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Risk of developing uterine and cervical cancer in Germany corrected for women no longer at risk after hysterectomy

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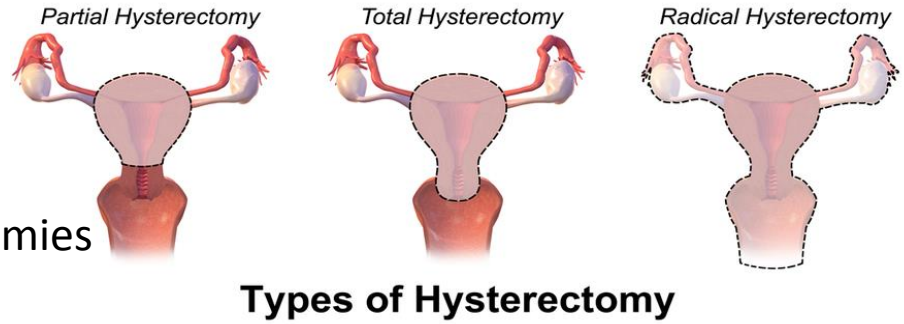
Background

- Cancer incidence rates can be interpreted as the average risk in a population of developing a cancer over a certain time period
- If a relevant proportion of the population are not at risk, it might be more meaningful to calculate the incidence for the population at risk
- This is the case for women after hysterectomy, who, depending on the specific procedure performed, are no longer at risk for
  - Uterine cancer
    - all hysterectomies
  - Cervical cancer
    - all but subtotal/partial hysterectomies



Types of Hysterectomy

Background (2)

- Studies from other countries (mostly US) have demonstrated a relevant increase of cervical cancer incidence for older age groups when rates were restricted to the population at risk (without hysterectomy)
- Most studies focused on just one year of diagnosis with the exception of Stang et al., 2014 (*Annals of Epidemiology)*
  - Data on hysterectomy prevalence from a biannual survey *(Massachusetts)*
- Out goal was to use data both on prevalent and incident hysterectomies to calculate age specific risk estimates for uterine and cervical cancer for the population ‚at risk' over a period of 5 years
  - „Dynamic correction method"
  - Applicable also for screening participation rates

Data used in our study

- Cancer incidence
  - Age specific estimates for Germany for cervical and uterine cancer
- Surgical procedures
  - DRG statistics of inpatient surgical procedures (available 2005-2016)
  - German Health Examination survey (DEGS 1), 2008-2011
- Population and mortality
  - Life tables for Germany
  - Official end of year population
- Screening
  - Age specific participation rates for cervical cancer screening

Hysterectomies in Germany: Prevalence for 2010

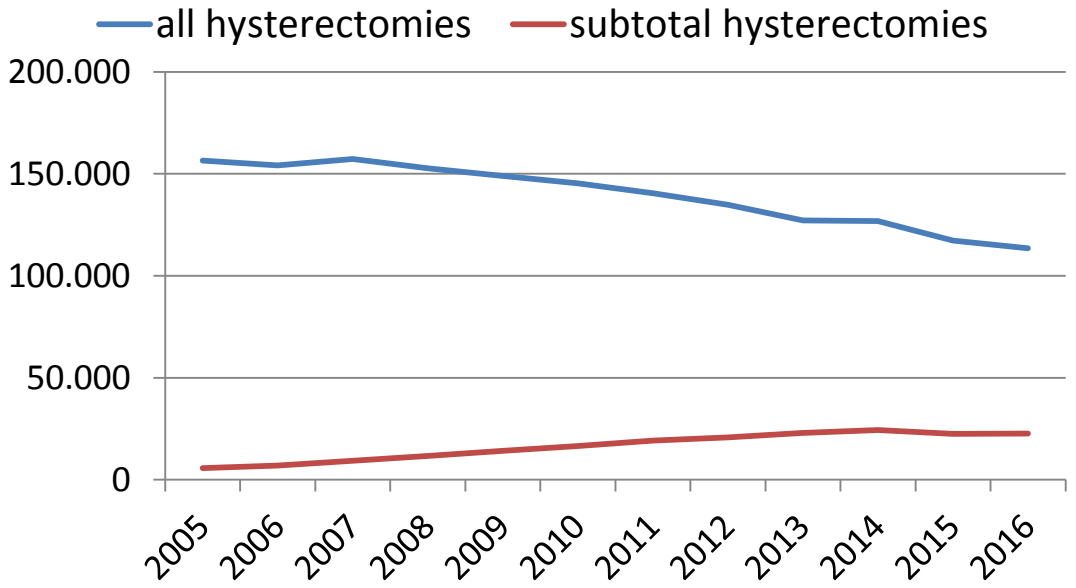
- 3,705 women (18-79y) participating in the German Health Examination Study (DEGS1, 2008-2011) were asked if they ever had a hysterectomy (and when)
- The overall prevalence of having had a hysterectomy was 17.5%
- Prevalence ranged from 0.8% (30-39 years) to 39.4% (70-79 years)
- Mean age at hysterectomy was 44 years
- In 94%, the underlying condition for a hysterectomy was benign

