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UPPER AGE LIMIT

Disclaimer

Presentation prepared by Dr Anthony Evans

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Some beginning thoughts...



Fact!

"Alertness, intelligence, judgment, emotional stability, and stamina are key requirements of professional flying"



Question!!!!???

To what extent does age impact the performance of the average pilot?

Is there such a thing as an “average pilot”?

How far can performance deteriorate without affecting safety?

Do all aspects of performance deteriorate at the same rate?

What role does experience play in offsetting aging effects?

Can laboratory testing predict real-world performance?

Do today's longer lifespans and healthier lifestyles make a difference?

Plan

1

ICAO

- History
- Provisions

2

Current limits around
world

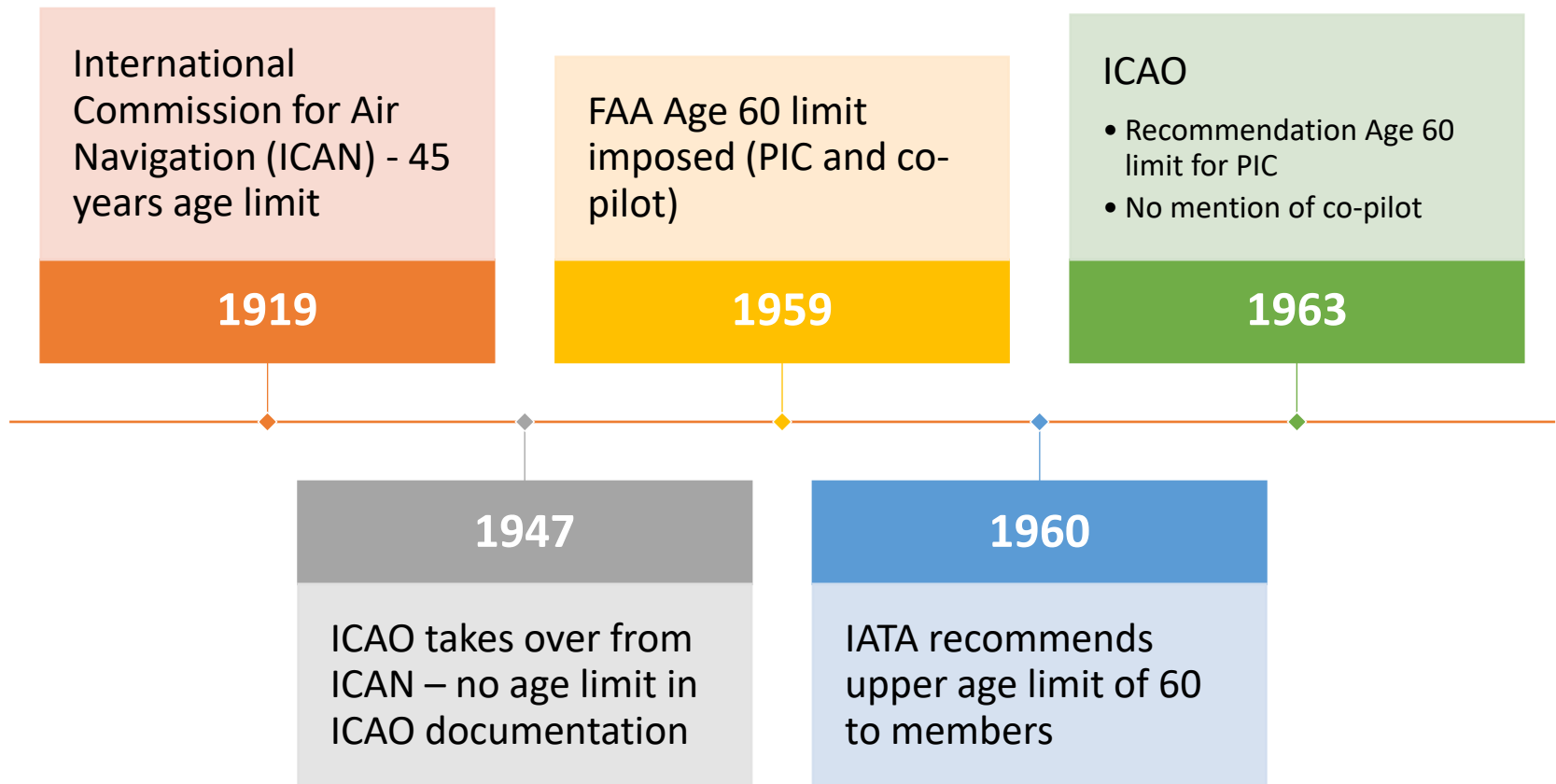
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Science of Aging & its
impact on the pilot

4

Summary/Conclusions

History



History

ICAO

- Age 60 limit became Standard for PIC
- Introduced as Recommendation for co-pilots
- Applicability 1978

1972

1996 – ICAO reviews – no change

1991

1980

Chile proposes deletion of age limit

- Unsuccessful

History

Upper age limit is 65 years (increased from 60 years)

- Standard for PICs
- Recommendation for co-pilots
- Only one pilot over 60 to be at controls at any time

2006

2013

(Current requirements) – ICAO proposes

- deletion of “one over one under” rule



News reports

Chicago Tribune

“Great record. Tip-top health. Too old”

“Older pilots question mandatory retirement age of 60, but younger brethren want FAA rule to stay in place”

Jon Hilkevitch and John Schmeltzer

Tribune staff reporters

August 22, 2006



*Chicago
Tribune*

Article

September

30, 2014,

3:13 PM

“No mandatory retirement age, but pilots must pass FAA review every 2 years”

The death of an 80-year-old pilot in the crash of a private plane in Kendall County may have some people wondering: Is there an age limit on pilots' licenses?

..... there is no immediate reason to believe that the pilot's age was a factor. But the pilot's age may sound surprising in light of the fact that airline pilots are required to retire at 65.

ICAO Provisions

- ICAO Approves Pilots Over Age 60
- The International Civil Aviation Organization adopted a **“standard” to increase the upper age limit for airline pilots to 65, effective 2006 November 23**. But the measure is limited to **two-pilot crews when the other pilot is younger than 60 years of age**.
- An ICAO “standard” is a mandatory minimum requirement and member states must notify ICAO if they are going to impose a more restrictive limit.

however, and the age-related developments that present problems for some people at 40 may materialize for others when they are considerably younger or older — or they may not

some wonder if a limit is
really necessary.

