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Population effects of antihypertensive treatment: South Africa 1998-2017

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Disclosures

- I have no actual or potential conflict of interest in relation to this presentation.

Elevated blood pressure

> 60000 Deaths

Background

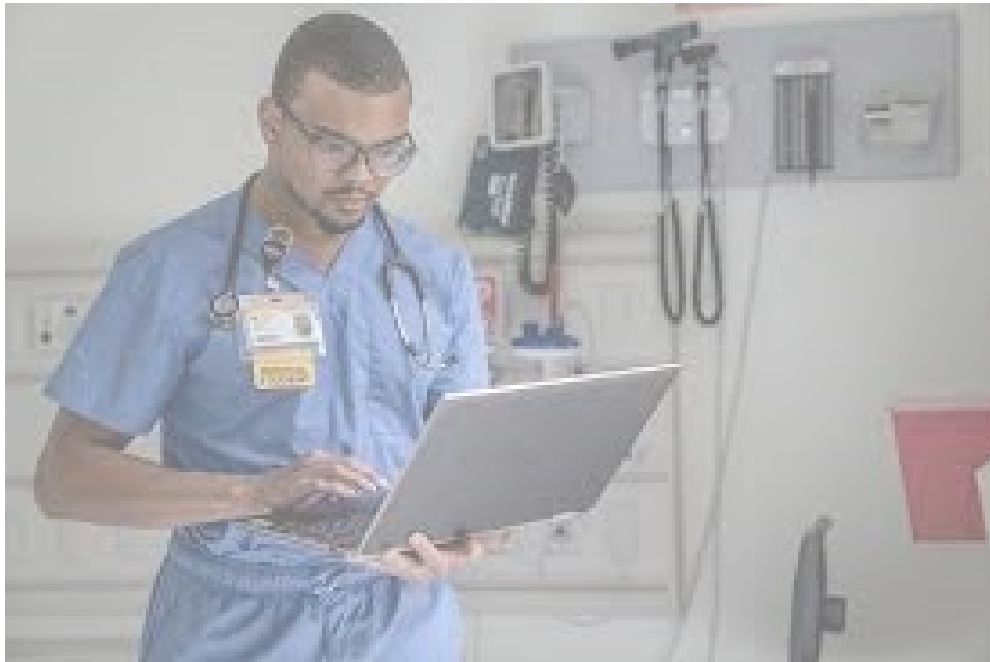Healthy life   Disease or Disability   Early death   Expected life years

1.4 million DALYs

Medication [*]	No. of Trials	No. of Pts	Average Effect ± SD (SBP/DBP in mm Hg)
ACE	36	1898	12.5 ± 5.3/9.5 ± 3.4
α_1-Blockers	15	1849	15.5 ± 4.8/11.7 ± 1.3
β_1-Blockers	18	908	14.8 ± 4.9/12.2 ± 2.2
Calcium blockers	34	3727	15.3 ± 5.0/10.5 ± 2.8
Dihydropyradine	26	3169	15.5 ± 5.3/10.2 ± 2.8
Non-Dihydropyradine	8	558	14.2 ± 2.5/12.5 ± 3.1
Thiazides	18	1657	15.3 ± 5.4/9.8 ± 3.6
Loop diuretics	17	366	15.8 ± 7.8/8.2 ± 4.7
Average	137	10405	14.8 ± 1.1/10.5 ± 1.0

CLINICAL TRIALS

Efficacy

Effectiveness?

Protocol?

Adherence?

Comorbidities?

Follow up?

Patients?

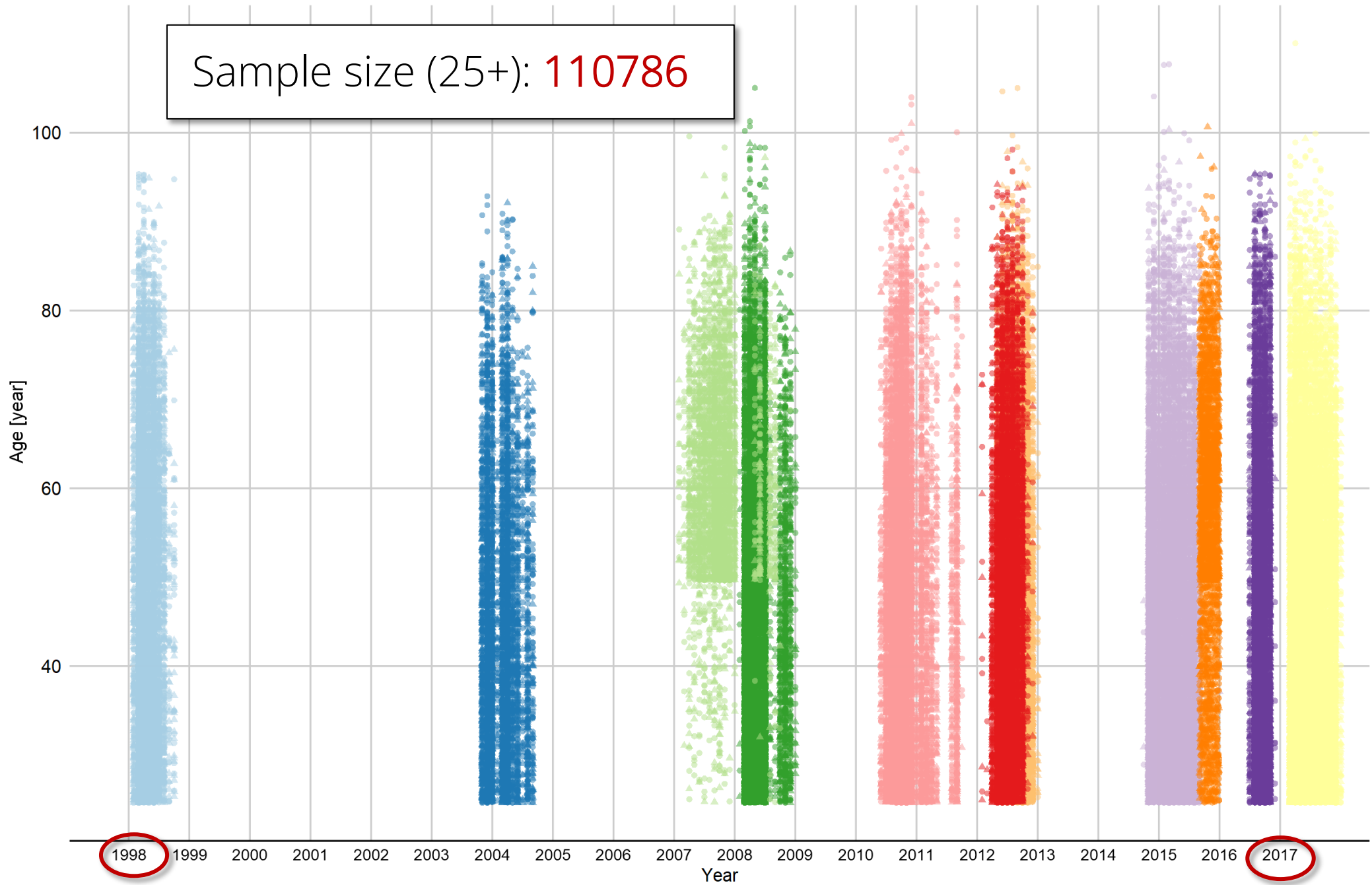Drug availability?

