

## Le reti cliniche in condizioni estreme

*good medicine in bad places*

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Kharkiv: after shelling

People with stroke, CVD and NCDs may be more vulnerable to the health impact of emergencies

**Emergencies** are events or incidents that require action that is usually urgent and often non-routine:

- natural hazards: **earthquakes**, cyclones, forest fires, floods, heatwaves and droughts
- epidemic and pandemic diseases- **Covid 19**
- technological hazards: transport crashes, building fires, chemical, radiological and other technological hazards,
- food insecurity, **conflicts**

## NCDs in Humanitarian settings

- One in five people worldwide live with one or more NCD
- heart attacks and strokes are two to three times more common in emergency settings than in normal circumstances
- More than one billion people live in fragile and conflict-affected situations (1/8 globally)
- In 2023, 299 million people needed humanitarian assistance and protection: around 3% of the entire global population
- 71.1 million people are internally displaced in their own country
- 36.4 million are refugees in need of humanitarian support in host countries



120 armed conflicts around the world

60 states and 120 non-state armed groups.

majority are of a non-international character

the highest number since data collection began in 1946

**one in six** people now live in areas affected by active conflict

**the number has tripled since the turn of the millennium**



Uppsala Conflict Data Program (UCDP); <https://acleddata.com/>



People with **stroke**, **CVD**, and **NCDs** may be more vulnerable to the health impact of **emergencies**

**Stroke**

**REQUIRE** organised and coordinated model of care

**REQUIRE** the provision of continuous care/**rehabilitation** over an extended period (often lifelong)

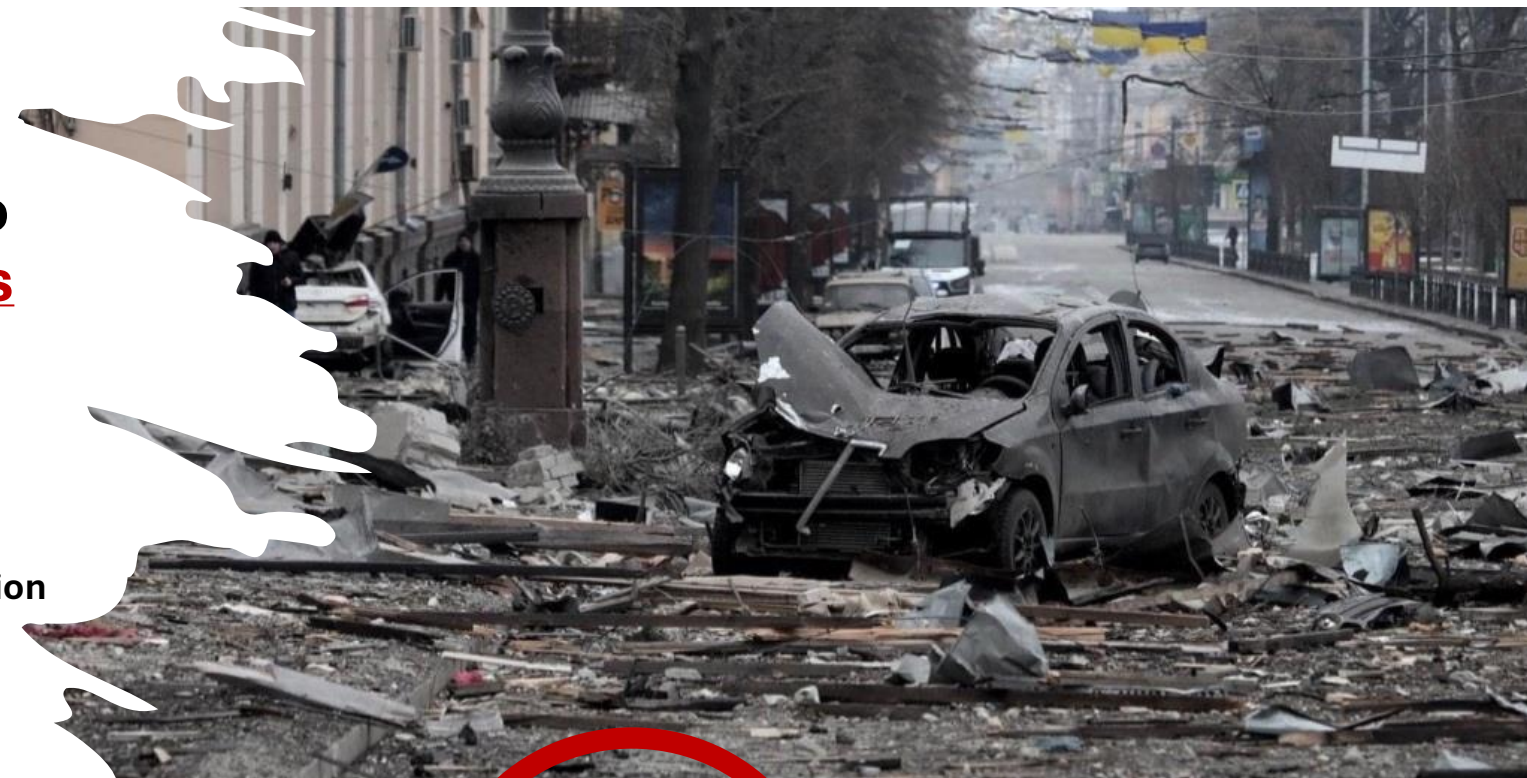
**REQUIRE** ongoing treatment with a medicine and/or medical technology or appliance

