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INTRODUCTION

Fractures are a clinically relevant endpoint of osteoporosis. Due to the "greying" of (industrialized) societies the incidence of osteoporosis and fragility fractures is expected to be increasing. These fractures are associated with increased morbidity, reduced quality of life and increased mortality.

CONCLUSIONS

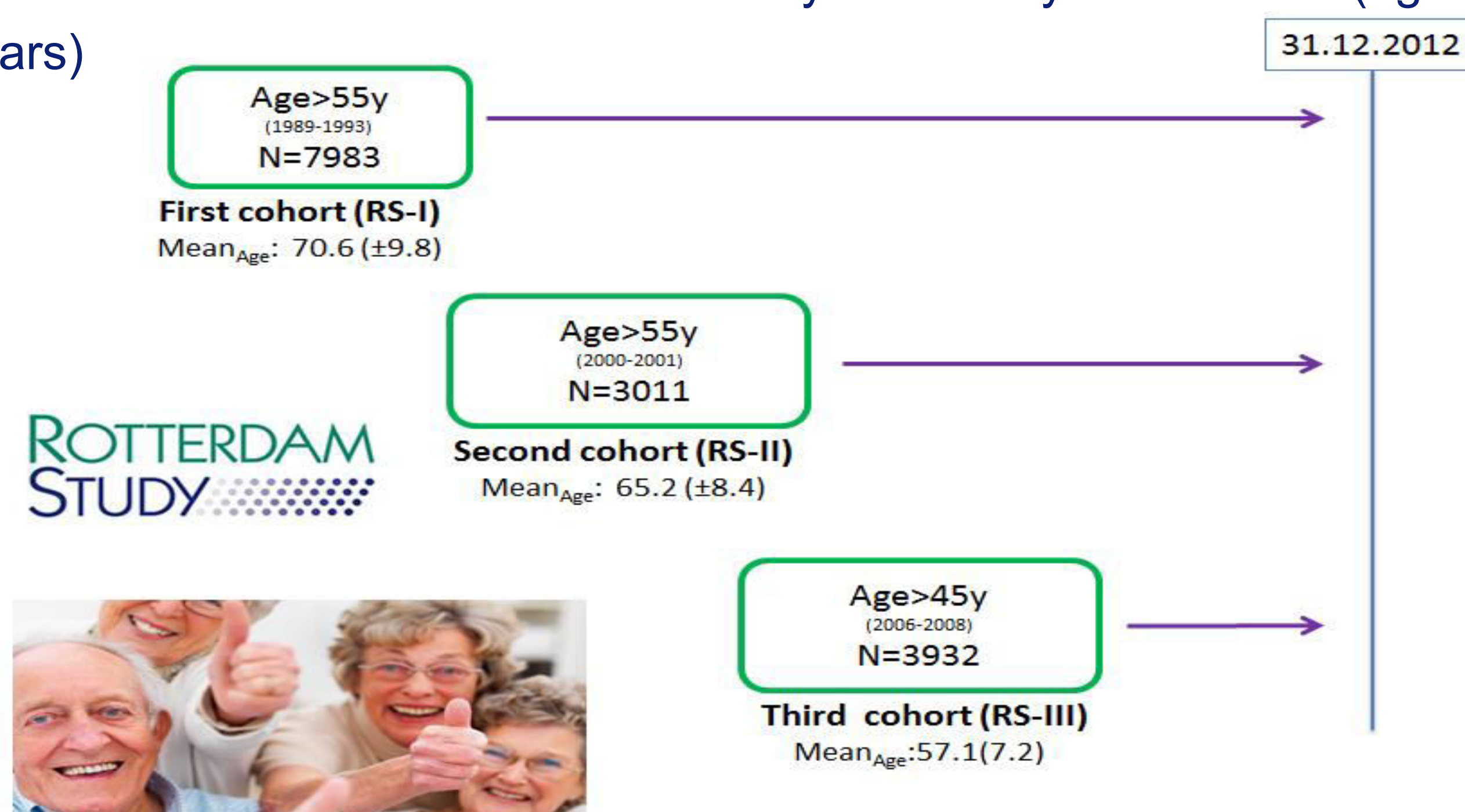
The incidence of non-vertebral fractures seems to be increasing in time increases with a large fraction of the population fracturing above the BMD threshold of osteoporosis. Combining additional fracture risk assessment tools with BMD remains a need in order to facilitate the implementation of preventative strategies that can decrease fracture incidence.