Methods

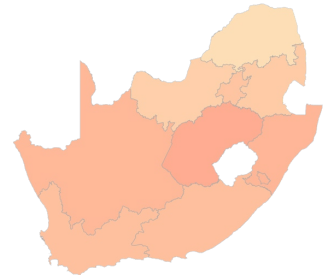A Cois | Antihypertensive treatment

Sample size (25+): 110786

Age [year]

Year

Data source
- DHS 1998
- DHS 2003
- SAGE W1
- NIDS W1
- NIDS W2
- SANHANES 2012
- NIDS W3
- SAGE W2
- NIDS W4
- DHS 2016
- NIDS W5

Sex
- Female
- Male

GAMLSS

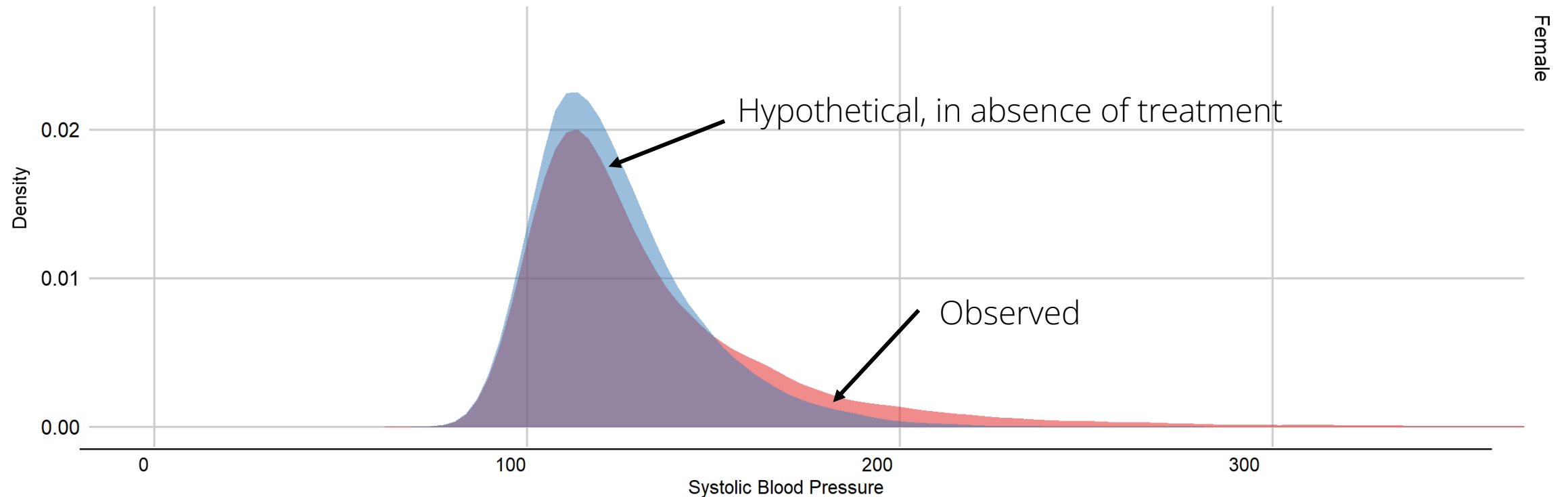$$g_1(\mu) = \eta_1 = X_1\beta_1 + \sum_{j=1}^{J_1} h_{j1}(x_{j1})$$

$$g_2(\sigma) = \eta_2 = X_2\beta_2 + \sum_{j=1}^{J_2} h_{j2}(x_{j2})$$

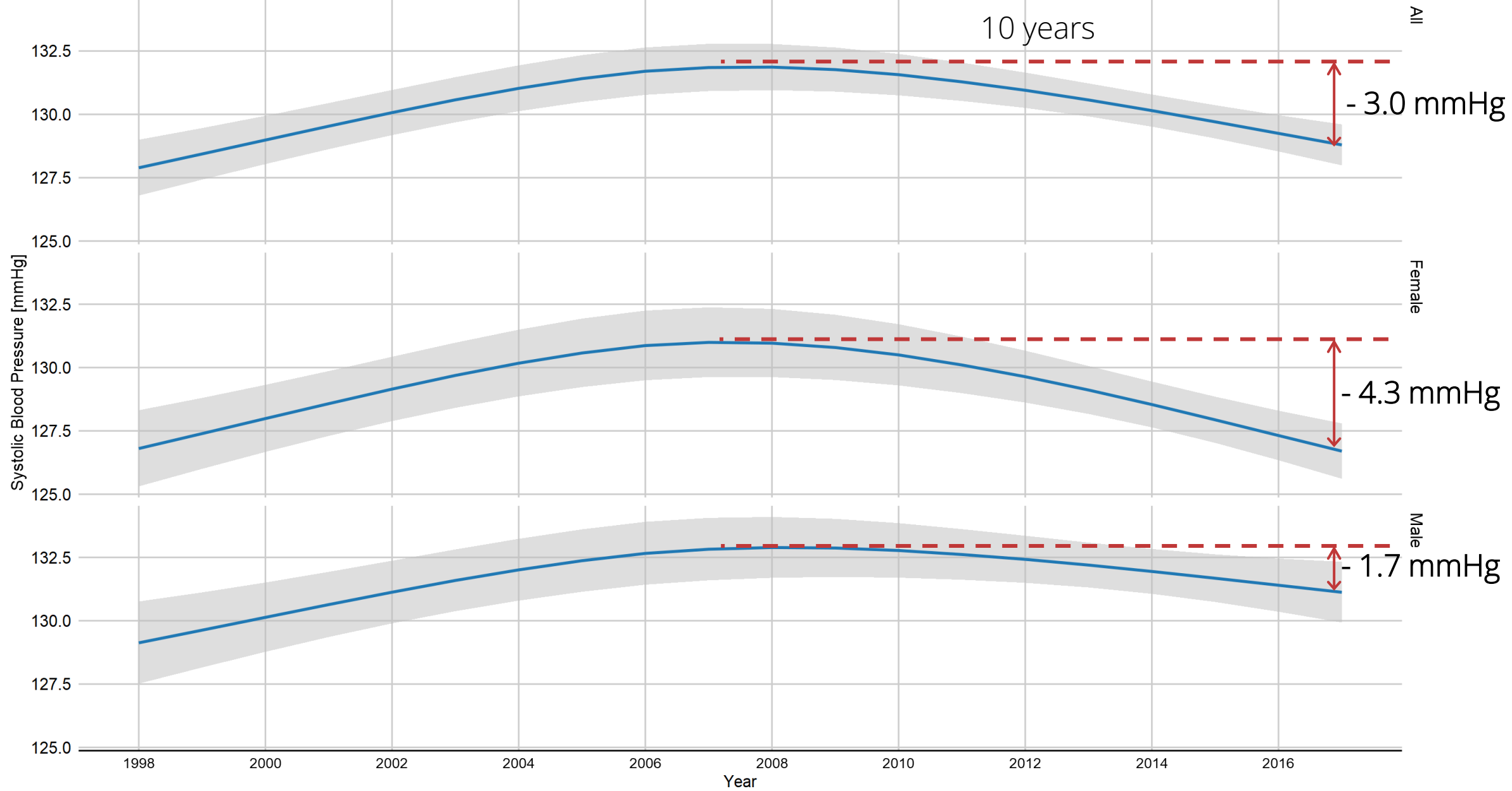$$g_3(\nu) = \eta_3 = X_3\beta_3 + \sum_{j=1}^{J_3} h_{j3}(x_{j3})$$

