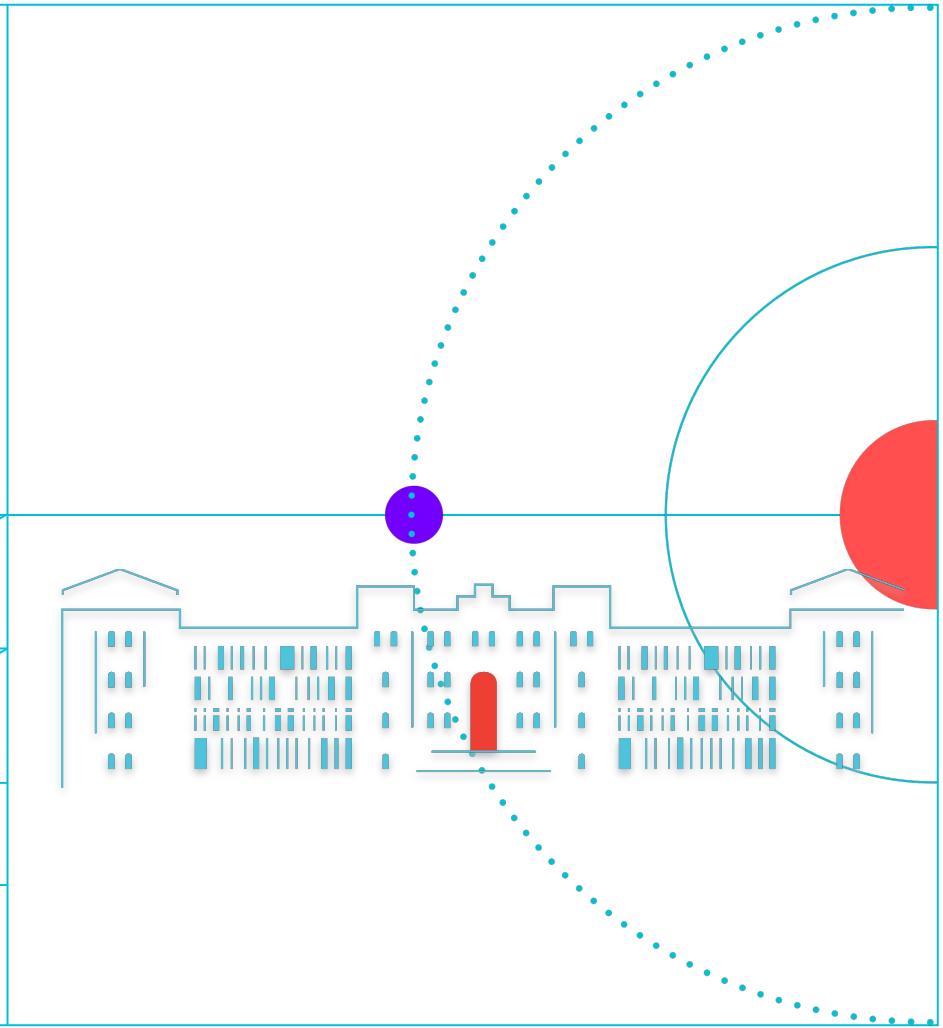
Hospital admittance rates of cancer patients



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Motivation

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Question:

Are cancer admission rates proportional to the population distribution across age groups?

Hypotheses:

H_0: Admission rates follow the population distribution.

H_1: Admission rates differ from the population distribution.

What Data Are We Working With?

