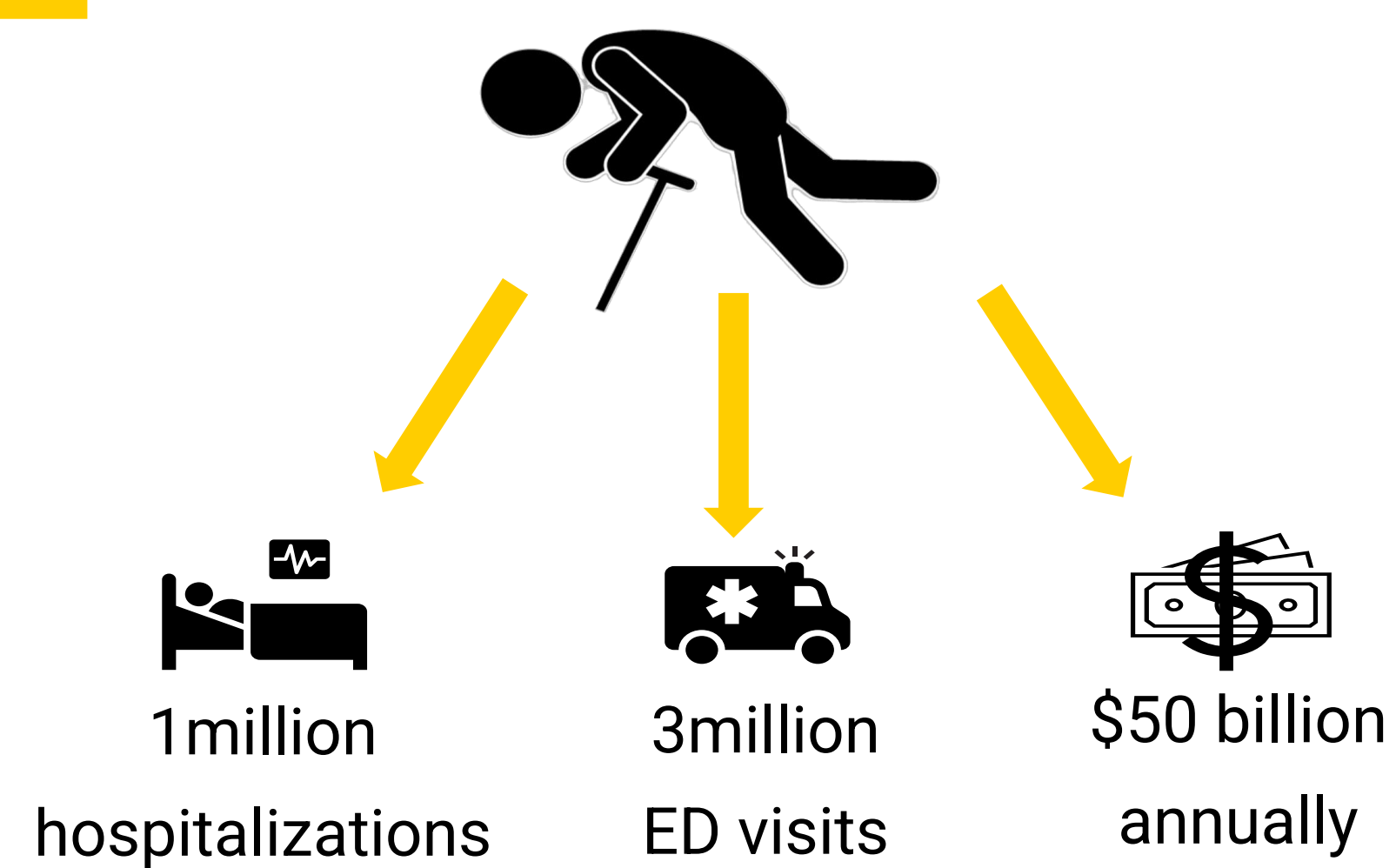


# Effect of Anti-hypertensive Use on Fall Risk

Blessing E. Alabi (B.Pharm), Cole G. Chapman (PhD)

Health Services Research, College of Pharmacy, University of Iowa

## Introduction



- Elderly falls cause severe debilitation and mortality each year (>1 in 4/yr).
- Several factors contribute to falls; age, morbidity and **medications**.
- Antihypertensives** have been associated with increased fall risk.
- One possible mechanism is through diastolic hypotension (DH) from the treatment of elderly systolic hypertension.
- DH results in **cerebral hypoperfusion** which causes **dizziness** and **syncope**, increasing fall risk.