BY LINDA WERFELMAN

FLY

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ICAO Provisions

- ICAO Approves Pilots Over Age 60
- Of 112 ICAO member countries responding to an ICAO letter, **83 percent indicated that an international age limit above 60 years would be appropriate for airline pilots.**
- However, **16 percent**—which includes the U.S.—indicated a preference to **maintain the current upper age limit of 60 years**, citing possible safety risks and a lack of convincing data that flying after age 60 is safe.

however, and the age-related developments that present problems for some people at 40 may materialize for others when they are considerably younger or older — or they may not

some wonder if a limit is
really necessary.

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© iStockphoto

PIC over ICAO upper age limit can fly only
if:

Pilot's Licensing
Authority allows it

Operations are
undertaken only in
national airspace;
unless,

Another State has given
specific authorization
that such flights are
permitted in its
airspace.

Conditions for pilots 60-65

From Nov 2006

- PIC over 60, co-pilot must be under 60
- Multi-crew
- All pilots over 60 must have a 6-monthly medical (annual otherwise)
- Single Operation pilot limit remains at 60



Current



Joint Aviation Authorities requirements

Mandatory max. age
65 (captain and co-
pilot)

- Only one pilot over 60 permitted

Until ICAO changed
France, Italy, Portugal
maintained ICAO
provisions

France only state to
prevent *overflying* of
PIC over 60

ICAO

- A PIC operating in full compliance with the ICAO Standard on age cannot be refused entry into another State's airspace by reason of age



Why change the upper age limit?

