



EUROPEAN STROKE NETWORK

Affording Recovery in Stroke



Gender Dimensions in Practise of EU-funded Projects

ARISE and the European Stroke Network (ESN)

16th Nov 2011, Wien

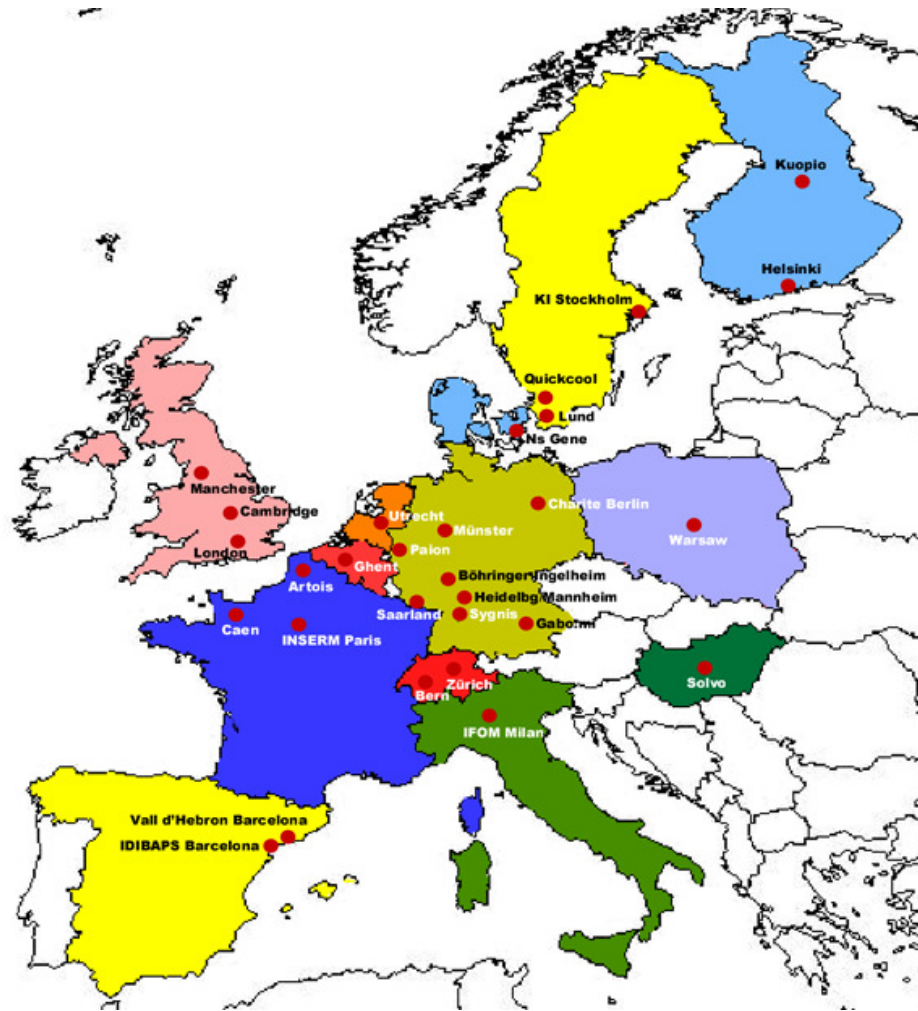
Christian Nolte
Department Neurology
Center for Stroke Research
Charite, Berlin, Germany



ARISE and the European Stroke Network (ESN)



29 partners from 13 countries





The European Stroke Network



Aims and Scope:

Developing successful strategies for
brain protection and repair

therefore requires a joint effort of experts on
basic neuroscience, vascular biology,
neuroimmunology, neuroprotection,
neuroregeneration, drug delivery, and
clinical stroke neurology



