

DOT/FAA/AM-00/11

Office of Aviation Medicine  
Washington, D.C. 20591

# Evacuee Injuries and Demographics in Transport Airplane Precautionary Emergency Evacuations

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March 2000

Final Report

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**Federal Aviation  
Administration**

## N O T I C E

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1. Report No. DOT/FAA/AM-00/11		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Evacuee Injuries and Demographics in Transport Airplane Precautionary Emergency Evacuations				5. Report Date March 2000	
				6. Performing Organization Code	
7. Author(s) Michael K. Hynes				8. Performing Organization Report No.	
9. Performing Organization Name and Address Hynes and Associates, Inc. 100 Helicopter Drive Frederick, OK 73542-2400				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No. DTFA-96-P-51602 and DTFA0299V05793	
12. Sponsoring Agency name and Address Office of Aviation Medicine Federal Aviation Administration 800 Independence Ave., S.W. Washington, DC 20591				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplemental Notes This work was performed under task AM-B-97-PRS-93; contract monitored by Jeffrey H. Marcus.					
16. Abstract <p>During a nine-year period from January 1, 1988, through December 31, 1996, there were more than 500 transport airplane precautionary emergency evacuations (PEEvacs), occurring on average about once a week. Each year as many as 6,000 persons participated in these events. In many cases, passenger and crewmember injuries resulted from the PEEvacs, resulting in large personal costs to passengers and crewmembers, as well as financial costs estimated to be in excess of \$11 million annually to airlines.</p> <p>This study was undertaken to sample available evacuee and injury data related to a subset of those PEEvacs, including information on types and causes of evacuee injuries, and evacuee age and gender. Other demographics were sought, but that information was generally unavailable. Unique, direct contacts with airport management were used to supplement publicly available information on certain of the PEEvacs, including activation of emergency escape slides during PEEvacs, injuries caused by the PEEvacs, and outcomes.</p> <p>Of the 136 airports identified as experiencing PEEvacs, 24 were selected to provide detailed data on injured evacuees for a 34-month interval lasting from December 1994 through November 1996. During this time frame, there were 109 precautionary evacuations at the 24 airports selected, i.e., approximately 70% of all reported evacuation events that occurred during the study period. Specific information on 193 persons injured during 19 of these evacuations was obtained and analyzed.</p> <p>The results of this study confirm the need for improved incident reporting and continued research into preventing injuries associated with the use of emergency egress systems and precautionary emergency evacuations of transport airplanes. The results should be additionally useful when considering proposed changes to applicable regulations and to airline training programs and aircraft emergency operations.</p>					
17. Key Words Emergency Egress, Evacuation, Airline Operations, Passenger Injuries, Economic Loss, Airline Economics			18. Distribution Statement Document is available to the public through the National Technical Information Service, Springfield, Virginia 22161		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 17	22. Price



## ACKNOWLEDGMENT

The author gratefully acknowledges the assistance of Dr. Mac McLean of the Civil Aeromedical Institute in the preparation of this manuscript.



# EVACUEE INJURIES AND DEMOGRAPHICS IN TRANSPORT AIRPLANE PRECAUTIONARY EMERGENCY EVACUATION

## INTRODUCTION

The number and frequency of transport airplane Precautionary Emergency Evacuations (PEEvacs) have recently been described by Hynes (1999), who studied the occurrence of PEEvacs during the period from January 1988 through December 1996 (see Figure 1). These events generally resulted from instances in which crewmembers or passengers believed the probability of a fire to be high, although no fire actually developed. As in other emergency evacuations, passengers and crew often suffered injuries; had they known that no fire would result, it would have been safer for them to remain on the airplane.

More than 500 PEEvacs occurred during the period studied, i.e., about 1 evacuation every 6 days. In contrast, the incident databases maintained by the Federal Aviation Administration (FAA) and by the National Transportation Safety Board (NTSB) reveal relatively little about the occurrence of PEEvacs,

even though these evacuations usually occur on airport properties, with the airport Crash-Fire-Rescue (C-F-R) teams responding. PEEvacs are, however, typically documented in records maintained by airport managers, as identified by Hynes (1994), using airport records as the primary data source. Other sources of information regarding PEEvacs included airline records, media reports, and insurance company records.

