

Degenerativni učinci starenja na tjelesne organe

MED.B.005 General medical requirements

Regulation (EU) 2024/2076

Applicants for a medical certificate shall be assessed in accordance with the detailed medical requirements set out in Sections 2 and 3.

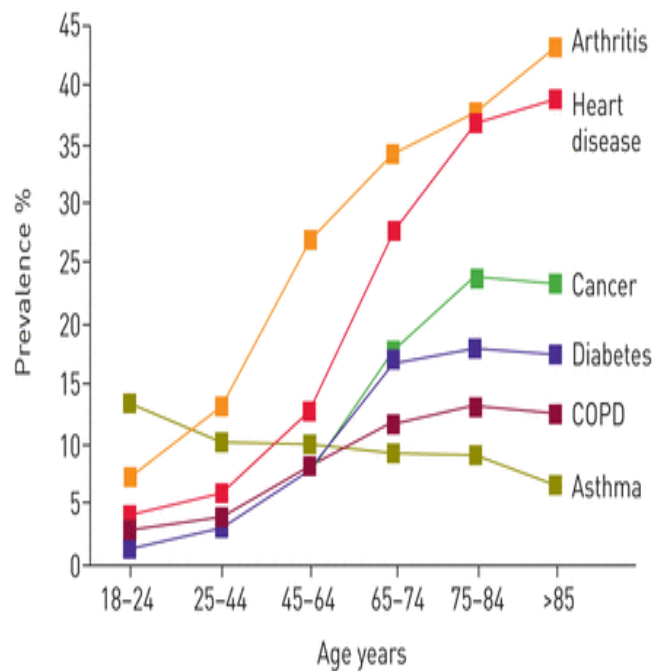
They shall, in addition, be assessed as unfit where they have any of the following medical conditions which entails a degree of functional incapacity which is likely to interfere with the safe exercise of the privileges of the licence applied for or could render the applicant likely to become suddenly unable to exercise those privileges:

- (a) abnormality, either congenital or acquired;
- (b) active, latent, acute or chronic disease or disability;
- (c) wound, injury or sequelae from operation;
- (d) effect or side effect of any prescribed or non-prescribed therapeutic, diagnostic or preventive medication taken.

In their examination AMEs shall give proper consideration to the degenerative effects of ageing on the body systems.

[applicable from 13 February 2025 - Regulation (EU) 2024/2076]

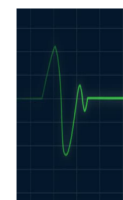
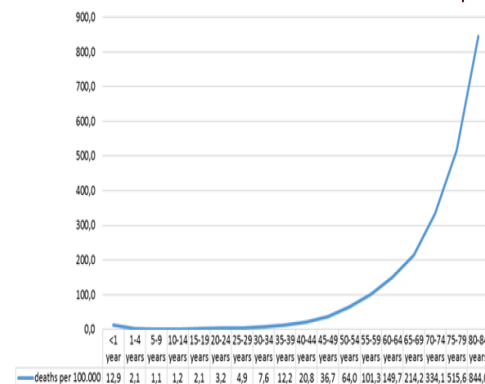
Rizični fiaktori



3. Risk factors for sudden incapacitation (results)

Sudden death

- Great majority of cases are caused by cardiovascular reasons
- The risk of sudden cardiac death increases exponentially with age



Koža: prva linija obrane tijela

- Promjene u strukturi: koža postaje tanja i gubi elastičnost starenjem zbog smanjenja proizvodnje kolagena i elastina. To dovodi do stvaranja bora, opuštenosti i suhoće.
- Smanjena proizvodnja znoja i ulja: žlijezde lojnice proizvode manje ulja, a žlijezde znojnice postaju manje aktivne, što rezultira sušom kožom. To također može oslabiti sposobnost kože da regulira temperaturu.
- Oslabljena funkcija barijere: Kako se koža tanji, barijera protiv patogena i toksina postaje manje učinkovita, čineći starije odrasle osobe osjetljivijima na infekcije i ozljede kože.
- Smanjena sposobnost zacjeljivanja: Zacjeljivanje rana postaje sporije zbog smanjene regenerativne sposobnosti stanica kože.