Future impact of stroke on society

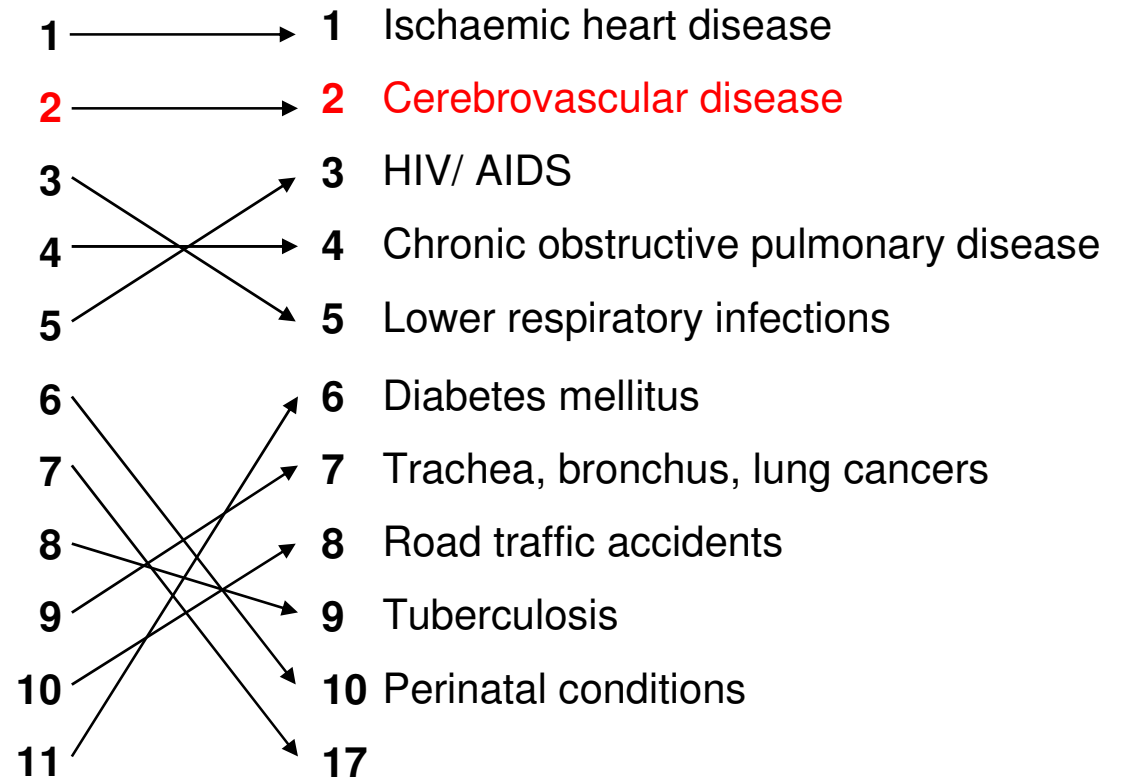
*Changes in main causes of death worldwide
2005: 5.8 million deaths, 2030: 7.4 million deaths*



2005 Disease or injury

- 1 Ischaemic heart disease
- 2 **Cerebrovascular disease**
- 3 Lower respiratory infections
- 4 Chronic obstructive pulmonary disease
- 5 HIV/ AIDS
- 6 Perinatal conditions
- 7 Diarrheal diseases
- 8 Tuberculosis
- 9 Trachea, bronchus and lung cancers
- 10 Road traffic accidents
- 11

2030* Disease or injury





Global causes for disability worldwide

Estimates of the WHO GBDS; percentage of DALYs lost due to the top ten diseases in men and women 15y and above





Gender and Stroke



Sex and Gender differences exist in the...

- ... incidence**
- ... risk factors**
- ...etiology**
- ... treatment**
- ...outcome**

