

A brief overview of common travel related disease

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Abstract

This article emphasizes the importance of preventing common travel-related issues through common-sense measures, often overlooked by travelers. It provides recommendations backed by scientific evidence for travel health advisors to pass on to travelers. Additionally, it highlights the significance of addressing the health concerns of individuals with compromised immunity, such as those with severe immunosuppression. Furthermore, it underscores the need to consider the unique health challenges faced by elderly travelers when journeying to developing countries. The purpose of this study is to provide guidelines for an evidence-based approach to pre-travel counseling and medical considerations for the elderly in a travel clinic.

Keywords: travel disease, Cardiovascular, Pulmonary, Malignancy and Thromboembolic, Motion Sickness, Altitude Sickness.

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Introduction

With approximately 1 billion air travelers annually and a projected doubling of passengers on U.S. airlines in the next two decades,¹ it is crucial to address the physiological, emotional, and environmental stresses associated with air travel when providing pre-travel health guidance. The precise incidence of in-flight emergencies remains unknown due to the absence of a centralized registry and non-mandatory reporting unless there is a fatality or flight diversion.² Over the past 40 years, there have been an average of 21 reported in-flight deaths per year to the U.S. Department of Transportation, many classified as "natural" deaths, primarily occurring in elderly passengers. A retrospective survey spanning from 1971 to 1980 disclosed nearly 8000 reported medical incidents to the Federal Aviation Administration (FAA).³ The estimated incidence of in-flight emergencies is about 1 per 35,000 passengers, with common complaints including chest pain, dyspnea, loss of consciousness, nausea, and vomiting. In a two-year study from August 1986 to July 1988, the FAA recorded 2322 medical emergencies, with 33 resulting in fatalities. The purpose of this study is to provide guidelines for an evidence-

based approach to pre-travel counseling and medical considerations for the elderly in a travel clinic.

Cardiovascular Disease

Elderly patients with a history of coronary artery disease (CAD) should undergo evaluations for acute or recent cardiac conditions before embarking on air travel. Cardiovascular events on airplanes are a frequent cause of in-flight medical incidents and diversions, with exacerbations of CAD being a prominent issue. These incidents are often influenced by the physiological stresses associated with air travel, including hypobaric hypoxemia, which can worsen underlying cardiovascular conditions. Such concerns have led the International Air Transportation Association to establish restrictions on passengers with various cardiovascular disorders. Despite the significance of cardiovascular problems during air travel, scientific data remain limited. Factors such as stress, exertion, and anxiety associated with flying, along with reduced atmospheric pressure and oxygen levels at high altitudes, contribute to cardiorespiratory issues.³ Screening for oxygen saturation should be considered for

passengers with cardiopulmonary problems. New guidelines recommend a treadmill test at 3 weeks following a heart attack and a 2-week recuperation period post-coronary bypass surgery. Most patients with pacemakers or implantable cardioverter defibrillators can safely travel by air, but the use of portable security magnets near defibrillator generators should be avoided, and patients carrying such devices should have a physician's letter explaining potential concerns.⁴

Pulmonary Disease

Elderly patients with underlying chronic pulmonary conditions, such as COPD and emphysema, or acute issues like pneumonia, should consult a clinician to assess the risk of exacerbation before air travel. Changes in altitude during flights lead to a drop in oxygen levels (PO₂), causing hypobaric hypoxemia, a challenge for those with lung diseases. To address this, travelers requiring supplemental oxygen must collaborate with their healthcare providers and notify the airline in advance, as carrying personal oxygen tanks aboard commercial aircraft is prohibited under Federal Aviation Administration policy. Travelers with chronic lung conditions, including interstitial lung diseases and bullous/cystic lung disorders, usually tolerate air travel well. However, pneumothorax is a strict contraindication due to the risk of progression to a tension pneumothorax. Patients should wait 2 to 3 weeks after chest tube removal or thoracic surgery. Those with chronic bronchopleural fistulae can travel with chest tubes using one-way Heimlich valves. Evaluating baseline arterial blood gas measurements is essential, with supplemental oxygen recommended for normocapnic patients whose baseline PaO₂ is less than 70 mm Hg.⁵ Increased risk at altitude applies to individuals with elevated PaCO₂ levels, even with supplementary oxygen. Consideration should be given to factors like departure and arrival airport altitudes, past air travel experiences, and journey duration. Airlines' policies regarding oxygen availability and stretchers vary, with advance arrangements typically required for oxygen. Passengers may be restricted from using their personal oxygen in the cabin, and charges may apply. In-flight use of drop-down masks is generally prohibited. Fitness for travel can be assessed practically by ensuring that patients can walk a short distance or climb stairs without severe dyspnea (table 1).⁶

