID-19 Status	Yes	-3

Score: 11, travel risk = Medium. Quarantine at home for 7 days, rapid antigen testing at Day 5.

Addendum A.

Examples of Varying COVID-19 Risk Exposure Levels and Travel Risk Assessment Tool Application:

3. High risk

Employee travels from Los Angeles to South Africa for a week-long international trade show with large group meetings and social functions (indoor and outdoor). Employee travels via an air carrier, uses shared taxis and ride sharing apps, attends indoor and outdoor meetings, and works independently at their primary job during travel. Employee has not been fully vaccinated in the previous 3 months.

Factor	Risk	Points
Travel Restrictions	High	3
Work Characteristics	High	3
Mode of Travel	Med	2
Relative Risk at Destination	High	3
Destination Environment	Med	3
Time at Destination	Med	3
Vaccination/COVID-19 Status	No	0

Score: 17, Travel Risk = High. Quarantine at home for 14 days followed by rapid antigen testing.