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**MEDICAL PROBLEMS IN COMMERCIAL FLIGHT:
SHORTAGE OF AIRPORT MEDICAL FACILITIES**

Norma Dowsett

Heart disease remains the leading cause of death in the United States. If the heart-attack victim is unfortunate enough to be at an airport, the prognosis for survival is exceedingly low, unless vigorous treatment begins immediately. Currently, there are only four fully staffed medical facilities operating at U.S. airport terminals, a fact that should be unacceptable. With the increase in air travel, cases of medical emergencies at the terminals and on board aircraft will inevitably increase. The rise in contagious diseases also could hamper the efficiency of aircraft flight. To save lives, to increase the expediency of emergency quarantine procedures, or, at the very least, to prevent unnecessary medical-emergency landings, telemedicine should be considered for use on board all major airline carriers and in airport medical facilities.

**MEDICAL FACILITIES AT AIRPORTS
AND THEIR ADEQUACY**

A recent survey of the 24 busiest U.S. airports found a total of only four doctors on call for duty at all the terminals. Most terminals also lack minimum medical supplies and life-saving equipment, such as defibrillators, which are necessary for resuscitating cardiac-arrest (heart-attack) victims.

Many airports rely on equipment and paramedics located at airport fire stations, which are usually minutes away from the terminals. If a traveler experiences a cardiac arrest at Hartsfield-Atlanta International Airport, for example, the wait for firefighters or paramedics could be three minutes or more. For each minute that passes before defibrillation begins, the chance of survival decreases by 10% (Levy & Sloan, 1996).

Hartsfield-Atlanta International Airport deals with approximately 50 million passengers per year, and about 100 emergency cases a month. Because making one's way through a terminal can be stressful, most medical emergencies happen in the terminal rather than in the air (King, 1989). At New York's LaGuardia Airport, no doctors, nurses, paramedics, or advanced life-support systems are available. Travelers in critical condition must wait for outside ambulance services to arrive (Levy & Sloan, 1996).

San Francisco International Airport (SFO) is the exception. If one is going to get sick while traveling, this

is the airport to be heading to (Levy & Sloan, 1996). It is the model for airport medical facilities. SFO Medical Service is the only airport medical clinic in the country where medical doctors, instead of paramedics, respond to all emergencies. The clinic sees 28,000 patients per year and is open 24 hours a day.

"It's a phenomenal place to work and it's a great service for the passengers because we're the only clinic that can officially treat and release people in time for them to take their connecting flight," says Dr. Wendy Thanassi, a physician at San Francisco International Airport. SFO is the fifth-largest U.S. airport and the world's eighth-largest airport for passenger traffic, with 100,000 people per day flying through the airport and 250,000 people per day on the airport grounds. "That's about one-half [the population of] the state of Vermont which passes through this airport each day," says Dr. Thanassi. The incredible number of transient people, and the fact that none speak English, makes these patients very complicated to handle. "We respond to a variety of medical emergencies, from a heart attack on one flight to a suicide on the next. We have customs and quarantine issues that are phenomenal--such as the need to quarantine entire planes, customs issues where drugs are involved, tropical and parasitic diseases," says Dr. Thanassi (personal communication, March 18, 1997).

The University of Illinois at Chicago (UIC) Medical Center at O'Hare International Airport--the busiest

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airport in the United States--also has a physician-staffed center with extensive operating hours. Patients who traditionally would have been transported to hospitals can be treated at the airport instead (Levy, 1996a).

Currently, one defibrillator is located at UIC Medical Center. "At the center, most cases we see are occupational injuries--about 75%--and 25% are travelers with sprains and fractures," says Joan Morris, emergency nurse at UIC Medical Center (personal communication, March 17, 1997).

Philadelphia International Airport has a clinic in Terminal C that is not always staffed with a physician (Grimes, 1996). However, Mercy Careport Clinic has extensive operating hours and an advanced life-support team (Gruskin, 1996b). "Our Medic Units are fully supplied with basic trauma supplies and advanced life supports, which includes defibrillators," says Jerry [last name withheld upon request], who works at Mercy Careport (personal communication, March 24, 1997).

Physicians and nurses also are available from Monday through Friday at Pittsburgh International Airport. The University of Pittsburgh Medical Center is located at the entrance to Concourse C. Firefighters and emergency medical technicians (EMTs) also provide emergency basic life support (Gruskin, 1996b).