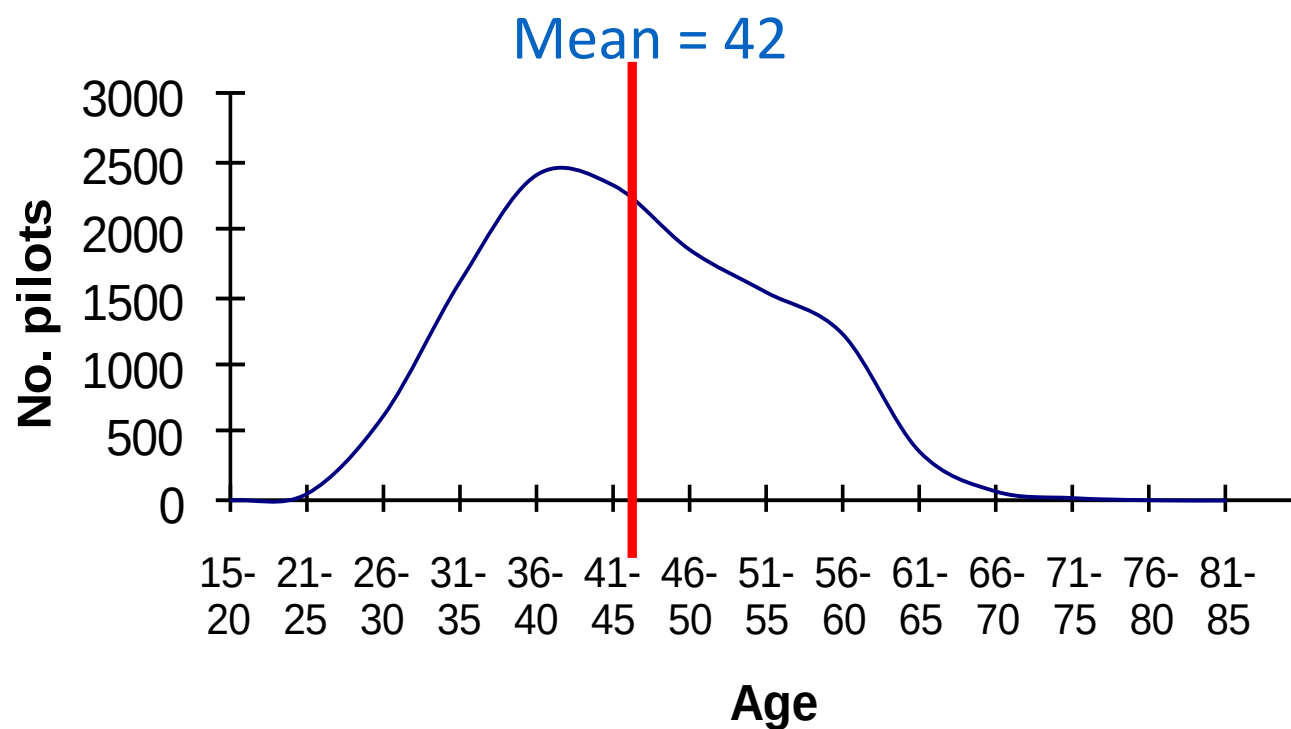


Sudden
incapacitation



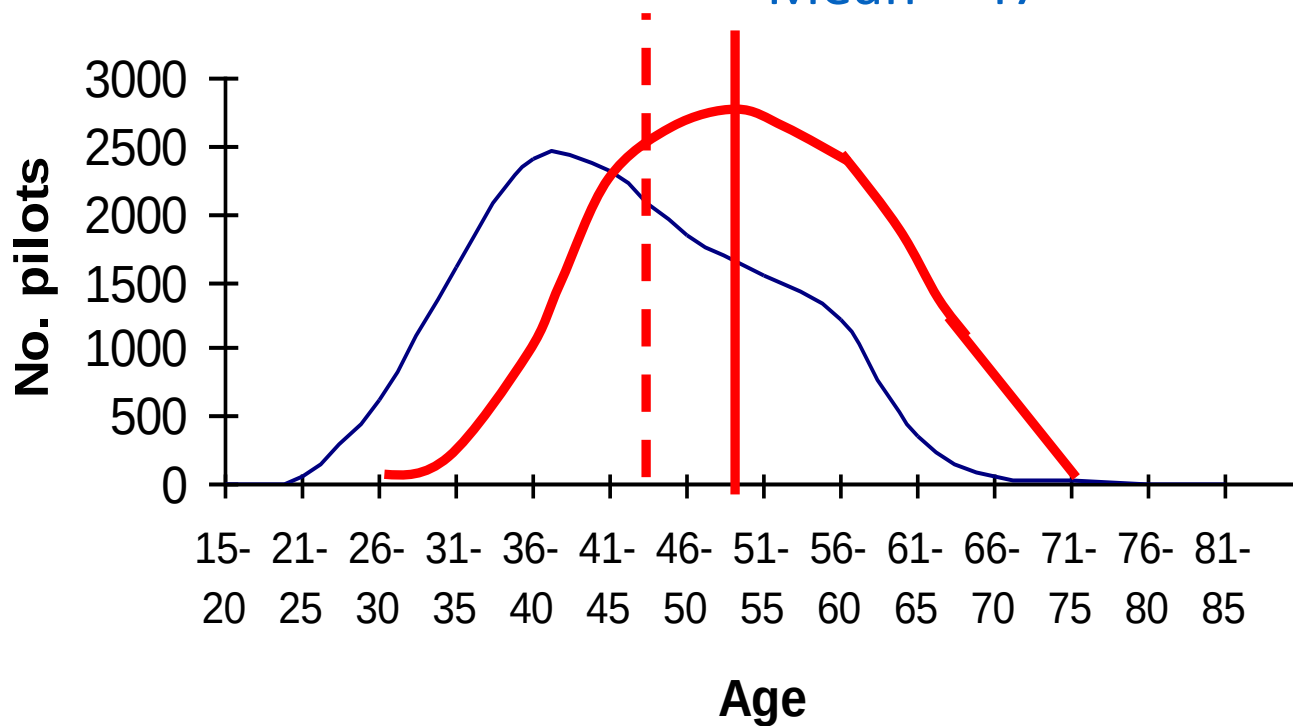
Gradual
performance
degradation

Age profile UK ATPL(A)



Potential age profile UK ATPL(A) post 2006

Mean = 47



Science



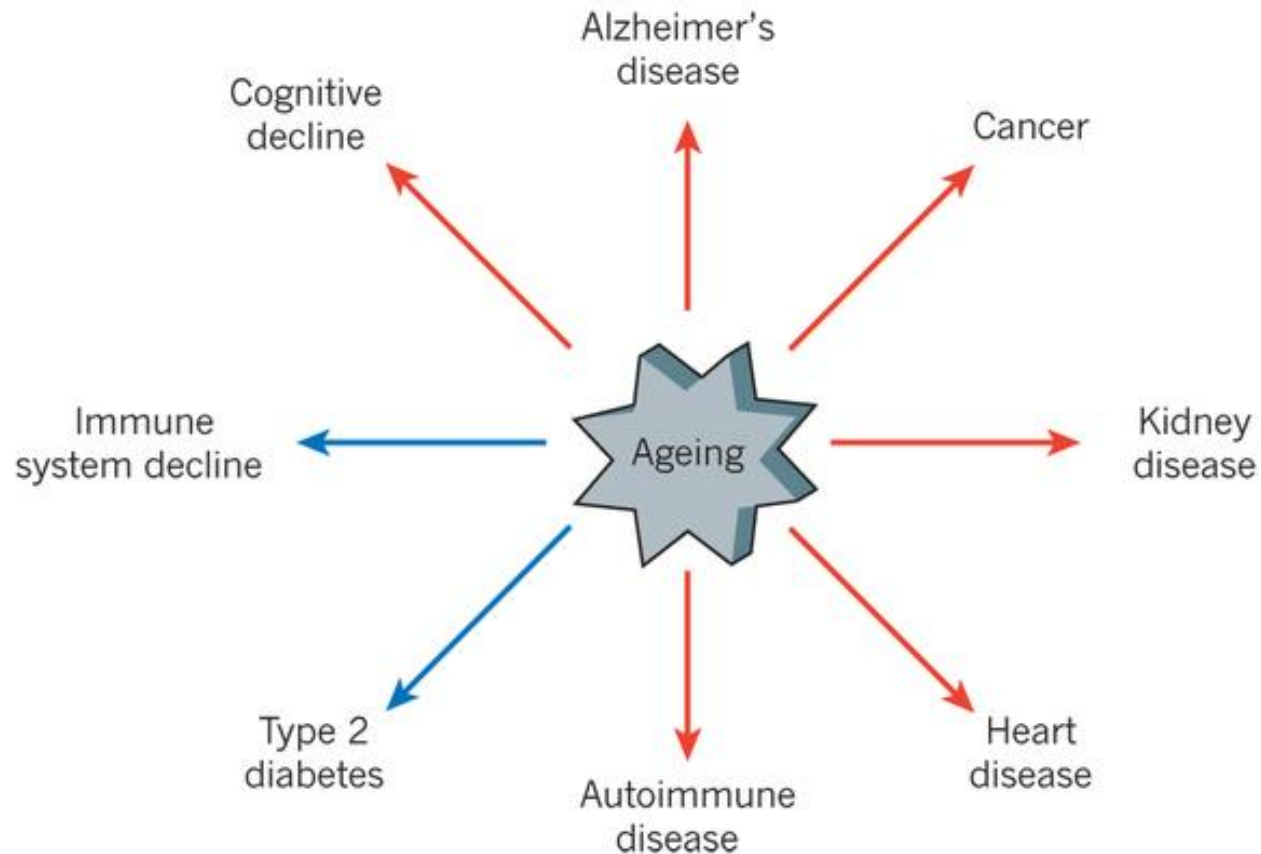
Medical

- General population living longer (mainly because of decrease cardiovascular mortality)
 - Reduced smoking, improved treatments
 - Pilots live longer than the general population
- But risk of illness (and incapacitation) still increases with increasing age