AIM

- To investigate: 1) if the incidence of non-vertebral fractures (overall and site specific) has changed over time in a population-based setting
- 2) the relation between incident fractures and osteoporosis or osteopenia status assessed by bone mineral density (BMD) at baseline

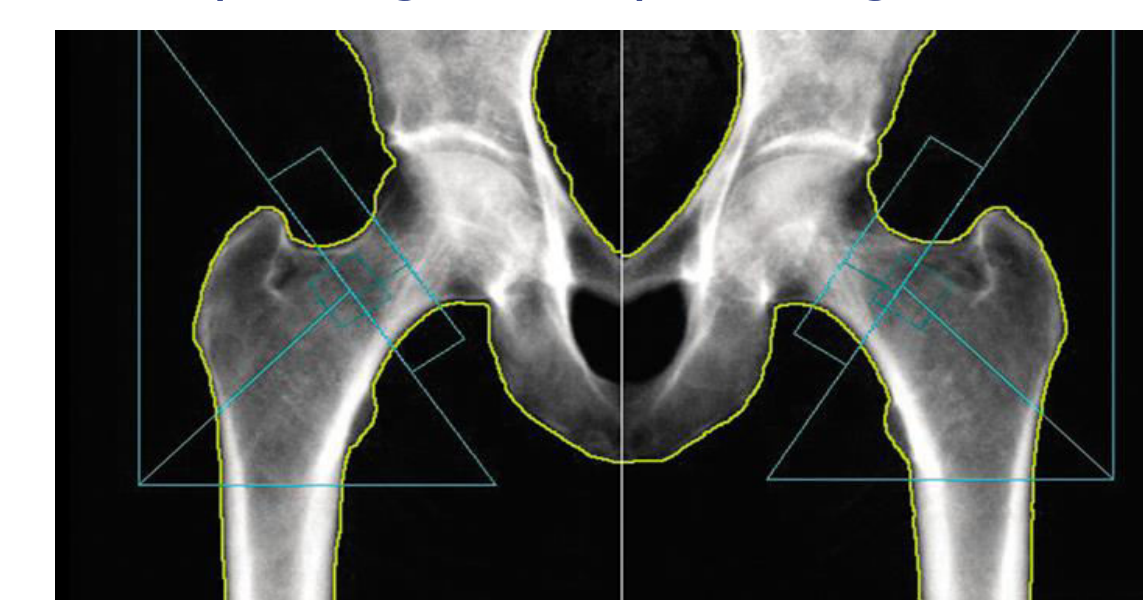
STUDY POPULATION

- The Rotterdam Study is a prospective population-based study of the determinants of disease and disability in elderly individuals (age > 45 years)



METHODS

- Fracture events were obtained from general practitioners (GPs) in the research area and/or hospital records between 1989 and 2011.
- Incident non-vertebral fractures were assessed in 14,619 men and women, age ≥45 years, during a median follow-up of 11.7 (SD±6.2) years (median follow-up: first cohort=14.5, round-two=12.0, round-three=5.6 years).
- In the first cohort, fracture incidence rates were compared across two 10 years periods (1989-2000 and 2000-2012) in individuals of age 70-80 years at the beginning of the period
- Femoral neck BMD was measured at baseline (using DXA) and gender-specific T-scores (NHANES) were calculated



RESULTS

In total, 3,981 fracture events were observed, where hip (21.3%), wrist (19.3%) and proximal humerus (9.1%) fractures were the most frequently occurring in men and women (other type of fractures 50.3%). The incidence rate for first non-vertebral fracture was 21.4 per 1000 person years.

Figure 1. Site-specific incidence rate of first fragility fracture per 1000 person years in the Rotterdam Study (1989-2012 follow-up)