Hysterectomies in Germany: Incidence

- Data on all inpatient surgical procedures in Germany are collected since 2005 (introduction of DRG system for hospital reimburcement)

- Number of annual hysterectomies fell from 156,000 (in 2005) to 113,000 (2016)

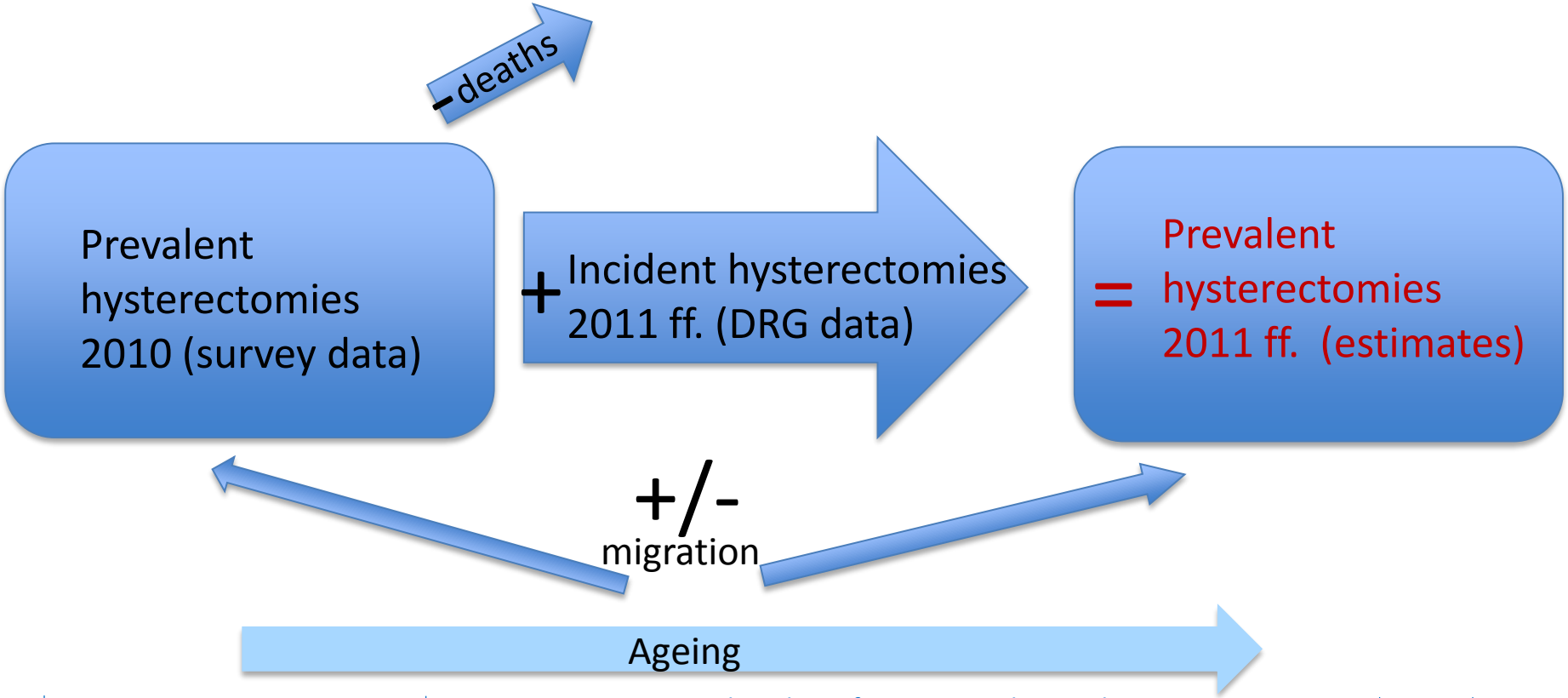
- Proportion of subtotal hysterectomies increased from 4% to 20%



