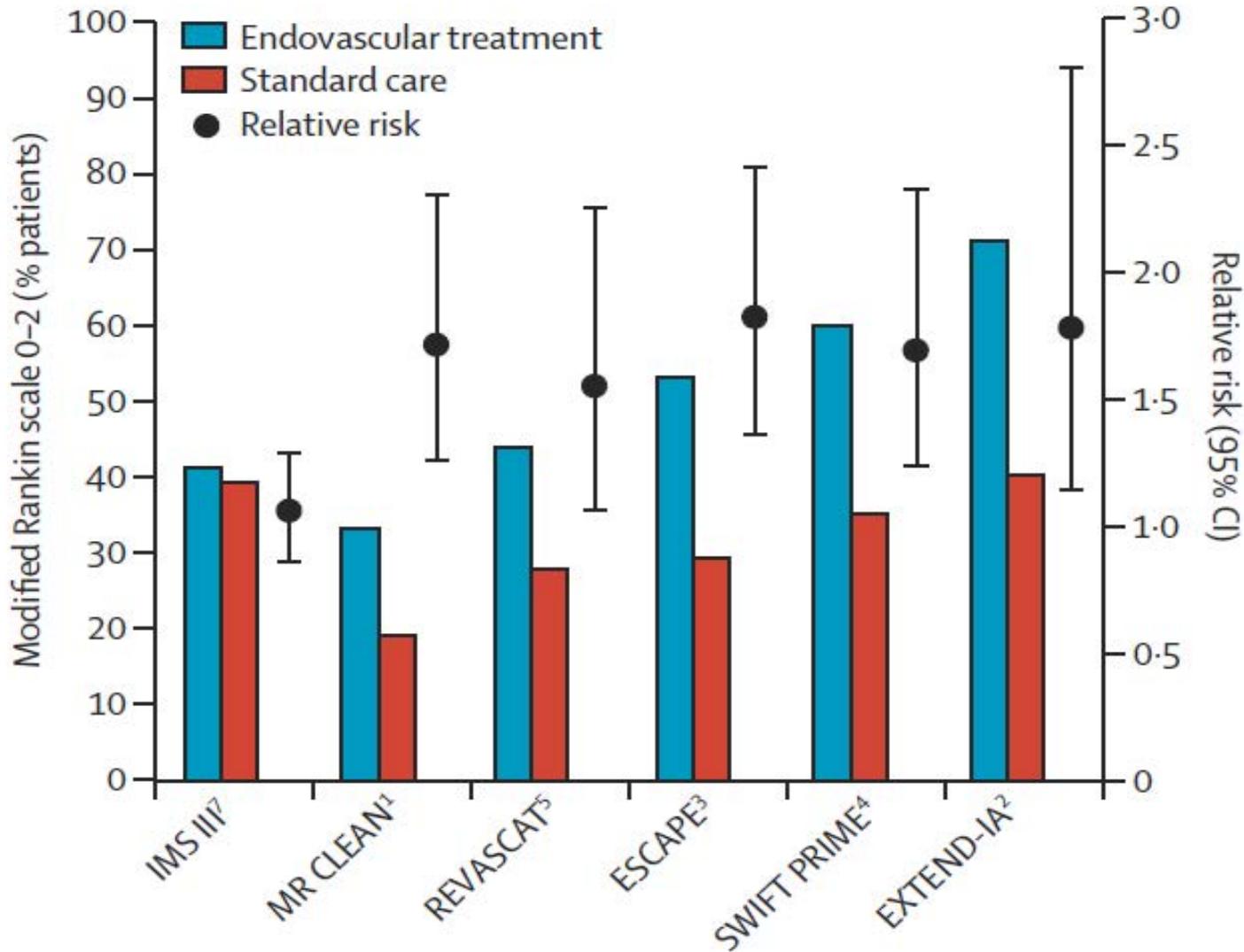


# La thrombectomie: une nouvelle donne pour les AVC en phase aiguë. *Influence sur le circuit patient.*

*Jérôme Berge, Neuroradiologie, CHU de Bordeaux*



# META-ANALYSE HERMES 2015

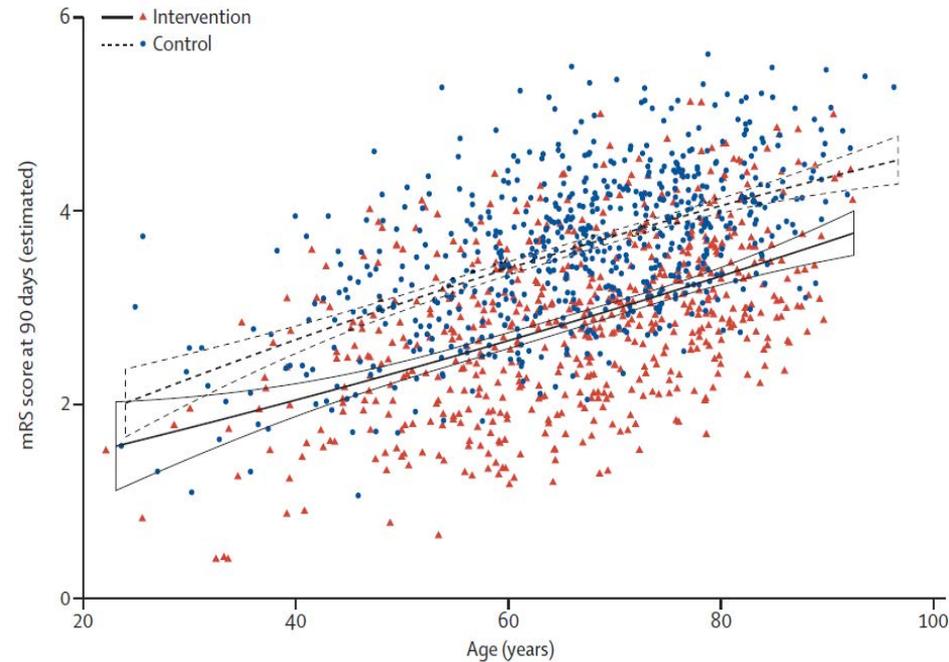
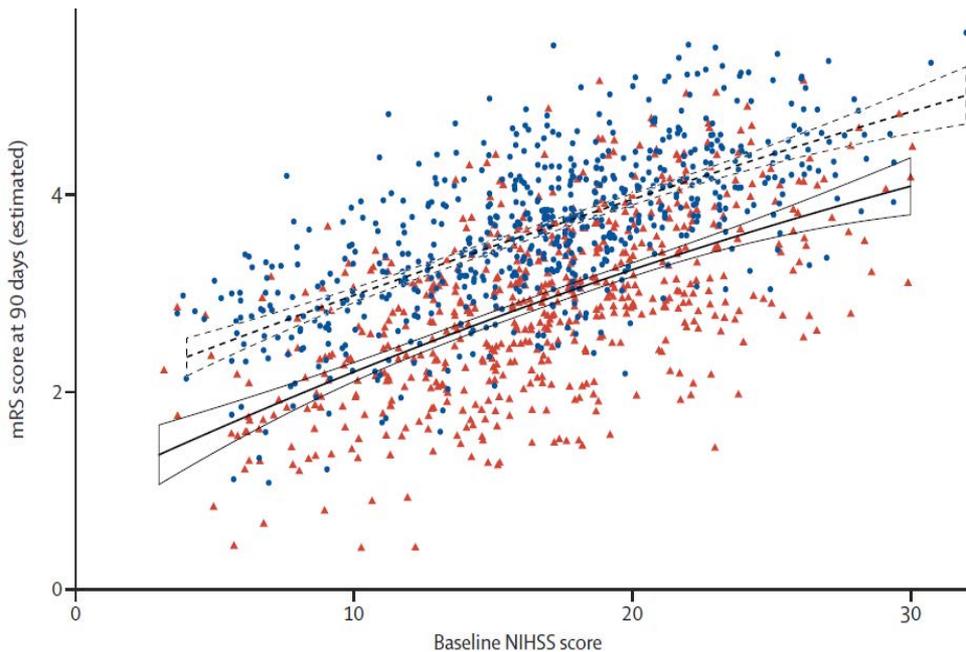
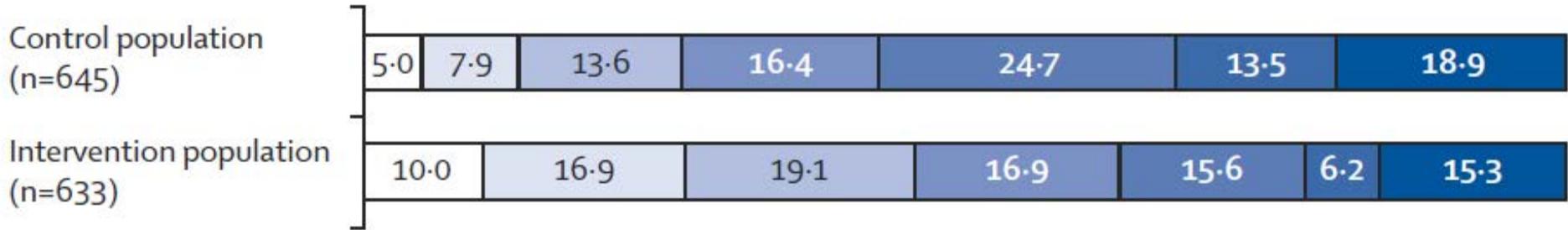


# Endovascular thrombectomy after large-vessel ischaemic stroke: a meta-analysis of individual patient data from five randomised trials