Mišićno-koštani sustav: zdravlje kostiju, mišića i zglobova

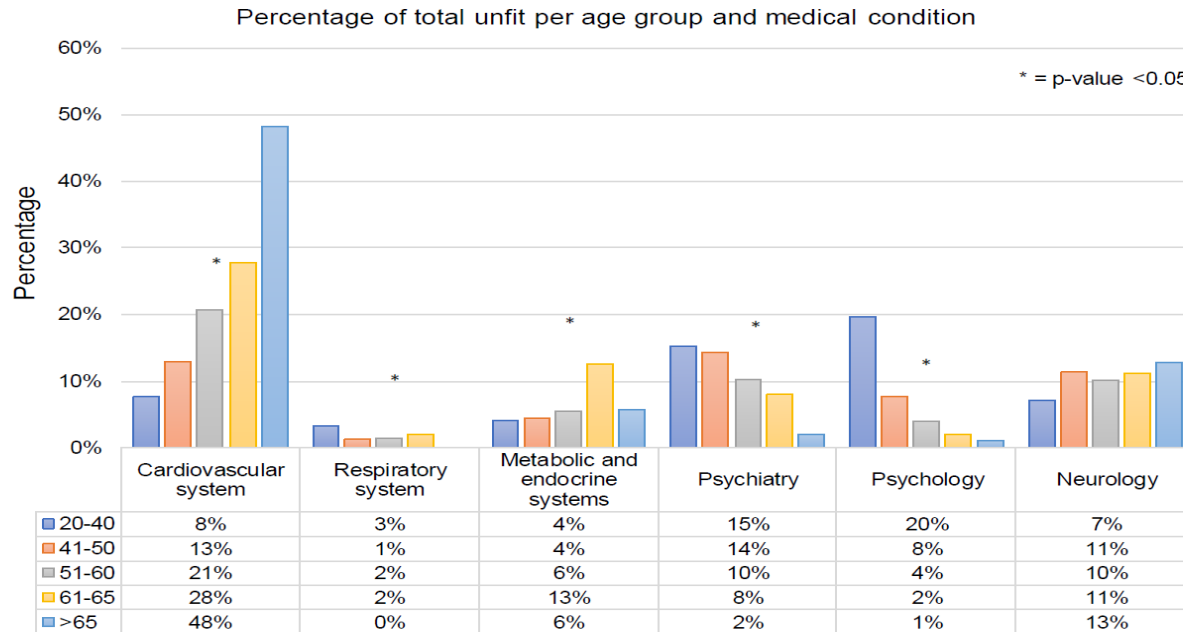
Mišićno-koštani sustav jedan je od najpogođenijih starenjem, a njegovo se slabljenje često povezuje s invaliditetom.

- Gustoća kostiju: koštana masa se smanjuje s godinama zbog smanjenja aktivnosti osteoblasta i povećanja aktivnosti osteoklasta. To dovodi do osteoporoze, zbog čega kosti postaju krhke i sklone lomovima.
- Promjene zglobova: starenje dovodi do degenerativnih promjena u hrskavici, prvenstveno u zglobovima koji nose težinu kao što su koljena, kukovi i kralježnica. To rezultira osteoartritisom, karakteriziranim boli, ukočenošću i smanjenim rasponom pokreta.
- Mišićna masa i snaga: Mišićna masa i snaga se smanjuju rezultirajući sarkopenijom. Gubitak mišićnih vlakana, uz smanjenje funkcije motoričkih neurona, pridonosi slabosti i smanjenoj pokretljivosti.



Kardiovaskularni sustav: srce i krvne žile

2. Analysis of the collected data (results)



Kardiovaskularni sustav: srce i krvne žile

Sinoatrijski čvor gubi dio svojih stanica
Hipertrofija lijeve klijetke
Promjene miokarda
Promjene na zaliscima
Baroreceptori starenjem postaju manje osjetljivi

Hipertenzija, ortostatska hipotenzija
Angina pectoris, koronarna bolest
Aritmije
Ateroskleroza
Kongestivno zatajenje srca
Aortalna stenoza



Kardiovaskularni sustav: srce i krvne žile

applicable until 12 February 2025 - Regulation (EU) 2019/27]

(3) For a class 1 medical certificate, an extended cardiovascular assessment shall be completed at the first revalidation or renewal examination after the age of 65 and every 4 years thereafter. For applicants involved in single-pilot HEMS operations, an extended cardiovascular assessment shall be completed at the first revalidation or renewal examination after the age of 60 and subject to a cardiovascular risk factor assessment thereafter.