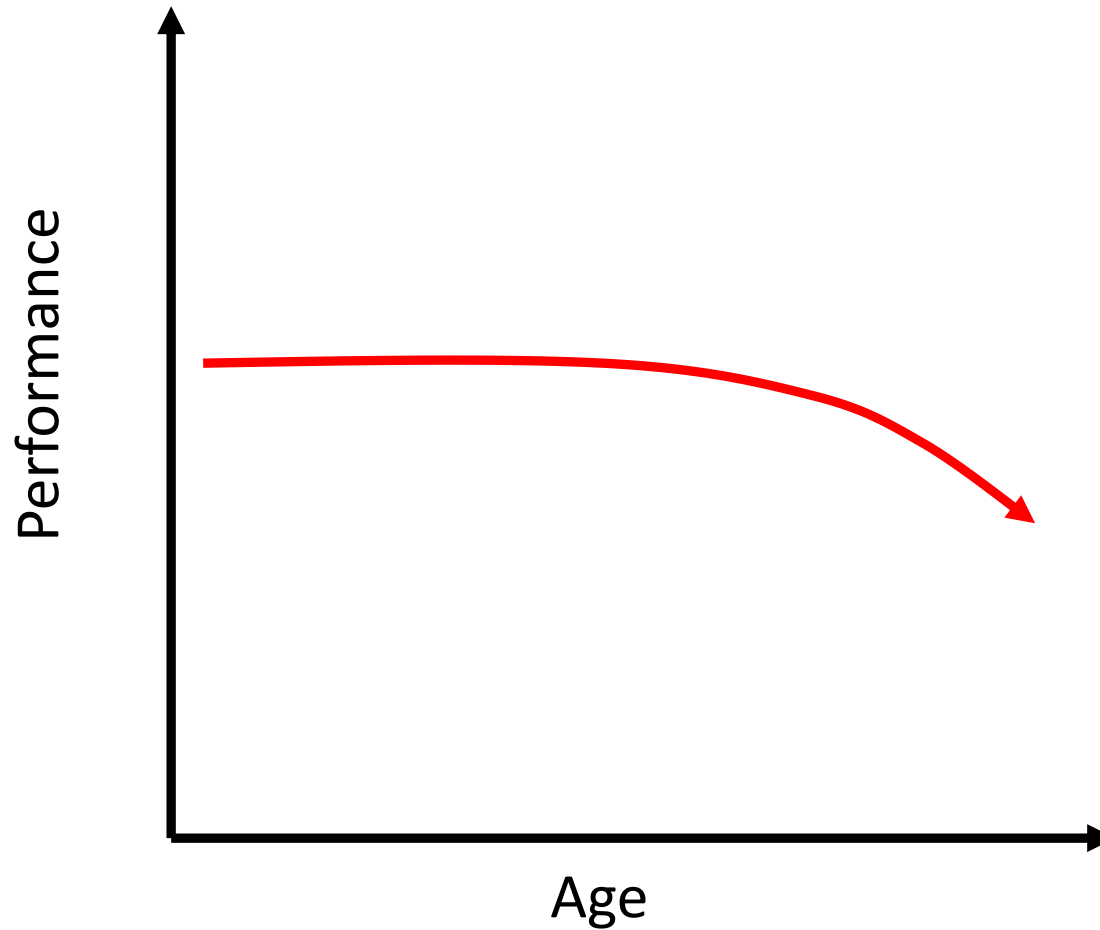
Performance

- Pilot performance will eventually decrease with increasing age

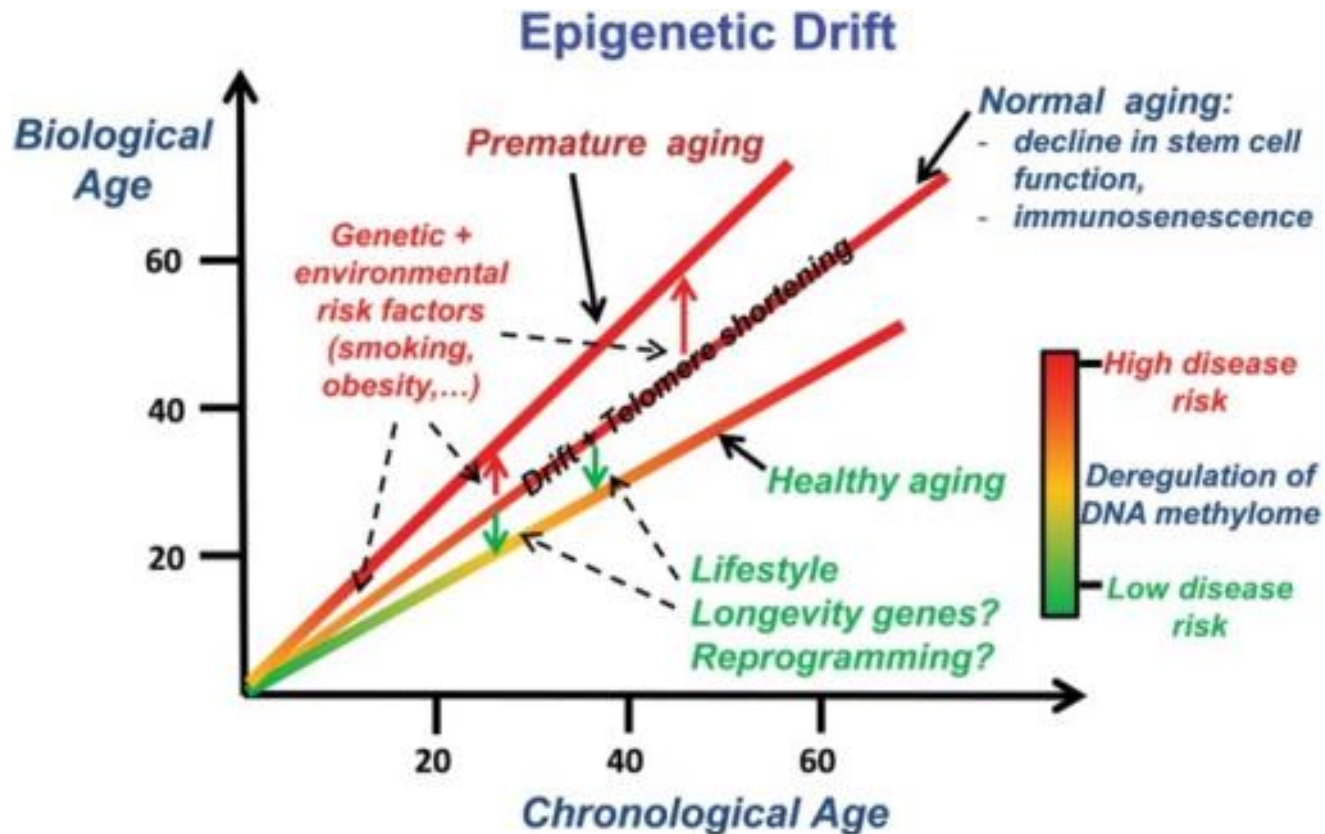
The problem with getting old



The problem with getting old



Epigenetic Drift



An Ideal pilot

Confidence

- ability to take action and make decisions with assuredness
- Be able to handle the consequences of one's actions
- Be sure of oneself backed by one's training and practiced decision making.