Lancet 2016; 387: 1723-31

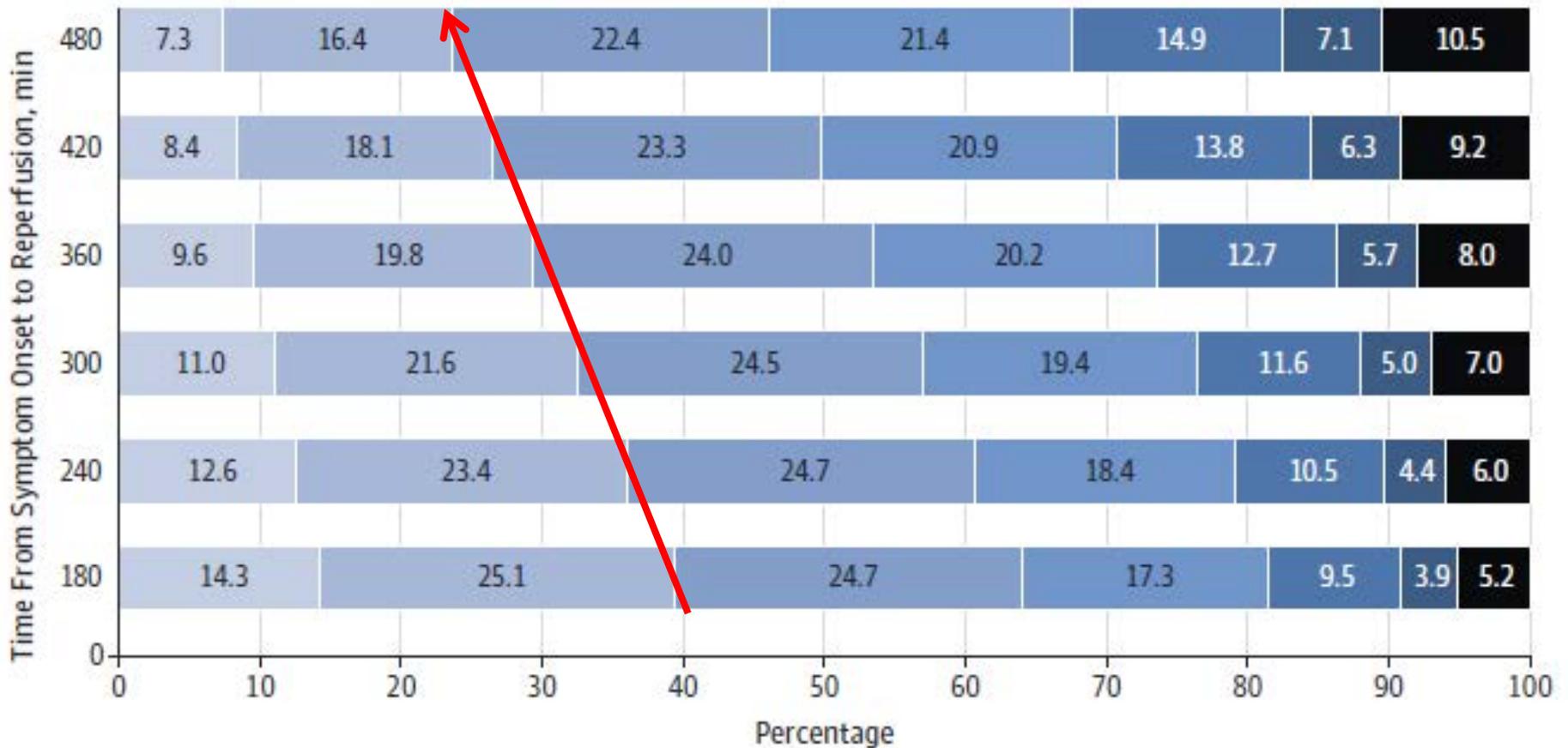
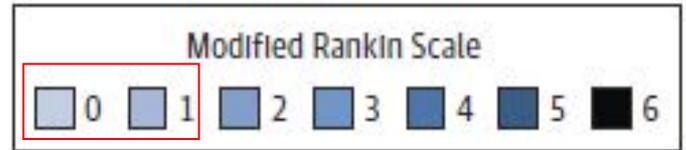
Mayank Goyal, Bijoy K Menon, Wim H van Zwam, Diederik W J Dippel, Peter J Mitchell, Andrew M Demchuk, Antoni Dávalos, Charles B L M Majoie,



# Time to Treatment With Endovascular Thrombectomy and Outcomes From Ischemic Stroke: A Meta-analysis

Jeffrey L. Saver, MD; Mayank Goyal, MD; Aad van der Lugt, MD; Bijoy K. Menon, MD; Charles B. L. M. Majoie, MD; Diederik W. Dippel, MD;

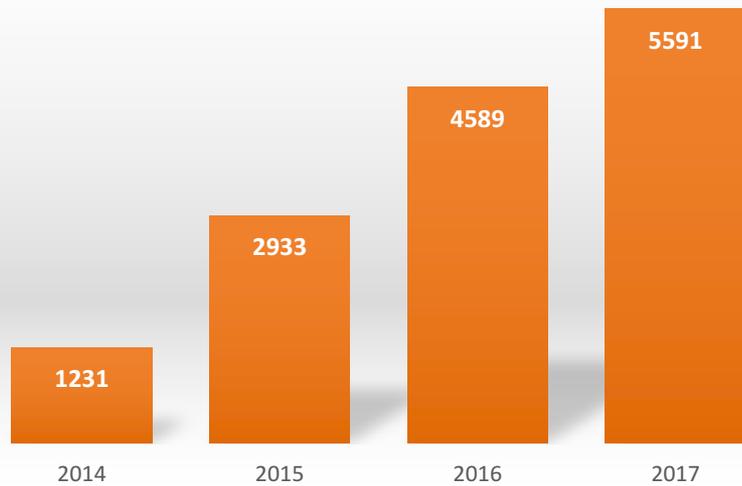
Patients autonomes



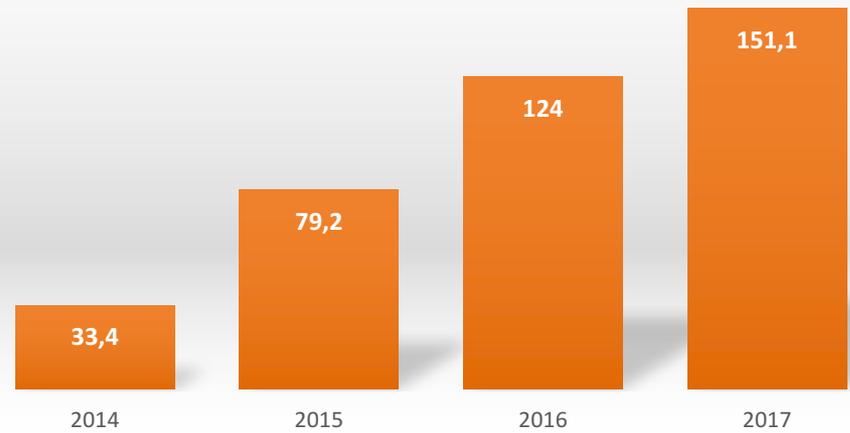
# Activité TM 2014-2017

Etat des lieux janvier 2018

Nombre de thrombectomies 2017  
en France



Nombre de thrombectomies par  
centre en France en 2017



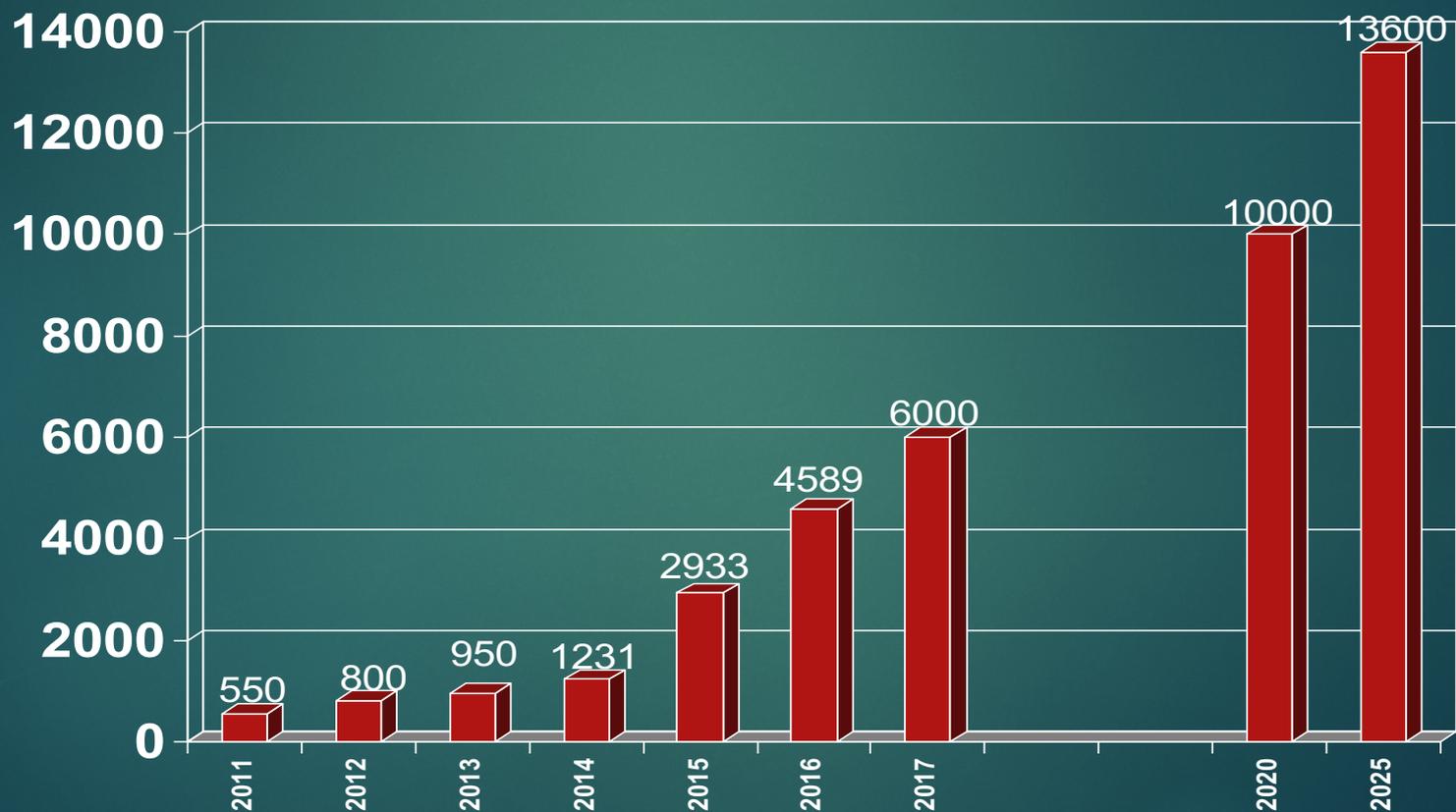
# PERSPECTIVES D'ACTIVITE TM:

## Synthèse de la littérature

- ▶ Estimation extrapolée à partir de la région Aquitaine:
  - ▶ 20 000 TM / an
- ▶ REVASCAT 2015 (Catalogne): TM pour 4% AVC:  $120\,000 \times 0,04$ 
  - ▶ 4 800 TM / an
- ▶ Campbell (Lancet neurol.2015): TM pour 10% AVC:  $120\,000/10$ 
  - ▶ 12 000 TM / an
- ▶ Vanacker (stroke 2016): 17% des AVC =  $120\,000 \times 0,17$ 
  - ▶ 20 400 TM / an
- ▶ El Tawil (europ stroke j 2016): 15% des AVC =  $120\,000 \times 0,15$ 
  - ▶ 18 000 TM / an
- ▶ Soderqvist (Karolinska 2016, base nationale 2013): 6% des AVC
  - ▶ 7200 TM / an
- ▶ France: Perspective moyenne 2025 = 13 600 TM / an

# Perspective nationale 2017/2025

- ▶ Extrapolation à partir de la littérature 2015/2017
- ▶ Avant DAWN et DEFFUSE 3



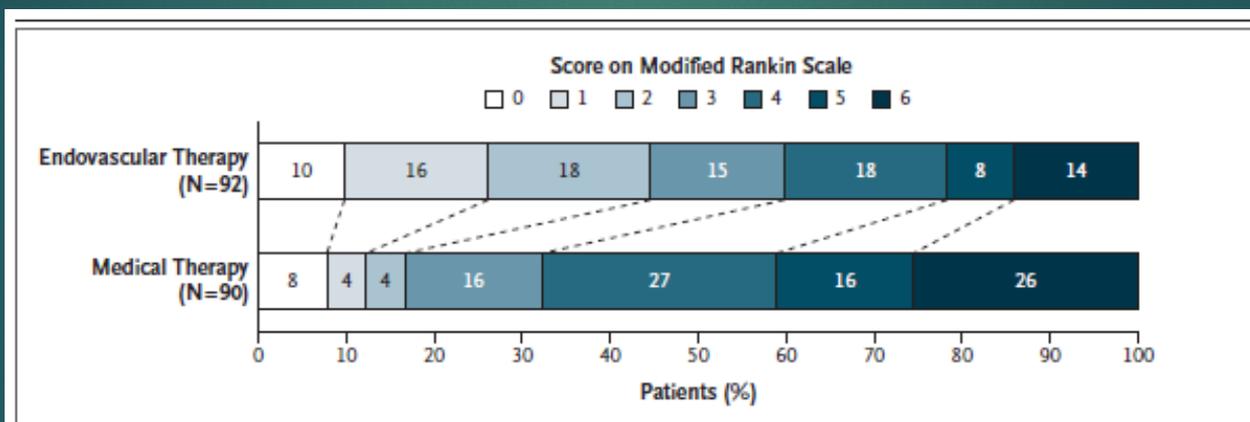
# Evolution des indications ?

- ▶ Score NIHSS bas ? **In Extremis**
- ▶ Score ASPECT < 5 ? **Tension / In Extremis**
- ▶ Topographie vertébro-basilaire ?
- ▶ Suppression de la fibrinolyse veineuse préalable ? **Swift Direct**
- ▶ Délai de prise en charge supérieur à 6h ?
  - ▶ **Étude DAWN:** (mars 2017)
    - ▶ Efficacité TM sur fenêtre 6/24h sur 500/107 patients; (mRS à 3 mois)
    - ▶ Mismatch entre la clinique et la zone d'infarctus (diffusion IRM ou CT perfusion)
    - ▶ Critères d'inclusion très restrictifs (infarct core < 21 / 31 / 51 ml)
    - ▶ mRS <2: 49% versus 13% (à comparer avec 46% Vs 26% dans HERMES)
  - ▶ **Étude DEFFUSE 3:** (janvier 2018)
    - ▶ Intérêt de l'imagerie de la pénombre

## ORIGINAL ARTICLE

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

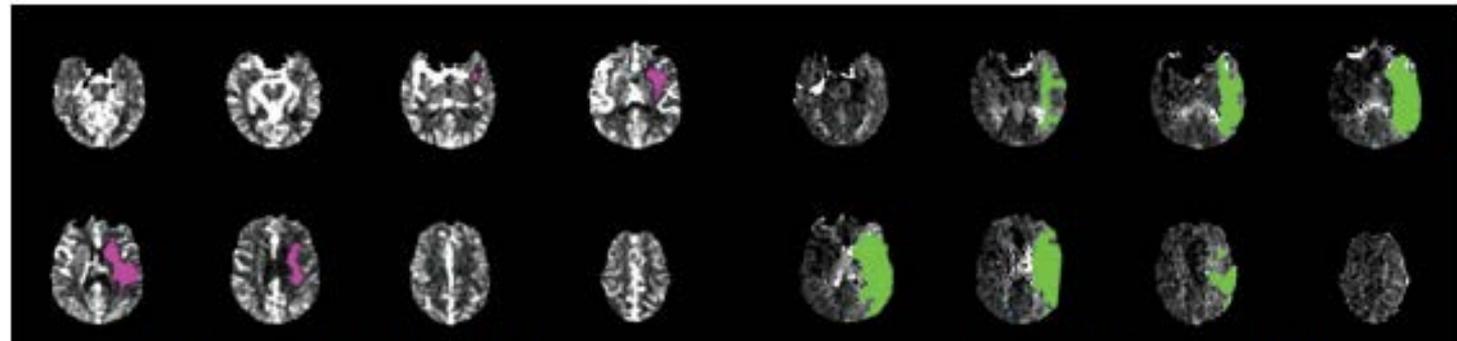
DEFFUSE 3: Results: mRS&lt;2: 45% versus 17%



**Figure 2.** Scores on the Modified Rankin Scale at 90 Days.

Patients in the endovascular-therapy group received endovascular therapy plus standard medical therapy. Patients in the medical-therapy group received standard medical therapy alone. Scores on the modified Rankin scale range from 0 to 6, with 0 indicating no symptoms, 1 no clinically significant disability, 2 slight disability, 3 moderate disability, 4 moderately severe disability, 5 severe disability, and 6 death. There was a significant difference favoring the endovascular-therapy group over the medical-therapy group in the overall distribution of scores (unadjusted common odds ratio, 2.77; 95% CI, 1.63 to 4.70;  $P < 0.001$ ).

