Safety
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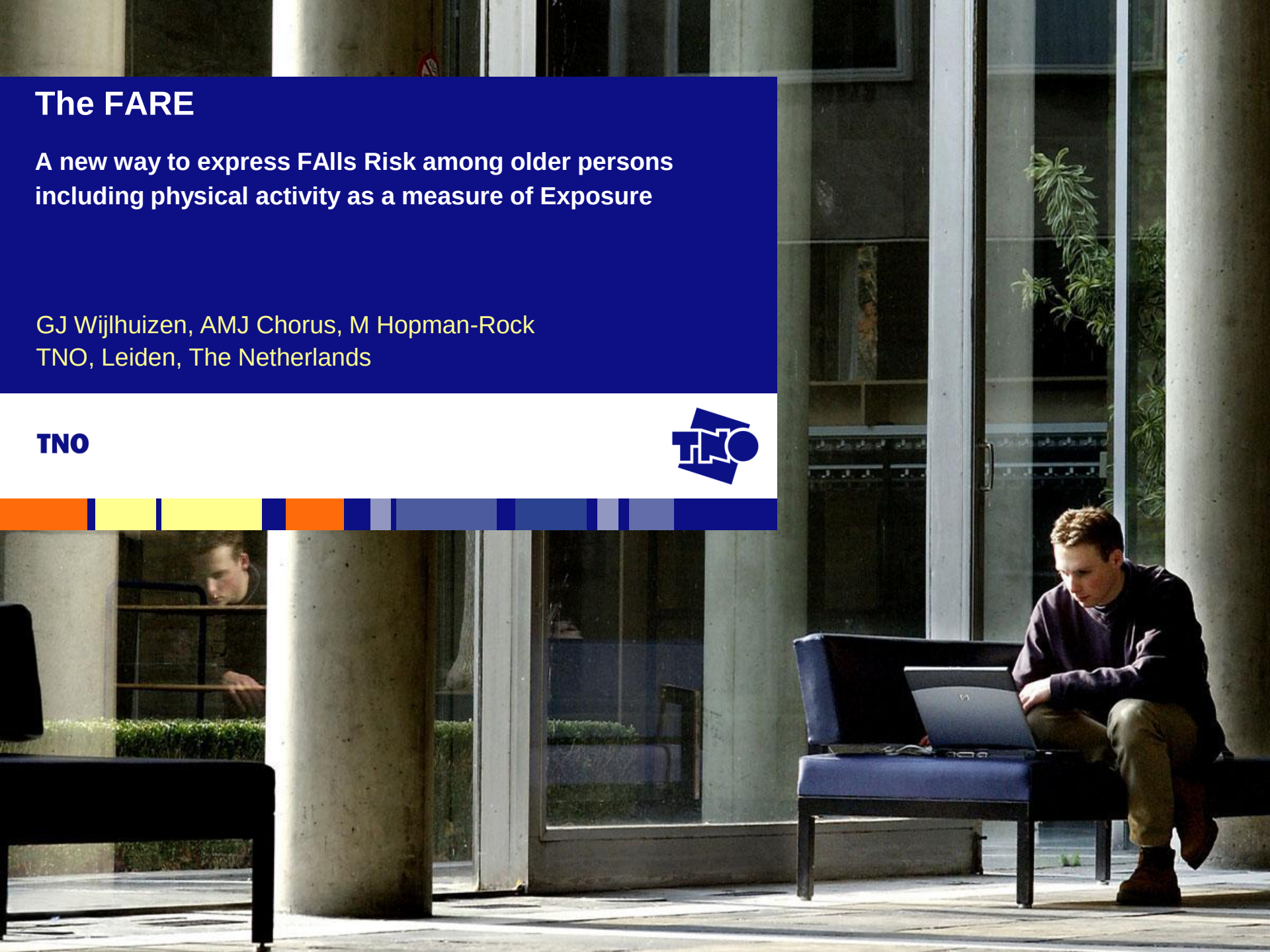
The FARE

A new way to express FAlls Risk among older persons including physical activity as a measure of Exposure

