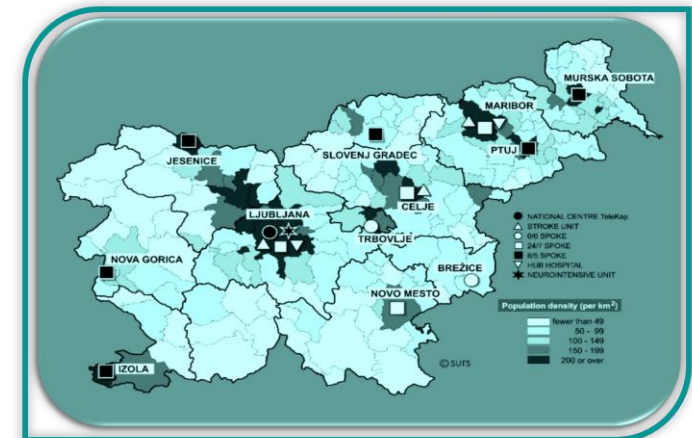




Prof. dr. Bojana Žvan, dr. med., višja svetnica, FESO
UKC Ljubljana
MC Medicor

Kardio-nevro-vaskularne bolezni: sedanje in bodoče možnosti

Cardio-neuro-vascular diseases:
current and future perspectives





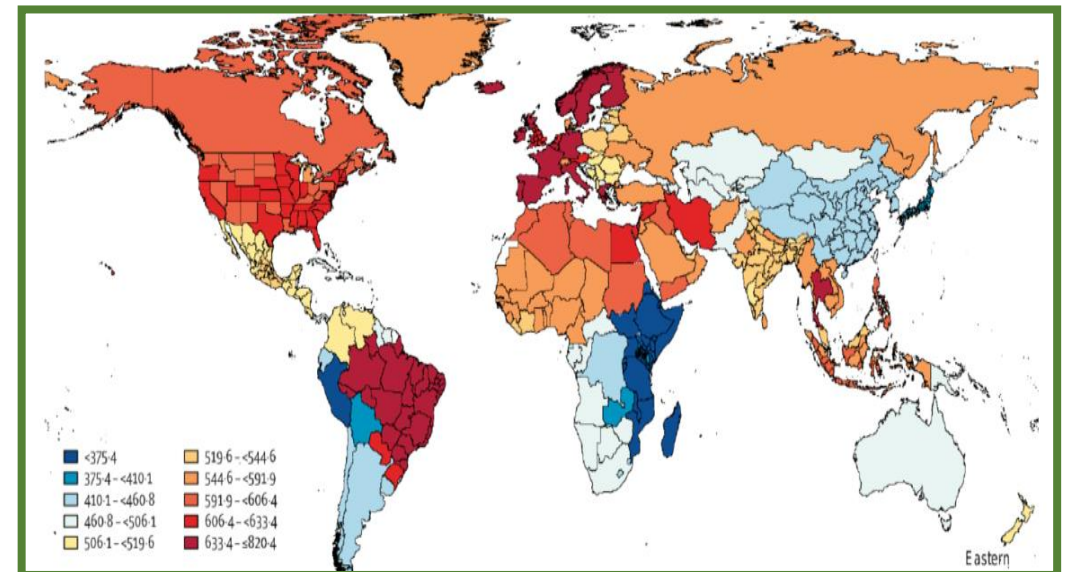
Onesposobljenost prilagojenih let življenja nevroloških bolezni glede na geografske predele v svetu

Disability Adjusted Life Years of Neurological Diseases by Geographic Region in the World

Rank	Global	East Asia	Southeast Asia	Oceania	Central Asia	Central Europe	Eastern Europe	High-income Asia Pacific	Australasia	Western Europe	Southern Latin America	High-income North America	Caribbean	Andean Latin America	Central Latin America	Tropical Latin America	North Africa and Middle East	South Asia	Central sub-Saharan Africa	Eastern sub-Saharan Africa	Southern sub-Saharan Africa	Western sub-Saharan Africa	
Možganska kap	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
Migraine	2	3	3	3	2	2	2	2	1	1	2	2	2	2	2	3	2	2	4	3	3	3	3
Alzheimer's disease and other dementias	3	2	2	2	4	3	3	3	3	3	3	3	3	3	3	2	3	4	3	4	4	4	4
Meningitis	4	11	5	4	9	12	10	14	13	13	11	13	4	9	10	8	5	3	2	2	5	2	2
Epilepsy	5	5	4	5	3	7	8	6	7	6	5	6	5	4	4	4	4	6	5	5	2	5	5
Spinal cord injury	6	7	8	9	7	6	5	4	4	4	4	4	9	8	9	9	6	9	6	7	10	9	9
Traumatic brain injury	7	6	6	7	5	4	4	7	8	8	9	8	7	7	6	7	9	7	7	8	6	7	7
Brain and other CNS cancer	8	4	9	10	6	5	6	8	5	5	6	5	8	6	7	5	8	10	9	11	9	10	10
Tension-type headache	9	8	10	8	10	8	7	5	6	7	7	7	6	5	5	6	7	8	8	9	7	6	6
Encephalitis	10	9	7	6	8	13	11	11	14	14	12	14	11	10	11	12	10	5	10	10	11	8	8
Parkinson's disease	11	10	11	12	12	9	9	10	9	10	8	9	12	11	12	11	12	13	13	13	12	13	13
Other neurological disorders	12	12	12	11	11	10	12	9	10	9	10	10	10	12	8	10	11	12	12	12	8	12	12
Tetanus	13	15	13	14	15	15	15	15	15	15	15	15	13	15	15	15	14	11	11	6	15	11	11
Multiple sclerosis	14	14	15	15	13	11	13	13	12	11	13	11	15	14	14	14	13	14	14	14	13	15	15
Motor neuron diseases	15	13	14	13	14	14	14	12	11	12	14	12	14	13	13	13	15	15	15	15	14	14	14

Možganska kap in migrena sta med najbolj razširjenimi in onesposabljučimi nevrološkimi boleznimi.

Stroke and migraine are among the most widespread and disabling neurological diseases.



Neurology Collaborators. Global, regional, and national burden of neurological disorders, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet Neurol.* 2019 May;18(5):459-480.

Možganska kap v svetu ni več bolezen starejših

Stroke is no longer a disease of the elderly worldwide



12,2 milijona/leto
1 IMK/3 sekunde

101 milijonov oseb po IMK
podvojilo v zadnjih 30 letih



2017
450
milijard
\$

Stroški zaradi IMK
450 milijard \$ 2017

89% smrti po IMK 2019 v državah
z nizkimi in srednjimi prihodki



1 od 4 ljudi živi po IMK
Št. se je povečalo
za 50% v 17 letih



80% kapi in srčnih napadov
pri osebah z nizko ali zmerno
stopnjo tveganja



2019 - 63% IMK pri osebah
mlajših od 70 let
IMK ni več bolezen starejših



**1 IN 3 DEATHS IN WOMEN
ARE FROM CARDIOVASCULAR
DISEASE AND STROKE.**

You can quit. CALL 1-800-QUIT-NOW.

10
vodilnih
dejavnikov
tveganja
za IMK

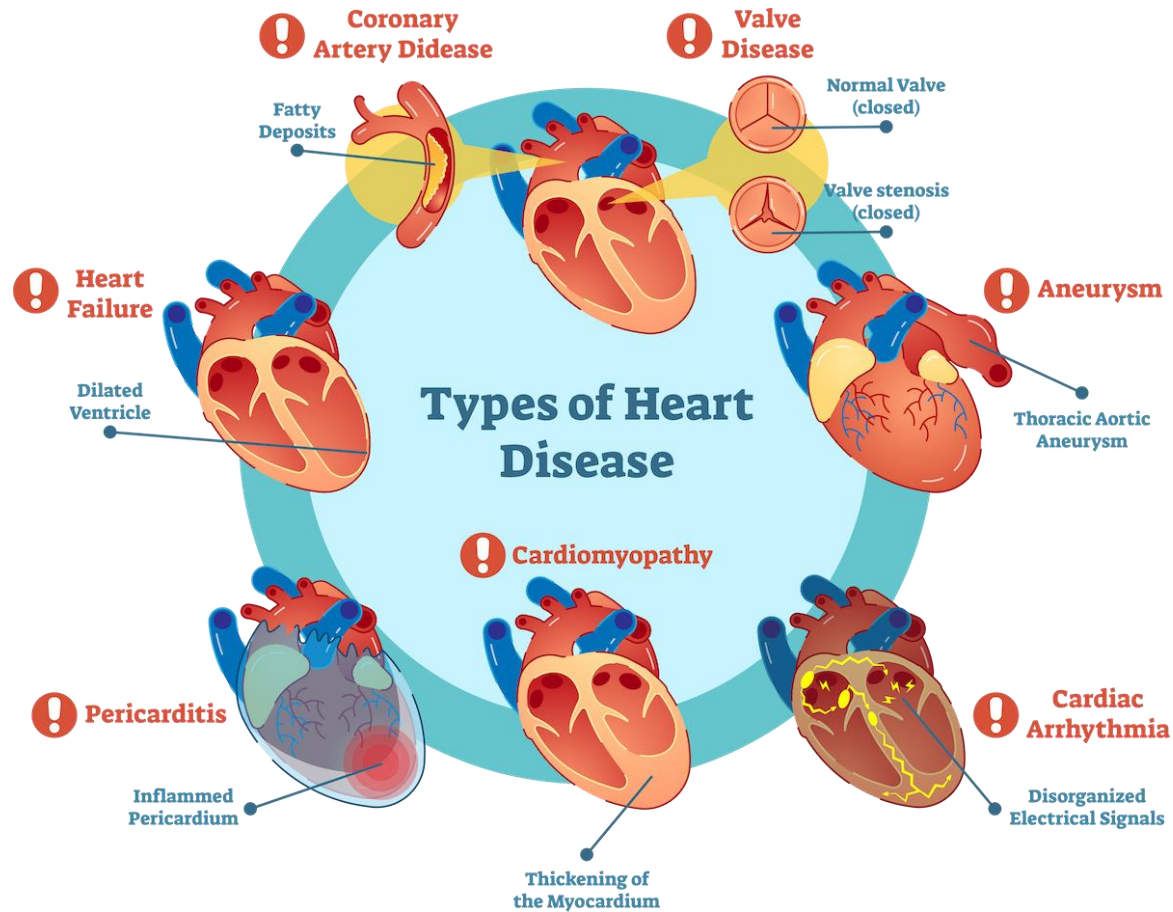
56%	ELEVATED SYSTEMIC BLOOD PRESSURE	24%	HIGH BODY MASS INDEX	20%	HIGH FASTING GLUCOSE	20%	AIR POLLUTION	18%	SMOKING
31%	POOR DIET	10%	HIGH LDL CHOLESTEROL	8%	KIDNEY DYSFUNCTION	6%	ALCOHOL USE	2%	LOW PHYSICAL ACTIVITY