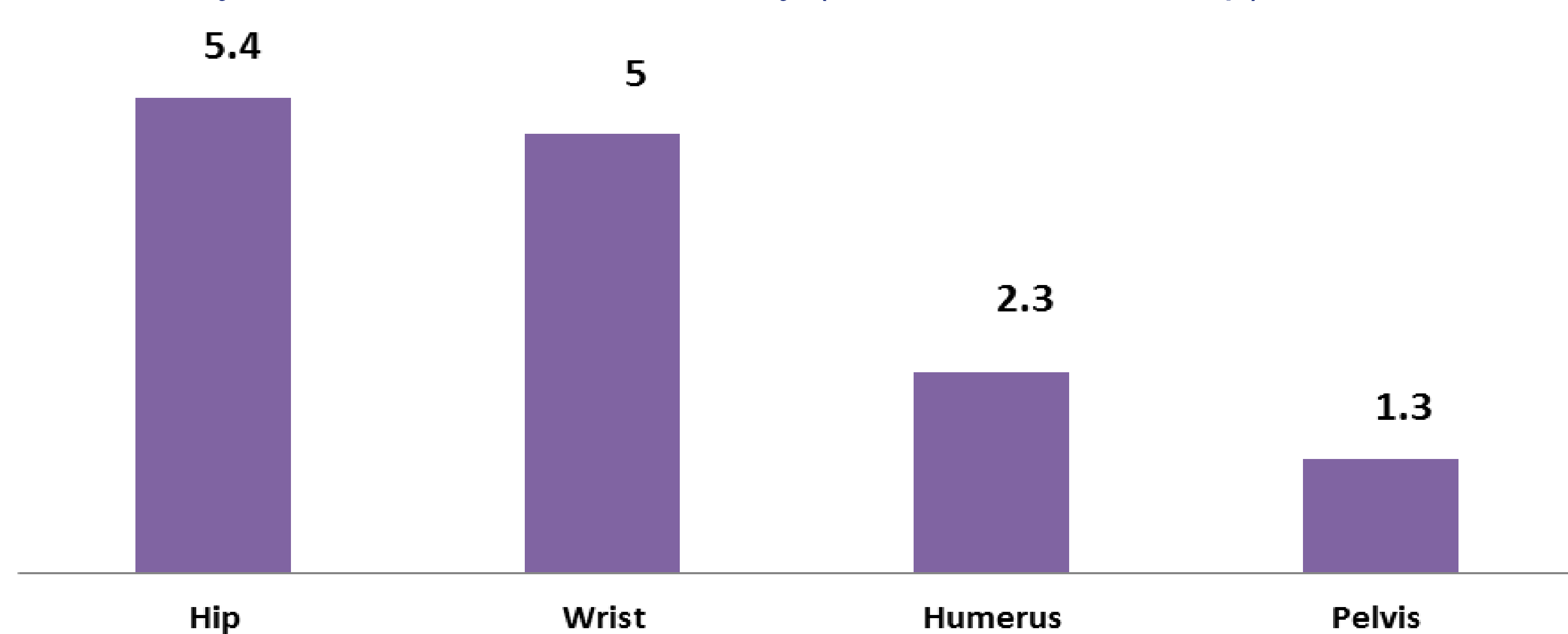
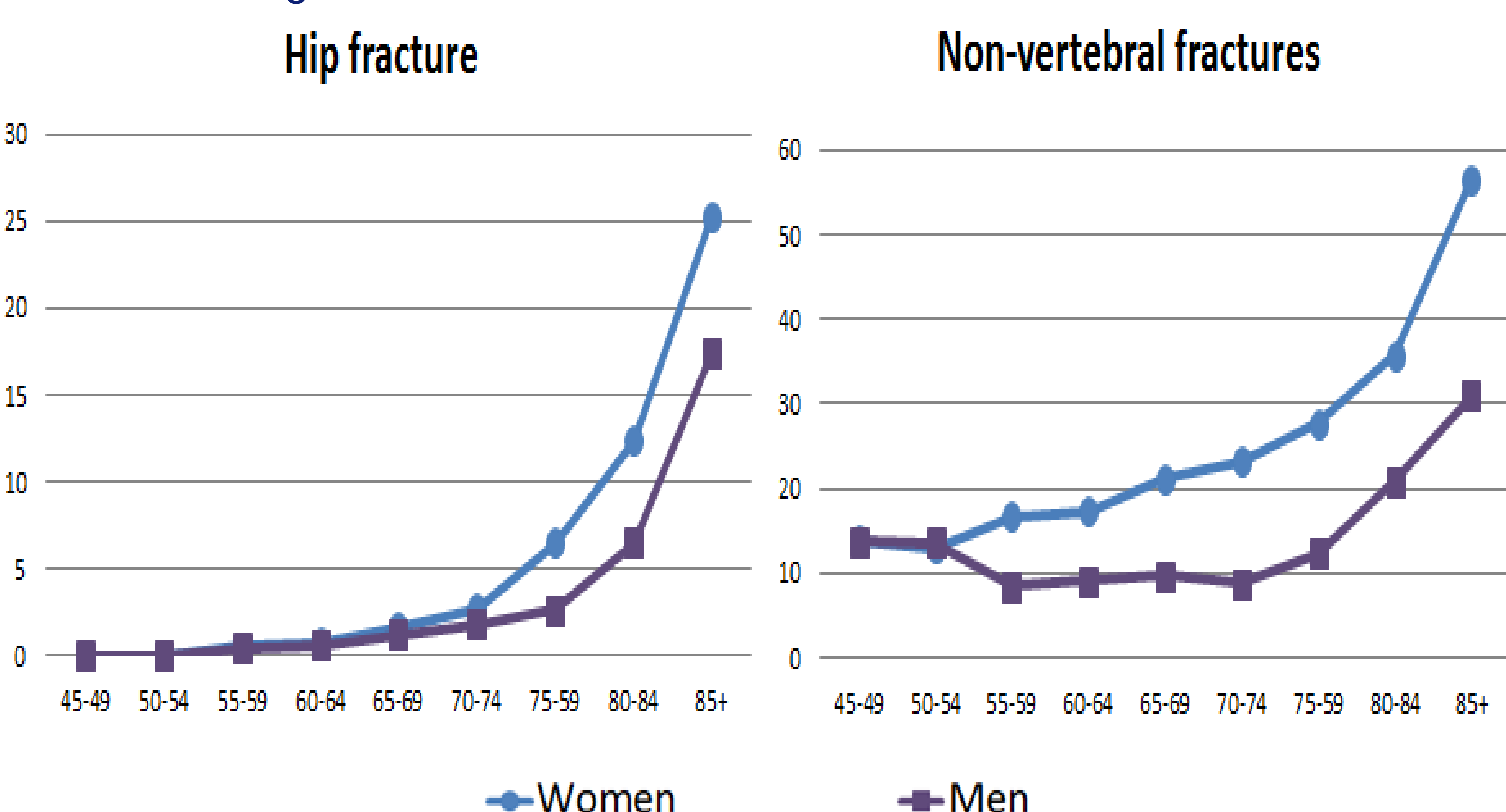