Table 1. Recommendations For Air Travelers Withcardiac Or Pulmonary Dysfunction

Recommendations For Air Travelers Withcardiac Or Pulmonary Dysfunction
a-Carry all medications on board
b-Be aware of dose intervals while crossing time zones
c-Carry a recent EKG
d-Carry a pacemaker card with an EKG
e-Use airline special services: wheelchairs, trolley service, special diet, oxygen, preboarding
f-Walk through the cabin frequently, perform in-seat range-of-motion exercises and deep breathing exercises
g-Avoid alcohol and drink plenty of fluids
h-Wear support hose

Malignancy and Thromboembolic

Elderly individuals at an increased risk of venous thromboembolism (VTE) should consider using well-fitted below-the-knee compression hosiery or subcutaneous enoxaparin before and 1 day after flights lasting more than three hours. Long-duration travel can lead to blood flow stasis, a weak risk factor for VTE. However, the risk of travel-related thrombosis is notably higher in individuals with pre-existing risk factors, including older age, malignancy, recent surgery, and a history of prior blood clots. Travelers with these high-risk factors, embarking on journeys exceeding three hours, may benefit from preventative measures involving compression stockings and enoxaparin.^{7,8}

Motion Sickness

Motion sickness symptoms vary in intensity and person susceptibility. Common complaints include nausea, malaise, sweating, vomiting, and paleness or flushing. Severity typically follows this order: boats (especially in rough seas), air travel, cars, and trains. Children aged 3 to 12 are most susceptible, with higher rates in women during menses and pregnancy. People often adapt to motion after several days, but symptoms may persist in a few. Prevention strategies involve staying in a central location on a boat or mid-plane, minimizing head and body movement, focusing on a stable horizon or external object, and avoiding visual stimuli like reading. Sitting in the front seat or driving in a car helps, as does increasing ventilation, reducing food intake, and avoiding alcohol. Various medications are available for symptom control,

but they may have significant side effects. Biofeedback and acupressure have shown limited benefit.² A study comparing seasickness prophylaxis agents found no significant difference in efficacy among them. Dimenhydrinate and meclizine are accessible options, and transdermal scopolamine patches may return to the market. Ginger root and anticonvulsants like phenytoin have shown some efficacy. Promethazine, administered as a suppository or intramuscularly, is highly effective but can cause significant drowsiness.¹⁰

Jet Lag

Jet lag, resulting from disrupted circadian rhythms when traveling across time zones, leads to symptoms like fatigue, insomnia, irritability, and headache (figure 1). Its duration is related to the number of time zones crossed, with one day needed for adaptation per zone. Traveling eastward worsens jet lag compared to westward travel, and symptoms increase with age. Various measures to mitigate jet lag include adjusting sleep patterns before the trip, exposure to bright light, and increasing outdoor activity. Napping can be beneficial, but it should be limited to less than 45 minutes to avoid grogginess. Scheduling physical or intellectual activities at least 48 hours after arrival is recommended.¹¹ Dietary practices like the "jet lag diet" involve alternating food intake and regulating caffeine. Limited data support these measures, but consuming less alcohol, more fluids, and smaller meals while traveling may be beneficial. Medications like benzodiazepines are used to improve sleep but don't readjust circadian rhythms.¹² Recent research focuses on melatonin, a hormone synthesized from tryptophan in the pineal gland, secreted at night, and influenced by daylight signals. Melatonin administration before and after travel has shown favorable results in alleviating jet lag, with varying doses and few side effects. Timing is crucial, with different dosing recommendations for eastward and westward travel. However, concerns about safety and efficacy, along with variability in melatonin supplements, underscore the need for more research, standardized preparation, and adverse reaction monitoring. Melatonin's central action may affect various bodily functions, but as a dietary supplement, it's not regulated by the FDA for effectiveness or safety. Purity and quality can be uncertain, and further research should aim to clarify its mechanism of action and ensure safety and efficacy. Standardization of melatonin preparations and reporting adverse reactions to the FDA are essential. Consequently, the recommendation of melatonin for jet lag remains controversial.¹³