PEEvacs result in significant personal costs to the passengers and crew members involved, not to mention the more than \$11 million they cost the airlines annually (Hynes, 1999). To a large extent, the personal costs result from injuries to passengers and crew members evacuating the airplanes during the PEEvacs, and primarily include expenses for medical treatment, lost earnings and productivity, and associated litigation. The purpose of this report is to describe injured evacuees

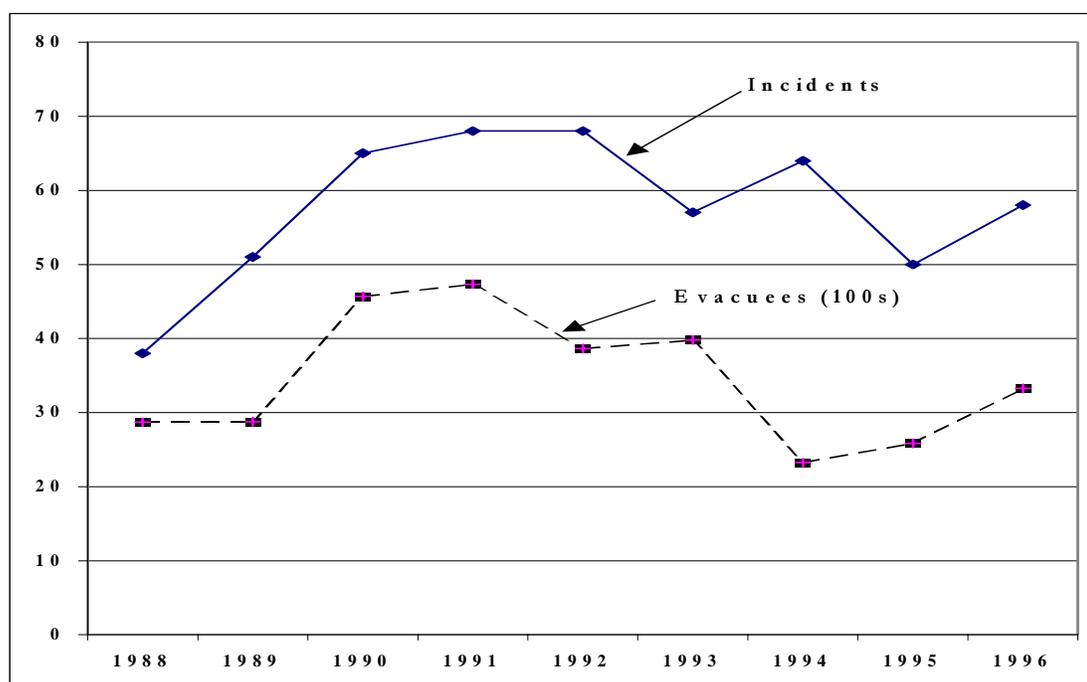


Figure 1. Number of Precautionary Evacuations and Evacuees

and, where possible, their demographics, to provide a base for improved aircraft operations related to minimizing the sequelae of these apparent emergency events.

## METHODS

For the purposes of this study, the term *precautionary emergency evacuation* includes: (a) those transport airplane incidents in which the emergency escape system was deployed, and (b) those incidents in which the emergency escape system was not deployed, but passengers and crew members were forced to conduct an unscheduled deplanement at other than a normal gate location.

Information on the use of emergency escape systems and emergency evacuations was collected from several sources, including the FAA *Accident and Incident Data System* (AIDS), the NTSB accident database, and the National Aeronautics and Space Administration (NASA) *Aviation Safety Reporting System* (ASRS). Information suggesting that precautionary evacuations might have occurred was also collected from the *FAA Administrator's Daily Bulletin*.

An historical review of this information was conducted to identify specific airports at which PEEvacs occurred and the approximate dates of those incidents. This information was used to establish a contact list for subsequent surveys, in which information was obtained from 136 airport managers. The results of these surveys have been reported by Hynes (1994, 1997, 1999). As a point of reference, those airports accounted for 85.6% of all CFR Parts 121 and 135 passenger enplanements in 1995.