$$g_4(\tau) = \eta_4 = X_4\beta_4 + \sum_{j=1}^{J_4} h_{j4}(x_{j4})$$
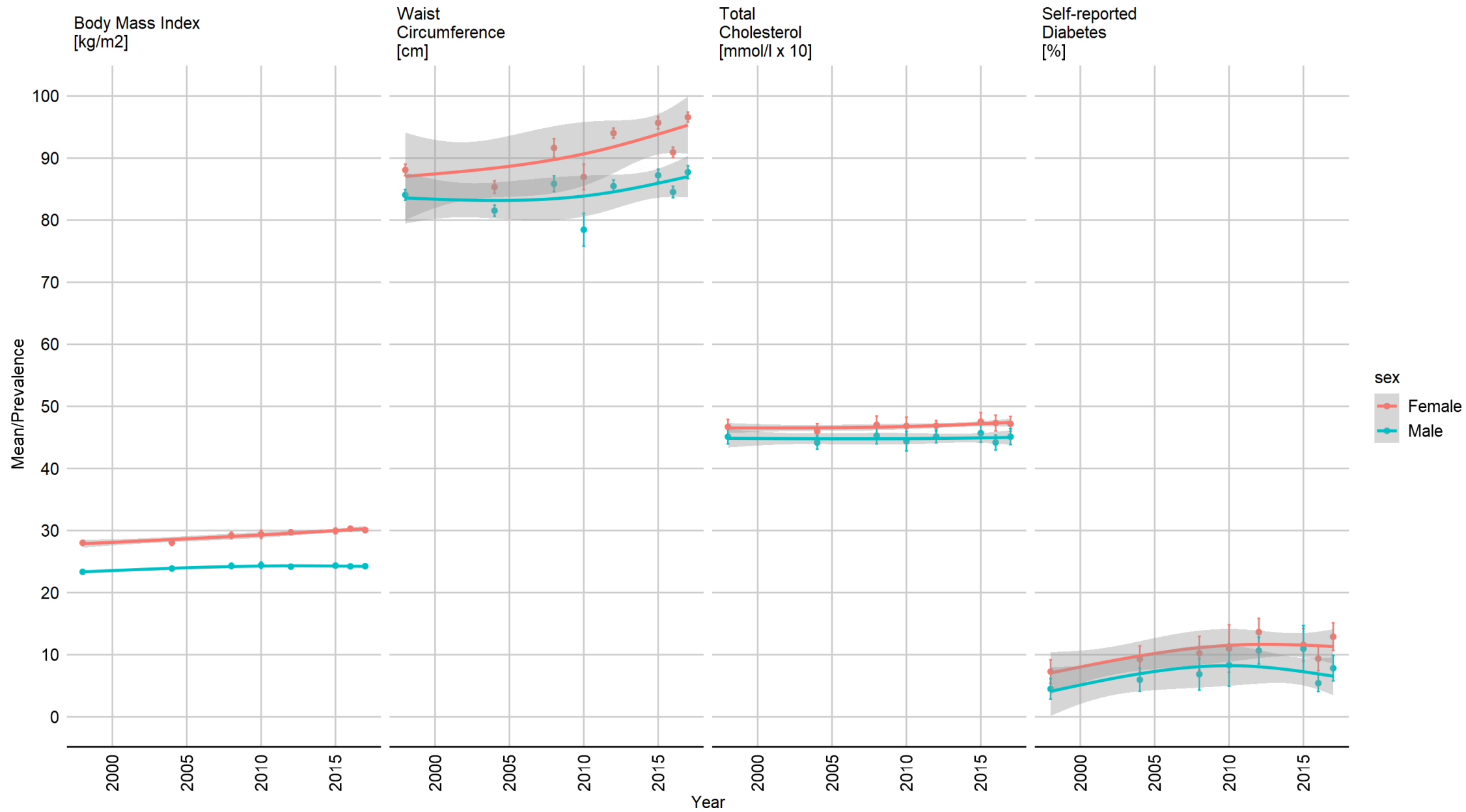
Censored regression

