ROME

EUROPEAN
TELEMEDICINE
CONFERENCE

7-8 OCTOBER 2014 | ROME, ITALY

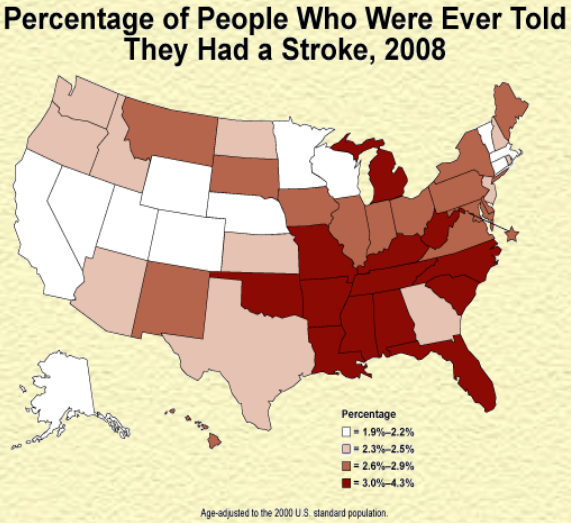
TELESTROKE

Stroke Facts

- Second leading cause of death worldwide
- Third leading cause of adult disability
- More then 15 million new strokes each year
- Direct costs of stroke > $30 billion
- Indirect costs: caregivers, lost wages, etc.

Why Telestroke?

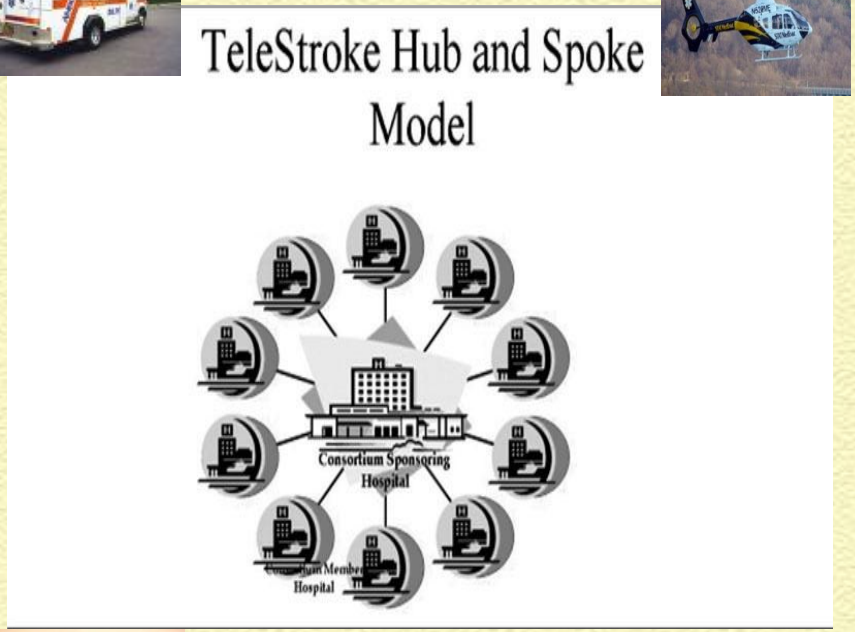
- 1.5-2.0 X greater probability of good outcome after stroke with IV tPA within 4.5 hrs
- Only 2-8% of stroke patients receive IV tPA
- Many hospitals don't have stroke protocols and have never treated a patient with tPA
- Lack of available stroke specialist in rural hospitals major impediment to emergent treatment



*** Kleindorfer et al Stroke 2009**

Stroke Systems of Care

- Rapid evaluation and treatment
- Stroke team 24/7/365
- Affiliations with community hospitals
- Stroke experts available
- Evaluate for IV tPA
- Transfer for interventional therapy



