Cardiovascular risk stratification in the context of the Age 60-rule

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First International Congress on

CURRENT ISSUES OF AVIATION MEDICINE

17.-19. October 2018, Moscow

Disclosures: No conflicts of interest

- Introduction
- Cardiovascular risk
- Cardiovascular risk stratification
- Age 60-rule: Preceded and ongoing projects
- Conclusions

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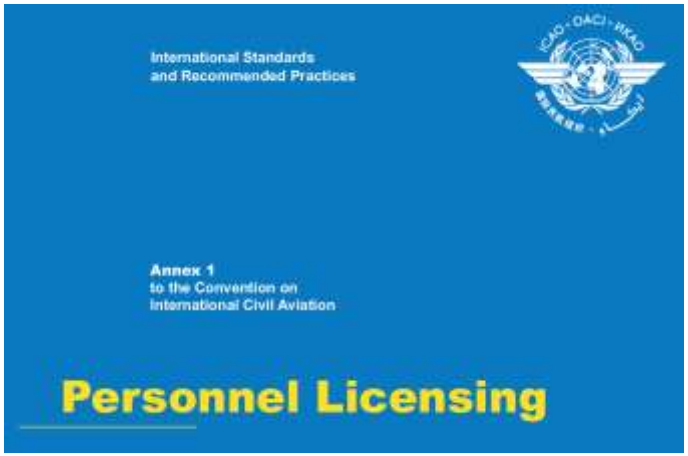
Introduction



2.1.10 Limitation of privileges of pilots who have attained their 60th birthday and curtailment of privileges of pilots who have attained their 65th birthday

2.1.10.1 A Contracting State, having issued pilot licences, shall not permit the holders thereof to act as pilot-in-command of an aircraft engaged in international commercial air transport operations if the licence holders have attained their 60th birthday or, in the case of operations with more than one pilot where the other pilot is younger than 60 years of age, their 65th birthday.

2.1.10.2 **Recommendation.**— *A Contracting State, having issued pilot licences, should not permit the holders thereof to act as co-pilot of an aircraft engaged in international commercial air transport operations if the licence holders have attained their 65th birthday.*

25.11.2011 EN Official Journal of the European Union L 311/1

II

(Non-legislative acts)

REGULATIONS

COMMISSION REGULATION (EU) No 1178/2011

of 3 November 2011

laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council

(Text with EEA relevance)

FCL.065 Curtailment of privileges of licence holders aged 60 years or more in commercial air transport

(a) Age 60-64. Aeroplanes and helicopters. The holder of a pilot licence who has attained the age of 60 years shall not act as a pilot of an aircraft engaged in commercial air transport except:

(1) as a member of a multi-pilot crew; and

(2) provided that such a holder is the only pilot in the flight crew who has attained the age of 60 years.

(b) Age 65. The holder of a pilot licence who has attained the age of 65 years shall not act as a pilot of an aircraft engaged in commercial air transport.

This age limitation was set up many decades ago (ICAO).

???

- Can you compare older people from 2018 with those from earlier time?
- Have there not been changes in life-expectancy within the last several decades?
- And didn‘t the age-related criteria for physical and mental fitness change?
- In summary: Is the age limitation 60+ justified?

Fauja Singh became the first 100-year-old to finish a marathon, completing the Toronto Waterfront Marathon in 8:11:06!

Neue Zürcher Zeitung Donnerstag, 18. Mai 2017

Senioren am Steuer sind nicht häufiger für Unfälle verantwortlich als jüngere Verkehrsteilnehmer. GAETAN BALLY / KEYSTONE

Ärztliche Kontrollen für Autofahrer erst ab 75

Bundesrat will verkehrsmedizinische Untersuchungen hinausschieben

Statt wie bisher mit 70 Jahren sollen autofahrende Senioren erst fünf Jahre später zum Arzt. Den Anstoss dazu gegeben hat der 75-jährige SVP-Mann Maximilian Reimann.

nahmen soll vermieden werden, dass sich der spätere Beginn der medizinischen Kontrolluntersuchung negativ auf die Verkehrssicherheit auswirkt. Die Informations- und Sensibilisierungsmassnahmen des Bundes zielen darauf ab, dass sich Senioren weiterhin ab 70 Jahren mit der Frage befassen, ob sie dem

stellen. Dieses müsse aber ebenfalls in Eigenverantwortung vorgenommen werden – oder könnte in Zweifelsfällen ab 75 Jahren auch vom Strassenverkehrsamt angeordnet werden.