from stroke

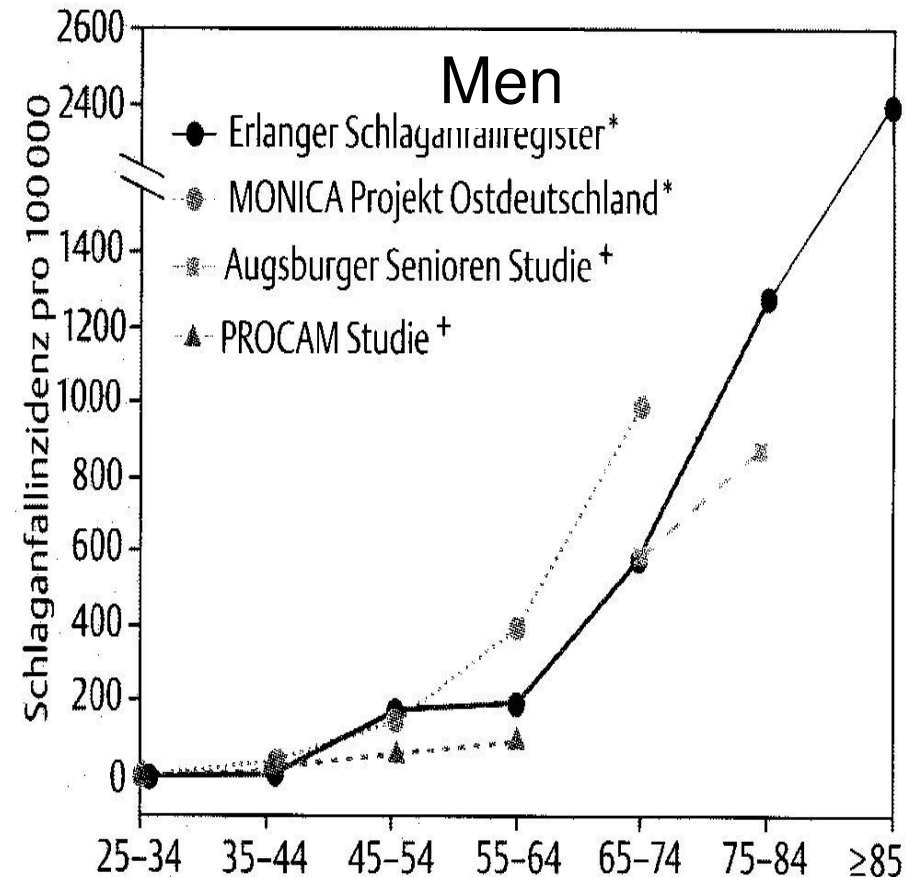
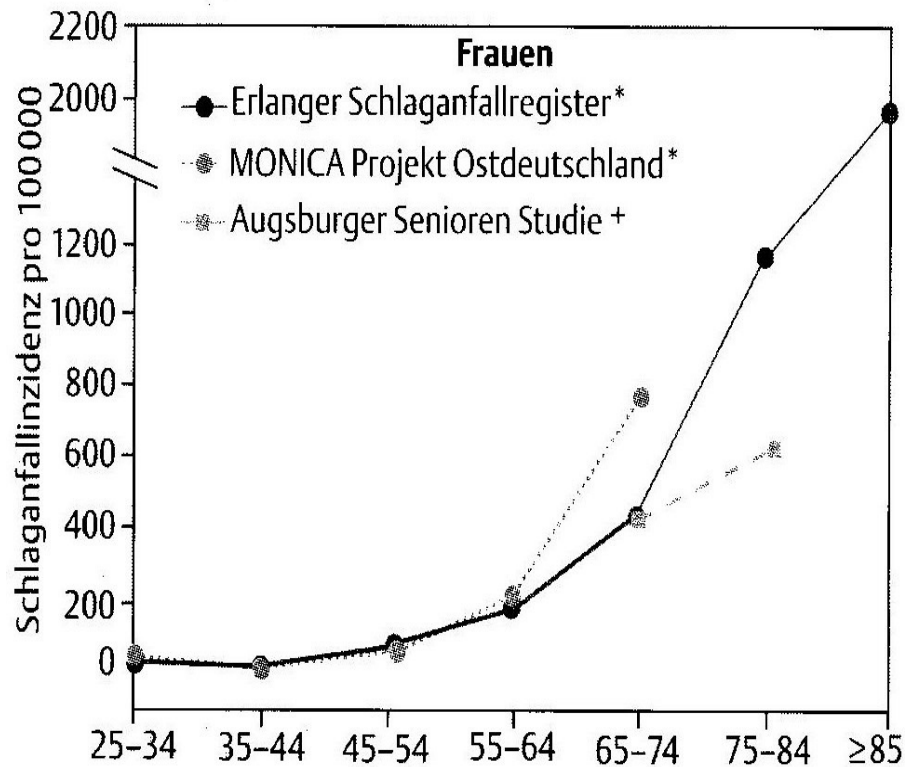


