

ECR 2018

# Thrombectomy : a European perspective

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 **Université  
de Lille**

# Stroke : a pandemic

## Worldwide in 2016 :

- More than 13 million strokes
  - 9,5 million ischemic strokes
  - More than 5 million deaths

*Global Burden of Disease Study 2016 (GBD 2016)*

- 18 million ischemic stroke survivors

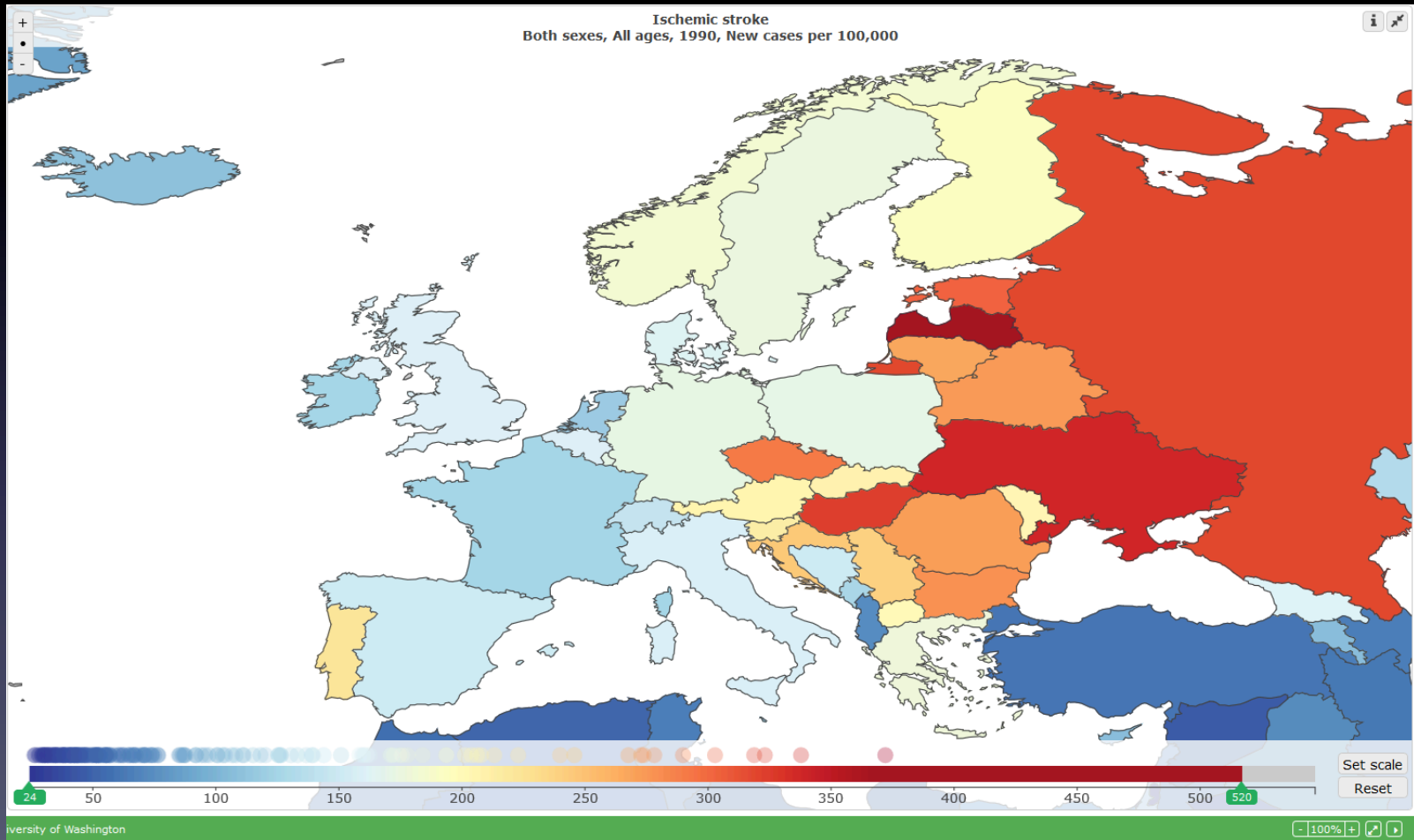
*Feigin V.L – Neuroepidemiology 2015*

- **Healthcare challenge :**

- 1st cause of acquired disability in developed countries
- 3rd most common cause of death in developed countries