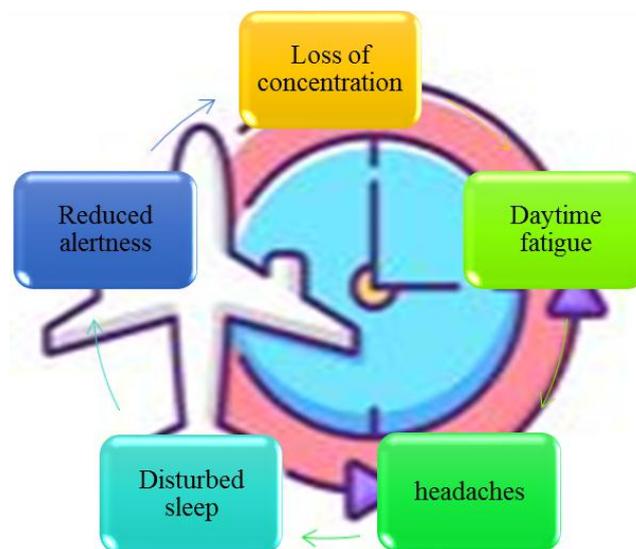


Fig 1. Symptoms caused by jet lag

Altitude Sickness

Altitude illness is a spectrum of problems linked to the body's reaction to reduced oxygen levels at higher altitudes. Generally, there are no strict contraindications to altitude exposure for individuals with controlled hypertension, stable coronary disease, mild chronic obstructive lung disease, obesity, or poor physical condition. The risk of altitude illness is difficult to predict due to varying individual characteristics.¹⁴ Acute mountain sickness (AMS) is characterized by symptoms like headache, nausea, vomiting, fatigue, and more due to rapid altitude gain. It can occur above 2500 m (8200 ft) and is most common between 3500 and 5500 m.¹⁵ Symptoms typically disappear within a week at altitude. High altitude pulmonary edema (HAPE) is a potentially fatal condition that often develops within days of rapid ascent to altitudes above 2500 m. It includes symptoms like shortness of breath, cough, chest tightness, and may result from a low hypoxic ventilatory drive. HAPE risk factors include ascent rate, exertion, final altitude, temperature, and hypnotic drug use. Those with a history of HAPE are at higher risk. High altitude cerebral edema (HACE) occurs when an individual, often with AMS and HAPE, experiences altered consciousness, confusion, hallucinations, seizures, and may progress to coma. Preventing serious altitude illness is possible through proper acclimatization. Individuals heading to high altitudes should be informed about altitude sickness warning signs and the importance of sleeping altitude in symptom development. Despite research efforts, predicting altitude illness remains challenging (table 2).¹⁶

Table 2. Prevention of acute mountain sickness

Prevention of acute mountain sickness	
Nonpharmacologic	Gradual ascent-300 m/day
	Spend a few days at intermediate altitudes (2500-3000 m)
	Slowly ascend at >2500 m
	Spend an extra night for every 600-900 m if continuing to ascend.
	Climb high, sleep low
Avoid alcohol and sedative-hypnotics	
Pharmacologic	Acetazolamide-125-250 mg PO every 8 to 12 h starting 24 h before ascent and continue for 2 days at altitude
	500 mg PO sustained release tablet every 24 h and continue for first 2 days at altitude
	DexamethasonH mg PO every 6 to 12 h