Clinics at airport medical centers in Honolulu, Denver, Minneapolis, Kennedy in New York, and Los Angeles are in separate buildings or off-site (Grimes, 1996). However, Los Angeles' Centinela Hospital Airport Medical Clinic also has a first-aid station located in the International Terminal, with extensive operating hours--seven days a week. "We handle anything out there," says David Roberts, who works at the first-aid station in Los Angeles International Airport. "We treat heart-attack victims, escalator falls--a variety of emergencies. But in the past 12 years, we haven't had [delivered] a baby yet!" (personal communication, March 17, 1997).

John F. Kennedy International Airport's Kennedy Medical Center is located on the airport grounds, and emergency medical equipment and medical personnel are not located at the terminals. Physicians respond to emergencies at the terminals when necessary (Grimes, 1996). The Medical Center also provides routine medical services, such as checkups and physicals for the airport's

employees, in addition to the emergency services (Taylor, 1988). According to Dr. Nicholas Lomangino, medical director of the Kennedy Medical Offices in New York, about 70% of the practice deals with injuries and ailments among airport workers and flight crews (Grimes, 1996).

Denver International Airport (DIA) has at least one paramedic on duty and three at peak hours. Each paramedic has the same equipment ambulances have. They also have a red-light-topped electric cart that gets the paramedics around the 54-square-mile airport. Because the nearest hospital is 16 miles away, and ambulances 15 to 90 minutes distant, Denver officials opted for paramedics in the terminals. The paramedics often can provide treatment for travelers and enable them to continue their trips.

At other times, the paramedics must persuade travelers that they need emergency help. "You get these big businessmen who may be having a heart attack but don't want to miss their flight," says Steven Jones, a paramedic at DIA (Levy, 1996b, p. 3D).

Honolulu International Airport's Queens Airport Medical Center is located on the airport grounds near the Japanese Gardens. The first call for any emergency goes to the nurses, who provide immediate advanced life-support treatment. The firefighters act as backup, while an ambulance is a phone call away (Gruskin, 1996a).

Paramedics at Miami International Airport deal with a great number of international travelers, which creates problems much like those encountered at SFO, such as language and confusion over medication. Besides these dilemmas, paramedics assigned to the fire station see their share of criminal situations (Levy, 1996d).

EMERGENCY MEDICAL PROCEDURES AND THEIR ADEQUACY

For the half-billion travelers who use the nation's airports each year, the bustle for the connecting flight or the long journey to the baggage claim area may be as agonizing as the fear of flying. Medical emergencies recorded during a year-long study at Seattle-Tacoma International Airport indicated 75% of the 754 injuries and ailments took place in the terminal. Most of the problems encountered, such as shortness of breath or injuries caused by falls, were likely prompted by anxiety

or overexertion. The five heart attacks that occurred happened on the ground--three at the baggage claim area, one after the passenger disembarked, and another on the plane before departure (King, 1989).

Seattle-Tacoma International Airport has no advanced life support or medical care in the terminals. Firefighters respond from an adjacent fire station, or paramedics from off-airport grounds. Because timely defibrillation is the most important factor in saving the lives of sudden cardiac arrest victims, medical facilities should be located in the airport itself. A facility would drastically reduce the time it takes to get medical treatment to anyone who falls ill or has an accident in the terminals (Levy & Sloan, 1996).

Although few airports have medical facilities, some use first-aid clinics, which can treat minor injuries. However, most major U.S. airports lack provisions for swift emergency care (Taylor, 1988).

Heart-attack victims and injured travelers in the terminal at O'Hare International Airport are treated by the Chicago Fire Department (CFD). The CFD is currently training airport employees, including U.S. Customs agents, in cardiopulmonary resuscitation (CPR), and plans to place a defibrillator in the terminal so that revival procedures can begin before paramedics, located at the fire station, arrive (Levy, 1996a).

If a medical emergency occurs in the parking lot at Philadelphia International Airport (PIA), the call could be handled by Mercy Careport paramedics or by Philadelphia Fire and Rescue at PIA, "which is a five-minute response time away," says Jerry [last name withheld upon request], who works at Mercy Careport (personal communication, March 24, 1997). "Now we have redundancy, which is good," says Robert Wolfe, captain at the airport fire station (Gruskin, 1996b, p. 3D).

Today, Captain Wolfe urges more airports to follow Philadelphia International Airport's lead, observing that a year with the new program has saved lives and has addressed passengers' health and safety concerns (Gruskin, 1996b). Federal regulations require one first-aid qualified person on duty at all times. All major U.S. airports exceed the minimum required by federal regulations. However, airport administrators are

undecided as to how much the minimum standards should be increased. Ian Cummings, president of the Association of Emergency Physicians, says that every major airport should have a defibrillator and paramedics (Levy & Sloan, 1996).