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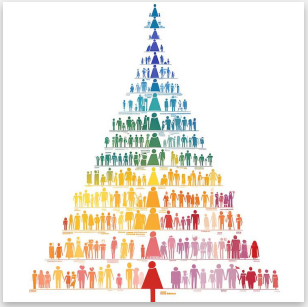
1st Dataset: Diagnoses of Hospital In-Patients (ICD-10)

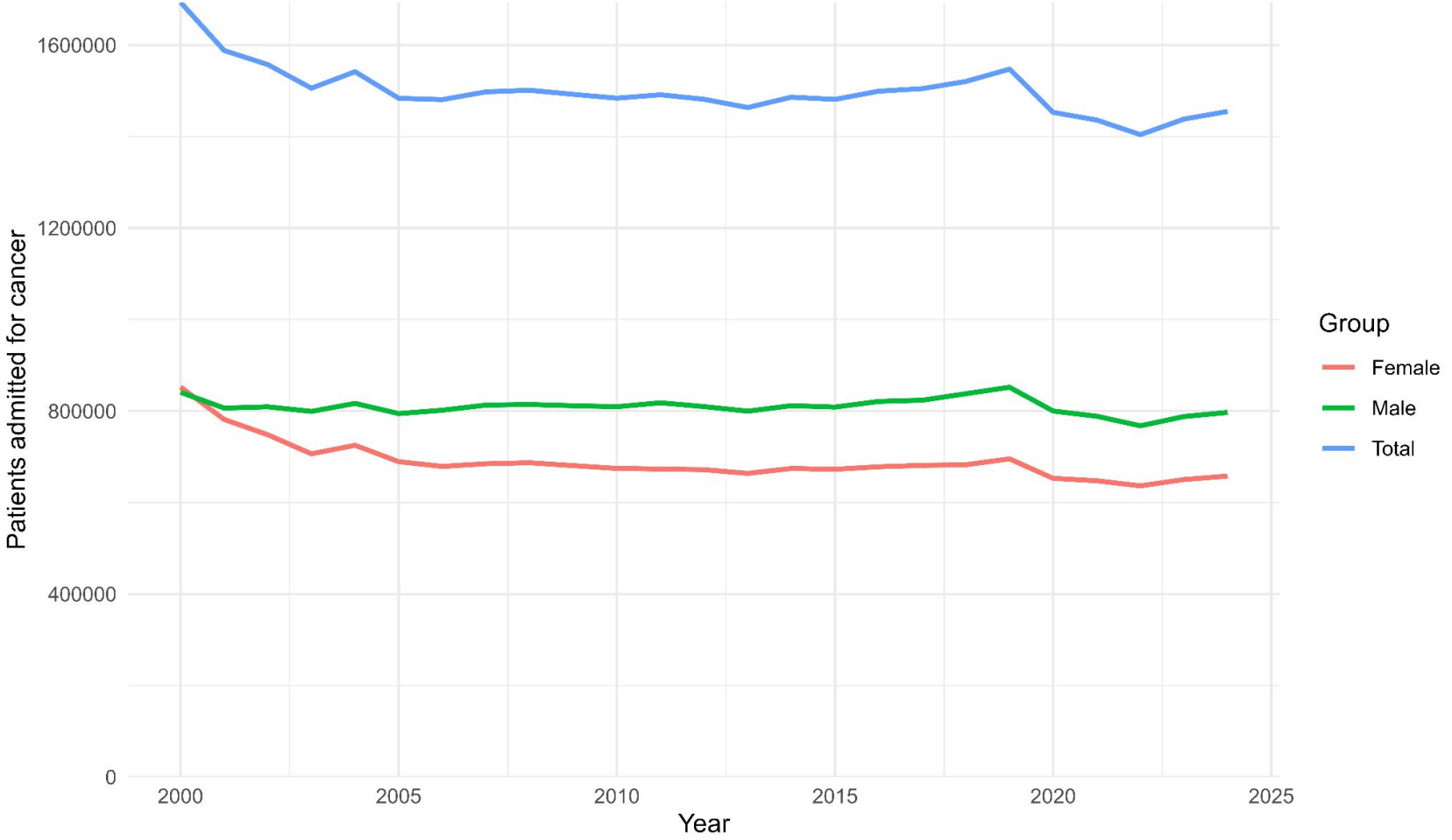
Source: Destatis — GENESIS Table **23131-0001**