**CAN HAVE ACUTE COMPLICATIONS** that require medical care, incur health costs and may limit function, affect daily activities and reduce life expectancy

**NECESSITATE COORDINATION OF CARE** provision and follow-up between different providers and settings

**MAY BE ASSOCIATED** with the need for palliative care

**CAN REDUCE PEOPLE'S ABILITY TO COPE WITH THE EMERGENCY**





### **natural disasters, stroke and NCDs**

- **disasters directly impacts physical health**, stimulating conditions such as autonomic system imbalance, hemodynamic disorders, sympathetic and renin angiotensin system activation, oxidative stress and inflammation, or mental disorders
- **disaster victims are exposed to risk factors**: an increasing number of studies have reported that catastrophic natural disasters are related to increased exposure to established risk factors, such as hypertension, increased body mass index (BMI), smoking, alcohol abuse, high blood glucose and high-sodium diets<sup>1</sup>
- **access to medical services is hindered**, as natural disasters often result in the destruction of infrastructure and social environments, creating difficulties in accessing medical services

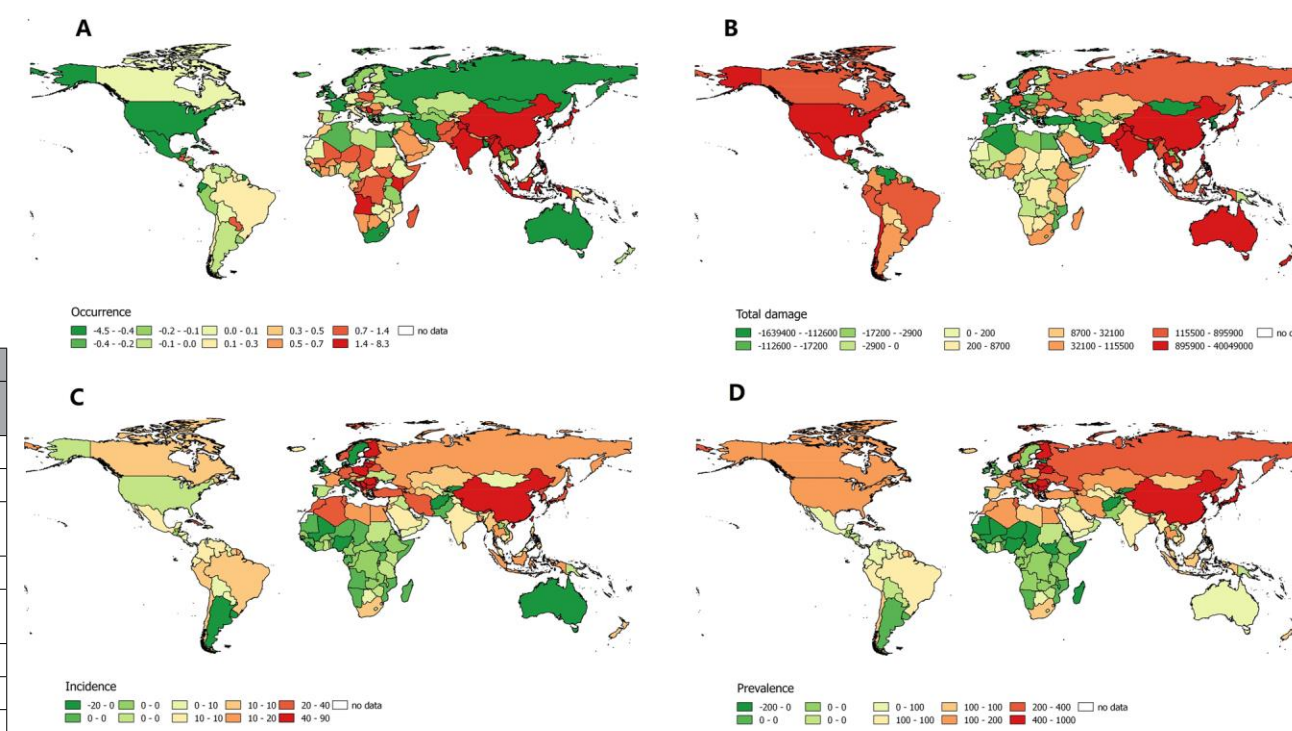
[www.nature.com/scientificreports](http://www.nature.com/scientificreports)

scientific reports

**OPEN** Changes in the incidence and prevalence of ischemic stroke and associations with natural disasters: an ecological study in 193 countries

