

Increasing False Positive Diagnosis May Lead to Overestimation of Stroke Incidence, Particularly in the Young: A Cross-Sectional Analysis

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Introduction

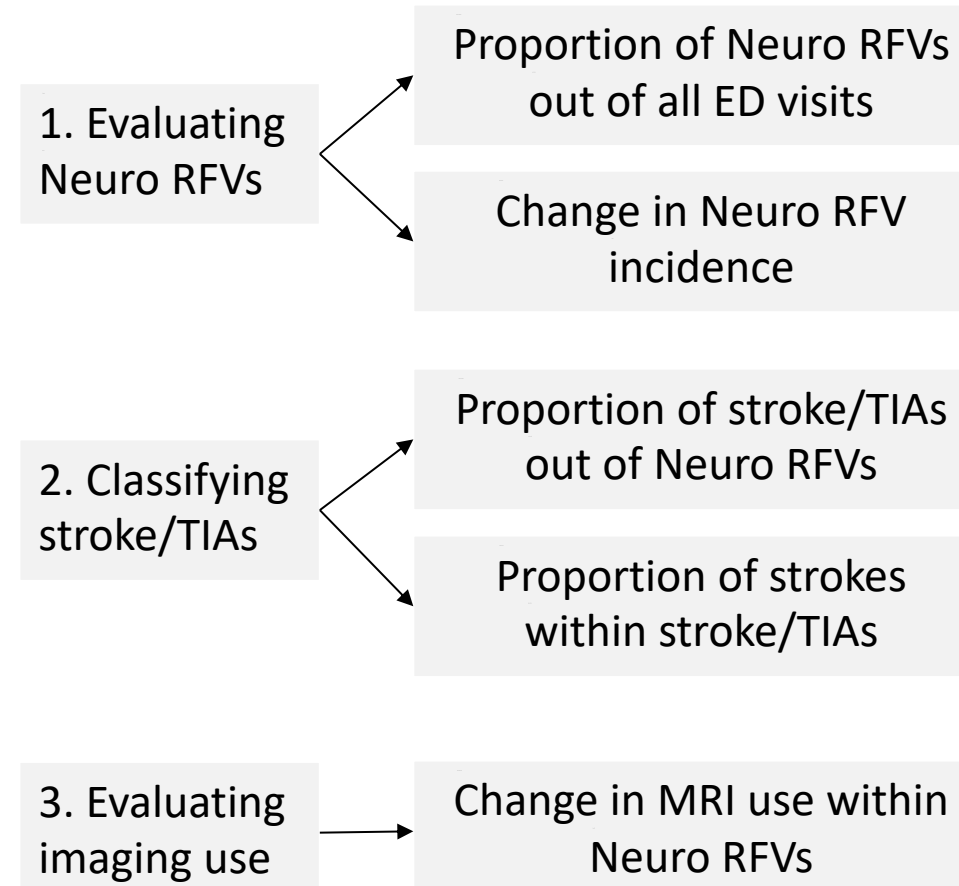
- Stroke in the young is reportedly increasing [1-6]
- Proposed causes include

- Increasing CV risk factors
- Changes in definition of TIA and stroke
- Increased use of advanced imaging

Question: Do trends in..

- Neurologically focused ED visits
 - Differential classification of stroke & TIA over time
 - Changes in the use of advanced imaging
- ... contribute to the reported increase in stroke?
- If stroke truly is rising, it should be a high priority for research and public health moving forward