Of the 136 airports originally contacted by Hynes, 24 airports (see Appendix A) were selected as sources of injury data resulting from PEEvacs that occurred during the last 34-month period of the study, extending from February 1994 through November 1996. During that time frame, the 24 airports had experienced 109 evacuation events (i.e., 70% of all evacuations that occurred), a number typical of any similar interval during the study period. Appendix B contains the airport contact letter and data format sheet, as well as an injured evacuee follow-up telephone interview, used to obtain the information. A response rate of 100% was achieved from the 24 airports; most were also visited to review the raw data and to obtain needed information when it was unavailable from other sources.

The 34-month interval was selected for convenience and cost/effectiveness, because incident data are much harder to obtain as the time after an incident increases, making data collection efforts extremely difficult. Similarly, the recall of evacuees who participate in such incidents typically declines as time elapses, making corroboration of specific details less certain.

## RESULTS

Nineteen (17.4%) of the 109 precautionary evacuations resulted in injuries to 190 passengers and 3 crewmembers. Approximately 86% of the evacuees reporting injuries required medical assistance; of those, 67% were treated at a hospital. Information related to the specific treatments and outcomes of those injured (e.g., hospitalized for x number of days, treated and released, permanently disabled) was generally not available because of privacy laws and the absence of this type of information in airport records. In some cases, telephone interviews were attempted with those who had been injured in an effort to obtain this information. For various reasons, few injured passengers were actually contacted, and those who were contacted were typically vague regarding relevant details.

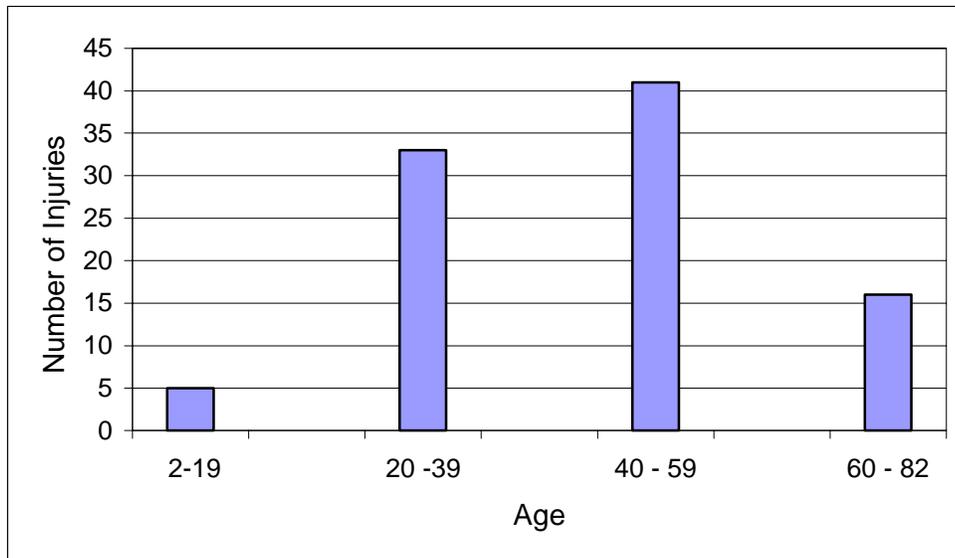
As shown in Appendix C, available information on evacuee injuries varied widely in descriptive quality. Of the 193 persons reported as injured, information was available for 135 (69.9%). However, 26 (13.5%) of these injured evacuees refused medical assistance, eliminating any detailed record of the nature of their injuries. See Table 1 for the general types of injuries reported.

Available demographic information about injured evacuees may also be found in Appendix C. Typically, age and gender were the only categories of data obtainable, and even those data were not available for all injured evacuees. Males (mean age of 42.7 years) accounted for 36.8% of the reported injuries and females (mean age of 45.1 years) comprised 52.8% of those injured; the rest (4.5%) were not identified as to gender. Sixty-three percent of the injured evacuees for whom age was available were 40 years or older, i.e., the occurrence of injuries was skewed toward older evacuees (see Figure 2). The degree to which this skewing represents a typical airliner passenger complement remains to be determined. Information on the height of injured evacuees was not available;

**Table 1.** Evacuee Injuries

Injury	Number	Percentage of Total
Back / Neck	53	34.2
Leg / Foot	27	17.4
Cuts/Abrasions	27	17.4
Minor	19	12.3
Broken Bones	11	7.1
Abdominal / Chest Pains	10	6.5
Sprains	8	5.2

Totals exceed 135 because of specific reporting of multiple injuries.