- Among treated, BP in absence of treatment is ≥ measured BP;
- After adjustment for a series of risk factors, the untreated BP distribution among hypertensives is similar to the distribution among health subjects
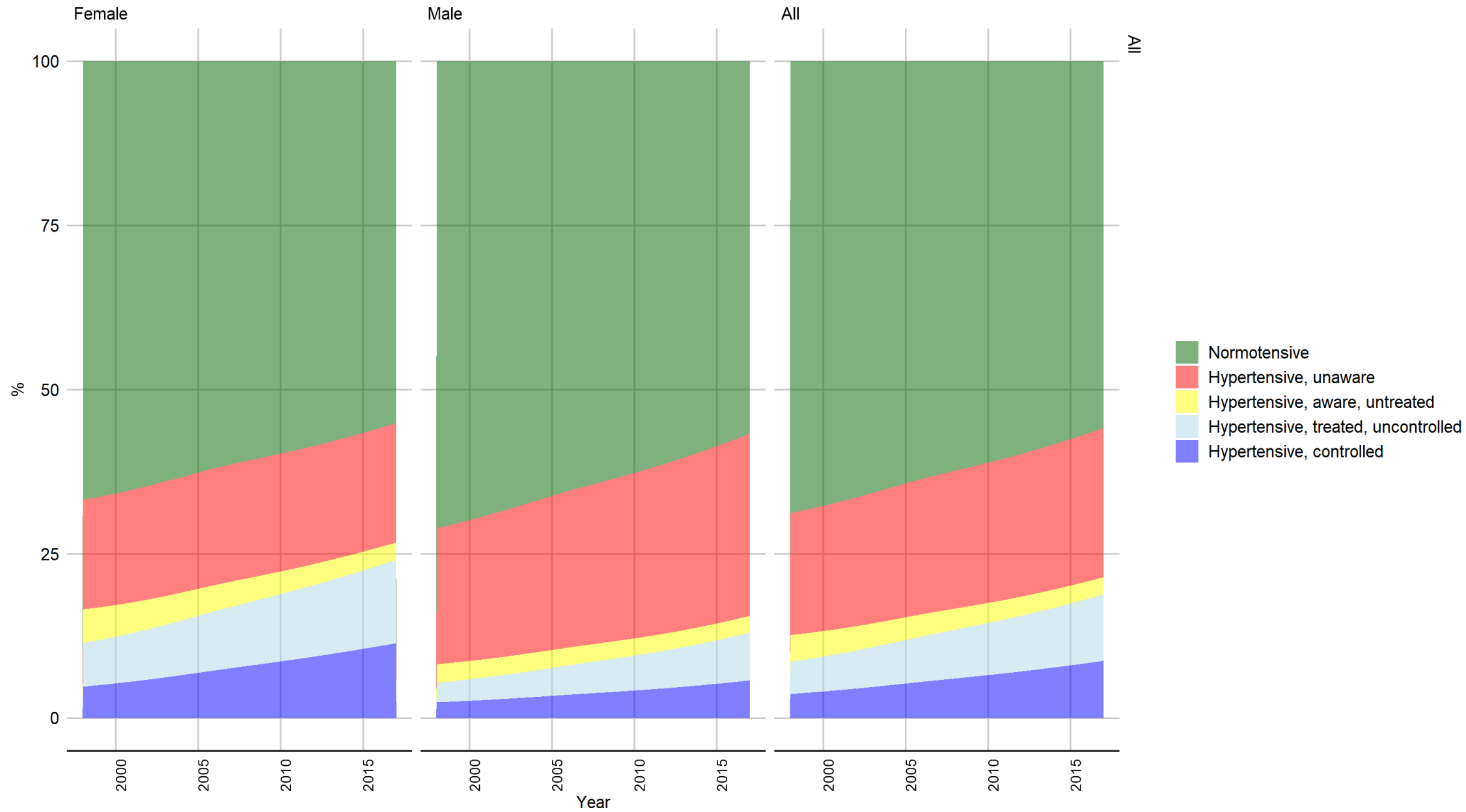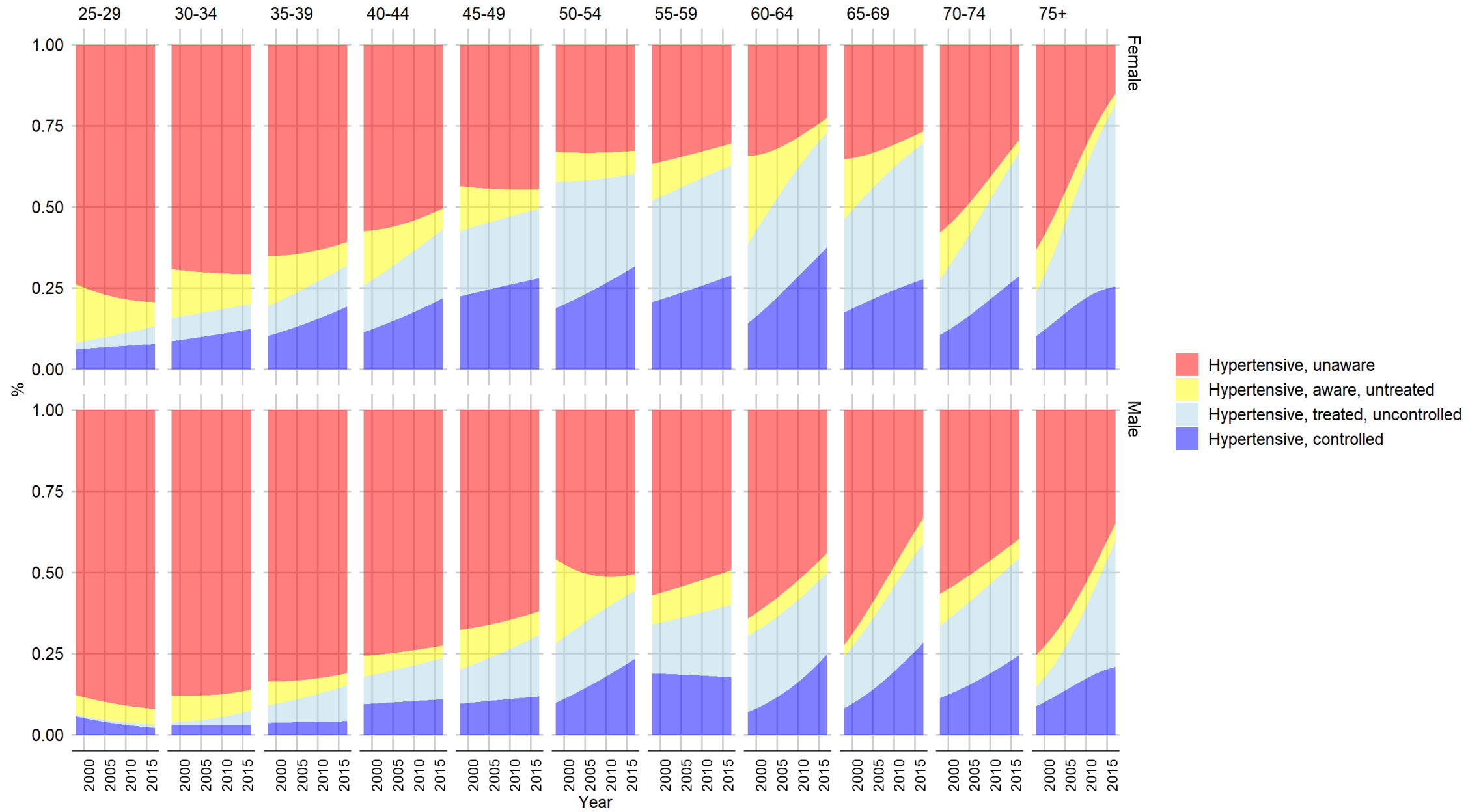
Results

Average systolic blood pressure, by sex.

