U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

SEP 9 2003

Mr. Samuel D. Woolsey
14 Creekwood Court
Danville, CA 94526

Dear Mr. Woolsey:

This letter responds to your complaint filed in the U.S. Department of Transportation Docket Management System on April 15, 2003, in which you recommend a plan of action for the FAA to take regarding Age 60 matters, in particular statistical analyses. You assert that your complaint was filed pursuant to 44 U.S.C. §§ 3501 et seq. and 44 U.S.C. § 3516 (Note). You indicate that the Federal Aviation Administration (FAA) "produces and disseminates four studies that it knows to be false and misleading...to justify and defend its so-called age 60 rule." You cite many Age 60-related studies conducted over the years, highlighting in particular the four 2000 Civil Aerospace Medical Institute (CAMI) reports, the 1983 Golaszewski Study, and the 1993 Hilton studies.

This letter responds to your challenge to several Age 60-related studies brought under the Information Quality guidelines of the Paperwork Reduction Act. Below are responses to your general challenges of the four CAMI reports and the Golasewski and Hilton studies. Enclosed is a response to your specific challenges to the CAMI studies.

The CAMI Report

Your request for correction of the CAMI reports presents a general complaint of inaccuracy and unreliability. At the core of the request you indicate that the four reports posted on the Civil Aerospace Medical Institute (CAMI) website make no mention of the possible impact of removing the hours accumulated under 14 CFR part 121 from the accident rate denominator at age 60. In response, we will incorporate a caveat into the findings in revised versions of CAMI Reports 3 and 4 noting the potential impact arising from removal of those "ultra-safe" hours from the accident rate denominator at age 60. We also identified transcription errors in CAMI Report 3 in the course of this review and will correct them.

The other faults you cite are matters of interpretation and emphasis rather than fact. Therefore, no other corrections are required, as the four CAMI reports are complete, accurate within the limits of the data and methodology specified by Senate Report 106-55, and provide sufficient transparency of data and methods to allow reanalysis by qualified members of the public.

The Golaszewski and Hilton Studies

As for the Golaszewski and Hilton studies, the FAA defers to the court rulings handed down in recent challenges. Two decisions by U.S. Circuit Courts of Appeals have recognized that the Golaszewski Flight Time Study has some value, even though it has flaws. No U.S. court has held that the Golaszewski study is false and misleading, nor has any U.S. court found the FAA's defense of the Golaszewski study to be inappropriate.

The two U.S. cases that discuss the Golaszweski/Flight Time Study are Yetman v. Garvey, 261 F.3d at 676-677 (7th Cir. 2001) and Baker v. FAA, 917 F.2d at 320-321 (7th Cir. 1990). The Court in Baker analyzed many of the same challenges contained in your letter. The Court concluded that the Flight Time Study had flaws, but overall the agency presented substantial evidence for its decision to reject the petitions for exemption. The same Court in Yetman reiterated the concerns over the Flight Time Study, but ultimately found the FAA was justified in rejecting the Yetman petition for exemption.

The Court in Yetman also noted the FAA's argument in response to the alleged findings of the Hilton study. The study does not address the basic concern of how to identify and predict age-related decline in pilot performance. The Court also noted the FAA's opinion that the Hilton study conclusions regarding age 60 pilots were based largely upon accident data from air carrier operations. The Court continued, however, by stating that pilots who fly cargo transports, according to the FAA, have different flying patterns that may subject them to lesser levels of fatigue and stress. The Court further continued, because accidents in air carrier operations are rare and factors such as seniority bidding on more desirable routes preclude developing meaningful statistics regarding the effects of aging, the FAA suggests that caution precluded reliance on the Hilton study as justification for granting exemptions. The Court deferred to the FAA on the probative value of the study. The United States Circuit Court of Appeals for the District of Columbia in Professional Pilots Federation v. FAA, 118 F.3d 758, 769-770 (D.C. Cir. 1997) also deferred to the FAA on the value of the Hilton study.