Multi-tasking

- simultaneously and effectively manage and take action on multiple priorities and projects at once.

Time management:

- have the ability to manage complex tasks and deadlines within given parameters of time that are critical to mission accomplishment.

Problem solving

- have the ability to solve complex problems that might prove challenging to another person.
- Problem solving involves an ability to simultaneously consider a variety of options and variables to come up with a speedy solution

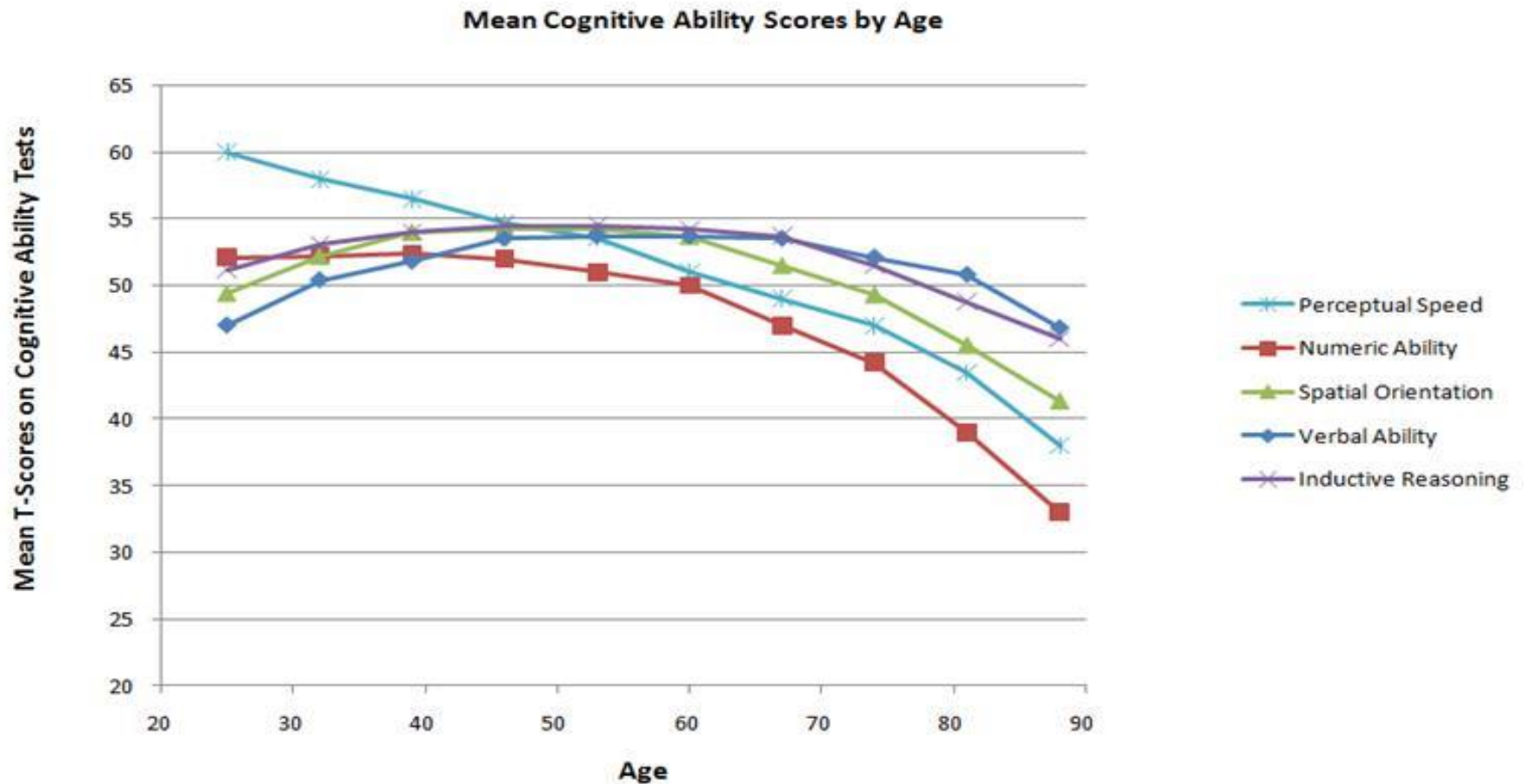
Adaptability

- Be able to swiftly take into consideration a variety of changing circumstances and change behaviour or actions quickly to take advantage of the differing opportunities

TABLE 1. Key Piloting Behaviors Affected by Aging and/or Experience

Construct	Process	Sample Piloting Activity
Perceptual	Auditory Perception	Listen to ATC communication, listen for variance in engine noise or air flow over flight control surfaces
	Visual Perception	Inspect, read instruments, observe changes in instrument readings, detect and follow runway lighting
	Visual Scanning	Instrument scan, air traffic detection
Psychomotor	Tracking	Track instrument and external sources and adjust controls appropriately
Attention	Selective/Focused	Ignore task-irrelevant information
	Divided	Multiple task processing (e.g., reading instruments during ATC communication sequence)
	Switching	Attend to several subsystem states during emergency to assess situation
	Sustained	Maintain constant monitoring of instruments and external cues (especially for situation awareness during long flights)
Memory	Short term and working memory	Maintain information for immediate processing (e.g., runway clearance information)
	Long term memory	Remember standard operating and emergency procedures
	Prospective	Remember to perform standard scans and safety checks
Information Processing	Speed	Identify inputs quickly (e.g., recognize anomalous condition which could lead to an emergency)
	Visual spatial	Visualize 3-D situation, modification or rotation of mental image for awareness of aircraft location and direction, distance, and speed perception
	Verbal sequential	Process ATC communication (e.g., for awareness of surrounding air traffic)
Problem Solving and Decision-Making	Domain Independent	Ability to apply rules, ability to draw conclusions regarding interrelationships among variables, mental arithmetic.
	Domain Dependent	Assess situation and decide on appropriate action (e.g., interpret how weather impacts flight plan); identify and evaluate the worth of alternative solutions (e.g., mechanical failures)

