

Medicinski aspekti održivog razvoja

Kardiovaskularne bolesti

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Aerozagađenje u urbanoj sredini, posebno u uskim gradskim zonama sa visokom frekvencijom saobraćaja (30%), ima značajan uticaj na zdravlje ljudi, a posebno na kardiovaskularni sistem.



Prema izveštaju Svetske zdravstvene organizacije, suspendovane čestice i opšte aerozagađenje su ključni faktori koji direktno utiču na zdravlje ljudi, sa ozbiljnim posledicama na kardiovaskularni i respiratorni sistem.



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Vazduh kao stabilna mešavina pretežno gasovitih (azot (78%), kiseonik (21%), ozon, helijum, vodonik... (1%)), a u manjoj meri i čestičnih komponenti, predstavlja osnov ljudskog života.




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Agencija za zaštitu životne sredine Srbije svakodnevno meri količine čestica sumpor-dioksida, PM 10, azot-dioksida i kobalta i na osnovu toga određuje kvalitet vazduha.

Evropska agencija za životnu sredinu meri količine čestica PM 2.5, PM 10, azot-dioksida, sumpor-dioksida i ozona.



KONCENTRACIJA SUSPENDOVANIH ČESTICA U SRBIJI PREMAŠUJE EU I WHO STANDARDE	
 36 $\mu\text{g}/\text{m}^3$ SRBIJA*	 53 $\mu\text{g}/\text{m}^3$ SRBIJA*
 25 $\mu\text{g}/\text{m}^3$ EU GODIŠNJI LIMIT	 40 $\mu\text{g}/\text{m}^3$ EU GODIŠNJI LIMIT
 10 $\mu\text{g}/\text{m}^3$ WHO PREPORUKE	 20 $\mu\text{g}/\text{m}^3$ WHO PREPORUKE
PM2.5	PM10



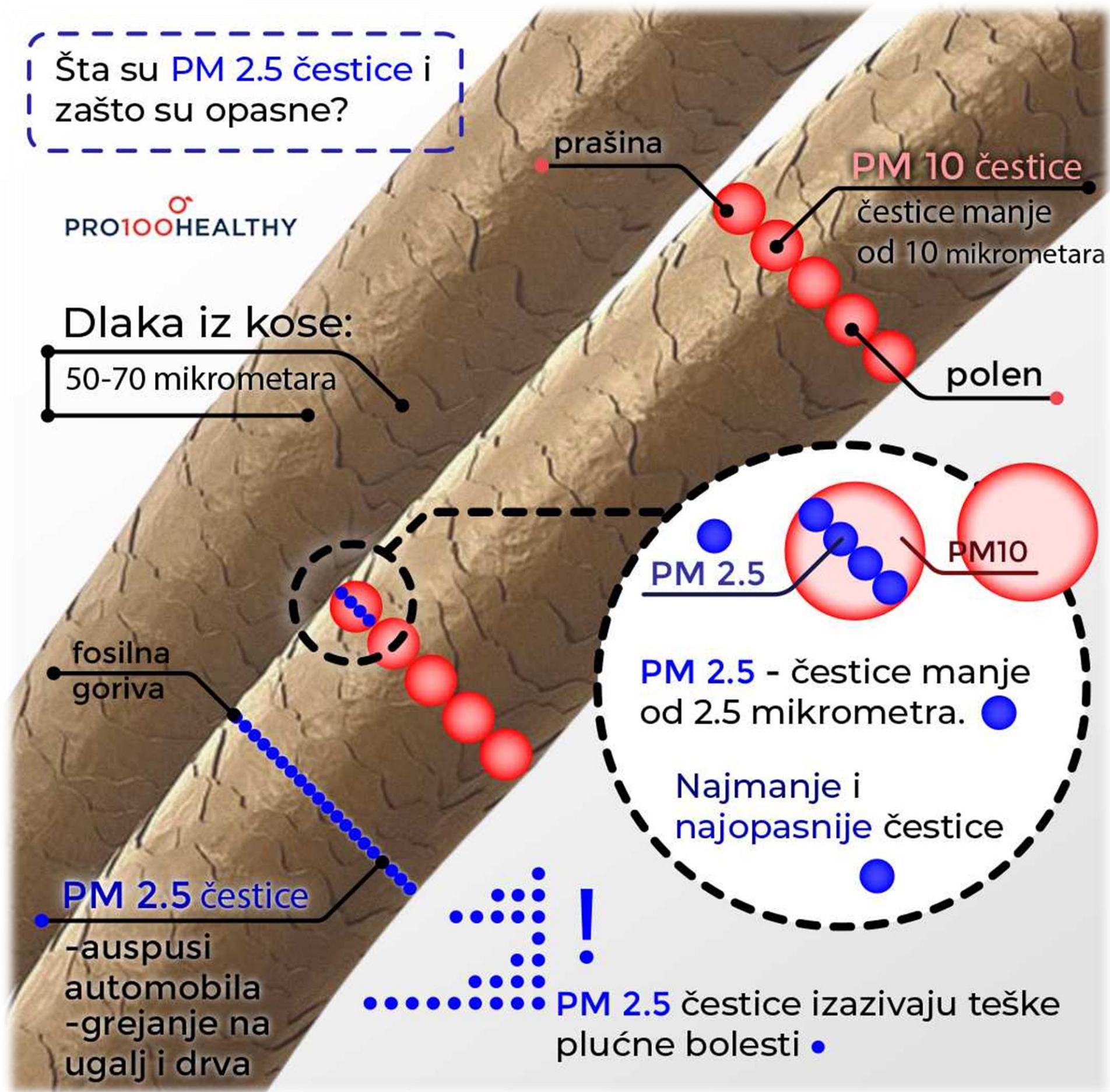
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6 criteria air pollutants (grupacija zagađujućih materija koje se smatraju najznačajnijim u pogledu uticaja na ljudsko zdravlje i životnu sredinu, u koje spadaju:

- 1) suspendovane čestice **PM 10, PM 2,5 i PM 0,1** (u pitanju su čestice koje lebde u vazduhu i koje mogu biti čvrste – prašina, tečne – kapljice ili gasovite – veliki molekuli, čije su dimenzije manje od 10 ili 2,5 mikrometara, a mogu da budu različitog porekla i sastava – prašina, pepeo, čađ, duvanski dim, isparenja,...)
- 2) gasoviti polutanti – ozon, ugljenmonoksid, sumpor dioksid, azot dioksid
- 3) olovo i benzo piren (BaP), kao konstituenti PM10 čestica



Vodeći izvori koji emituju suspendovane čestice, kao i većinu drugih zagađujućih materija su prirodni – mora, okeani, vulkani, prirodni šumski požari, ogoljene zemljane površine, kao i veštački (antropogeni) - procesi sagorevanja fosilnih goriva, odnosno industrija, termoelektrane, toplane, saobraćaj, individualna ložišta (grejanje i kuvanje u domaćinstvima), poljoprivreda i deponije.



“Doprinos”

Za sada najveći broj naučnih dokaza govori u prilog toga da postoji snažna povezanost između nivoa zagađenja vazduha i oboljevanja od kardiovaskularnih bolesti, ali taj stepen naučnih dokaza nije dovoljan da bi se reklo da je ta veza uzročno-posledična.



Stručnjaci iz Svetske zdravstvene organizacije su procenili da svake godine prevremeno umre oko 7 miliona ljudi.

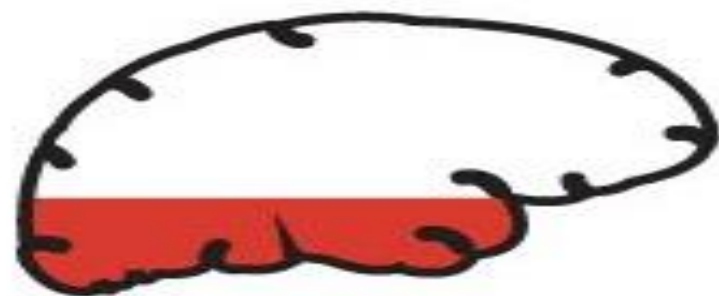
THE **INVISIBLE KILLER**

Air pollution may not always be visible, but it can be deadly.