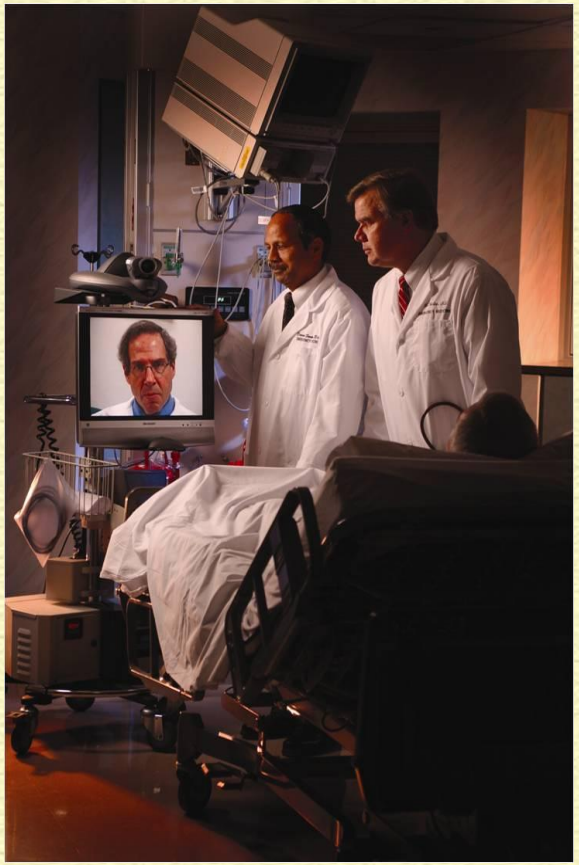
Telemedicine

Components of Telestroke Program

- Bidirectional real time video and audio
- Protocols / order sets
- In service training
- Stroke team
- Community education
- EMS awareness

Telestroke Quality Measures

- Process measures
  - Hub
    - Response time
    - Consult time
    - Transfers
  - Spoke
    - Door to CT
    - Door to consult
    - Door to treatment
    - Onset to treatment
  - Technology Assessment
    - Quality
    - Failures