Auch Hausärzte sind dafür

EASA
European Aviation Safety Agency

Should Class 1 pilots be allowed to fly single pilot CAT operations up to the age of 65?

MEG meeting - 18 April 2016

Your safety is our mission.

An Agency of the European Union

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Imperative for pilots for flights:

- Good mental and physical health!
- Low risk for sudden and „subtle“ incapacitation!

Highest risk for sudden incapacitation in the age group 60 to 65 are ...

- ... cardiovascular diseases!
- Therefore a cardiovascular risk evaluation is crucial when checking pilots in this age group for fitness to fly.

European Heart Journal (2016) **37**, 3232–3245
doi:10.1093/eurheartj/ehw334

REVIEW

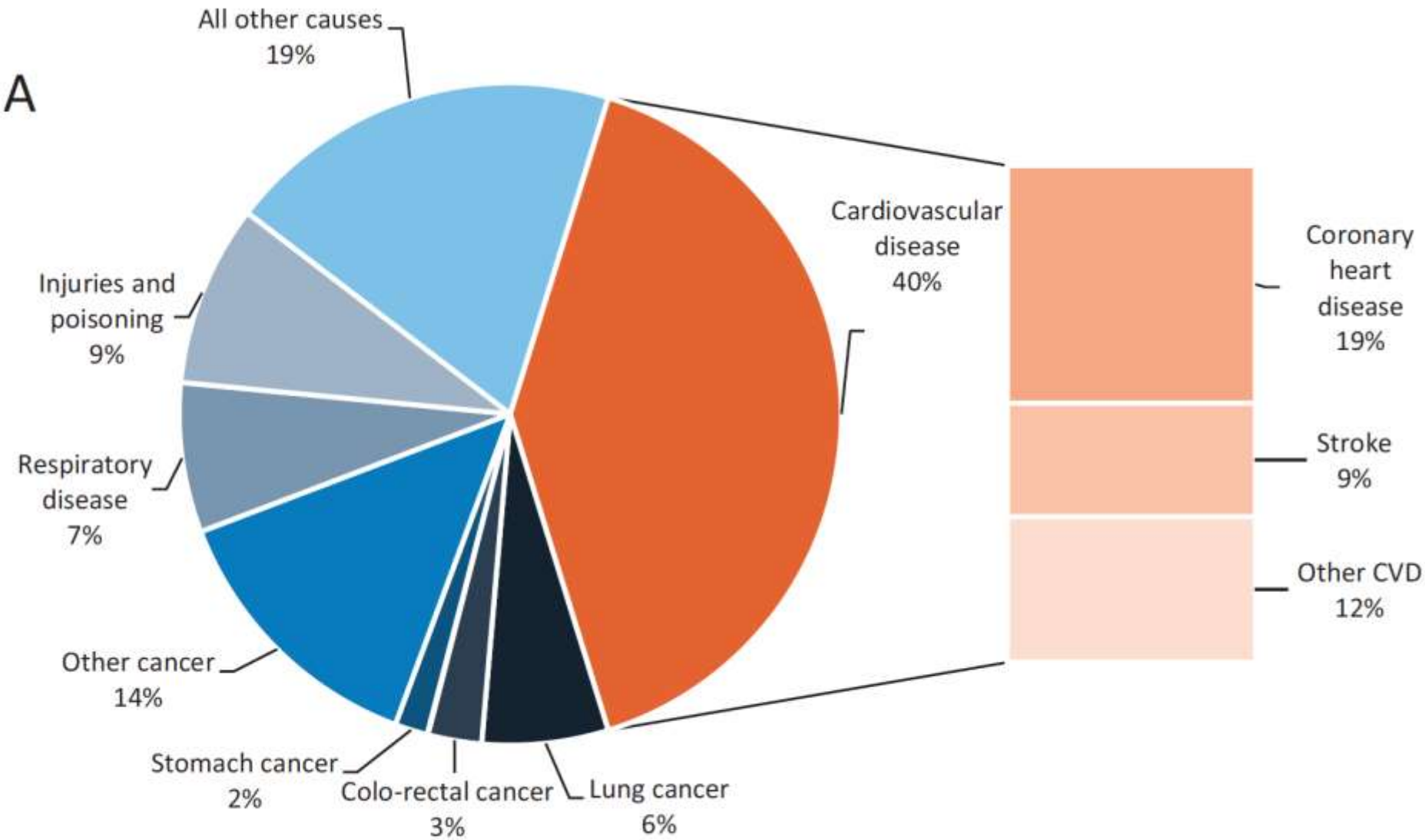
Cardiovascular disease in Europe: epidemiological update 2016