[applicable from 13 February 2025 - Regulation (EU) 2024/2076]

(4) For a class 1 medical certificate, estimation of serum lipids, including cholesterol, shall be required at the initial examination, and at the first examination after having reached the age of 40.

[applicable until 12 February 2025 - Regulation (EU) 2019/27]

(4) For a class 1 medical certificate, estimation of serum lipids, including cholesterol fractions, shall be required at the initial examination, and at the first examination after having reached the age of 40.

[applicable from 13 February 2025 - Regulation (EU) 2024/2076]

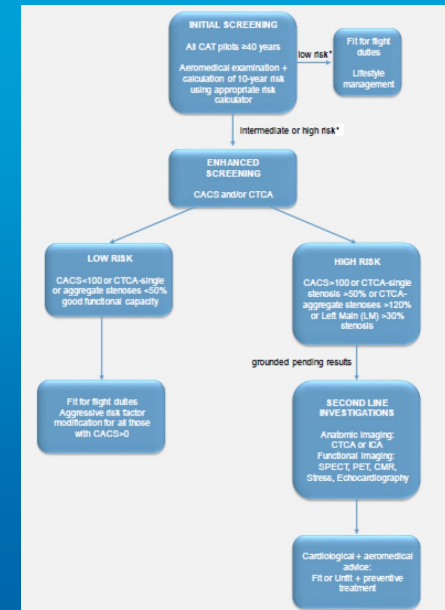
(5) A cardiovascular risk factor assessment shall form part of examinations for class 1 and class 2 medical certificates at the first examination after reaching the age of 40 and at regular intervals thereafter.

[applicable from 13 February 2025 - Regulation (EU) 2024/2076]

Kardiovaskularni sustav: srce i krvne žile

It is recommended that all aircrew, especially those over the age of 40 years, should be periodically screened for cardiovascular risk using a resting ECG and risk estimating calculators that are representative and appropriate for the population to screen and provide non-fatal and fatal endpoints. Pilots with an elevated CVD risk should be referred for enhanced risk assessment.

Ries Simons, René Maire, Extending the age limit of commercial pilots?, *European Heart Journal*, Volume 41, Issue 24, 21 June 2020, Pages 2239–2242, <https://doi.org/10.1093/eurheartj/ehaa397>



Kardiovaskularni sustav: srce i krvne žile

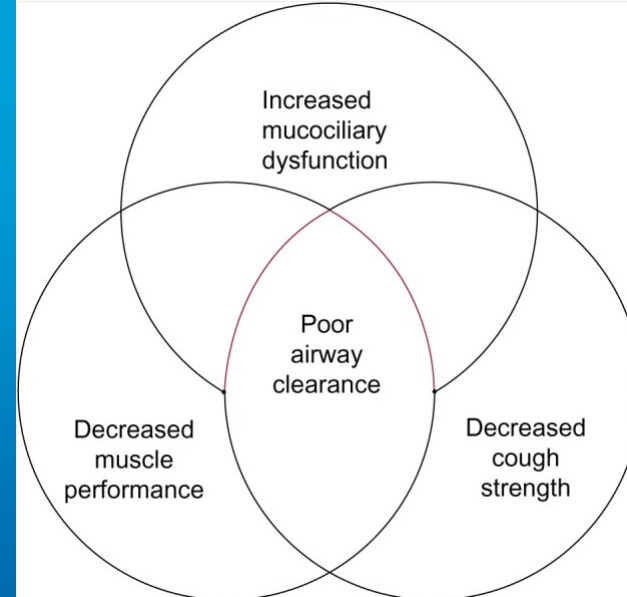
When the initial screening reveals an elevated or high CVD risk (e.g., >10% PROCAM risk score) or has a clinically determined higher risk of CVD, the pilot concerned should be referred to a cardiologist with aeromedical expertise for enhanced risk assessment in order to identify and substantiate the CVD risk and to advise on fitness for pilot duties and risk factor modification (individual prevention).