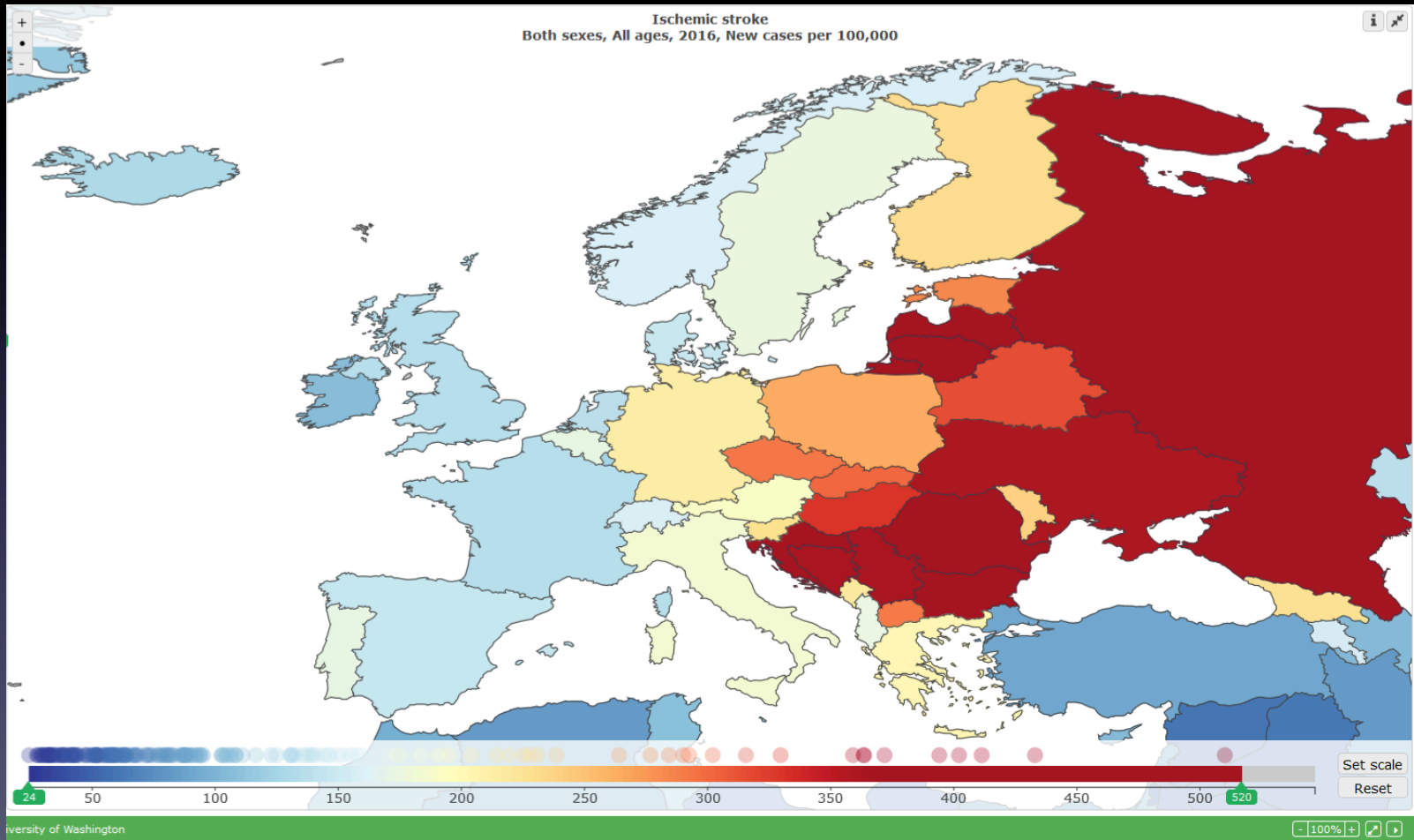
*World Health Organization, 2012*

# Evolution of stroke



1990

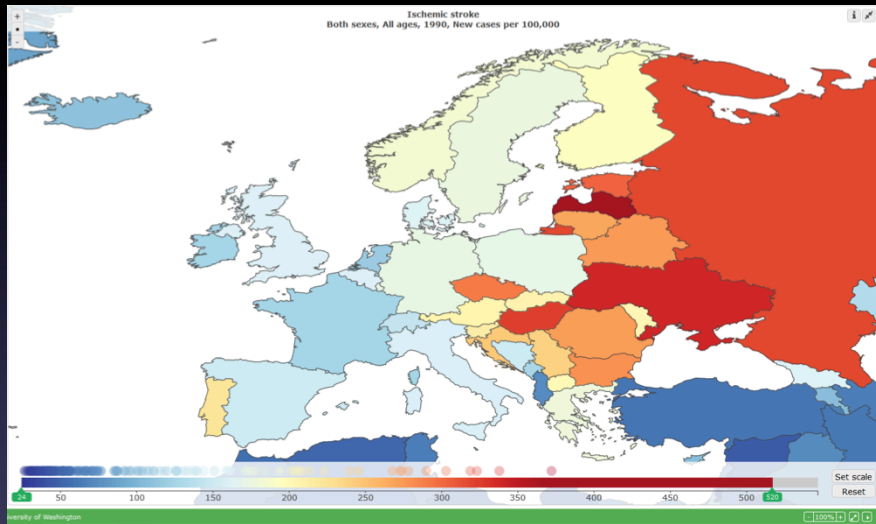
# Evolution of stroke



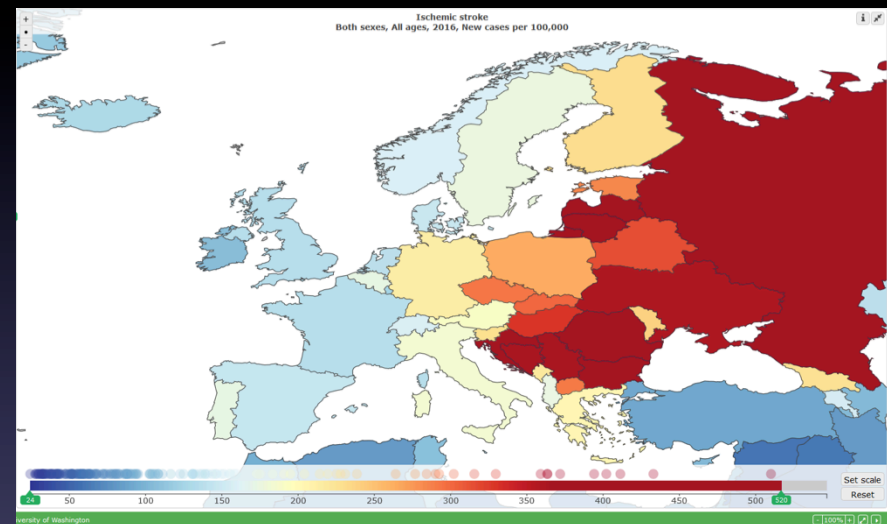
2016

# What happened in 26 years

1990



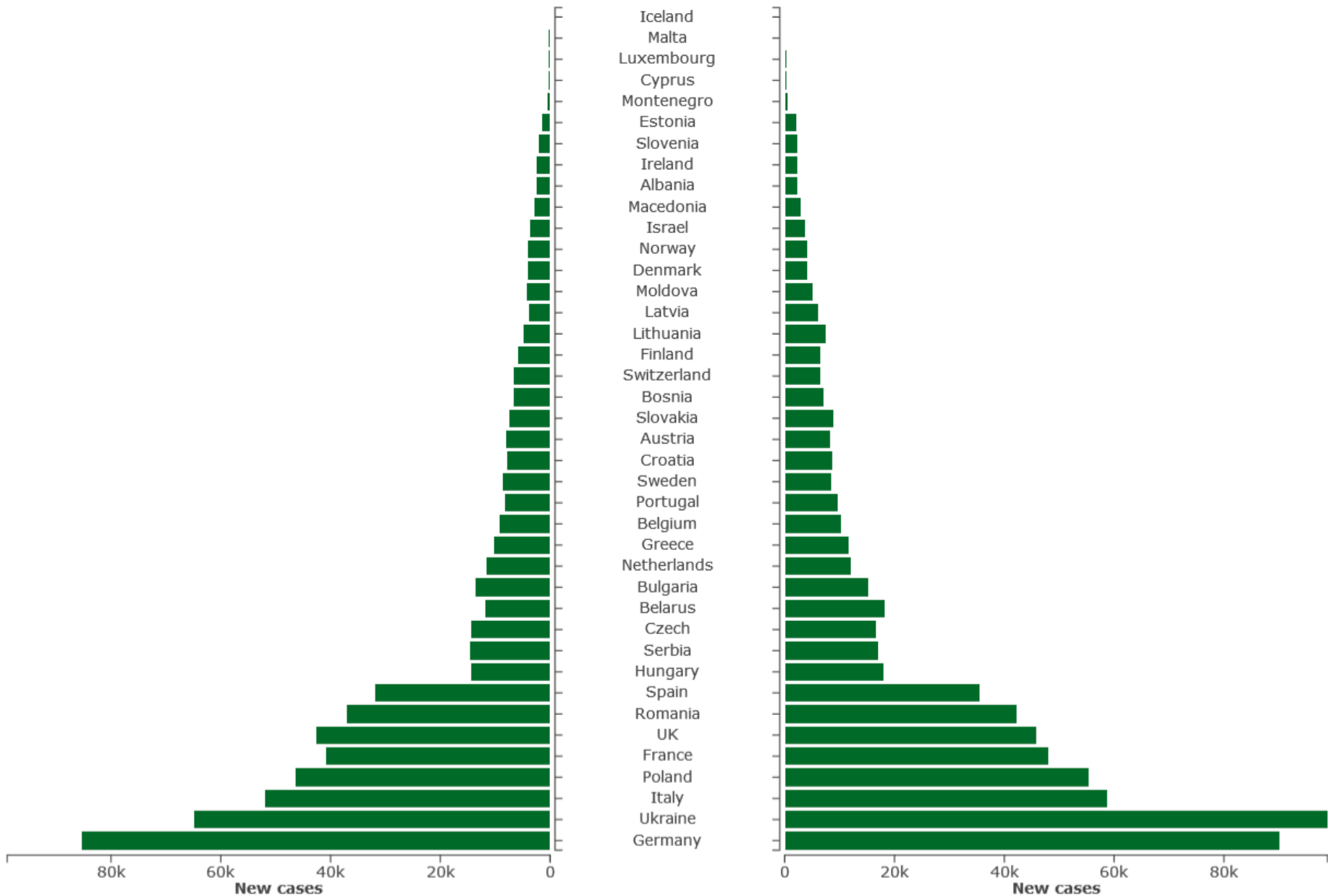
2016



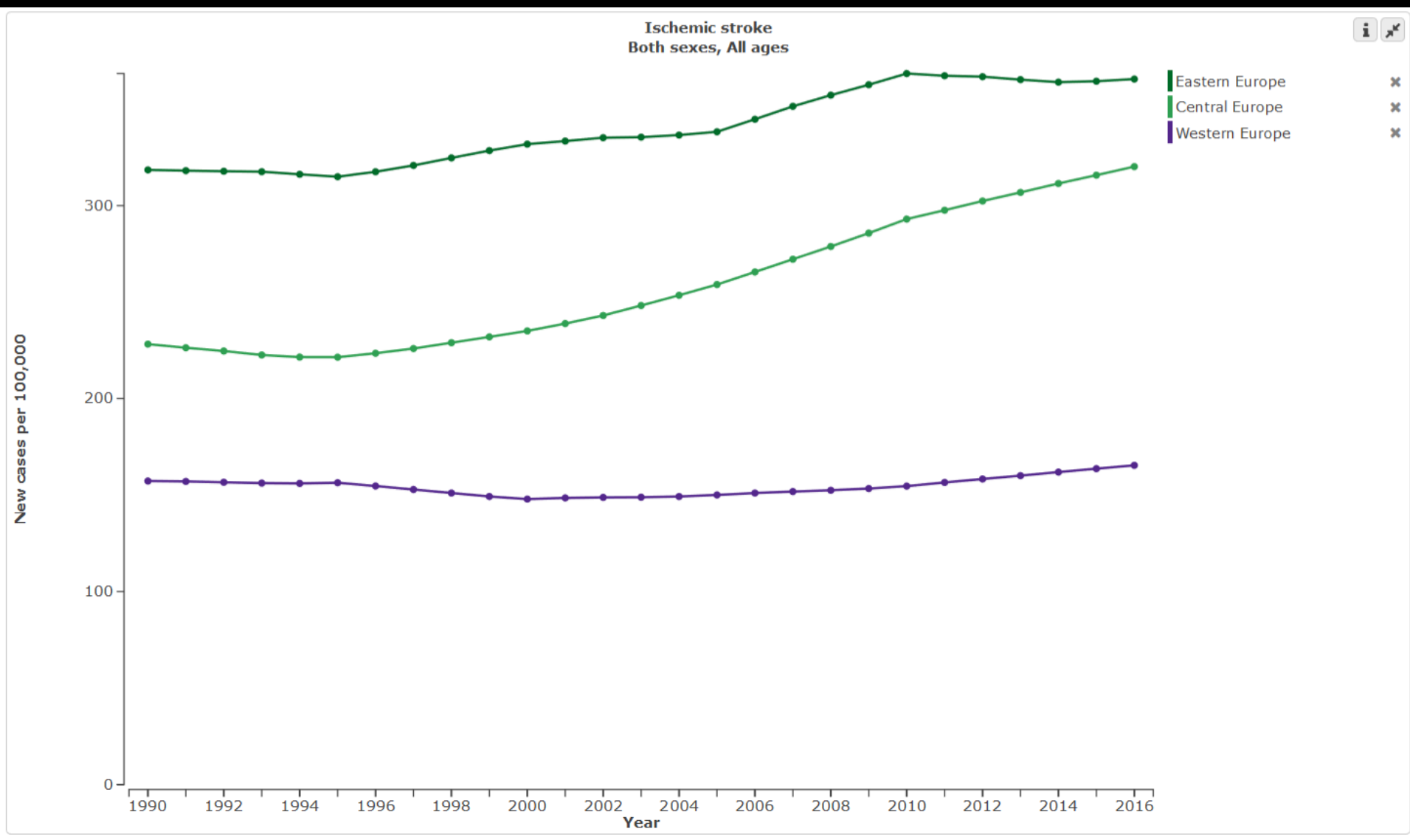
- Global stability of stroke incidence in Western Europe
- Increase in Central and Eastern Europe
- Increase in number of new stroke cases