Nick Townsend[1]*, Lauren Wilson[1], Prachi Bhatnagar[1], Kremlin Wickramasinghe[1], Mike Rayner[1], and Melanie Nichols[1,2]

[1]British Heart Foundation Centre on Population Approaches for Non-Communicable Disease Prevention, Nuffield Department of Population Health, University of Oxford, Old Road Campus, Oxford OX3 7LF, UK; and [2]Centre for Population Health Research, Faculty of Health, Deakin University, Geelong, Vic. 3220, Australia

Received 18 May 2016; revised 7 July 2016; accepted 12 July 2016; online publish-ahead-of-print 14 August 2016

European Heart Journal (2016) **37**, 3232–3245
doi:10.1093/eurheartj/ehw334

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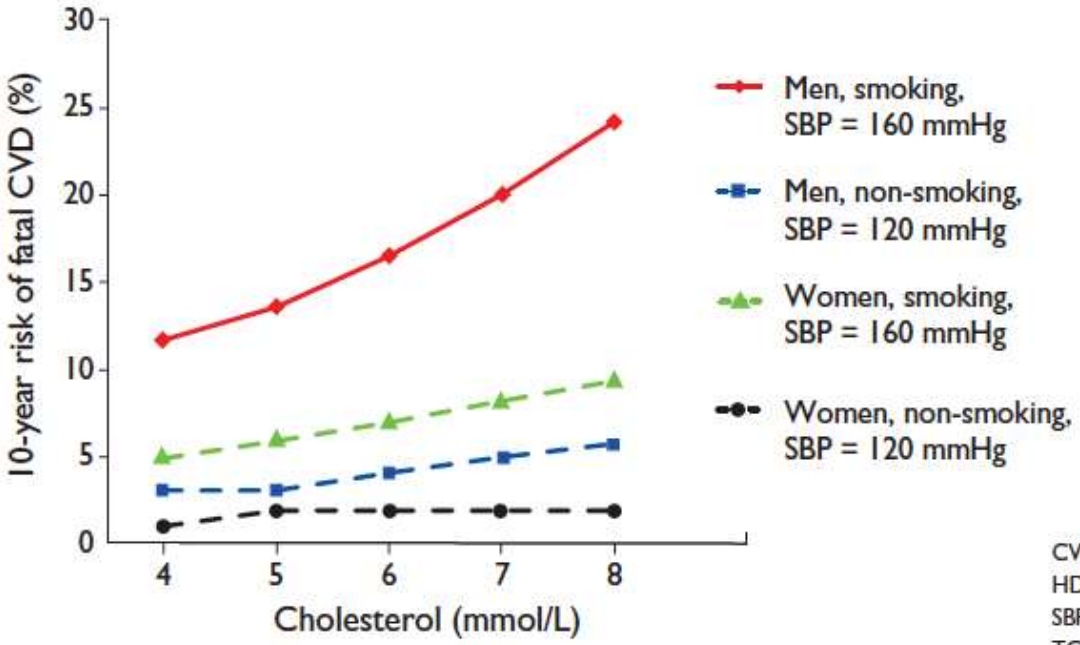

CVD = cardiovascular disease;
HDL = high-density lipoprotein;
SBP = systolic blood pressure;
TC = total cholesterol.

Figure 2 Relationship between total cholesterol/HDL cholesterol ratio and 10-year fatal CVD events in men and women aged 60 years with and without risk factors, based on a risk function derived from the SCORE project.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Lifetime Risks of Cardiovascular Disease

Jarett D. Berry, M.D., Alan Dyer, Ph.D., Xuan Cai, M.S., Daniel B. Garside, B.S., Hongyan Ning, M.D., Avis Thomas, M.S., Philip Greenland, M.D., Linda Van Horn, R.D., Ph.D., Russell P. Tracy, Ph.D., and Donald M. Lloyd-Jones, M.D.

N Engl J Med 2012;366:321-9.

METHODS

We conducted a meta-analysis at the individual level using data from 18 cohort studies involving a total of 257,384 black men and women and white men and women whose risk factors for cardiovascular disease were measured at the ages of 45, 55, 65, and 75 years. Blood pressure, cholesterol level, smoking status, and dia-

...