GJ Wijlhuizen, AMJ Chorus, M Hopman-Rock
TNO, Leiden, The Netherlands

TNO



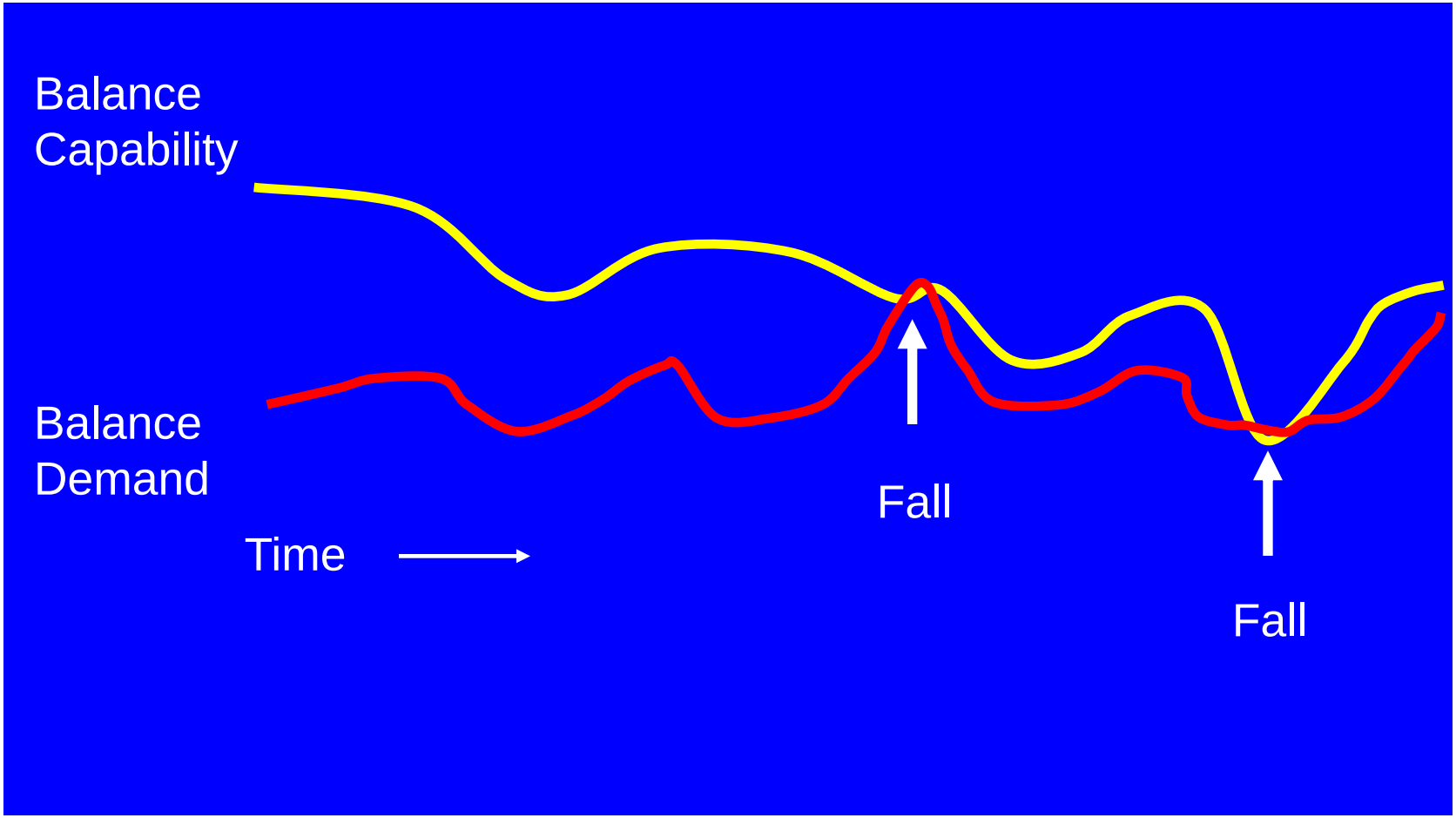
Falls among older persons (55+) in the Netherlands

- Each year:
  - 88.000 Treatments at ER
  - 32.000 Hospital admissions (78% fractures)
  - 1.800 Fatalities
  - High falls injury risk among older persons 75+
  - About 30% older persons fall at least once
  - Direct medical costs: 550 million Euros (700 million USD)

General assumption

- Persons will not fall if:
  - their capability to control balance
  - is greater than
  - the demands put on it.