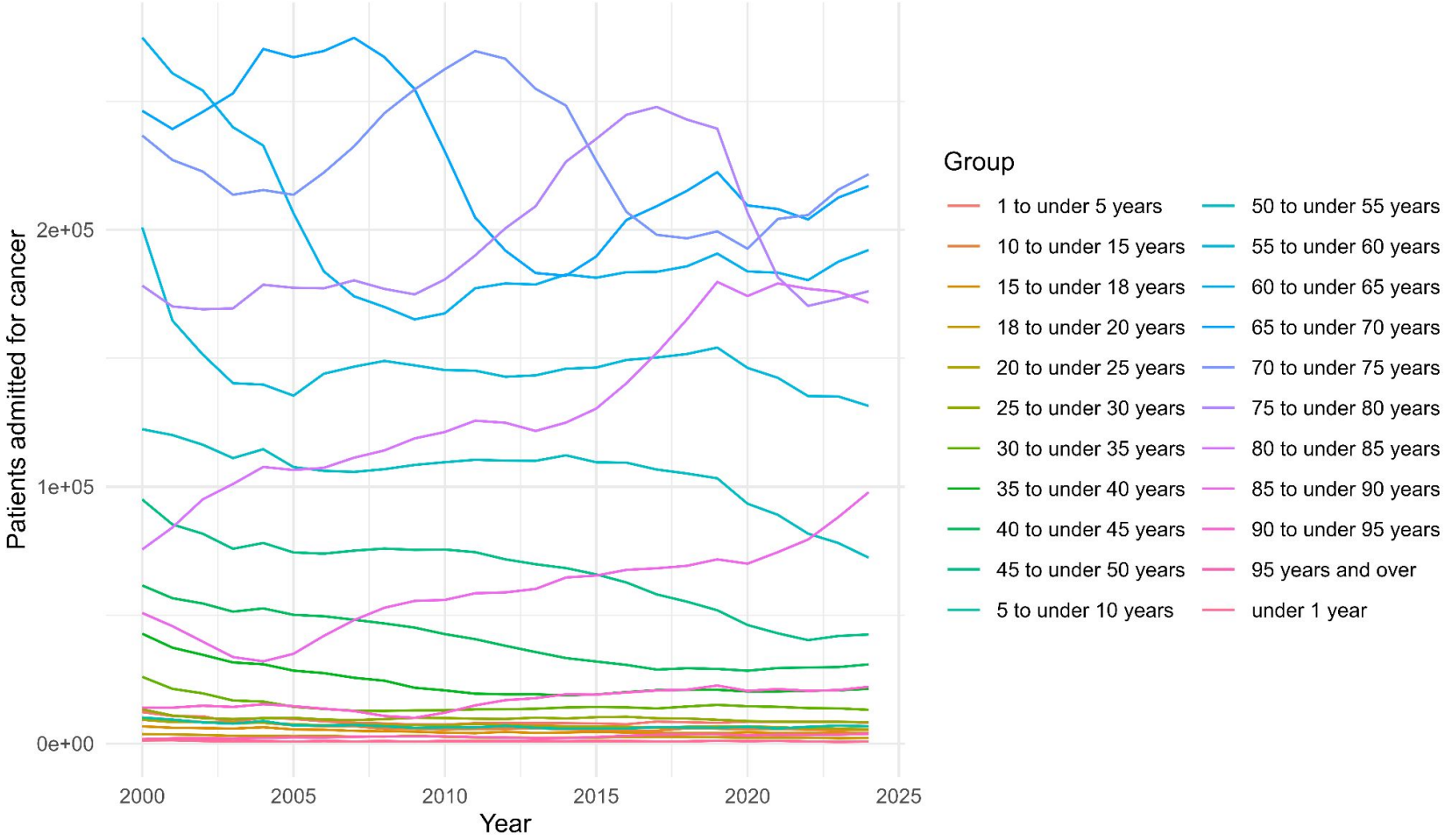
Our Focus: Malignant neoplasms (basically: all cancers)