*The sum of stroke burden attributable to the risk factors exceeds 100% because the effect of many of these risk factors overlap and are mediated partly or wholly through another risk factors. Percentages show stroke-related disability-adjusted life years attributable to each risk factor.



Tipi srčnih bolezni, ki lahko povzročijo MK

Types of Heart diseases as a cause of Stroke



- ✓ Bolezen srčnih zaklopk
- ✓ Koronarna arterijska bolezen
- ✓ Anevrizma torakalne aorte
- ✓ Srčne aritmije
- ✓ Kardiopmiopatija
- ✓ Perikarditis
- ✓ Miokarditis
- ✓ Srčno popuščanje



Število ljudi s srčnimi boleznimi, ki povzročijo možgansko kap, je danes najvišje v zgodovini

The number of people with heart disease that causes stroke is the highest in history today

- ✓ AF pride in mine
 - ✓ Pojavi se lahko brez simptomov
 - ✓ Oseba morda ne ve, da ima AF
 - ✓ Srčno-žilni dogodek → MK
 - ✓ Prepozno !!!
- ✓ AF comes and goes
 - ✓ It can occur without symptoms
 - ✓ A person may not know they have AF
 - ✓ Cardiovascular event → stroke
 - ✓ Too late!!!



Preprečevanje možganske kapi in atrijska fibrilacija

Prevention of stroke and AF

- ✓ Hitra diagnoza
 - ✓ Zdravila
 - ✓ Protikoagulacijska zaščita
 - ✓ Posegi
 - ✓ Preventiva
- ✓ AF pomembno poveča tveganje za MK po 1. AMI
 - ✓ Tisti z že obstoječo AF imajo večje tveganje za MK & moški ≤ 65 let
- ✓ AF significantly increases the risk of MK after 1st AMI
 - ✓ Those with pre-existing AF have a higher risk of MK & men ≤ 65 years
- ✓ Quick diagnosis
 - ✓ Medicines
 - ✓ Anticoagulation protection
 - ✓ Interventions
 - ✓ Prevention

Atrijska fibrilacija Simptomi



Huda utrujenost



Nepravilen utrip



Palpitacije



Metuljčki v prsih



Vrtoglavica
in omotica



Sinkopa

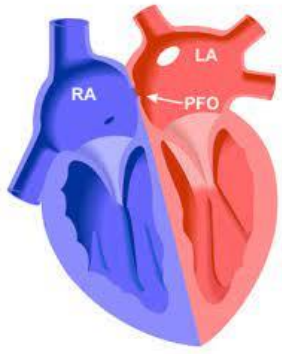


Težko dihanje



Bolečina v prsih





Odprto ovalno okno (OOO)/migrena/možganska kap

- ✓ OOO in migrena pogosti v splošni populaciji: 30% kriptogenih MK/27% OOO/15% migrena
- ✓ OOO → subklinična embolija → metaboliti iz venskega sistema obidejo pljuča in neposredno vstopijo v sistemsko cirkulacijo → draženje trigeminalnega živca in vaskularnih struktur možganov → migrena
- ✓ OOO → prehodna hipoksija → vzrok za subklinične infarkte v možganih → draženje in nagnjenost k migreni
- ✓ Na podlagi dokazov → perkutano zapiranje OOO za zdravljenje migrene **ne priporočajo**
- ✓ Premislek pri bolnikih z **refraktorno migreno**, pogostimi migrenami z avro in pomembno onesposobljenostjo

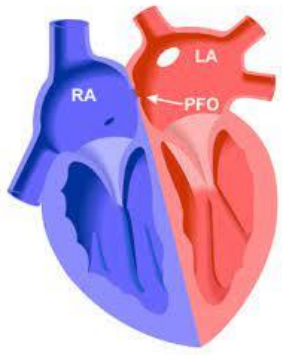
- ✓ PFO and migraine common in the general population: 30% cryptogenic stroke/27% PFO/15% migraine
- ✓ PFO → subclinical embolism → metabolites from the venous system bypass the lungs and directly enter the systemic circulation → irritation of the trigeminal nerve and vascular structures of the brain → migraine
- ✓ PFO → transient hypoxia → cause of subclinical infarcts in the brain → irritation and tendency to migraine
- ✓ Evidence based → percutaneous closure of PFO **is not recommended** for the treatment of migraine
- ✓ Consideration in patients with **refractory migraine**, frequent migraine with aura and significant disability

Kahya Eren N, et al. To be or not to be patent: the relationship between migraine and patent foramen ovale. Headache 2015; 55: 934–42.

Sharma A, et al. Role of patent foramen ovale in migraine etiology and treatment: a review. Echocardiography 2011; 28: 913–7.

Sevgi EB, et al. Paradoxical air microembolism induces ... J Am Heart Assoc 2012; 1: e001735.

Dowson A, et al. Migraine Intervention With STARFlex Technology (MIST) trial: Circulation 2008; 117: 1397–404.



Kardiogeni in paradokсни embolizem

Cardiogenic and paradoxical embolism

- ✓ Približno 20 % IMK pri mladih je posledica kardioembolizma; podoben delež kot pri starejših bolnikih.
- ✓ Vzroki revmatska bolezen zaklopk, umetne zaklopke in atrijska fibrilacija, pri mladih še endokarditis, miokarditis, dilatativna kardiomiopatija in odprto ovalno okno (OOO)
- ✓ Prevalenca OOO med mlajšimi bolniki s kriptogeno IMK je višja kot v splošni populaciji
- ✓ Mehanizem paradokсни embolizem in prehod venskega strdka iz desnega v levo srce prek OOO

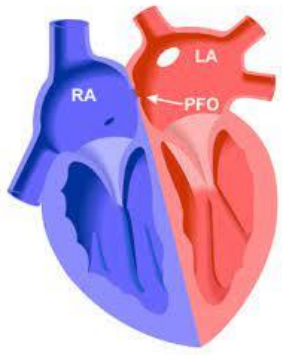
- ✓ Approximately 20% of IS in young people is due to cardioembolism; similar proportion to that in older patients.
- ✓ Causes rheumatic valve disease, artificial valves and atrial fibrillation, in young people also endocarditis, myocarditis, dilated cardiomyopathy and PFO
- ✓ The prevalence of PFO among younger patients with cryptogenic IS is higher than in the general population
- ✓ The mechanism is paradoxical embolism and the passage of a venous clot from the right to the left heart via OOO

Kahya Eren N, et al. To be or not to be patent: the relationship between migraine and patent foramen ovale. Headache 2015; 55: 934–42.

Sharma A, et al. Role of patent foramen ovale in migraine etiology and treatment: a review. Echocardiography 2011; 28: 913–7.

Sevgi EB, et al. Paradoxical air microembolism induces ... J Am Heart Assoc 2012; 1: e001735.

Dowson A, et al. Migraine Intervention With STARFlex Technology (MIST) trial: Circulation 2008; 117: 1397–404.



Kardiogeni in paradokсни embolizem

Cardiogenic and paradoxical embolism

- ✓ Merila za paradokсни embolizem:
 - dokaz arterijskega možganskega infarkta,
 - odsotnost emboličnega materiala v levem srcu,
 - dokaz venske tromboze/pljučne embolije in
 - dokaz desno-levega obvoda
- ✓ Odločitev glede zapiranja OOO - konzilij: Osnova verjetnost, da je možganska kap res posledica OOO.
- ✓ Zapiranje OOO je smiselno le pri mlajših bolnikih z embolično IMK, ki ostaja nepojasnjena.
- ✓ Konzilij: individualna, strokovno podprta obravnava, ki je ob odsotnosti jasnih smernic potrebna za preprečevanje nepotrebnih posegov.