**Figure 2.** Age Distribution of Injured Evacuees

similarly, weight was rarely included in the records. When questioned about these omissions in evacuee demographics, airport personnel indicated that such information was relatively unimportant for their needs; therefore, they made little effort to obtain it. Insurance company records were generally inaccessible, and media reports were not helpful for this aspect of the investigation.

## DISCUSSION

In addition to the emotional and physical pain of personal injuries associated with precautionary emergency evacuations, the economic costs to air travelers in lost earnings, productivity, medical costs, and related expenses appears to be very high. Using a modification of the formula in Bulletin APO-90-1, published by the FAA Office of Aviation Policy and Plans, Hynes (1999) estimated that passenger injuries cost the airlines more than \$8.5 million annually. That figure is based on an analytical scheme in which serious injuries are defined as those with losses of \$50,000 or more, substantial injuries as those with losses of \$10,000 to \$49,999, and minor injuries as those with claimed losses of less than \$10,000. When considering the comparatively large percentage of injured evacuees age 40 or older, who would recover less quickly than younger individuals in many cases, it is possible that expenses for acute and extended medical care, particularly, were greater than estimated. Further, considering that the average age of the flying population is generally increasing, such costs associated with future PEEvac would be expected to escalate accordingly.

Discussions with airline staff, insurance industry personnel, and attorneys indicated that the administrative and legal expenses to airlines associated with injury claims can also be significant, (Hynes, 1999). Together, these sources estimated that administrative costs to airlines associated with minor injuries average \$1,000 per injury claim, rising to \$2,500 for each substantial injury. Administrative costs for serious injuries averaged \$25,000, without litigation, and \$75,000 if litigation occurred. When applied to the 109 PEEvac-related injuries detailed in this study, administrative costs associated with processing injury claims would be expected to exceed \$1.97 million. Again, as the extent and duration of associated medical care increases, these costs would also rise. Together with the personal costs identified above, the impact of PEEvac on airline operations becomes more than just a nuisance.

Despite an apparent lack of public awareness, the frequency of precautionary emergency evacuations has been quite high. The development of preventive and mitigative strategies to address PEEvac is essential; however, such an endeavor requires a better understanding of the nature, causes, and results of PEEvac than is readily available. Upgraded information management systems and research dedicated to minimizing these events are needed to address this requirement, as well as to minimize the negative consequences of all emergency evacuations, whenever these events should occur. Preventing passenger and crewmember injuries associated with emergency evacuations is an important objective that can be accomplished in several ways. Included are: (1) safely reducing the number of these events, (2) improving the design of aircraft emergency egress systems and emergency exits, (3) upgrading air carrier training programs and operations, and (4) improving passenger safety information and education. Additional research directed toward further evaluating the important safety and economic issues associated with emergency evacuation events should also be undertaken.

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## APPENDIX A

### Airports Surveyed

ID	CITY, STATE	1994	1995	1996	1998	Rank <sup>‡</sup>	Enplanements <sup>‡</sup>
ATL	ATLANTA,GA	X	X	X	X	2	28,090,978
BNA	NASHVILLE, TN	X	X	X	X	42	3,685,219
BOS	BOSTON, MA	X	X	X	X	15	11,734,693
CLE	CLEVELAND, OH		X	X	X	32	5,270,004
CLT	CHARLOTTE, NC	X		X	X	20	10,463,122
CVG	GREATER CINCINNATI, KY	X	X	X	X	25	7,504,549
DAY	DAYTON, OH			X	X	80	1,088,823
DEN	DENVER, CO	X	X	X	X	7	14,858,763
DFW	DALLAS-FT WORTH, TX	X	X	X	X	3	26,962,940
DTW	DETROIT, MI (Metro)	X	X	X	X	9	14,082,598
FLL	FT LAUDERDALE, FL	X	X	X	X	34	4,787,467
IAH	HOUSTON, TX	X	X	X	X	16	11,350,898
JFK	NEW YORK, NY (Kennedy)	X	X	X	X	8	14,601,827
LGA	NEW YORK, NY (La Guardia)	X	X	X	X	21	10,297,628
MCO	ORLANDO, FL	X	X	X	X	19	10,583,166
MSP	MINNEAPOLIS, MN	X	X	X	X	14	12,559,491
ONT	ONTARIO, CA			X	X	46	3,232,996
ORD	CHICAGO, IL (O'Hare)	X	X	X	X	1	31,433,002
PHL	PHILADELPHIA, PA	X	X	X	X	23	8,791,372
SAV	SAVANNAH, GA				X	98	565,230
SFO	SAN FRANCISCO, CA	X	X	X	X	5	17,187,766
SLC	SALT LAKE CITY, UT	X	X	X	X	24	8,741,761
STL	ST LOUIS, MO	X	X	X	X	13	12,790,701
TPA	TAMPA, FL	X	X	X	X	30	5,567,950
Number of Airports Contacted						24*	

