Modena and Emilia Romagna HIV Surveillance: the application of ECDC HIV Modelling Tool.

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BACKGROUND

The HIV Modelling Platform is an online instrument offered by ECDC to facilitate the process of analyzing the local HIV epidemics by providing estimates based on surveillance data. It's an application which uses evidence-based methods to calculate HIV incidence in a given population.
The tool provides these estimates:
- the number of people living with HIV, including those not yet diagnosed;
- the annual number of new HIV infections;
- the average time between infection and diagnosis;
- the number of people in need of treatment according to CD4 cell counts.

The aim of this study was to interpret the available HIV surveillance data from Modena and Emilia-Romagna Observatories using the HIV Modelling Platform tool.

MATERIAL AND METHODS

- The HIV Modelling Platform Tool by ECDC was used in the online free version.
- HIV surveillance data collected in Modena provincial and Emilia Romagna regional Observatories since 1985 and 2006, respectively.
- The London Method: assumption that undiagnosed HIV-positive individuals who develop AIDS or other HIV-related symptoms of sufficient severity will present for care and as a result be diagnosed with HIV.
- Populations were defined according to ECDC guidelines for aggregated uploaded data: total number of HIV and/or AIDS diagnosis per year, stratification according to CD4 cell count at diagnosis (CD >=500 cells/mmc, CD4 350-499 cells/mmc, CD4 200-349 cells/mms, CD4 <200 cells/mms) and number of deaths per year.
- Data on AIDS incidence and mortality were available only in Modena Observatory.

## RESULTS

HIV Surveillance data - Modena 1985-2022

The expected data on the number of HIV and AIDS diagnosis over time were aligned with those observed, as shown in Figure 1 a-b.
The number of HIV diagnoses decreased with time, together with the estimate of undiagnosed HIV infections (Figure 1 c-d).
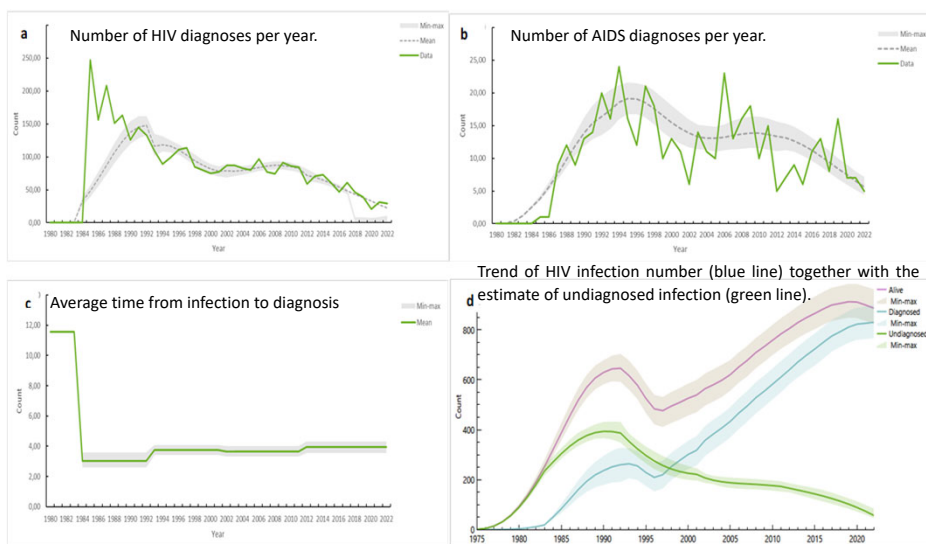
The trends of HIV diagnosis stratified according to CD4 cell count at diagnosis are shown in Figures 2 a-d and the observed data were aligned to the estimates.
The number of HIV diagnosis with CD4>350 cells/mmc decreased over time, while an increase in the proportion of people diagnosed with CD4 count between 200 and 350 cells/mmc was observed in last two years.