Methods: Finding Trends

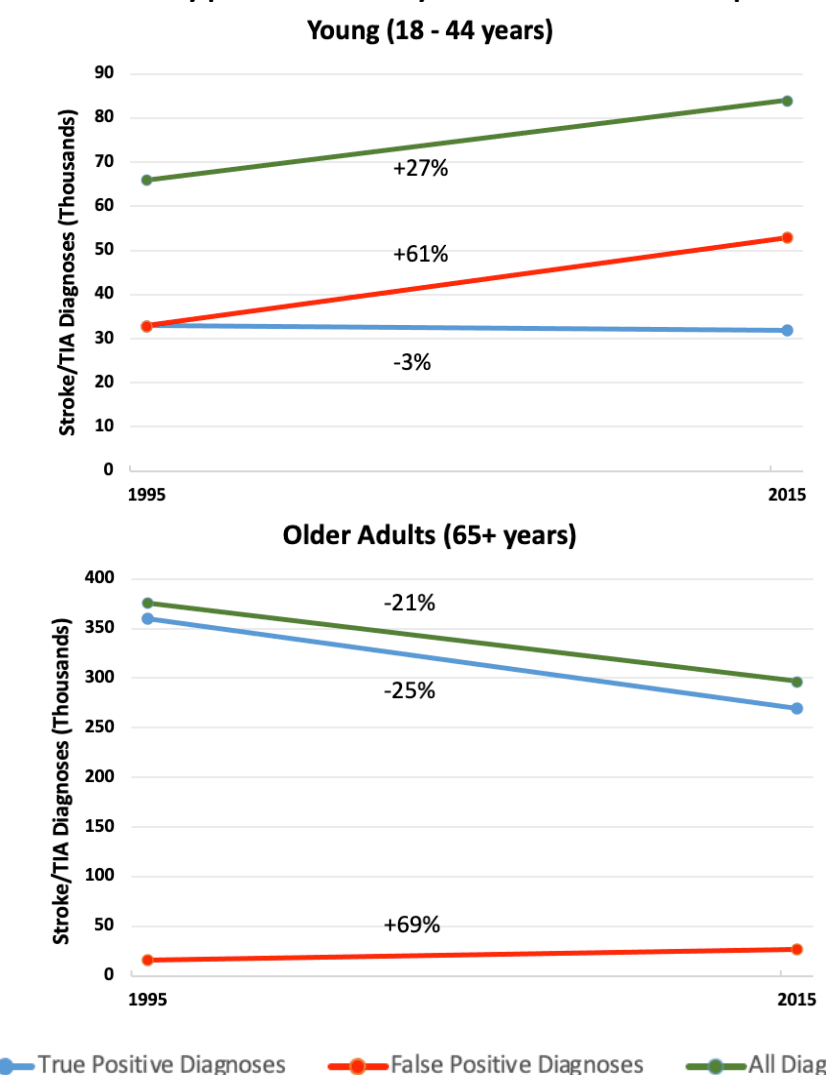


Study Population

Demographics	Neuro RFV, n = 189M (174M-204M)	Stroke/TIA, n = 9.6M (8.7M-10.4M)	All Subjects, n = 2.0B (1.9B-2.2B)
Age, mean yr (SD)	46 (23)	70 (15)	36 (24)
Female	59%	56%	54%
Race/ethnicity			
White	62%	73%	59%
Black	20%	13%	21%
Hispanic	11%	6%	13%
Other	7%	8%	7%
Insurance			
Private	30%	21%	32%
Medicare	26%	60%	17%
Medicaid	19%	7%	24%
Other	24%	11%	27%
MRI	2%	10%	< 1%
Age Distribution			
18 - 44	40%	6%	41%
65 +	25%	68%	15%
Comorbidities			
Hypertension	32%	66%	22%
Diabetes	13%	27%	9%
CEBVD	7%	60%	3%
Hyperlipidemia	11%	37%	7%

Conclusions

- With the assumptions for the young vs. old,
 - Neuro RFVs increasing faster
 - Similar specificity of stroke diagnosis
 - Lower prior probability of stroke diagnosis
- We can hypothetically calculate false positives,