\* 70% of the reported emergency evacuation events in the US during the 34-month period analyzed occurred at these airports.

‡ Data based on the 1995 Hynes airport survey.



## APPENDIX B

### Airport Contact Letter

Re: "Part 121 and 135 EMERGENCY EVACUATION STUDY"

Dear \_\_\_\_\_ :

In past years, your airport was one of several airports that were contacted and responded for the study of EMERGENCY EVACUATION EVENTS by Part 121 and 135 Air Carriers. To update these past studies, the Federal Aviation Administration (FAA) is now conducting new research into these types of events. The goal of this research is to reduce both the number of events and the possibility of passenger and crew injuries when these events must take place.

For past studies, seventy airports were contacted. These airports included the top 40 in the US, plus airports known to have had an emergency evacuation event. The response rate was 92.8%. This was a strong indication of the value airport management placed on the study and the professional attitude of managers in supporting safety orientated research.

*Under FAA contract No. 95P53815, we have been tasked to up-date the previous data you furnished on Part 121 and 135 EMERGENCY EVACUATION EVENTS **conducted at your airport**. Please review your records for the events listed and send us the requested information. To save time and expense, copies of any "Incident Reports" or any other type of existing records that contain the same information is acceptable.*

For the current study, only a few airports are being asked to provide a small amount of additional data. Attached is a form which identifies by date emergency evacuation events which took place at your airport. We want to keep any inconvenience or cost to you in responding to this FAA study to a minimum.

We are also sending you a copy of an analysis of the previous study and hope that some of the findings will be of interest to you. If you have any questions, please give us a call at our toll free number 1-888-335-5754. Thanks in advance for your cooperation.

Regards and have a good day.

DR. MICHAEL K. HYNES  
Director of Aviation Research  
WESTERN OKLAHOMA STATE COLLEGE  
November 12, 1997

(Our toll free number is 888-335-5754)



**Injured Evacuee Telephone Interview Format**

Hello My name is \_\_\_\_\_ and I am calling you from Oklahoma.

I work with Hynes and Associates, Inc. an Oklahoma aviation research company.

We are working on a contract for the Federal Aviation Administration, the FAA.

You were listed as one of the people who were on a \_\_\_\_\_ Airlines flight back in 19\_\_  
that had a problem at the \_\_\_\_\_ airport.

1. Am I speaking to the right person?	YES	NO
---------------------------------------	-----	----

(If yes, continue...if no---attempt to locate the correct person and continue.)

I have been asked to contact you to see how you are doing and to talk to you about the event and any injuries you may have incurred.

If you don't have a few minutes to talk to me now, when would it be a good time for me to call you again?

2. Do you remember the event?	YES	NO					
3. a. Do you remember what your injuries were? b. Can you tell me what your injuries were?	YES	NO					
4. a. Do you remember what caused your injuries? b. Can you tell me what caused your injuries or how you were injured?	YES	NO					
5. Did you have to go to a hospital?	YES	NO	How long?				
6.a. Were you disabled as a result of your injuries? b. Did you stay home from work? c. How long were you disabled?	YES	NO	YES	NO	DAYS	WEEKS	MONTHS
7.a. How are you feeling now?							
8.a. Did you receive any financial help from the airline? b. Do you feel that it was fair? c. Did you need to use an Attorney? d. What type (amount) of help did you receive?	YES	NO	YES	NO	YES	NO	
9. We show that you were _____ years old back then?	Is that correct? YES NO (Correct age was _____ )						
10. About how tall are you?	ft. in.						
11. Do you remember what your weight was back then?	lb.						