Age Chart of Cognitive Ability



The Annual Incapacitation Rate of Commercial Pilots

- Results

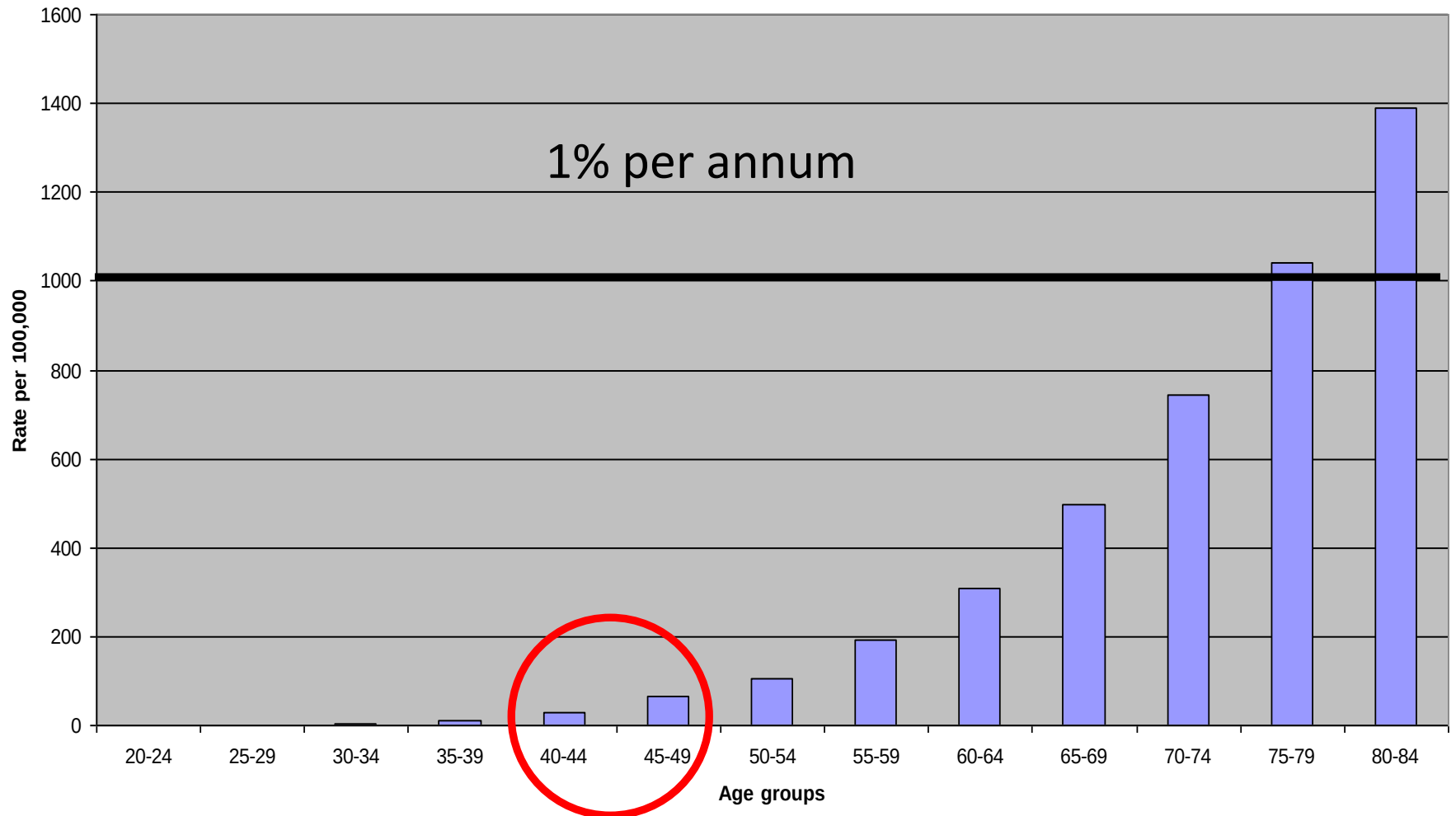
- The type of incapacitation varied with age. A male pilot in his 60s had 5 times the risk of incapacitation of a male pilot in his 40s
- The annual incapacitation rate was $40/16,145 = 0.25\%$

- Discussions

- Aeromedical emphasis on minimizing cardiovascular risk and monitoring the mental health of pilots remains appropriate.
- Age should influence the content and periodicity of regulatory aeromedical assessments.
- The demonstrated annual incapacitation rate of 0.25% may provide a basis for quantifying the acceptable risk for a pilot undertaking single pilot commercial air transport operations.

- **Evans S, Radcliffe S-A. *The annual incapacitation rate of commercial pilots.* Aviat Space Environ Med 2012; 83:42–9.**

Coronary Heart Mortality, Males, England & Wales, 2002



So...

- Number of fatal accidents per year, unlikely to change
- But...what about individual risk?

Main, potentially
predictable,
sudden
incapacitations?

Coronary heart disease

Stroke

Seizure

Review risk for age 70

Annual incidences at age 70 yrs, per 100,000 population

CHD mortality
(male) = 600

CVD mortality
(male) = 160

Seizure
incidence (M &
F) = 80

Total risk sudden
incapacity =
840/100,000

= 0.84% p.a.

- i.e. below 1% p.a.

So, since the upper age limit introduced:

- Pilots are living longer
- Incapacitation training introduced in 1970s
- Modern aircraft are easier to fly than the pre-1970s vintage
 - Various protections in-built
- Therefore, the risk of an incapacitation cause accident is less now than in the 1970s



Does Age Affect A Pilot's Ability To Fly?