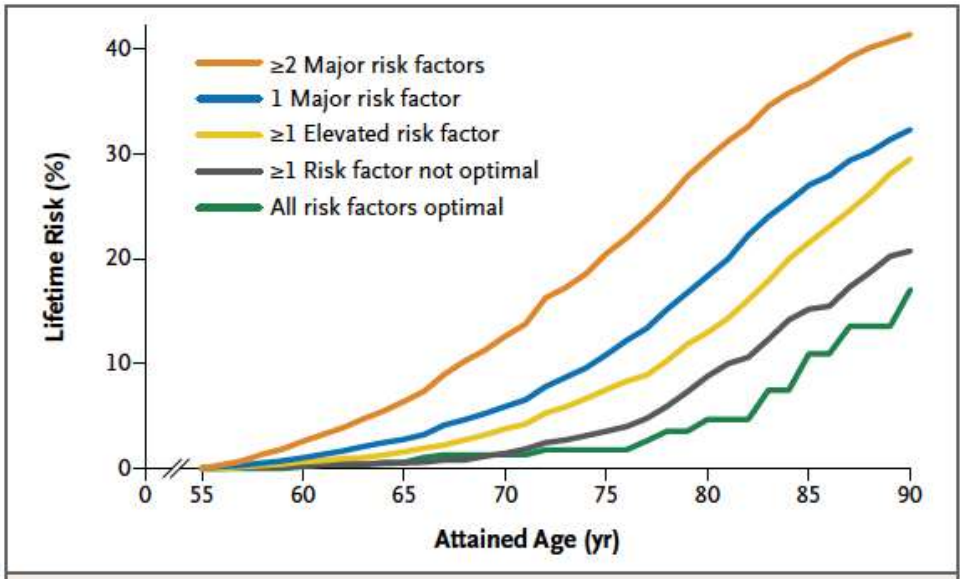

Figure 1. Lifetime Risk of Death from Cardiovascular Disease among Black Men and White Men at 55 Years of Age, According to the Aggregate Burden of Risk Factors and Adjusted for Competing Risks of Death.

The risk-factor profile was considered optimal when a participant had a total cholesterol level of less than 180 mg per deciliter (4.7 mmol per liter) and untreated blood pressure of less than 120 mm Hg systolic and less than 80 mm Hg diastolic, was a nonsmoker, and did not have diabetes. It was considered not to be optimal for nonsmokers without diabetes who had a total cholesterol level of 180 to 199 mg per deciliter or untreated systolic blood pressure of 120 to 139 mm Hg or untreated diastolic blood pressure of 80 to 89 mm Hg. Levels of risk factors were viewed as elevated for nonsmokers without diabetes who had a total cholesterol level of 200 to 239 mg per deciliter (5.17 to 6.18 mmol per liter) or untreated systolic blood pressure of 140 to 159 mm Hg or untreated diastolic blood pressure of 90 to 99 mm Hg. Major risk factors were defined as current smoking, diabetes, treatment for hypercholesterolemia, an untreated total cholesterol level of at least 240 mg per deciliter (6.21 mmol per liter), and treatment for hypertension, untreated systolic blood pressure of at least 160 mm Hg, or untreated diastolic blood pressure of at least 100 mm Hg. The data were derived from the 17 studies in the pooled cohort; data from the Multiple Risk Factor Intervention Trial were not included.