Methods: Considered surgival procedures

- 5-683 Hysterectomie (82%)
- 5-682 Subtotal (partial) hysterectomy (11%)
- 5-685 Radical Hysterectomie (6%)
- 5-673 Amputation of the cervix uteri (< 1%)
- 5-684 Exstirpation of the cervical stump (< 1%)
- 5-686 Radical exstirpation of the cervical stump (< 1%)
- 5-757 Hysterectomie, obstetric (< 1%)

Principle Methods

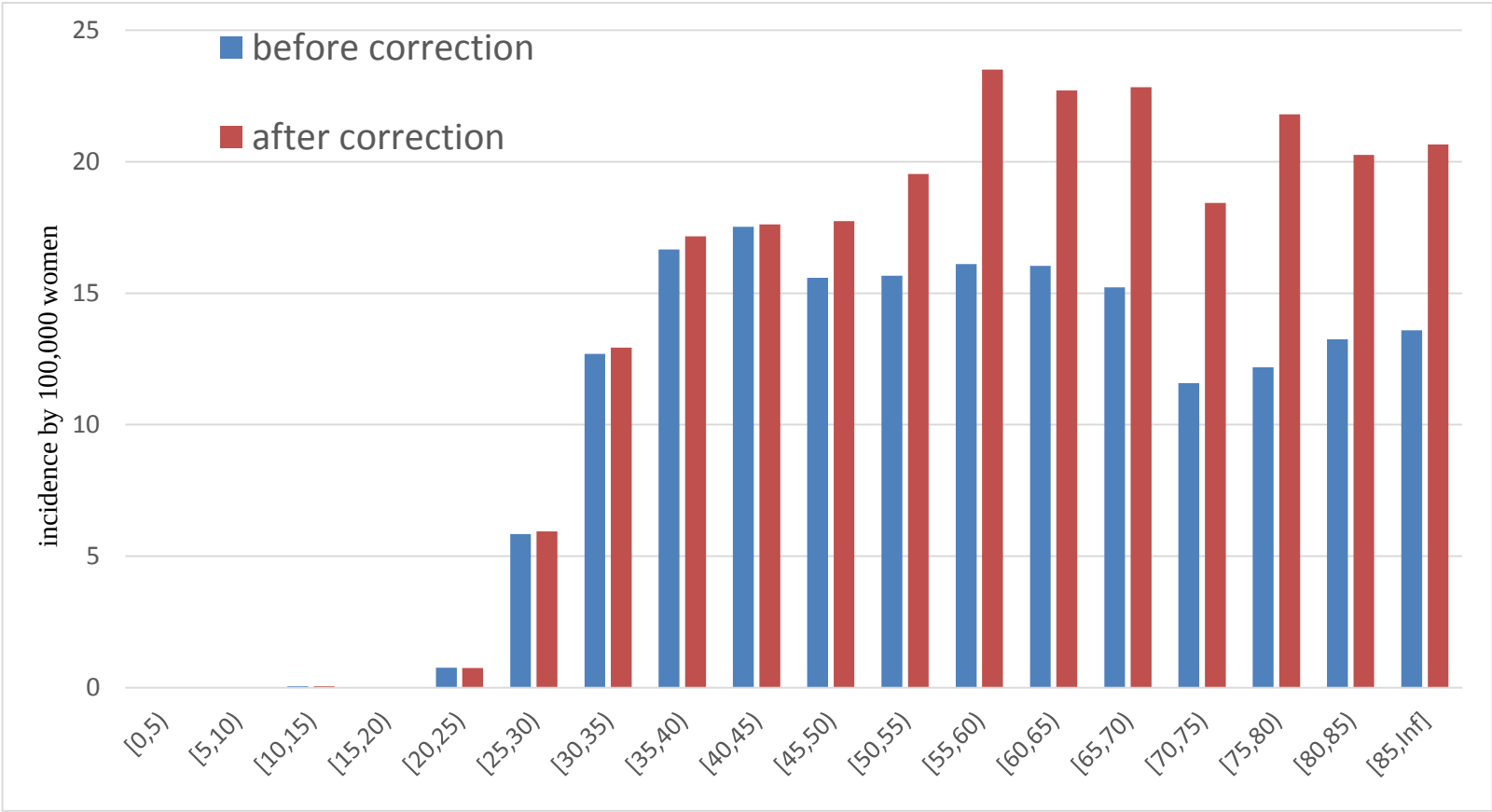


Assumptions

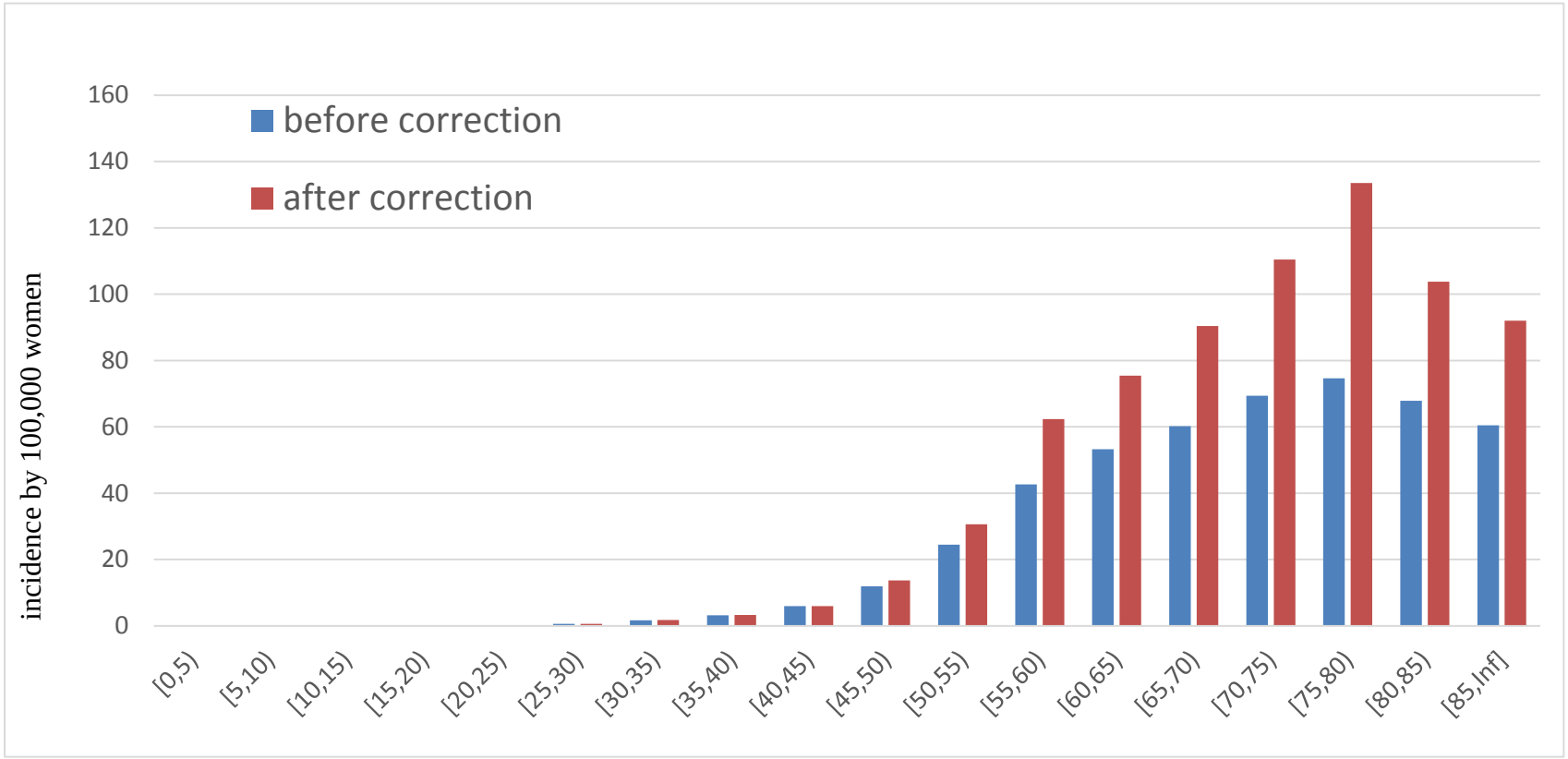
- Survival of women after hysterectomy is the same as in general population
- None of self reported hysterectomies in the DEGS-1 study were subtotal
- No net effect of migration on the number of women with hysterectomy