## APPENDIX C

### Specific Data On Precautionary Evacuation Injuries

Ref #	Gender	Age	A/C	Slides	Injury description and cause	Hosp
001			B737	Yes	Broken ankle	Yes
002			B737	Yes	Broken leg	Yes
003			B737	Yes	Chest pain	?
004			B737	Yes	Minor injuries	?
005			B737	Yes	Minor injuries	?
006			B737	Yes	Minor injuries	?
007			B737	Yes	Minor injuries	?
008	F	30	B757	Yes	Pain lower back-CREW	Yes
009	F	49	B757	Yes	Pain neck, shoulders-CREW	Yes
010	F	40	B757	Yes	Pain lower back-Minor	Yes
011	M	40	B757	Yes	Abdominal pain	No
012	F	33	B757	Yes	Pain back & ankle	No
013	F	51	B757	Yes	Twisted ankle-Minor	Yes
014	F	71	DC9	Yes	Right arm abrasion, left arm pain	No
015	F	62	DC9	Yes	Sprained left ankle	Yes
016	F	77	DC9	Yes	Nervous	No
017	F	20	B727	Yes	Cut to left hand-CREW	No
018	F	39	B727	Yes	Right leg & foot pain	No
019	F	27	AT72	N/A	Pain left thigh & ankle	Yes
020	M	45	AT72	N/A	Pain left ankle	No
021	F	45	B757	?	Possible fracture left ankle	Yes
022	M	49	B757	?	Stiff neck & shoulder	No
023	M	36	B757	?	Pain lower back	No
024	F	72	B757	?	Spine pain	No
025	F	79	B757	?	Sore right wrist	No
026	F	41	B757	?	Sore neck & upper back	No
027	M	17	B757	?	Sore jaw	No
028	F	67	B757	?	Abrasion right patella	No
029	F	49	B757	?	Neck & clavicle pain	No
030	F	53	B757	?	Stiff lower back	No
031	F	43	B757	?	Shortness of breath	No
032	F	50	B757	?	Pain right ankle	No
033	F	53	B757	?	Sore lower back	No
034	F	50	MD11	Yes	Broken right ankle	Yes
035	F	58	MD11	Yes	Possible back & shoulder injury	Yes
036	M		MD11	Yes	Friction burns on arm	RMA* No
037	M	59	MD11	Yes	Slightly injured	RMA* No
038	F	45	MD11	Yes	Unknown	RMA* No
039	F		MD11	Yes	Pain lower right arm	RMA* No
040	M		MD11	Yes	Pain neck, shoulder couldn't move	Yes
041	F	02	MD11	Yes	Unknown	RMA* No

Ref #	Gender	Age	A/C	Slides	Injury description and cause	Hosp
042	F	50	MD11	Yes	Complained back & neck RMA*	No
043	F		MD11	Yes	Right arm RMA*	No
044	F	76	MD11	Yes	Left leg & knee	Yes
045	F	33	MD11	Yes	Lower back	No
046	F	59	MD11	Yes	Head & neck injuries RMA*	No
047	M		MD11	Yes	Leg & back injuries	Yes
048	M		MD11	Yes	Possible back injury	Yes
049	M		MD11	Yes	Not reported	Yes
050	F	80	MD11	Yes	Not reported	Yes
051	F		MD11	Yes	Not reported	Yes
052	F		MD11	Yes	Not reported	Yes
053	M		MD11	Yes	Possible back injury	Yes
054	F		MD11	Yes	Not reported	Yes
055	F		MD11	Yes	Possible leg & back injury	Yes
056	M		MD11	Yes	Possible leg & back injury	Yes
057	F		MD11	Yes	Not reported	Yes
058	M		MD11	Yes	Not reported	Yes
059	F	60	MD11	Yes	Not reported	Yes
060	F	35	MD11	Yes	Bruised, sore legs	Yes
061	M	35	MD11	Yes	Bruised & sore right leg	Yes
062	M		MD11	Yes	Not reported	Yes
063	M	54	MD11	Yes	Unknown RMA*	No
064	F	43	MD11	Yes	Unknown RMA*	No
065	F	43	MD11	Yes	Unknown RMA*	No
066	M	03	MD11	Yes	Bleeding from mouth	Yes
067	F	21	MD11	Yes	Leg & back	Yes
068	M	50	MD11	Yes	Right leg	Yes
069	M		MD11	Yes	Back	Yes
070	F	21	MD11	Yes	Leg & back	Yes
071	M		MD11	Yes	Not reported	Yes
072	F		MD11	Yes	Not reported	Yes
073	F	21	MD11	Yes	Leg & back	Yes
074	M		MD11	Yes	Back	Yes
075	M	21	MD11	Yes	Back RMA*	No
076	M		MD11	Yes	Back & shoulder	Yes
077	M	60	MD11	Yes	Back injury & shortness of breath	Yes
078	F	60	MD11	Yes	Not reported	Yes
079	M	49	MD11	Yes	Unknown RMA*	No
080	M	48	MD11	Yes	Unknown RMA*	No
081	F		MD11	Yes	Unknown RMA*	No
082	M	37	MD11	Yes	Unknown RMA*	No
083	F	46	MD11	Yes	Unknown RMA*	No
084	M	39	MD11	Yes	Unknown RMA*	No
085	F	27	MD11	Yes	Unknown RMA*	No
086	F	34	B727	Yes	Motion sickness	Yes
087			B727	Yes	Unknown	Yes