It is not within my authority, based on your recommendation, to withdraw or modify the Age 60 rule. However, although you have not petitioned to amend or remove the Age 60 rule and thus, have not met the agency's procedural requirements regarding rulemaking, you should be aware of the following: First, the Age 60 rule is a long-standing operational rule that pre-dates studies completed subsequently. Second, those studies have not presented sufficient evidence to assuage the agency's concerns about the medical risk factors associated with age, many of which develop and occur insidiously. If such studies and data become available, and they present sufficient evidence and cause

for reevaluation, the FAA would reevaluate the issues. Additionally, no one has presented protocols that would reliably predict when or whether a pilot over the age of 60 might experience a medical event that could jeopardize aviation safety.

I would like to let you know that you may appeal our agency's decision either in writing or electronically within 30 days of receiving this response. Your request should be identified by Docket Number FAA-2003-14951 and state the reasons for your appeal. You may submit your appeal using any of the following methods:

1. DOT Docket web site: Go to http://dms.dot.gov and follow the instructions for sending comments.

2. Mail: Docket Management Facility; US Department of Transportation, 400 Seventh Street, S.W., Nassif Building, Room PL-401, Washington, DC 20590-0001.

3. Fax: 1-202-493-2251.

4. Hand Delivery: Room PL-401 on the plaza level of the Nassif Building, 400 Seventh Street, S.W., Washington, DC, between 9 a.m. and 5 p.m., Monday to Friday.

Sincerely,

Jon L. Jordan, MD

Jon L. Jordan, M.D.
Federal Air Surgeon

Enclosure

RESPONSE TO SPECIFIC CHALLENGES TO THE CAMI STUDIES

CAMI Report 1:

1. *Complaint.* Omits negative evaluations of the 1983 "Flight Time Study" by R. Golaszewski. Golaszewski's 1983 study was not reviewed or elaborated upon in the report except where it was cited by other authors of studies conducted between 1990 and 1999. The complaint apparently centers on this passage in the annotated bibliography:

> "During the last two decades, several studies have been carried out to assess the relationship between age, experience, and pilot performance, as determined by the occurrence of a general aviation (GA) accident (Bruckart, 1992; Golaszewski, 1983; OTA, 1990; Golaszewski, 1991, 1993; Guide & Gibson, 1991; Kay, Hillman, Hyland, Voros, Harris, & Deimler, 1994; Li & Baker, 1994; Mortimer, 1991, & Rebok, Grabowski, Baker, Lamb, Willoughby, & Li, 1999). The work of Golaszewski (1983) is most commonly cited. He found that older Class I and II pilots exhibited higher accident rates at all levels of total flight time between 101 and 5,000 hours. Class III pilots demonstrated a decline in accident rates until age 60 and over, when rates increased."

Response:

The authors of the annotated bibliography noted that Golaszewski's work *has* been criticized, for example, in the course of the Hilton Systems study of age and pilot performance commissioned by the FAA in 1993:

> "Kay and associates were critical of a number of the earlier studies, both on methodological grounds and because the conclusions were not based on statistical analyses (notably Golaszewski, 1983; ..."

While a different phrasing may have been preferable, the statement notes that Golaszewski's work has not been uncritically accepted. The descriptions of Golaszewski's 1983 study are factually correct and unbiased.

2. *Complaint.* Fails to include the view that apparently higher accident rates for older pilots are an artifact of the rule itself, and this artifact has been exposed and explicated.

Response:

Li (1994) noted, for example, the potential for biasing that might result from mismatched numerator and denominator data in investigations of accident rates and pilot age, a point the bibliography authors specifically noted in the discussion of studies of actual flight performance:

> "Li (1994) comments on the general methodological issues associated with studies of age and accident rates in pilots as well as specific comments concerning how Golaszewski (1983) determined the numerator and denominator for his study. Additional analyses are needed to clarify the factors associated with the differences in outcomes." (p. 13)

While you may prefer a different phrasing, we feel that the citation is appropriate and complete within the context of an annotated bibliography.

3. *Complaint.* Inappropriately compares automobile accident statistics among a "totally unregulated driver population to the most highly regulated air carrier population."

