

REPORT
OF
THE NATIONAL INSTITUTE ON AGING
PANEL ON THE EXPERIENCED PILOTS STUDY

DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
NATIONAL INSTITUTES OF HEALTH
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CONCLUSIONS AND RECOMMENDATIONS

The Panel attaches no special medical significance to age 60 as a mandatory age for retirement of airline pilots. It finds, however, that age-related changes in health and performance influence adversely the ability of increasing numbers of individuals to perform as pilots with the highest level of safety and, consequently, endanger the safety of the aviation system as a whole. Moreover, the Panel could not identify the existence of a medical or performance appraisal system that can single out those pilots who would pose the greatest hazard because of early, or impending, deterioration in health or performance.

THE PANEL THEREFORE RECOMMENDS:

- (1) that the present age limit for air carrier pilots-in-command and first officers be retained;
- (2) that the Federal Aviation Administration (FAA) or some other appropriate Federal agency be requested to engage in a systematic program to collect the medical and performance data necessary to consider relaxation of the current age 60 rule (a proposal for obtaining the necessary data is contained in the section of this report entitled "An Approach to Changing the Age 60 Rule"); and
- (3) that, in view of the growing importance of commuter air carriers, the present age limit be extended to cover all pilots engaged in carrying passengers for hire, including specifically operations under part 135 of title 14 of the Code of Federal Regulations, in order to provide a level of safety equivalent to that provided in air carrier operations (as recommended by the National Transportation Safety Board [NTSB] in Safety Recommendations A-80-36 & 37, Appendix E).

SUMMARY OF FINDINGS

This report was prepared by a panel assembled by the National Institute on Aging of the National Institutes of Health. The Panel was asked to examine critically the report of the Institute of Medicine, Airline Pilot Age, Health and Performance: Scientific and Medical Considerations; to review public comments on the report; and to assist the National Institutes of Health in preparing a response to Congress concerning Public Law 96-171, which called for "a study of the desirability of mandatory age retirement for certain pilots."

At issue was the adequacy of medical certification procedures and examinations for commercial and airline transport pilots and, in particular, the "age 60 rule" which prohibits air carriers from assigning a person who reaches 60 years of age to piloting duties, either as pilot-in-command or as co-pilot. P.L. 96-171 posed five questions relating to the age 60 rule. According to the wording of the questions, only those aspects of the rule that related to medical factors and pilot performance were to be considered by the Panel.

The Panel concluded that there is no convincing medical evidence to support age 60, or any other specific age, for mandatory pilot retirement. However, it found abundant and persuasive evidence that, among pilots as well as others, disease, disability and death rates rise increasingly steeply during each half-decade beyond the age of 50 (Figure 1). The Panel was impressed by evidence indicating that air carriers, operating under the limiting conditions of the age 60 rule, have achieved a very high level of safety during the past two decades. This achievement appears to be the result of a complex interplay among several factors, including striking advances in technology, a complex system of performance evaluation by air carriers and the Federal Aviation Administration, a variably effective system of government and air carrier medical surveillance, and a complex system of regulations designed to minimize risks to the traveling public. The net result of this complicated interplay has been a generally effective aviation system which has promoted public safety. One inevitable, but unfortunate, by-product of the present system is the unavailability of adequate data concerning the medical status and piloting performance of air carrier pilots past the age of 60 since, under the age 60 rule, persons have not been permitted to continue as air carrier pilots past that age.

The Panel also took note of accident and incident data in its deliberations. It found no convincing evidence that older pilots have better safety records, in proportion to exposure, than do younger pilots. On the contrary, several studies (Harper, 1964; Lategola et al., 1970; Rohde and Ross, 1966) dealing with accident risk related to age have demonstrated increasing risk with increasing age. The data of Booze (FAA Report No. AM-77-10, 1977) indicate that exposure is the most important factor in general aviation accident statistics. These data also indicate that general aviation pilots with high total or recent experience (those pilots whose experience most closely parallels that of professional pilots) have declining accident rates until the age of 60, after which those trends reverse. The rise in accident