- Prevalence of hysterectomy for women < 37 years and > 80 years (in 2010) was estimated using smoothing spline interpolations

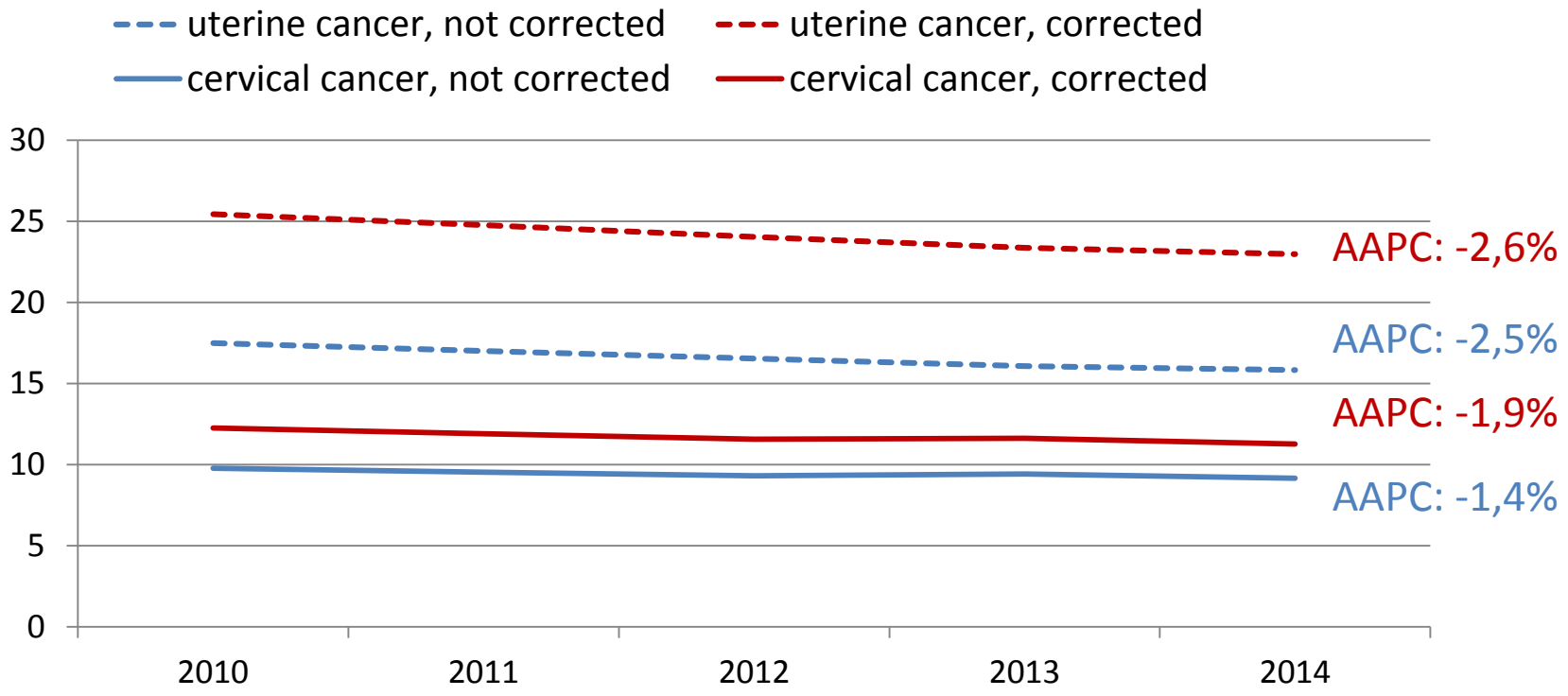
Results: Cervical cancer incidence for 2014, by age group