Figure 2. Analyses and estimates of HIV infections stratified according to CD4 cell count at diagnosis from Modena Observatory from 1990 to 2022.
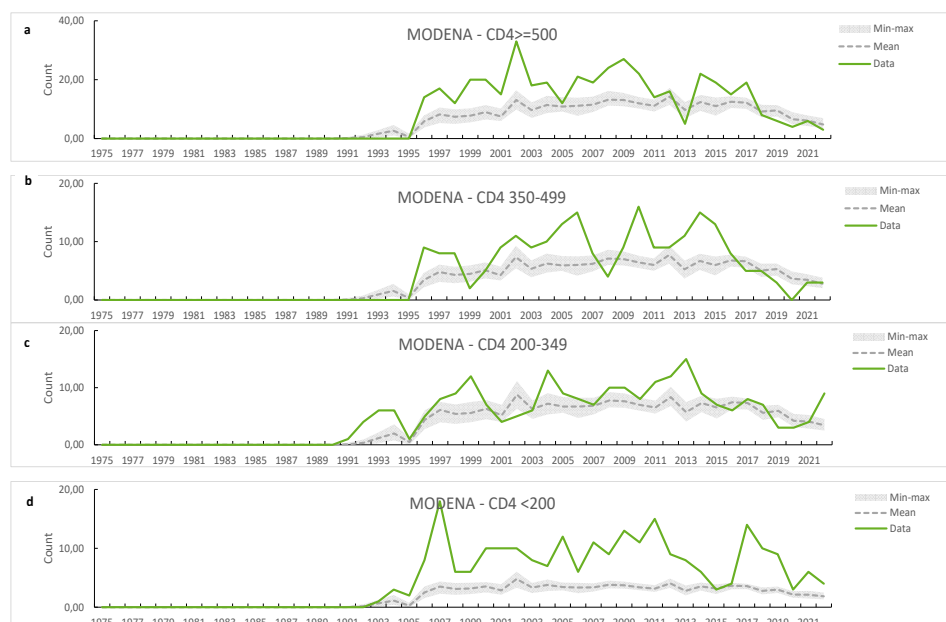
Legend: Number of HIV infection over time according to CD4 cell count strata at diagnosis (a) >= 500 cells/mmc, (b) 350-499 cells/mmc, (c) 200-349 cells/mmc, (d) < 200 cells/mmc.
The green line represents the observed data from Modena Observatory collected since 1990. The dotted grey line represents the estimate according to the ECDC HIV Modelling Platform Tool.

HIV Surveillance data – Emilia Romagna

The trends in terms of progressive reduction over time in number of new HIV and AIDS diagnosis were confirmed at regional level, applying Emilia Romagna HIV surveillance data that, although with a relatively shorter follow up duration, were more powerful in terms of event number. The increase of diagnosis with CD4<350 cells/count was confirmed with regional data, as well (data not shown).
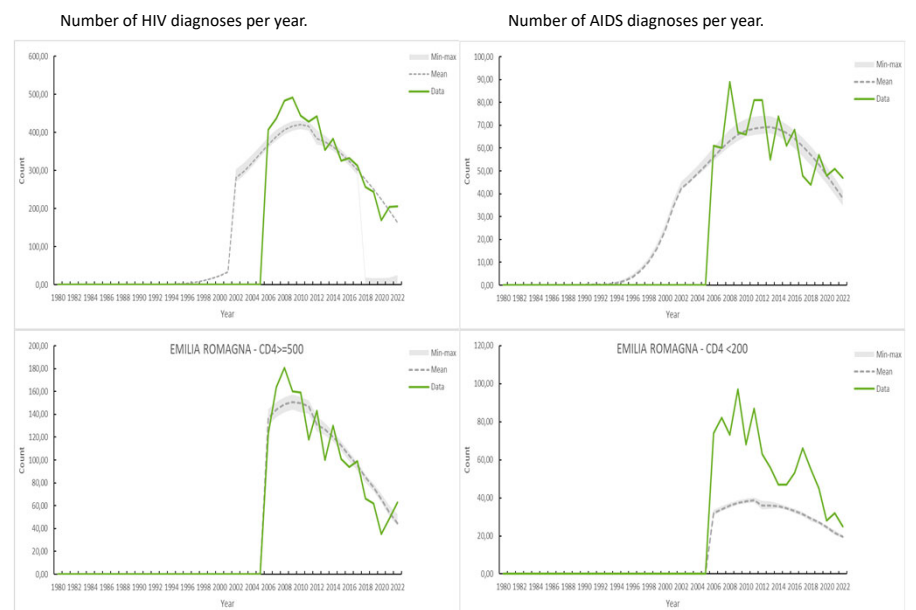
CONCLUSIONS

- The incidence of new HIV infection and AIDS diagnosis decreased during the follow-up time in Modena and Emilia Romagna, in alignment with the estimates modelled by the ECDC HIV Modelling Platform Tool.

- Although the estimate of undiagnosed individuals and the average time between infection and diagnosis both improved over time, there is still a significant proportion of people with late diagnosis.

- This trend could reflect lower HIV transmission levels due to prevention campaigns, changes in the transmission route over the years, effective antiretroviral therapy and pre-exposure prophylaxis introduction in the last years, but more effort should be necessary to reduce time to diagnosis.

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