

## **Kolloquium „Statistische Methoden in der empirischen Forschung“**

Wann: 18. November 2014, 17:00 – 18:30 Uhr

Wo: Lebenswissenschaftliche Fakultät, Humboldt-Universität zu Berlin,  
Hörsaal 2, 2. Etage, Invalidenstr. 42, 10115 Berlin

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### **Schätzung der HIV-Inzidenz und -Prävalenz für Deutschland mit Hilfe einer verallgemeinerten Rückprojektion**

#### *Background*

Since the time between HIV-infection and the diagnosis of HIV could be several years, the estimation of the course of the HIV-incidence is highly non-trivial, even with good data about HIV- and AIDS-diagnoses in the course of the epidemic.

#### *Method*

We use data from the German AIDS case register in the period 1978 to 1995, i.e. the period before the antiretroviral therapy was established. Using the progression time distribution between an HIV infection and the manifestation of AIDS known from cohort studies, the HIV incidence can be estimated between 1975 and 1995 by a non-parametric back-projection of the AIDS cases. Confirmed HIV diagnoses according to the German Infection Protection Act (IPA) are available since 1993. To estimate the progression time between HIV infection and HIV diagnosis we use as an additional marker the CD4 cell count at diagnosis. Since the IPA data contain missing values for this marker and also for other important variables, we perform a chained multiple imputation of CD4 category, clinical stage at HIV-diagnosis, transmission group, origin from a high prevalence country (yes/no), place of infection outside Germany (yes/no) and federal state of residence in Germany using time of diagnosis, age and sex as external variables.

To apply the back-projection to data on HIV diagnoses, we simulate HIV diagnoses before 1993 from the estimated HIV incidence between 1975 and 1995. To do this we assume that the distribution of CD4 categories (<200, 200-350, 350-500, >500 cells/ $\mu$ l) at HIV diagnosis conditioned on age, sex and transmission group in the period before 1995 equals the one between 1993 and 2000. A certain evaluation of this assumption is possible by comparing the simulated curves with the true course of the diagnoses after 1993.

Given the completed course of the HIV diagnoses stratified by the CD4 categories we are able to estimate the course of the HIV incidence between 1975 and 2012. We use again the non-parametric back-projection taking into account transmission group, sex, 5-years age group and the federal state of residence in Germany. In result we can estimate also the number of undiagnosed people living with HIV by age group, sex and transmission group.

Confidence intervals for the course of the incidence can be provided by using different realisations of the imputation as well as different realisations of the progression time distribution to AIDS or a certain CD4 category.