Incidence of stroke in Germany – age adjusted

Data from population-based registers and prospective cohort-studies



Women

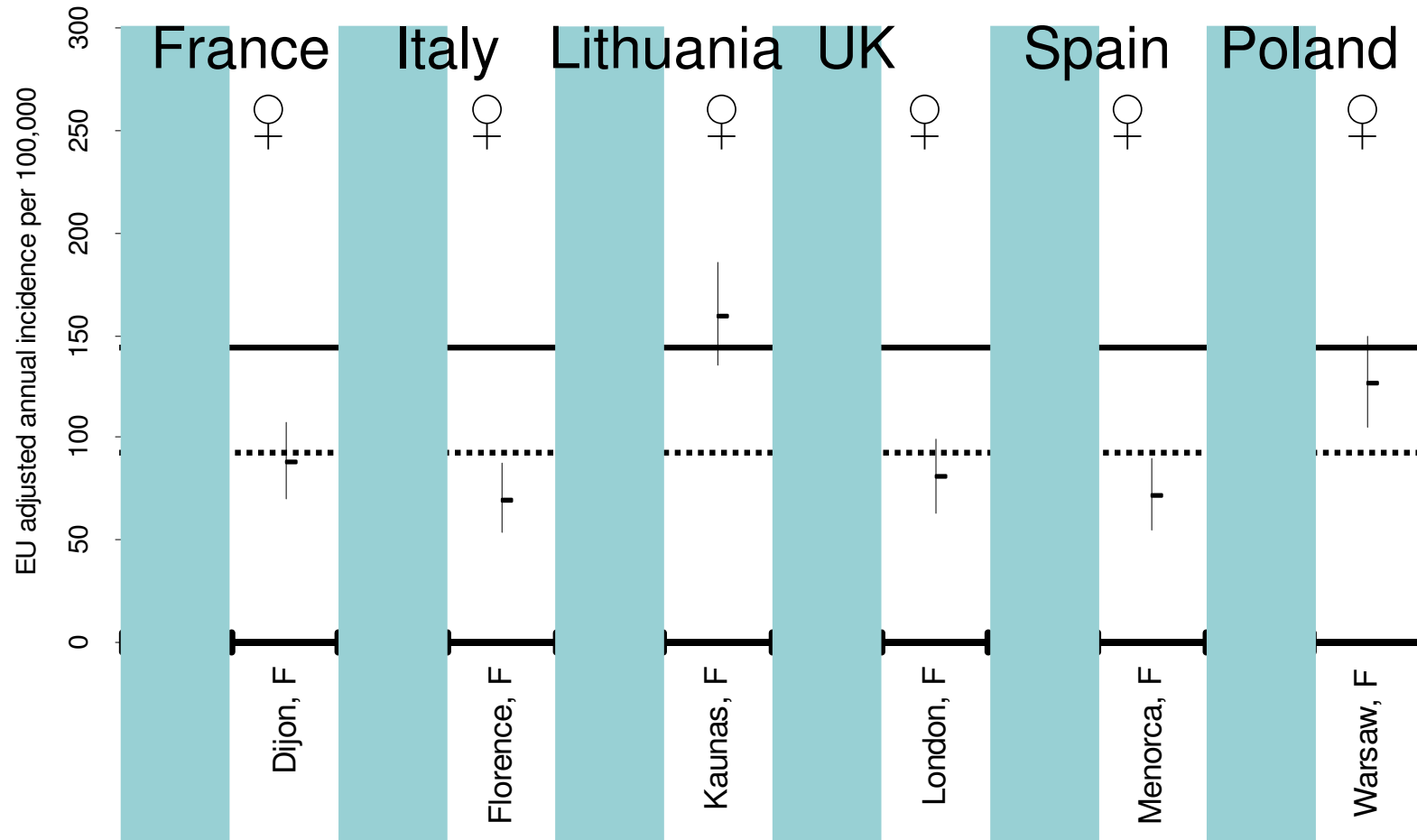


=> Cumulative incidence per year ca. 200/ 100.000 inhabitants



Incidence of stroke in Europe

European Stroke Registries Collaboration, 2004-2006



Annual stroke incidence rate and 95% CI per 100000 population adjusted to the European population for males (M) and females (F) the line represents the mean annual incidence rate adjusted to the European population for all centers