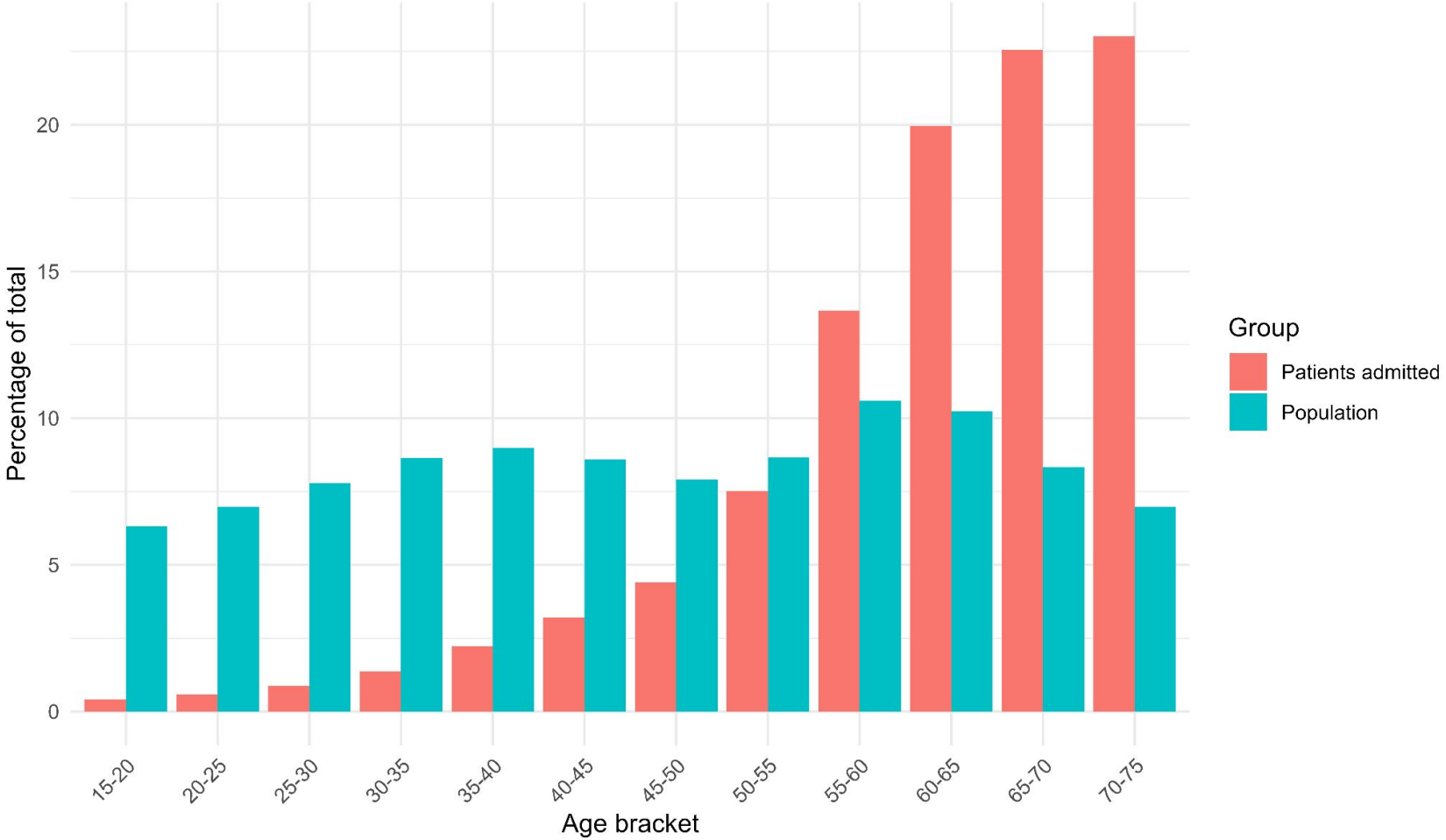
2nd Dataset: Population by Age Groups

Source: Destatis — GENESIS Table **12211-0001**




1600000
1200000
800000
400000
0
Patients admitted for cancer
2000
2005
2010
2015
2020
2025
Year
Group
Female
Male
Total