- ✓ Criteria for paradoxical embolism:
 - evidence of arterial cerebral infarction,
 - absence of embolic material in the left heart,
 - evidence of venous thrombosis / pulmonary embolism and
 - proof of right-left bypass
- ✓ The decision to close OOO: the probability that the stroke is indeed due to OOO.
- ✓ Closure of the OOO only makes sense in younger patients with embolic MIK that remains unexplained.
- ✓ Consultation: individual, professionally supported treatment, which is necessary in the absence of clear guidelines to prevent unnecessary intervention

Statistični podatki o srčnih boleznih in možganski kapi (posodobitev 2021)



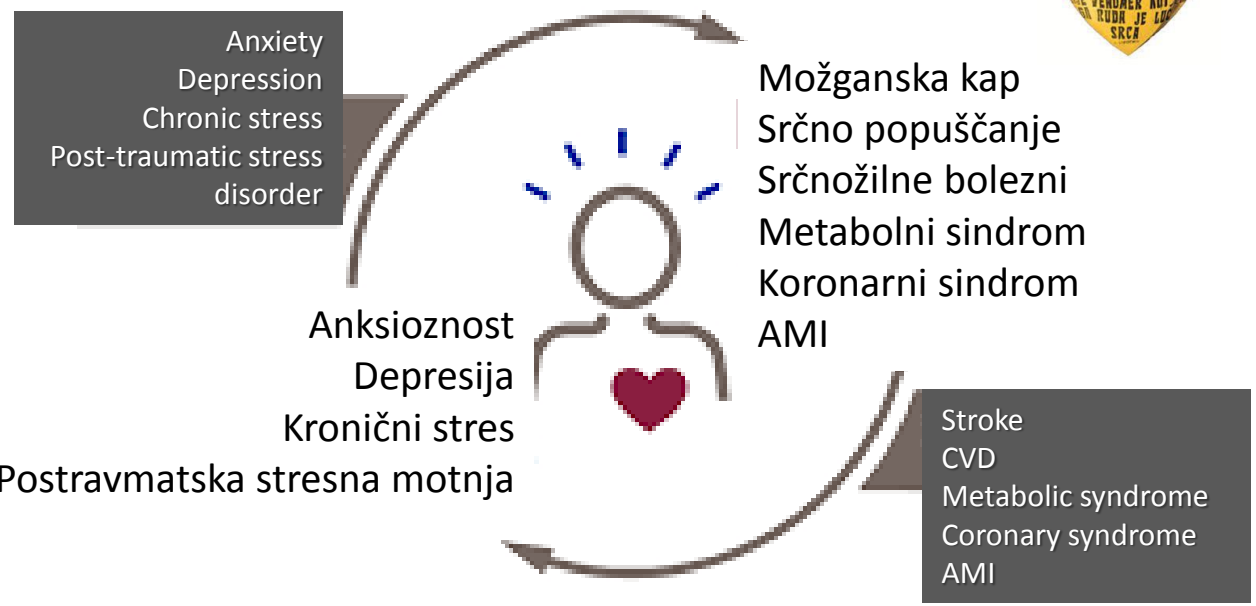
Sedem pristopov k ohranjanju zdravega srca in možganov:

1. Bodite aktivni !
2. Ohranjajte zdravo telesno težo !
3. Poučite se o holesterolu !
4. Ne kadite in ne uporabljajte brezdimnega tobaka !
5. Jejte zdravo !
6. Ohranjajte zdrav krvni tlak !
7. Poučite se o krvnem sladkorju in sladkorni bolezni !



Kronični psihosocialni stres je povezan s srčno-možgansko-žilnimi boleznimi

Chronic psychosocial stress is associated with cardio-neurovascular diseases

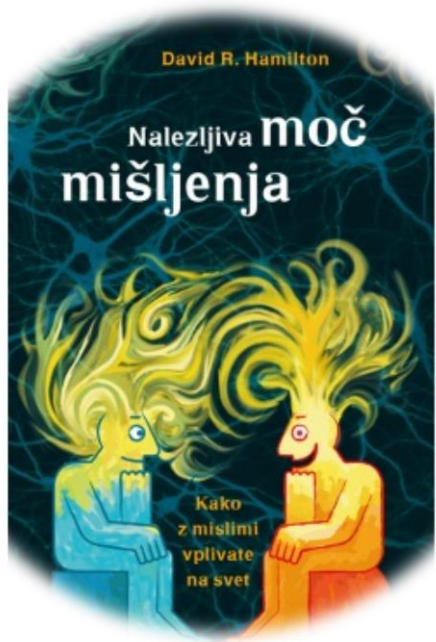


*Smeh je nalezljiv,
ujameš ga kot prehlad.
Ko se mi nekdo
nasmehne,
še sam se smejem rad.*

*Vreden je več kot cvet,
en sam nasmeh –
najmanjši,
lahko obkroži svet.*

*Laughter is contagious,
you catch it like a cold.
When someone smiles at me,
I like to laugh myself.*

*It is worth more than a flower,
a single smile - the smallest,
can go around the world.*





Kronični psihosocialni stres je povezan s srčno-možgansko-žilnimi boleznimi

Psihosocialni stres povezan s SMŽB	Predlagani mediatorski mehanizmi
*Bezupnost lahko odraža trenutno ali preteklo "življenjsko situacijo" ali pa je lahko simptom depresije; SMŽB – srčno-možgansko-žilne bolezni; BMI – indeks telesne mase	
Delovni stres	
Velik napor in malo nagrad	Povečan BMI, povečana raven holesterola
Izčrpavajoč slog spopadanja (tekmovalni)	Oslabljena fibrinolitična sposobnost
Stres doma	
Razpad zakonske zveze pri ženskah	Psihični stres, ki ni drugače opredeljen
Skrb za zakonca z demenco	Psihični stres, ki ni drugače opredeljen
Socialna izolacija (in zanemarjanje samega sebe)	
Nizek dohodek (revščina)	
> fibrinogen, > kortizol	
Kronične čustvene motnje	
Anksioznost	Vnetje nizke stopnje in ateroskleroza
Brezupnost*	Avtonomna disfunkcija (hipofunkcija vagusa)
Brezupnost in depresija	Vnetje nizke stopnje in ateroskleroza
Depresija	Vnetje nizke stopnje in ateroskleroza

Možganska kap je drugi najpogostejši vzrok smrti in glavni vzrok invalidnosti odraslih



Stroke is the second leading cause of death and the leading cause of disability in adults

- ✓ Analiza podatkov NIJZ za Slo → postopno padanje incidenčne stopnje in umrljivost zaradi MK in 30-dnevne smrtnosti po MK
- ✓ V primerjavi z drugimi EU državami → incidenčna stopnja MK v Sloveniji je v povprečju
- ✓ Najvišja incidenca MK → pomurska regija
- ✓ Najvišja smrtnost → osrednjeslovenska regija in Podravska regija (oba UKC)
- ✓ Večja smrtnost pri hemoragični MK in ženskah
- ✓ Stopnja umrljivosti in 30-dnevna smrtnost zaradi MK → **pod vrhom najvišjih stopenj v EU**
- ✓ Zmanjšanje incidence in umrljivosti zaradi MK
 - Preventiva (primarna, sekundarna)
 - IVT in MeR → temelj zdravljenja akutne IMK
 - Nacionalna mreža TeleKap → zmanjšuje razlike v obravnavi MK v državi

- ✓ NIJZ data analysis for Slo → gradual decline in the incidence and mortality rate due to MK and 30-day mortality after cerebrovascular event (CVD)
- ✓ Compared to other EU countries → the incidence rate of stroke in Slovenia is on average
- ✓ The highest incidence of CVD → Pomurska region
- ✓ Highest mortality → Osrednjeslovenska region and Podravska region (both UMC)
- ✓ Higher mortality in hemorrhagic MK and women
- ✓ Mortality rate and 30-day mortality from CVD → below the peak of the highest rates in the EU
- ✓ Reduction in stroke incidence and mortality
 - Prevention (primary, secondary)
 - IVT and MeR → the basis of the treatment of acute stroke
 - TeleKap national network → reduces the differences in the treatment of stroke in the country



Revaskularizacijsko zdravljenje ishemične možganske kapi (IMK)