—— for men for women



Gender specific variations in risk factors

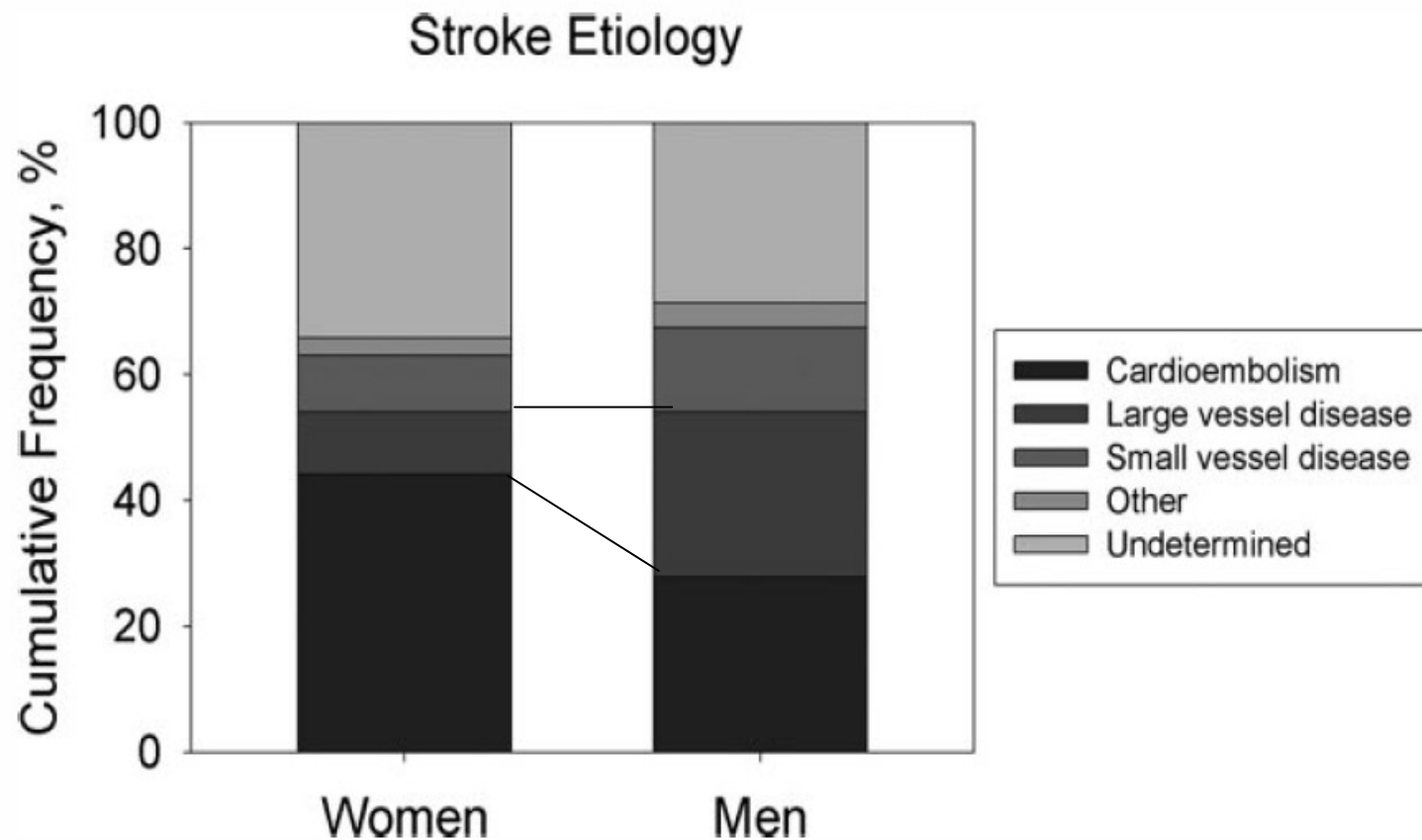
BIOMED II Stroke Project, 22 hospitals from 7 European countries, 1993-1994

| Variable | Males (n=2239) | Females (n=2260) | P |
|------------------------------------|----------------|------------------|--------|
| Mean±SD Age, y | 69.2±12.1 | 74.5±12.5 | <0.001 |
| Living at home alone | 20.6% | 36.1% | <0.001 |
| Institutionalized | 3.7% | 7.9% | <0.001 |
| Atrial fibrillation | 15.2% | 20.8% | <0.001 |
| Hypertension | 46.7% | 50.7% | 0.007 |
| Diabetes | 20.5% | 21.3% | 0.536 |
| Current or previous smoking | 57.3% | 18.4% | <0.001 |
| Alcohol intake | 47.9% | 21.1% | <0.001 |
| Previous myocardial infarction | 14.0% | 8.0% | <0.001 |
| Previous transient ischemic attack | 13.4% | 11.7% | 0.084 |
| Antihypertensive therapy | 37.4% | 45.1% | <0.001 |
| Anticoagulant therapy | 4.0% | 3.8% | 0.747 |
| Antiplatelet therapy | 20.4% | 16.8% | 0.003 |
| Prestroke Rankin Score (2-5) | 22.9% | 31.7% | <0.001 |



Gender Differences in Acute Ischemic Stroke Etiology, Stroke Patterns and Response to Thrombolysis

Alex Förster, MD; Achim Gass, MD; Rolf Kern, MD; Marc E. Wolf, MD; Caroline Ottomeyer, MD; Katrin Zohsel, PsyD; Michael Hennerici, MD; Kristina Szabo, MD