Males, All ages, 2016

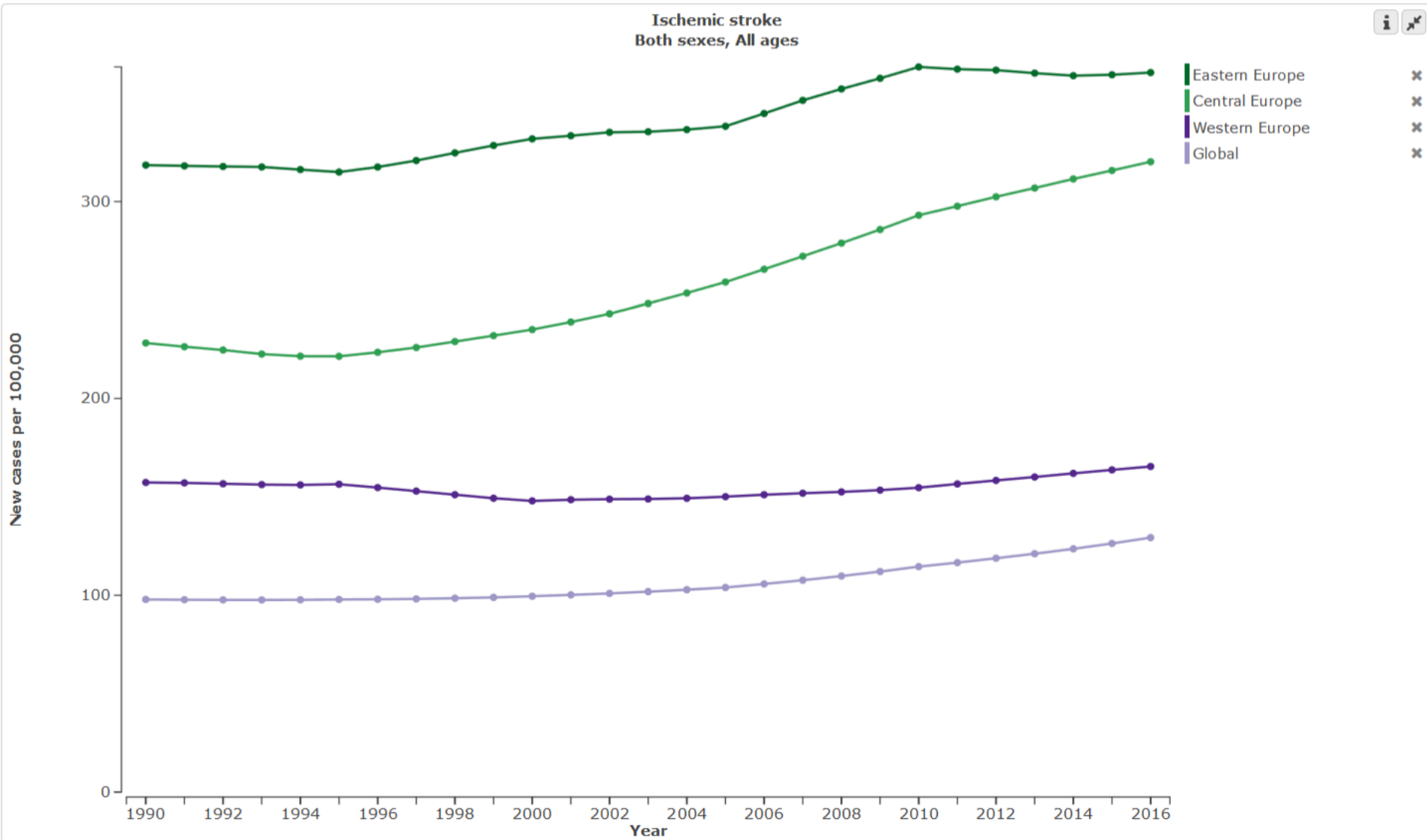
Females, All ages, 2016



# Eastern > Central > Western

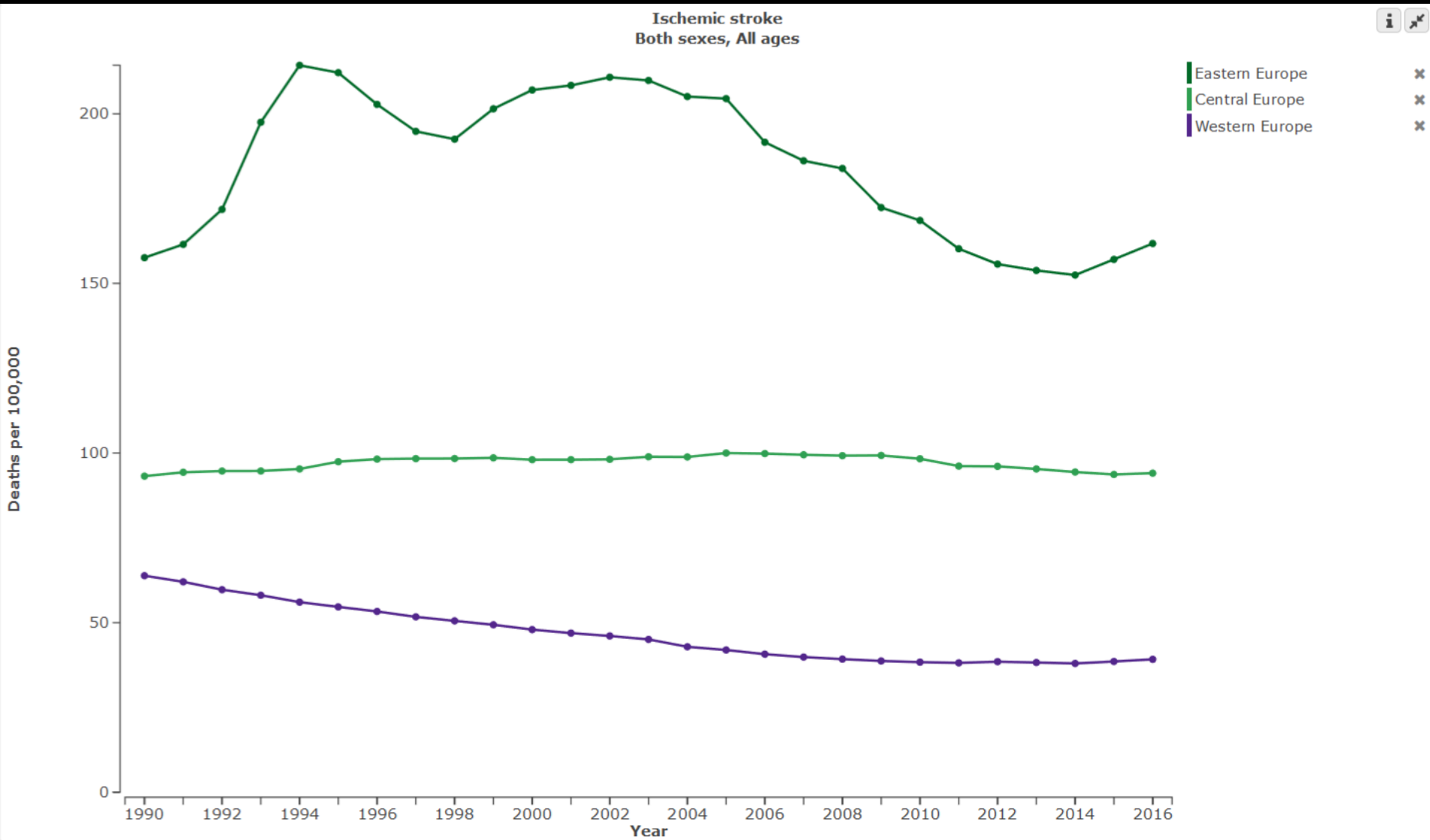


# But above global incidence !



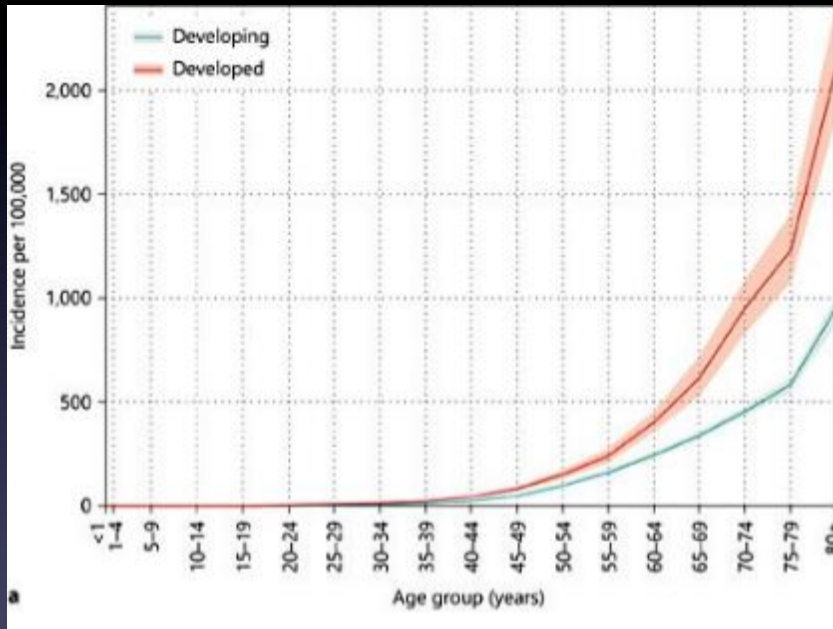


# Mortality is decreasing in W.E.

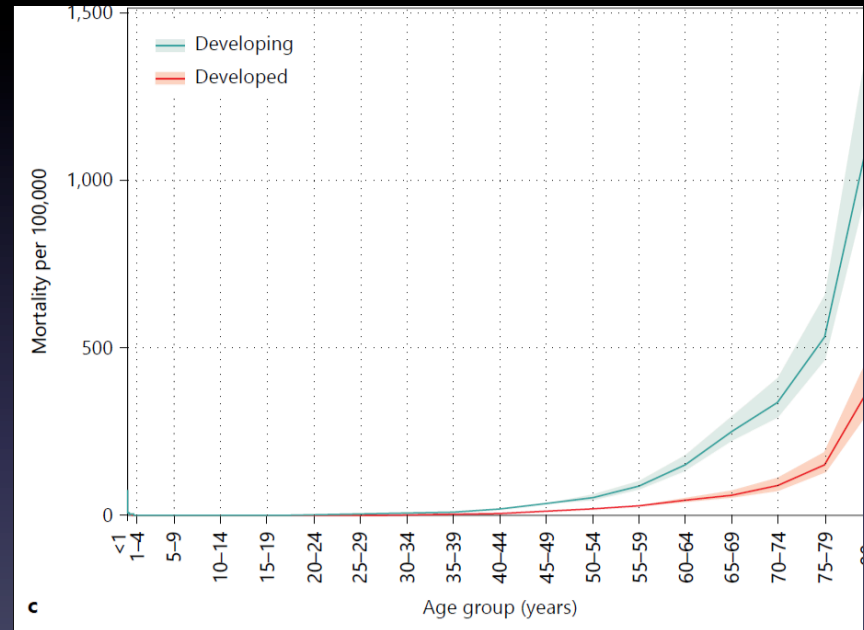


# Developed and developing countries

## Incidence



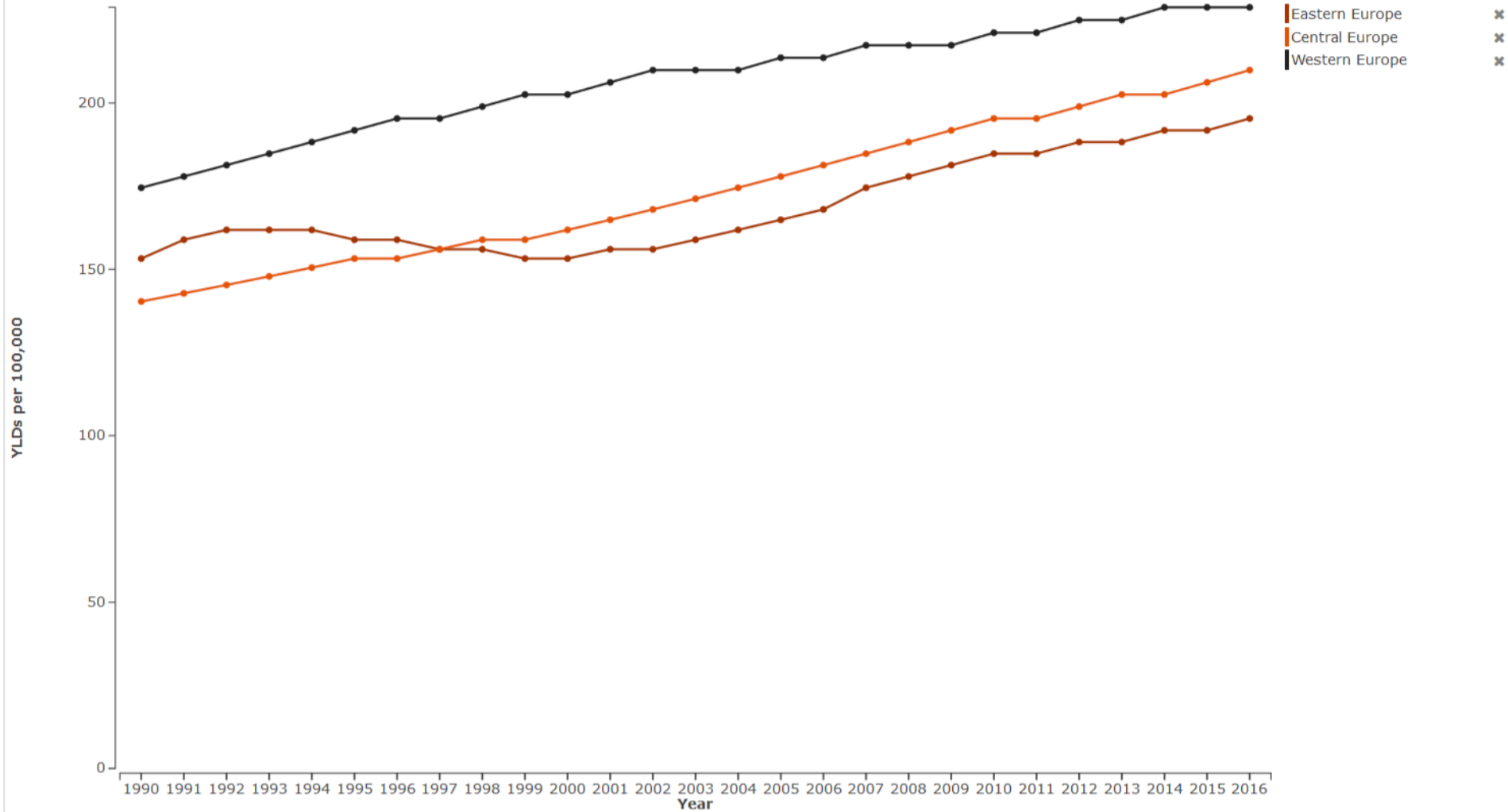
## Mortality



Developed countries : more stroke and less mortality = more stroke survivors

# Years lived with a disability

Ischemic stroke  
Both sexes, All ages

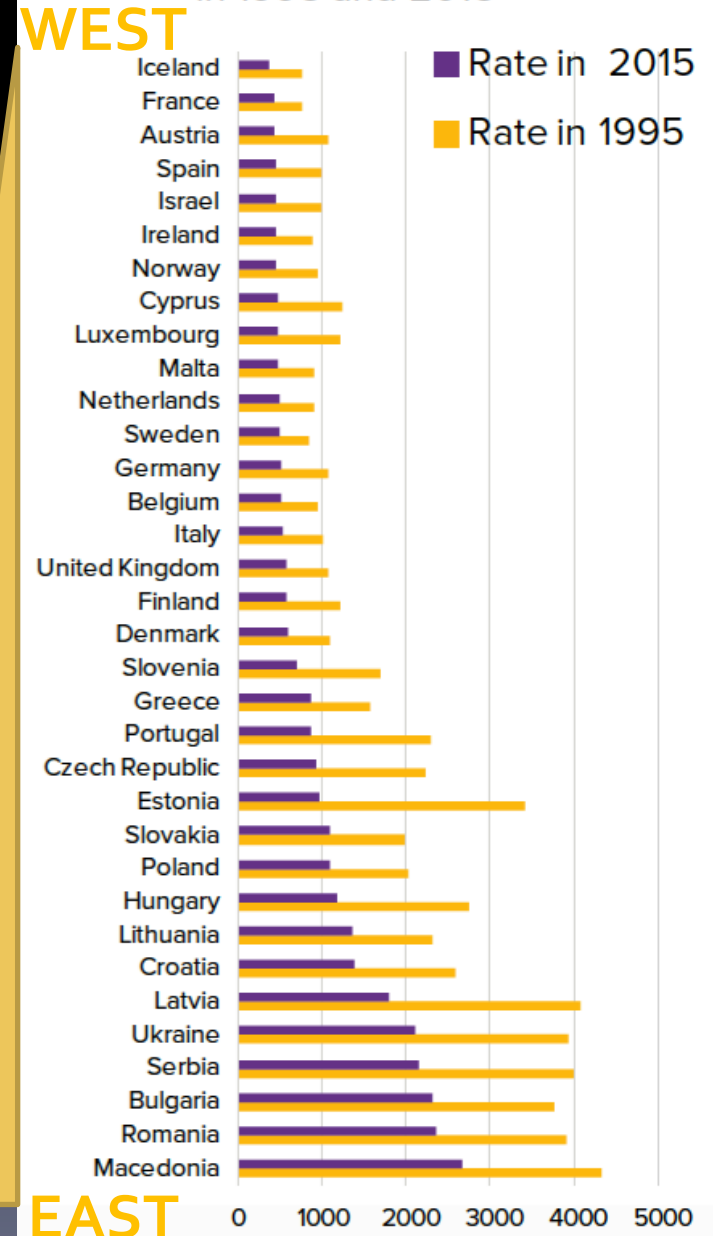


# The human cost :

West – East gradient

*Systematic analysis for the Global Burden of Disease Study  
2015. Lancet, 2016*

DALYs lost due to stroke per  
100,000 inhabitants,  
adjusted for age and sex,  
in 1995 and 2015



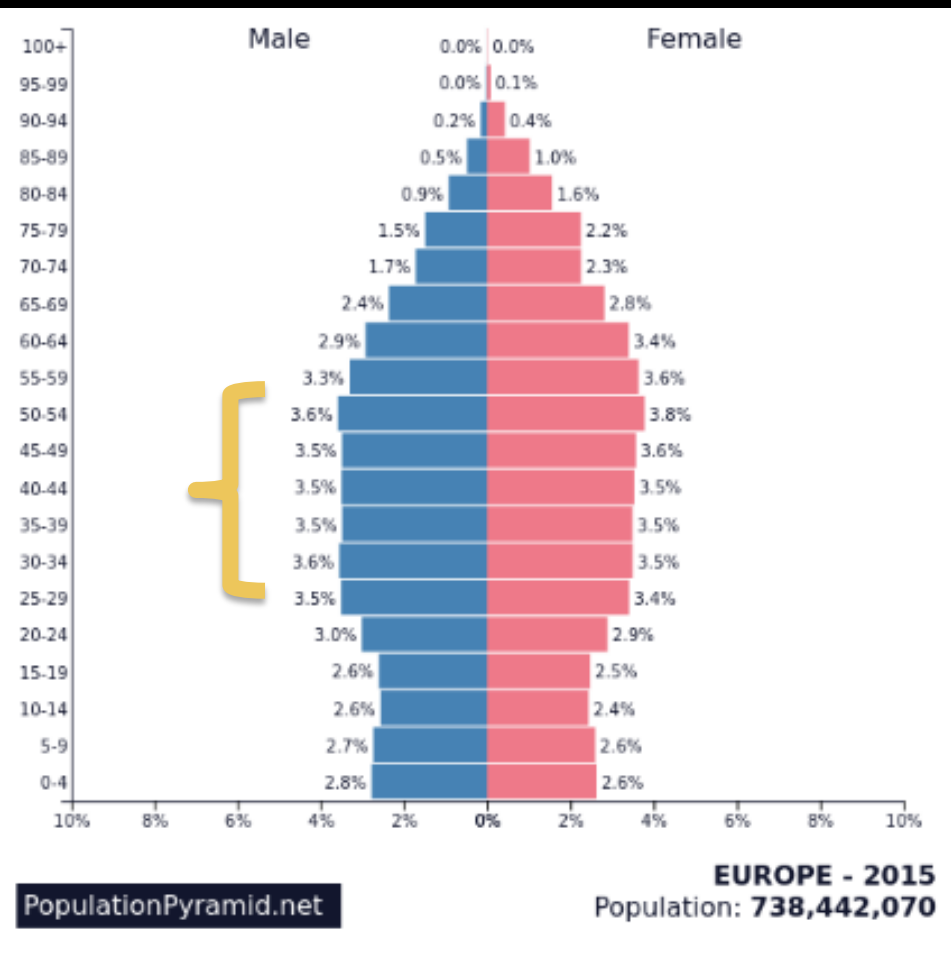
# The economical cost :

	€ thousands	% of total
Direct healthcare costs	€ 20,058,318	44%
Productivity loss due to mortality	€ 5,440,593	12%
Productivity loss due to morbidity	€ 3,983,874	9%
Informal care costs	€ 15,855,181	35%
<b>Total</b>	<b>€ 45,337,965</b>	

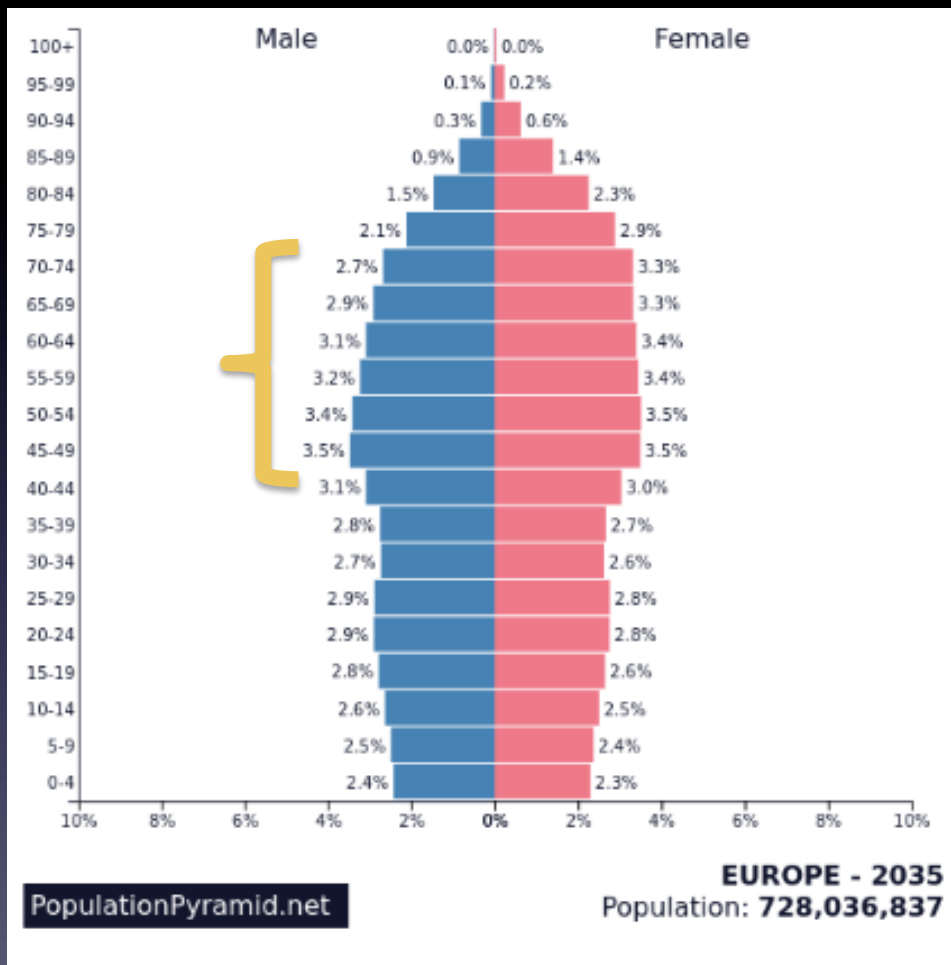
Stroke E.U. 2015 :  
45 billions euros  
20 billions euros direct to healthcare

*European cardiovascular disease statistics 2017  
SAFE : The Burden of Stroke in Europe*

# Aging population



2015

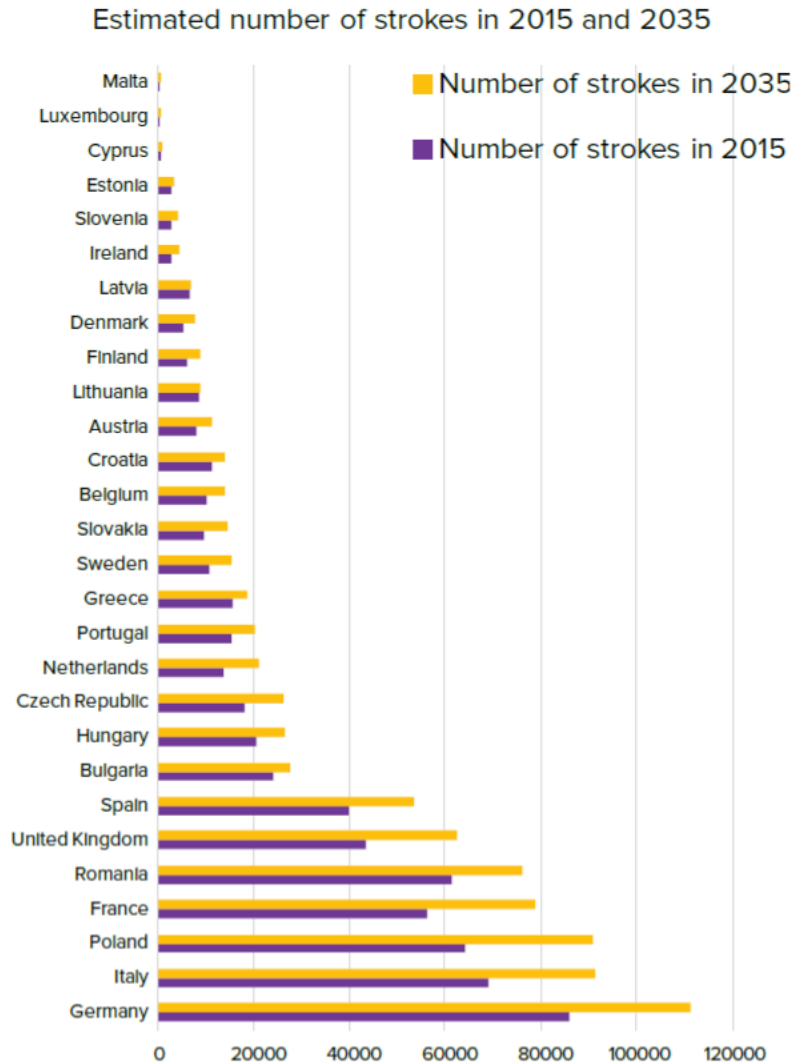


2035

5

# Previsions in Europe

Estimated number of stroke events in 2015 and 2035 in EU member states



2015

- 1,8 M. strokes
- 3 700 000 stroke survivors

2035

- 3 M. strokes
- 4 630 000 stroke survivors

Treat ?