Defibrillators have become relatively inexpensive (\$3,000 per unit), compact (the size of a hardcover book), and easy to use (SerVaas, 1997). Unfortunately, only seven of the U.S. airports surveyed have them in their terminals (Levy & Sloan, 1996).

Airlines in other countries, such as Air Zimbabwe, Qantas, and Virgin Atlantic, already have defibrillators in aircraft (SerVaas, 1997). Eric Donaldson, medical director of the Australian airline Qantas, says, "From our experience, there is a strong argument for putting defibrillators in every terminal" (Levy & Sloan, 1996, p. 1D). Qantas added defibrillators to all long-haul aircraft five years ago and uses them as often in the terminals as in the air. Out of 18 attempts, four lives have been saved in the terminals, and these lives were saved at airports that did not have their own defibrillator (Levy & Sloan, 1996).

Mike Cosgrove, spokesman for the Chicago Fire Department, says there is nothing as effective as having advanced life-saving equipment like defibrillators at the terminals. Critical time is no longer wasted in waiting for an ambulance with the proper equipment to arrive (Levy & Sloan, 1996). Experts estimate that 100,000 lives a year could be saved if defibrillators were widely available (SerVaas, 1997).

In contrast to the medical emergencies at the terminals, in-flight medical emergencies during the year-long study at Seattle-Tacoma consisted mostly of chest pains, loss of consciousness, asthma attacks, allergic reactions, and motion sickness. Of the 190 passengers who became ill during their flights, 44% had to be treated in an emergency room. The University of Washington researchers said that seven of the calls in the Seattle-Tacoma study resulted in medical-emergency landings. Later analysis of those cases indicated the emergency landings were unnecessary (King, 1989).

The standard protocol for an in-flight cardiac arrest is to divert the aircraft to a nearby airport where EMTs or paramedics can apply defibrillation. The chances for

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survival are very low.

American Airlines plans to be the first domestic airline to put defibrillators on board. Also, the American Heart Association and Heartstream Incorporated of Seattle are training 2,300 flight attendants to operate automated external defibrillators (SerVaas, 1997). Flight attendants are trained to recognize illness and injury and to use the first-aid kit. A "doctor's kit" has been required on board every commercial flight since 1986 (King, 1989) and must be opened only by doctors (Grimes, 1996).

According to Julie Dreher of Hartsfield-Atlanta International Airport, the doctor's kit currently includes: three airways, one tourniquet, 10 antiseptic wipes, one sphygmomanometer (blood pressure cup), one stethoscope, one bottle of 25 tablets of nitroglycerine (for heart-related chest pains), two epinephrine injections (for anaphylactic reaction or allergic reaction), two 25-gauge 5/8-inch needles, two Benadryl injections, two 22-gauge 1-1/2-inch needles, one 50-ml vial of dextrose injection, one 50-ml syringe, two 18-gauge 1-1/2-inch needles, two pairs of gloves, one thermometer, and four 1-ml syringes (personal communication, April 1, 1997).

QUARANTINE PROCEDURE

FOR INFECTIOUS DISEASE EXPOSURE TO PASSENGERS AND FLIGHT CREWS

According to the World Health Organization (WHO), infectious diseases are on the rise. Vigilance must be maintained by airport personnel to identify passengers or flight crews who may be infected with a contagious disease. Quarantine procedures also must be reinforced.

For example, the incidence of tuberculosis is on the rise, claiming approximately 3 million lives each year. Russia has seen a 70% rise in tuberculosis (TB) cases and a 90% increase in tuberculosis death rates, says Richard Bumgarner, deputy director of the WHO's Global Tuberculosis Program. Bumgarner believes Europe is headed for another tuberculosis crisis ("Tuberculosis Epidemic," 1997).

Tuberculosis is highly contagious, and is the world's leading infectious killer. Tuberculosis is spread mainly through the air, and a person with active tuberculosis can spray droplets infected with the bacterium (mycobacterium, also known as tubercle bacillus) into the air by coughing, sneezing, or laughing. The chance that

tuberculosis will be transmitted depends on three factors: (a) the infectiousness of the person with tuberculosis, (b) the environment in which the exposure took place, and (c) the duration of exposure (CDC, 1994).