Although the majority of cases of referral to cardiological expertise will concern coronary pathology (e.g., stenosis, plaques), it is emphasized that a cardiological examination is also indicated in cases of conduction abnormalities, arrhythmias, heart muscle disease, and valvular heart disease and aortopathy.

Dišni sustav: pluća i funkcija dišnih putova

- Smanjena elastičnost pluća: smanjeni vitalni kapacitet
- Smanjena ciliarna funkcija: povećavn rizik od respiratornih infekcija.
- Alveolarne promjene: Broj alveola se smanjuje, što dovodi do manje učinkovite izmjene plinova i smanjene razine kisika u krvi, osobito tijekom fizičkog napora.



Dišni sustav: pluća i funkcija dišnih putova

(b) Applicants for a class 1 medical certificate shall undertake pulmonary morphological and functional tests at the initial examination and when clinically indicated.

[applicable until 12 February 2025 - Regulation (EU) 2019/27]

(b) Applicants for a class 1 medical certificate shall undertake pulmonary functional tests at the initial examination and when clinically indicated.

[applicable from 13 February 2025 - Regulation (EU) 2024/2076]

(ba) For class 1 medical certificate holders involved in single-pilot HEMS operations, pulmonary functional tests and obstructive sleep apnoea (OSA) screening shall be completed at the first revalidation or renewal examination after the age of 60.

[applicable from 13 February 2025 - Regulation (EU) 2024/2076]

Živčani sustav

Kognitivne funkcije:

Kratkoročno pamćenje i sposobnost učenja novog materijala

Verbalne sposobnosti, uključujući vokabular i upotrebu riječi, mogu početi opadati u dobi od 70 godina

Intelektualni učinak - sposobnost obrade informacija (bez obzira na brzinu) - obično se održava do najmanje 80 godina ako ne postoje prisutni neurološki ili vaskularni poremećaji

Alzheimer

Depresija

Mb. Parkinson

Cerebrovaskularne bolesti

Epi

Sinkopa

3. Risk factors for sudden incapacitation (results)

Stroke risk

- Is the second leading cause of death after ischemic heart disease (Benjamin et al., 2018).
- Recent decline in mortality due to timely treatment
 - the number of incidents of non-fatal IS events remained stable
- The incidence of (first-ever) ischemic stroke (IS)
 - increases between 50 and 65 years of age
 - increases sharply in the age cohorts of 65-74 years and beyond.



Vidni sustav

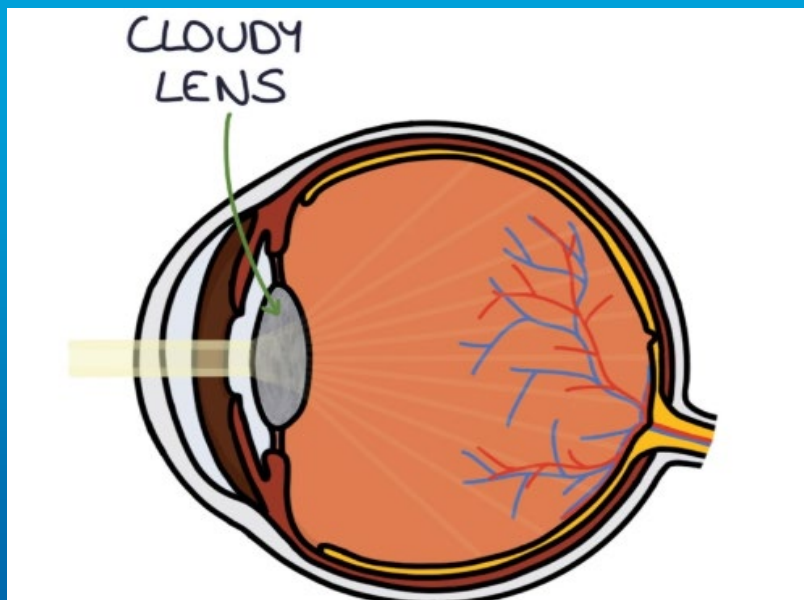
vidna oštrina

contrast sensitivity

razlikovanje boja

vidno polje

katarakta, glaukom



(a) Examination

(1) For a class 1 medical certificate:

(i) a comprehensive eye examination shall form part of the initial examination and shall be undertaken when clinically indicated and periodically, depending on the refraction and the functional performance of the eye.