The occurrence of a fall; capability-demand



Safety of system or person

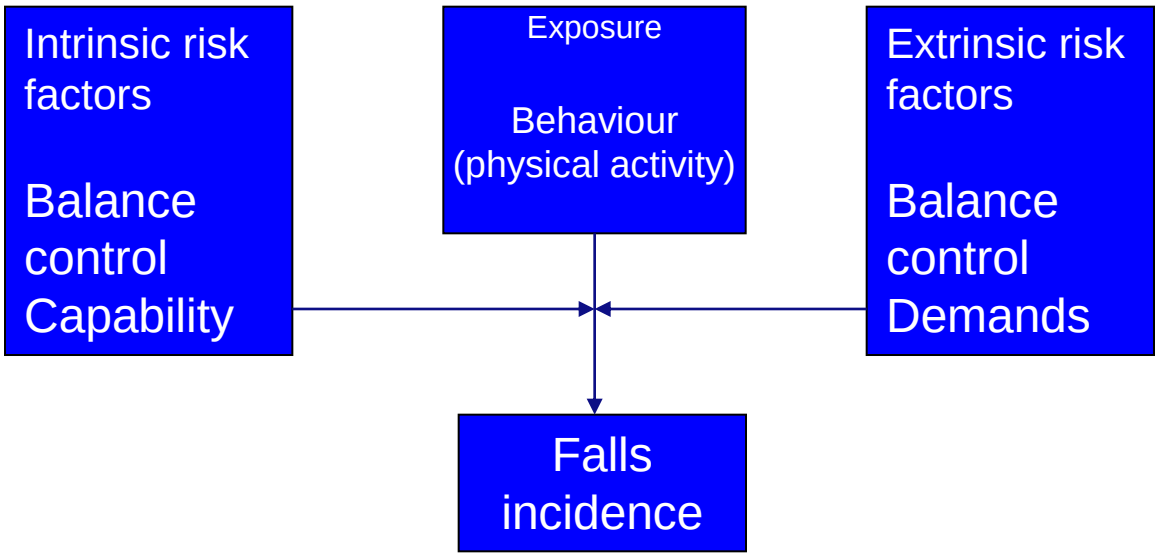
- Product of:
  - Probability of having an accident/injury given a unit of exposure
  - Observed level of exposure

(Hauer, Accid Anal Prev, 1982; Qin et al, Accid Anal Prev, 2004)

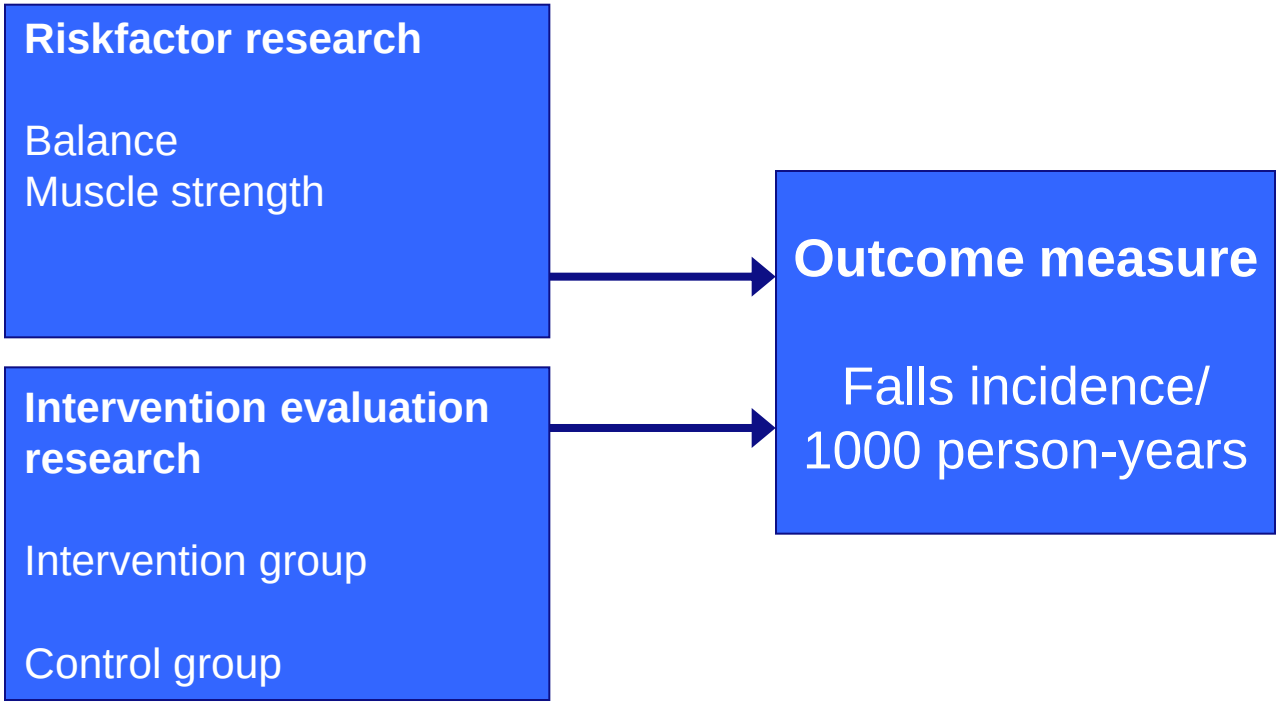
Concept of exposure related to falls

- Exposure is zero if a person does not move (PA level =0)
- Exposure increases if PA level >>0

