



ATRIAL FIBRILLATION & THE RISK OF STROKE

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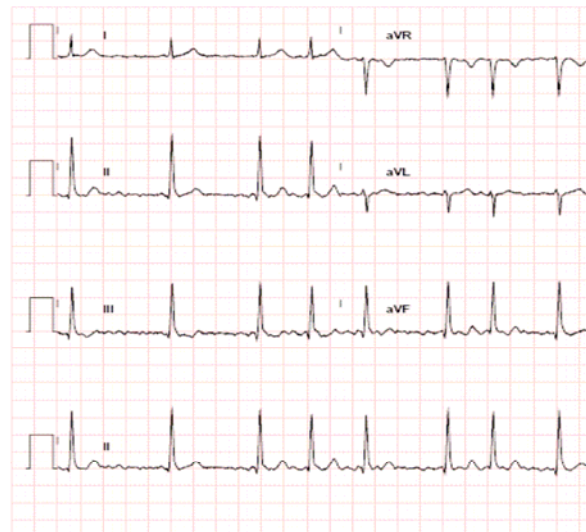
BDH-Clinic Elzach, Clinic for Neurological Rehabilitation

- Charitable and independent
- 200 Beds, 52 Intensive Care
- 2,000 Patients/ year
- 1,200 ischemic stroke patients, > **1/3 atrial fibrillation**

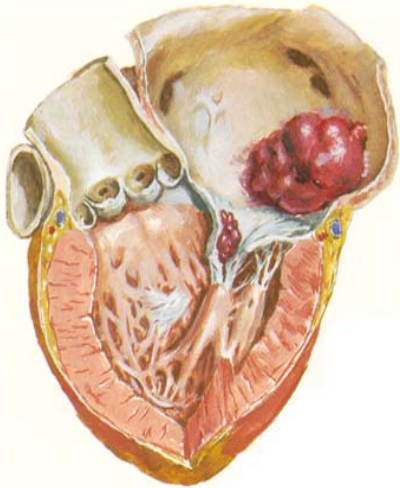


ATRIAL FIBRILLATION (AF)

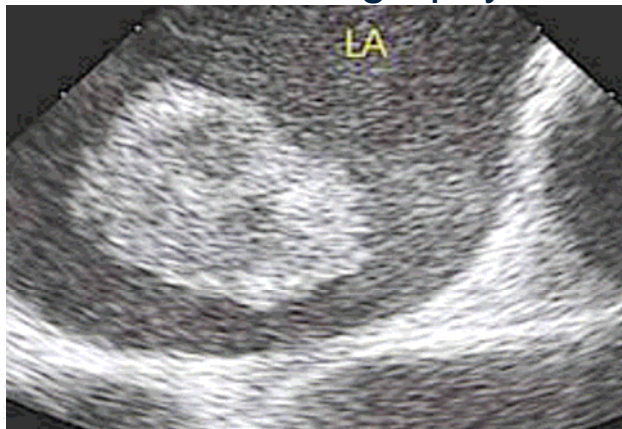
- Uncoordinated electrical signals in the atria cause deterioration in atrial function and cardiac efficiency
- AF is the most common heart rhythm disturbance¹
- It is estimated 1 in 4 individuals aged 40 years or older will develop AF¹
- In 2007, 6.3 million people in the US, Japan, Germany, Italy, Spain, France and the UK were living with diagnosed AF²
- Due to the aging population, this number is expected to double within 30 years³



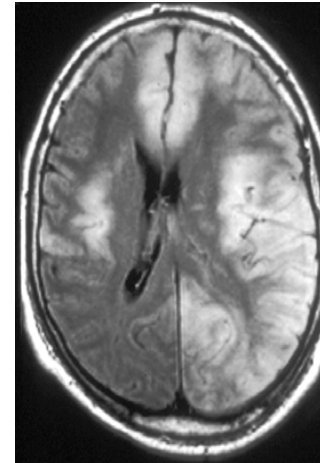
Atrial Fibrillation in Pathology:
The left atrium is enlarged and
immobile -> prothrombotic state