A Research Study

- 118 non-commercial airline pilots, age 40 to 69, annually for three years
 - currently flying, had between 300 and 15,000 hours of total flight time
 - had a FAA medical certificate
 - tested on;
 - accuracy of executing communications,
 - traffic avoidance,
 - scanning cockpit instruments to detect emergencies, and
 - executing a visual approach landing
- Joy L. Taylor, PhD, Stanford/VA Aging Clinical Research Center in Palo Alto, California, February 27, 2007, issue of Neurology®

Does Age Affect A Pilot's Ability To Fly?

A Research Study

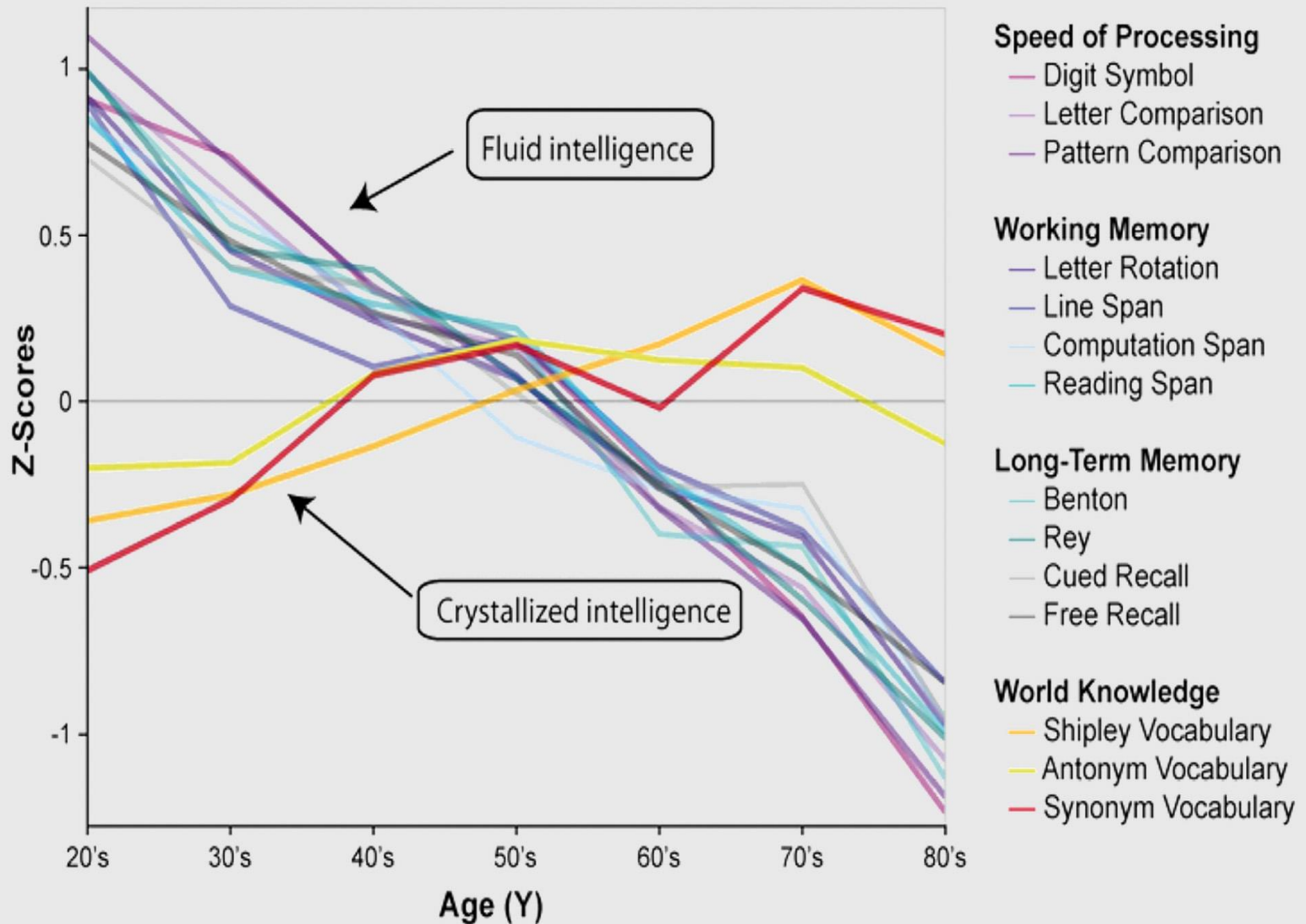
- **The study findings;**

- older pilots initially performed worse than younger pilots, older pilots showed less of a decline in overall flight summary scores than younger pilots, and over time their traffic avoidance performances improved more than that of younger pilots
- pilots with advanced FAA pilot ratings and certifications showed less performance decline over time, regardless of age.

- **Conclusion**

- pilots with advanced FAA pilot ratings may maintain performance over time due to a mechanism of preserved task-specific knowledge, known as crystallized intelligence, which is similar to what is seen in music or expert chess playing.

- Joy L. Taylor, PhD, Stanford/VA Aging Clinical Research Center in Palo Alto, California, February 27, 2007, issue of Neurology®



Why not abandon the age
limit completely?

Some Examples

- For example, elderly people who are aware of the stereotypes about aging and memory may expect **to perform poorly on memory tasks**.
- If they do perform poorly; they assume that it is b/c they are old, and **make an attribution that reinforces their expectations**.