Response:

The authors of the annotated bibliography did not make comparisons between pilots and drivers:

> "We have elected not to include in the reference pool information on aging associated with automobile performance and accidents although there is clear evidence that accident rates increase for drivers age 65 and older (e.g. Massie, Campbell, and Williams, 1995). That decision was made because it is impossible to determine the extent to which driver health and the use of a variety of medications affect accident rates. In contrast, pilots are required to pass periodic physical examinations to obtain their airman medical certificates. They are also not allowed to use medications that are likely to influence their alertness, cognition, or coordination. In contrast, automobile drivers are allowed to drive with a variety of mental and physical conditions that would be disqualifying for pilots. However, the relationship of automobile accidents to aging is an established way of presenting data in that segment of the transportation system and has a place in the context of assessing transportation safety." (p. 2)

The authors do compare the results reported in the Hilton Systems 1993 study to automobile accident rates on page 12-13:

> "For example, Massie, Campbell, and Williams (1995), using data from a 1990 National Personal Transportation Survey, the 1990 Fatal Accident Reporting System, and the 1990 General Estimates System determined mileage-based rates for automobile accidents involving injuries and fatalities. Comparisons across age groups per 100-million miles for fatal accidents revealed that rates declined from 16-19 year olds to the 30-34 year old age group. The incidence remained relatively stable through the 60-64 year old age group after which rates increased substantially." (p. 12-13)

While the comparison may seem inappropriate, it is common in science to compare findings in one domain with those from other domains or to provide a context for an observation. We feel, therefore, that the comparison is not in error.

4. *Complaint.* Omits "expressions of discontent with the [Age 60] rule" from the international community.

Response:

The purpose of the bibliography was to assemble and summarize scientific research on pilot age and performance. Such "expressions of discontent" would be appropriate in a review of the political/regulatory status of the rule, not in a review of relevant scientific literature.

CAMI Report 2:

1. *Complaint.* "Bears no relevance to the request contained in Senate Report 106-55."

Response:

We believe that the information is relevant to the request contained in the Senate Report and have received no information to the contrary.

2. *Complaint.* Does not analyze the Tribune article, "but rather a different analysis by a different author (Savage) on which the Tribune piece was based."

Response:

In fact, Dr. Ian Savage conducted the statistical analyses reported in the Tribune article. Dr. Savage provided those analyses and the raw data (as initially given to Dr. Savage by the Tribune reporter in an e-mail message) to the author of CAMI Report 2 for the re-analysis.

3. *Complaint.* "... buried the original conclusion reported in the Tribune story that pilots over 60 had the safest record by far." Apparently, the error in this part of CAMI Report 2 is "unqualified references to and support for the flawed and discredited methodologies of Golaszewski (1983)"

Response:

CAMI Report 2 recapitulates the results of the Tribune story as follows:

> "Overall, there appeared to be no statistically significant differences in the accident/incident rates by age group. That is, as the Tribune reported, this analysis indicated that, for this data set, the proportion of older ATPs involved in an accident or incident was no greater than the proportion of younger pilots involved in an accident or incident." (p. 3)

Moreover, upon re-analysis with corrected pilot census data, CAMI Report 2 states:

> "However, the pattern of results based on the airmen's census is the same as reported in the original Tribune analysis." (p. 4)

CAMI Report 2 presents the conclusions from the Tribune study, and notes that the pattern of results upon re-analysis are the same as reported by the Tribune.

4. *Complaint.* Suggests an "intentional disregard" by Broach in CAMI Report 2 "of the factors that control a valid age vs. risk analysis *within the context of the age 60 rule"* [emphasis added]. More likely, however, CAMI Report 2 is an effort to lay groundwork for its later replication of the Golaszewski results in CAMI Report 4, justify his own later analyses of heterogeneous populations demographically skewed by the age 60 rule as valid methodology, and by those results, the age 60 rule itself."

Response:

The language of Senate Report 106-55 directs the FAA analyses significantly. The guidance provided by the United States Senate was treated as obligatory rather than discretionary.

5. *Complaint.* Omits critical citations of the Golaszewski (1983) "Flight Time Study."