29%

OF DEATHS FROM
LUNG CANCER



24%

OF DEATHS FROM
STROKE



25%

OF DEATHS FROM
HEART DISEASE



43%

OF DEATHS FROM
LUNG DISEASE



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ESC

European Society
of Cardiology

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REVIEW

Cardiovascular disease



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Air pollution, cardiovascular disease, and urban greening: an ecological blueprint

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Table 1 Comparison of the ceilings of mean annual concentrations ($\mu\text{g}/\text{mm}^3$) of the main ambient air pollutants according to the guidelines and standards for ambient air quality of the European Union, USA Environment Protection Agency, and World Health Organization compared with those of a few selected large countries

Pollutant	EU	EPA	WHO	Russian Federation	India	China	Japan	Australia
PM ₁₀	40	—	15	40	60	50	—	—
PM _{2.5}	25	12	5	25	40	35	15	8
NO ₂	40	30	10	40	40	40	—	60
Ozone	120	100	60	—	100	160	—	170

The dashes denote data not available.



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Association of long-term exposure to air pollutant mixture and incident cardiovascular disease in a highly polluted region of China[☆]
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India

Qatar



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RESPIRATORNI SISTEM

U efekte spadaju: povećani respiratorni simptomi, infekcije, povećana reaktivnost disajnih puteva, nadražaj, upala pluća, povećana respiratorna smrtnost i bolničke posete, hospitalizacija, smanjena funkcija pluća, pogoršanje astme, pogoršanje hronične opstruktivne bolesti pluća, povećan rizik od raka pluća