Exposure as a precondition for falls



Falls research models
do not take exposure into account



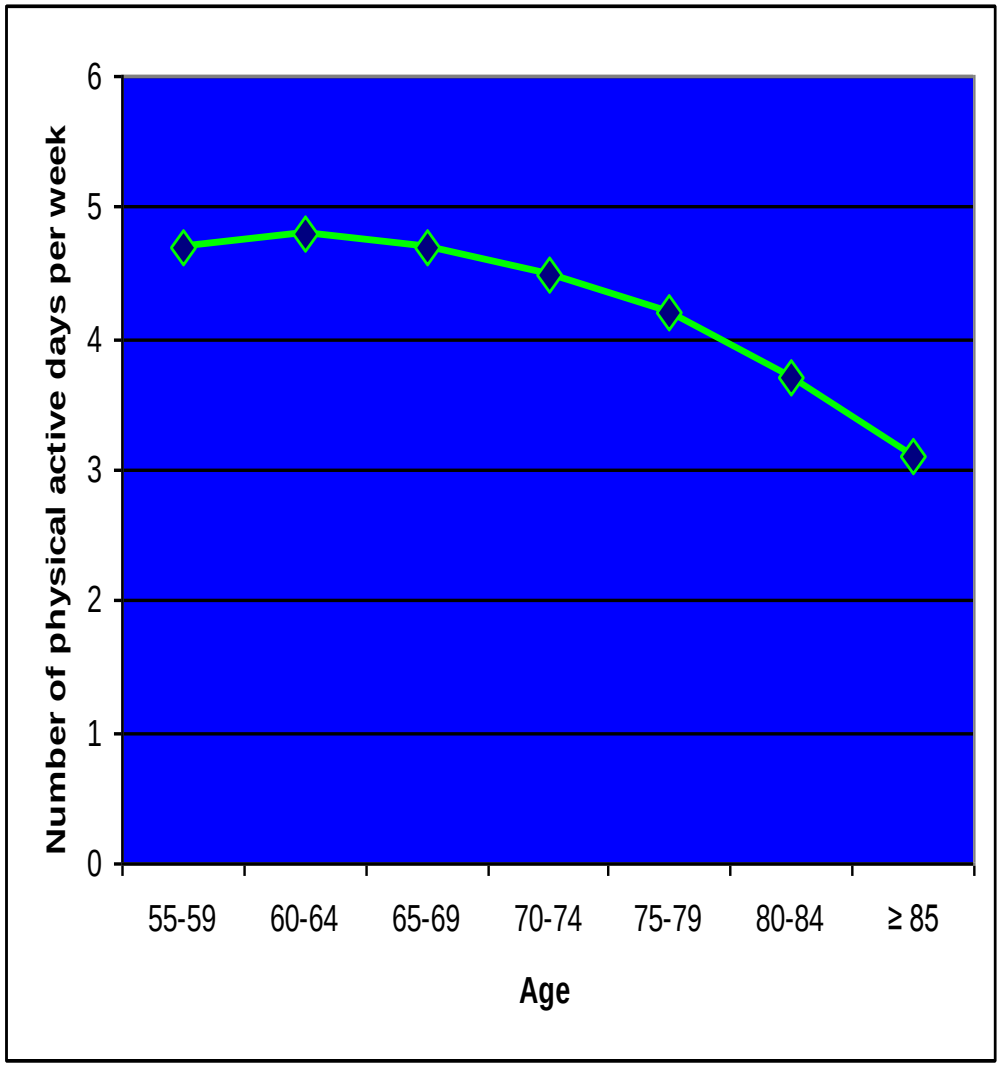
Is exposure important in falls research?

- No, if:
  - There are no differences in exposure among older persons
  - If exposure measures show no relation with falls