The Centers for Disease Control and Prevention (CDC) has investigated six instances between January 1993 and February 1995 in which passengers or flight-crew members traveled while infected with tuberculosis. All six investigations involved patients who were highly infectious at the time of flight.

Two of the investigations indicated that transmission did occur. One investigation showed that transmission was associated with seating proximity to the infectious passenger. This flight also was the longest, exceeding eight hours ("Exposure of Passengers," 1995). The correct treatment for tuberculosis yields an excellent prognosis; however, the death rate is 50% in people with strains that resist two or more of the major antituberculosis drugs. Untreated cholera also may kill up to 50% of infected people. The death rate for typhoid, a clinical variant of salmonellosis, is 10% of untreated people. Travelers and laboratory workers are at high risk for this disease (*Professional Guide*, 1995). Ultimately, quarantine procedures should be upgraded and reinforced to prevent exposure to the general public. Today's quarantine procedures depend on whether the flight is international or domestic.

According to David Lozea, district chief of Airport Operations for the Chicago Fire Department (O'Hare International Airport), quarantine procedures are twofold. First, an ill passenger on a domestic flight would be transported to the hospital. If the passenger is diagnosed with a contagious disease, the hospital would immediately notify the fire department, and "then we would follow our contagious-disease protocols," says Lozea. If the flight is international, Customs and Immigration would separate that passenger and begin quarantine procedures (personal communication, March 17, 1997). Jack Abbott, director of Airport Public Services at Daytona Beach International Airport, says quarantine procedures are similar there (personal communication, March 21, 1997).

Although quarantine procedures are fairly identical, the opportunity for transmittal of contagious diseases to air-

port and health-care employees is evident. One method to halt the subsequent spread of contagious diseases, and to save lives during a medical emergency in flight, is the use of telemedicine on board aircraft and at airport medical facilities.

TELEMEDICINE USE IN AIRCRAFT AND TERMINALS

The delivery of health information and services at low cost can be achieved by innovative technologies such as telemedicine. Telemedicine is defined as the "delivery of health information or services through the use of interactive video systems" ("Why Telemedicine," 1997).

As the cost of telecommunications services decreases, telephone lines and satellite systems will assume an important role in the delivery of medical care. This development could be a source of solutions for an overburdened health-care system. Also, the ways in which telemedicine applications can be beneficial are quite diverse. Medical specialties are using telemedicine technology in cardiology, emergency care, general medicine, and many more areas ("About Telemedicine," 1997). Other examples are the use of video and satellite relays to train health-care professionals in remote clinical settings, videoconferencing among members of health-care teams, and video links between patient and physician for diagnostic purposes (Williams & More, 1995).

Telecommunications industry standards are achieving conformity, and with the advent of digital transmission, channels are available through telephone and cable networks (Harrison, Clayton, & Wallace, 1996). Thus, telemedicine technology is available and can contribute to a reduction of medical-emergency landings. But, consideration also must be given to the levels of technology employed, technical standards that must be met, costs or reimbursement for telemedicine services, the issue of practicing medicine across state lines, federal and state regulations, and, ultimately, patient and provider acceptance ("About Telemedicine," 1997).

Furthermore, direct communication can be established between the in-flight care-giver and an emergency-care physician on the ground, either at an airport medical facility or at a participating hospital. This is important because the current chain-of-communication system is archaic and unreliable. This chain of communication goes from flight attendant to captain, to air-traffic control, to dispatcher. In one incident, for example, airport paramedics responded to a call for a person "trapped in the bathroom" on a plane. This emergency turned out to be a person in cardiac arrest (Levy, 1996c, p. 3D). It is obvious that telemedicine is necessary on board aircraft. The use of telemedicine would be comparable to having a medical doctor on board every flight, at a fraction of the cost.

CONCLUSION

It is regrettable that most U.S. airports are inadequately equipped with medical services for the half-billion travelers who use the nation's airports each year. Insufficient airport funding or the need to control health-care costs may be major factors in the neglect.

However, with the decreasing cost of videoconferencing, the achievement of telecommunication standards, and the advent of digital transmission, channels are available through telephone and cable networks (Harrison, Clayton, & Wallace, 1996). Telemedicine technology is available and should be used on board aircraft for the expedient care of in-flight illness or injury. The use of telemedicine on board aircraft also could prevent costly and unnecessary medical-emergency landings. This researcher also proposes the training of selected flight attendants as emergency medical technicians in conjunction with telemedicine use.

The installation of airport medical facilities, the availability of defibrillators at every terminal, and the use of telemedicine on board aircraft are essential for the safety of the traveling public.□

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