# Time window / mismatch window



Volume of Ischemic Core, 23 ml

Volume of Perfusion Lesion, 128 ml

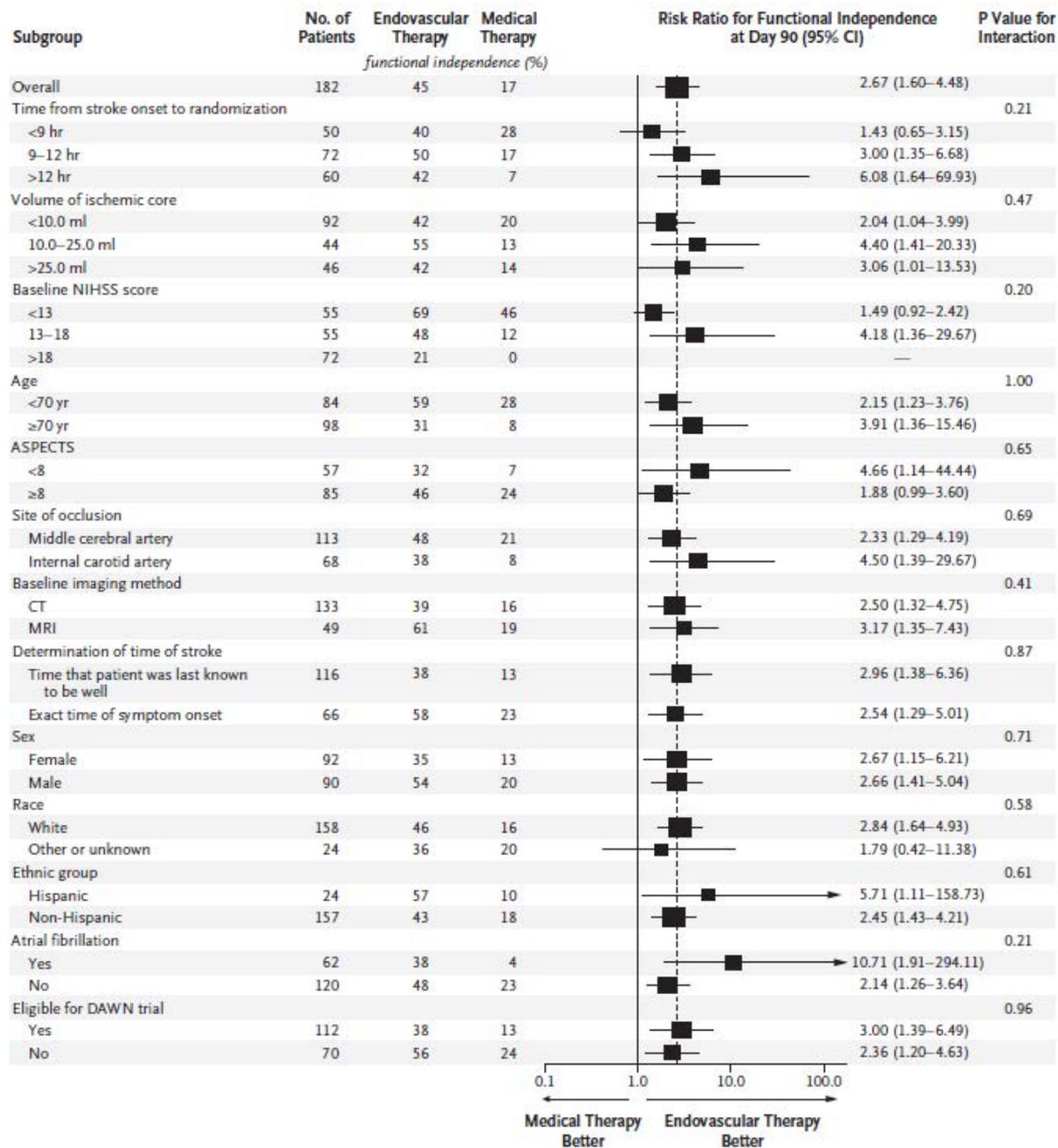
Mismatch volume, 105 ml

Mismatch ratio, 5.6

**Figure 1.** Example of Perfusion Imaging Showing a Disproportionately Large Region of Hypoperfusion as Compared with the Size of Early Infarction.

A 59-year-old man presented with a "wake-up stroke" (having awakened with symptoms of stroke) 13 hours after he was last known to be well. The score on the National Institutes of Health Stroke Scale (NIHSS; range, 0 to 42, with higher scores indicating a greater deficit) was 23. A baseline CT perfusion scan that was obtained with the use of RAPID software shows a region of severely reduced cerebral blood flow (<30% of that in normal tissue), which represents the early infarct (ischemic core), of 23 ml (pink) and a region of perfusion delay of more than 6 seconds, which represents hypoperfused tissue, of 128 ml (green).

- ▶ Infarct core < 70 ml
- ▶ Ratio MTT / CBV > 1,8

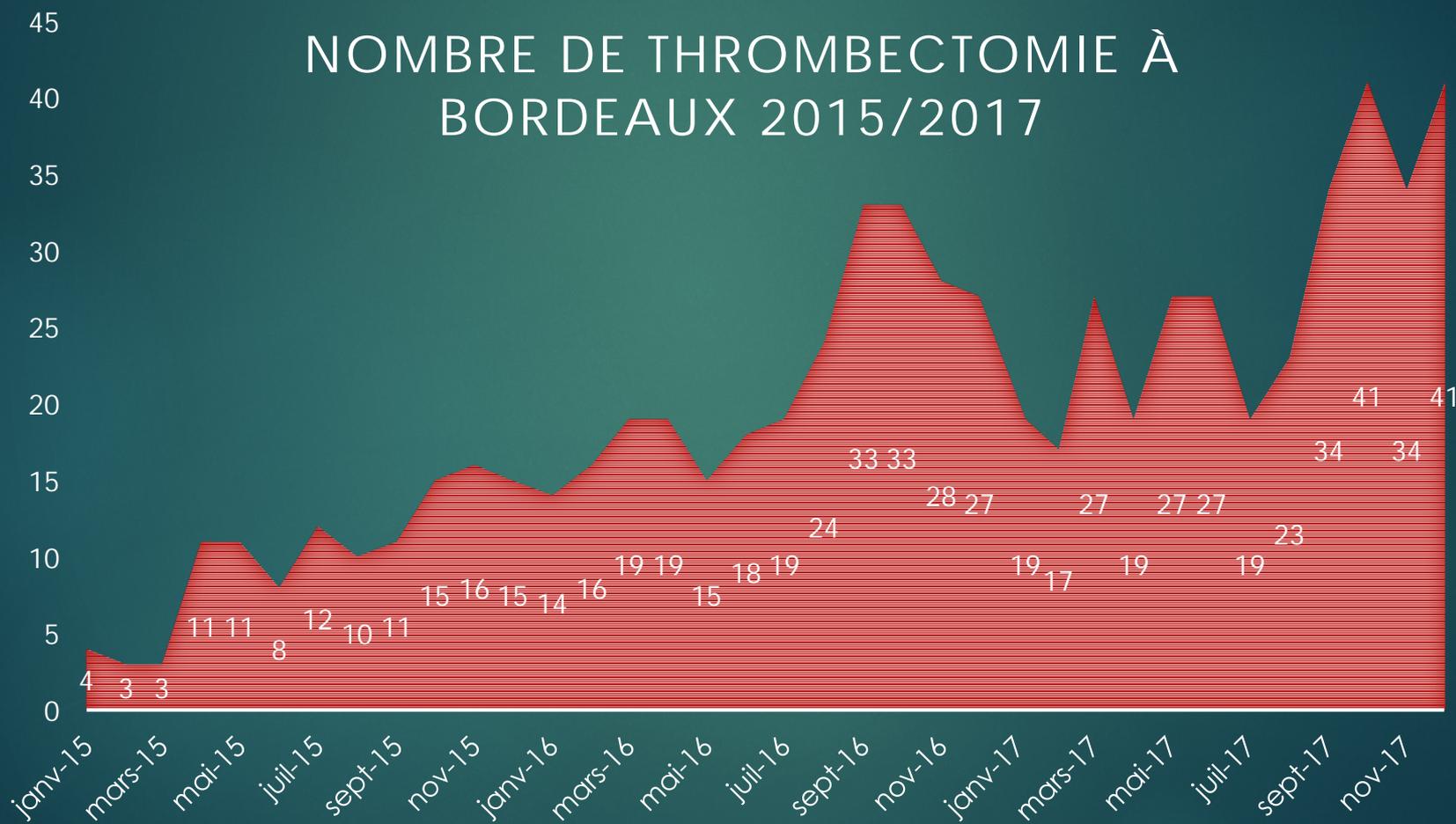


- ▶ Etudes par sous groupes
- ▶ Le tri par la zone de pénombre l'emporte sur tous les autres critères.

# Croissance et perspectives d'activité

## à Bordeaux

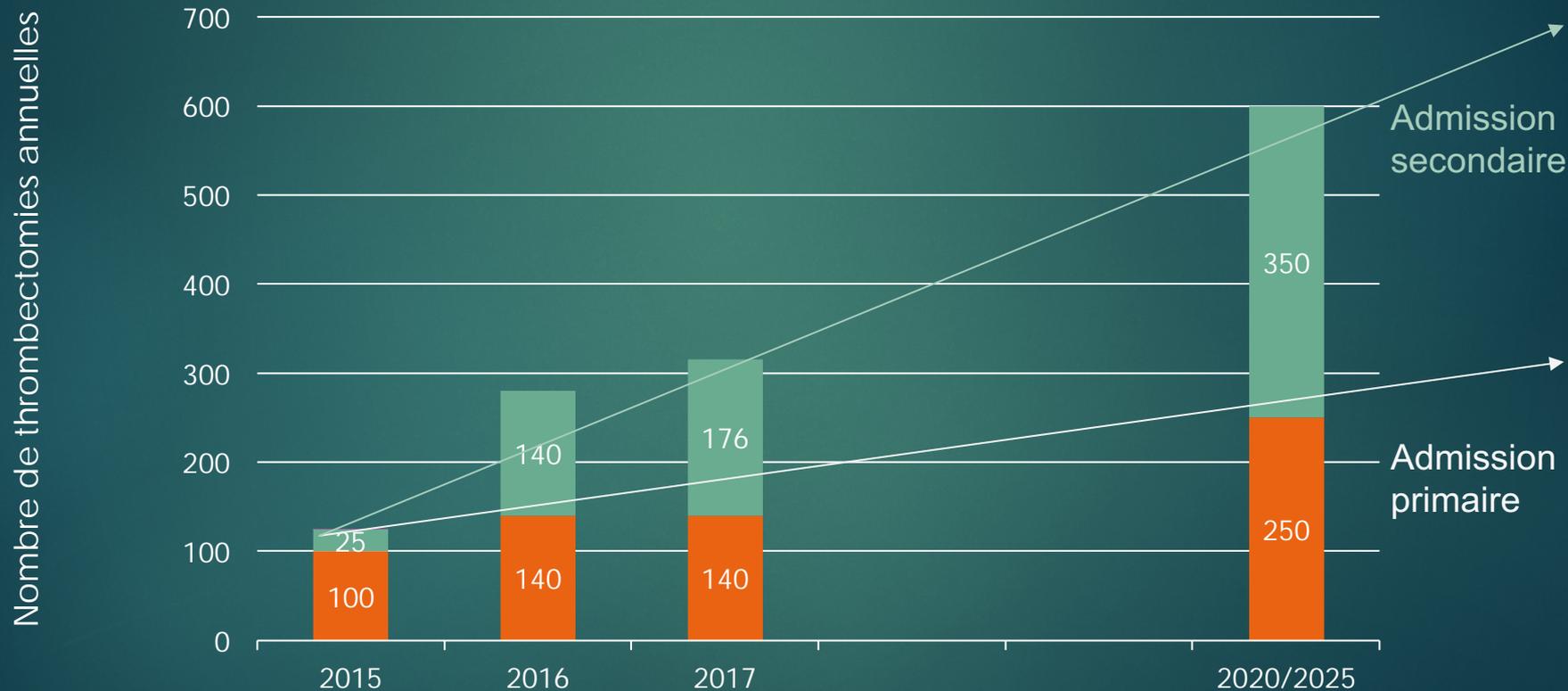
- ▶ Moyenne 2016: 26,3 / mois
- ▶ Moyenne 4° trimestre 2017: 38 / mois soit 450 / an