Revascularization treatment of ischemic stroke

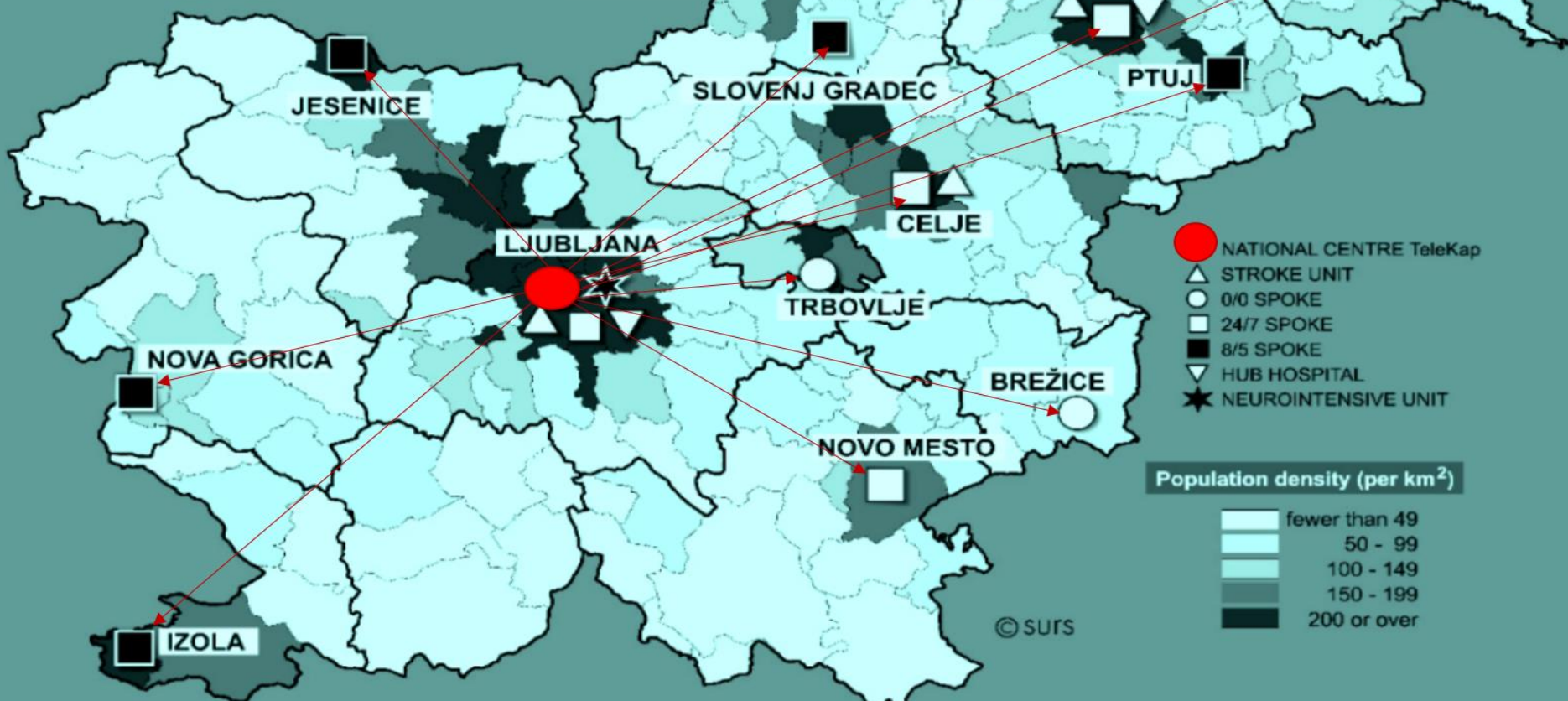
- ✓ **Umrljivost zaradi MK je odvisna od kakovosti zdravstvene oskrbe**
 - ✓ Intravenska tromboliza (IVT) in mehanska revaskularizacija (MeR) → edina odobrena načina zdravljenja za akutno IMK
 - ✓ IVT in MeR → pomembno zmanjšujeta invalidnost zaradi IMK
 - ✓ Uporaba IVT in MeR po Evropi se razlikuje:
 - nizka uporaba IVT (MeR) → večja stopnja invalidnosti in smrtnosti
 - manjša dostopnost do IVT/MeR na podeželju in državah s skromnejšimi dohodki
 - ✓ Skrajševanje časa do IVT (MeR) → hitrejše zdravljenje
 - ✓ Nove ESO smernice ponujajo širšo uporabo IVT/MeR (pozno časovno okno, relativna kontraindikacija za IVT)
- ✓ **Stroke mortality depends on the quality of medical care**
 - ✓ Intravenous thrombolysis (IVT) and mechanical revascularization (MR) → the only approved treatment for acute stroke
 - ✓ IVT and MR → significantly reduce disability due to stroke
 - ✓ The use of IVT and MR across Europe varies:
 - low use of IVT (MeR) → higher rates of disability and mortality
 - less accessibility to IVT/MeR in rural areas and low income countries
 - ✓ Shortening time to IVT (MeR) → faster treatment
 - ✓ New ESO guidelines offer wider use of IVT/MR (late time window, relative contraindication for IVT)



Enf

Edu

- ✓ 2 milijona prebivalcev
- Gostota prebivalstva:
 - 1000/km² v Ljubljani
 - 5/km² v alpskih regijah



- NATIONAL CENTRE TeleKap
- △ STROKE UNIT
- 0/0 SPOKE
- 24/7 SPOKE
- 8/5 SPOKE
- ▽ HUB HOSPITAL
- ★ NEUROINTENSIVE UNIT

Population density (per km²)

lightest blue	fewer than 49
light blue	50 - 99
medium blue	100 - 149
dark blue	150 - 199
black	200 or over

© SURS

- ✓ Za
- ✓ Tel
- ✓ Tel
- ✓ Na
- ✓ IVT
- ✓ MeR

treatment of
eKap).
stroke
nry in light of
ote
and/or MR
surgical
als
ransferred to

Bolnišnice	Št. vseh bolniških postelj za MK	Postelje v enotah za možgansko kap (EMK)	Št. vseh možganskih kapi	Št. ishemičnih možganskih kapi	Št. intravenskih tromboliz (IVT)	Št. mehanskih revaskularizacij (MeR)	Št. Telekonzultacij
SB CE 2019	25	8	521	443	83 (18.7%)	29 (6.5%)	153
SB CE 2020	25	8	518	440	60 (13.6%)	13 (2.9%)	116
UKC Mb 2019	30	8	802	534	84 (15.7%)	48 (9%) 27%	1
UKC Mb 2020	30	8	741	491	79 (16%)	22 (4.5%) 16%	24
UKC LJ 2019	60	8	1982	1135	234 (21%)	178 (15.7%) 73%	60
UKC LJ 2020	60	8	1794	1119	224 (20%)	136 (12%) 84%	41
SB NM 2019	20	0	219	218	64 (29%)	9 (4%)	75
SB NM 2020	20	0	202	199	40 (20%)	6 (3%)	59
SB SG 2019	14	0	262	113	16 (14.5%)	8 (7%)	77
SB SG 2020	14	0	280	130	17 (13%)	4 (3%)	94
SB NG 2019	14	0	200	170	18 (10.6%)	4 (2.3%)	199
SB NG 2020	14	0	253	181	29 (16%)	3 (1.9%)	219
SB Izola 2019	19	0	186	158	22 (14%)	3 (1.2%)	109
SB Izola 2020	19	0	174	154	12 (8%)	5 (3.2%)	98
SB Jesenice 2019	12	0	146	131	16 (12.2%)	5 (3.8%)	168
SB Jesenice 2020	12	0	180	156	27 (17.3%)	2 (1.3%)	204
SB Brežice 2019	4	0	65	51	20 (39%)	1 (1.9%)	103
SB Brežice 2020	4	0	55	46	24 (52%)	1 (2.1%)	125
SB Trbovlje 2019	0	0	7	6	2 (33%)	0	9
SB Trbovlje 2020	0	0	5	4	0 (0%)	0	8
SB Ptuj 2019	6	0	94	72	27 (37%)	3 (4%)	65
SB Ptuj 2020	6	0	91	72	43 (59%)	9 (12.5%)	93
SB MS 2019	14	0	288	247	39 (15.7%)	7 (2.8%)	116
SB MS 2020	14	0	237	181	31 (17%)	5 (2.7%)	109
Total							
2019	218	24	4772	3278 69,5%	625 (19.0%)	295 (7%)	1135
2020	218	24	4496	3173 70,6%	586 (18.6%)	206 (5%)	1190



Obravnava bolnikov z MK v Sloveniji v letih 2019 in 2020

Treatment of patients with stroke in Slovenia in 2019 and 2020

Vse mrežne bolnišnice 2019

- ✓ 2019 → 4772 bolnikov z MK: IMK 3278 (69,5%) bolnikov
- ✓ 2019 → IVT 625 (19%) bolnikov z AIMK
- ✓ 2019 → MeR 295 (7%) bolnikov z AIMK

Vse mrežne bolnišnice 2020

- ✓ 2020 → 4462 bolnikov z MK: IMK 3149 (70,6%) bolnikov
- ✓ 2020 → IVT 586 (18,6%) bolnikov z AIMK
- ✓ 2020 → MeR 206 (5%) bolnikov z AIMK

V mreži TeleKap → delež IVT večji:

30 % bolnikov z AIMK (>50% v nekaterih mrežnih SB)

Večje št. bolnikov v mreži TeleKap:

> št. IVT v mreži TeleKap ($r = 0,905$; $p = 0,013$)