Response:

In CAMI Report 2, the only citations to Golaszewski are in the context of technical details of methodology. For example, on page 5, CAMI Report 2 compares how the accident rate might be calculated and cites Golaszewski among others. Golaszewski is again cited on page 7, along with other work, in a discussion about the denominator of an accident rate. Finally, Golaszewski is mentioned a third time in a discussion about statistical analyses of accident rates. We believe these citations are correct, factual, and appropriate in a discussion of methodological choices in the study of accident rates and pilot age.

CAMI Report 3:

1. Complaint. Would have provided a better assessment of the 14 CFR part 135 pilot population "actual risk experience" had more selective screening of pilot records for inclusion in the study been conducted. With its many favorable and misleading references to Golaszewski, CAMI Report 3 should be banned the same as the other three."

Response:

The selection of pilots to include in the analysis was determined by the language of Senate Report 106-55, as discussed on pages 11-12 of CAMI Report 3. The Senate requested a comparison of accident rates by age for "non-scheduled commercial" and "scheduled commercial" pilots. "Non-commercial" pilots were to be included as available. As noted in the report, the population for which accident rates were to be computed in terms of "non-scheduled" and "scheduled" commercial and non-commercial pilots could not be defined strictly in accordance with the Senate language. Given the limits of available data, therefore, the definition of the population of pilots to be studied was based on the certificates held by a pilot.

In CAMI Report 3, the authors focused on professional pilots holding first-class medical and Airline Transport Pilot (ATP) certificates. This group was likely to include "non-scheduled commercial (and non-commercial, if available)" and "scheduled commercial pilots (and non-commercial pilots, if available)" as an initial approximation to the target population specified by the United States Senate. Pilots holding these certificates can conduct scheduled and non-scheduled flights for air carriers and commercial operators under 14 CFR parts 121 and 135. Depending on the employer, they may also engage in commercial or non-commercial operations. While more selective screening, as you suggest, might be desirable in future research, there was no error in the definition of the sample.

In reviewing CAMI Report 3 for this response, errors on pages 14, 15, and 20 of the report were identified. Specifically, in paragraph 3 on page 14, the total number of accidents included in the analysis should read 680 rather than 696. The number of accidents ranged from 55 to 83 rather than from 55 to 82 in the same paragraph. The errors occurred as a result of a transcription error in handwritten notes in preparing the manuscript; specifically, after aggregation of the accident records by pilot identifier and year, there were 676 accident records, which was read as "696" in preparation of the manuscript. Review of the computer output files confirmed that the actual number of accidents included in CAMI Report 3 was 680, and the analyses were based on 680 accidents. Figure 1 on page 15 is also in error, and should total 680 accidents (rather than 676 as it does now). Finally, the number of accidents cited in paragraph 1 of page 20 should read 680 rather than 696. The manuscript for CAMI Report 3 will be corrected and reposted to the CAMI Library website. Despite these clerical errors, the actual computations and analyses were based on the correct number of 680 accident records meeting the CAMI Report 3 inclusion criteria.

Overall, reliable data sources (the FAA's Comprehensive Airman Information System (CAIS) and the National Transportation Safety Board (NTSB) accident database were used. The analytic techniques were appropriate, and the weaknesses and strengths of the approach were thoroughly discussed in the report. Finally, the report provides enough detail on the data and analysis to allow independent reanalysis by qualified members of the public. Overall, CAMI Report 3 meets the DOT data quality guidelines.

CAMI Report 4:

1. *Complaint.* Asserts the following statements that are not only incorrect but "preposterously so:"

> "The results of the three analyses reported in this study are consistent with the conclusions reported by Golaszewski (1983, 1991, 1993) although the methodologies differed significantly."
>
> "... The analyses reported in this study are based on a sample that is very similar to the working population of airline pilots subject to the Age 60 Rule."

In support of this characterization, you dismiss the 1991 and 1993 Golaszewski studies as "garbage" and irrelevant to any inquiry into aviation risks.

Response:

You appear to be suggesting the following: (a) the assertion by Broach et al. as to the similarity of results despite methodological differences with Golaszewski's work is in error and (b) comparison to Golaszewski's results, in any case, is in and of itself an error. Based on your subsequent explanation, it appears that the first error you cite is the author's assertion of the use of different methodologies in CAMI Report 4 compared to the works by Golaszewski. For example, you assert that the *only* "apples to apples" comparison for the sample of pilots holding ATP or Commercial Pilot and first- or second-class airman medical certificates used in CAMI Report 4 is to a combination of Golaszewski's Pilot Groups A and B (footnote 134, p. 50).