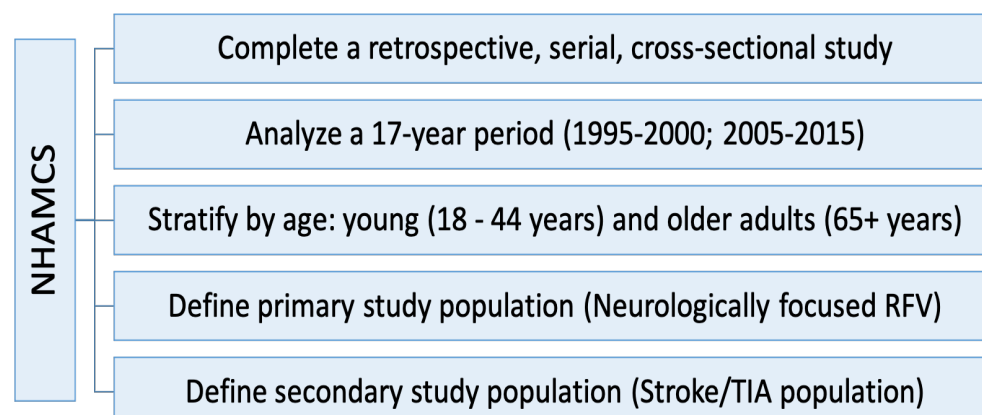


False positives may be rising quickly in the young, which presents a potential explanation for reported trends

Methods

- Retrospective, serial, cross-sectional study on a nationally representative sample of ED visits in the US using NHAMCS data from 1995-2015
- Examines time trends in age-stratified reasons for visit, stroke/TIA diagnoses, and MRI utilization
- Dataset & Patients:

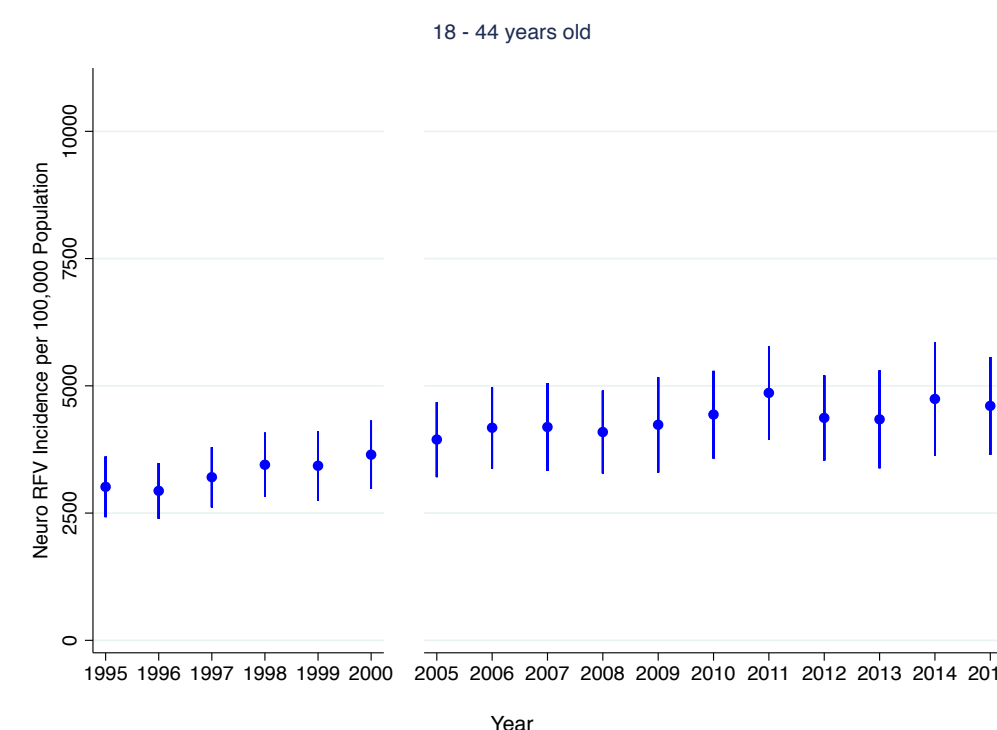
NHAMCS: Survey data on utilization and provision of ambulatory services in hospital EDs