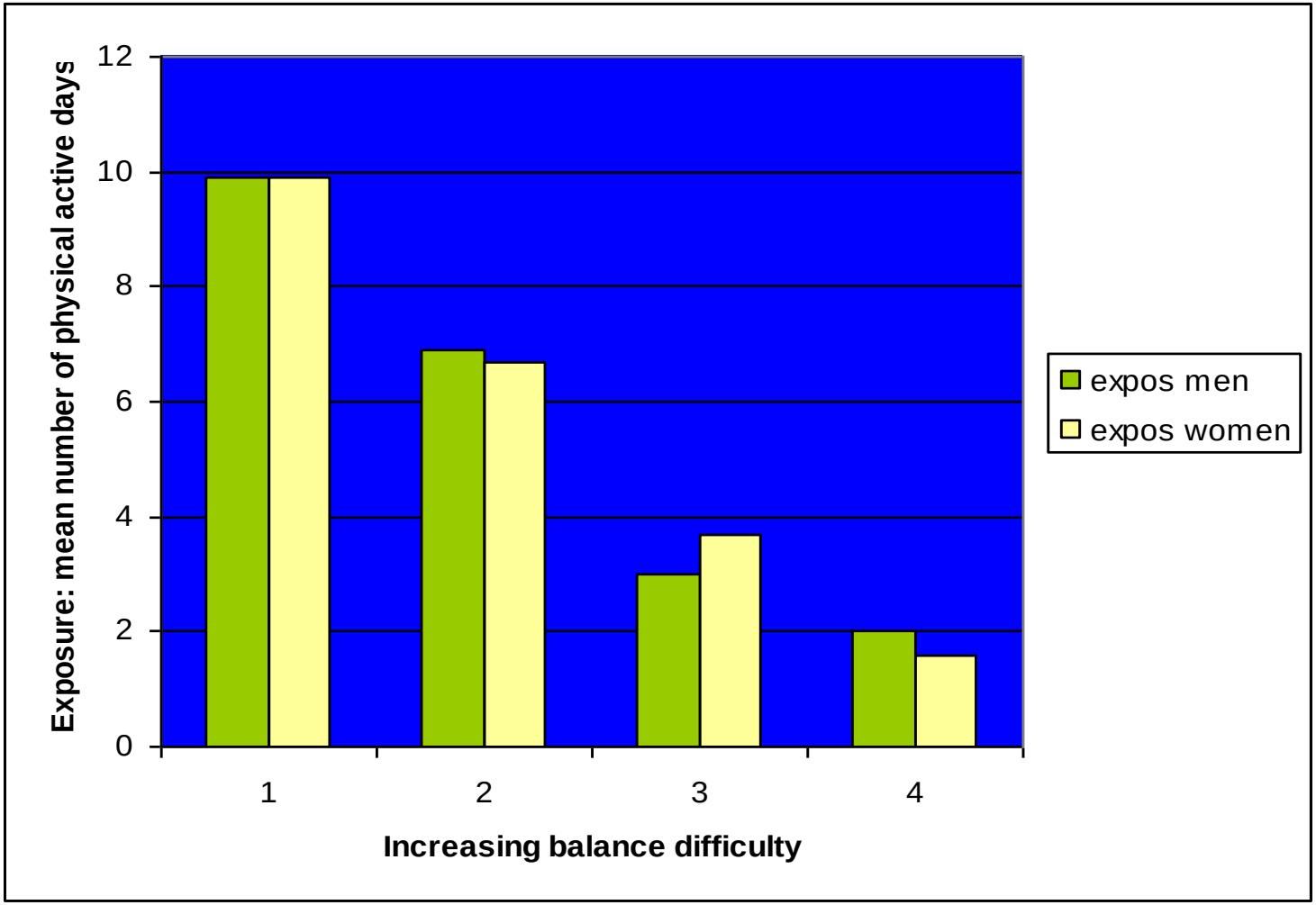
Any differences in exposure among older persons?

- Subjects were asked for both summer and winter about:
- The number of days during an average week at which they were physically active for at least 30 minutes at a moderate level (at least as heavy as brisk walking or bicycling).