# PROSPECTIVE: Admission primaire CHU versus admission secondaire depuis UNV à distance.



## Répartition par provenance des patients



# Quel itinéraire patient choisir ?



- ▶ Accueil Urgences Orthez + imagerie
  - ▶ Télémédecine avec Pau
  - ▶ Thrombolyse éventuelle
- ▶ Transfert vers UNV territoire: Pau
- ▶ Ou UNV de Recours Bordeaux pour thrombectomie

# Délais inter-hospitaliers en Aquitaine: faire un stop ou pas ?

Le délai séparant, chez les patients en ayant bénéficié, la TIV à la TM, était significativement plus important en cas d'orientation selon le modèle « drip and ship » (157,5min et 135min respectivement pour les UNV et les CHG) que celui observé selon le modèle « mothership » (40min,  $p < 0,001$ ). Il n'était pas retrouvé de différence significative de ce délai selon que le patient provenait d'une UNV ou d'un CHG ( $p=0,345$ ). Les délais par CH sont présentés dans les Figure 17 et Figure 18.

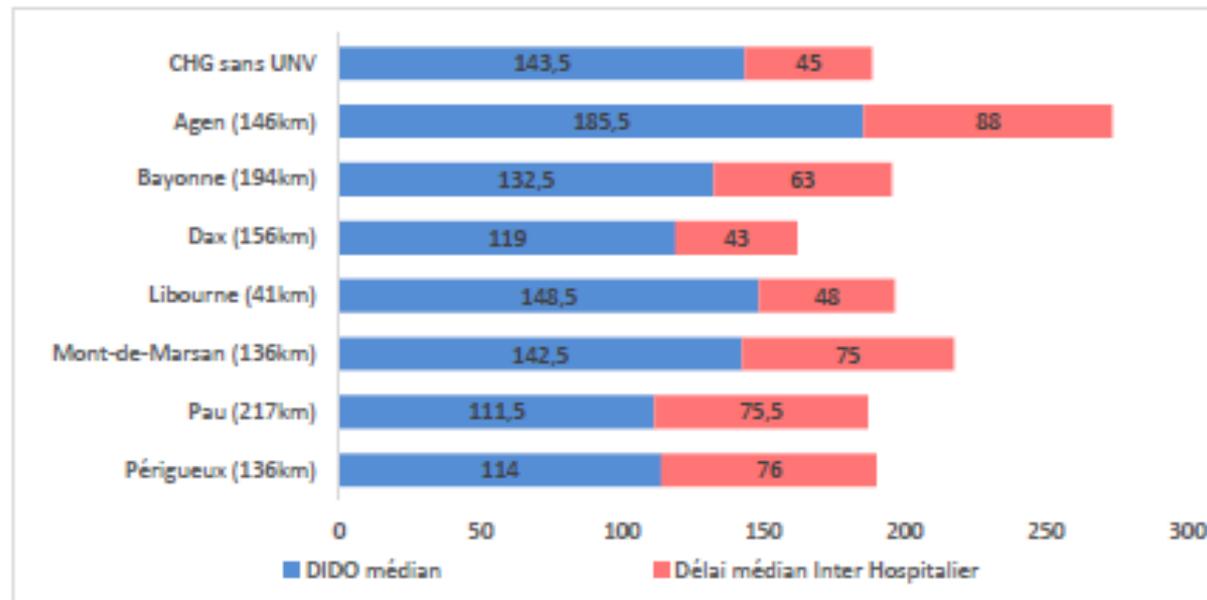


Figure 17: DIDO et délais inter hospitaliers selon le modèle "drip and ship" via une UNV ou un CHG



# Comment gagner du temps ?

Aller au plus court dans l'UNV la plus proche  
centre intermédiaire de triage (CH ou UNV de territoire): [Drip 'n Ship](#)  
problème du transfert secondaire: surtout après rTPA

Ne pas perdre de temps en UNV périphérique  
notion de DIDO

Directement du domicile à UNV de recours: [Mothership](#)

Décision de filière MotherShip: Quelles questions se poser ?

Comment faire le tri pour le 15 ? (score NIHSS)

Est-ce utile pour le patient ? (retard à thrombolyse iv)

Contre-indication à la thrombolyse ?

Surcharge de l'UNV de recours, retour des patients ?

**TRIER LES PATIENTS: Prédiction clinique d'une occlusion d'un gros tronc artériel (LVO) avant angio-TDM/IRM**

# The Finnish Prehospital Stroke Scale Detects Thrombectomy and Thrombolysis Candidates—A Propensity Score-Matched Study

Jyrki P. Ollikainen, MD,\* Heikki V. Janhunen, MD,† Juho A. Tynkkynen, MD,‡

*Journal of Stroke and Cerebrovascular Diseases*, Vol. ■■■, No. ■■■ (■■■), 2017: pp ■■■–■■■

Table 2. Finnish Prehospital Stroke Scale (FPSS)

		Points	NIHSS correspondence
Face	Facial droop	1	Item No. 4 “Facial Palsy” scored over 0
Extremity	Weakness of 1 or more extremities	1	Item No. 5 “Motor Arm” or No. 6 “Motor Leg” scored over 0
Speech	Difficulty of understanding or producing speech, including slurring	1	Item No. 9 “Best Language” or No. 10 “Dysarthria” scored over 0
Vision	Field cut or blindness	1	Item No. 3 “Visual” scored over 0
Gaze	Partial or fixed gaze or head deviation away from the paretic side	4	Item No. 2 “Best Gaze” scored over 0
Total points	1-4 predicts non-LVO, ≥5 predicts LVO	0-8	

**FPSS detected LVO** with a sensitivity of 54%, specificity of 91%

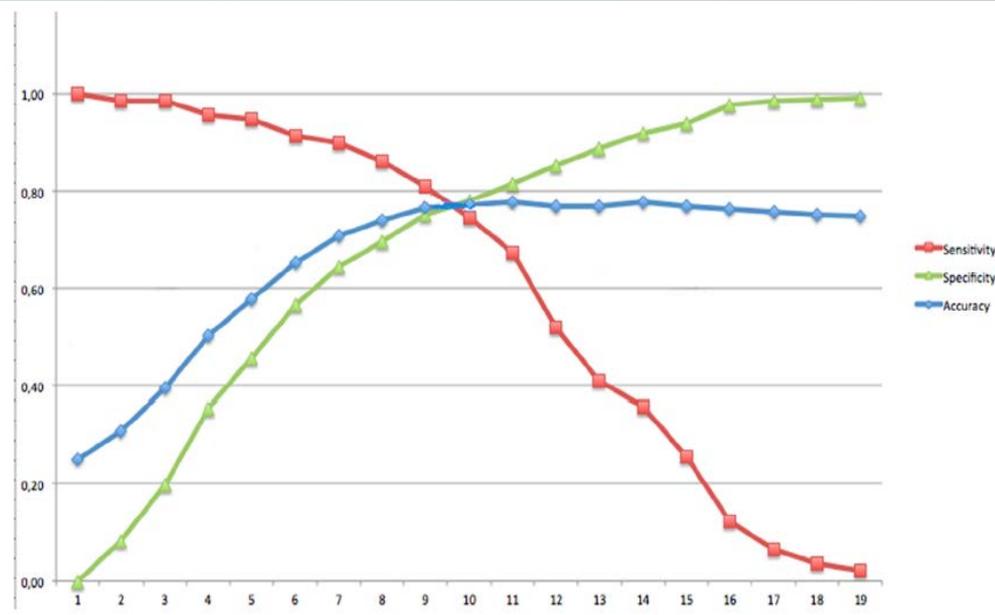
# Validation of the National Institutes of Health Stroke Scale-8 to Detect Large Vessel Occlusion in Ischemic Stroke

Jelle Demeestere, MD,\* Carlos Garcia-Esperon, MD,\* Longting Lin, PhD,†

*Journal of Stroke and Cerebrovascular Diseases*, Vol. 26, No. 7 (July), 2017: pp 1419–1426

New South Wales, Australia.