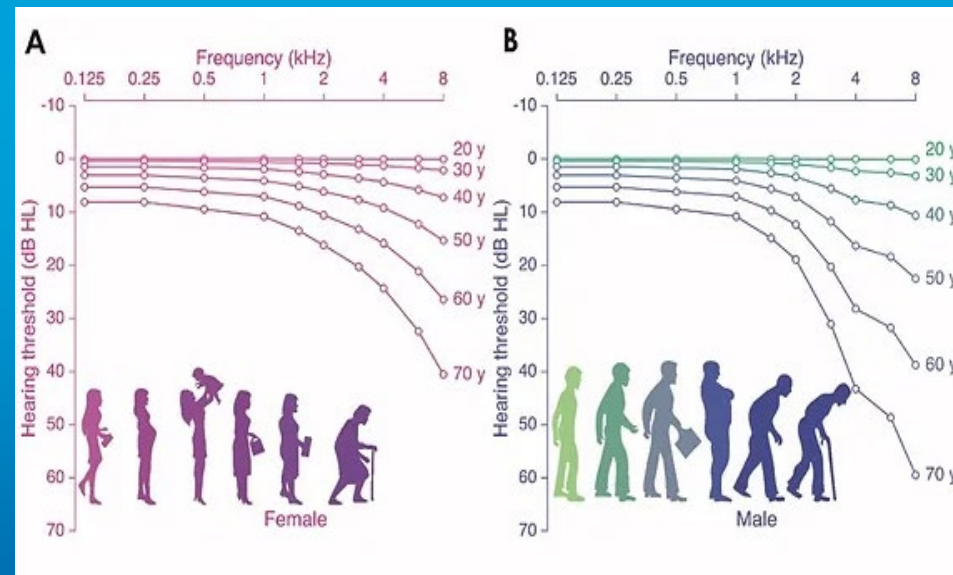
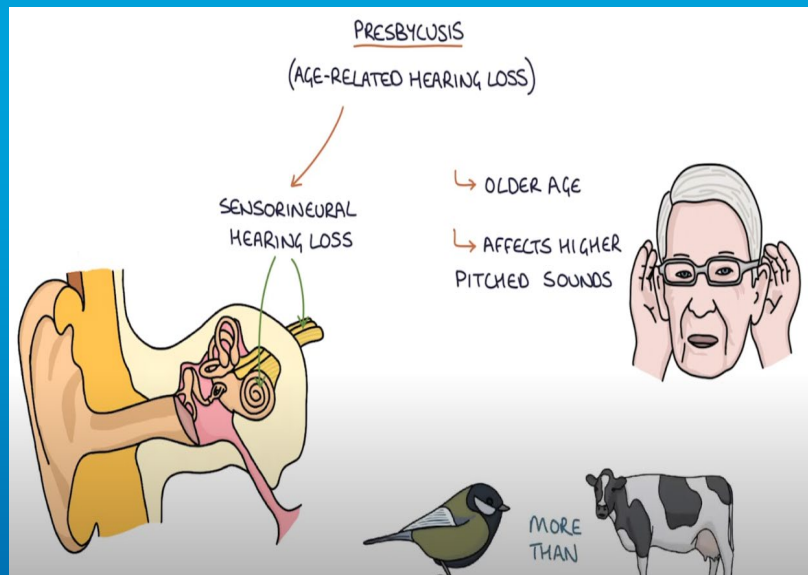
(ii) a routine eye examination shall form part of all revalidation and renewal examinations.

(iii) when holders are involved in single-pilot HEMS operations, a comprehensive eye examination shall be completed at the first revalidation or renewal examination after the age of 60 and every year thereafter.