Number of physical active days per week by age (N= 21.020) IPAN data 2000-2005

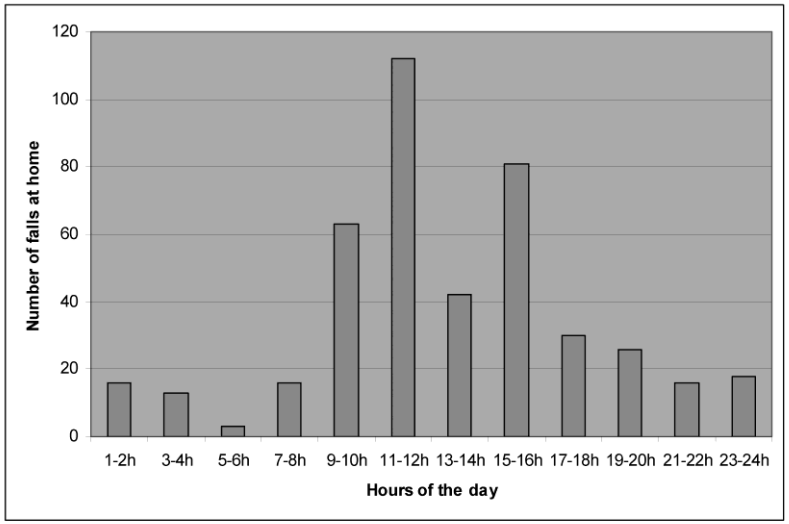


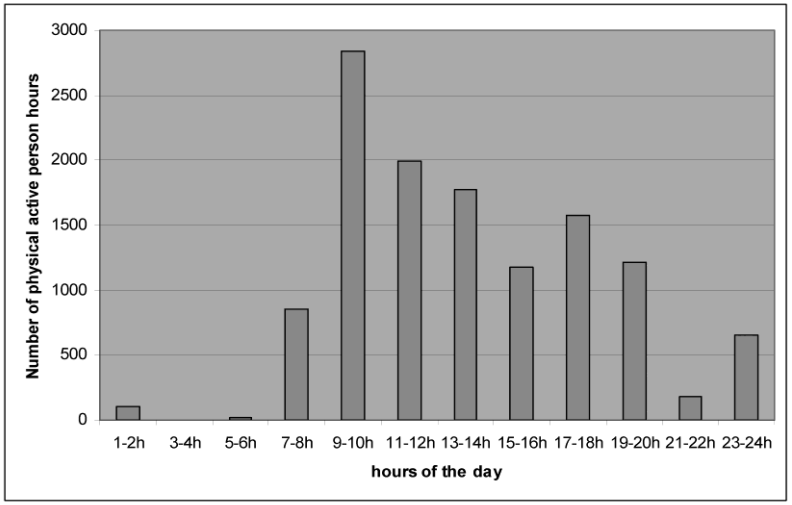
Exposure by balance difficulty among community dwelling older persons (70+), N=704



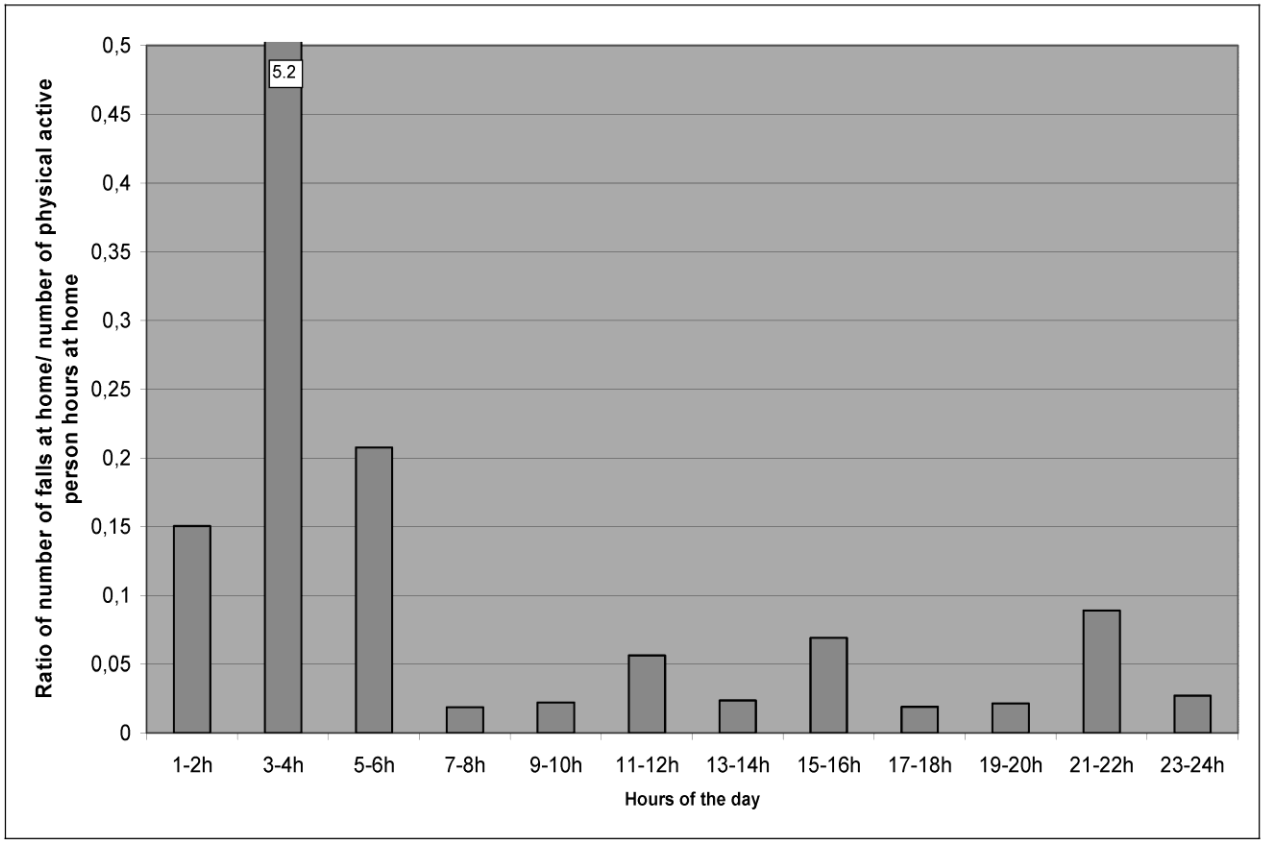
Wijlhuizen et al, Prev Med, 2010

Distributions of falls at home (n=305) (top) and physically active person-hours at home (n=459) among community dwelling older persons 65+