Kai-Sen Huang<sup>1,2,10</sup>, Ding-Xiu He<sup>1,2,10</sup>, Qianlan Tao<sup>3</sup>, Yan-Yan Wang<sup>4</sup>, Yong-Qiang Yang<sup>1</sup>, Biao Zhang<sup>5</sup>, Gang Mai<sup>6</sup> & Debarati Guha-Sapir<sup>7</sup>

Factors	Incidence*			Prevalence*		
	Coefficient (95% CI)	Standardized coefficient	P value	Coefficient (95% CI)	Standardized coefficient	P value
<b>Natural disaster</b>						
Occurrence	3.119 ± 0.384	0.483	0.000	24.891 ± 3.665	0.438	0.000
Casualties (deaths + injuries)	NA <sup>b</sup>	0.065	0.131	NA	-0.072	0.127
Total damage	NA	-0.095	0.102	NA	-0.101	0.108
Fat and meat consumption	NA	-0.005	0.876	NA	0.006	0.867
Tobacco use	0.622 ± 0.205	0.101	0.003	6.651 ± 1.957	0.123	0.001
Alcohol consumption	0.407 ± 0.063	0.233	0.000	4.147 ± 0.602	0.270	0.000
Health expenditure	0.012 ± 0.001	0.318	0.000	0.153 ± 0.013	0.470	0.000
CO <sub>2</sub> emissions	3.955 ± 0.846	0.270	0.000	38.383 ± 8.293	0.298	0.000
Trade (% of GDP)	0.105 ± 0.050	0.069	0.036	0.952 ± 0.476	0.070	0.047
Urban population (% of total)	0.652 ± 0.198	0.184	0.001	4.861 ± 1.889	0.156	0.011



Multivariable linear regression-derived coefficients for natural disaster and socioeconomic variables for the incidence and prevalence of ischemic stroke in both sexes from 1990 to 2017 in 193 countries, weighted by population



## Impact of armed conflict on CVD and Stroke risk and mortality

**Armed conflict is associated with increased stroke**, coronary heart disease, and endocrine diseases, in addition to **increased blood pressure, lipids, alcohol and tobacco use**.

**Increased risk of stroke and CVD may manifest itself during periods of active conflict, but also in the acute and chronic post-conflict period** example IRAQ (2003)

**Refugee status is associated with higher prevalence of Stroke and AMI compared to non-refugee counter-parts** in several studies:

- Among **Palestinian refugees in Lebanon**, 4 NCDs per person an average, in **Syrian refugees** 2.5 NCDs per person (Strong et al. 2015)
- In displaced persons in **Croatia**, a statistically significant difference in prevalence of stroke and CVD risk factors, compared to age-matched controls who were not displaced during the **war of independence** (Kadojic 1999)
- In a populations being served by UNRWA in **Jordan, Syria, Lebanon, West Bank, and the Gaza Strip**, **the risk of having acute stroke or AMI was 2.7 times higher** in individuals with 4 risk factors as compared to those with only 1 risk factor (Mousa et al. 2010)

Healthcare delivery, economics and global health

ORIGINAL RESEARCH ARTICLE

### Impact of armed conflict on cardiovascular disease risk: a systematic review

Mohammed Jawad,<sup>1</sup> Eszter P Vamos,<sup>1</sup> Muhammad Najim,<sup>1</sup> Bayard Roberts,<sup>2</sup> Christopher Millett<sup>1</sup>

BMJ 2019;365:e2367 doi: 10.1136/bmj.e2367 (Published 29 May 2019)

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### RESEARCH NEWS

#### Living in a war zone increases heart disease and stroke risk years after conflict ends, study finds

International Journal of Cardiology Cardiovascular Risk and Prevention 12 (2022) 200126



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Epidemiology of cardiovascular disease and its risk factors among refugees and asylum seekers: Systematic review and meta-analysis\*

Tala Al-Rousan<sup>a,1,\*</sup>, Rawan AlHeresh<sup>b,1</sup>, Altaf Saadi<sup>c</sup>, Hannah El-Sabrou<sup>d</sup>, Megan Young<sup>b</sup>, Tarik Benmarhnia<sup>e</sup>, Benjamin H. Han<sup>f</sup>, Laith Alshwabkeh<sup>g</sup>