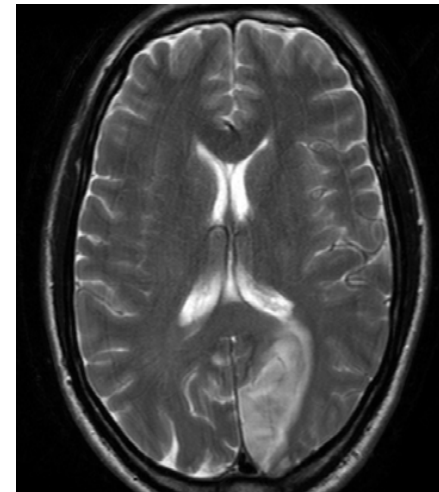
Atrial thrombus in
echocardiography



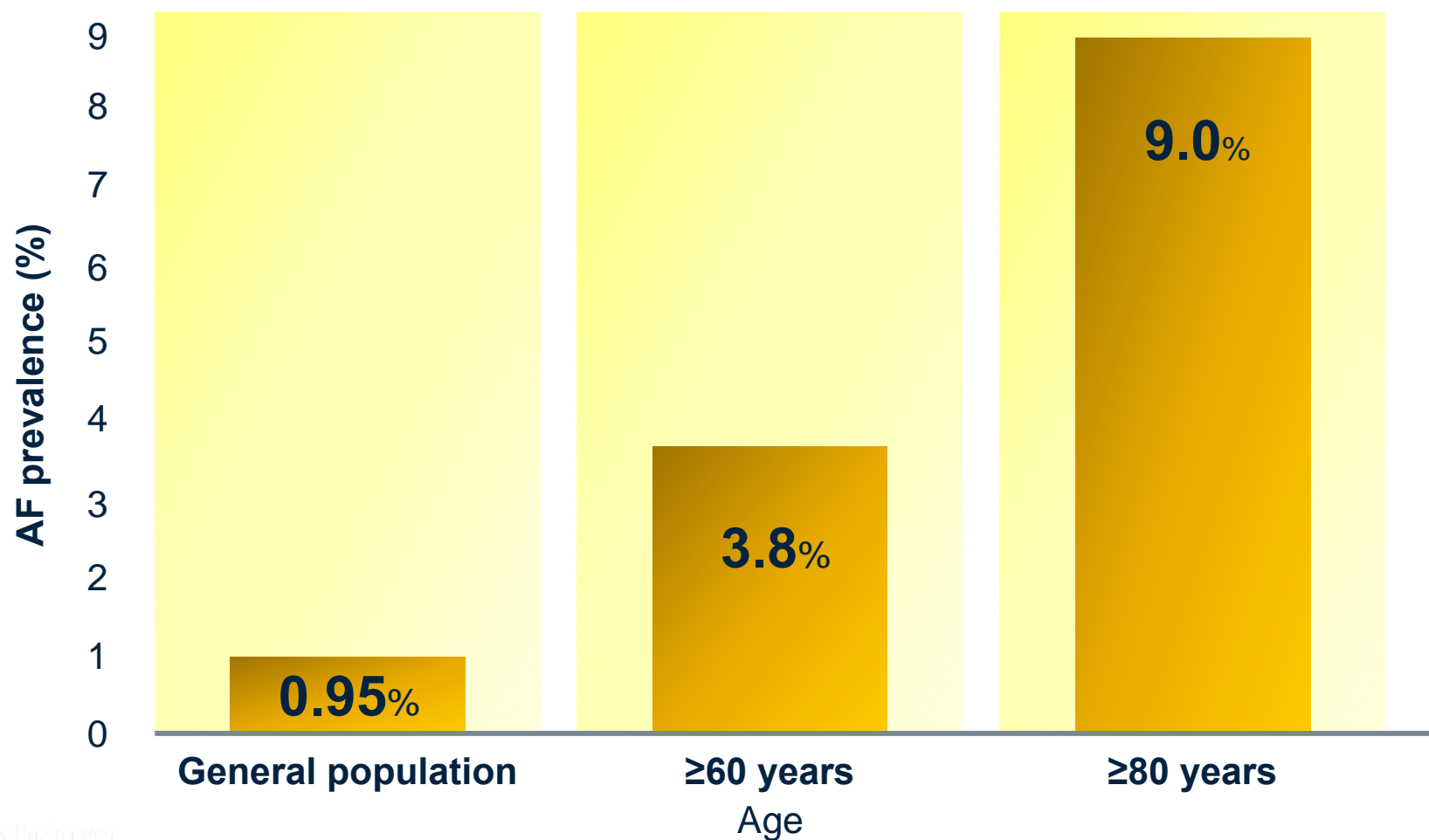
Cardiogenic catastrophe:
multiple cardiogenic infarcts
from one atrial thrombus