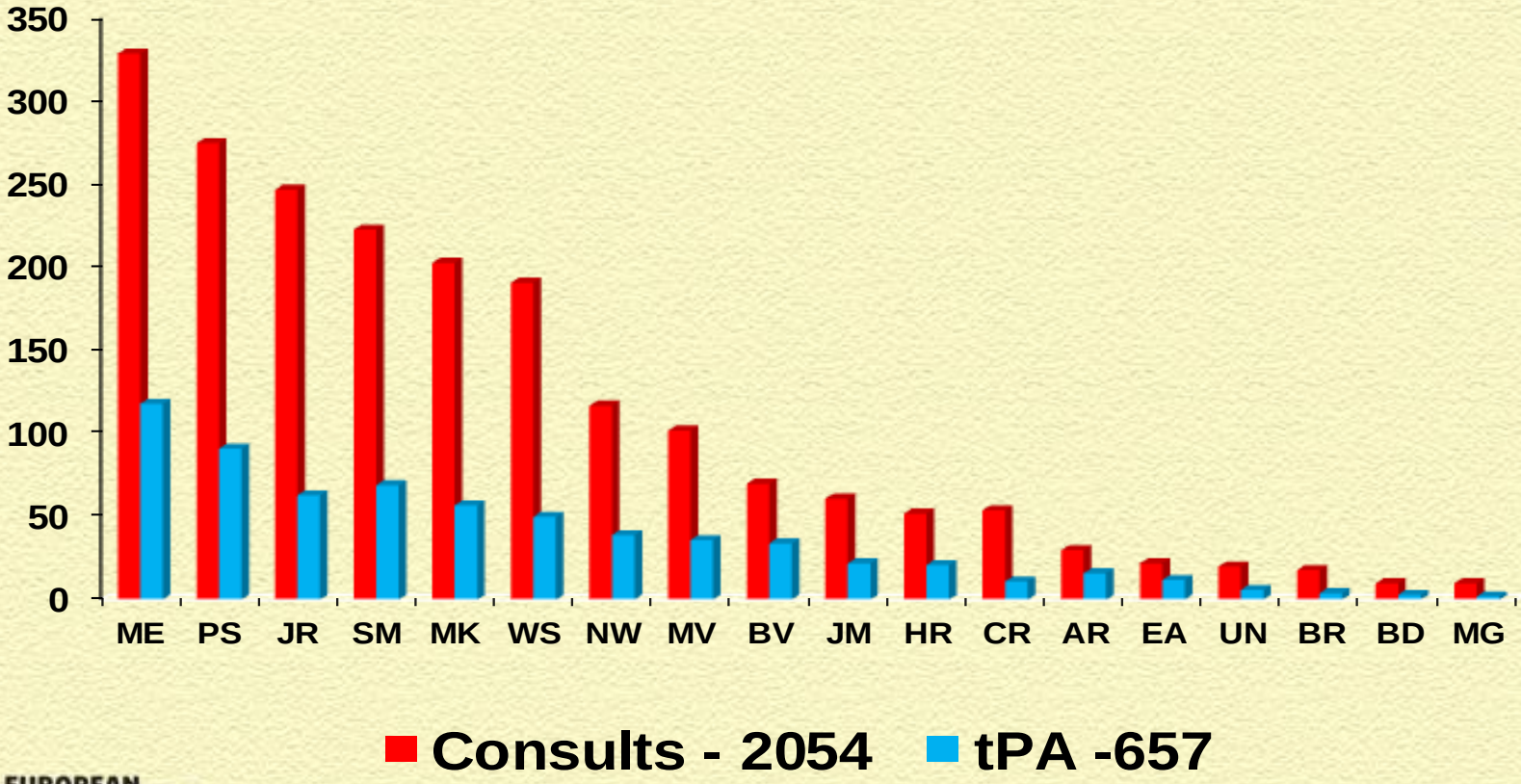


Telestroke Outcomes

- Percent of acute stroke patients evaluated within window for IV tPA
- Percent of all stroke patients appropriate for telestroke with calls initiated
- Percent of all eligible patients treated with IV tPA
- 90 day outcomes (mRS)
- Symptomatic hemorrhage
- Mortality – in hospital and 90 days