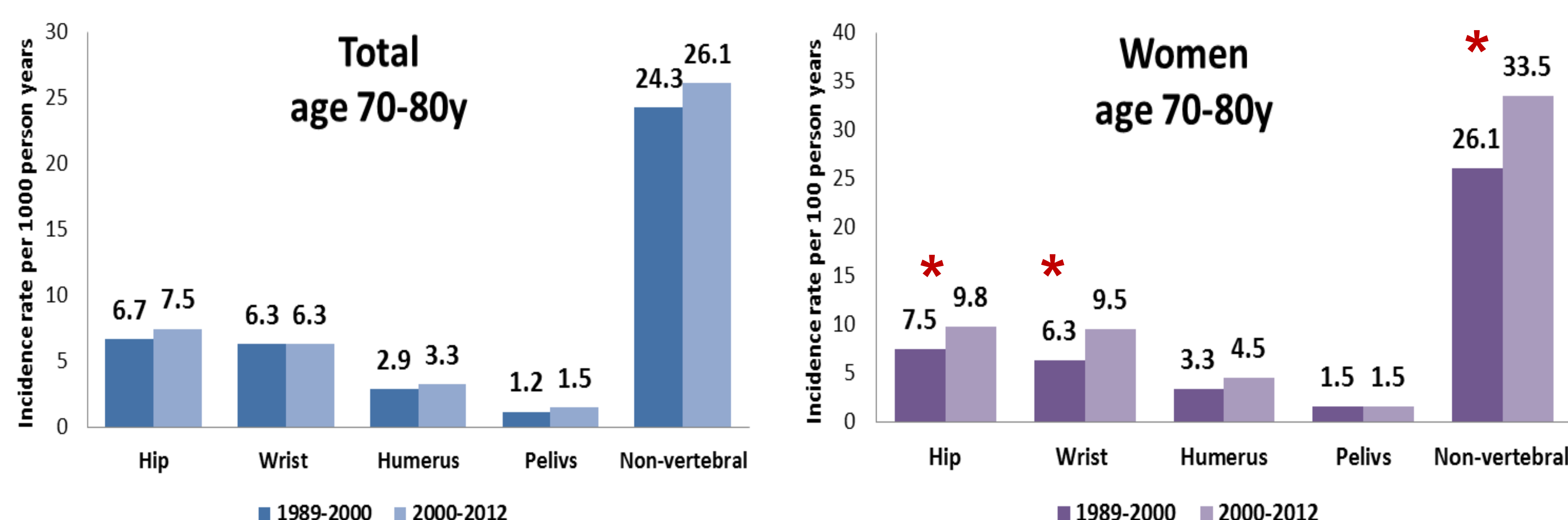