Review Article

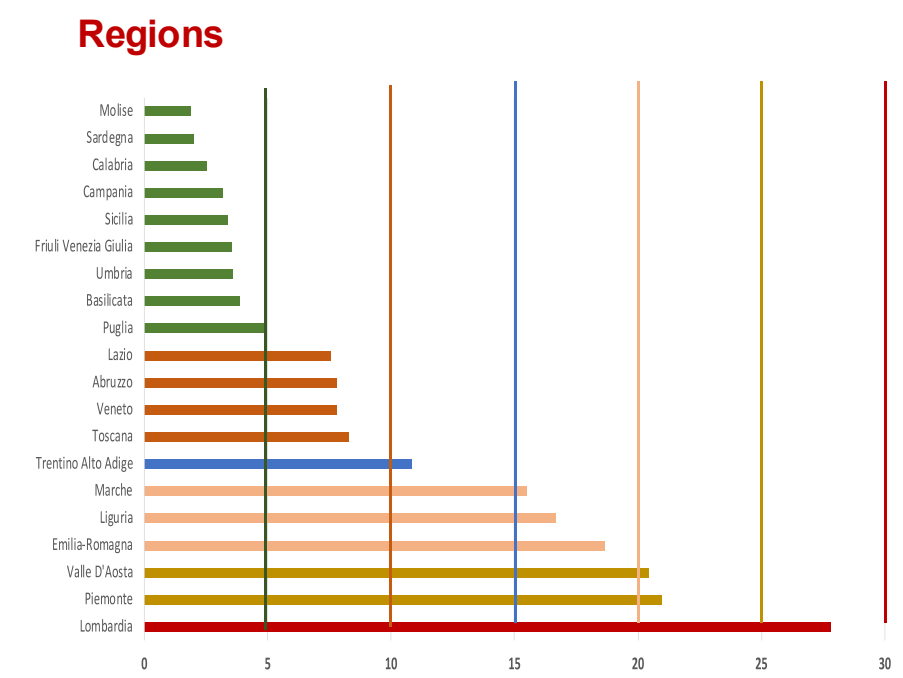
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Stroke care in Italy: An overview of strategies to manage acute stroke in COVID-19 time

Marialuisa Zedde<sup>1</sup>, Francesca Romana Pezzella<sup>2</sup>, Maurizio Paciaroni<sup>3</sup>, Francesco Corea<sup>4</sup>, Nicoletta Reale<sup>5</sup>, Danilo Toni<sup>6</sup> and Valeria Caso<sup>3</sup>