Small cardiogenic infarct



AF PREVALENCE INCREASES WITH AGE



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Herzrhythmus
Gesellschaft

1. Go AS, et al. JAMA 2001;285:2370-2375.

AF INCREASES THE RISK OF STROKE



- AF is associated with a pro-thrombotic state¹
 - ~5-fold increase in stroke risk²
- Risk of stroke is the same in AF patients regardless of whether they have continuous or occasional AF (permanent and paroxysmal)^{3,4}
- Up to 3 million people worldwide suffer strokes related to AF each year⁵⁻⁷
- AF-related strokes tend to be especially severe and disabling with a 1-year mortality rate of ~50%^{6,7}
 - Cardioembolic stroke has a 30-day mortality rate of 25%⁶

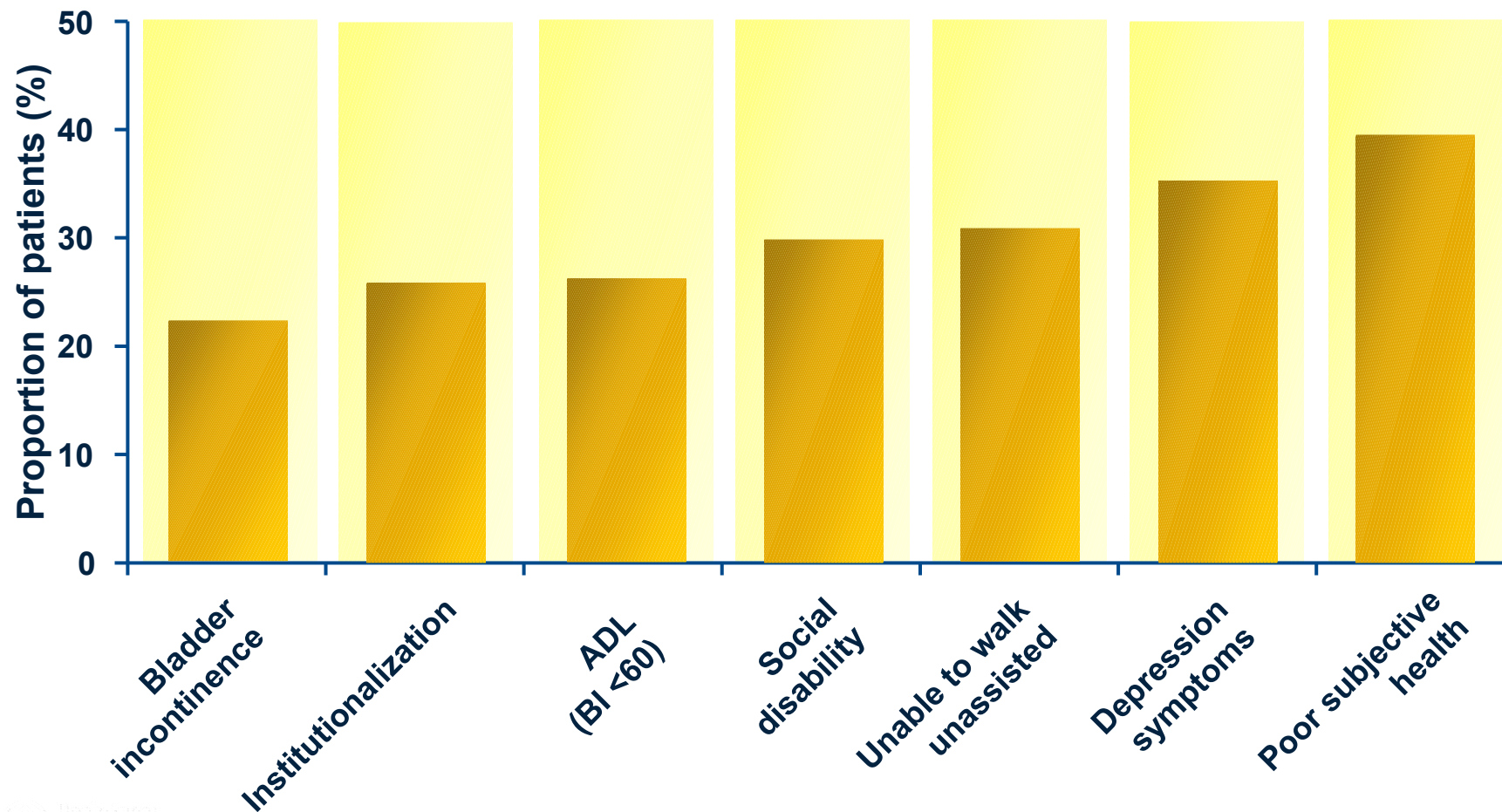
1. Watson T, et al. *Lancet* 2009;373:155-166. 2. Wolf PA, et al. *Stroke* 1991;22:983-988.
3. Rosamond W, et al. *Circulation* 2008;117:e25-146. 4. Hart RG, et al. *J Am Coll Cardiol* 2000;35:183-187.
5. Atlas of Heart Disease and Stroke, World Health Organization, September 2004. Viewed at http://www.who.int/cardiovascular_diseases/en/cvd_atlas_15_burden_stroke.pdf.
6. Lin HJ, et al. *Stroke* 1996;27:1760-1764. 7. Marini C, et al. *Stroke* 2005;36:1115-1119.