Yes

!

But how?

# Treatment before 2015

Number of patients to treat for one functional independent patient :

## Intravenous thrombolysis





# 2015 : the paradigm shift

The **NEW ENGLAND**

The NEW ENGLAND JOURNAL of MEDICINE

7 randomised controlled trials :  
**Thrombectomy + I.V. tpa > I.V. tpa**

Ster

THE LANCET

J Neurol Neurosurg Psychiatry. 2017 Jan;88(1):38-44. doi: 10.1136/jnnp-2016-314117. Epub 2016 Oct 18.

**Endovascular therapy for acute ischaemic stroke: the Pragmatic Ischaemic Stroke Thrombectomy Evaluation (PISTE) randomised, controlled trial.**

Symptom

Mechanical thrombectomy after intravenous alteplase versus alteplase alone after stroke (THRACE): a randomised controlled trial

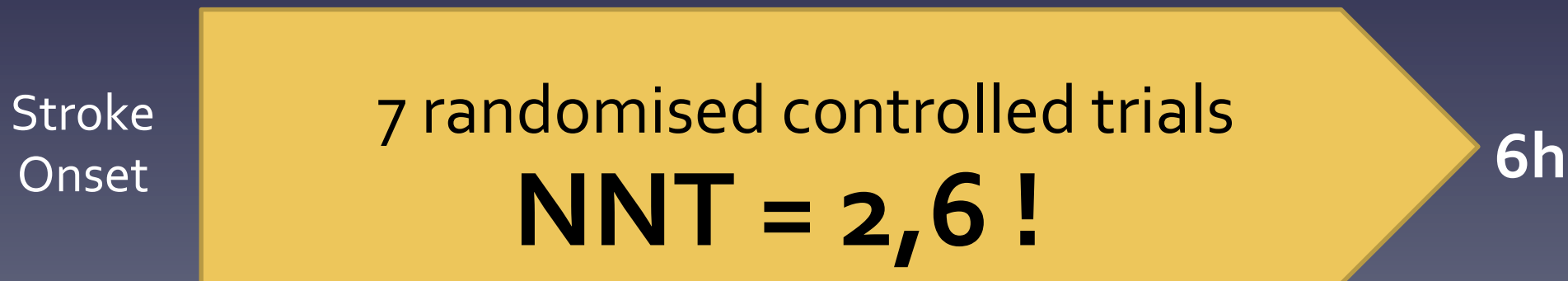


# Treatment after 2017

## Intravenous thrombolysis



## Mechanical Thrombectomy



# Recommendations

- Ischemic stroke
- large vessel occlusion
- Up to 6 hours after symptoms onset
  - +/- IV thrombolysis within the first 4,5 hours

# Beyond the 6 hours window

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Thrombectomy for Stroke at 6 to 16 Hours  
with Selection by Perfusion Imaging

The NEW ENGLAND  
JOURNAL of MEDICINE

ESTABLISHED IN 1812

JANUARY 4, 2018

VOL. 378 NO. 1

Thrombectomy 6 to 24 Hours after Stroke with a Mismatch  
between Deficit and Infarct

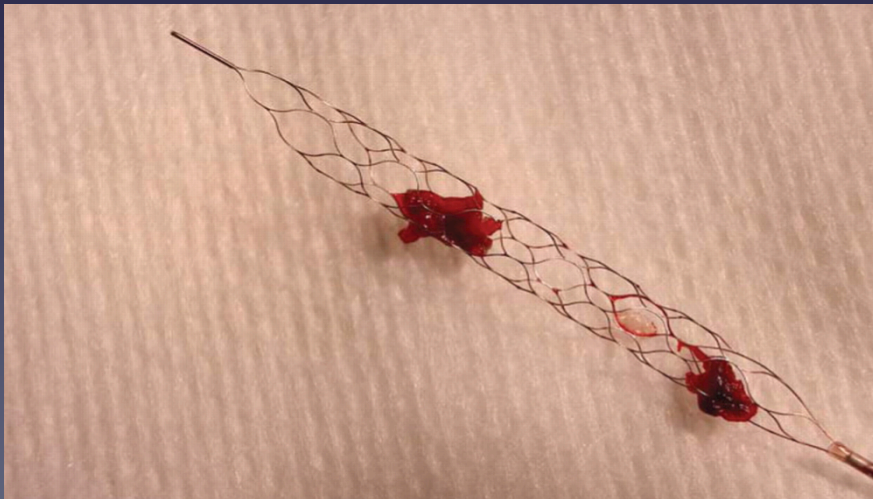
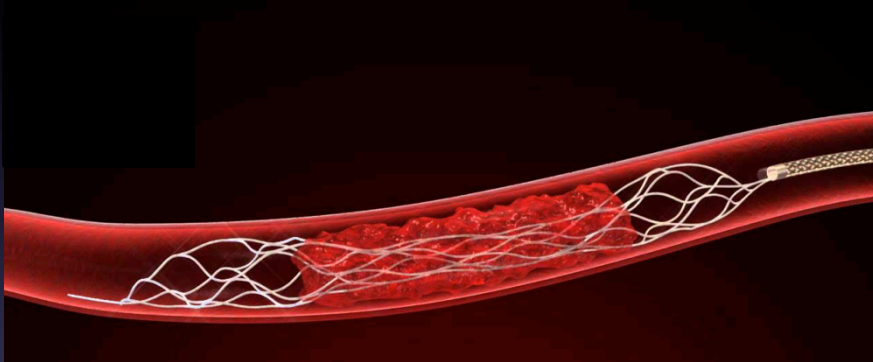
# How to do it

- Biplane Angio suite
- Anesthesia : local or general
- Vascular access :
  - Arterial puncture (femoral, carotid or brachial)
  - Catheterism of supra aortic vessels
  - Angriography
  - Clot access using a micro-catheter



# How to remove the clot?

- Stent retriever



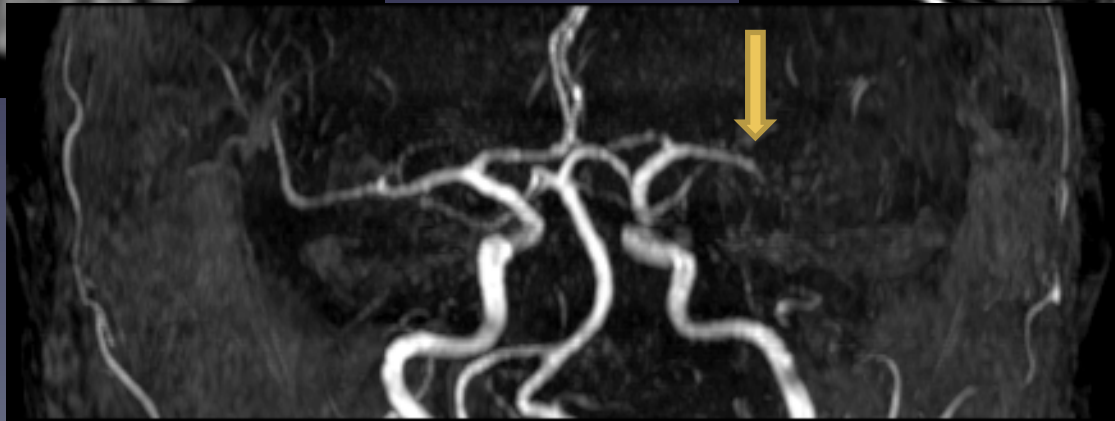
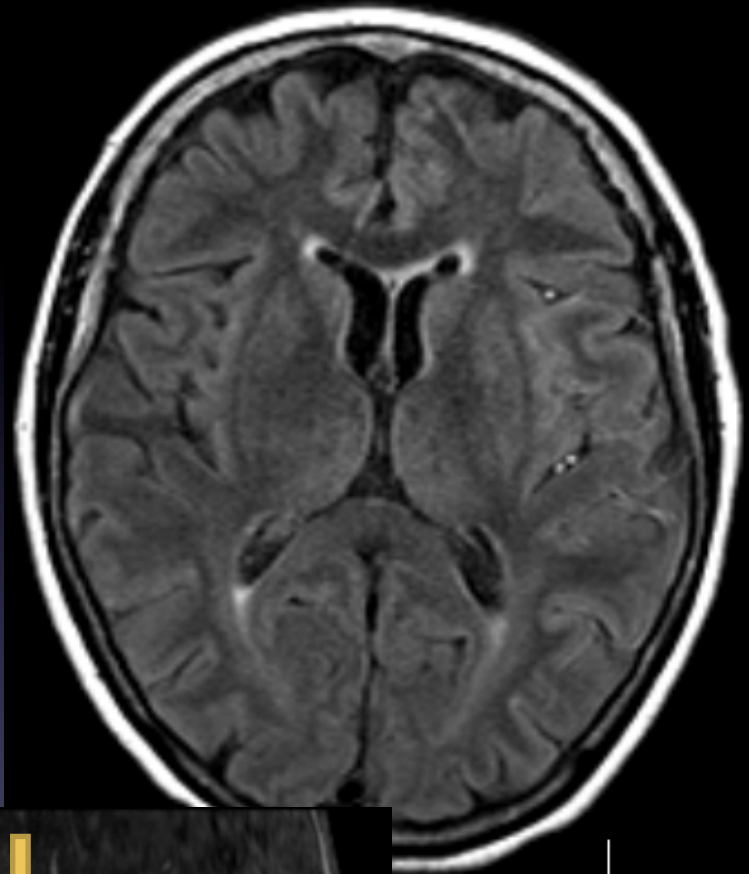
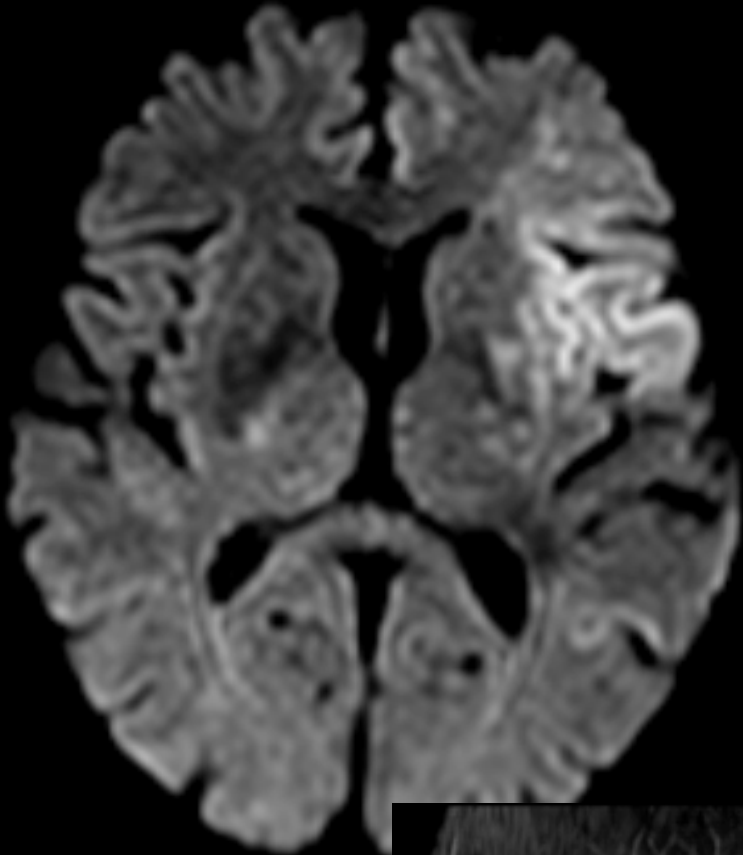
- Aspiration