Distribution of ratio falls/ per active person-hours at home (Spearman cor = .89)



Wijlhuizen et al, Prev Med, 2008

Conclusions

- There are large differences in exposure (PA) among older persons
- Exposure (PA) measure shows strong relation with falls
- Therefore:
- We should take exposure into account in falls research

Wijlhuizen et al, Int J Inj Control Saf Promot, 2007

Wijlhuizen et al Prev Med, 2007, 2008a,b, 2010.

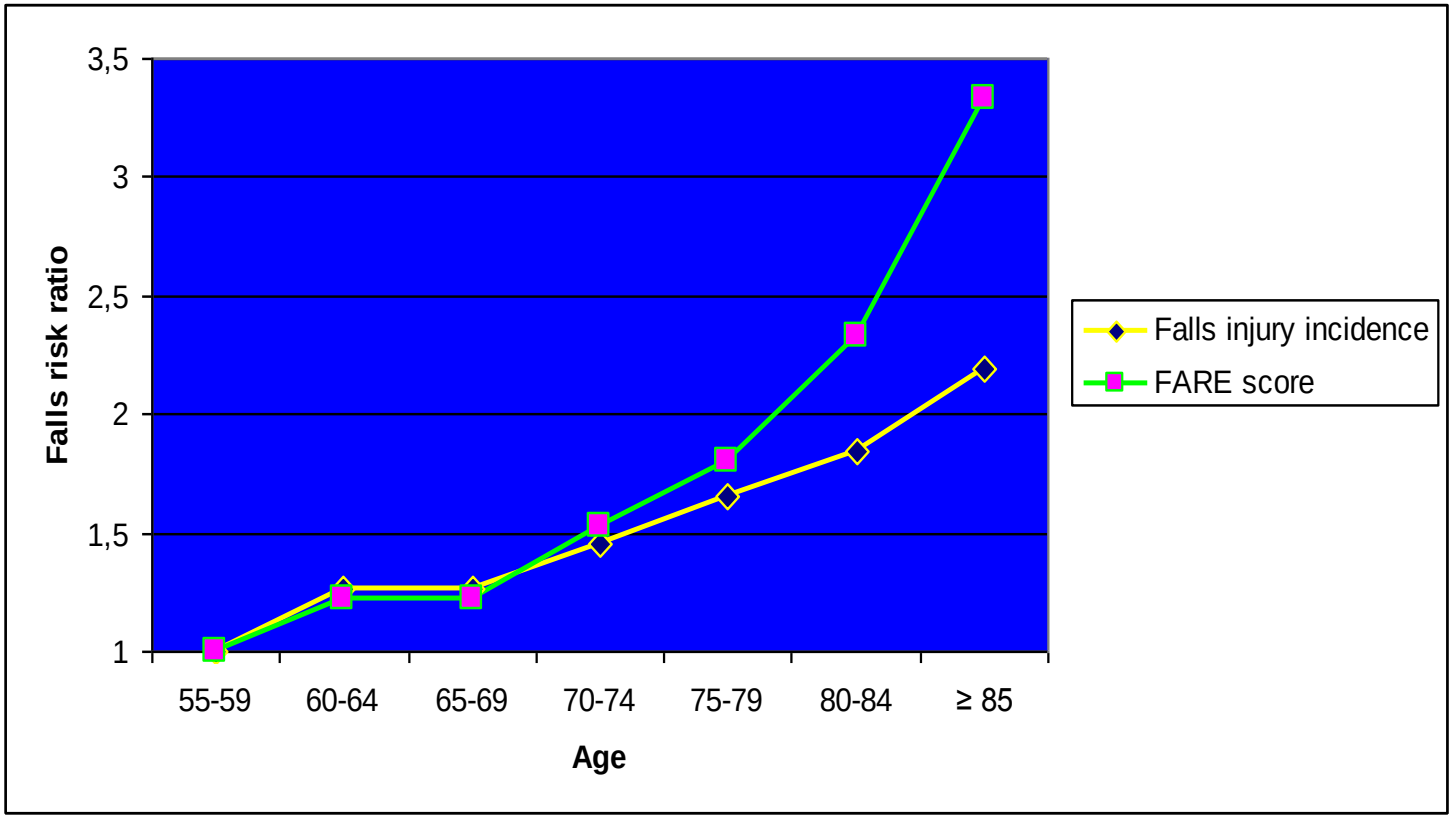
The Falls risk by Exposure (FARE)