percentage of hospital beds occupied by COVID-19 patients at 22 April 2020

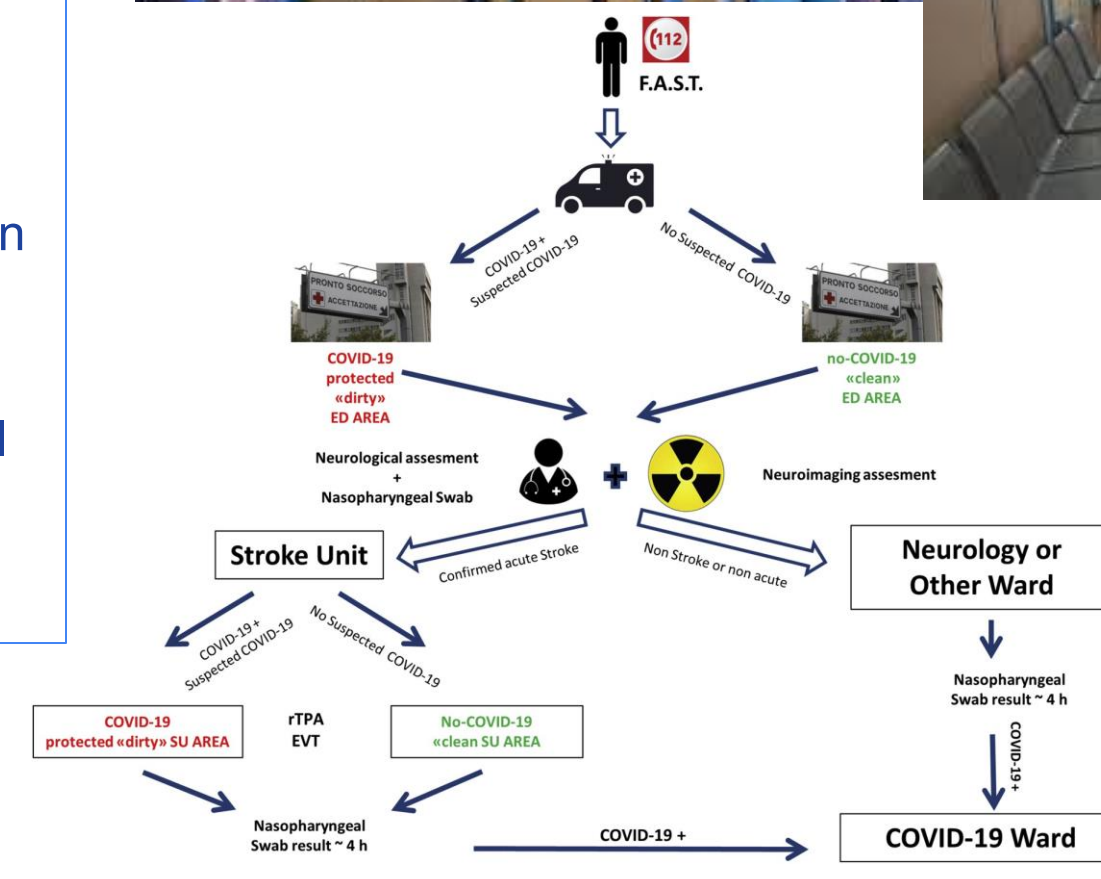


- **Access to Hospital<sup>1</sup>**  
 in Veneto Region, there has been an overall 50–60% reduction in the number of stroke patients arriving at hospitals, compared to the same period a year before
- **Access to treatment<sup>1</sup>**  
 the number of patients who underwent IVT or bridging therapy (combined intravenous and thrombectomy) decreased 26% and 30%, respectively, while the number of primary EVT increased by 41%.
- **High risk of cerebrovascular events profile predict a fatal outcome of COVID-19 infection**  
 age >65 years, obesity, diabetes, high blood pressure and the number of comorbidities.
- **Stroke diagnosis and treatment of COVID patients<sup>2</sup>**  
 acute stroke may complicate or co-exist with COVID-19 disease: 5%, 0.5% and 0.5% of the patients developed acute ischemic stroke, cerebral venous sinus thrombosis and cerebral haemorrhage accordingly