- Aspiration + stent



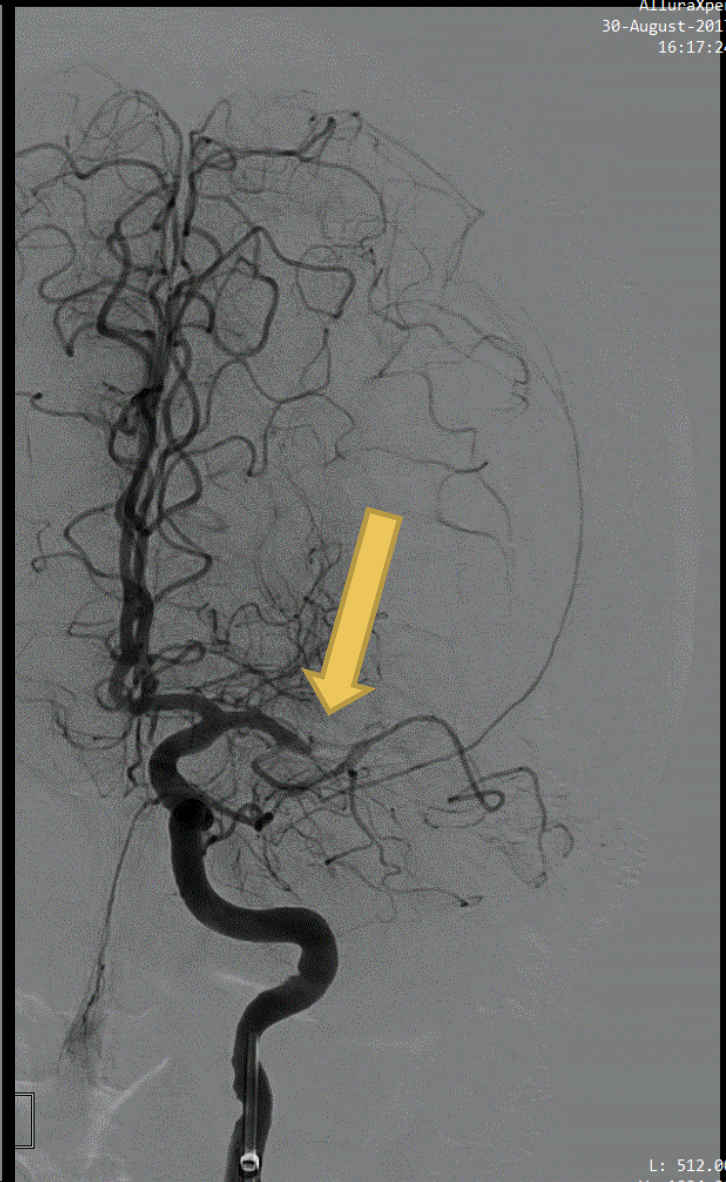
# Stroke and vessel occlusion



# Left MCA M<sub>1</sub> occlusion

AlluraXper  
30-August-2017  
16:17:24

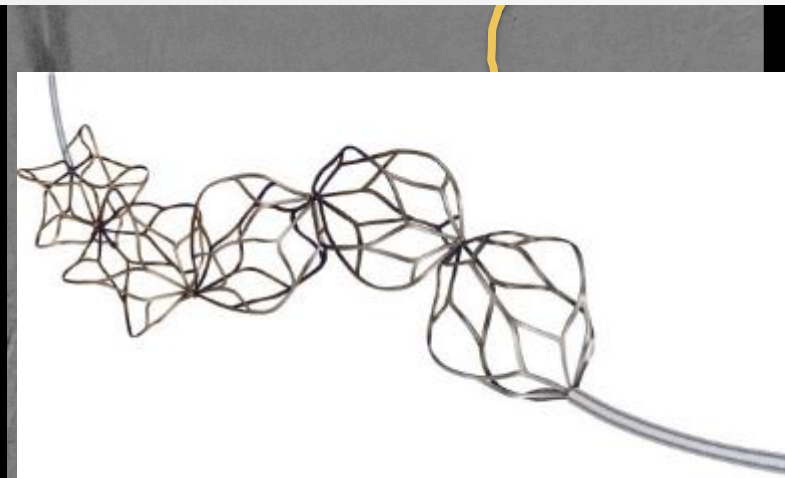
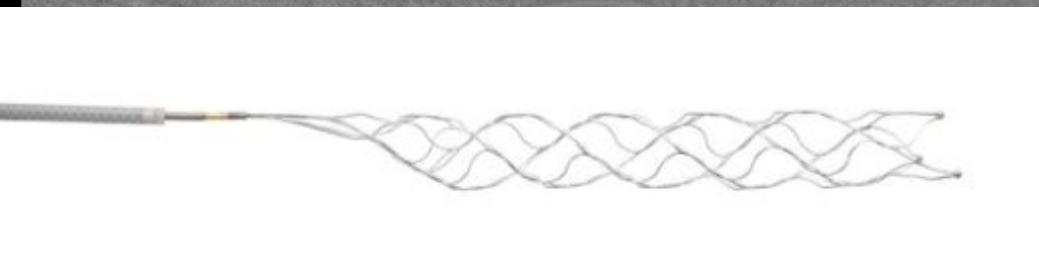
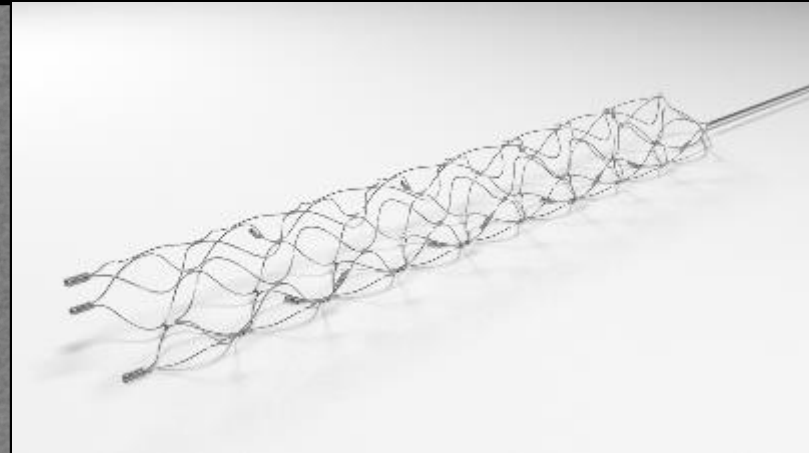
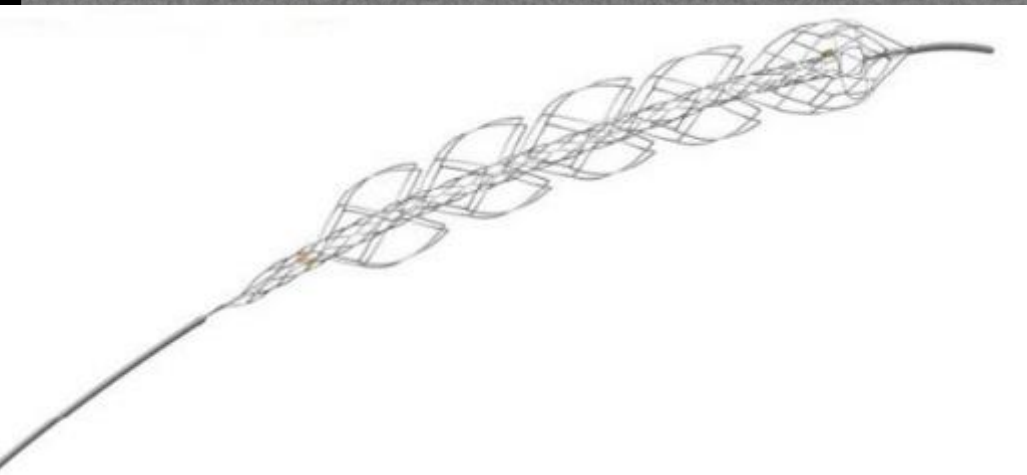
Carotide Interne Gauche