[applicable from 13 February 2025 - Regulation (EU) 2024/2076]

Sluh

Oko 30 posto odraslih starijih od 65 godina ima gubitak sluha vezan uz dob, obično uzrokovan promjenom u živcima ili strukturi uha ili vanjskim čimbenicima poput dugotrajne izloženosti buci, medicinskim stanjima ili nuspojavama lijekova .



(a) Examination

(1) Applicants' hearing shall be tested at all examinations.

(i) For a class 1 medical certificate, and for a class 2 medical certificate when an instrument rating or en route instrument rating is to be added to the licence, hearing shall be tested with pure-tone audiometry at the initial examination, then every 5 years until the licence holder reaches the age of 40 and then every 2 years thereafter.

[applicable until 12 February 2025 - Regulation (EU) 2019/27]

(i) For a class 1 medical certificate, and for a class 2 medical certificate when an instrument rating or a basic instrument rating is to be added to the licence, hearing shall be tested with pure-tone audiometry at the initial examination, then every 5 years until the licence holder reaches the age of 40, and then every 2 years until the licence holder reaches the age of 60 and every year thereafter.

[applicable from 13 February 2025 - Regulation (EU) 2024/2076]

(ii) When tested on a pure-tone audiometer, initial applicants shall not have a hearing loss of more than 35 dB at any of the frequencies 500, 1 000 or 2 000 Hz, or more than 50 dB at 3 000 Hz, in either ear separately. Applicants for revalidation or renewal with greater hearing loss shall demonstrate satisfactory functional hearing ability.

(2) A comprehensive ear, nose and throat examination shall be undertaken for the initial issue of a class 1 medical certificate and periodically thereafter when clinically indicated.

(3) For class 1 medical certificate holders involved in single-pilot HEMS operations, a comprehensive ear, nose and throat examination shall be completed at the first revalidation or renewal examination after the age of 60.

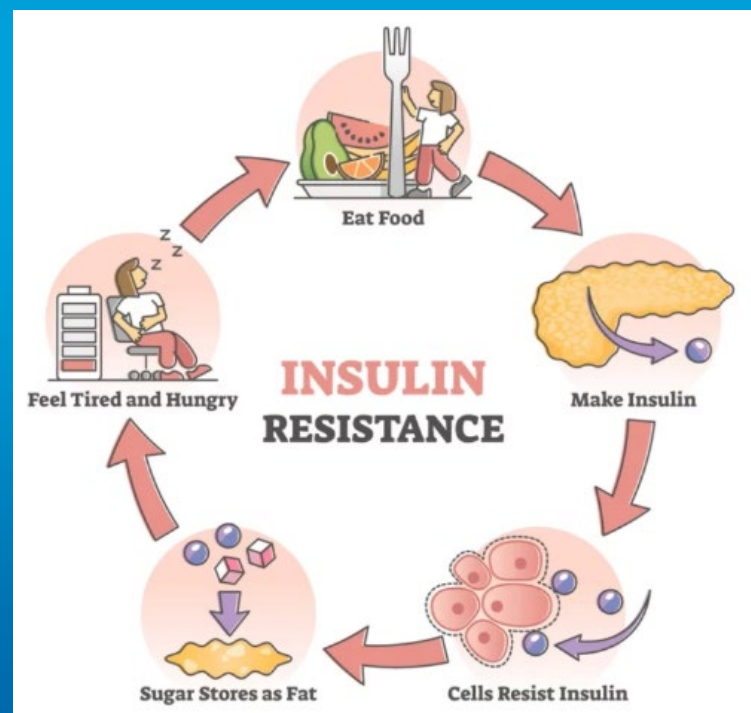
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- Endokrini sustav: hormoni i metabolizam

Inzulinska rezistencija

Funkcija štitnjače: hipertireoze ili hipotireoze

Menopauza



Zablude o starenju, uključujući neuspjeh da se napravi razlika između normalnog procesa starenja i procesa bolesti koji se češće javljaju kod starijih osoba, i dalje doprinose velikom dijelu nesporazuma i kontroverzi koje okružuju ovo pitanje.



HVALA!

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