Patients admitted for cancer
2e+05
1e+05
0e+00
2000
2005
2010
2015
2020
2025
Year
Group
1 to under 5 years
10 to under 15 years
15 to under 18 years
18 to under 20 years
20 to under 25 years
25 to under 30 years
30 to under 35 years
35 to under 40 years
40 to under 45 years
45 to under 50 years
5 to under 10 years
50 to under 55 years
55 to under 60 years
60 to under 65 years
65 to under 70 years
70 to under 75 years
75 to under 80 years
80 to under 85 years
85 to under 90 years
90 to under 95 years
95 years and over
under 1 year


Percentage of total
20
15
10
5
0
15-20
20-25
25-30
30-35
35-40
40-45
45-50
50-55
55-60
60-65
65-70
70-75
Age bracket
Group
Patients admitted
Population

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Chi-Squared Test

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Results:

$X^2 = 1008249$, $df = 11$, $p < 2.2e{-}16 \rightarrow H_0$ rejected

Interpretation:

Cancer admissions are not proportional to population age distribution.

Implicit Assumptions

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- **Representativeness**
  - hospital cases accurately reflect how common the disease is
  - admittance likelihood stays constant over time
- **Consistent Classification**
  - Diagnosis and Classification of disease stays constant across hospitals and doctors
- **Independence of Observations**
  - In reality, patients could be admitted multiple times

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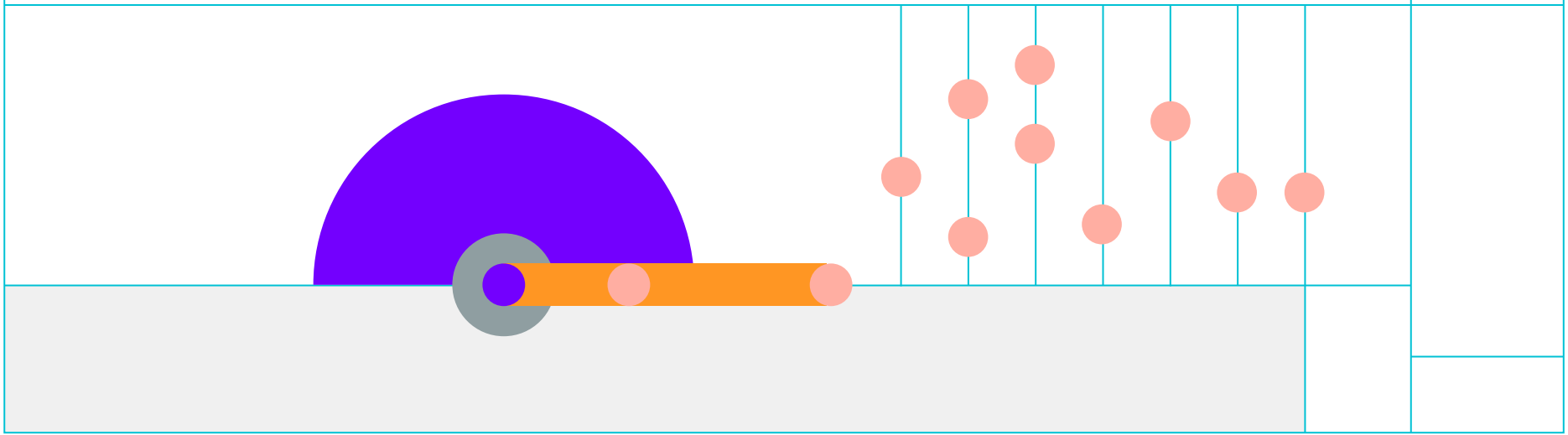
Thank you for your attention!