Age as risk factor

- Introduction
- Cardiovascular risk
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- Age 60-rule: Preceded and ongoing projects
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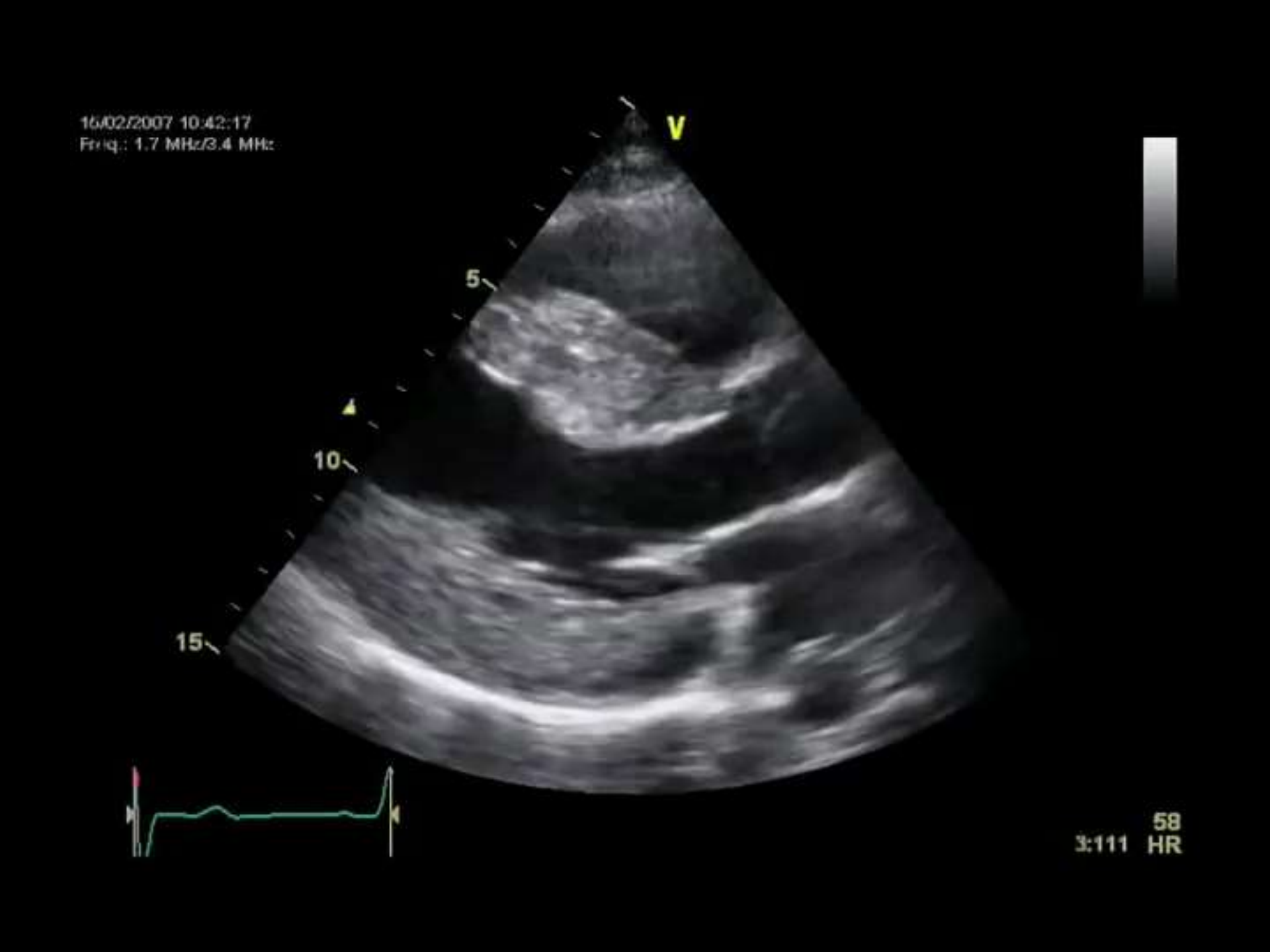
Demand for risk stratification ...

- ... especially in cardiovascular diseases.
- Cardiologists are well trained in the procedure of risk stratification.
- There must be defined end points, thus that it is clear which the consequences of the result of the risk stratification are (for a pilot, the acceptable risk according to his activity must be defined).
- Example: Hypertrophic cardiomyopathy.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European Heart Journal (2014) **35**, 2733–2779
doi:10.1093/eurheartj/ehu284

ESC GUIDELINES

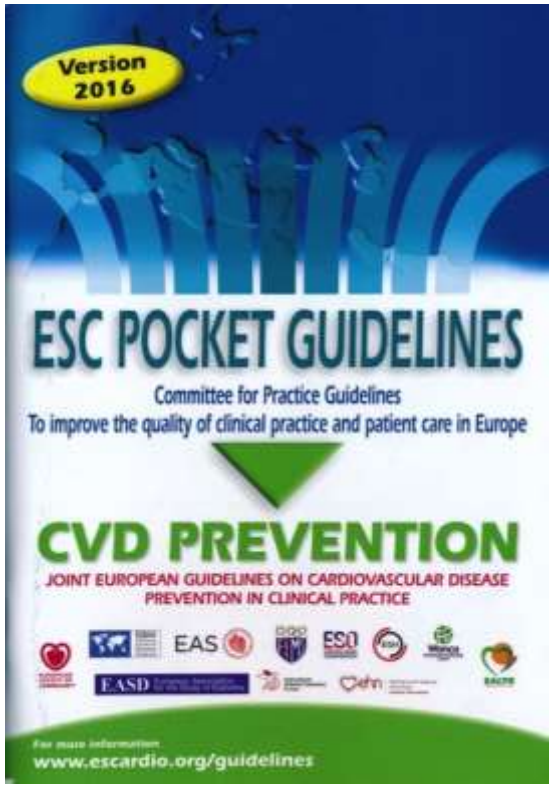
2014 ESC Guidelines on diagnosis and management of hypertrophic cardiomyopathy