South African population 25+ years, 1998-2017

Trends in major risk factors for hypertension, by sex

South African population 25+ years, 1998-2017

Hypertension Cascade, by age and sex
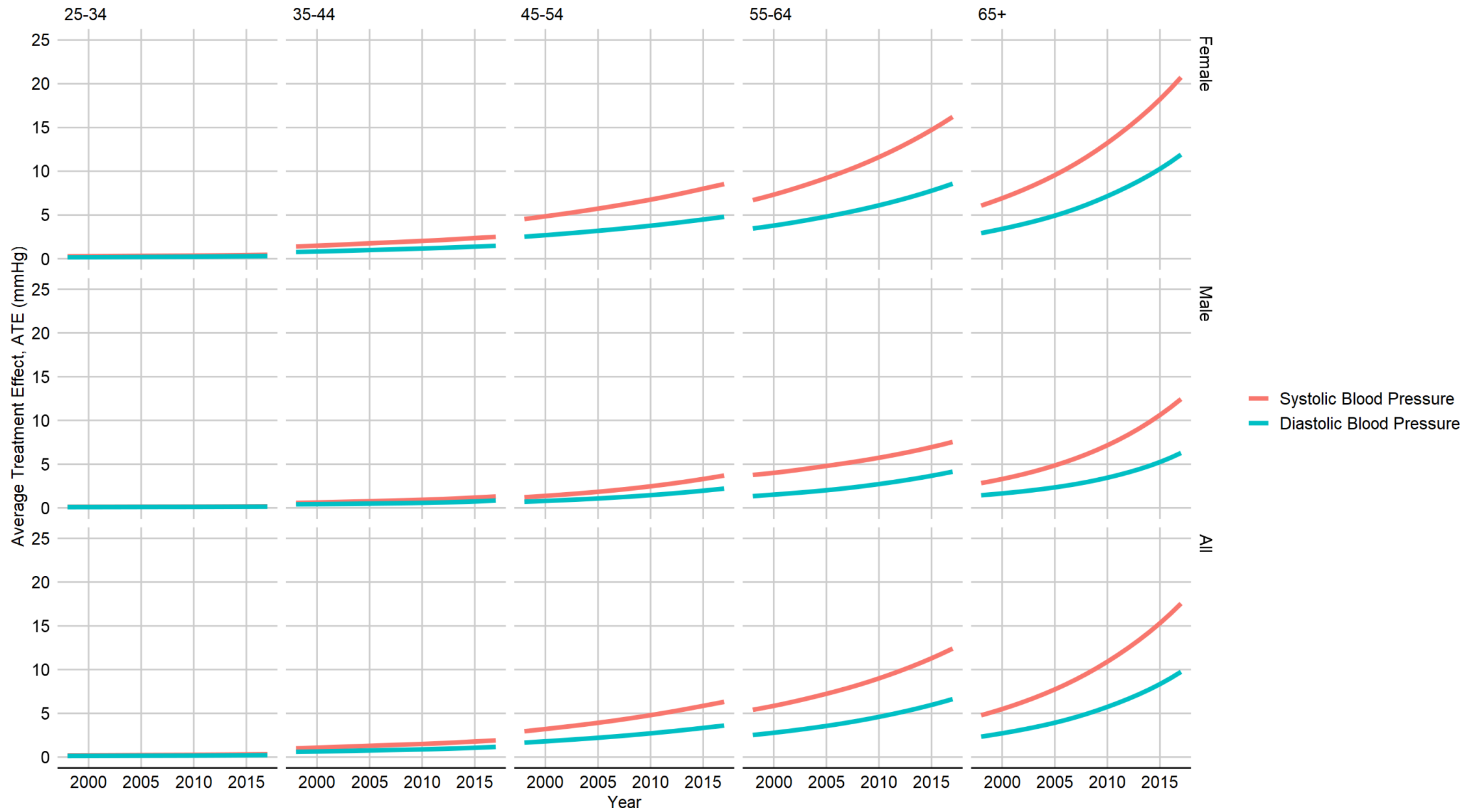
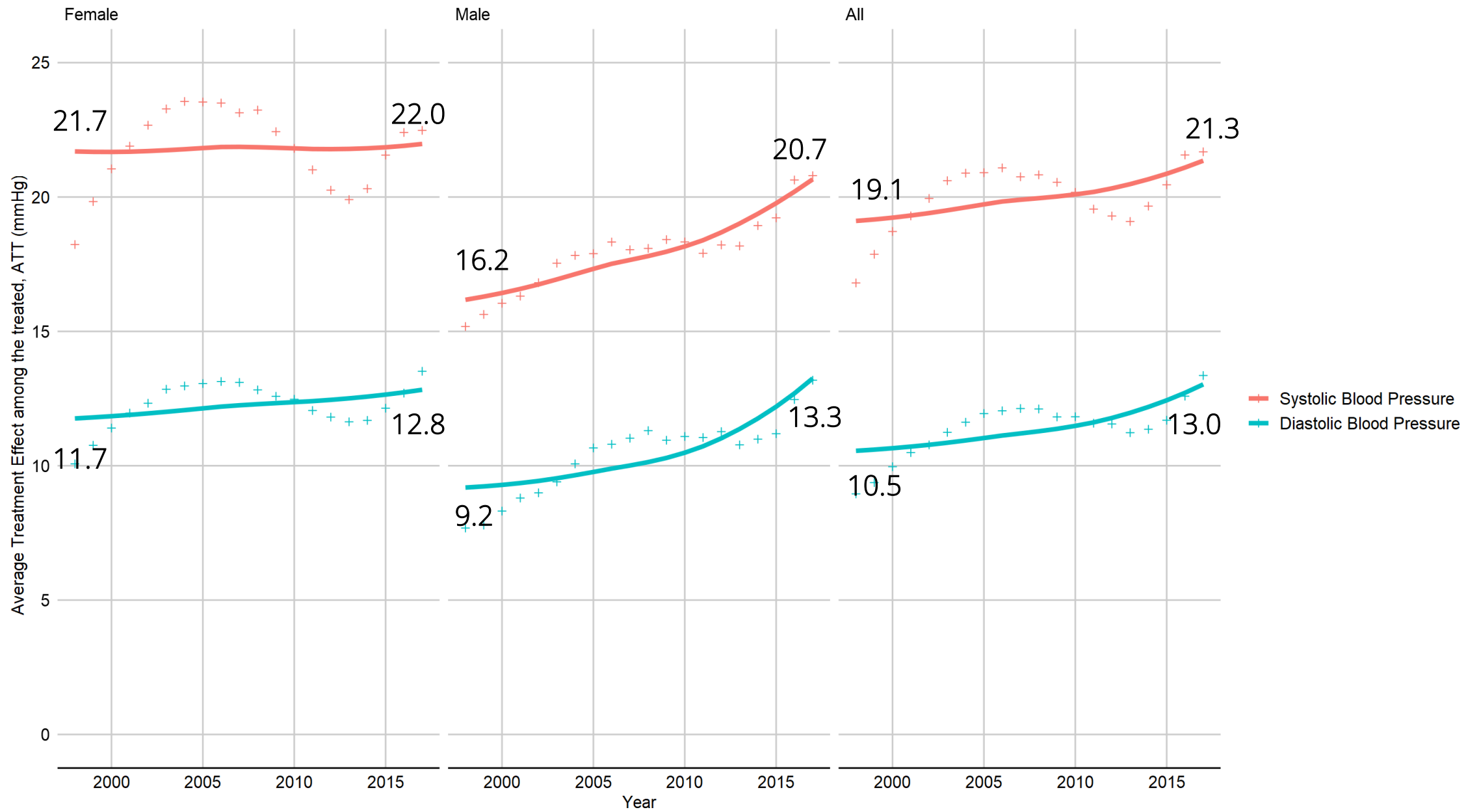*South African population 25+, 1998-2017*