STROKE SURVIVORS FACE PERSISTENT DISABILITY



Disability 6 months post-stroke (all types)



n=108; 22-year follow up of >5000 participants in the Framingham study, including patients with AF, cardiac failure, coronary heart disease and hypertension; ADL = activities of daily living; BI = Barthel Index

**The Burden of Stroke:
Dysphagia (swallowing disorder)
- Therapy successful in most instances, tendency to
spontaneous recovery**



sensation



movement



taste



The Burden of Stroke: Immobility

- Therapy successful in most instances,
tendency to spontaneous improvement



The Burden of Stroke:

Arm paresis

- Treatment failure in many instances (solely cortical representation)



Mirror Therapy

Robot-assisted Therapy

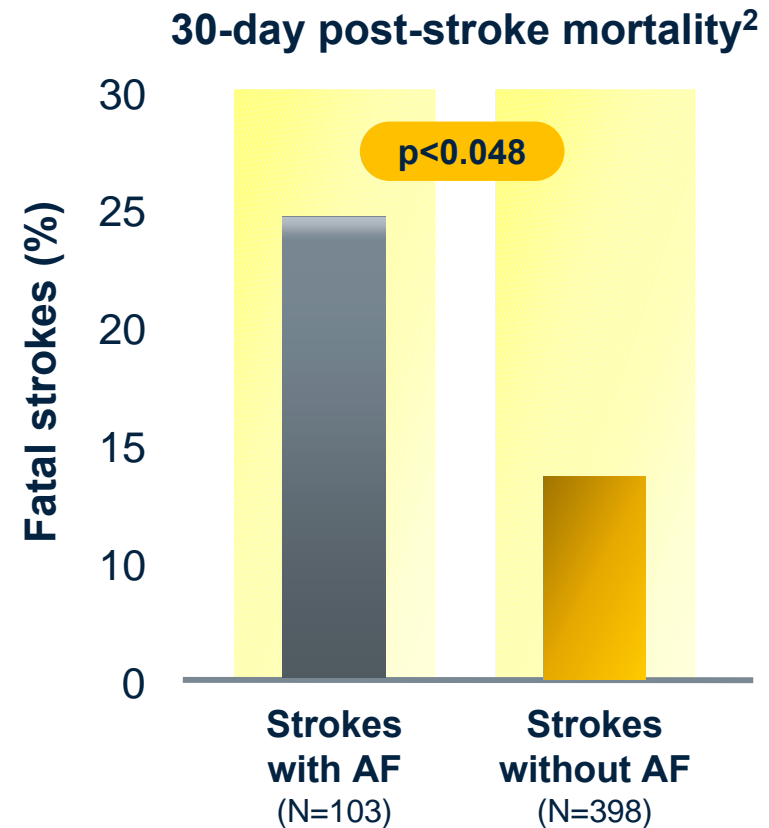
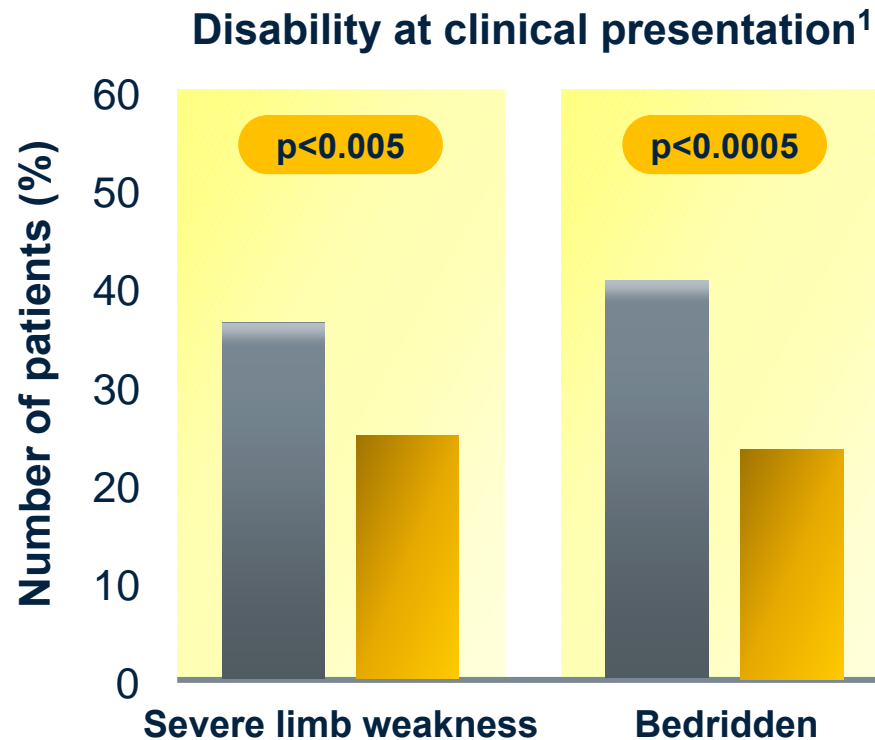
Constraint Induced
Training