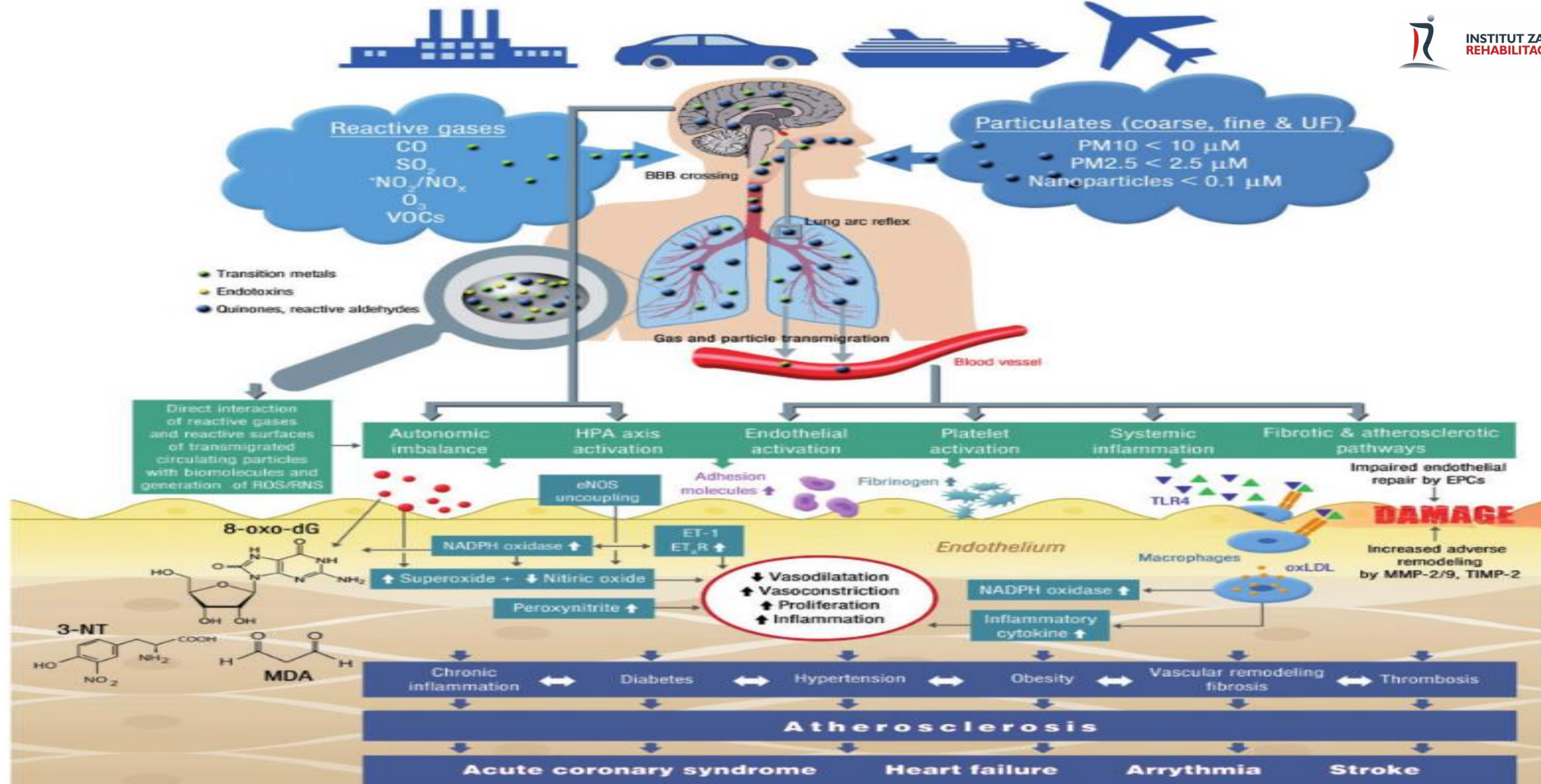
KARDIOVASKULARNI SISTEM

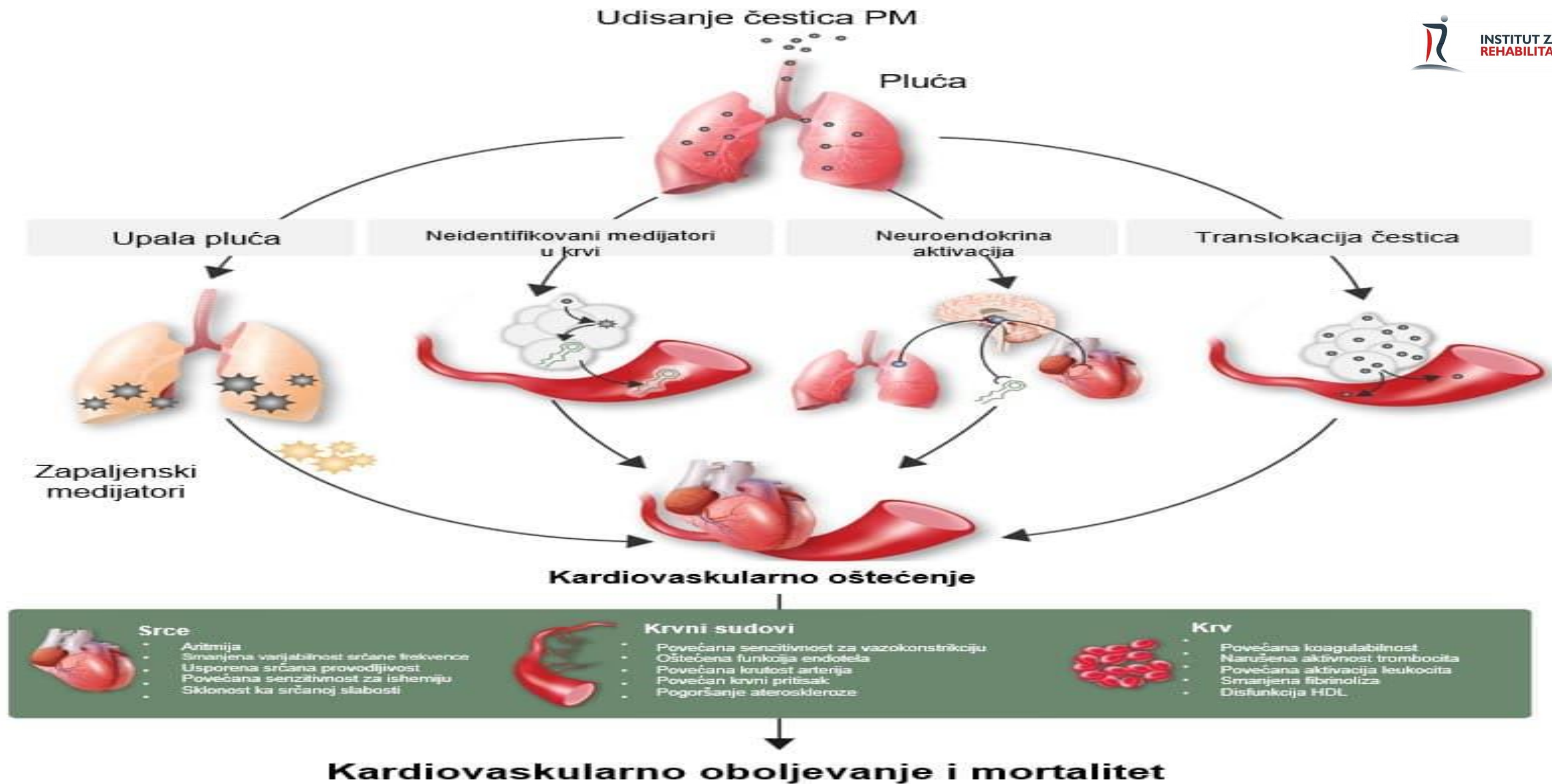
U efekte spadaju: promenjena srčana autonomna funkcija, infarkt miokarda, angina pectoris, povećan krvni pritisak, ateroskleroza, hipertenzija, povećana cerebrovaskularna ishemija