### Study Objective:

- To evaluate how fall risk attributable to antihypertensive treatment varies by age and blood pressure levels at initiation of treatment.

## Method

- Design:** retrospective cohort study with pre/post measurements and comparison group
- Data:** electronic medical records from a large midwestern academic medical center (2014 – 2022)
- Sample:**
  - Exposed group:**  $\geq 1$  prescription for antihypertensives within 2016–2020 (index date)
  - Comparison group:**  $\geq 1$  outpatient visit within 2016–2020 (index date)
- Stratified groups into three categories based on age at index (18–44 years, 45–64 years, 65+ years)
- Measured fall rates within 2years before and 2years after index

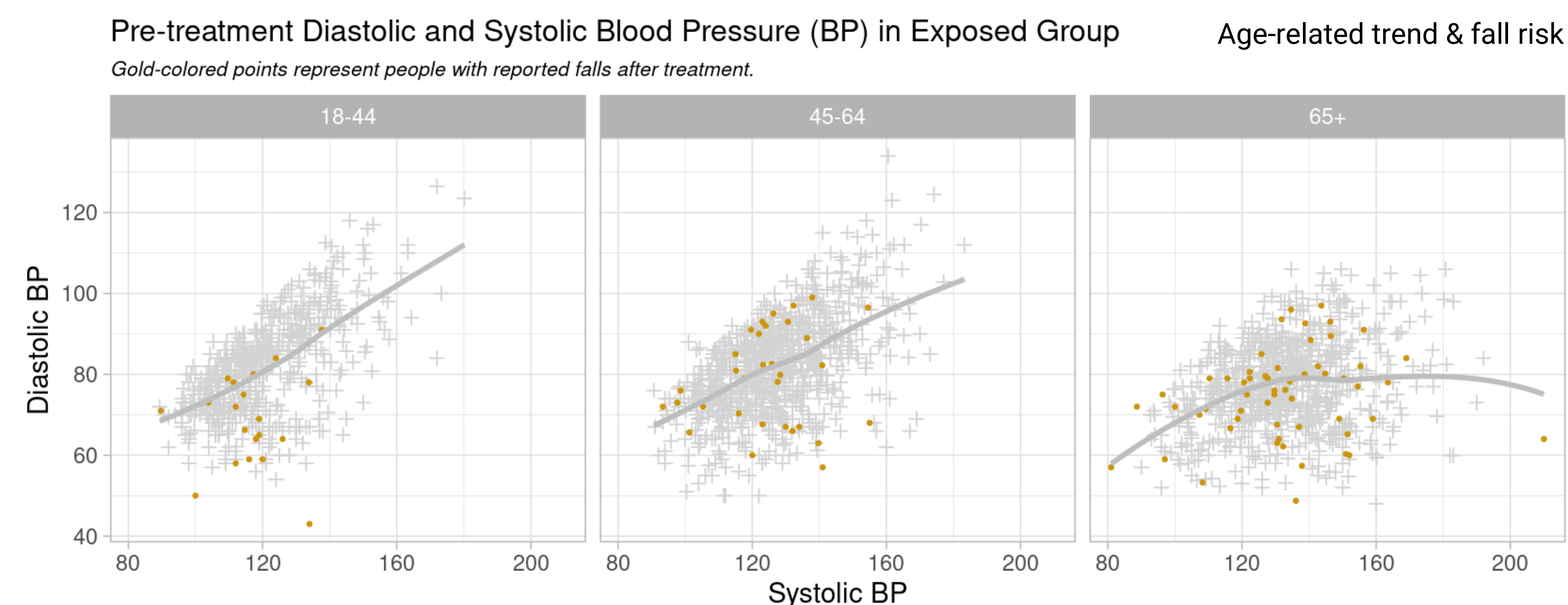
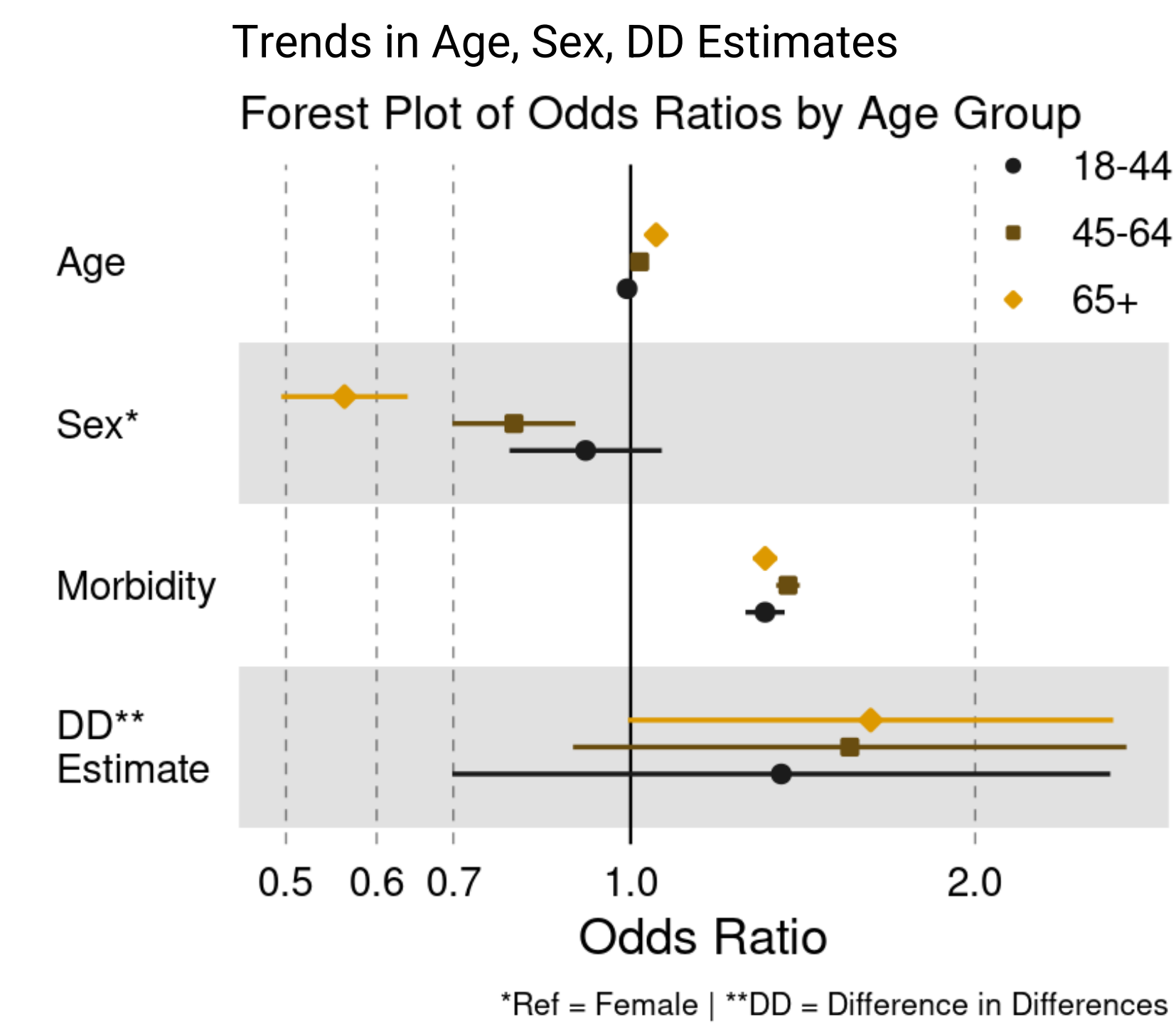
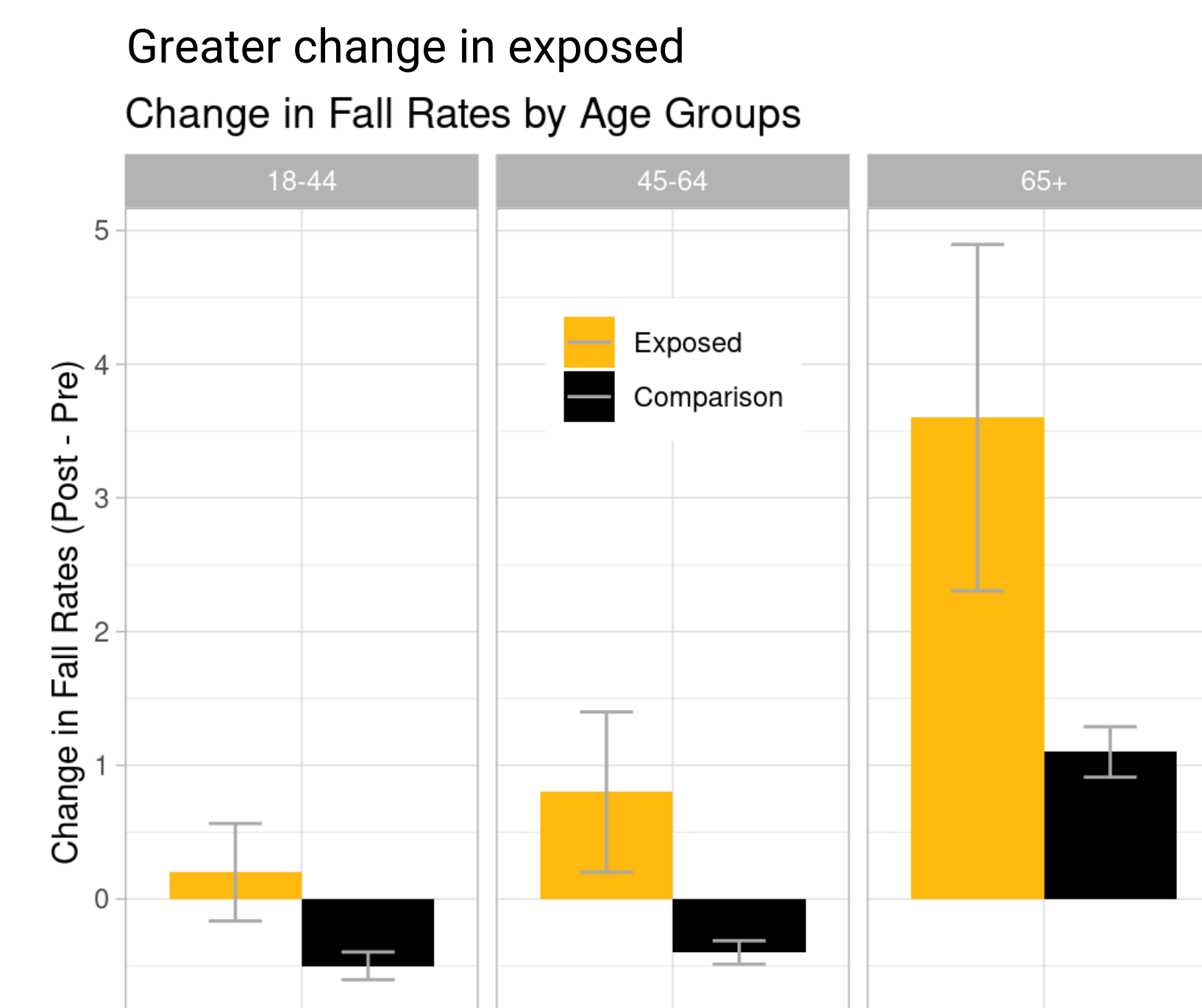
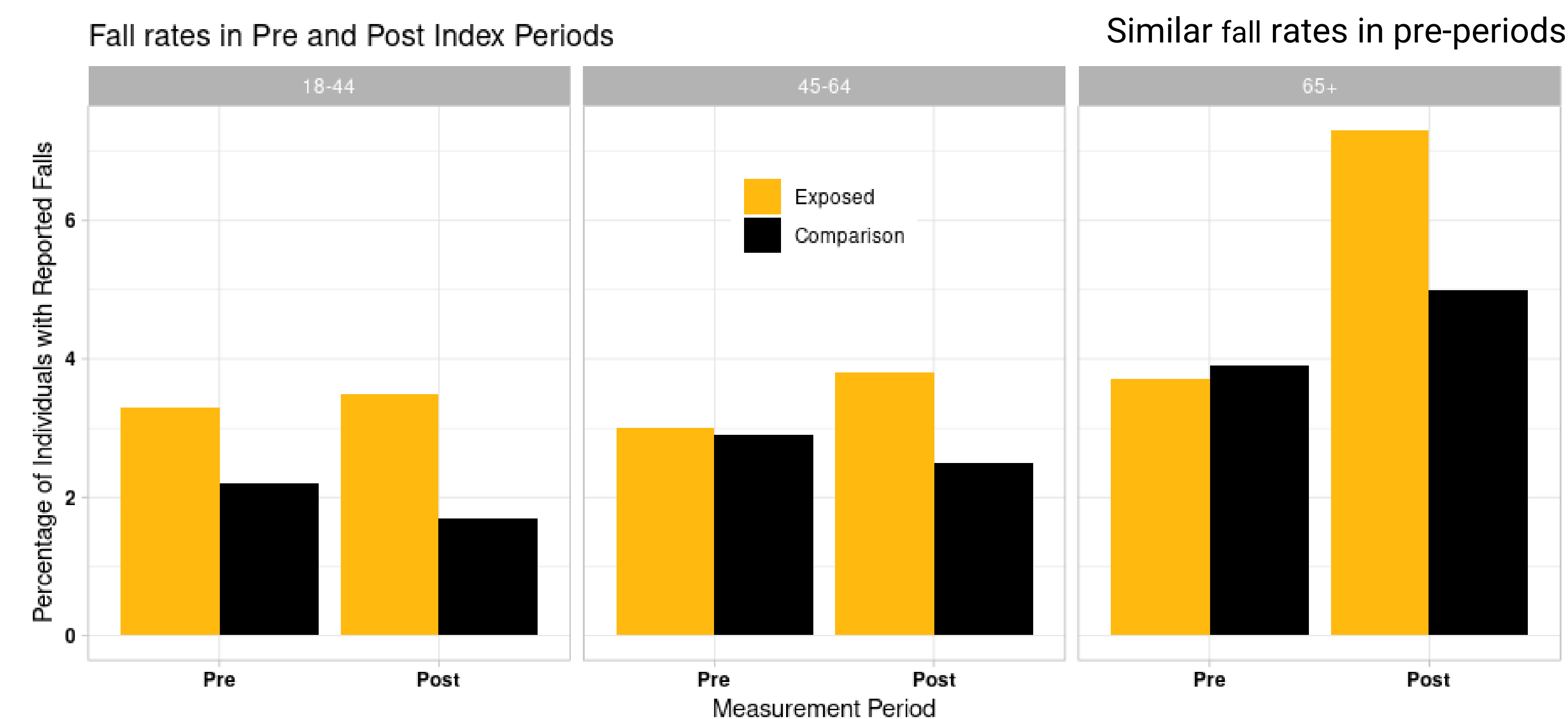
### Statistical Analysis:

- Difference-in-Differences** method was used to estimate the effect of antihypertensives on Fall risk.
- Covariates included in the model were age, sex and comorbidity count.
- All models were evaluated at 0.05 significance level.

$$fall = group + post_{index} + (group * post_{index}) + covariates + error$$

## Results

- The final cohort included **2,197** and **48,771** patients in exposed and comparison groups respectively.
- Exposed group: 26% were 18–44 years, 38% were 45–64 years, and 36% were 65+ years; while in the comparison group; 36%, 40% and 24% were 18–44, 45–64 and 65+ respectively.



## Discussion

- Fall rates** – there was increasing rate of increase in falls rates from pre to post periods across age subgroups of the exposed group. Across age strata in the comparison group, fall rates increased only in the oldest subgroup.
- Antihypertensives** maybe associated with increased fall risks in older adults, as seen from the difference-in-differences Odds ratio which neared statistical significance.
- Aging** – the effect of a 1year increase in age increased across age strata, with the greatest impact in older adults.
- Males had lower risk for falls compared to females, with the largest **sex-difference** in the oldest group. This reflects greater sex-related difference in strength and agility in older adults.
- The effect of increasing **morbidity** was similar across age strata.
- The oldest group had lower diastolic and higher systolic **pre-treatment BP** (greater pulse pressure) compared to other groups. Intensive treatment in this group may put them at risk for suboptimal diastolic pressure, elevating fall risk.

## Limitations

- Comorbidity burden** were greater for those in the exposed group than in the comparison group. While we adjusted for the number of comorbidities in our analysis, the degree of frailty from the interaction of these diseases may not have been captured in our model.
- Use of high fall risk **Over-The-Counter medications** may be greater in the exposed group than in comparison group as they had greater disease burden. This wasn't captured in the data and was therefore unaccounted for.
- Lifestyle differences** between exposed and comparison groups could impact fall risks. Examples are exercise, alcohol consumption and diet. This was not captured in the data and was therefore unaccounted for.
- Use of **secondary data** may limit the accuracy of pre- and post-index measurement of falls and other covariates.
- The **rate of reporting** of falls may not be similar in both groups (falls are generally under-reported).

## For enquiries

- Contact Blessing Alabi @ [blessing-alabi@uiowa.edu](mailto:blessing-alabi@uiowa.edu)