Hypertension Cascade, by sex

South African population 25+, 1998-2017
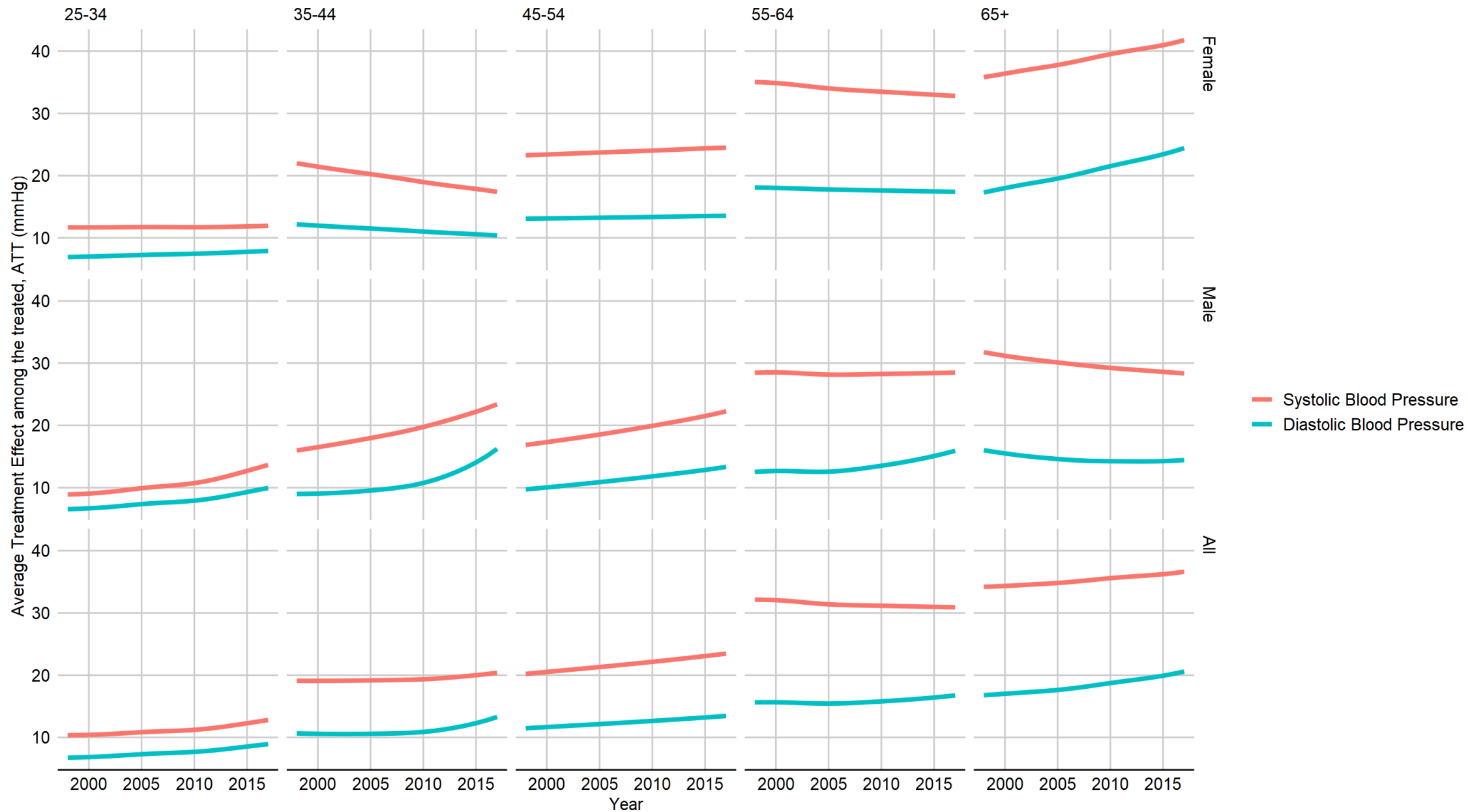
A Cois   Antihypertensive treatment