1-Baracchini C, Pieroni A, Viaro F, et al. Acute stroke management pathway during Coronavirus-19 pandemic. *Neurol Sci*,  
 2- Li Y, Wang M, Zhou Y, et al. Acute cerebrovascular disease following COVID-19: a single center. *Retrospect Observ Study*

**Managing stroke care with PPE and social distancing measure: the main service challenges**

- Access to stroke pathway/stroke unit
- Access to neuro-rehabilitation services
- Access to drugs and medical consultation





## Neurological Practice in the Time of War: Perspectives and Experiences from Ukraine

Yuriy Flomin, MD, PhD, DMedSci<sup>1,2</sup> Andriy Dubenko, MD, PhD<sup>3</sup> Olga Dubenko, MD, PhD, DMedSci<sup>4</sup>  
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<sup>6</sup>Stroke Unit, Matsuk Mariupol Municipal Hospital No. 4, Mariupol, Ukraine

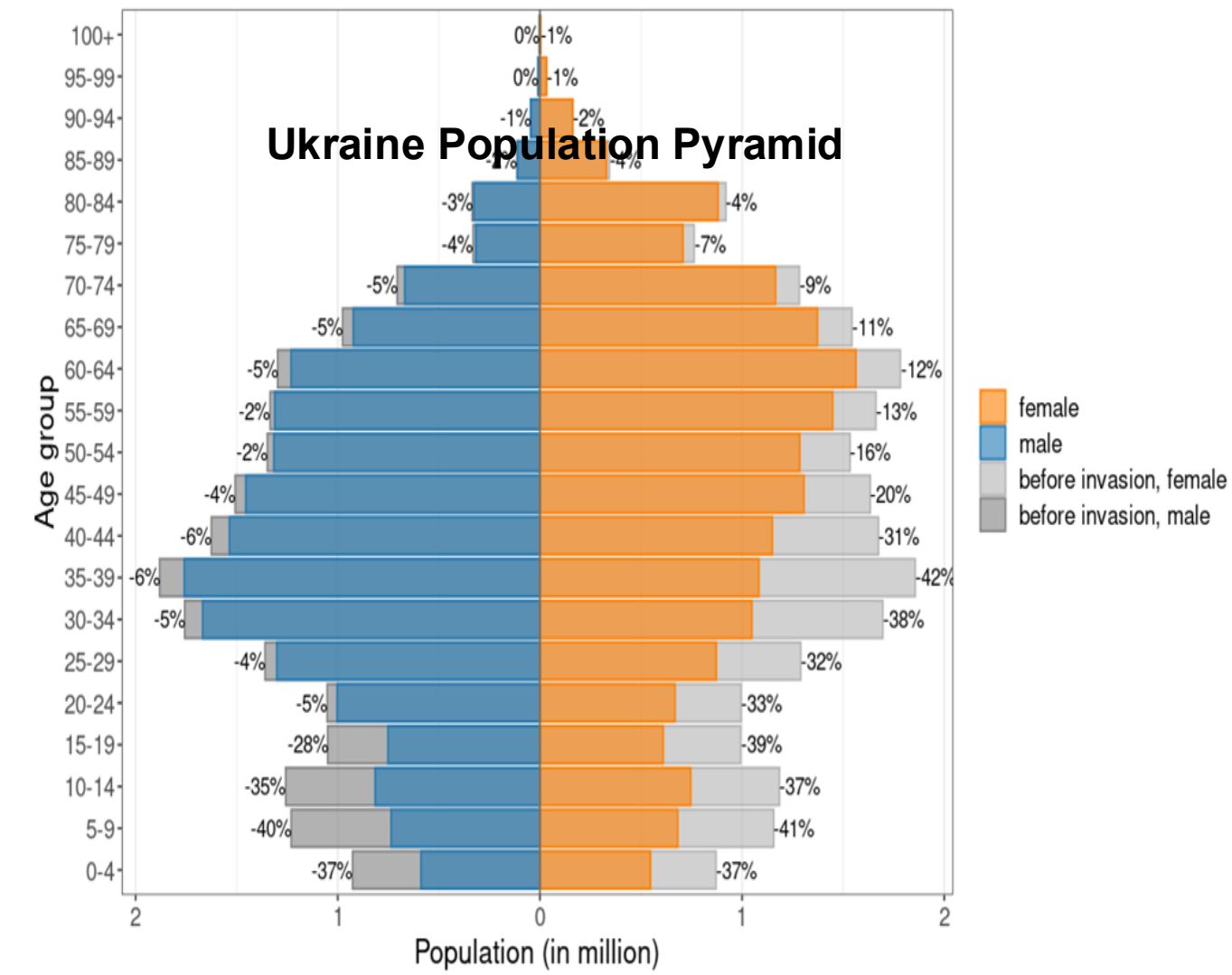
<sup>7</sup>Stroke Unit, Azienda Ospedaliera San Camillo Forlanini, Roma, Italy