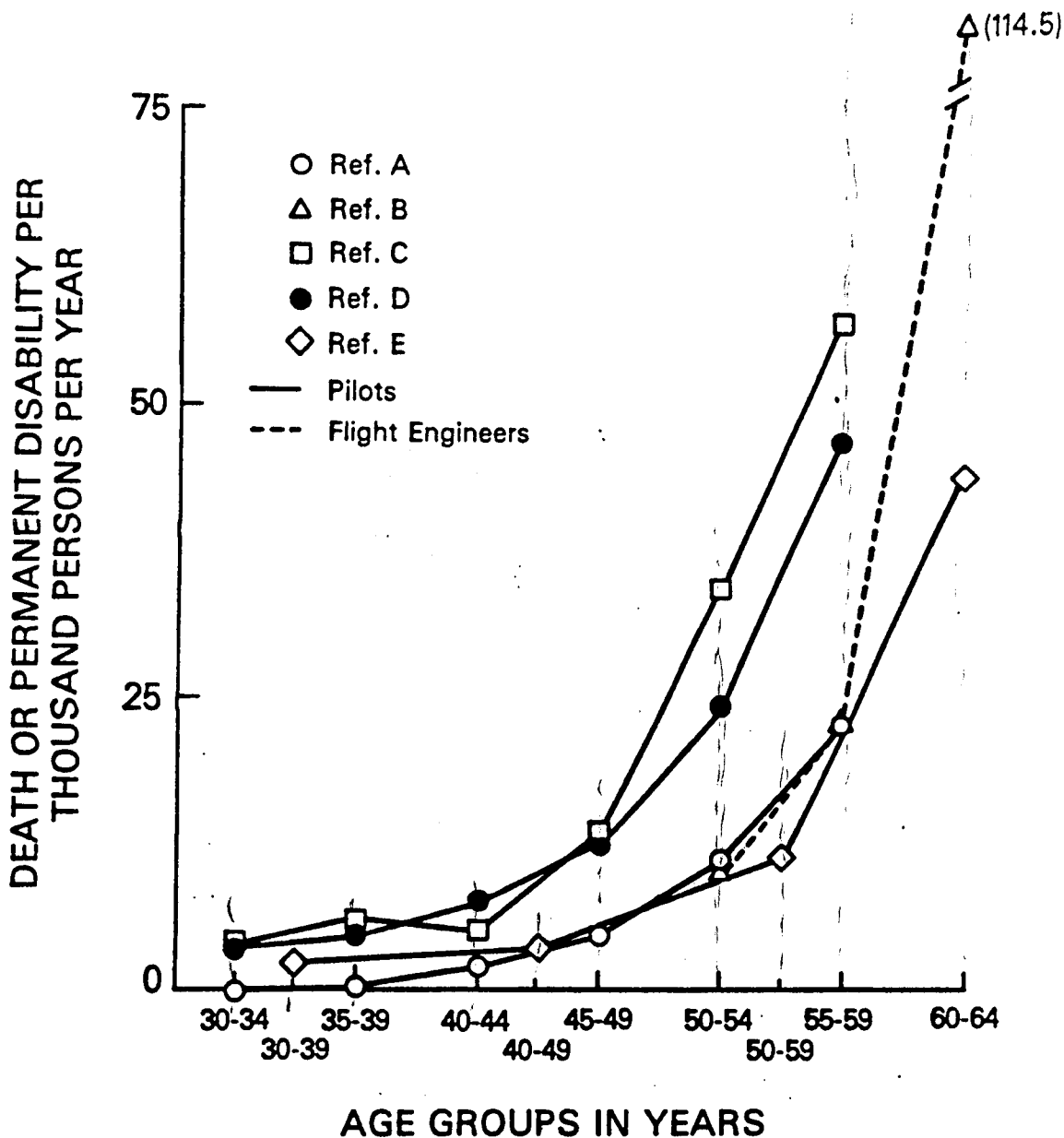


Figure 1. Death and Disability Rates in Air Carrier Pilots and Flight Engineers

- A. Pilot permanent groundings for medical reasons, U. S. air carrier. Letter communication, Walter A. Jensen, Vice President, Operations and Engineering, Air Transport Association of America, June 24 and July 16, 1981.
- B. Flight engineer permanent groundings for medical reasons, same carrier as (A). Letter communication, Walter A. Jensen, Vice President, Operations and Engineering, Air Transport Association of America, June 24, 1981.
- C. Medical retirements and deaths, U. S. air carrier. Orford, R. R. and Carter, E. T. Aviation, Space and Environmental Medicine 47(2): 180-184, 1976.
- D. Deaths and permanent disabilities in flight crew holding ALPA Loss of License insurance. Kulak, L. L., Wick, R. L. and Billings, C. E. Aerospace Medicine 42(6): 670-672, 1971.
- E. Pilot groundings, U. S. air carrier. Jensen, W. A. In: Hearings before the Subcommittee on Aviation, U. S. House of Representatives, concerning H. R. 3948, July 18-19, 1979.

rates (per pilot year rather than per hour flight time or on takeoff) in the 60- to 69-year age group with high recent experience (over 200 hours/6 months) is striking (Figure 2). No comparable data for air carrier pilots age 60 and older were available.