Ref #	Gender	Age	A/C	Slides	Injury description and cause	Hosp
088	F	54	DC9	?	Sore right ankle	No
089	F	40	DC9	?	Tailbone discomfort	No
090	F	10	DC9	?	Rug burn right thigh posterior	No
091	M	47	B737	No	Laceration right knee	No
092	M	43	B737	No	Abrasion left hand/twisted ankle	No
093	F	43	B737	No	Cut on left hand	No
094	M		B737	Yes	Chest pains	Yes
095	F		B737	Yes	Sprained ankle	No
096	F		B737	Yes	Nervous	No
097	F		S340	N/A	Minor injury to right heel	No
098			DC9	Yes	Broken ankle	Yes
099			DC9	Yes	Minor cuts & bruises	No
100			DC9	Yes	Sore knee	No
101	F		A300	Yes	Unspecified injuries	Yes
102	F		A300	Yes	Unspecified injuries	Yes
103	F		A300	Yes	Unspecified injuries	Yes
104	F		A300	Yes	Unspecified injuries	Yes
105	F		A300	Yes	Unspecified injuries	Yes
106	M		A300	Yes	Unspecified injuries	Yes
107	M		A300	Yes	Unspecified injuries	Yes
108	F		A300	Yes	Unspecified injuries	Yes
109	M		A300	Yes	Unspecified injuries	Yes
110	M		A300	Yes	Unspecified injuries	Yes
111	M	29	A300	Yes	Lower back pain	Yes
112	F	33	A300	Yes	Breathing problem	Yes
113	F	40	A300	Yes	Abdominal pain	Yes
114	F	37	A300	Yes	Lower back pain, breathing problem	Yes
115	M	67	A300	Yes	Chest & back pain	Yes
116	M	50	A300	Yes	Ankle (?fracture), lower back pain	Yes
117	M	49	A300	Yes	Back pain	Yes
118	F		A300	Yes	Unspecified injuries	Yes
119	F		A300	Yes	Unspecified injuries	Yes
120	F		A300	Yes	Unspecified injuries	Yes
121	F		A300	Yes	Unspecified injuries	Yes
122	F		A300	Yes	Unspecified injuries	Yes
123	F		A300	Yes	Unspecified injuries	Yes
124	M		A300	Yes	Unspecified injuries	Yes
125	F		A300	Yes	Unspecified injuries	Yes
126	M		A300	Yes	Unspecified injuries	Yes
127	F		A300	Yes	Unspecified injuries	Yes
128	F		A300	Yes	Unspecified injuries	Yes
129	M		A300	Yes	Unspecified injuries	Yes
130	F		A300	Yes	Unspecified injuries	Yes
131	F		A300	Yes	Unspecified injuries	Yes
132	M		A300	Yes	Unspecified injuries	Yes
133	F	53	MD80	Yes	Pain lower left ribs	Yes