NIHSS-8 Item	Scoring Definition	Score
1. LOC	0-alert (A) 1-rousable to minor stimulation (V) 2-rousable only to painful stimulation (P) 3-reflex response or un-rousable (U)	
2. LOC Questions – Ask patient's age and current month (Must be exact)	0-Both correct 1-one correct or dysarthria, foreign language 2-Neither correct	
3. Commands – opens/close eyes, grip and release non paretic hand Other 1 step commands or mimic ok)	0-Both correct (Ok if impaired by weakness) 1-One correct 2-Neither correct	
4. Best Gaze – Test horizontal eye movements tracking object/face	0-Normal 1-partial gaze, abnormal gaze in 1 or both eyes 2- Forced eye deviation or total paresis which cannot be overcome	
5. Facial Palsy – Show teeth, close eyes tight, raise eyebrows. If stuporous, check symmetry of grimace to pain	0-Normal 1-Minor paralysis, flat NLF, asymmetrical smile 2-Partial paralysis (lower face) 3-Complete paralysis (upper & lower face)	
6. Motor Arm - arms outstretched 90deg (sitting or 45 deg (supine) for 10secs. Encourage best effort. Score for Left and then Right arm.	0-No drift for 10 secs 1-drift but does not hit bed 2-Some antigravity effort but can't sustain 3-Unable to overcome gravity, minimal proximal movement present 4-No movement at all X-Unable to assess due to amputation, fusion,fx etc	Left: Right:
7. Dysarthria – read or repeat list of words (see reverse of page)	0-Normal 1-mild-mod slurred speech but intelligible 2-Unintelligible or mute X-intubation or mechanical barrier	
8. Extinction / Neglect – simultaneously touch patient on both hands or legs with their eyes closed, show fingers in both visual fields.	0-Normal none detected 1-neglect or extinction to double simultaneous stimulation in any modality (sensory, visual) OR visual/sensory loss on one side 2-profound neglect in both visual and sensory modalities	
Total Score		



**Optimum NIHSS-8 cutoff of  $\geq 8$**   
**Sensitivity of .81**  
**Specificity of .75 for prediction of LVO**

# BMJ Open Design and validation of a clinical scale for prehospital stroke recognition, severity grading and prediction of large vessel occlusion: the shortened NIH Stroke Scale for emergency medical services

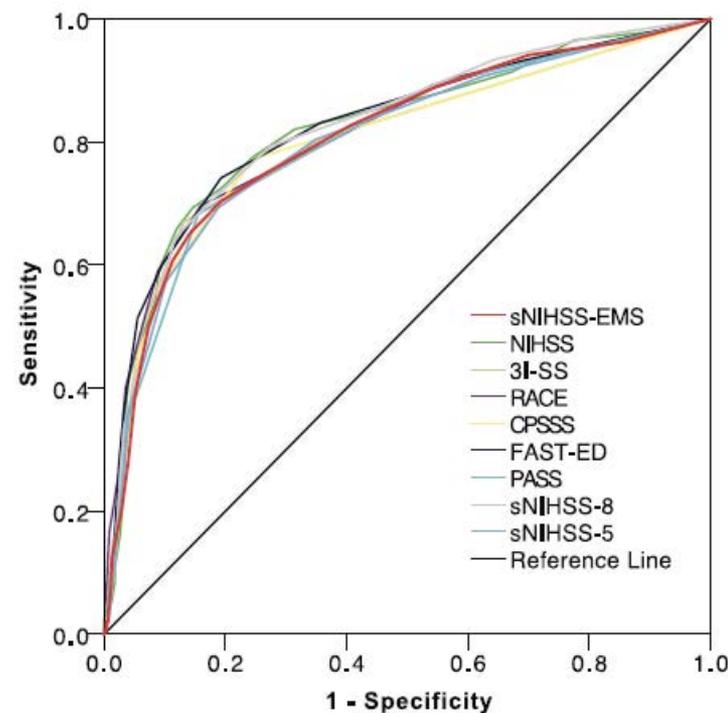
BMJ Open 2017;

Germany

Jan Christoph Purrucker,<sup>1</sup> Florian Härtig,<sup>2</sup> Hardy Richter,<sup>2</sup> Andreas Engelbrecht,<sup>1</sup>

**Table 1** The sNIHSS-EMS

Number	sNIHSS-EMS item	Equivalent to the NIHSS item	Range
1	Level of consciousness	1a	0–3
2	Facial palsy	4	0–3
3a	Motor arm (left)	5	0–4/UN
3b	Motor arm (right)	5	0–4/UN
4a	Motor leg (left)	6	0–4/UN
4b	Motor leg (right)	6	0–4/UN
5	Sensory	8	0–2
6	Best language	9	0–3
7	Dysarthria	10	0–2/UN
	Sum	–	0–29



**Prediction for LVO:  $\geq 6$**   
 sensitivity 70%  
 specificity 81%



# Comparaison Mothership / Drip'n Ship:

Que dit la littérature en fonction de la géographie ?

Exemple dans le Tennessee

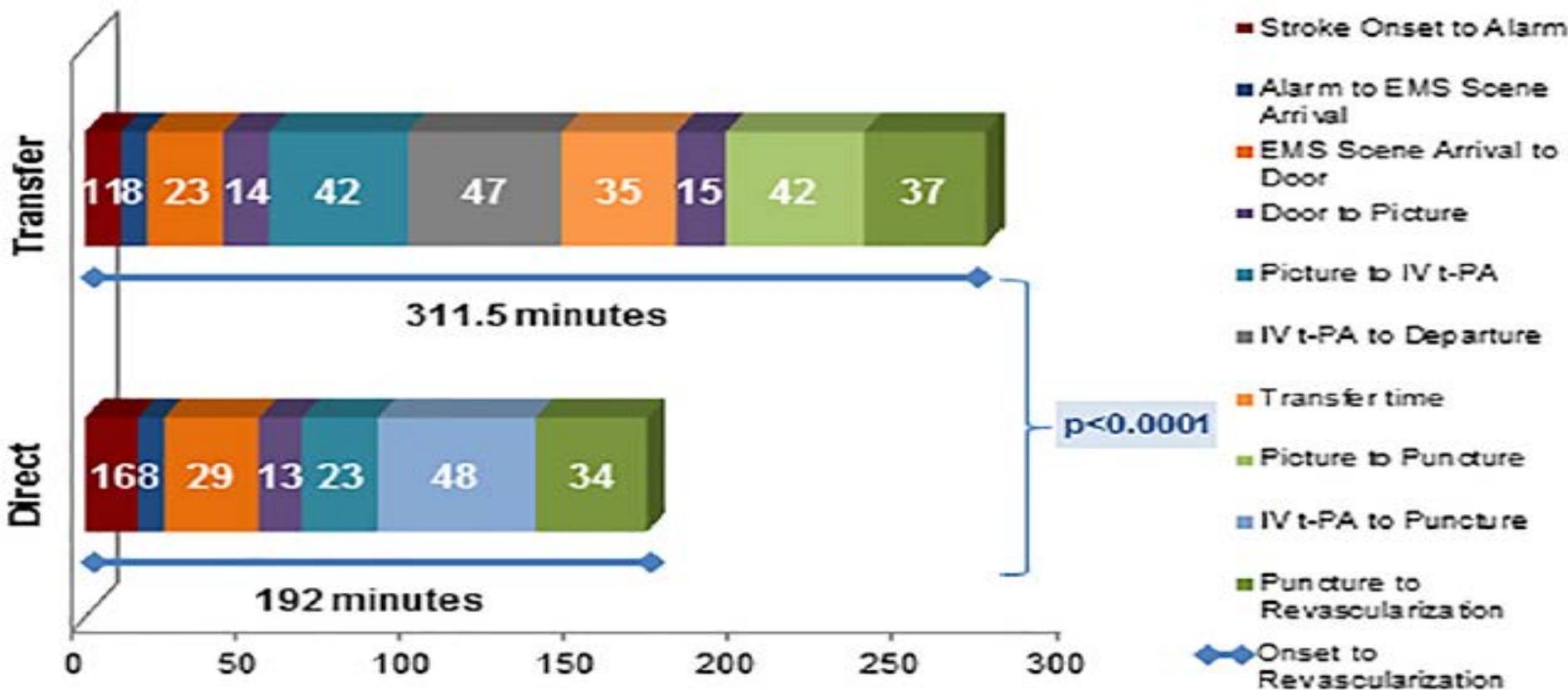
Exemple à Paris



# Interhospital Transfer Before Thrombectomy Is Associated With Delayed Treatment and Worse Outcome in the STRATIS Registry (Systematic Evaluation of Patients Treated With Neurothrombectomy Devices for Acute Ischemic Stroke)