AF-RELATED STROKES ARE ASSOCIATED WITH GREATER DISABILITY AND A HIGHER MORTALITY RATE



■ Strokes with AF (N=216) ■ Strokes without AF (N=845)



ECONOMIC BURDEN OF STROKE



The American Heart Association estimates that the direct and indirect **cost of stroke in the US is \$65.5 billion¹**



A German Registry has shown that the overall first-year **cost of stroke per patient is €18,517²**



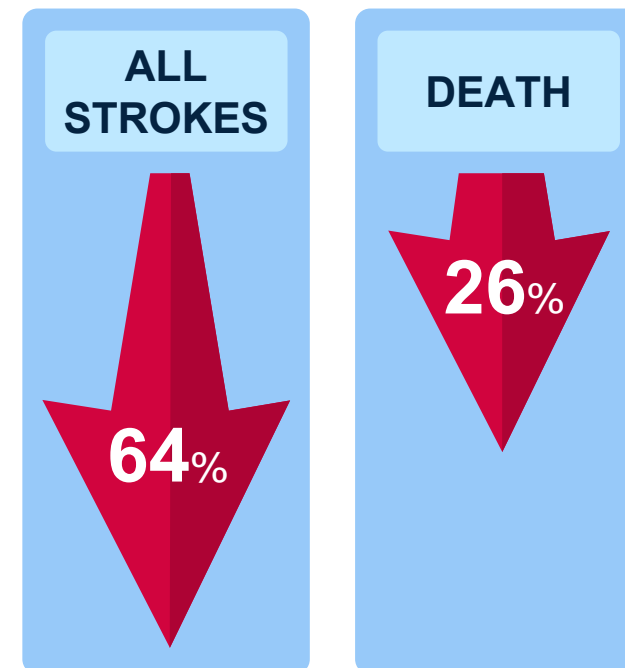
A 15% reduction in hospital admissions due to AF-related strokes in the UK would **save an estimated £30 million/year³**