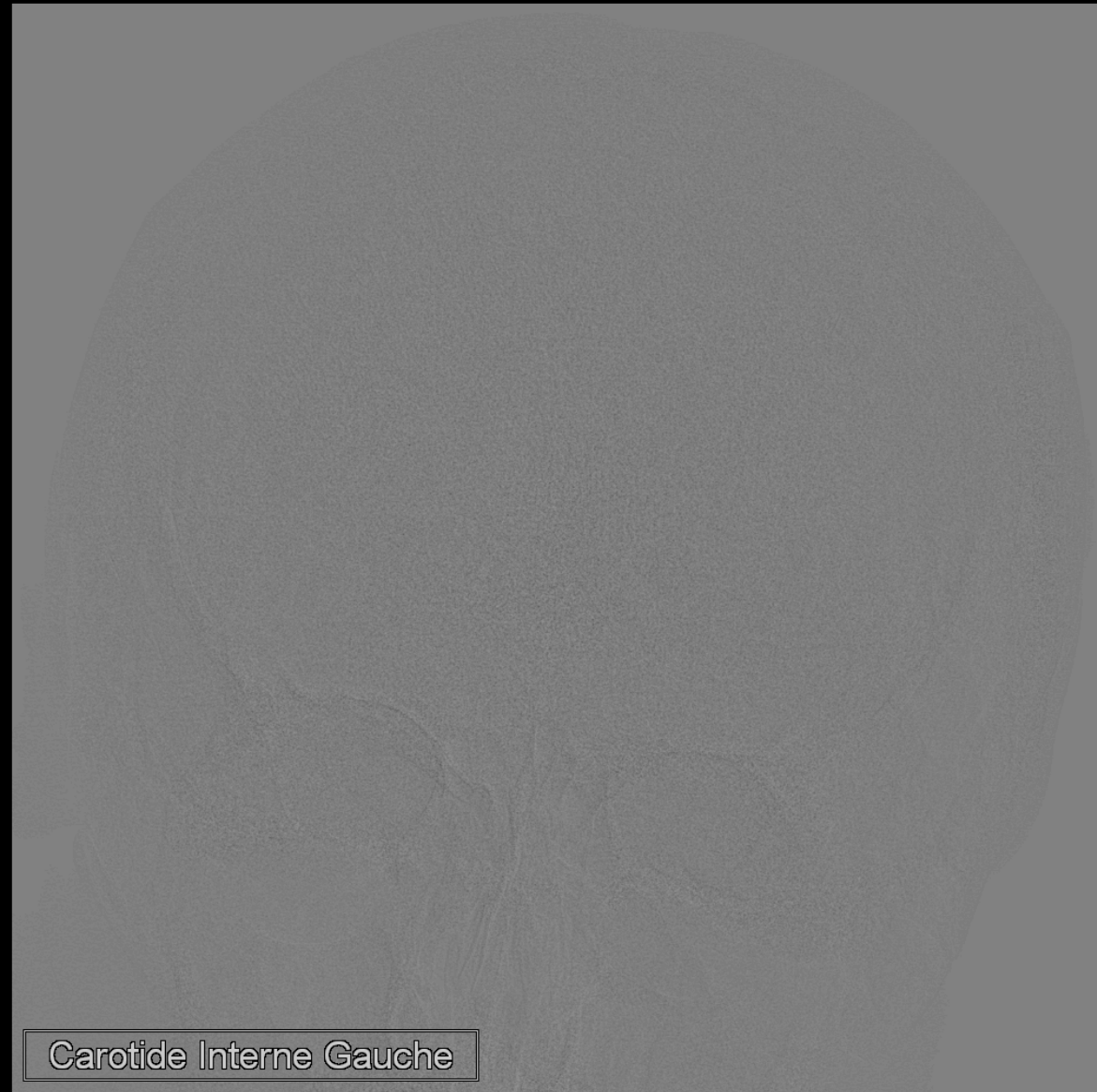
L: 512.00  
W: 1024.00



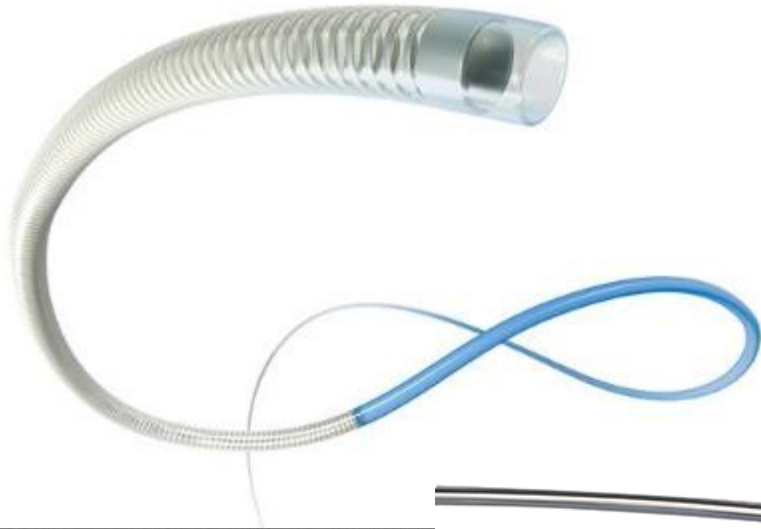
# Stent retriever



# Recanalization



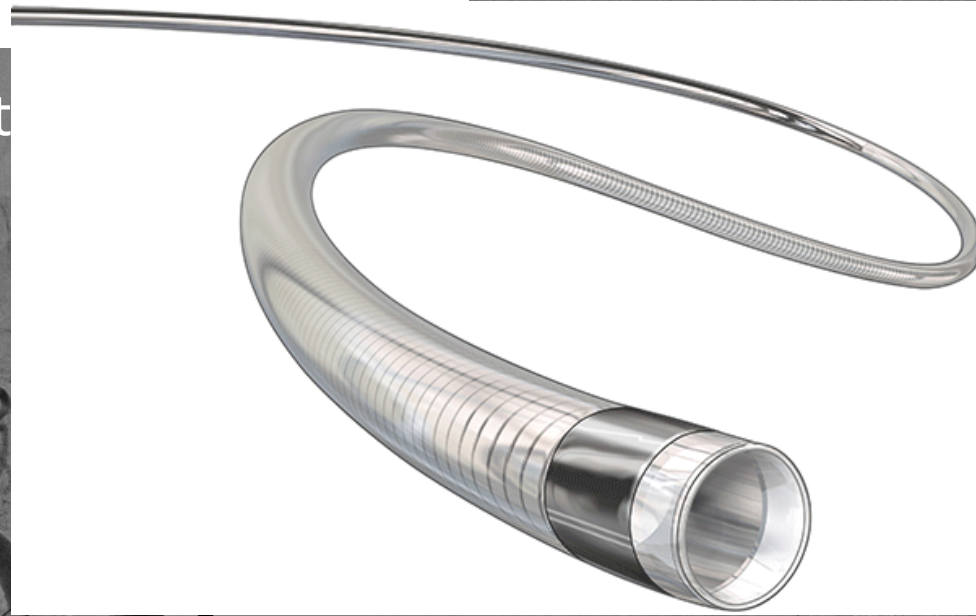
# Basilar artery occlusion



/er



Aspiration cat

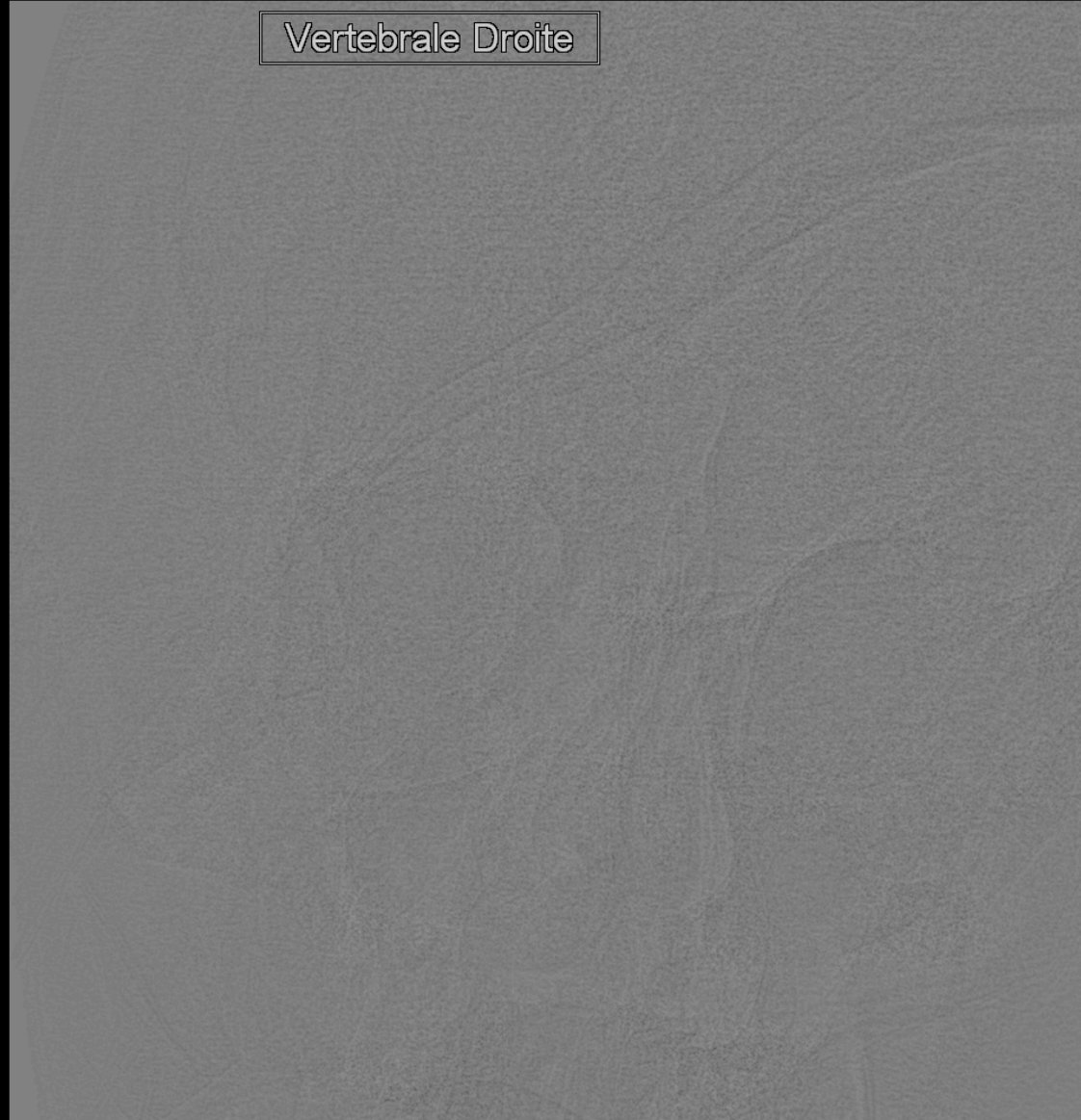


# Recanalization

Vertebrale Droite



Vertebrale Droite



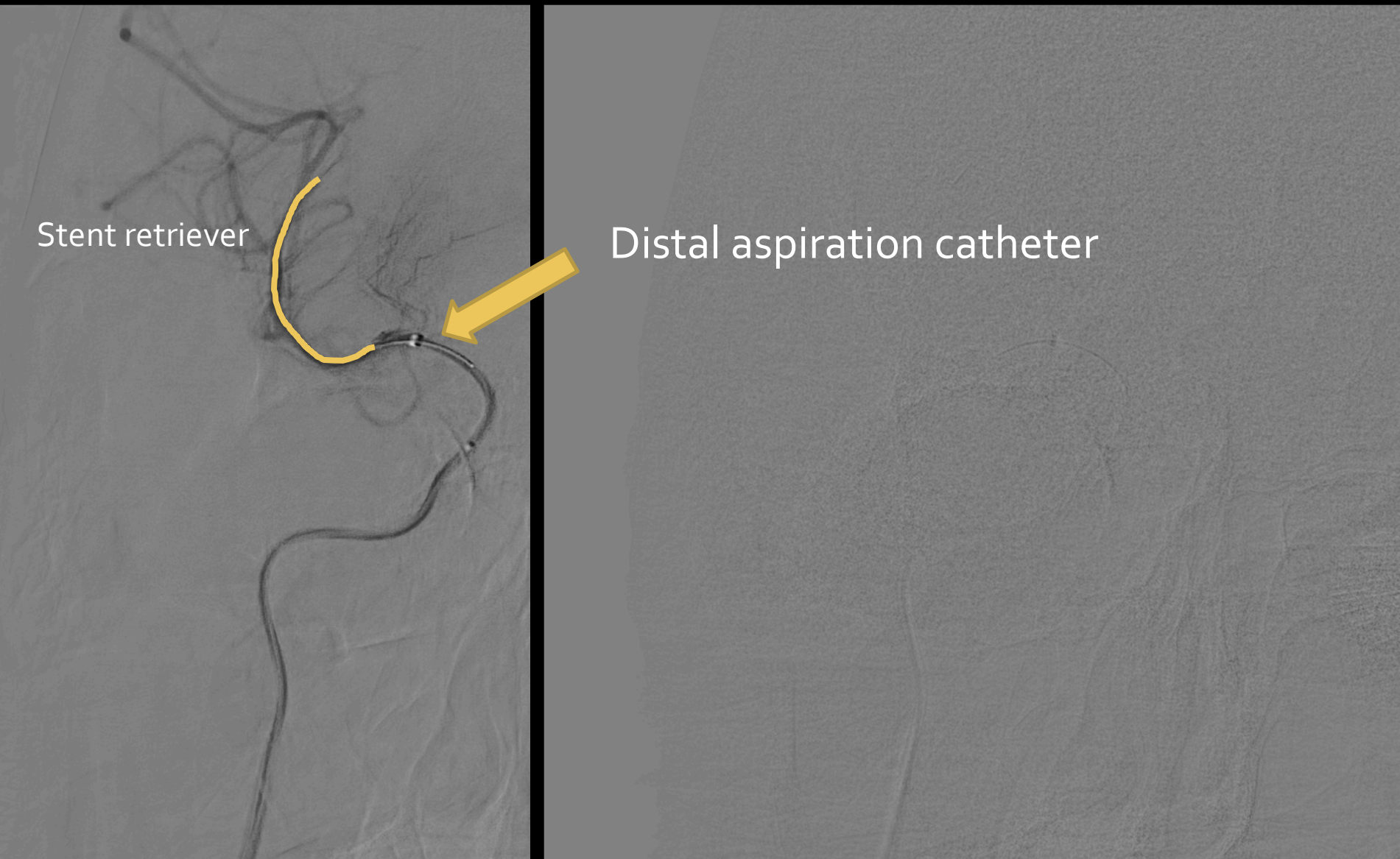
# Right MCA M<sub>1</sub> occlusion



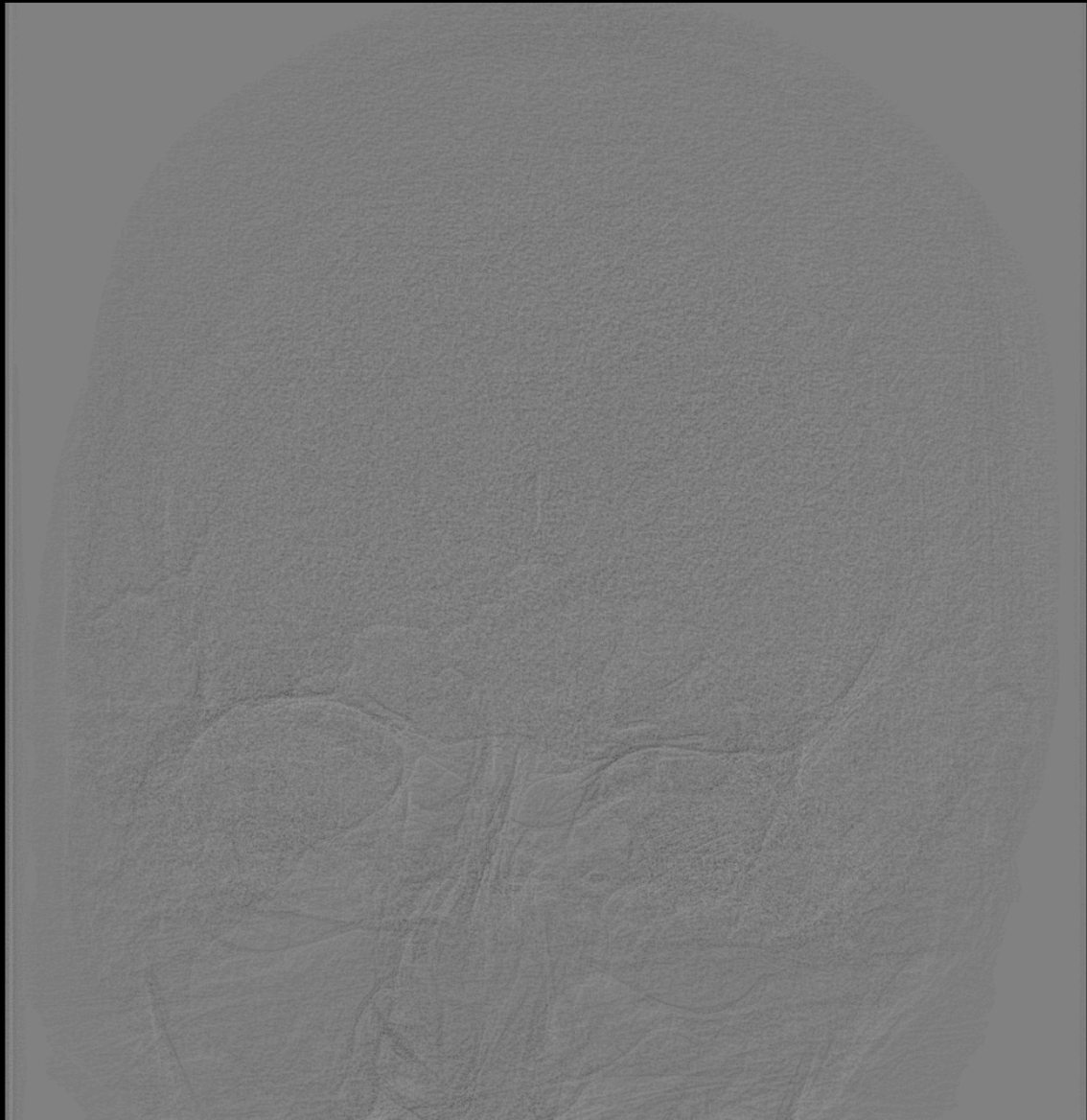
# Stent retriever and aspiration

Stent retriever

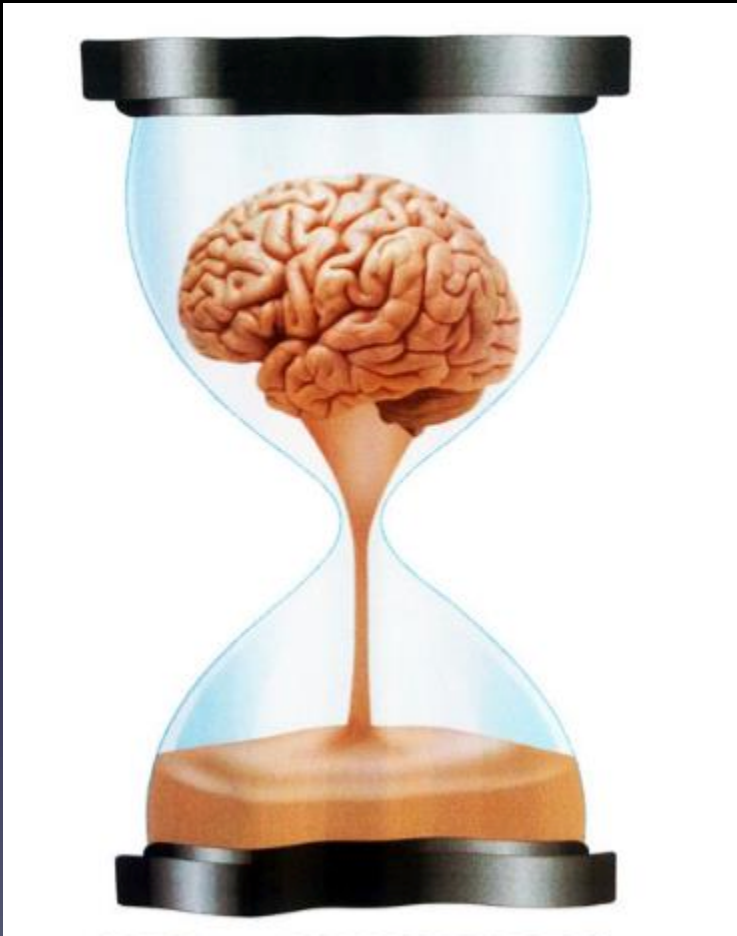
Distal aspiration catheter



# Recanalization



Treat?

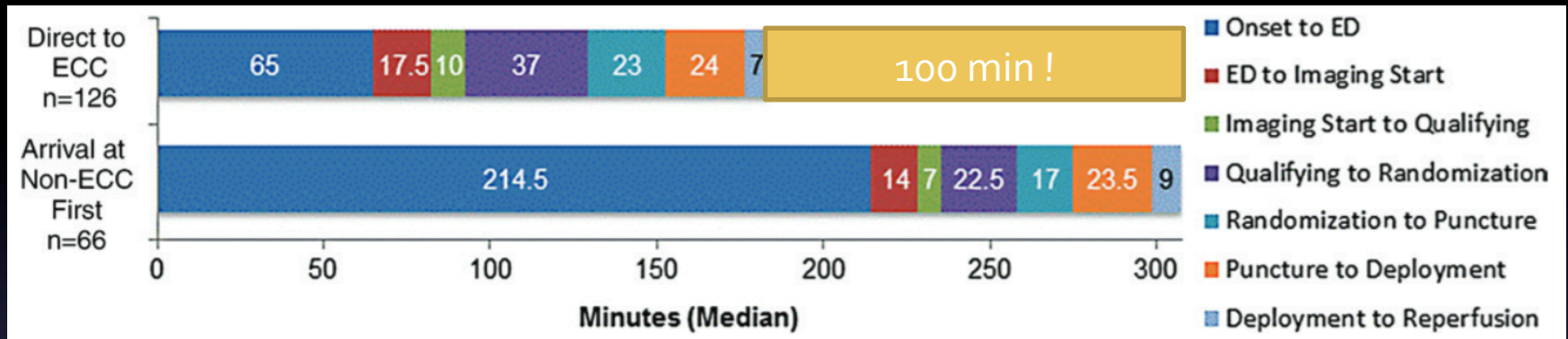


where ?

Time is brain !