As noted previously, it is not uncommon in scientific research to compare findings across disparate populations and settings, in order to assess the degree to which any given result is found in other settings, and to also provide context for the interpretation of a given finding. Specifically, Golaszewski's groups A and B were defined in terms of self-reported occupation and class of certificate issued based solely on data in the medical historical file. In contrast, the pilot sample included in CAMI Report 4 was defined in terms of self-reported occupation, employer, and class of issued certificate from the medical component of the CAIS and pilot certificate issued from the certificate records component of CAIS. Golaszewski's groups A and B may or may not have included pilots holding ATP or Commercial Pilot certificates; it is simply unknown. Therefore, the appropriate comparison is a matter of professional judgment.

2. Complaint. Is not merely consistent but identical to the 1983 Golaszewski study. The identity in result arises because both populations and methodologies used were essentially identical:

- "Both included 'all' pilots in the groups they analyzed."
- "Both included pilots of both medical classes – I and II."
- "Both grouped pilots by age, then computed risk based on 'annualized' recent flight hours for each age group."

- "Both used the standard rate equation: 'risk' = 'accident count' / 'annualized hours' (in 100K units)."
- "In both populations, data for the ultra-safe air carrier pilots were included in the under-60 ages – depressing the risks for those brackets only."
- "In both populations, the data for the ultra-safe air carrier pilots were excluded from over-60 risk calculations."
- "In both populations, age 60 rule distortion of the pilot populations created the false and misleading appearance [emphasis in original] of an increase in risk precisely at age 60."
- "In both of these 'studies,' it is this false and misleading appearance [emphasis in original] of an increase in risk at age 60 that FAA relies on in its unceasing support for the age 60 rule."

Response:

With respect to the inclusion of "all" pilots in the groups analyzed, it is not clear how that is an error. Rather, it is accepted scientific practice to include all subjects meeting the study inclusion criteria. Using your criterion, the results of the Hilton Systems studies of pilot age and accident rates would also be suspect for including "all" the pilots in the groups analyzed. The same point can be made for each of the similarities noted above.

The fault underlying the study of pilots holding first- and second-class airman medical certificates in your second point of comparison is the aggregation of data across heterogeneous subsets of pilots. In your view, such aggregation is inappropriate under any circumstances. However, as previously pointed out, the definition of the sample to be studied was driven by the language of Senate Report 106-55, which was considered obligatory rather than discretionary. Moreover, the purported "Age 60" effect is based on the assertion that flight hours from "ultra-safe" pilots employed by Part 121-certificated flag, domestic, or supplemental carriers are included in the denominator of accident rates for pilots under age 60 and excluded for pilots over age 60. As a result, the accident rate at younger ages is depressed, while the accident rate for older ages, without those millions of flight hours contributed by pilots flying under Part 121, appears to increase. In essence, the argument is that the increase apparent at age 60 is a statistical artifact created by the rule itself.

While the authors of CAMI Report 4 did appropriately caveat the findings on page 44 with regard to the inherent heterogeneity of the hours included in the denominator, no mention was made of the possible impact of removing the hours accumulated in Part 121 operations from the denominator at age 60. Therefore, an additional caveat to the findings will be incorporated into CAMI Report 4 (and CAMI Report 3 as well) that will explicitly address the impact of removing flight hours accumulated in Part 121 operations from the denominator at age 60. The characterization of the sample will also be changed to indicate that (a) it meets the Senate definition of the population to be studied and (b) likely included pilots that flew for flag, domestic, and supplemental air

carriers certificated under Part 121, pilots who flew for air taxi/on-demand operators certificated under Part 135, and other pilots.

3. *Complaint*. Should not have been presented at the annual scientific meeting of the Aerospace Medical Association in 2000.

Response:

The presentation was subjected to a peer review prior to acceptance. Under the USDOT Data Quality Guidelines, peer review approval creates a presumption of acceptable quality unless otherwise rebutted.