Semin Neurol

The European Stroke Organization (ESO) has publicly supported stroke victims and healthcare workers in Ukraine during this time; specifically, ESO contributed funds to Médecins Sans Frontières, and organized a Task Force for Ukraine (TF4UKR) chaired by authors Dr. Francesca Romana Pezzella (Italy) and Dr. Yuriy Flomin (Ukraine),<sup>21</sup> with the goal to address the needs of the Ukrainian stroke community through information channels and support groups. TF4UKR promoted a series of initiatives to support the Ukrainian stroke community: (1) waiving the annual societal and individual membership fees for ESO; (2) supporting Ukrainian stroke physicians to relocate to other European institutions; (3) offering ten grants to Ukrainian neurologists to visit stroke units in other European countries; (4) building educational forums, including weekly virtual lectures; (5) forming collaborations with WHO and other European institutions (such as the University of Oslo, the Danish Stroke Society, and Stroke Support Organization) to address gaps in stroke care, using mapping services and providing equipment.

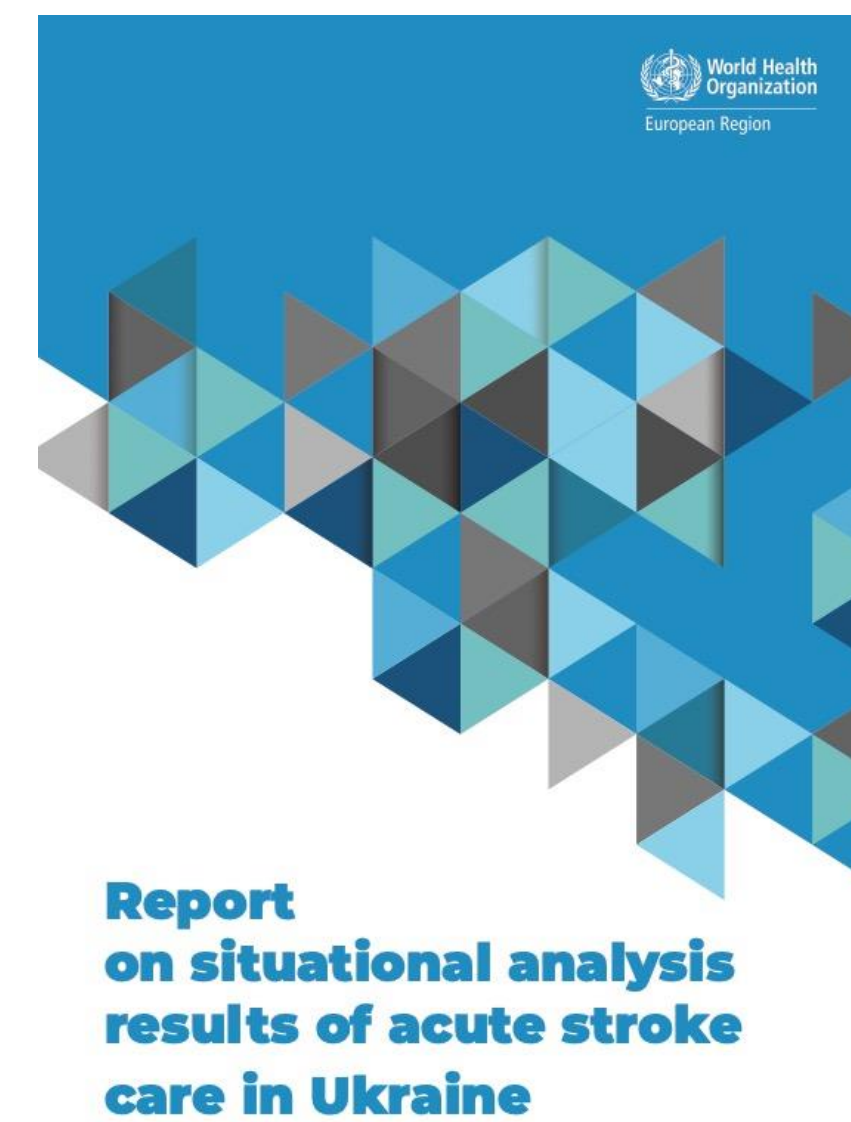
## Ukraine

- Before the war, up to 130,000 people suffered from strokes annually, with high mortality rates
- Stroke-contracted hospitals: 239 in 2021, 255 in 2022, 229 in 2023, and 226 in 2024
- Trend of trombolysis is rising 10% in 2024
- Trend of thrombectomy is stable 2%



Yuriy Flomin, Tarig Fadalla MD, Aussen Al-Athwari MD, Francesca Romana Pezzella, Valeria Caso, **Practicing stroke medicine in war zones, Stroke, 2024 under review**  
 Ueffing et al., op. cit. Authors' estimates based on data from ISTAT, Eurostat and UNHCR - **Ukraine's Alarming Demographics**  
 SCEEUS Report Series on Ukrainian Domestic Affairs, No. 7, 2 MAY 2023





## Yemen

- Population of Yemen 35 million
- Military conflicts since 2011
- Borg Al-Atiba Stroke Center, stroke thrombectomy center, was established in 2023 and registered in the Registry of Stroke Care Quality (RES-Q), receiving the first **World Stroke Organization (WSO) Angel Award, the diamond status in Q3 2023.**

### Barriers to acute stroke care:

- Limited access to neuroimaging, medications, and funding for acute stroke care.
- **Alteplase is now sourced from neighboring countries and is difficult to transport, as there is no local supplier.**
- **Alteplase** stockouts have occurred, preventing timely treatment.
- Bringing tools for mechanical thrombectomy is challenging
- **The Private sector provides almost 80% of health services, and Stroke treatment is not free as patients and families must pay for thrombolysis and thrombectomy upfront, a challenge given the war economy.**

Yuriy Flomin , Tarig Fadalla MD, Aussen Al-Athwari MD, Francesca Romana Pezzella, Valeria Caso, **Practicing stroke medicine in war zones, *Stroke, 2024 under review***



## Yemen

### Barriers to Stroke Care

- **Lack of neurologists**, vascular and interventional neurologists, physiotherapists, speech therapists, and occupational therapists.
- **No CT perfusion and limited access to CTA hinder timely stroke management.**
- The **adapted pathway includes direct transfer to the Angio-suite for expected LVO, as CTA is unavailable 24/7.**
- Military checkpoints and security concerns delay rapid transport.
- There is also a lack of a pre-hospital hotline/helpline.
- Yemen is on the "not to go" list for the USA and Europe, with no embassies to facilitate travel for training or conferences.
- Banking restrictions hinder membership renewals in international organizations.

Yuriy Flomin , Tarig Fadalla MD, Aussen Al-Athwari MD, Francesca Romana Pezzella, Valeria Caso, **Practicing stroke medicine in war zones, *Stroke, 2024 under review***

## Sudan

- 47 million inhabitants and median age of 19
- Civil war began on April 15 2023, Khartoum and Darfur.
- Since the outbreak of hostilities, 13 million people have been internally displaced, **Sudan is home to the largest population of internally displaced individuals worldwide.**
- **Stroke is the 3° leading cause of death: mortality rate of 48.09 deaths per 100,000 people**

-The number of neurologists per 100 thousand population is the lowest (0.1) in the MENA Region

-Stroke service provided through general hospital, both **thrombolysis and thrombectomy available**

-Secondary Prevention diagnostics, rehabilitation are available

-no national or international stroke registry (2023)

-Prior to the current crisis, Sudan had an estimated 6,500 primary healthcare facilities and 300 public hospitals across the country.

- **WHO estimates that 70 – 80% of health facilities in areas worst affected by conflict, such as Al Jazirah, Kordofan, Darfur and Khartoum, and about 45% in other parts of the country, are now barely operational or closed.**

- Sudan crisis one of the worst humanitarian disasters in recent memory.