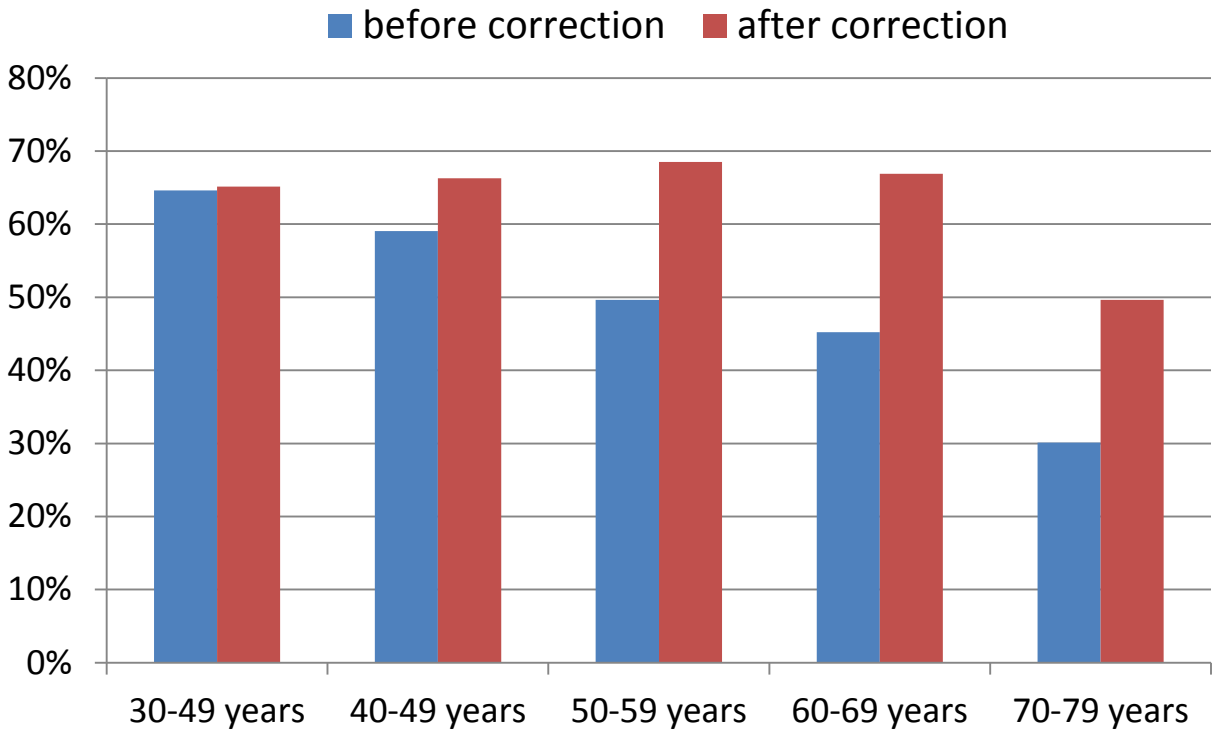
Results: Uterine cancer incidence for 2014, by age group



Results: Age standardized incidence (ESP), 2010-2014 with average annual percentage change (AAPC)



Results: Annual cervical cancer screening participation, 2010, by age



Summary

- After correction for hysterectomy, the age specific incidence for cervical and uterine cancer increased by up to 70% (for older age groups)
- Decreasing trends for age standardized incidence were slightly more distinct after correction (especially for cervical cancer)
  - Result of decreasing incidence (and prevalence) of hysterectomy in GER
- For women up to 70 years of age, participation of cancer screening no longer decreased with age when taking hysterectomies into account

Work in progress

- Calculation of cumulative risk estimates (e.g. over 10 years) from incidence rates
- Sensitivity analyses regarding possible violation of assumptions
- Backward calculation of incidendence/risk for the years 2005-2009

Discussion

- Similar to other studies, we found a relevant increase in age specific incidence rates when results were restricted to the population at risk
- With the proposed method, realistic estimates of age specific cancer risks for uterine and cervical cancer for the population at risk can be published for Germany
- These results are relevant for
  - women's decision to attend cervical cancer screening
  - the evaluation of cervical cancer incidence trends in the light of HPV vaccination and changing screening procedures (HPV based cervical cancer screening program in Germany soon to be implemented)
  - The evaluation of participation rates for cervical cancer screening

Thank you for your attention!

https://www.krebsdaten.de/Krebs/EN