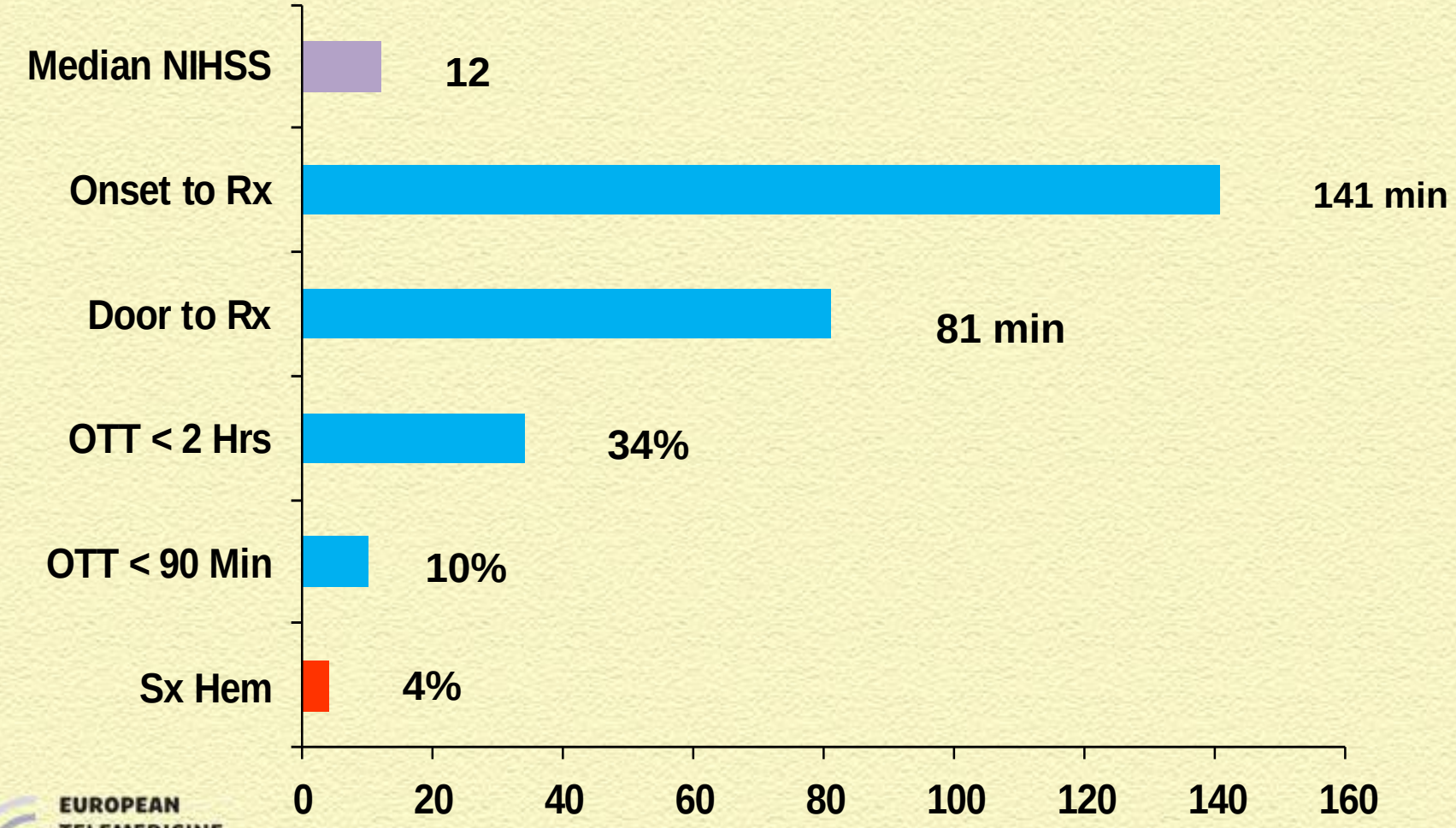
UPMC Telestroke

- 21 hospitals – 10 UPMC, 11 non-UPMC
- tPA treatment rate: 32%
- Transfers: 23%



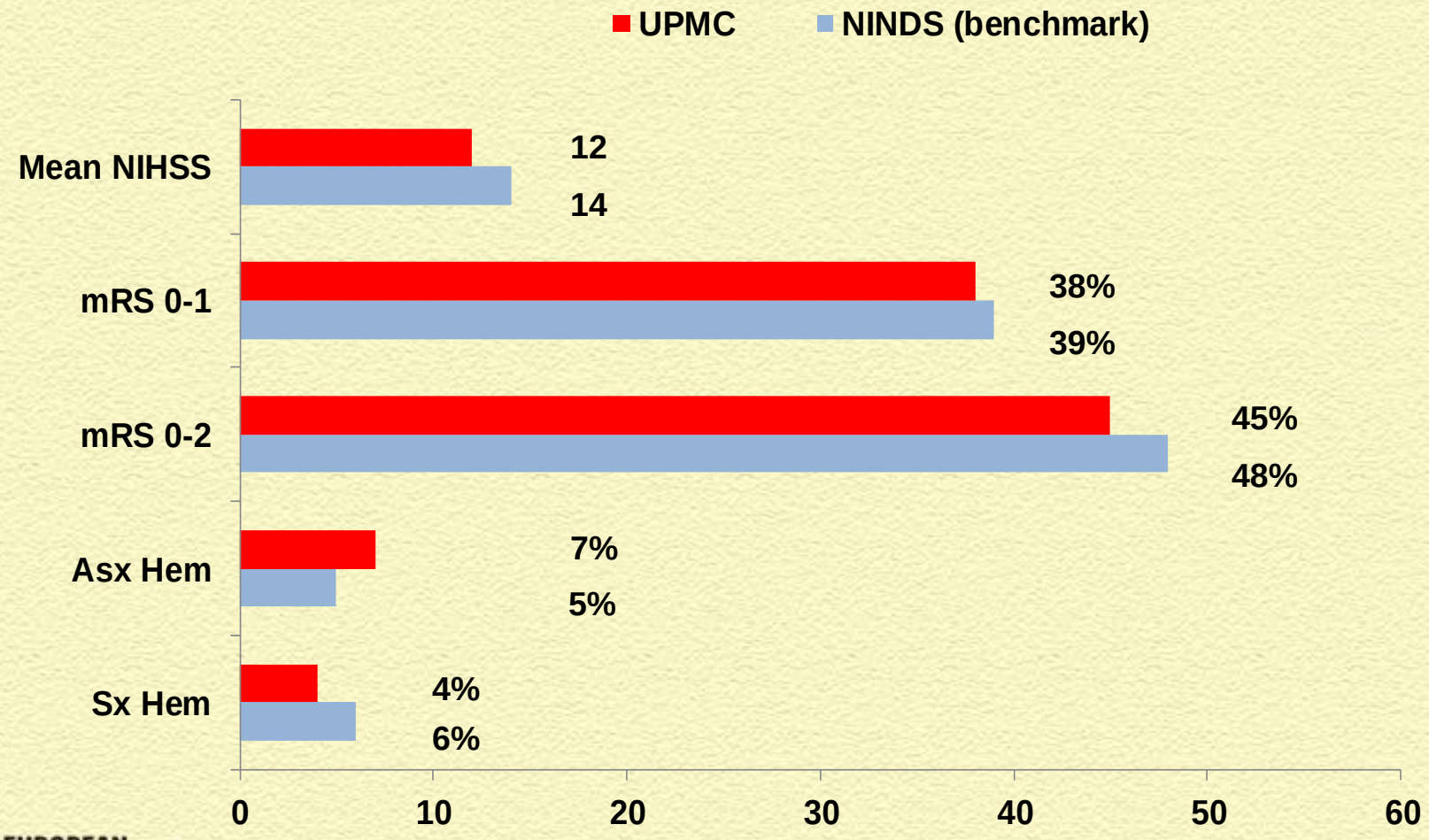
UPMC Telestroke – Process Measures

564 tPA Treatments