Outcome- 3 months after stroke

Riks-Stroke Register Sweden, 1872 men & 2483 women, 2006



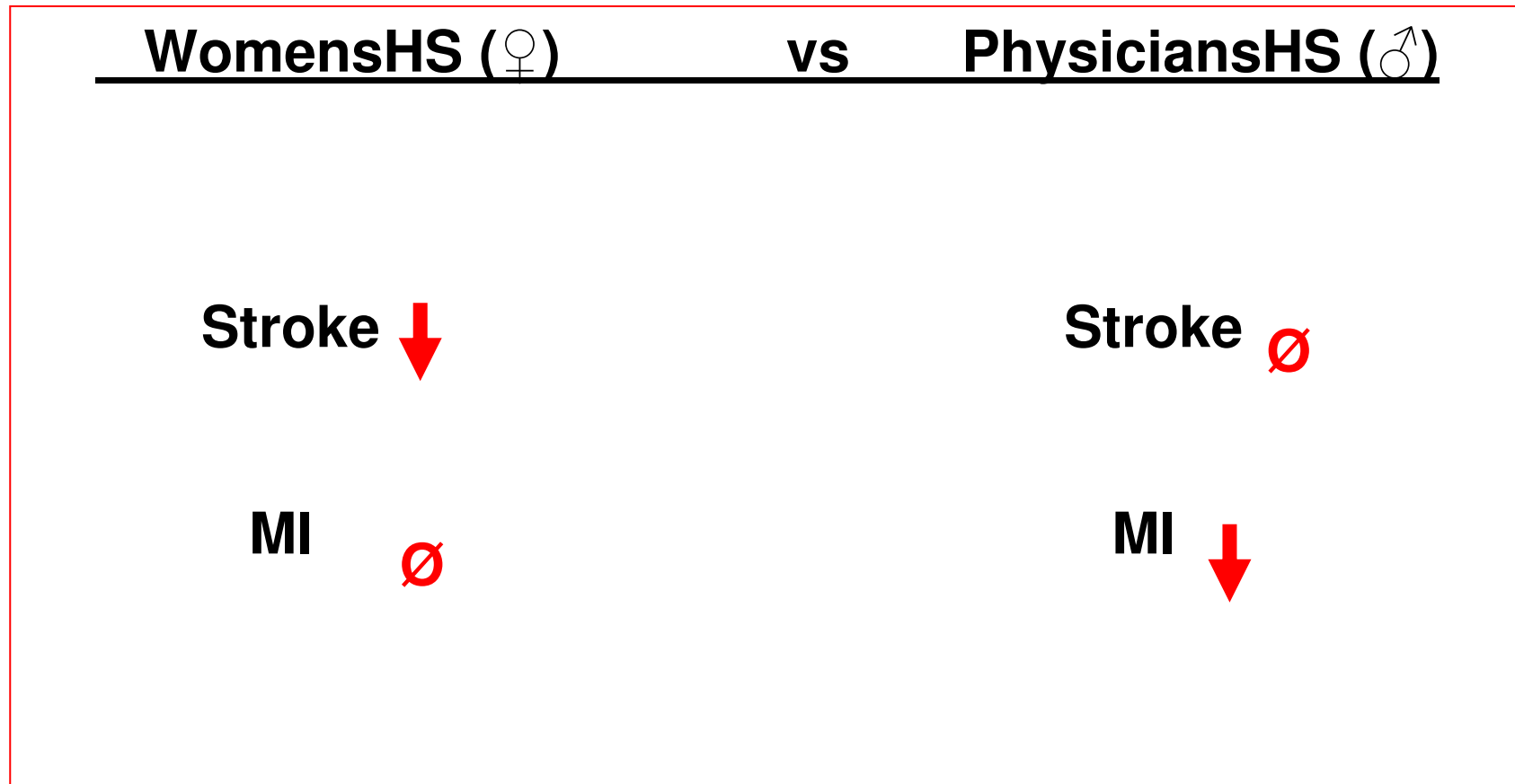
| Outcome | Sex | Proportion (%) | Age-adjusted OR | 95% CI |
|---|-------|----------------|-----------------|-------------|
| 90-day case fatality | Men | 15.2 | | |
| | Women | 20.2 | 1.080 | 1.008-1.158 |
| Institutional living | Men | 11.6 | | |
| | Women | 14.5 | 1.127 | 1.016-1.250 |
| Dependent in activities of daily living | Men | 19.0 | | |
| | Women | 23.9 | 1.079 | 0.995-1.170 |
| Speech difficulties | Men | 24.3 | | |
| | Women | 25.4 | 1.006 | 0.936-1.082 |
| Self-reported depression | Men | 11.0 | | |
| | Women | 15.4 | 1.490 | 1.357-1.637 |
| Self-reported bad health status | Men | 18.0 | | |
| | Women | 21.9 | 1.194 | 1.103-1.293 |



Treatment



Aspirin in primary prevention



Women's Health Study: Ridker et al., NEJM 2005; 352:1293ff



Articles



Prevention of disabling and fatal strokes by successful carotid endarterectomy in patients without recent neurological symptoms: randomised controlled trial

MRC Asymptomatic Carotid Surgery Trial (ACST) Collaborative Group*

Lancet 2004; **363**: 1491–502

-3120 patients with asymptomatic ICA stenosis $\geq 70\%$
-perioperative morbidity and mortality : 3,1%

NNT for Stroke

NNT 90

men

NNT 59

women

NNT 125

The sex of the patient is one potential risk factor



Biological origins for sex differences in stroke

Most common hypotheses are related to steroid hormones, particularly oestrogen.