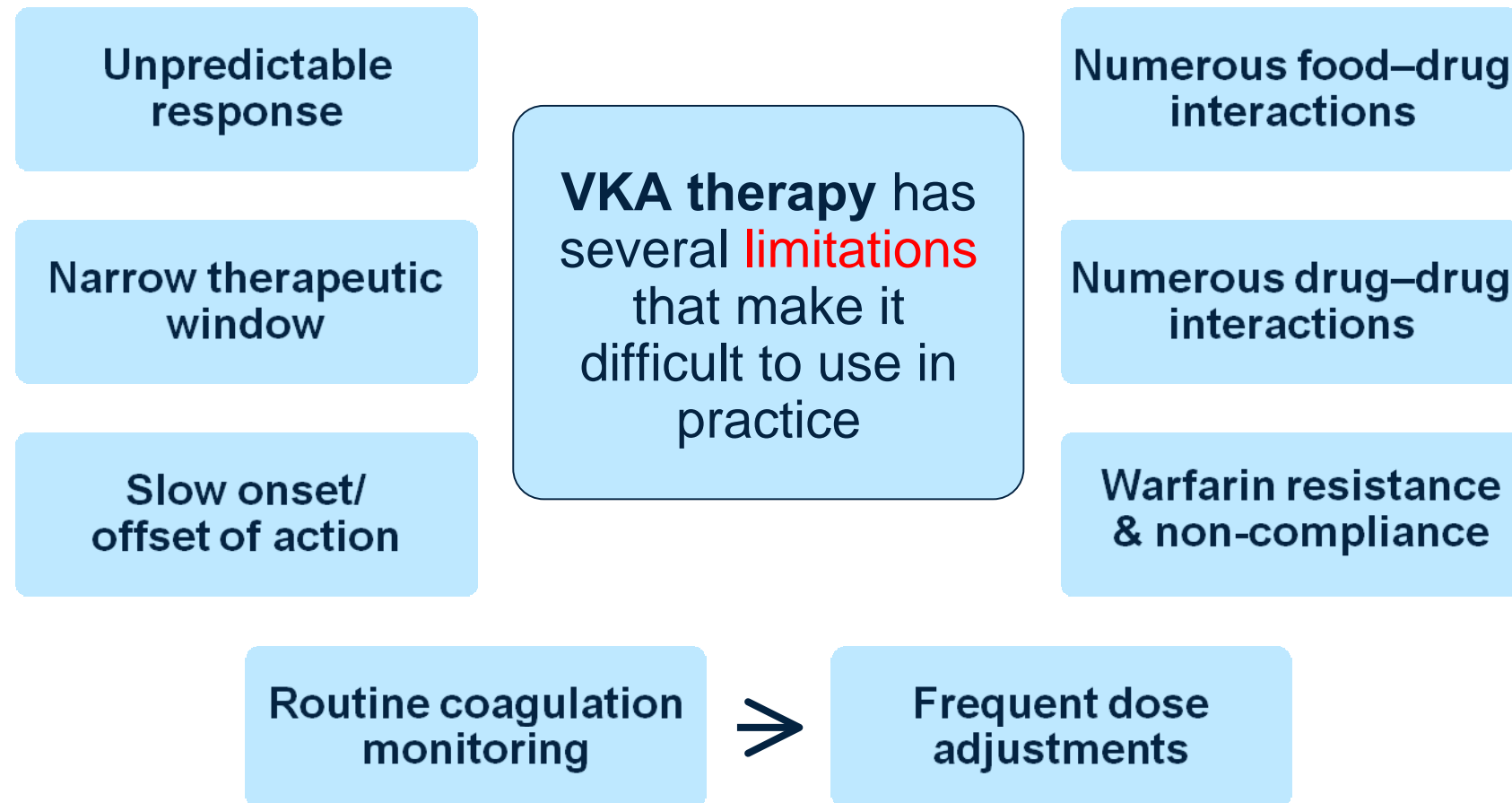
AF-RELATED STROKE IS PREVENTABLE

- Effective stroke prevention is the most important element of treatment for patients with AF¹
- Two-thirds of strokes due to AF are preventable with appropriate anticoagulant therapy with a vitamin K antagonist (VKA) (INR 2.0–3.0)²
- A meta-analysis of 29 trials in 28,044 patients showed that adjusted-dose warfarin results in a reduction in stroke rate and in all-cause mortality²
- VKAs are associated with complications, such as increased bleeding risk
 - **Anticoagulation with a VKA is recommended for patients with more than one moderate risk factor¹**

EFFECT OF VKA COMPARED WITH PLACEBO



LIMITATIONS OF VKA THERAPY



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INR = International normalized ratio; VKA = vitamin K antagonist

Ansell J, et al. *Chest* 2008;133:160S-198S. Umer Ushman MH, et al. *J Interv Card Electrophysiol* 2008;22:129-137.

Nutescu EA, et al. *Cardiol Clin* 2008;26:169-187.

CONCLUSIONS

- AF is the most common cardiac arrhythmia
- Prevalence of AF is increasing
- AF is a costly condition
- Stroke is likely to be more severe and fatal in patients with AF compared with those without - AF patients that survive a stroke have poorer outcomes and increased and persistent disability
- Effective stroke prevention is the most important element of treatment for patients with AF
- New treatments that reduce the incidence of stroke in AF have the potential to improve outcomes and reduce total care costs.