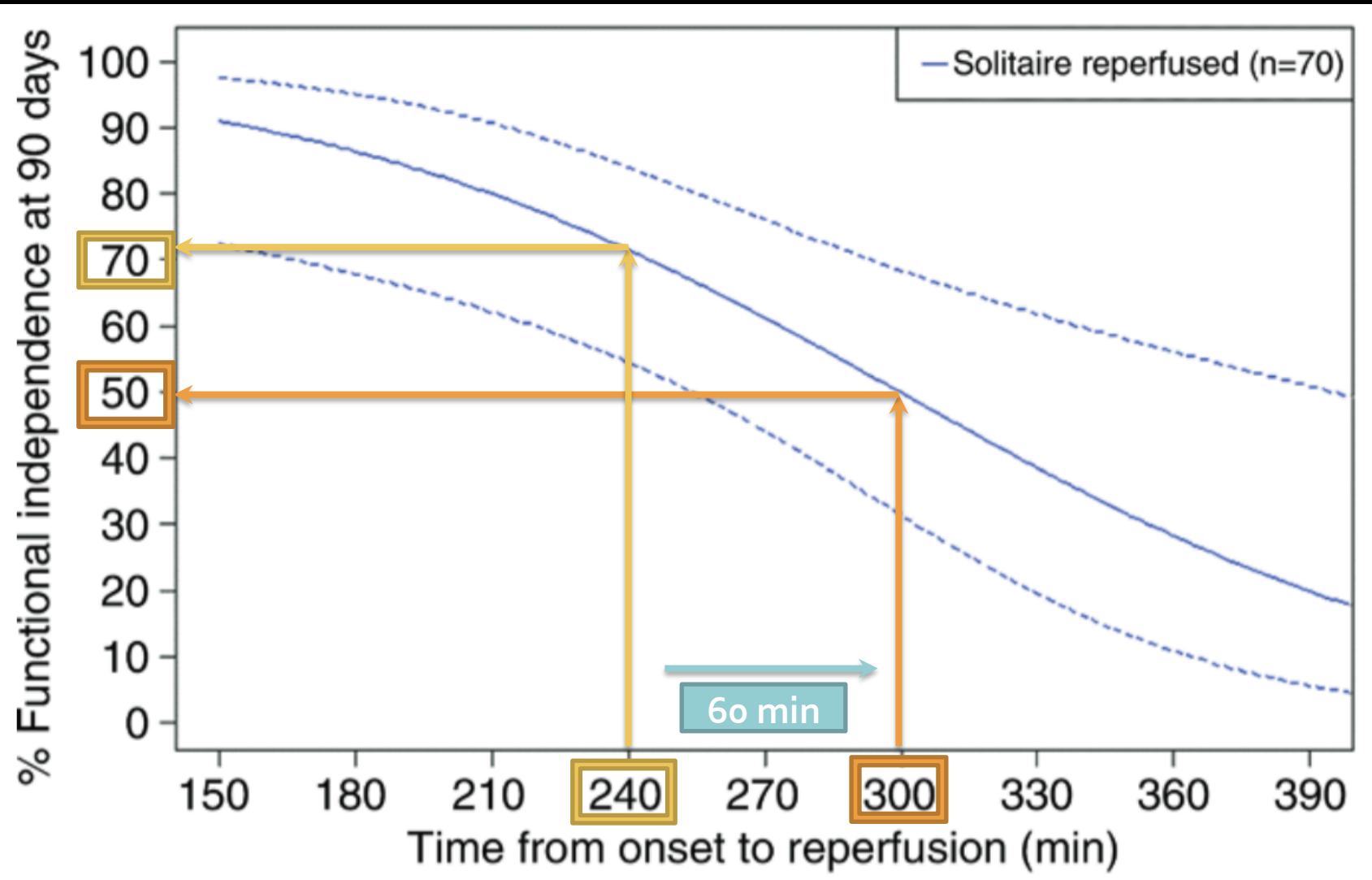
# Time



**Figure 2:** Graph of time intervals in patients treated within the same institution (an ECC) versus those who were transferred from another facility after receiving intravenous tPA therapy. *Deployment* = device deployment, *puncture* = groin puncture, *qualifying* = qualifying image acquisition.

275 vs 179,5 min to reperfusion

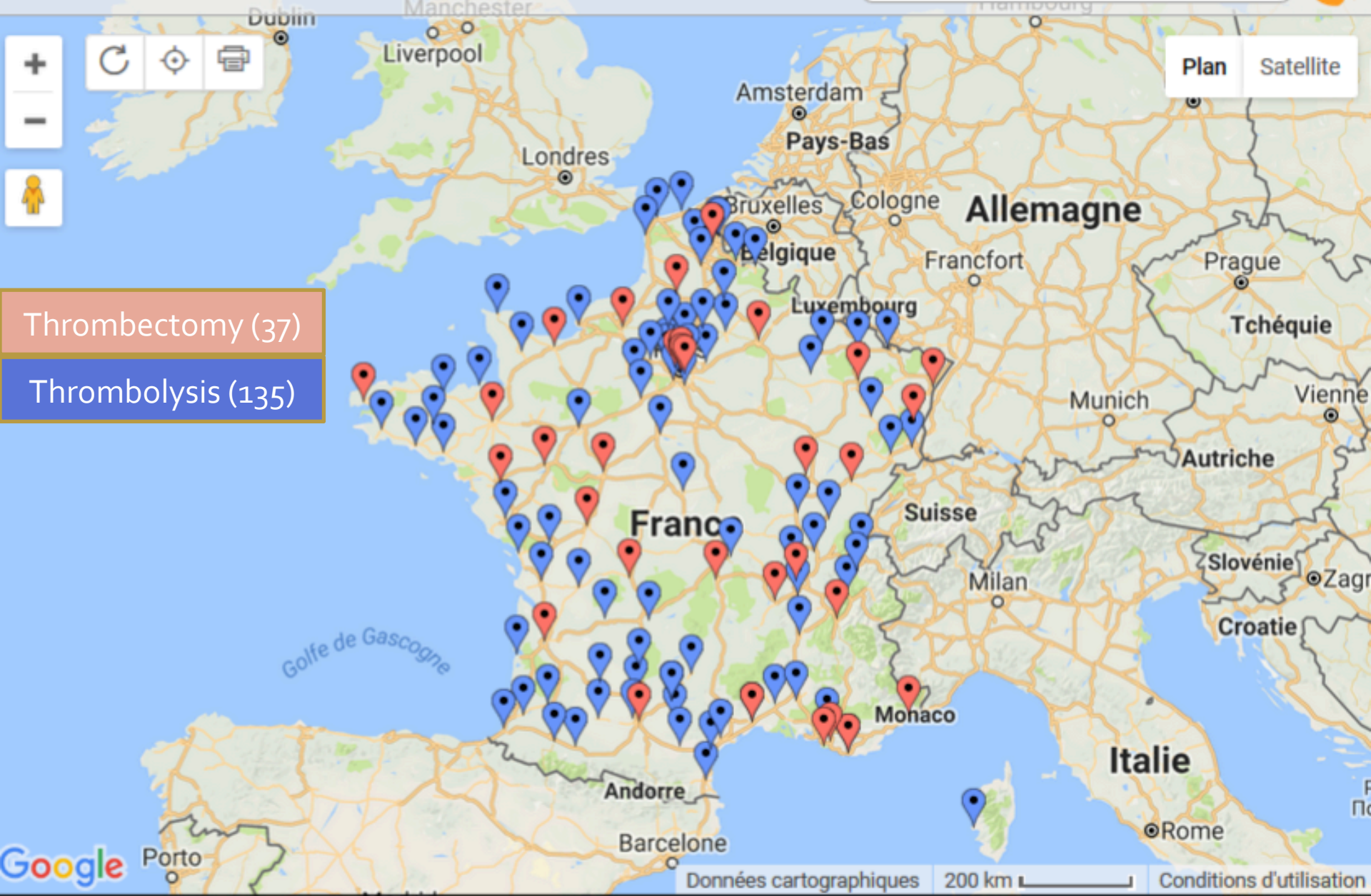
# Impact of Time



# Where ?

- Time is brain
- Need for a stroke ready proximity network
- To get the patient to the right center fast

# SFNR Thrombectomie 2016



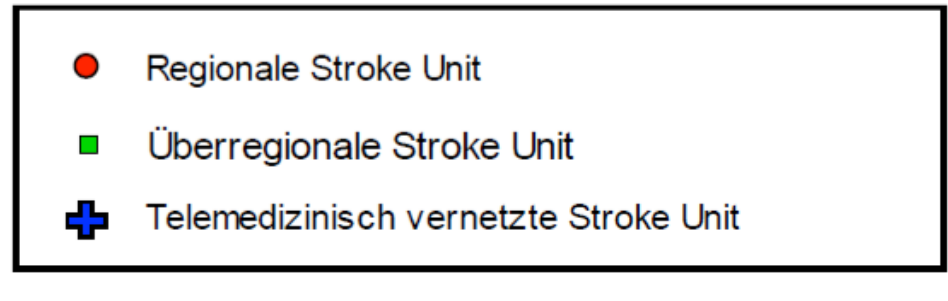
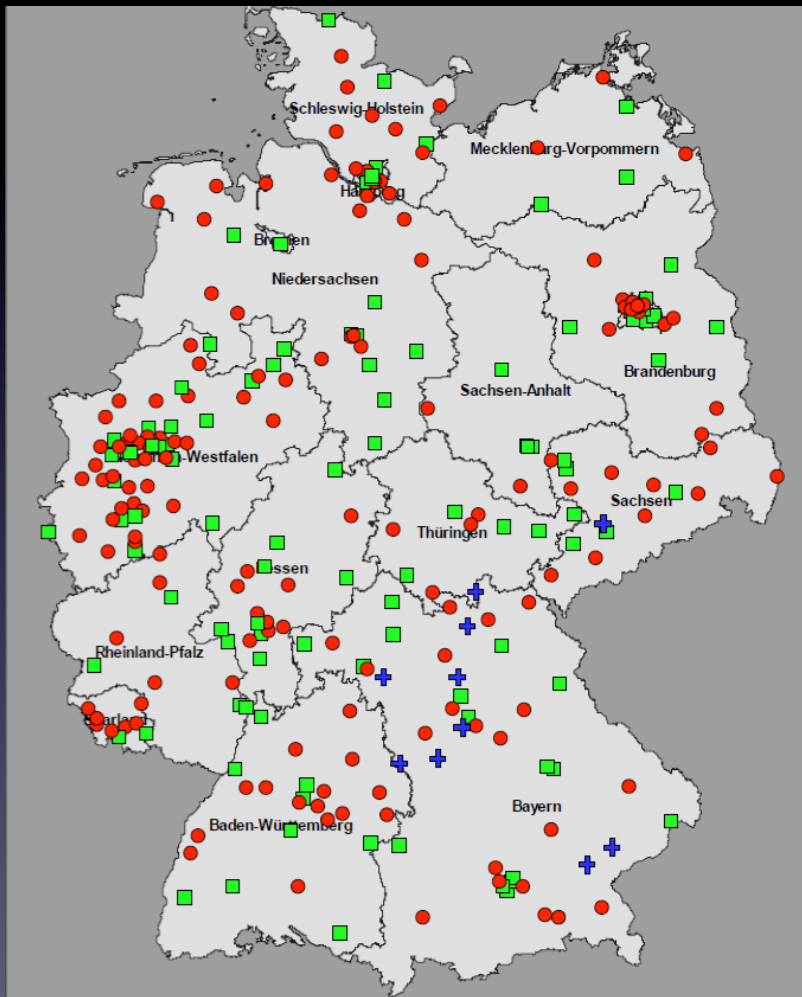
Thrombectomy (37)

Thrombolysis (135)

# German Stroke Units (279)



# The German stroke network



279 Stroke Units

- 162 regional Stroke Units (58%)
- 107 transregional Stroke Centers w/ thrombectomy (38%)
- 10 Tele-Stroke Units (4%)

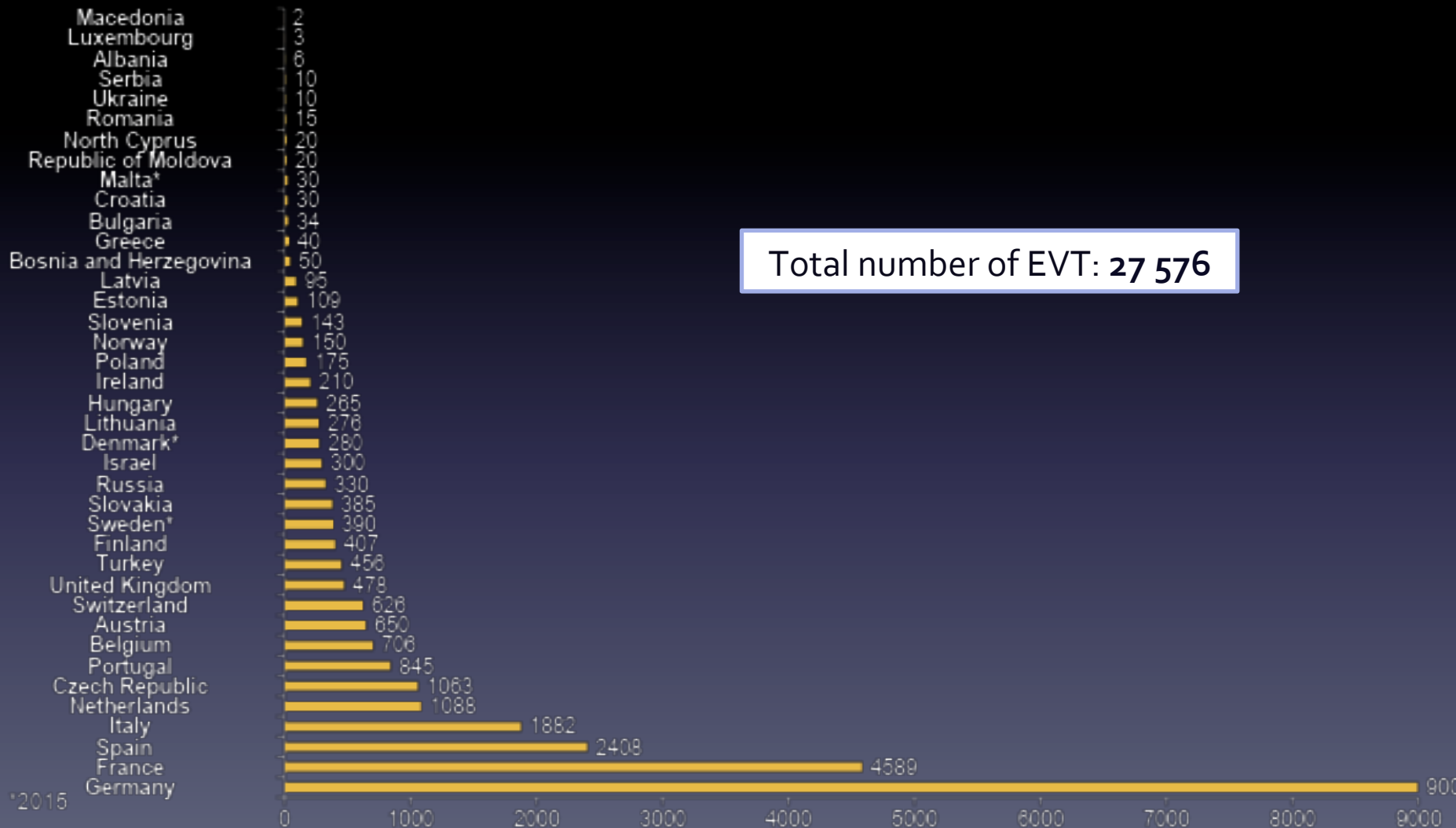
# Estimation of thrombectomies

Ischemic strokes in 2016	
Studies :	Eligibility
REVASCAT (New England 2015)	4%
Campbell (Lancet neurol.2015)	10%
Vanacker (Stroke 2016)	17%
El Tawil (Europ Stroke j 2016)	15%
Soderqvist (Karolinska Nat. Base 2013)	6%
<b>Eligible thrombectomies</b>	<b>10,4%</b>