Malaria

Make sure senior tourists are aware of the significance of wearing personal protective equipment and should seek medical attention as soon as possible if they become feverish after visiting areas where malaria is endemic. (Strong suggestion, excellent supporting data) According to the Centers for Disease Control and Prevention, three typical patient populations young children, expectant mothers, and visitors from non-endemic areas to malaria-endemic regions have higher rates of morbidity and death from malaria [90]. According to research by Checkley et al., visitors over 50 had an almost tenfold higher risk of dying from malaria than a younger group of visitors returning to the UK.¹⁷ Furthermore, compared to younger patients, a research detailing a cohort of travelers over 60 years old who returned to Denmark with malaria had lengthier hospital stays and 2-fold higher parasitemias.¹⁸ Given this, it is crucial to advise senior tourists visiting dangerous locations on the value of taking personal protective equipment and to seek medical attention as soon as possible if they become ill after returning from their trip. The age of the tourist has no bearing on the recommendations for personal protective measures for avoiding insect vectors, which include applying permethrin to clothes and N, N-diethyl-3-methylbenzamide (DEET) to skin.¹⁹ Doxycycline, mefloquine, chloroquine, and atovaquone/proguanil are among the chemoprophylactic options that are generally well tolerated in older travelers; however, there are some variations depending on side effect profiles. Atovaquone/proguanil is a great agent to use in light of polypharmacy in older patients because it is well tolerated and has very few drug-drug interactions. Despite

cycloquanil's apparent higher bioavailability, the drug's pharmacokinetics do not change with age, and no significant toxicity has been observed in the elderly population, according to research. Malarone, however, should not be administered to senior tourists who have severe renal impairment (creatinine clearance <30 ml/min).²⁰ Cardiovascular conduction disease and neuropsychiatric disorders preclude the use of mefloquine.²¹ Due to these factors, patients of all ages in the US are no longer routinely prescribed this medication. Those who are elderly can use chloroquine. However, this medication should be avoided when there are ophthalmological concerns at baseline and periodic eye exams should be carried out in the setting of prolonged use due to concerns of retinopathy and macular degeneration associated with it.²² It is more challenging to administer doxycycline to elderly travelers due to worries about pill esophagitis, photodermatitis, and dietary and supplement restrictions.²³

Conclusions

Maintaining one's well-being while traveling necessitates a blend of practicality, awareness of health risks in the destination country, and a touch of good fortune. While common discussions on travelers' health often revolve around vaccinations, combating traveler's diarrhea, and guarding against malaria, there are subtle aspects that often escape attention. Amidst the excitement of exploration, humor becomes an unexpected ally for travelers, alleviating the stress induced by disrupted schedules, jet lag, crowded spaces, limited privacy, and navigating diverse cultures. Upon reaching their destinations, it becomes imperative for travelers to allocate time for rest, adjustment, and acclimatization before embarking on further adventures. Equally crucial is the post-journey phase, where a thoughtful readjustment ensures a seamless transition back to the embrace of family, friends, and the responsibilities awaiting at home. By recognizing the significance of physical and emotional well-being throughout the entire travel experience, individuals can enhance their ability to savor the richness of new landscapes while safeguarding their health and resilience.

Review Highlights

What Is Already Known?

Existing knowledge suggests that travel-related health issues, including cardiovascular and pulmonary concerns, motion sickness, altitude sickness, and malaria, significantly affect travelers, especially the elderly and those with compromised immunity. Moreover, scientific data emphasize the prevalence of in-flight medical emergencies and the need for pre-travel evaluations, but the precise incidence remains ambiguous due to underreporting and the absence of a centralized registry.

Review Highlights

What Does This Study Add?

This study contributes by providing evidence-based guidelines for pre-travel counseling and medical considerations, specifically tailored for elderly individuals and those with compromised immunity. It highlights the significance of addressing various health concerns, such as cardiovascular and pulmonary conditions, malignancy, thromboembolic events, motion sickness, jet lag, altitude sickness, and malaria, within the context of travel health. Furthermore, it underscores the importance of careful evaluations and preventative measures, aiming to enhance the well-being of travelers facing these health challenges.