- **Mouse models of ischaemic stroke show sex differences in stroke volumes:**

- females have smaller stroke volumes than males
- ovariectomised females have similar stroke volumes than males
- ovariectomised females given hormone replacement therapy have similar volumes as intact females

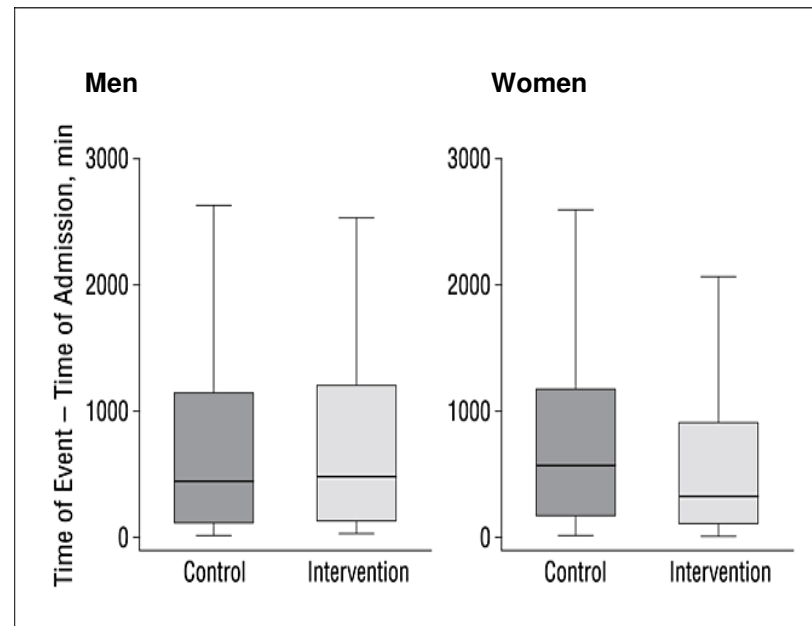
→ Protective role of oestrogens?



Reduction of prehospital delays by a population-based intervention



**Prehospital time in intervention and control group in men and women.
Data are given as median values with 25th and 75th percentiles.**



Conclusions: The population-based intervention was effective in reducing prehospital delays in women but not in men.



Gender Mainstreaming



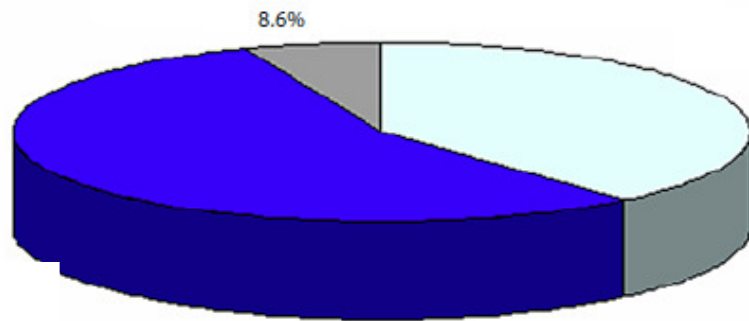
Process of implementing gender equality
..... has not been an issue so far



Gender Research in Stroke is still dominated by men

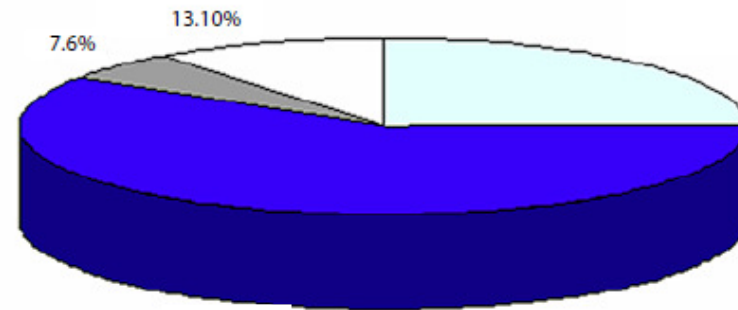


Gender first author (stroke)