The Task Force for the Diagnosis and Management of Hypertrophic Cardiomyopathy of the European Society of Cardiology (ESC)

3. Total cardiovasular risk

3.1 Total cardiovascular risk estimation

CV risk in the context of these guidelines means the likelihood of a person developing an atherosclerotic CV event over a defined period of time.



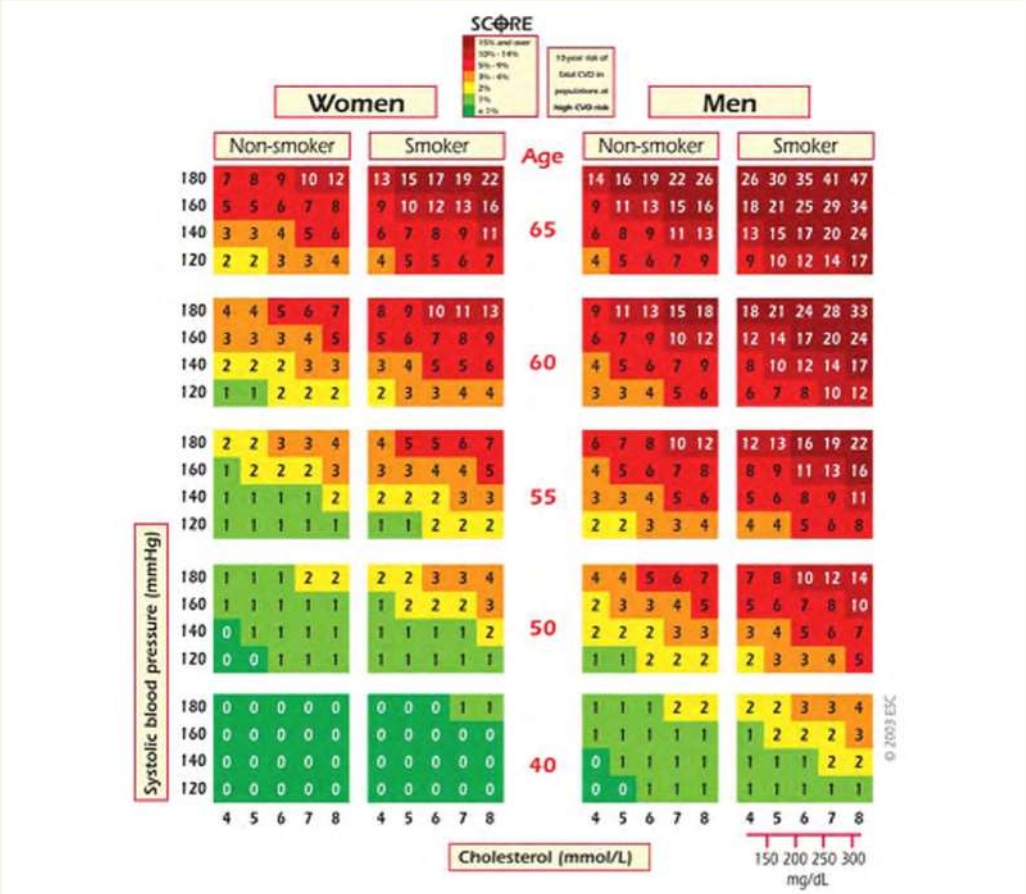
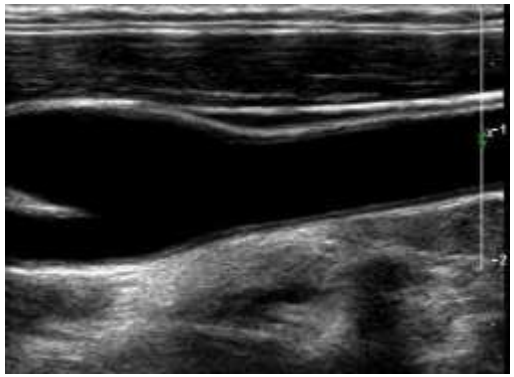