Average Treatment Effects, by sex

South African Population 25+, 1998-2017

Average Treatment Effects, by sex and age

South African Population 25+, 1998-2017

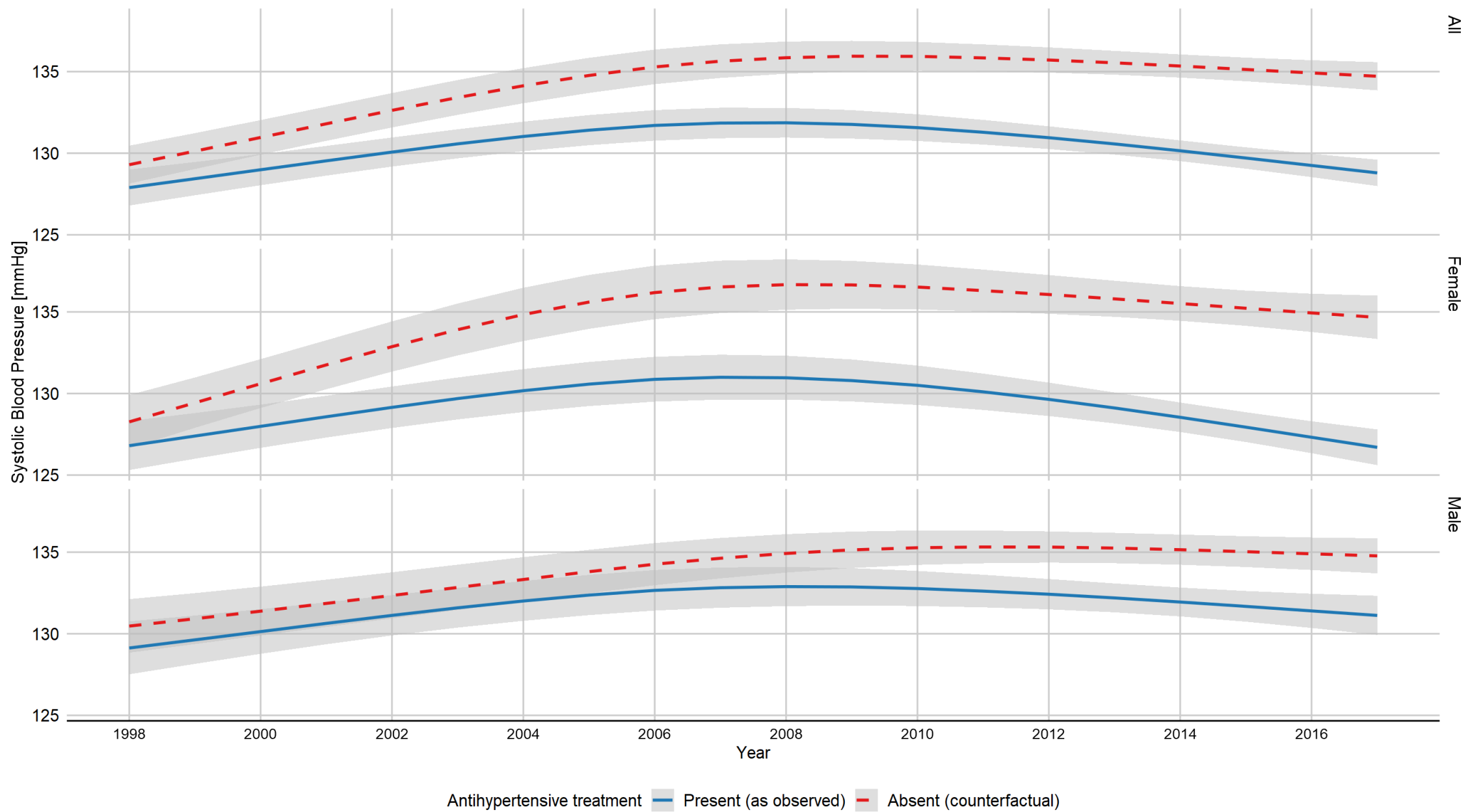A Cois   Antihypertensive treatment

Average Treatment Effects among the treated, by sex

South African Population 25+, 1998-2017

Average Treatment Effects among the treated, by sex and age

South African Population 25+, 1998-2017
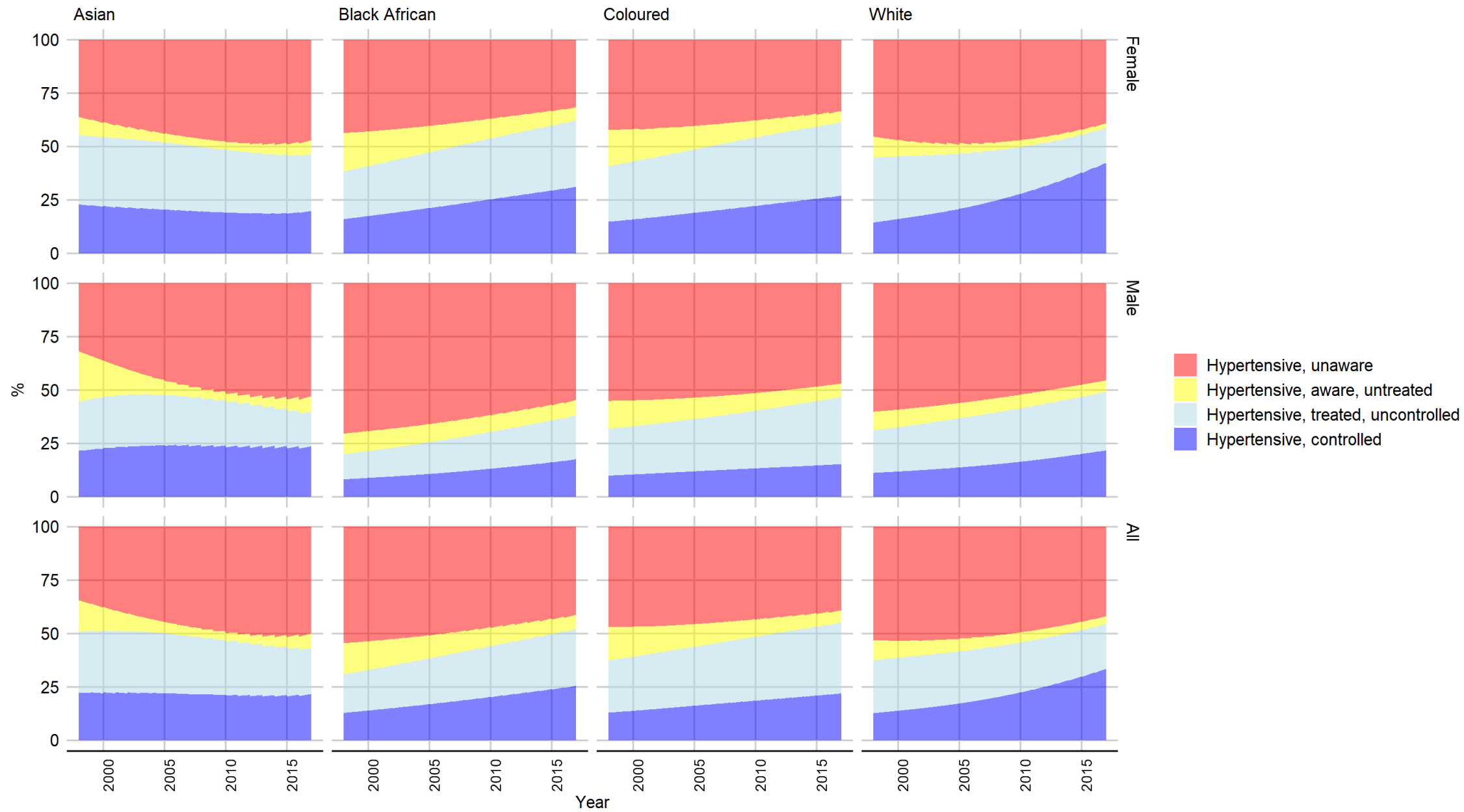
A Cois Antihypertensive treatment

Observed and counterfactual (in absence of treatment) trends in systolic blood pressure, by sex

South African population 25+, 1998-2017

Equity?