NERVNI I CEREBROVASKULARNI SISTEM

U efekte spadaju: neurorazvojni poremećaji, upala nervnog tkiva, oksidativni stres, promene u krvno–moždanoj barijeri, glavobolja, uznemirenost, udar, Alchajmerova bolest, Parkinsonova bolest







AIR POLLUTION & CARDIOVASCULAR DISEASE



Air pollution is the **world's largest single environmental health risk**

7 MILLION PEOPLE



die every year
because of
air pollution



50%

die from
heart disease
and stroke



According to the World Health Organization,
air pollution is responsible for



25%
OF ALL DEATHS FROM
HEART DISEASE

24%
OF ALL DEATHS FROM
STROKE



HOW DOES AIR POLLUTION AFFECT YOUR HEART?

Tiny particles
travel into
the
bloodstream



They damage the inside
walls of your blood
vessels, causing them
to become narrower
and harder



Restricted movement
of blood vessels can
increase your blood
pressure



Your blood is more
likely to clot, which
can lead to a heart
attack or stroke



Normal electrical functioning
of your heart is affected,
which can cause abnormal
heart rhythms



If you already have heart disease, even short-term exposure to air pollution increases your risk of heart attack and stroke.



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OUTDOOR AIR POLLUTION



9 IN 10 PEOPLE
live in places where air quality
levels exceed recommended limits

Sources of outdoor air pollution



Industry &
Energy Supply

Transport



Waste
Management



Dust



Agricultural Practices



INDOOR AIR POLLUTION



3 BILLION PEOPLE cook using polluting open
fires or stoves fuelled by
kerosene and solid fuels

In poorly ventilated dwellings, indoor smoke can be

100 X HIGHER than acceptable levels

3.8 MILLION

people die every year from
illnesses attributable to household
air pollution

45%

of these
deaths are
due to heart
disease or
stroke



People living in low- and middle-income
countries are disproportionately affected
by both indoor and outdoor air pollution.



WHAT CAN YOU DO TO REDUCE YOUR RISK?

Walk or cycle
instead of driving
(but avoid busy
roads)



Eat plenty of fruit
and vegetables



Exercise
regularly



Monitor air
pollution
levels



Avoid highly polluted
areas



If you have
an existing
heart
condition,
talk to your
doctor



Policies and investments supporting

**CLEANER
TRANSPORT**



**ENERGY-
EFFICIENT
HOMES**



**POWER
GENERATION**



**INDUSTRY
REGULATION**



**ACCESS
TO CLEAN
FUEL AND
TECHNOLOGIES**



**BETTER
MUNICIPAL
WASTE
MANAGEMENT**



can effectively reduce key sources of air pollution

Sources: World Health Organization; IHME, Global Burden of Disease; British Heart Foundation



AMERICAN
COLLEGE of
CARDIOLOGY



American
Heart
Association.



ESC
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of Cardiology



WORLD
HEART
FEDERATION



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THANK YOU



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