All network hospitals 2019

- ✓ 2019 → 4772 patients with stroke: ischemic stroke (IS) 3278 (69.5%) patients
- ✓ 2019 → IVT 625 (19%) patients with acute IS
- ✓ 2019 → MR 295 (7%) patients with acute IS

All Network Hospitals 2020

- ✓ 2020 → 4462 patients with stroke: IS 3149 (70.6%) patients
- ✓ 2020 → IVT 586 (18.6%) patients with acute IS
- ✓ 2020 → MR 206 (5%) patients with acute IS

TeleKap network → the rate of IVT is higher:

30% of patients with acute IS (>50% in some network GHs)

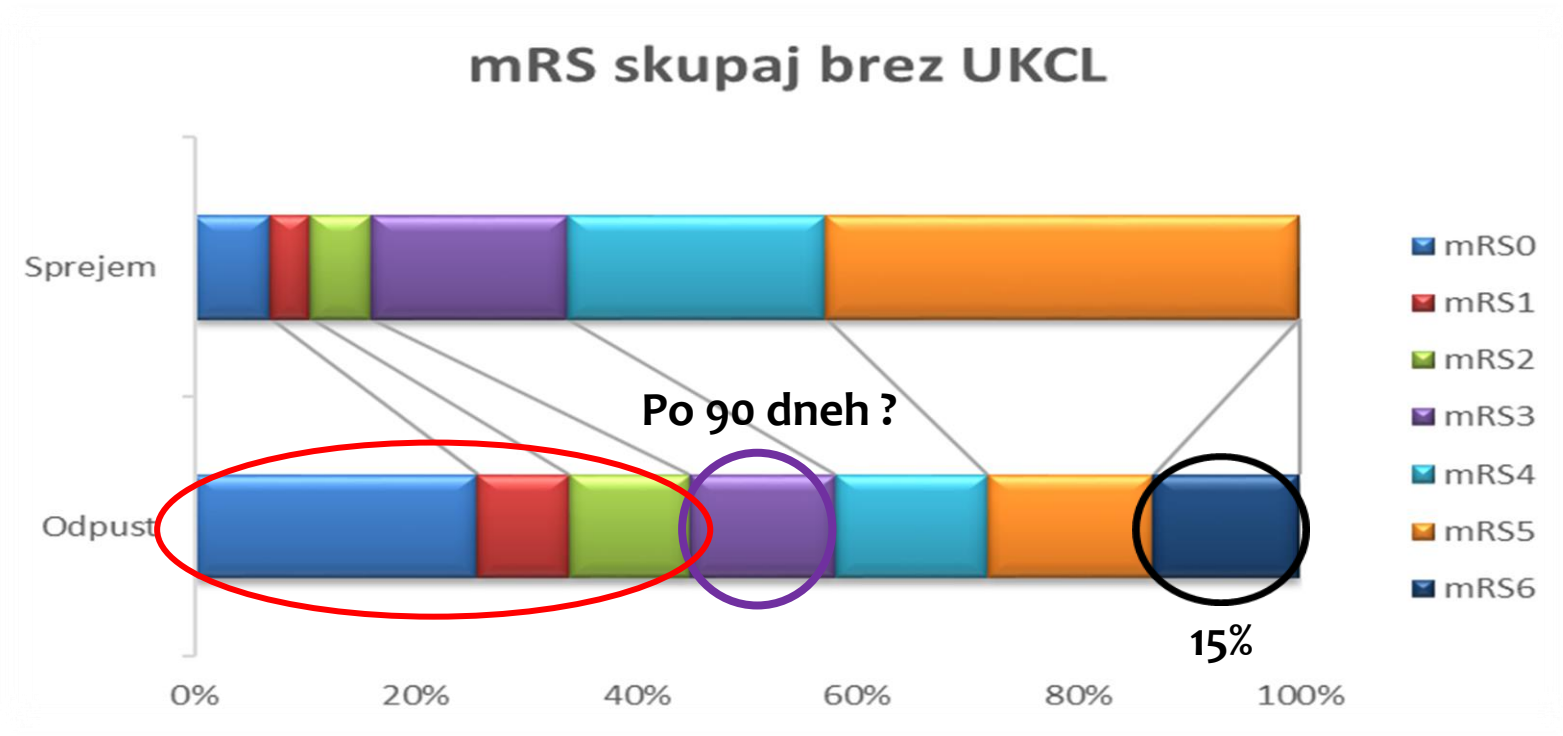
Larger No. of patients in the TeleKap network:

> No. IVT in the TeleKap network ($r = 0.905$; $p = 0.013$)

Izidi po IVT v mreži TeleKap

Outcomes after IVT in the TeleKap network

Analiza funkcionalnega stanja bolnikov po lestvici mRS ob odpustu iz mrežnih bolnišnic (mRS 0, 1 in 2 = dober izid) (2020);
Št. pacientov IVT – 234 (Number of patients – 234; the year 2020)

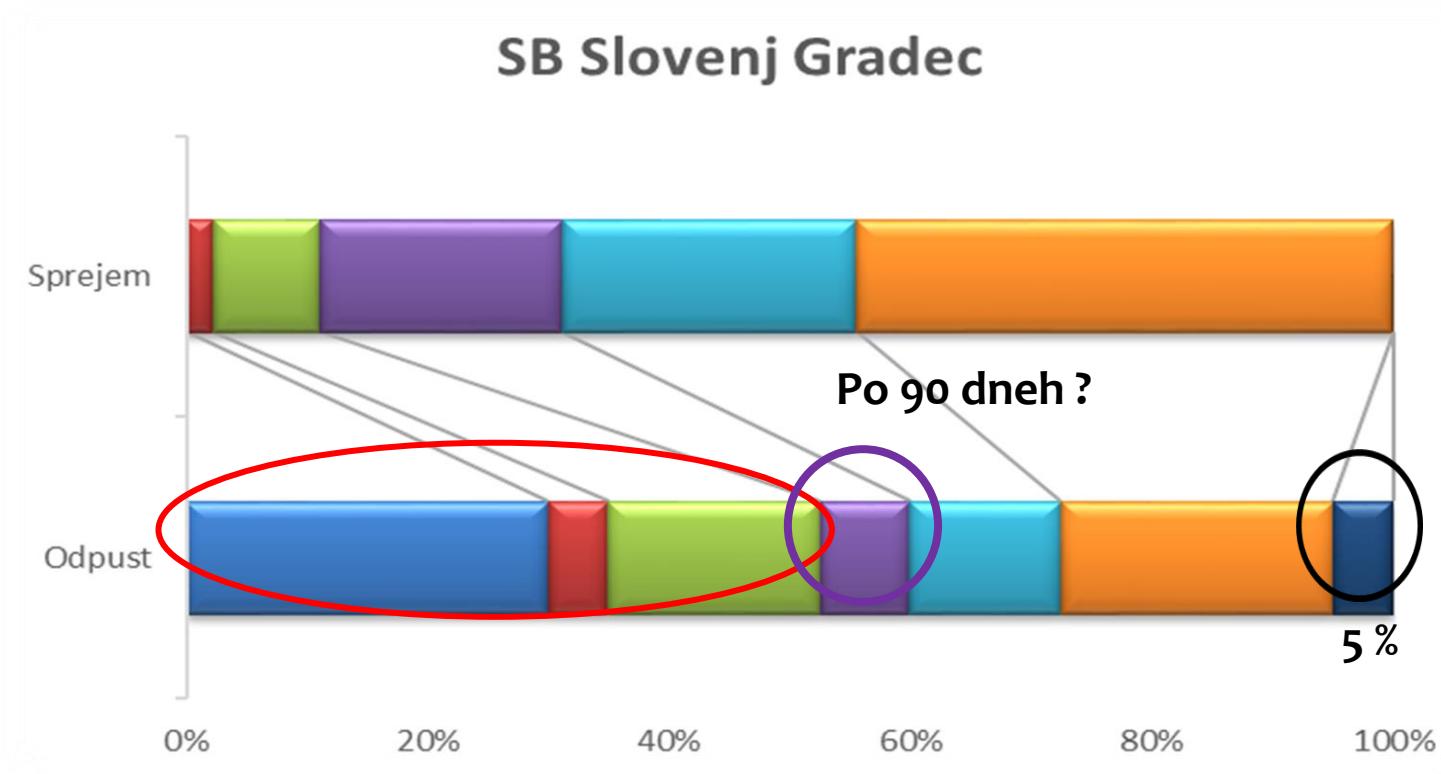


~50% of good outcomes
~50% dober izid (mRS 0, 1, 2)

Izidi po IVT v mreži TeleKap

Outcomes after IVT in the TeleKap network

Analiza funkcionalnega stanja bolnikov po lestvici mRS ob odpustu iz mrežnih bolnišnic (mRS 0, 1 in 2 = dober izid) (2020);
Št. pacientov IVT – 17