Aircraft accidents attributed to acute or subtle incapacitation from disorders associated with aging have occurred in the United States and elsewhere in scheduled, charter and commercial operations as well as in general aviation. The available actuarial and epidemiological data suggest that the probability of such accidents will increase if the age limit is increased (Figure 3, IOM report; Figures 1, 3A and 3B, this report). Recent accidents among commuter airlines motivated the National Transportation Safety Board to recommend that a maximum allowable age for pilots in part 135 operations be instituted by the FAA (Appendix E). Action on this recommendation is still pending.

Although the Panel was compelled by the available data to recommend that the age 60 rule be retained and extended to pilots in part 135 operations, it also gave considerable attention to methods of developing data that could form the basis for a relaxation of the rule. One possible approach is described in the final section of this report. The following points were considered in developing the approach:

- (1) Although the age 60 rule appears indefensible on medical grounds, the national aviation system has operated effectively and safely within its bounds for 20 years.
- (2) Although age 60 represents no medical "breakpoint" in the progressive deterioration that comes with age, the likelihood of cardiovascular accidents increases markedly once the sixth decade is entered.
- (3) Despite the attractiveness of current risk factor concepts for the prediction of cardiovascular disease, these factors deal with populations rather than individuals, and they suffer from a lack of predictive accuracy and from a progressive decrease in discriminatory power as age 60 is approached.
- (4) Graded tests of cardiovascular performance to enable better prediction of individuals at risk would add considerably to the cost of medical surveillance.
- (5) Psychological tests designed to identify subtle changes in cognitive functioning have not been systematically administered to pilots. Their relevance to such essential skills as decision-making, resource management and vigilance under stress is therefore unknown.
- (6) Age-related data from longitudinal studies are currently insufficient to permit extrapolation of available information about the medical and physical fitness and performance of pilots beyond age 60.