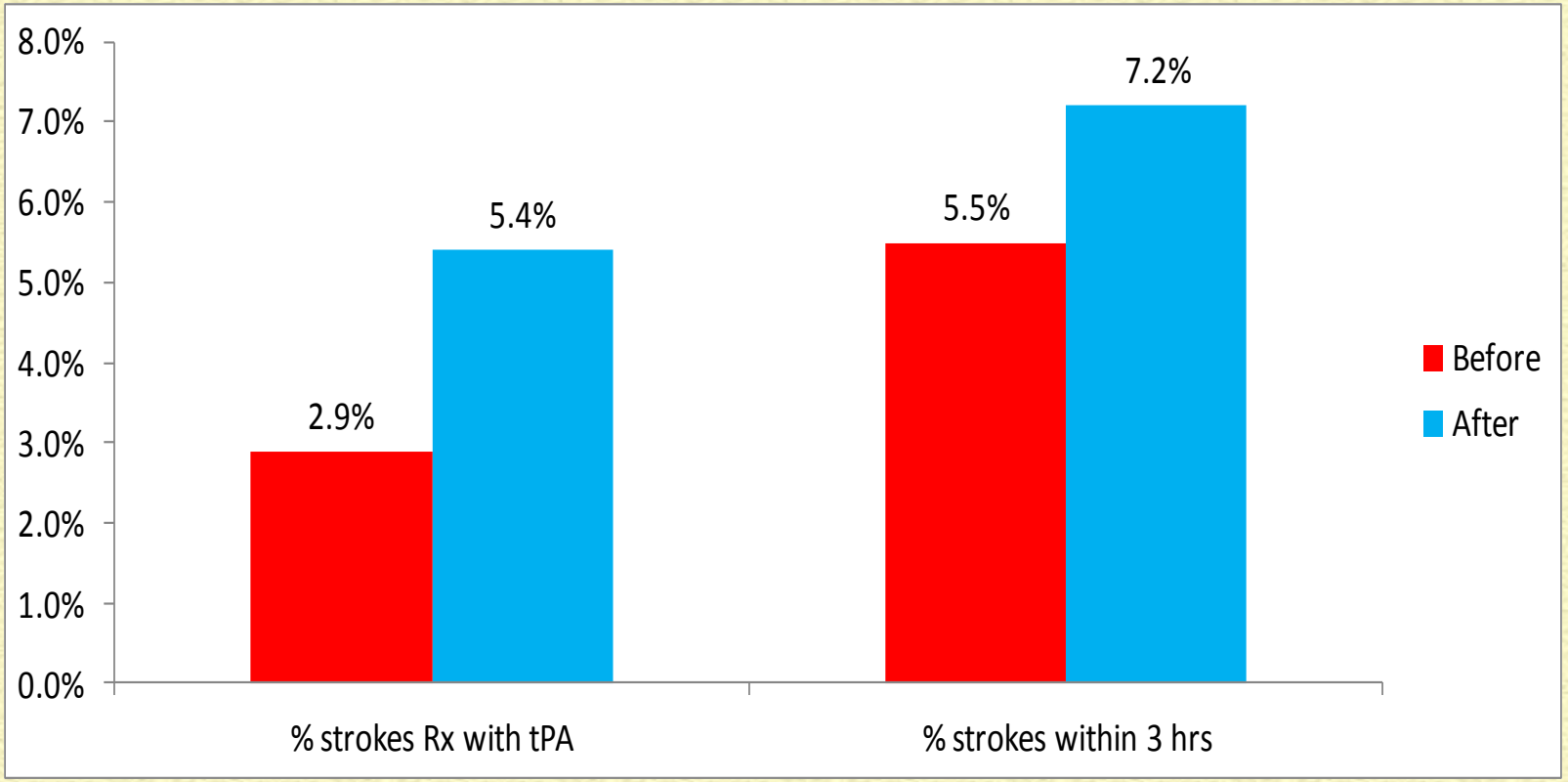
UPMC Telestroke - 90 Day Outcomes

453 tPA Treatments



Telestroke Before and After:
All UPMC Hospitals

1235 Pts Before
2175 Pts After



Telestroke: Is Post-tPA Care the Same?
IV tPA Treated Patients Hub v. Spoke

Mulitvariate Analysis
Telemedicine patients v. Hub hospital patients

	Odds Ratio	95% CI
In Hospital Death	11.0	3.3-36.3
LOS	5.0	2.6-9.4
Age	2.4	1.3-4.7
Hyperlipidemia	1.8	1.0-3.2
Fever	0.3	0.1-0.7
NIHSS	0.3	0.2-0.6
LVO	0.3	0.1-0.5
Intubation	0.03	0.01-0.20