Ref #	Gender	Age	A/C	Slides	Injury description and cause	Hosp
134	F	34	MD80	Yes	Broken ankle & foot-Slip/fall wing foam	Yes
135	F	38	MD80	Yes	Possible femur fracture	Yes
136	M	31	MD80	Yes	Abrasion left thigh/buttock-Slip/fall wing foam	Yes
137	F	36	MD80	Yes	Pain back of neck/Slip/fall wing foam RMA*	No
138	F	51	MD80	Yes	Pain left thigh-Slip/fall wing foam	Yes
139	M		MD80	Yes	Pain & bump on left knee- RMA*	No
140	M	36	MD80	Yes	Pain right knee/Slip/fall wing foam RMA*	No
141	M	38	MD80	Yes	Pain right knee & lower back-Slip/fall wing foam	Yes
142	M	22	MD80	Yes	Pain knees, low back & neck-Slip/fall wing foam	Yes
143	F	28	MD80	?	Left buttock pain	No
144	F		MD80	?	Right knee injury	Yes
145	M	63	MD80	?	Multiple contusions right leg	No
146	F		MD80	?	Back spasm pain	?
147	F	30	MD80	?	Right thigh abrasion	No
148	M		MD80	?	Not reported	?
149	F	18	MD80	?	Not reported	?
150	M		MD80	?	Not reported	?
151	F		MD80	?	Not reported	Yes
152	M		MD80	?	Head & neck injury	?
153	M		MD80	?	Not reported	?
154	F		MD80	?	Not reported	?
155	F		MD80	?	Muscle pain left leg	?
156	F		MD80	?	Bruises	?
157	F		MD80	?	Chest pain	?
158	F		MD80	?	Bruises	?
159	M		MD80	?	Lower back pain	?
160	F		MD80	?	Not reported	?
161	M	27	MD80	?	Head & knee pain	No
162	F	29	MD80	?	Neck, knee & back	No
163	M	34	MD80	?	Bruised/cut right knee	No
164	M		MD80	?	Lower back, broken vertebrae	Yes
165	M		MD80	?	Lower back pain , right thumb cut	Yes
166	M		MD80	?	Neck & head injuries	Yes
167	M		MD80	?	Not reported	Yes
168	M		MD80	?	Shoulder & rib injury	Yes
169	M		MD80	?	Neck injury/whiplash	Yes
170	F		MD80	?	Back pain	Yes
171	M		MD80	?	Not reported	?
172	M		MD80	?	Back pain	?
173	M		MD80	?	Head & neck injury	?
174	M		DC9	Yes	Minor lower back injury- RMA*	No
175	M	73	DC9	Yes	Injury to neck, back, shoulder	?
176	F	55	DC9	Yes	Possible injury to left ankle	Yes
177	M	34	DC9	Yes	Abrasion to left elbow- RMA*	No
178	F	54	DC9	Yes	Abrasion to right elbow- RMA*	No
179	M	82	DC9	Yes	Bump on head/lower back pain	Yes

Ref #	Gender	Age	A/C	Slides	Injury description and cause	Hosp
180	F	48	DC9	Yes	Lower back-Fell off wing	Yes
181	F	52	MD80	?	Unknown- RMA*	No
182	F	76	MD80	?	High blood pressure- RMA*	No
183	F	49	MD80	?	Injuries to neck, head, back	Yes
184	F		DC9	Yes	2nd degree burn-puncture wound during evac	Yes
185			DC9	Yes	Ankle injury	No
186	M		DC9	Yes	Back injury	No
187	F		DC9	Yes	Self-reported smoke inhalation **	No
188			DC9	Yes	Laceration	No
189			DC9	Yes	Contusions	No
190			DC9	Yes	Lacerations, self-reported smoke inhalation **	No
191			DC9	Yes	Lacerations, self-reported smoke inhalation **	No
192			DC9	Yes	Lacerations, self-reported smoke inhalation **	No
193	F		DC9	Yes	Lacerations, self-reported smoke inhalation **	No

RMA\* = Refused Medical Assistance.

\*\* = No fire developed and these injuries were not confirmed by medical examination.

The 193 injuries were incurred during 19 PEEvacs. In two events (A/C AT72 and S340), evacuees were injured on airplanes not equipped with emergency escape slides.