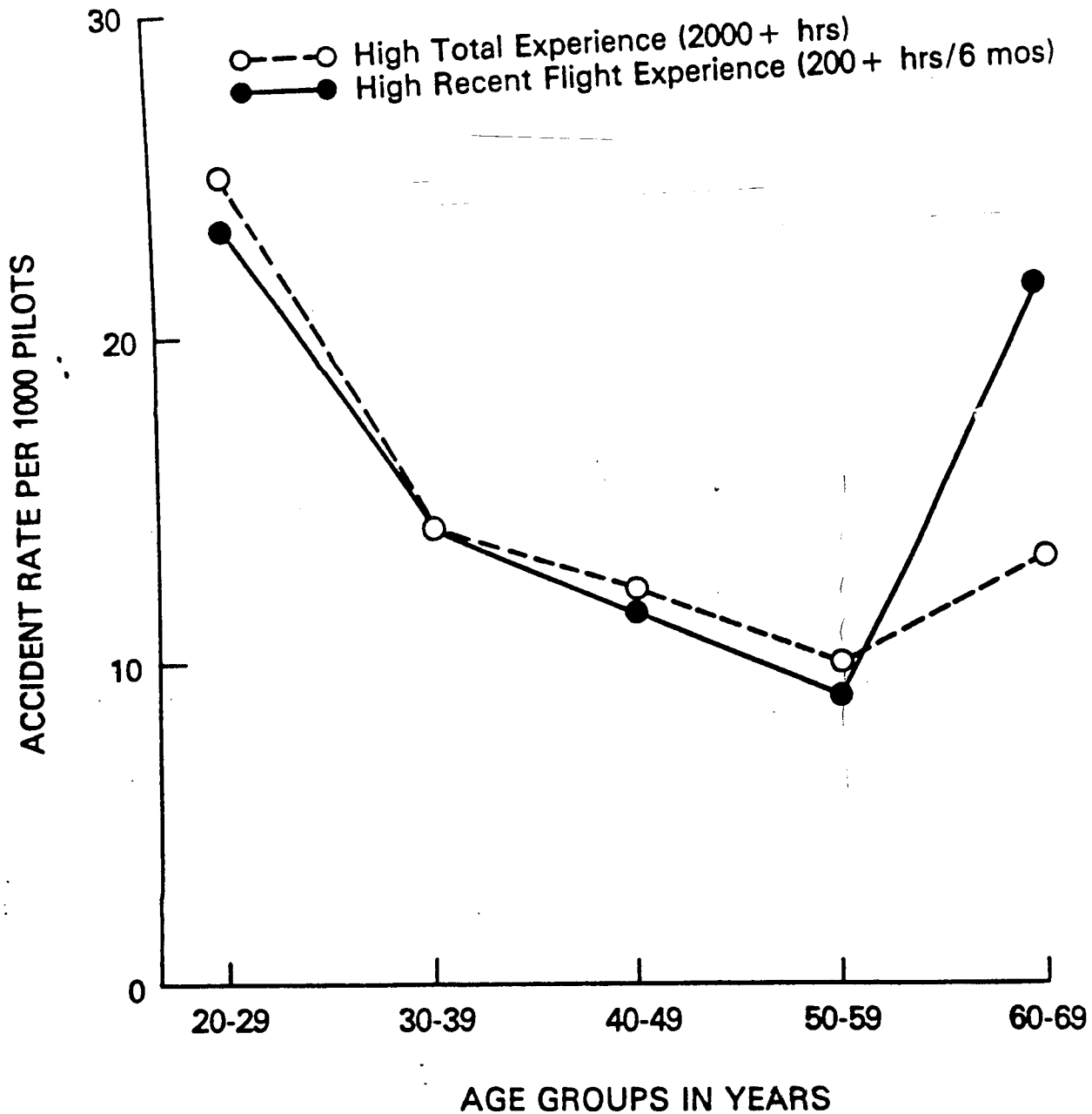
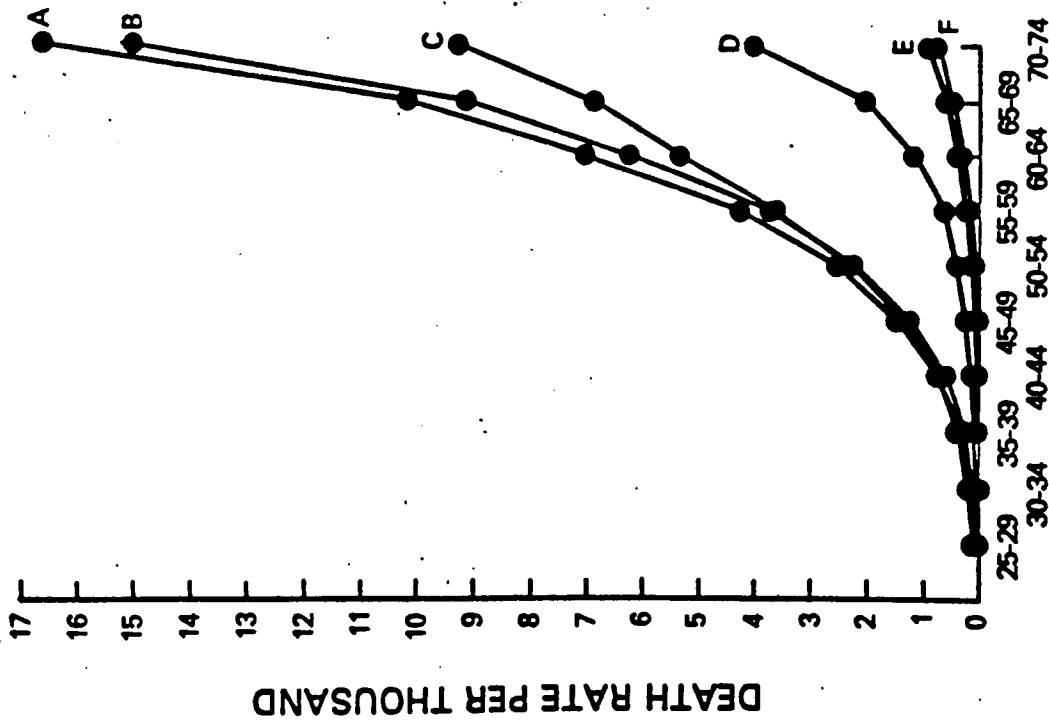


Figure 2. U. S. General Aviation Accident Data, by Age, for Pilots with High Total Experience and High Recent Flight Experience

Source: Booze, C. F., Jr. An Epidemiologic Investigation of Occupation, Age and Exposure in General Aviation Accidents. Washington, D.C. Office of Aviation Medicine, Federal Aviation Administration Report No. FAA-AM-77-10, March 1977.