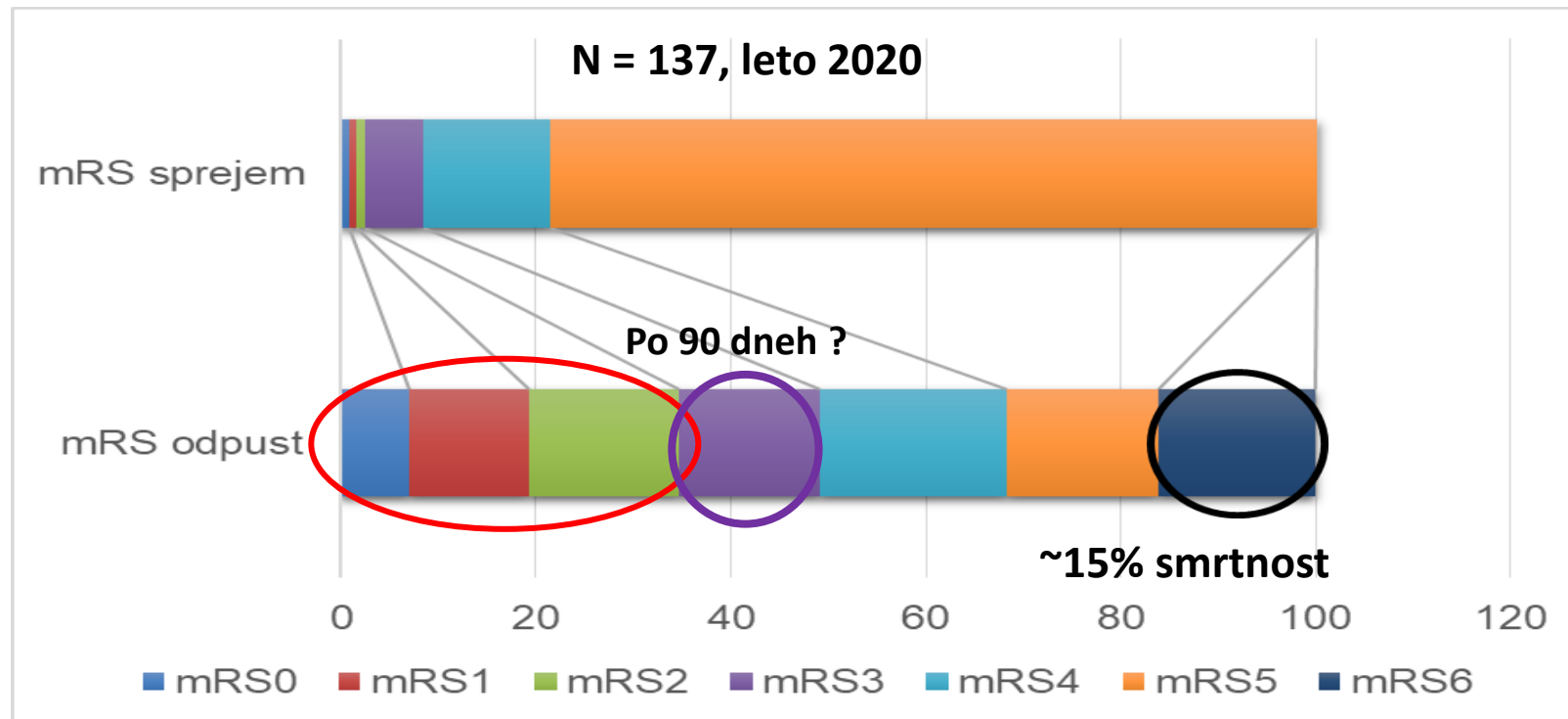
>50% dober izid (mRS 0, 1, 2)
>50% good outcome

Izidi po MeR v mreži TeleKap ~ Študija Mr. Clean

Results according to the MR in the TeleKap network ~ Study of Mr. Clean



Funkcionalni izid MeR mRS 0, 1, 2 – dober izid)



~40 dober izid (mRs 1,2,3)

~40 good outcome



MeR pri bolnikih z AIMK v UKCL v letu 2020 (206 bolnikov)

MR in acute IS patients in UMCL in 2020 (206 patients)

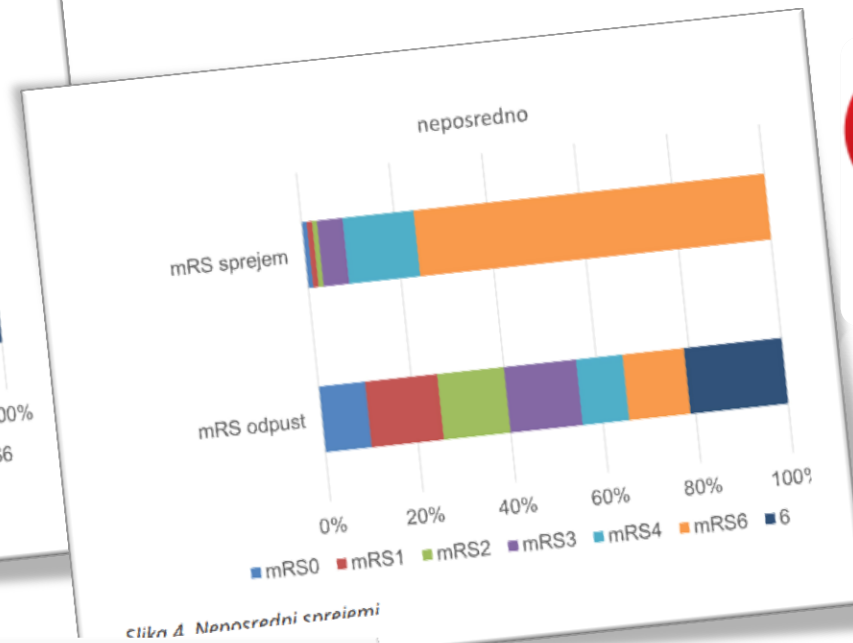
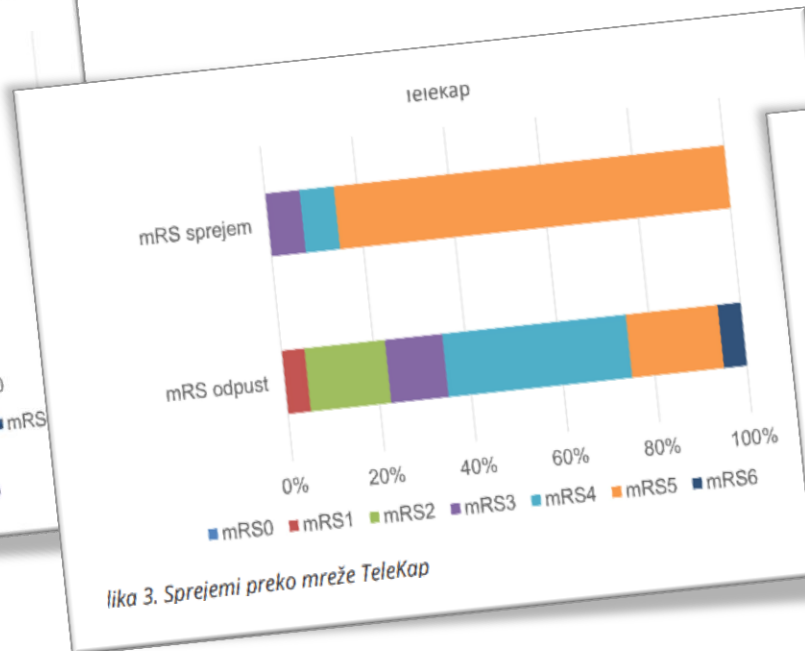
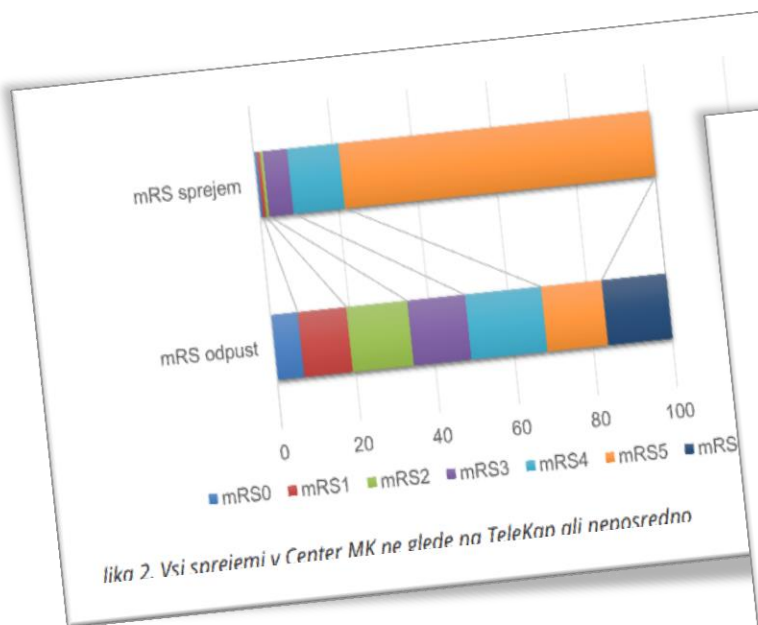