- Common expression of falls risk:
  - Number of falls/ 1000 person-years

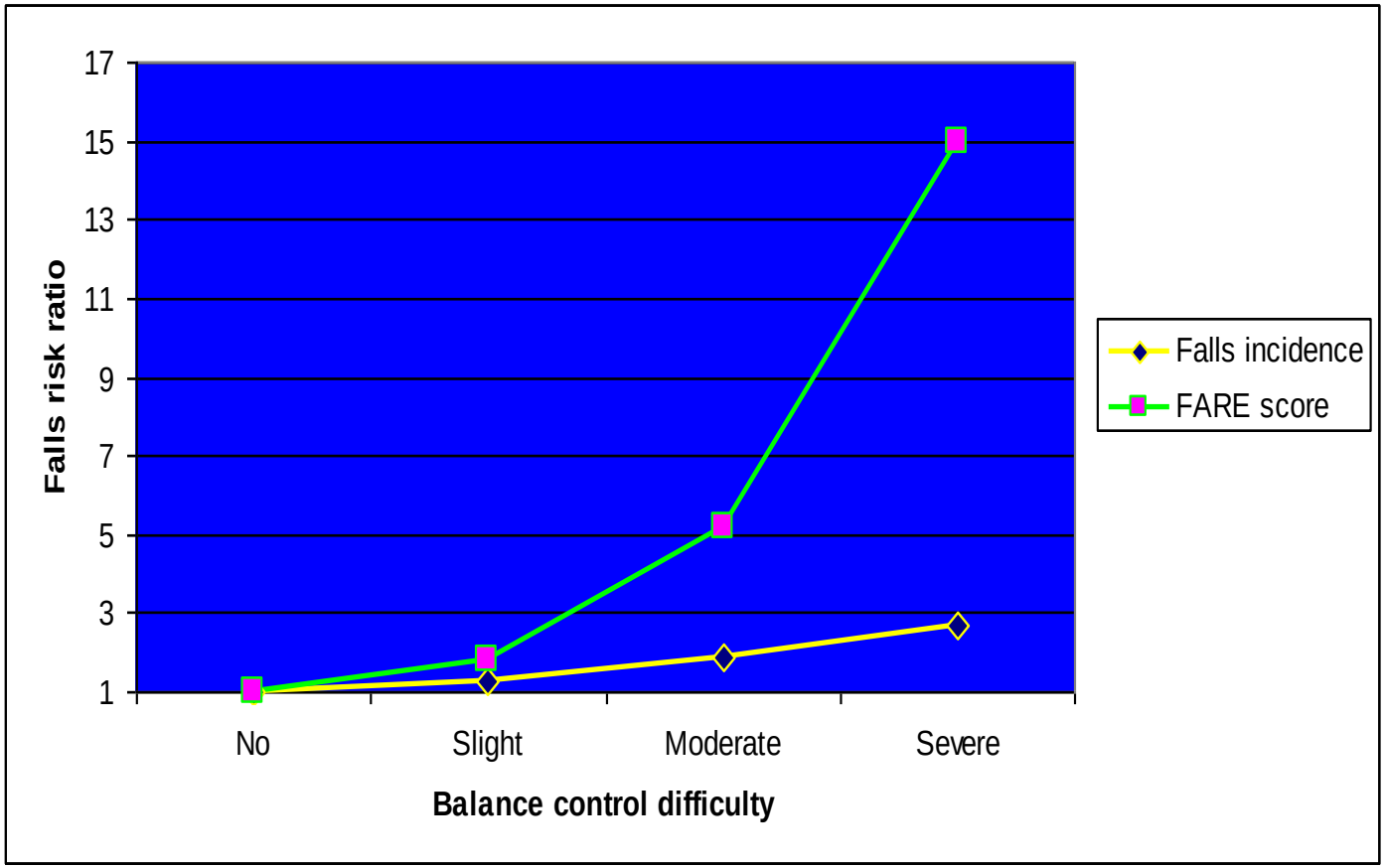
- The FARE:
  - Number of falls/ 1000 physically active person-days

Wijlhuizen et al, Prev Med, 2010

Falls injury risk ratio by age expressed by Incidence/FARE (N= 21.020) IPAN data 2000-2005



Falls risk ratio by level of Balance control difficulty expressed by Incidence/FARE (N=704)



Wijlhuizen et al, Prev Med, 2010

Final conclusions

- We should take exposure into account in falls research
  - Because:
    - There are large differences in exposure (PA) among older persons
    - Exposure (PA) measure shows strong relation with falls
    - Actual falls risk is generally strongly underestimated compared to the FARE
- We do not have an exposure measure which is agreed upon

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