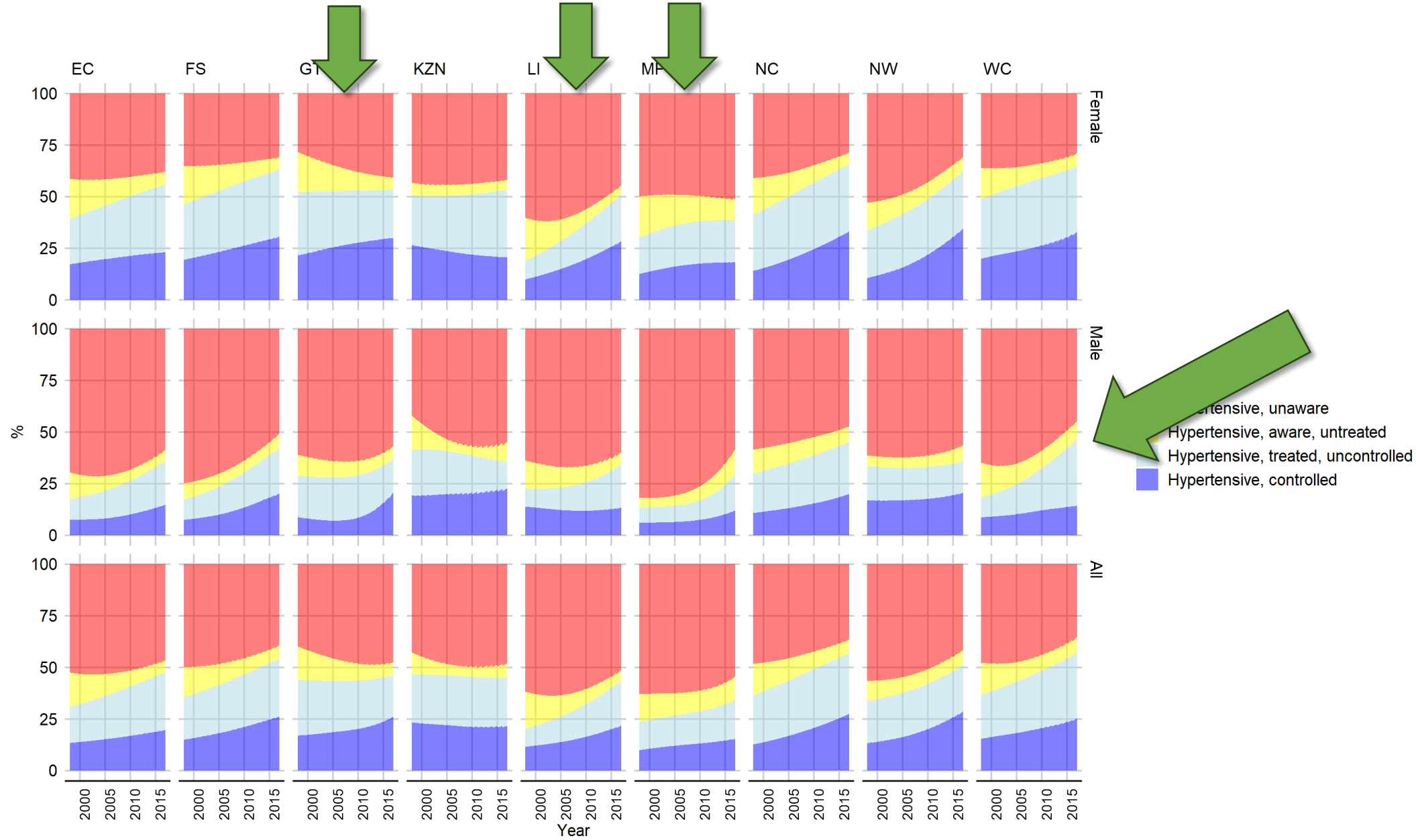Antihypertensive treatment

A Cois
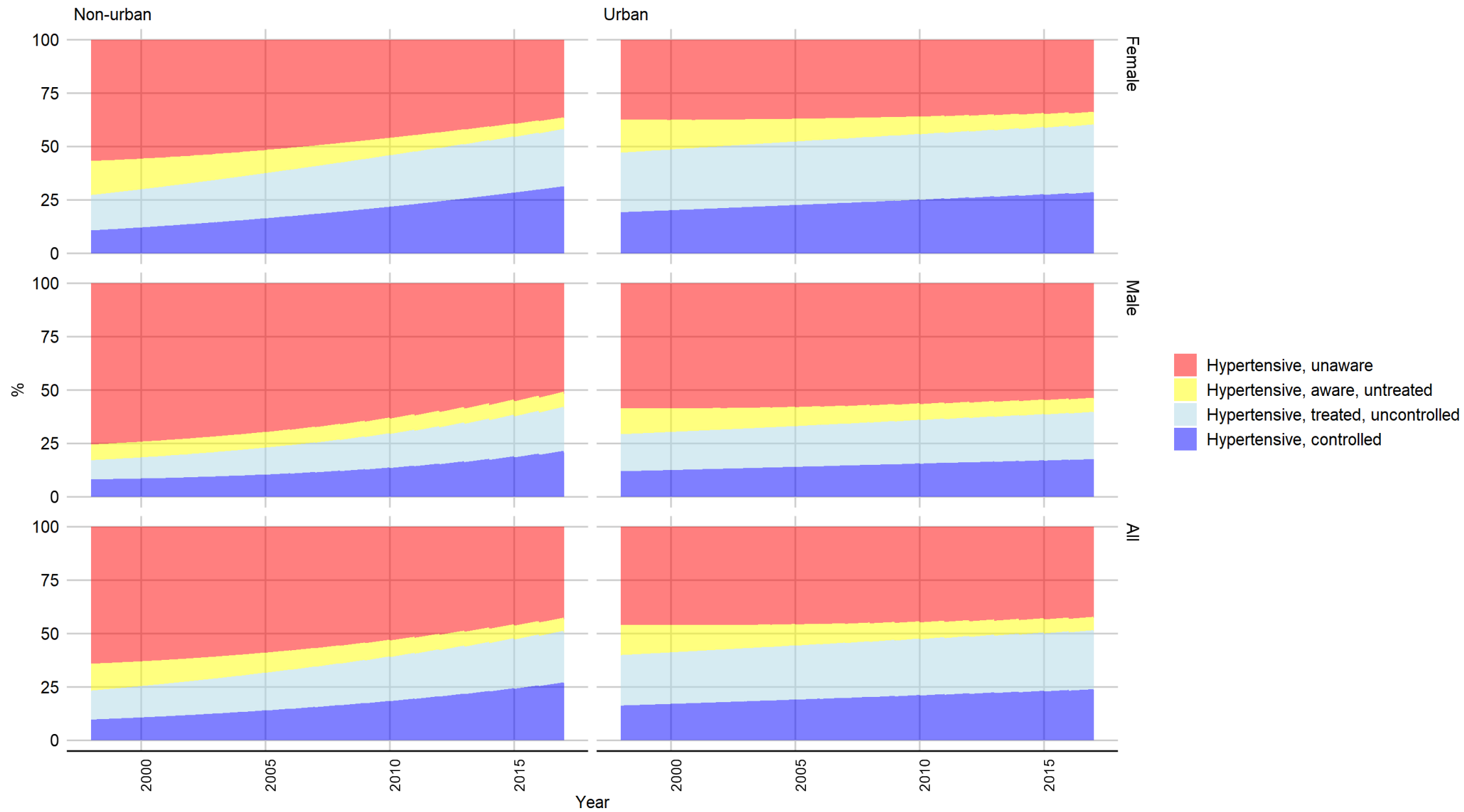
Hypertension cascade, by geotype

South African Population 25+, 1998-2017

Hypertension cascade, by population group

South African Population 25+, 1998-2017

A Cois   Antihypertensive treatment

Hypertension cascade, by Province

South African Population 25+, 1998-2017

Conclusions

- In the South African population, antihypertensive treatment is effective in reducing blood pressure by clinically significant amounts, resulting in a shift of the population distribution of public health relevance

- The increasing diffusion (and, possibly, improved effectiveness) of antihypertensive treatment contributed substantially to the observed decline of average systolic blood pressure in the last decade

- Levels of awareness and control of hypertension are on the rise but still largely inadequate

- Large differences exist on the hypertension cascade across socioeconomic and geographic strata of the population

- Data suggest an overall trends towards a reduction of the inequities, with exceptions.

Limitations

- Observational data

- Between-survey differences in sampling strategies, data collection methods, quality

- Self-reported use of medication

- No record of medication type/class

- Assumptions underlying the modelling of counterfactual distributions

Thank you

ExPoSE

Explaining Population trends in cardiovascular risk: A comparative analysis of health transitions in South Africa and England

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