Tabela 3. Zamudni časi v mreži TeleKap in neposredno

	Zamudni časi (min)			
	$T_{IMK-rekanalizacija}$	$T_{IMK-MeR}$	$T_{MeR-rekanalizacija}$	$T_{sprejem - MeR}$
TeleKap	458,4 ± 180,0	414,1 ± 184,5	44,3 ± 33,4	112,1 ± 80,7
Neposredno	355,1 ± 242,6	317 ± 239,6	38,1 ± 31,7	124,5 ± 127,0

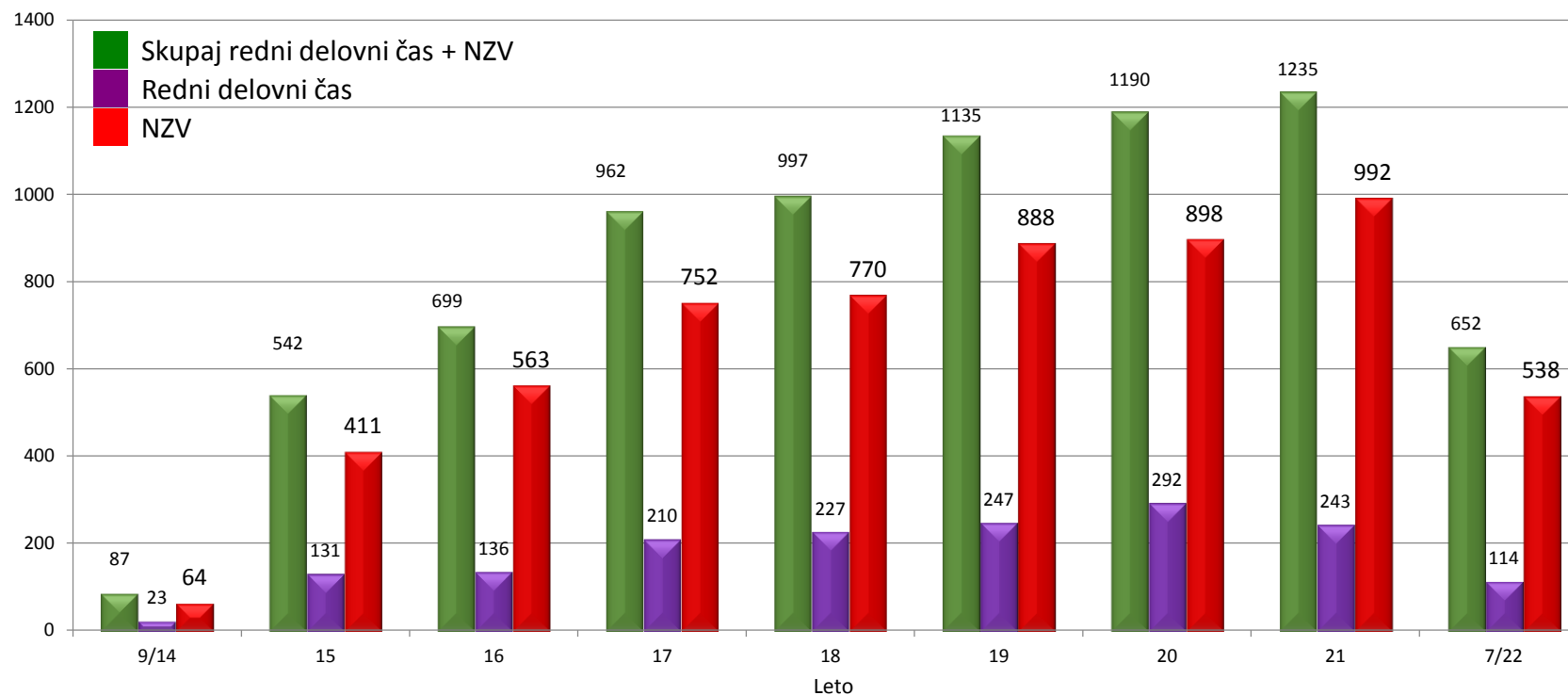
T – zamudni čas, MeR – mehanska rekanalizacija.

Potek dela v mreži TeleKap od 15. septembra 2014 do julija 2022

TeleKap workflow from September 15, 2014 to July 2022



Število bolnikov



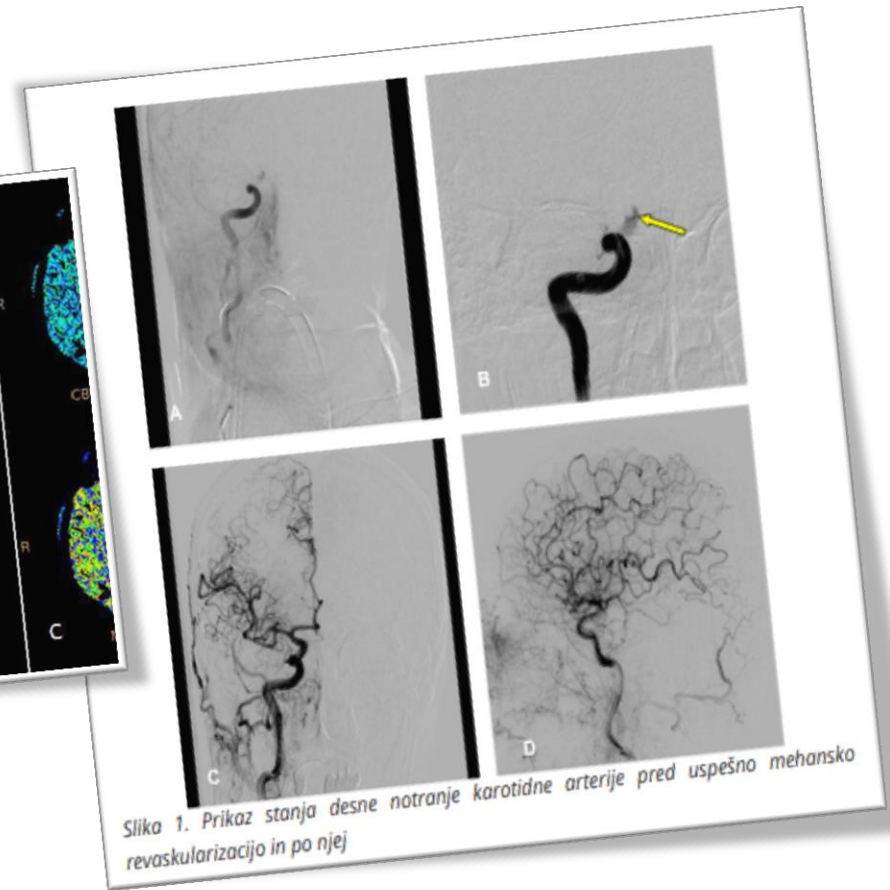
Slika 1. Število vseh bolnikov obravnavanih v mreži TeleKap (**7499** bolnikov), med NZV (**5876** bolnikov - **78,3%**) in med rednim delovnim časom (1623 bolnikov - 21,7%)

Figure 1. Number of all patients treated in the TeleKap network (7499 patients), during continuous health care (5876 patients - 78.3%) and during regular working hours (1623 patients - 21.7%)



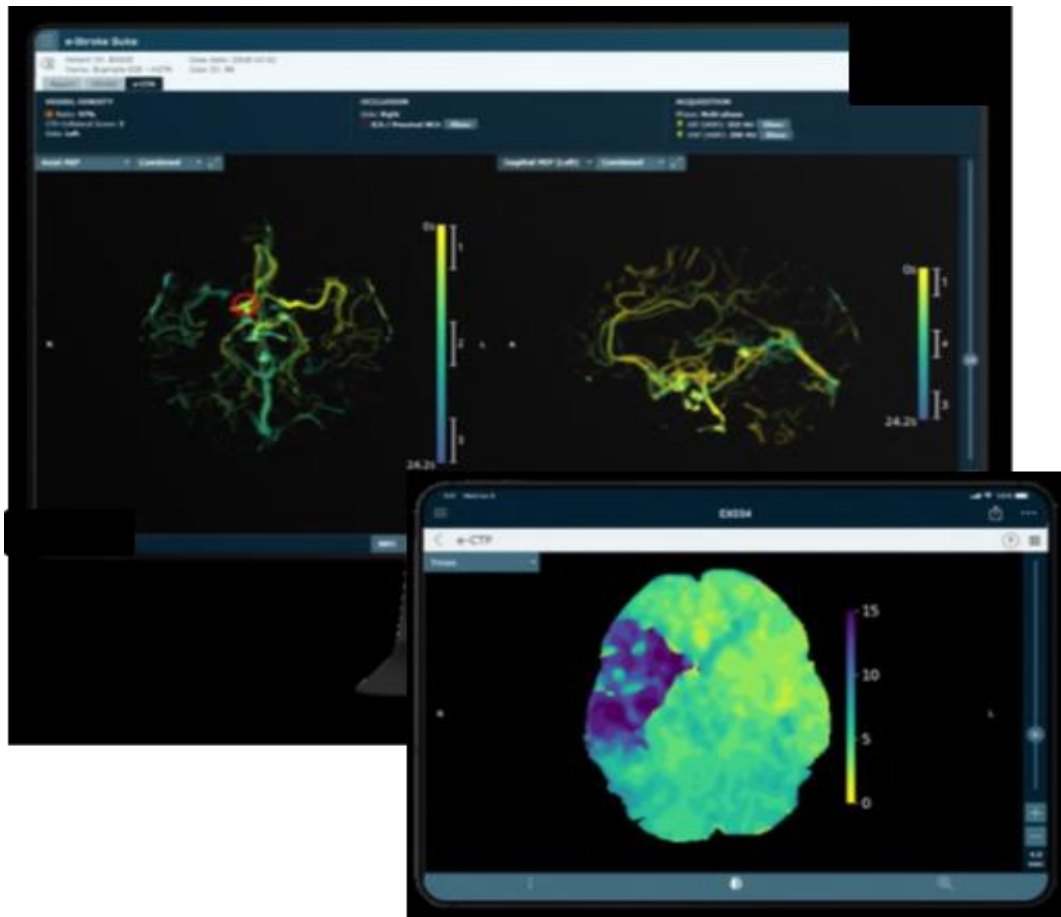
MeR – odločitev s pomočjo avtomatične slikovne analize