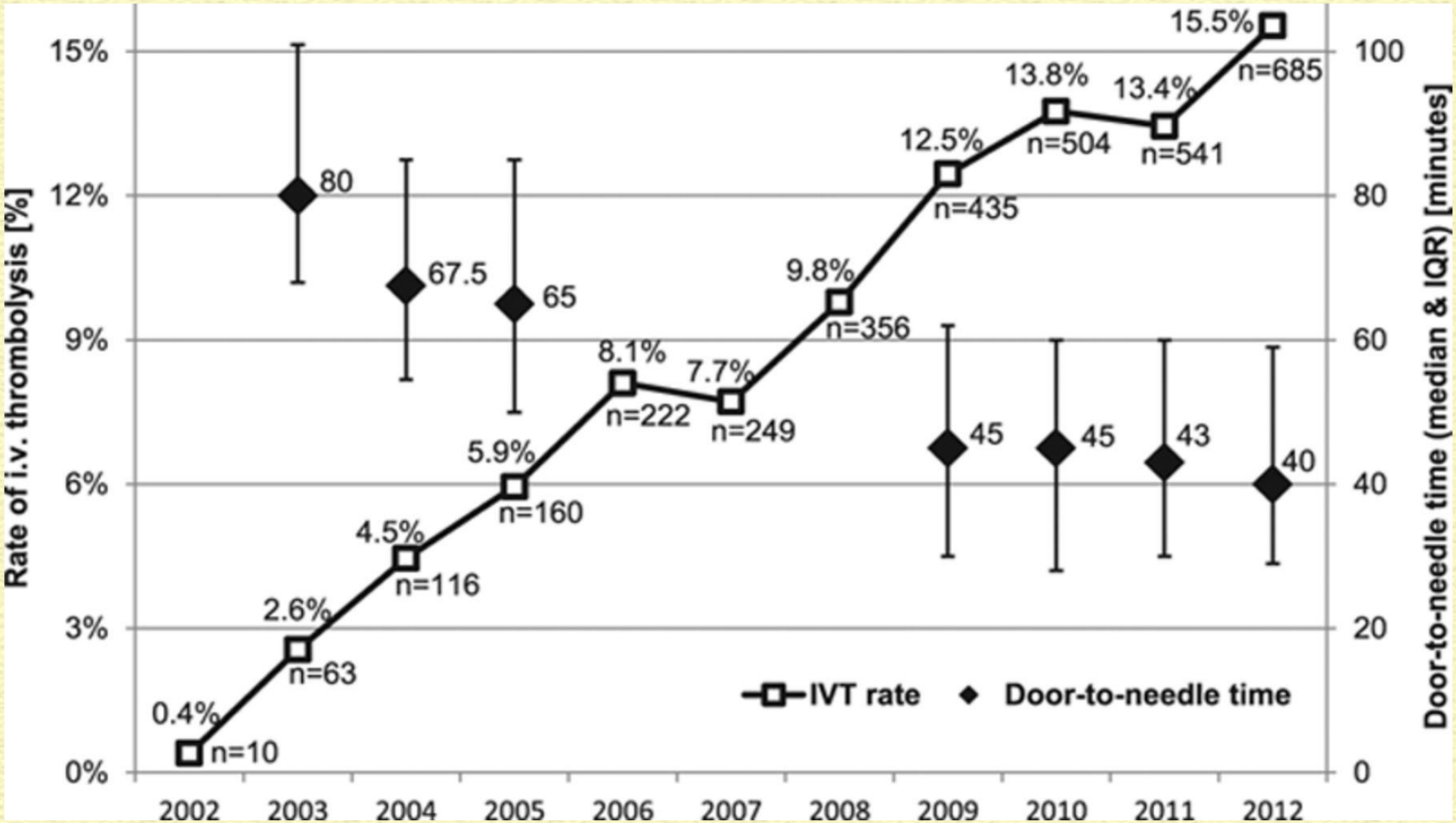
TEMPiS

- 12 community hospitals connected to 2 stroke centers in Bavaria, Germany since 2003
- 170 pts treated with IV tPA over 22 months by telemedicine compared to 132 at stroke centers
  - mRS 0-1 at 6 mo - 39.5% telemed, 30.9% stroke centers (p=0.10)
- Reduction in death and disability at 12 and 30 mo compared to non-telemed hospitals

Audebert et al Stroke 2005 Ickenstein et al Neurocrit Care 2005 Schwab et al. Neurology 2007 Audebert et al Stroke 2009

TEMPiS:

10 Year Telemedicine Experience in Bavaria, Germany



Müller-Barna P et al. Stroke. 2014

The Economics of Telestroke

Saving

1. Telemedicine increases utilization of tPA
2. tPA improves stroke outcomes and reduces long term care costs
3. Hospitals receive higher payment with tPA

Cost

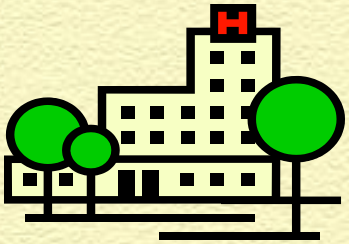
1. Equipment cost
2. Connectivity
3. IT costs
4. Stroke team coverage

Arch Intern Med. 2003 Oct 13;163(18):2198-202.