Figure 2. Fracture incidence per 1000 person years by 5-year age categories



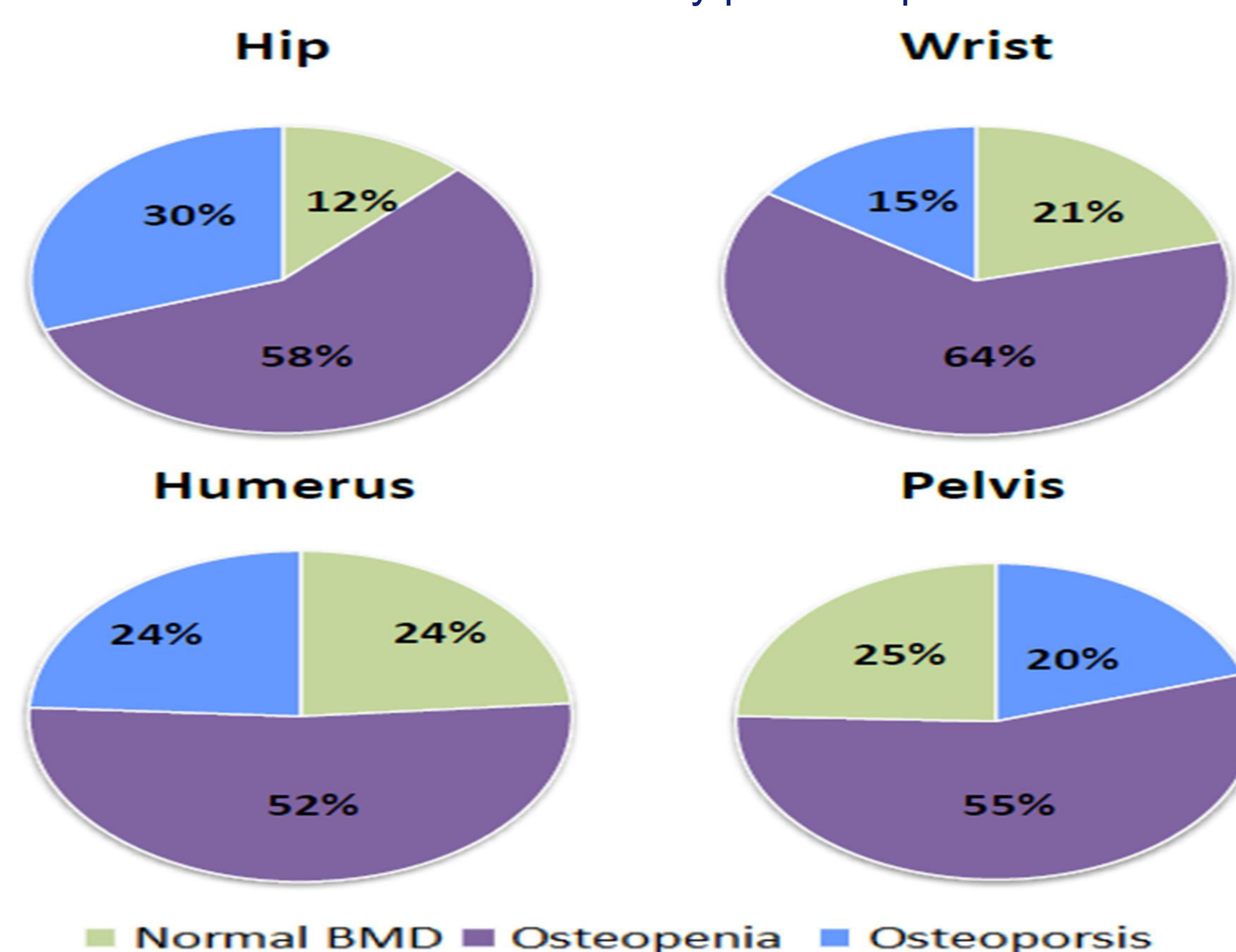
In both men and women, the incidence of hip and non-vertebral fractures increases exponentially with age. The exponential increase in (particularly hip) fracture incidence occurs at the age of 70-75 with a peak at the age of 85 years.

Figure 3. Incidence of vertebral fractures observe an increase in time



When comparing participants of the same age (70-80 years) at the beginning of the follow-up period, particularly in women there was significant (*) increase in the incidence rate of hip, wrist and non-vertebral fractures.

Figure.4 Distribution of bone mineral density per site specific fracture



During follow-up a large fraction of the population fractured above the BMD threshold of osteoporosis (gender specific T scores) assessed at baseline.

A reduction of one SD in BMD is associated with 1.6 increased risk (hazard) of any type of non-vertebral fractures and 2.6 increased risk of hip fracture.