

## **U.S. Department of Transportation: Airline Passenger Health**

*To address the concerns of age and health-compromised airline passenger population, the FAA, Harvard University, and the Boeing Company collaborated to evaluate the physiological effects of normal cabin pressure on a passenger population that included both healthy and less than healthy older subjects.*

### **Lead Agency:**

Department of Transportation (DOT) - Federal Aviation Administration (FAA), Office of Aerospace Safety (AVS) – Office of Aerospace Medicine (AAM)

### **Agency Mission:**

Federal Aviation Administrations mission is to provide the safest, most efficient aerospace system in the world.

Aviation Safety and the Office of Aerospace Medicine's mission is to enhance aerospace safety through surveillance, research, education, medical standards, and the prevention of illness and injury.

### **Principal Investigators:**

John D. Spengler, Ph.D.  
Harvard University, School of Public Health  
677 Huntington Avenue  
Boston, MA 02115

Dennis Burian, Ph.D.  
AAM-600  
FAA Civil Aeromedical Institute  
P.O. Box 25082  
Oklahoma City, OK 73125

### **Partner Agencies:**

Air Transportation Airliner Cabin Environment Research (ACER) Center of Excellence program  
The Boeing Company  
Harvard University School of Public Health  
FAA Civil Aeromedical Research Institute, AAM-600.

### **General Description:**

The demographics of the US flying population show that airline passengers are rapidly getting older and increasingly have significant health problems. To address the concerns of age and health in the passenger population, the FAA (CAMI), Harvard University and the Boeing Company collaborated under the FAA Center of Excellence (COE) for Airliner Cabin Environment Research (ACER) program to evaluate the physiological effect of normal cabin pressure (7,000 ft altitude) on a passenger population that included both healthy and less than healthy older subjects. This project evaluated subjects older than 55 years of age and included three test groups, a normal group, a group that had implantable cardiac defibrillators (ICD group) and a group of heavy smokers. The medical condition of the subjects and the extensive physiological evaluation of the subjects made this program one of the most complex ever conducted at the Civil Aerospace Medical Institute.

***Excellence:*** What makes this project exceptional?

The study group represents a flying population for which little data regarding the risk of flight in commercial aircraft has been gathered. It is the first altitude study that addresses the health effects of cabin pressure on older passengers with cardiac and respiratory disease.

***Significance:*** How is this research relevant to older persons, populations and/or an aging society?

The demographics of the US flying population show that airline passengers are rapidly getting older and increasingly have significant health problems. Flight in commercial aircraft typically exposes passengers to oxygen levels commensurate with 6,000 to 8,000 ft altitudes. Previous studies of altitude exposure have been performed at higher altitudes and/or used subjects of a relatively young age. This study is investigating the effects of cabin altitude exposure on 55 to 80 year old groups of subjects, healthy subjects with little overall health impairment, cardiac patients with implanted defibrillators, and smokers without other overt clinical symptoms.

***Effectiveness:*** What is the impact and/or application of this research to older persons?

Data gathered during the study includes changes in physical measurements from prolonged periods of being seated, physiological changes reflected in oxygen saturation, pulse and respiration rates, plasma and serum markers for organ function, cytokine markers of inflammation, and intracellular changes measured by gene expression analysis. Cognitive test data and mood/sleepiness surveys are also being collected to assess neuropsychological effects of mild altitude exposure. The results of the research will provide guidance to passengers relative to commercial air travel.

***Innovativeness:*** Why is this research exciting or newsworthy?

The research complexity has not been accomplished in past-related research and has never addressed the physiological aspects of older and health compromised passengers.

The functional genomics scientific field define the future of aerospace medicine.