Yuriy Flomin , Tarig Fadalla MD, Aussen Al-Athwari MD, Francesca Romana Pezzella, Valei Aref H, El Nahas N, Alrukn SA, Khan M, Kesraoui S, Alnidawi F, et al. (2023) Stroke services





**NONCOMMUNICABLE DISEASES  
IN EMERGENCIES**

**FIRST 30 - 90 DAYS:**  
Focus on life-threatening  
or treatment of severely  
symptomatic conditions

**CONTINUING RESPONSE:**  
Expand management to  
sub-acute and chronic  
presentations of NCDs.

**DURING EMERGENCIES:**

- ensure access to treatments
- ensure treatment of people with acute life-threatening condition
- establish SOPs for referral
- ensure access to essential diagnostic equipment

2018

**Challenges and Mitigation for stroke physicians during war-time**

Challenge	Mitigation Actions	Involved Organizations
Stroke falls off the health priority list	Advocacy / <b>WHO Best Buys/thrombolysis is an essential WHO treatment</b> / WHO Rehabilitation Strategy/ World Stroke Organization's Global Bill of Rights	NGO:WSO/ESO/EHN/SAFE/national NGO; WHO/UN
Damage to Healthcare infrastructure	Rebuilding efforts and <b>provision of temporary facilities</b>	Governments, UN Agencies, NGOs
Shortage of Healthcare professionals	<b>training programs</b> for local stroke/emergency Physicians/facilitate the <b>relocation of international medical staff.</b>	WSO/ESO/Governments, UN, NGOs
Security concerns and restricted mobility	protections for healthcare workers/secure transportation routes for medical supplies and personnel	Governments, UN, NGOs
Psychological impact on healthcare workers	<b>mental health support and resilience training for medical staff</b>	WHO, UN, NGOs
Disruption in continuity of care	mobile medical units, stockpile essential medications, and implement telemedicine solutions	Governments, UN, NGOs Médecins Sans Frontières, International Committee of the Red Cross, Emergency, Drug and Device Companies
Financial barriers for patients	Secure funding and provide financial assistance programs for patients requiring critical treatments	Governments, UN Agency, NGOs , WB
Lack of coordinated intervention of involved organization	Establish positive synergic collaboration among involved organization with clear targets and leadership to avoid redundancies and gaps	WHO, Governments, UN Agencies NGOs

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**Impacts of the large-scale displacement from Ukraine on health systems in refugee-receiving countries in the WHO European Region**  
 Challenges and opportunities for transformative actions and policies

Kayvan Bazargmehr, Elin Rast, Akaki Zaidze, Martin McKee

**Regional workshop on advancing civil-military collaboration to strengthen health emergency preparedness**

Meeting report, 10-11 April 2024, Copenhagen, Denmark

**Emergency Medical Teams response to the Türkiye earthquake: lessons learned workshop report**

Istanbul, Türkiye  
 15-16 June 2023



**Key outcomes and recommended actions**

<b>Strengthening EMT coordination and response</b>	Strengthening the national EMT coordination mechanism, adapted to the context and agile enough to meet complex operational demands when activated to receive international EMTs, through improved information sharing.
<b>EMT networks and partnerships</b>	Advancing EMT networks and partnerships through a community of practice to enhance greater interregional collaboration and complementarity of capabilities as part of further regionalization of the EMT Initiative.
<b>Operational Research</b>	Systematized collection of evidence and best practices in emergencies, offering a centralized point of reference to enable collaboration on research efforts and transferability in sharing of experiences, and best practices.
<b>Training</b>	Evidence-based training opportunities and capacity building to address needs and gaps across the Region and facilitate knowledge transfer.
<b>Enabling environment</b>	Making efforts to strengthen the enabling environment to be strategic and intentionally directed to leverage time, resources, capacities and capabilities and effectively to support development and expansion and strengthening of the EMT Initiative.
<b>Knowledge and information management</b>	Improving information management systems and standards to better inform operational decision-making and delivery of EMT needs-based services. Investing in an EMT knowledge and information management system to ensure the ability to scale up, and maintain continuity and sustainability of health workforce capacity. Harnessing information management systems to better offer sharing of experiences and best practices to contribute towards strengthening evidence-based research, generation and transfer of knowledge to enhance EMT capacity and professional capabilities and performance of the EMT workforce.

#ForumRisk19

ement.it

### Emergency **preparedness** for **stroke management**... lessons learned to enhance capability to respond

- **Pre-emergency state of stroke care in the area**
- Protection of key health facilities and stockpiling of key medicines/equipment, including **stroke** medication;
- Incorporation of the needs of **stroke** patients into **national disaster plans**;
- Facility-specific disaster planning for **critical facilities** such as **major hospitals**;
- Development of **individual patient strategies for emergencies**, including a backup supply of medications and instructions for emergency care, and promotion of community- level preparedness among the population group with vascular risk factors;
- Establishment of registries of NCD patients with critical needs (e.g. home ventilators, dialysis units, type 1 diabetes);
- **Links to organizations that can facilitate stroke care in emergencies** – experiences with other NCDs: the Renal Disaster Relief Task Force of the International Society of Nephrology, the International Diabetes Federation, Insulin for Life charity