Stroke. 2007 Jun;38(6):1952-5. Epub 2007 May 3

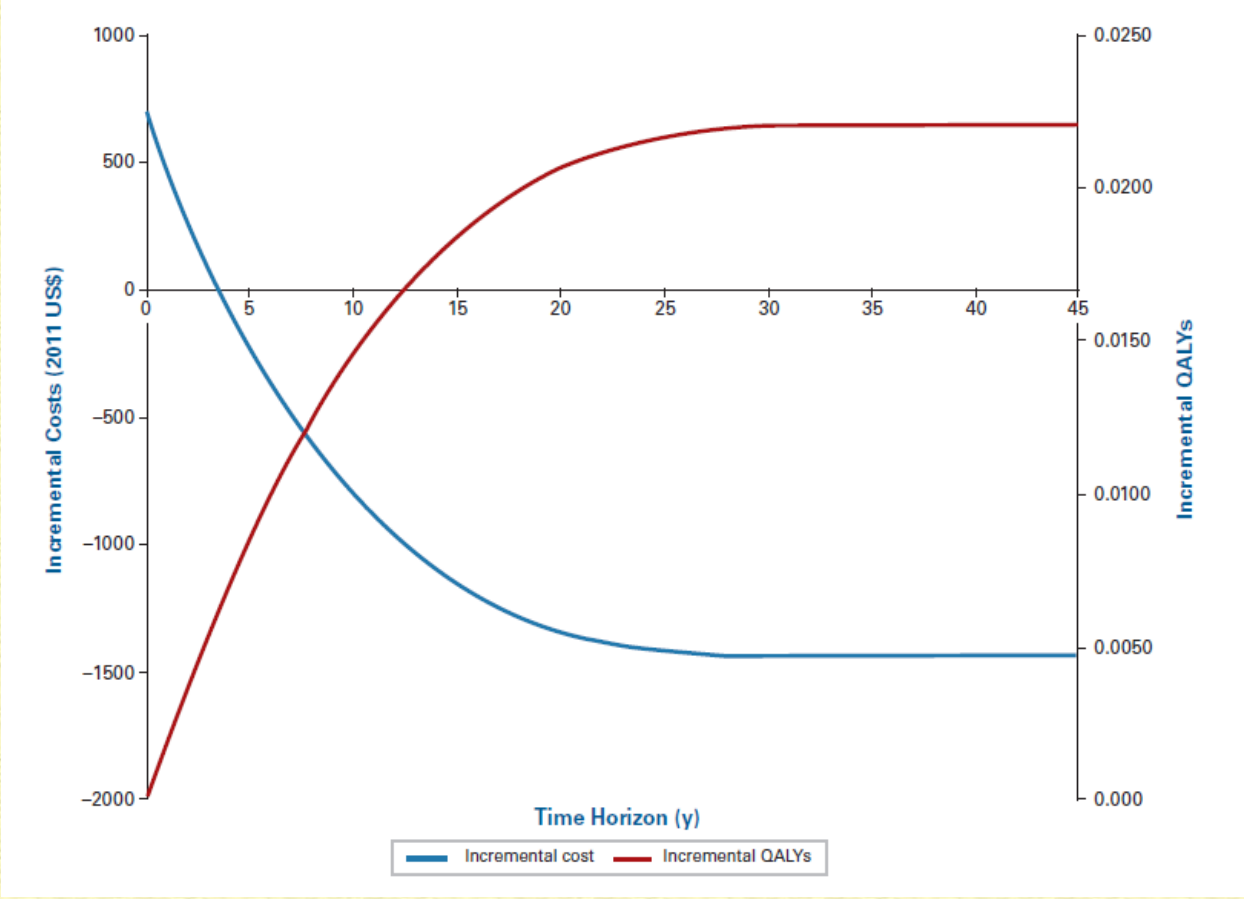
Neurology. 1998 Apr;50(4):883-90

ROI of Telestroke: Hub and Spoke



Hub Hospital	Spoke Hospital	Societal
+ Stroke transfers	+ Avoid transfers	+ Improved outcomes: tPA
+ Endovascular cases	+ No EMS bypass	+ Reduced disability
- Network support	+ High quality stroke care	+ Return to work
- Neurology support	- Greater cost of care	+ Less caregiver burden
- IT costs	- Stroke quality monitoring	- Higher upfront costs

Costs and QALYs per AIS Pt Over Time



Demaerschalk et al. AJMC 2013

Lessons

- Stroke evaluation by Telemedicine is equivalent to in person examination
- Outcomes of IV tPA treatment by telestroke same as in person
- Monitoring of process measures at hub and spoke as well as patient outcomes is critical
- Improved outcomes and long term cost savings offset any upfront costs