MR – decision with the help of automatic image analysis



MeR – odločitev s pomočjo avtomatične slikovne analize

MR – decision with the help of automatic image analysis



E-možganska kap omogoča:

- ✓ Skrajševanje zakasnitev
- ✓ Prepoznavanje kandidatov za MeR
- ✓ Oceno velikosti ishemične sredice, ishemične penumbre, mesta arterijske zapore in razpoložljivosti kolateralne cirkulacije

E-stroke enables:

- ✓ Shortening delays
- ✓ Identification of MeR candidates
- ✓ Assessment of ischemic core size, ischemic penumbra, site of arterial occlusion and availability of collateral circulation

Program e-možganska kap je mogoče naložiti na različno strojno opremo

The e-stroke program can be loaded on different hardware



Ekonomska korist naložbe v mrežo TeleKap (primer iz prakse)

The economic benefit of investing in the TeleKap network (example from practice)

- ✓ Ocenjeni stroški rehabilitacije enega bolnika z IMK, ki ne dobi IVT - 60.000 € (svetovno povprečje).
- ✓ 2015-2020 v omrežju »TeleKap« zdravljenih 1196 AIMK bolnikov z IVT.
- ✓ Dober izid po mRS (0, 1, 2 ob odpustu iz bolnišnice) cca. 50 % bolnikov.
- ✓ Umrlo 15 % bolnikov; zmerno prizadetih 20 %; 15% bolnikov huje onesposobljenih.
- ✓ 15 sept. 2014 do 30. 12. 2020 privarčevali: $60.000 \text{ €} \times 1196 - 239 (20\%) = \mathbf{57.420.000 \text{ €}}$ zaradi IVT.
- ✓ Prevozi ob povprečnih stroških prevoza (1.500 € svetovno povprečje) – 80% od 5411 bolnikov ni potrebovalo prevoza; prihranek $1.500 \text{ EUR} \times 4029 = \mathbf{6.043.500 \text{ €}}$.
- ✓ **Skupni prihranek zaradi zdravljenja z IVT in nepotrebnih prevozov 63.463.500 €.**

(Plačilo ZZS za TeleKap 2 mio € v navedenem obdobju; 1/2 sredstev porabljena za TK).

- ✓ **Total savings due to IVT treatment and unnecessary transport €63,463,500.**

Sklepno razmišljanje

Dobro -- enakost in zaupanje



Prednosti mreže TeleKap

- ✓ Trend vseh kliničnih obravnav se od 2014–2022 enakomerno povečuje (**cca. 9000 obravnav**).
- ✓ Diagnoza MK ~ 80 %.
- ✓ Število vseh obravnav z MK → se enakomerno statistično pomembno povečuje.
- ✓ Delež IVT pri bolnikih z AIMK v mreži TeleKap je → 30 %.
- ✓ Skupni delež IVT v letih 2019 in 2020 → skupaj: neposredno v SB & TeleKap → 19%.
- ✓ Delež posnemovalk MK → 20–30 % (uporaba TeleKapi tudi za druge nevrološke patologije).
- ✓ MeR se je izkazala za učinkovito revaskularizacijsko metodo v mreži TeleKap.

- ✓ The trend of all clinical treatments is steadily increasing from 2014–2022 (approx. 9,000 examinations).
- ✓ Diagnosis of stroke ~ 80%.
- ✓ The number of all treatments with CVD → increases steadily and statistically significantly.
- ✓ The rate of IVT in stroke patients in the TeleKap network is → 30%.
- ✓ Total share of IVT in 2019 and 2020 → total: directly in GH & TeleKap → 19%.
- ✓ Share of stroke mimics → 20–30% (use of TeleKap network also for other neurological pathologies).
- ✓ MR has proven to be an effective revascularization method in the TeleKap network.

Sklepno razmišljanje

Slabo - neenakost in nezaupanje



Slabosti mreže TeleKap

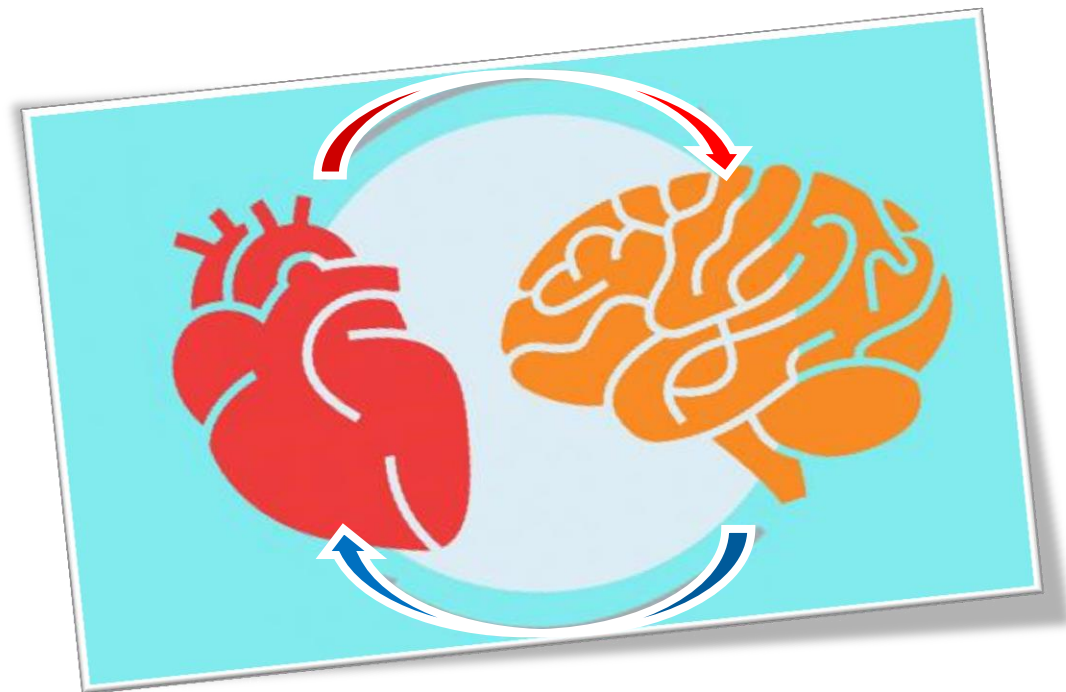
- ✓ Organizacija ni vzpostavljena (nacionalni koordinator, regionalni koordinatorji, nurse, IT).
- ✓ Popolna odsotnost izobraževanja vseh deležnikov v mreži.
- ✓ Nezadovoljiva komunikacija na vseh ravneh.
- ✓ Vključevanje v mrežo ni obvezno (fakultativno).
- ✓ Ni plačila vseh deležnikov v mreži (intervencijski radiologi).
- ✓ Ni posodabljanja IT strojne in programske opreme.
- ✓ Ni posodobljene klinične poti, ni niti SOP-ejev.
- ✓ Ni sistematičnega spremljanja izidov zdravljenja in kazalnikov kakovosti.
- ✓ Zato ni možna realna ocena zdravstvenih & finančnih učinkov.
- ✓ Ni registra za MŽB.
- ✓ Niso možne raziskave in publikacije.
- ✓ TeleKap je zastala na polovici planiranega razvoja.

- ✓ The organization is not established (national coordinator, regional coordinators, nurses, IT).
- ✓ Total absence of education of all stakeholders in the network.
- ✓ Insufficient communication at all levels
- ✓ Networking is not mandatory (optional).
- ✓ There is no payment for all stakeholders in the network (interventional radiologists).
- ✓ No updating of IT hardware and software.
- ✓ There is no updated clinical pathway or SOPs.
- ✓ There is no systematic monitoring of treatment outcomes and quality indicators.
- ✓ Therefore, it is not possible to realistically assess the health & financial effects.
- ✓ There is no registry for CVD.
- ✓ Research and publications are not possible.
- ✓ TeleKap has stopped halfway through the planned development.

Slovenska mreža TeleKap & MC Medicor

Slovenian network TeleKap & MC Medicor

„In a team, they balance each other and the total is greater than the sum of the parts.“
Steve Jobs



Sedanje in bodoče možnosti !

Current and future perspectives !