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Conflict of Interest

The authors have no conflict of interest to declare.

References

- Hinkelbein, J., Böhm, L., Braunecker, S., Genzwürker, H. V., Kalina, S., Cirillo, F., ... & Neuhaus, C. (2018). In-flight cardiac arrest and in-flight cardiopulmonary resuscitation during commercial air travel: consensus statement and supplementary treatment guideline from the German Society of Aerospace Medicine (DGLRM). *Internal and emergency medicine*, 13, 1305-1322. [Doi: 10.1007/s11739-018-1856-4](https://doi.org/10.1007/s11739-018-1856-4)
- Wang, W., Brady, W. J., O'Connor, R. E., Sutherland, S., Durand-Brochec, M. F., Duchateau, F. X., & Verner, L. (2012). Non-urgent commercial air travel after acute myocardial infarction a review of the literature and commentary on the recommendations. *Air Medical Journal*, 31(5), 231-237. [Doi: 10.1016/j.amj.2012.01.002](https://doi.org/10.1016/j.amj.2012.01.002).
- Peterson, D. C., Martin-Gill, C., Guyette, F. X., Tobias, A. Z., McCarthy, C. E., Harrington, S. T., ... & Yealy, D. M. (2013). Outcomes of medical emergencies on commercial airline flights. *New England Journal of Medicine*, 368(22), 2075-2083. [Doi: 10.1056/NEJMoa1212052](https://doi.org/10.1056/NEJMoa1212052).
- Pearce, E., Haffner, F., Brady, L. B., Sochor, M., Duchateau, F. X., O'Connor, R. E., ... & Brady, W. J. (2014). Nonurgent commercial air travel after acute coronary syndrome: a review of 288 patient events. *Air Medical Journal*, 33(5), 222-230. [Doi: 10.1016/j.amj.2014.04.013](https://doi.org/10.1016/j.amj.2014.04.013).
- Hampson, N. B., Kregenow, D. A., Mahoney, A. M., Kirtland, S. H., Horan, K. L., Holm, J. R., & Gerbino, A. J. (2013). Altitude exposures during commercial flight: a reappraisal. *Aviation, Space, and Environmental Medicine*, 84(1), 27-31. [Doi: 10.3357/ASEM.3438.2013](https://doi.org/10.3357/ASEM.3438.2013).
- IATA, I. (2016). *IATA Medical Manual*.
- Gautret, P., Gaudart, J., Leder, K., Schwartz, E., Castelli, F., Lim, P. L., ... & GeoSentinel Surveillance Network. (2012). Travel-associated illness in older adults (> 60 y). *Journal of travel medicine*, 19(3), 169-177. [Doi:10.1111/j.1708-8305.2012.00613.x](https://doi.org/10.1111/j.1708-8305.2012.00613.x).
- Clarke, M. J., Broderick, C., Hopewell, S., Juszczak, E., & Eisinga, A. (2021). Compression stockings for preventing deep vein thrombosis in airline passengers. *Cochrane database of systematic reviews*, (4). [Doi:10.1002/14651858.CD004002.pub4](https://doi.org/10.1002/14651858.CD004002.pub4)
- Stern, R. M., Jokerst, M. D., Muth, E. R., & Hollis, C. (2001). Acupressure Relieves the Symptoms of Motion Sickness and Reduces Abnormal Gastric Activity. *Alternative therapies in health and medicine*, 7(4), 91.
- Gupta, A. K., Kumar, B. V., Rajguru, R., & Parate, K. D. (2021). Assessment of sea sickness in naval personnel: incidence and management. *Indian Journal of Occupational and Environmental Medicine*, 25(2), 119. [Doi: 10.4103/ijoem.IJOEM_94_20](https://doi.org/10.4103/ijoem.IJOEM_94_20).