Michael T. Froehler, MD, Nashville,

**A** Median Times from Stroke Onset to Revascularization for Direct vs. Transfer Patients (IV-tPA + MT Subgroup)

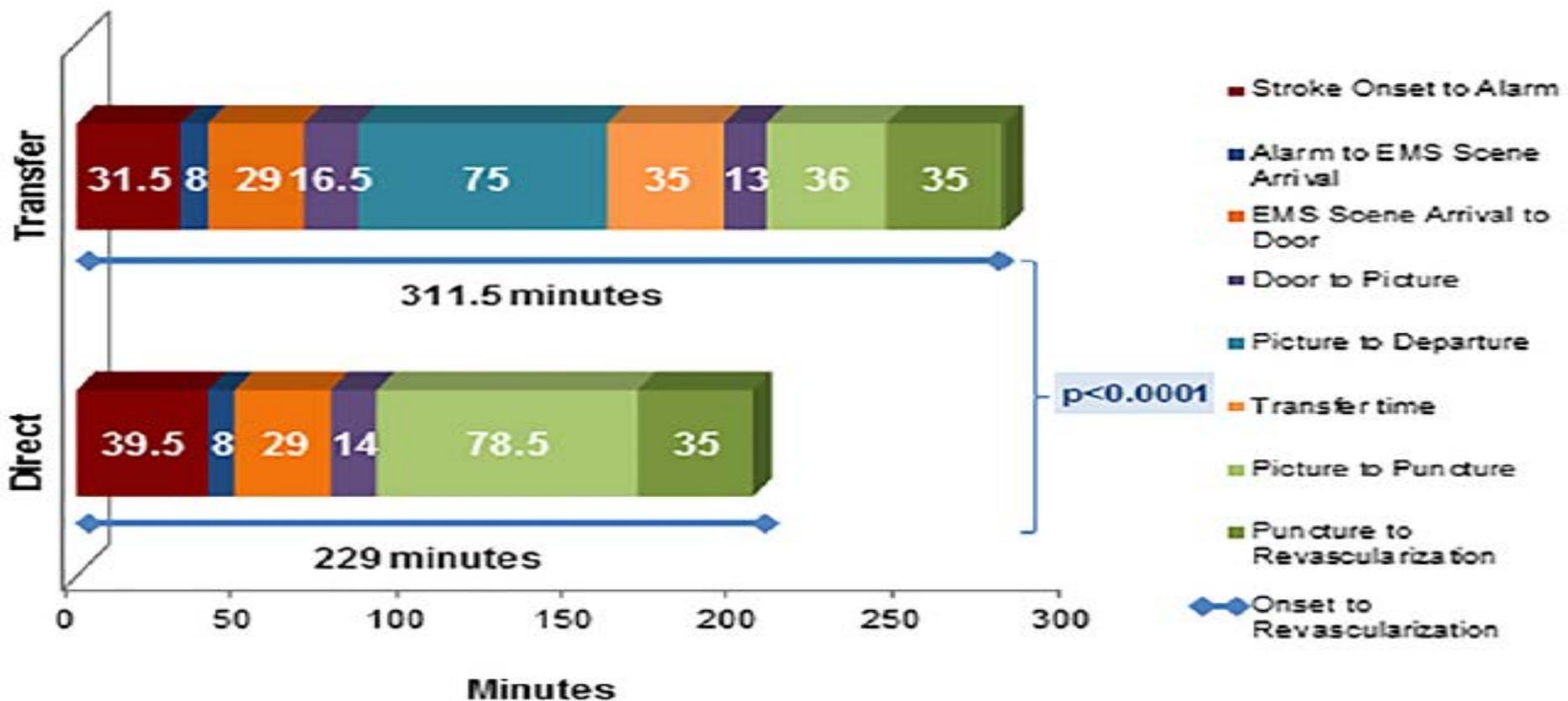




# Interhospital Transfer Before Thrombectomy Is Associated With Delayed Treatment and Worse Outcome in the STRATIS Registry (Systematic Evaluation of Patients Treated With Neurothrombectomy Devices for Acute Ischemic Stroke)

Michael T. Froehler, MD, Nashville,

**B** Median Times from Stroke Onset to Revascularization for Direct vs. Transfer Patients (MT Alone Subgroup)

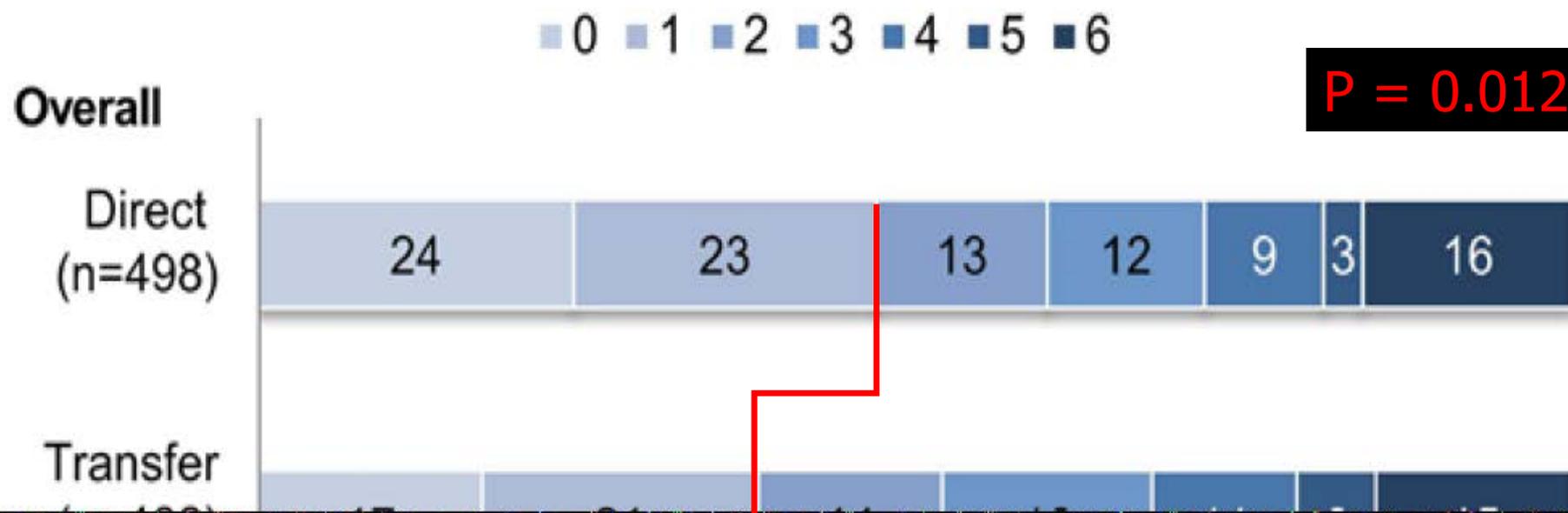




# Interhospital Transfer Before Thrombectomy Is Associated With Delayed Treatment and Worse Outcome in the STRATIS Registry (Systematic Evaluation of Patients Treated With Neurothrombectomy Devices for Acute Ischemic Stroke)

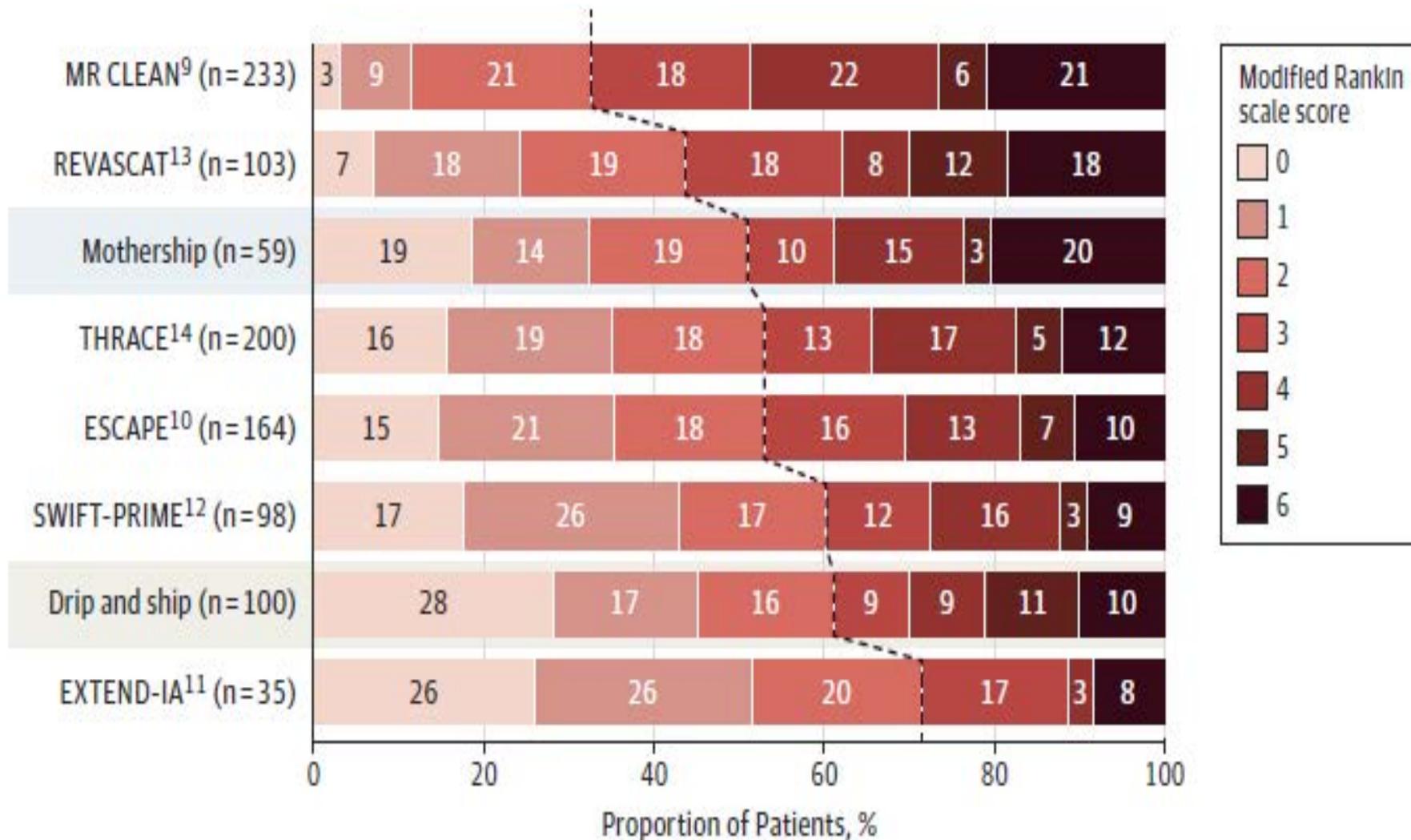
Michael T. Froehler, MD, Nashville,

## A mRS at 90 days for Direct vs. Transfer Patients



# Two Paradigms for Endovascular Thrombectomy After Intravenous Thrombolysis for Acute Ischemic Stroke

Gaspar Gerschenfeld, MD, MSc; Ioan-Paul Muresan, MD; Raphael Blanc, MD, MSc; Michael Obadia, MD, MSc; Marie Abrivard, MSc; Michel Piotin, MD, PhD; Sonia Alamowitch, MD