Gradual performance degradation



Reaction time



Short term memory



Flexibility

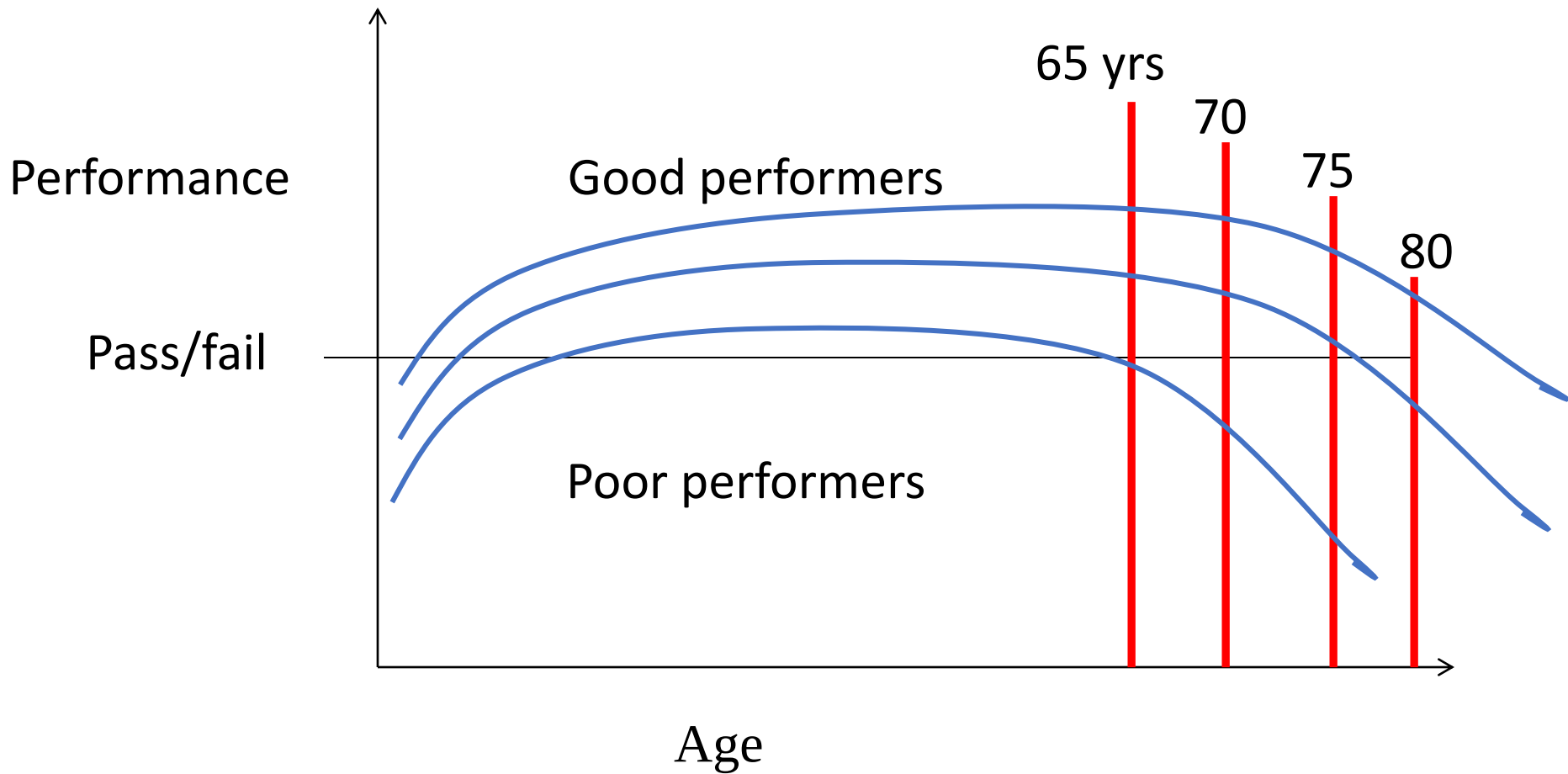


Physical degradation

Vision

Hearing

Operational performance and age



Summary (sudden incapacity)

- Sudden incapacity risk increases with increasing age
- Number of incapacitation 'at-risk' pilots will increase with increasing age
- Medical examination will only detect a proportion of serious illnesses
- Upper age limit change from 60 to 65 will not materially affect flight safety in two-pilot operations
- Average risk at 65 remains below 1% p.a.

Summary (performance degradation)

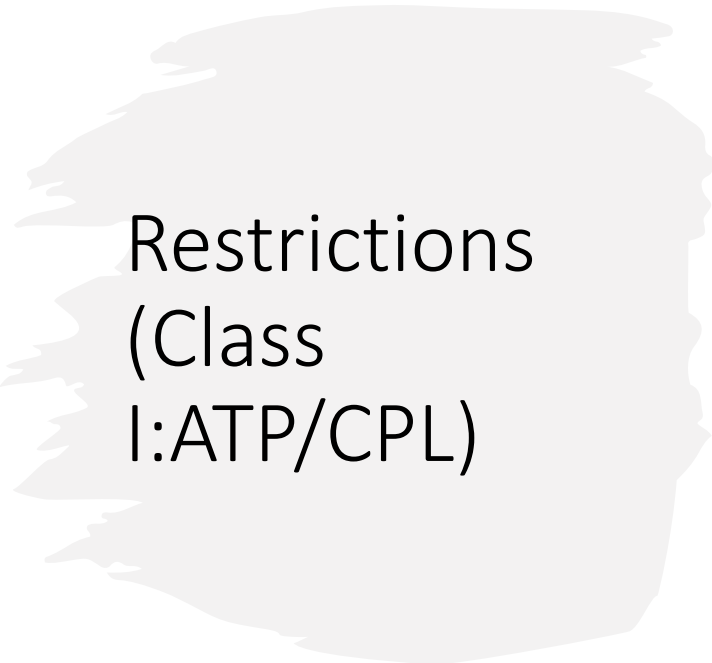
- Performance degradation risk increases with increasing age
- Number of performance 'at-risk' pilots will increase with increasing age
- Sim checks, line checks, peer review will detect most cases of significant deterioration
- Sim check is best test of cognitive performance

Upper age limit for PIC were safely increased from 60 to 65 in 2-pilot operations



Medical examinations (and simulator checks) are not sufficiently sensitive to enable abolition of an upper age limit

Conclusions



Restrictions (Class I:ATP/CPL)

Single Operation pilot
limit remains at 60

Restricted to operate
only in the South
African Airspace

To operate in a
Multicrew environment
only if engaged in
commercial Air
Transport Operations

A vibrant tropical beach scene. In the foreground, a red biplane with silver floats is on the turquoise water. To the left, two palm trees lean over the beach. In the background, a small hut with a thatched roof sits on the sandy shore under a bright blue sky with fluffy white clouds.

The Golden Age of Aviation, Co.

THANK YOU