- Janse van Rensburg, D. C., Jansen van Rensburg, A., Fowler, P. M., Bender, A. M., Stevens, D., Sullivan, K. O., ... & Botha, T. (2021). Managing travel fatigue and jet lag in athletes: a review and consensus statement. *Sports Medicine*, 51(10), 2029-2050. [Doi: 10.1007/s40279-021-01502-0](https://doi.org/10.1007/s40279-021-01502-0)
- Van Rensburg, D. C. C. J., Van Rensburg, A. J., Fowler, P., Fullagar, H., Stevens, D., Halson, S., ... & Cronje, T. (2020). How to manage travel fatigue and jet lag in athletes? A systematic review of interventions. *British journal of sports medicine*, 54(16), 960-968. [Doi: 10.1136/bjsports-2019-101635](https://doi.org/10.1136/bjsports-2019-101635).
- Hardeland, R., Pandi-Perumal, S. R., & Cardinali, D. P. (2006). Melatonin. *The international journal of biochemistry & cell biology*, 38(3), 313-316. [Doi: 10.1016/j.biocel.2005.08.020](https://doi.org/10.1016/j.biocel.2005.08.020).
- West, J. B. (2012). High-altitude medicine. *American journal of respiratory and critical care medicine*, 186(12), 1229-1237. [Doi: 10.1164/rccm.201207-1323CI](https://doi.org/10.1164/rccm.201207-1323CI).
- Imray, C., Wright, A., Subudhi, A., & Roach, R. (2010). Acute mountain sickness: pathophysiology, prevention, and treatment. *Progress in cardiovascular diseases*, 52(6), 467-484. [Doi:10.1016/j.pcad.2010.02.003](https://doi.org/10.1016/j.pcad.2010.02.003).
- Bhagi, S., Srivastava, S., & Singh, S. B. (2014). High-altitude pulmonary edema. *Journal of occupational health*, 56(4), 235-243. [Doi:10.1539/joh.13-0256-RA](https://doi.org/10.1539/joh.13-0256-RA).
- Checkley, A. M., Smith, A., Smith, V., Blaze, M., Bradley, D., Chiodini, P. L., & Whitty, C. J. (2012). Risk factors for mortality from imported falciparum malaria in the United Kingdom over 20 years: an observational study. *Bmj*, 344. [Doi:10.1136/bmj.e2116](https://doi.org/10.1136/bmj.e2116).
- Gjørup, I. E., & Rønn, A. (2002). Malaria in elderly nonimmune travelers. *Journal of travel medicine*, 9(2), 91-93. [Doi:10.2310/7060.2002.21494](https://doi.org/10.2310/7060.2002.21494).
- Freedman, D. O. (2008). Malaria prevention in short-term travelers. *New England Journal of Medicine*, 359(6), 603-612. [Doi: 10.1056/NEJMc0803572](https://doi.org/10.1056/NEJMc0803572).
- McKeage, K., & Scott, L. J. (2003). Atovaquone/Proguanil: A Review of its Use for the Prophylaxis of Plasmodium. *Drugs*, 63, 597-623.
- Grabias, B., & Kumar, S. (2016). Adverse neuropsychiatric effects of antimalarial drugs. *Expert opinion on Drug safety*, 15(7), 903-910.
- Nika, M., Blachley, T. S., Edwards, P., Lee, P. P., & Stein, J. D. (2014). Regular examinations for toxic maculopathy in long-term chloroquine or hydroxychloroquine users. *JAMA ophthalmology*, 132(10), 1199-1208. [Doi:10.1001/jamaophthalmol.2014.1720](https://doi.org/10.1001/jamaophthalmol.2014.1720).
- Tan, K. R., Magill, A. J., Parise, M. E., & Arguin, P. M. (2011). Doxycycline for malaria chemoprophylaxis and treatment: report from the CDC expert meeting on malaria chemoprophylaxis. *The American journal of tropical medicine and hygiene*, 84(4), 517. [Doi: 10.4269/ajtmh.2011.10-0285](https://doi.org/10.4269/ajtmh.2011.10-0285).