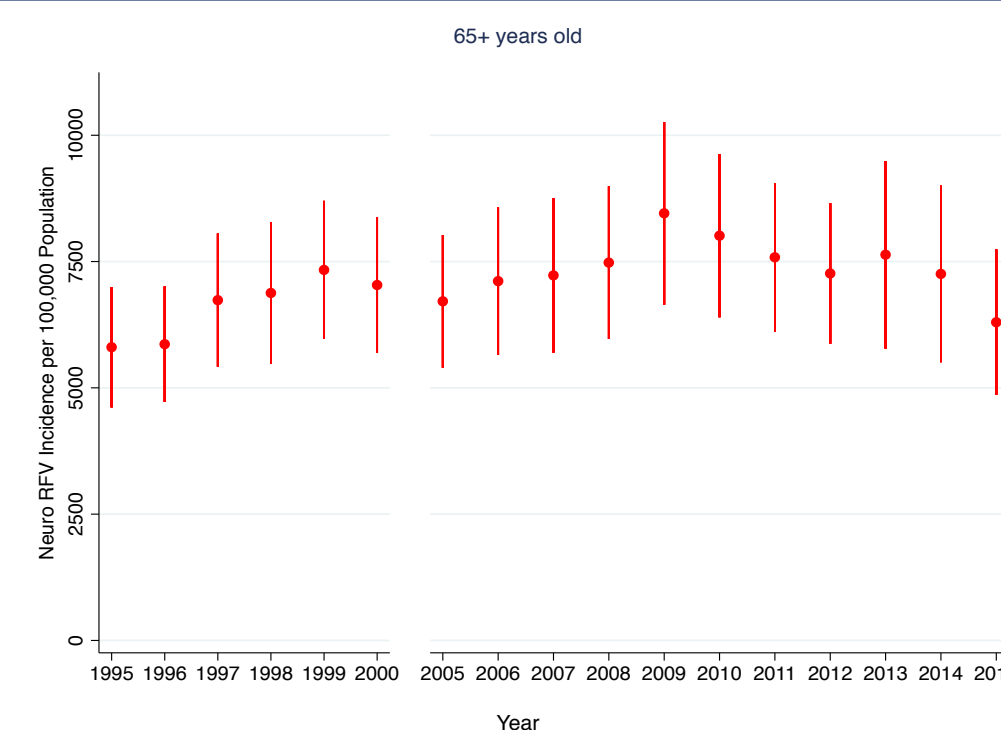
- Defining terms:

- Neuro RFV: ED visit with primary reason for visit being a neurologically-focused symptom/concern
- Stroke/TIA: ED visit given primary diagnosis of stroke or TIA (based on ICD-9 coding)

Results 1: Neuro RFV incidence is rising faster in the young (p = 0.022)



Young adults: + 111 Neuro RFVs/100,000 population/year (95% CI: +98 - +125)



Older adults: + 70 Neuro RFVs/100,000 population/year (95% CI: +34 - +108)

Results 2 & 3: Trends of Stroke/TIAs & MRI use

2. No differential classification of TIA to stroke over time in young or older adults

Young: OR 1.00, 95% CI: 0.93 - 1.08
Old: OR 1.00, 95% CI: 0.98 - 1.03

3. No disproportional rise in MRI use for Neuro RFVs over time in young or older adults

Young: OR 1.00, 95% CI: 0.93 - 1.08
Old: OR 1.00, 95% CI: 0.98 - 1.03

Summary

- Do trends in neuro-focused ED visits, classification of stroke and TIA, and changes in imaging use contribute to reported increasing stroke incidence?
- In this cross-sectional study (1995-2015), neuro-focused ED visit incidence rose faster in young vs old
- Meaning: Increasing false positive diagnoses in the young may be a contributing factor to the observed increases in stroke incidence in the young and merits further scrutiny**

References

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