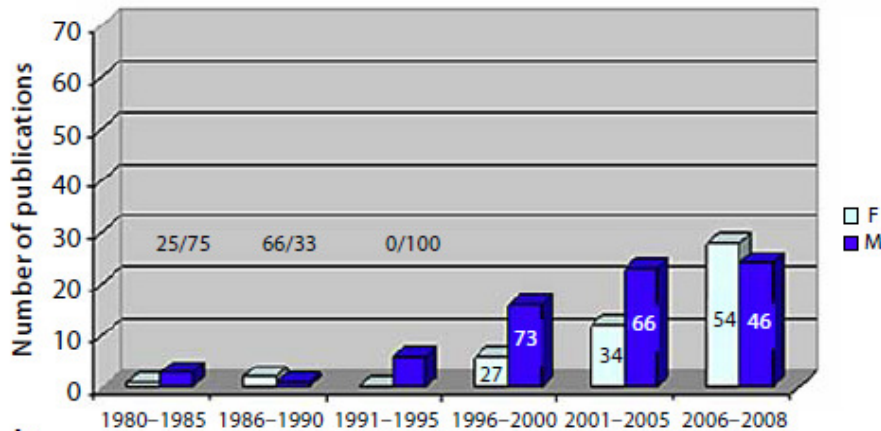
a □ Female ■ Male ■ Unknown

Gender last author (stroke)



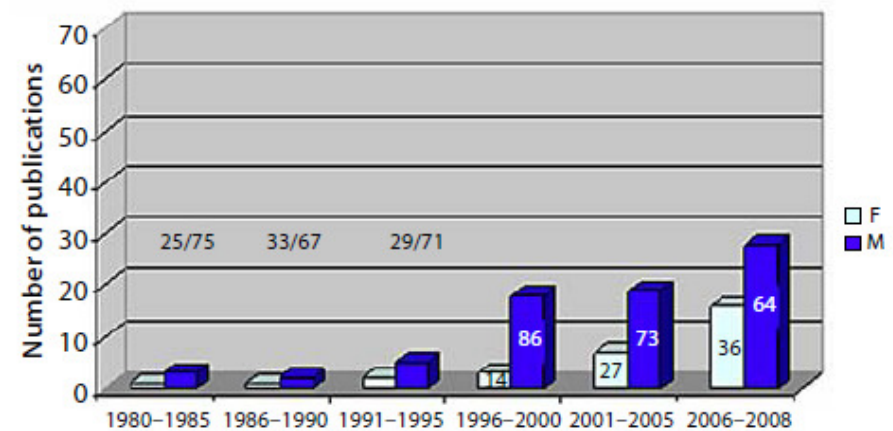
□ Female ■ Male ■ Unknown □ Collective

Authorship trends (first author stroke)



b

Authorship trends (last author stroke)





Female participation within ESN



Anna Planas (Barcelona, ES)
Stroke Immunology



Nancy Rothwell (Manchester, UK)
Biomarkers



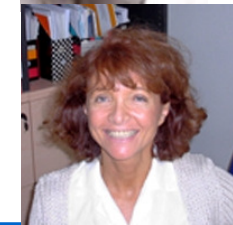
Lydia Sorokin (Münster, D)
Immunology



Britta Engelhardt (Bern, CH)
Immunology



Elisabetta Dejana (Milano, I)
Angiogenesis





5 Project Leaders out of 29





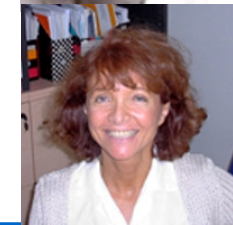
ESN / ARISE:

WHO?

**gender mainstreaming has not been
a big issue so far**

female participation is present

**gender mainstreaming might be
a chance to further improve networking
and output**





Take Home Messages



(WHAT and HOW)

Sex and Gender differences in stroke are present at many aspects of STROKE and are looked at within ESN

**The reasons for the differences are multifactorial
(age, risk factors, societal)**

(WHO)

Gender Mainstreaming has not been an issue within the ESN/ARISE so far



CHARITÉ CAMPUS BENJAMIN FRANKLIN

LANGZEITBELICHTUNG
PETER LÜDEMANN



Costs for medical care of ischemic stroke

Time period 2006-2025



| Time period | Men | | Women | | Total | |
|------------------|-----------|----------|-----------|----------|-----------|----------|
| | cases | billions | cases | billions | cases | billions |
| 2006-2010 | 331,000 | 13.8 | 425,000 | 16.1 | 756,000 | 29.9 |
| 2006-2015 | 701,000 | 27.1 | 880,000 | 30.9 | 1,581,000 | 58.0 |
| 2006-2020 | 1,108,000 | 39.7 | 1,367,000 | 44.6 | 2,475,000 | 84.3 |
| 2006-2025 | 1,547,000 | 51.5 | 1,883,000 | 57.1 | 3,430,000 | 108,6 |