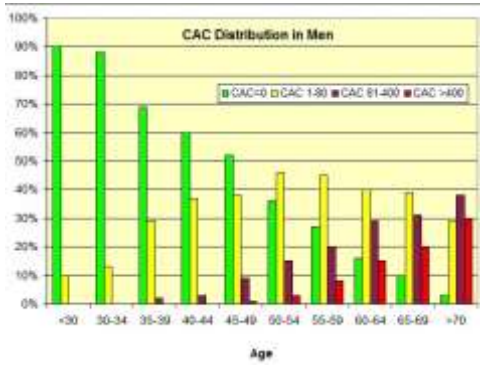
Figure 1 SCORE chart: 10 year risk of fatal cardiovascular disease (CVD) in populations at **high CVD risk** based on the following risk factors: age, gender, smoking, systolic blood pressure, and total cholesterol. To convert the risk of fatal CVD to risk of total (fatal + non-fatal) hard CVD, multiply by 3 in men and 4 in women, and slightly less in old people. Note: the SCORE chart is for use in people without overt CVD, diabetes, chronic kidney disease, or very high levels of individual risk factors because such people are already at high risk and need intensive risk factor advice.

Today ...

... in addition to the cardiovascular score systems there are techniques, which allow a more precise estimation of the cardiovascular risk, like ...

- Carotid ultrasound imaging
- Coronary artery calcium testing
- Coronary artery CT-Scanning





Literature review

Coronary artery calcium testing and Coronary artery CT-Scanning

Coronary artery calcium testing and Coronary artery CT Scanning are useful for cardiovascular risk stratification, especially in patients and pilots with an intermediate cardiovascular risk, and it might be useful in individual cases with a low cardiovascular risk.

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Age 60-rule: Preceded and ongoing projects

austro CONTROL

AGE 60 - RULE WORKSHOP

16.-17. March 2017

Hotel NH Danube City, Wagramer Strasse 21, 1220 Vienna / AUSTRIA

AGENDA 16/03/2017		
TIME	**AGENDA ITEM**	**SPEAKER**
09:30 – 10:00	**REGISTRATION**	
10:00 – 10:10	WELCOME PRESENTATION OF AGENDA	J. EIDHER & T. PINK CAA AUT
10:10 – 10:20	WELCOME – HISTORY AGE 60 RULE – MAB DISCUSSIONS OVERVIEW	F. GRASER CAA AUT
10:20 – 10:30	WELCOME AGE 60 RULE – EU COMMISSION's PERSPECTIVE	J. WOELDGEN EU COMMISSION
10:30 – 10:55	AGE 60 RULE – ICAO's POINT OF VIEW	A. JORDAAN

Country:	**State 1**
Organisation(s) affected:	**2 HEMS operators**
Number of HEMS Pilots affected (currently):	**1**
Reasons/Justification for granting the exemption:	• State 1 already had an exemption from JAR-FCL for domestig CAT-flights • Regular age for retirement 65 • No higher risk (statistically proven) • Average duration of HEMS-mission only 26 minutes • Operation close to surface, emergency landing can be performed
Mitigating Measures:	
Administrative:	• Inform staff • Notify pilots names to CAA (6 months before a pilot reaches the age of 60) • Inform the pilots of all requirements and procedures
Licence:	• Remark: "Art. 14.4 age 60-exemption: approval for single HEMS operations with an adapted medical certificate (SSL)"
Medical:	
First examination (at the age of 60):	• Laboratory report • Extended ophtalmological examination by eye specialist • Neurological status examination by specialist • Extended psychological test incl. cognitive skills
Each examination:	• Laboratory report, Spirometry
Every year	• Laboratory report
Every two years:	• Extended ophtalmological examination by eye specialist • Extended ENT examination by ENT-specialist • Extended cardiovascular/internal examination by specialist • Neurological status evaluated by a specialist
Further examinations:	• Further examinations can be determined
Medical issued:	• By CAA, including limitations
Limitations on Medical:	• "SIC" and "SSL"
Operational:	• Limited operation time (fives days a week, max. of three consecutived days) • Limit of the duty time to 12 hours (within 24 hours) • Avoid or limit the operation in case of extraordinary physical situations • Risk profile (risk assessment) of pilot to be considered • Documented review on the quality of line operation performed by the pilot (every 6 months)
Reporting:	• Report to CAA (at least every 3 months) – Statistics and incidents occuring with pilots older than 60 • Management review on the exemption process – Report to CAA once in 6 months • Documentation in the operating manual • Audit plan (must include the exemption process)