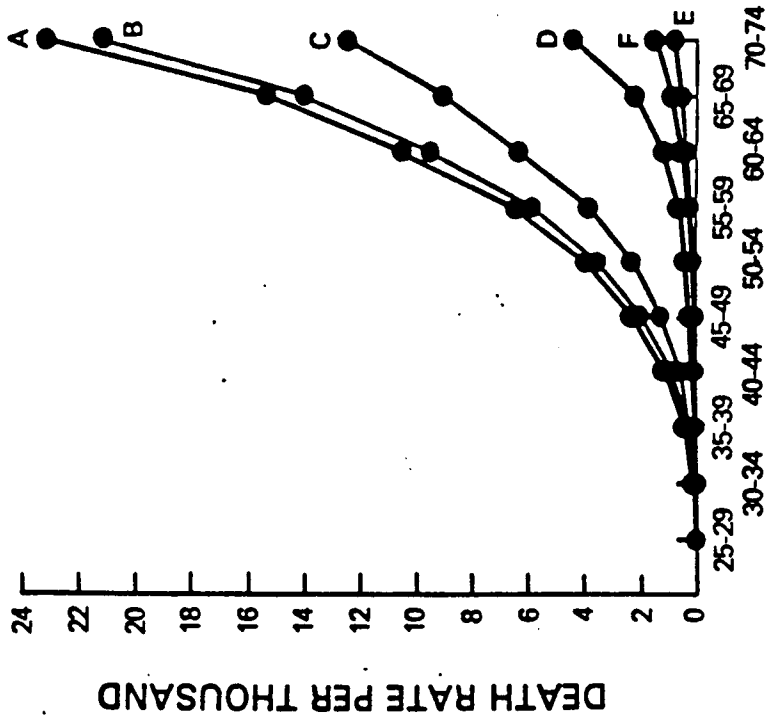


AGE GROUPS IN YEARS

Figure 3A. United States Death Rate in the General Population, by Age Groups

Source: National Center for Health Statistics. Vital Statistics of the United States 1976. Vol. II - Mortality, Part A, pp. 1-10 - 1-19, 1980.

- A — Diseases of the Heart
- B — Ischemic Heart Disease
- C — Malignant Neoplasms
- D — Cerebrovascular Diseases
- E — Diabetes Mellitus
- F — Bronchitis, Emphysema, Asthma



AGE GROUPS IN YEARS

Figure 3B. United States Death Rate in the White Male Population, by Age Groups

- (7) Graded tests of health and performance could probably be developed and applied within the present medical appraisal system if standard longitudinal risk factor profiles were determined for all pilots; additional screening and diagnostic procedures would be required to define health status and as a guide to prognosis for those individuals with risk above some defined level.
- (8) The periodic nature of current medical and performance appraisals provides an opportunity for deterioration in health and performance in the intervals between examinations, although this can be minimized to some extent for individuals with identified risks and older persons by increasing the frequency of examinations for these groups.

Having decided that the age 60 rule is not defensible on medical grounds, it was natural for the Panel to consider systems of medical appraisal by which the age limit might be raised without increasing the risk to public safety. The Panel recognized that one possibility for extending the age limit beyond age 60 would be a waiver system, involving more comprehensive medical and performance examinations than are currently required. Unfortunately, even the more comprehensive examinations cannot yet provide quantitative assessment of intellectual functions or reliable prediction, in individuals, of the likelihood of incapacitating cardiovascular disease. In this respect, it is important to take full account of the increasing unreliability of the screening tests in predicting cardiovascular accidents in individuals above age 60.

One aspect of the present report that warrants special emphasis is the serious difficulty involved in assessing pilot performance, with particular respect to the unavoidable stresses of flying. At present, it is possible to test many aspects of pilot performance in simulators which come reasonably close to reproducing critical situations during flight. These simulators are beginning to be used in civil aviation to evoke pilot responses to unanticipated stresses and emergencies. However, these new methods have not been quantified as objective tests for grading performance under these conditions. Instead, simulators are normally used in a system of peer review to identify deficiencies in manual control skills and knowledge of procedures. Used in this manner, they are apparently effective in detecting inadequate responses. However, there is no assurance about the extent to which these tests can be modified to serve as a sensitive, objective screen for the decrements in cognitive and intellectual skills that are of particular concern with respect to the aging pilot.

Finally, it is important to recognize that the periodic medical appraisal, particularly of cardiovascular performance, would have to be modified extensively and made more stringent if the age limit were increased. If the idea of a chronological age for retirement were abandoned in favor of functional medical testing, it would be reasonable to begin such medical appraisals at about age 40, so that persons with unacceptable levels of risk could be identified for further testing. Although this practice would serve to sort pilots into categories of risk, it would not pinpoint those individuals who would soon experience a heart attack or stroke. Nor can available tests provide a reliable measure of the extent to which cognitive performance will be preserved as the individual ages.

In the pages that follow, each of the queries posed in P.L. 96-171 is addressed. The response to each question includes a brief statement from the Panel concerning the bases for its recommendations.

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