# Création de nouveaux entres de TM en région Nouvelle Aquitaine

UNV existantes



NRI existants

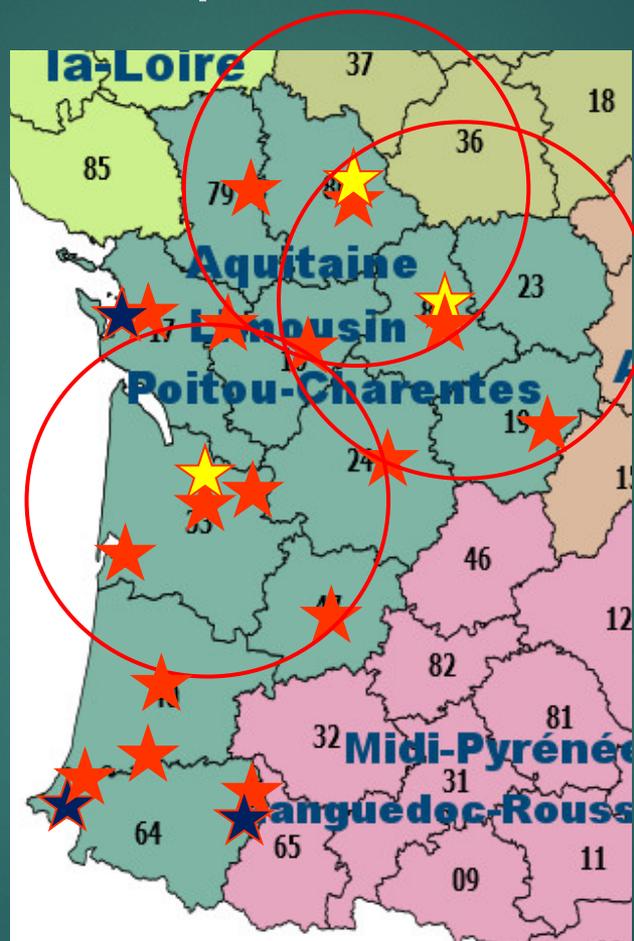


NRI à créer

(sous tutelle des CHU)



Cercle rouge de 140 km de  
Rayon autour centres NRI



## Aquitaine:

- Bordeaux (NRI)
- Périgueux
- Agen
- Mont de Marsan
- Dax
- Bayonne, Pau
- Libourne
- Arcachon

## Limousin:

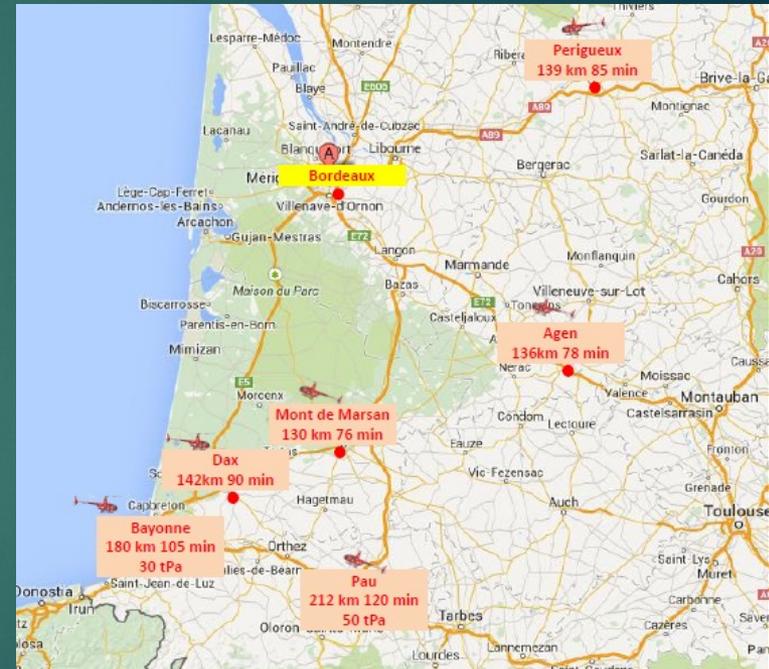
- Limoges (NRI)
- Brive, Guéret, Tulle

## Poitou-Charentes:

- Poitiers (NRI)
- La Rochelle
- Saintes, Niort
- Angoulême

# Conditions de création d'un nouveau service de NRI: les critères de la SFNR.

- ▶ **Distance > 140 km** / centre NRI le plus proche
- ▶ **Bassin de population**: minimum de 300 000 habitants.
- ▶ Nombre de TIV effectuée dans l'UNV au moins de **150 / an**.
- ▶ Conditions requises: **Accréditation** du nouveau centre et **formation** de nouveaux praticiens.
- ▶ Ouverture sous tutelle centre NRI



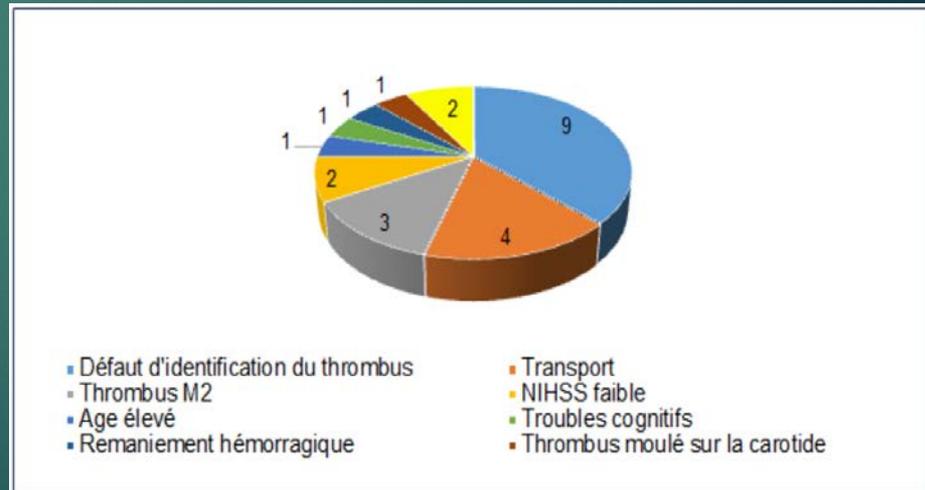
# Diagnostic régional sur la qualité de prise de décision de TM:

- ▶ Thèse présentée et soutenue publiquement le 27 Septembre 2017 Par Ludovic LUCAS:

« Etat des lieux de la Filière Thrombectomie en Aquitaine : analyse des délais pré, inter et intra hospitaliers ».

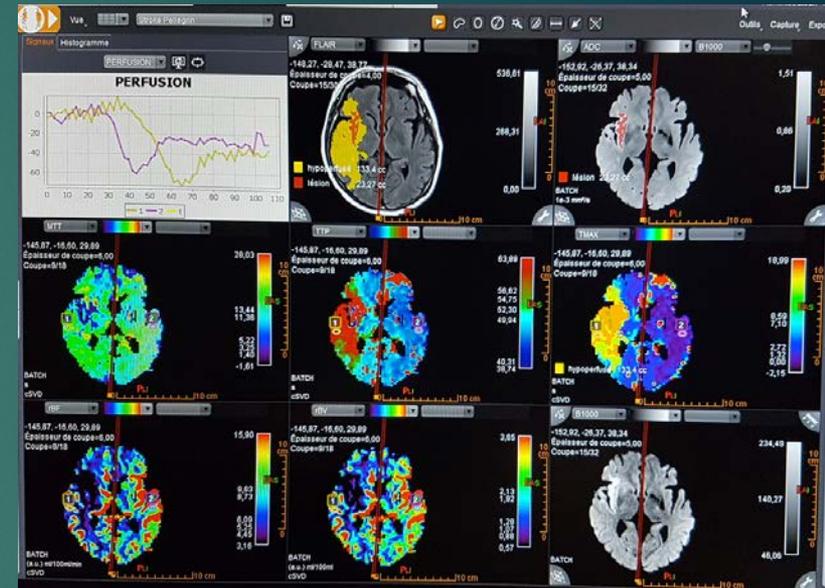
Motifs identifiés d'absence de transfert pour la réalisation d'une TM

Défaut de diagnostic radiologique  
Défaut d'indication neurologique  
Défaut de transport



# Projet de garde régionale de télé-expertise AVC

- ▶ Le but est de proposer une expertise en NRD pour tous les patients victimes d'un AVC en Nouvelle Aquitaine.
- ▶ Mise en place d'une lecture centralisée de toutes les imageries d'AVC en urgence.
- ▶ Réseau d'imagerie régional « KRYPTON »
- ▶ Potentiel de 30 à 50 avis par nuit.
- ▶ Choix de la destination du patient:
  - ▶ Local
  - ▶ UNV
  - ▶ thrombectomie
- ▶ Enjeu médico-économique majeur.



Imagerie multimodale par utilisation de logiciels de post-traitement

# UNE COURSE CONTRE LA MONTRE

- ▶ Evaluation neurologique rapide simple et efficace.
- ▶ Imagerie experte avec étude de la pénombre ischémique
- ▶ Décision de transfert optimal
- ▶ Maillage des centre de TM