Country:	**State 2**
Organisation(s) affected:	**17 HEMS operators**
Number of HEMS Pilots affected (currently):	**7**
Reasons/Justification for granting the exemption:	• Unforeseen urgent operational circumstances/ operational needs • Potential shortage of qualified pilots • Retirement age 64-65
Mitigating Measures:	
Administrative:	
Medical:	
First examination (at the age of 60):	• Comprehensive examination of the cardiovascular system (cardiovascular assessment) • Cardiovascular risk assessment – calculated risk must be below 10 percent
Medical issued:	
Limitations on Medical:	• Determined by the Medical Assessor of the CAA
Operational:	• Proficiency check (according to provisions, min. every 6 months)
Reporting:	• Results of Proficiency check to CAA • Audit inspection / Stringent oversight programme by the CAA (successful application of mitigating measures must be prooved)

AGE-60-Rule Workshop (16th-17th March 2017)
Vienna, Austria

SUMMARY / FINAL NOTE

…

Favored solutions:

The majority was of the opinion that a change of the current situation/rule change is inevitable. Furthermore there an immediate/intermediate solution, in order to have time to develop the amendment, would be necessary.

- No individual national Art. 14/4 exemptions in the future
- Change of rule (delete or change FCL.065, regulation in another Part)

Only the minority intended to continue with the current system of individual national Art. 14/4 exemptions.

…

Summary, main results & next steps?

The uniform tenor of the workshop was the demand for a harmonized solution in Europe (in coordination with ICAO) and a departure from different national individual exemptions. It was also clear for all stakeholder groups that a change in the provisions of the EU Regulation

Age 60-rule: Preceded and ongoing projects

EASA
European Aviation Safety Agency

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- Brexit Negotiations
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  - **Calls for expression of interest**
    - Independent External Experts
    - Vendors
  - Calls for tender

14 JUN 2017

EASA.2017.HVP.12

Research Study: age limitations for commercial air transport pilots.

CLOSED | **Closing Date:** 21/08/2017

eTendering EASA.2017.HVP.12

Like 0 | Tweet | Share | G+

Availability of Procurement Documents

Please note that all related Procurement Documents for the above mentioned procedure are publish
platform. More details, information and all related documents are available under the eTendering lin

Age 60-rule: Preceded and ongoing projects

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Age 60-Rule

Demands for a solution of an EASA exemption

A possible deviation of the Age 60-rule, thus an increase of the age limit for a single commercial pilot, is only acceptable if the risk for a sudden or a subtle incapacitation is not higher than what is actually accepted under the conditions which we have with the valid Age 60-rule. In order to achieve this goal, for commercial single pilots reaching the age of 60 years, one must first define the risk factors which are of importance, risk factors which may lead to an hazardous event when piloting an airplane. Second, one must establish concepts of examinations which allow a risk stratification, thus classifying pilots in different risk categories.

Age 60-Rule

Demands for a solution of an EASA exemption

If specific examinations in addition to the compulsory aeromedical examinations are introduced for single commercial pilot in the age 60 in order to undertake a risk stratification, clear criteria for those tests must be defined. The following criteria should be considered: The tests ...

- ... should have a scientific basis,
- ... should include considerations about its decison criteria,
- ... should be practical,
- ... should be cost efficient.

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Conclusions I

- Life-expectancy in 2018 is better than some decades ago and thus also than at the time when the Age 60-rule has been written.
- The highest risk for sudden incapacitation in the age group > 60 years form cardiovascular diseases.
- Age is a risk factor, but it is a lower risk factor in the age group of 60 to 65 years, than one might assume; the overall cardiovascular risk is primarily related to the amount of classical cardiovascular risk factors.
- Patients and pilots can be classified into different cardiovascular risk categories by specific risk stratification.

Conclusions II

- A cardiovascular risk stratification can be achieved by using classical cardiovascular risk scores, which should be complemented by modern technologies like Coronary artery CT scanning in specific cases.
- Actual scientific data do not justify anymore an age 60-limitation for all single commercial pilots.
- A harmonized solution for exemption of the Age 60-rule must be based on scientific level and include considerations about its decison criteria, its practicability and its cost efficiency.
- The scientifc study of this issue is underway - addressed by the group TNO et al. on behalf of EASA.

Thank you for your attention!