- In 2016 in Europe, **192 614** strokes were estimated eligible to mechanical thrombectomy

# ESO ESMINT EAN SAFE survey on stroke care in Europe

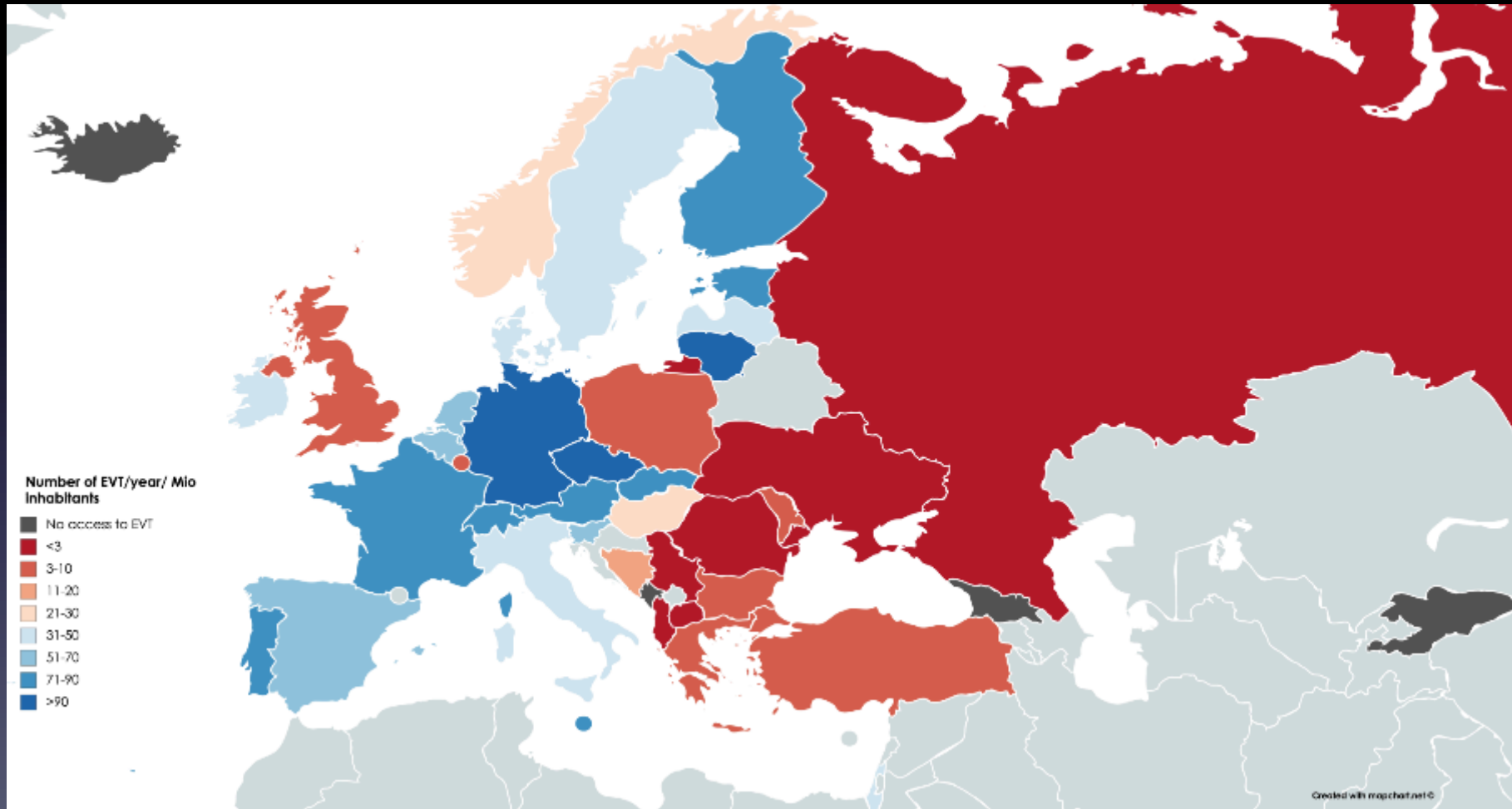
## Absolute number of endovascular treatments (EVT) in 2016





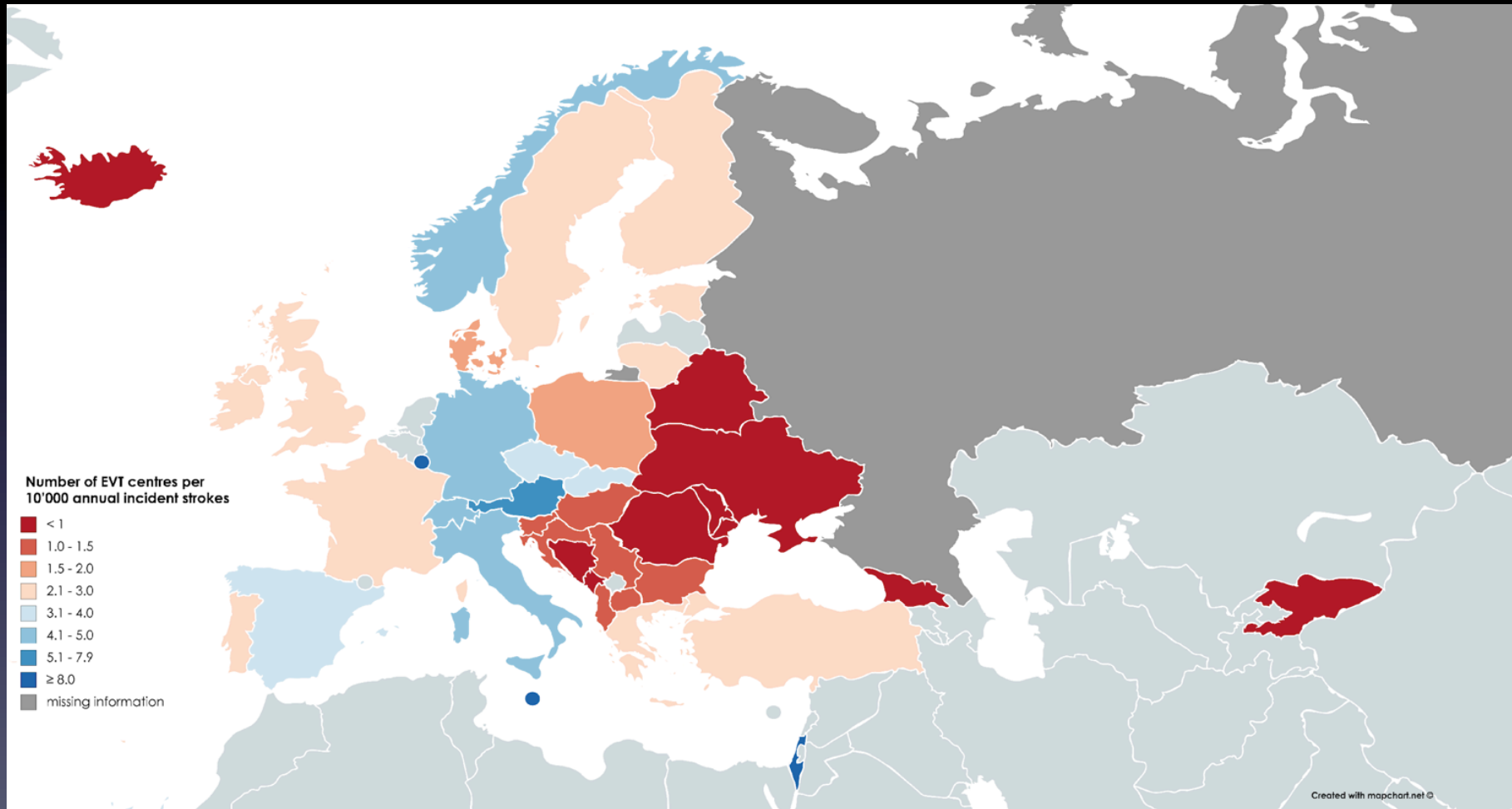
# ESO ESMINT EAN SAFE survey on stroke care in Europe

## Number of EVT per year / 1 Mio inhabitants



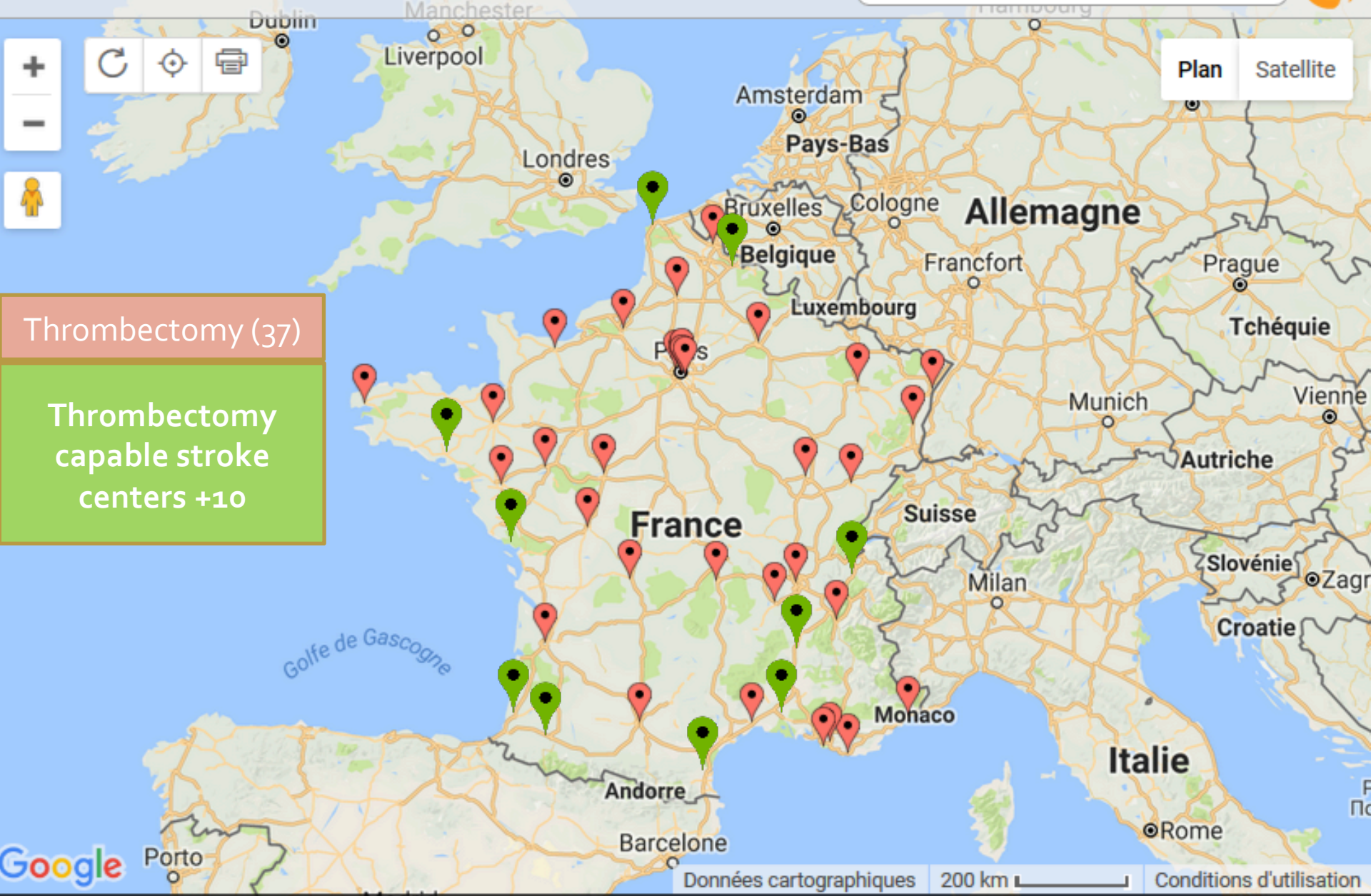
# ESO ESMINT EAN SAFE survey on stroke care in Europe

## Number of EVT centres per 10'000 annual incident strokes



# Solutions

- Train more interventionalists
- Open new centers vs centralization
- Optimize the stroke network :
  - Tele-stroke
  - Pre-hospital triage
  - Fast transportation



Thrombectomy (37)

Thrombectomy capable stroke centers +10

Traitement disponible

TM+TV  
TIV  
Valence

# We need more interventionalists !

## Neuroradio-interventionalist

- Comprehensive stroke centers
  - Mechanical thrombectomies
  - Intra cranial aneurysm
  - Cerebral arterio-venous fistulas and malformations
- Large volume of MT
- NRI + thrombectomy

# We need more interventionalists !

## Neuroradio-interventionalists

- Comprehensive stroke centers
  - Mechanical thrombectomies
  - Intra cranial aneurysm
  - Cerebral arterio-venous fistulas and malformations
- Large volume of MT
- NRI + thrombectomy

## Radiological interventionalists

- Thrombectomy-capable stroke centers (stroke units)
- Medium volume of MT
- Need for body vascular interventionist + thrombectomy

# The German Model

- DeGIR/DGNR formation :
  - Level 1 : basic interventional radiology
  - Level 2 : specialized training interventional radio.
    - With A – F modules representing different fields

# The German Model

**Table I.** DeGIR/DGNR certification including number of procedures.

Curriculum	Indication area	Number of procedures for level 2
DeGIR/DGNR	Vascular recanalization and reconstruction (non-neurovascular) (aorta, peripheral, haemodialysis shunts) (Module A)	150
	Vascular embolization procedures (Module B)	100
	Miscellaneous procedures including vascular foreign body removal, TIPSS, venous access (Module C)	100
	Minimally invasive tumour therapy including tumour embolization, chemoembolization and SIRT (Module D)	100
	Neurovascular revascularization including carotid and stroke (Module E)	100 (including at least 30 extracranial and at least 30 intracranial procedures)
	Neurovascular embolization (aneurysms, malformations, AV fistula) (Module F)	100 (including at least 50 intracranial procedures)



One true solution

**ECR 2018**  
**DIVERSE**  
& **UNITED**

February 28 - March 4  
Vienna



# Lille's Neuroradiology team



# Thank you !

