PE0609

Comparison of HIV clusters in metropolitan France and overseas territories

Noémie RYBAK[1], Guillaume WARTEL[2], Lam NGUYEN[3], Mohamadou NIANG [4], Éric HEDBAUT[1], Stéphanie TEIXEIRA[1], Vanesha KAILANATHAN[1], Kevin DIALLO[2], Stéphane LASTERE[3], Benoit VISSEAUX[1]

1. Laboratoire Cerba, Frépillon, France ; 2. CHU, La Réunion, France ; 3. CHPF, Pirae, Polynésie Française, France
4. CH, Mamoudzou, Mayotte France

noemie.rybak@aphp.fr
benoit.visseaux@lab-cerba.com

Objectives/ Introduction

- Phylogenetic reconstruction allows the identification of HIV recent transmission clusters (RTCs) and the analysis of epidemic dynamics.
- We analyzed the Cerba laboratory database to compare RTCs profiles between metropolitan France and the French overseas territories.

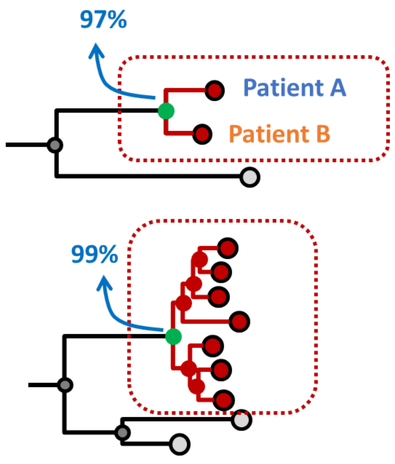

Figure 1. Clusters were defined by a maximum genetic distance of 4.5% or 1.5% and a branch support >90%

Methods

- **Sequence collection**
  - All HIV sequences (protease and retro-transcriptase) of unique patients
  - From the January 2013 to December 2024
  - 8,733 patients (6,195 metropolitan France and 2,538 overseas territories)
- **Phylogenetic reconstruction**
  - Maximum of likelihood using IQ-tree
  - Nucleotide substitution model GTR-G
  - Ultrafast bootstrap (1000 iterations) for branch support evaluation
- **Cluster identification**
  - Constraint hierarchical clustering (R/Python *in house* scripts)
  - Maximal genetic distances thresholds at 4.5% and <1.5%
  - Branch support value >90%
- **Data analyses**
  - Addition of associated data
  - Data description and statistical analyses using Python

Results

- **Sequencing coverage** was not uniform across all territories (Figure 2 and Table 1). This may impact the proportion of patients included into clusters, but not the age or sex ratio description *(Mazrouee et al. Sci Rep 12, 19230 (2022))*.
- **1,162 clusters** were identified at the 4.5% genetic distance threshold, and **633** at the 1.5% threshold.
- **Overseas territories** presented higher clustering rates than metropolitan France (Figure 3).
- Patients from overseas territories **were overrepresented in large clusters** (>10 patients) (71.7% of patients at the 4.5% threshold; OR 6.56; p <0.001).

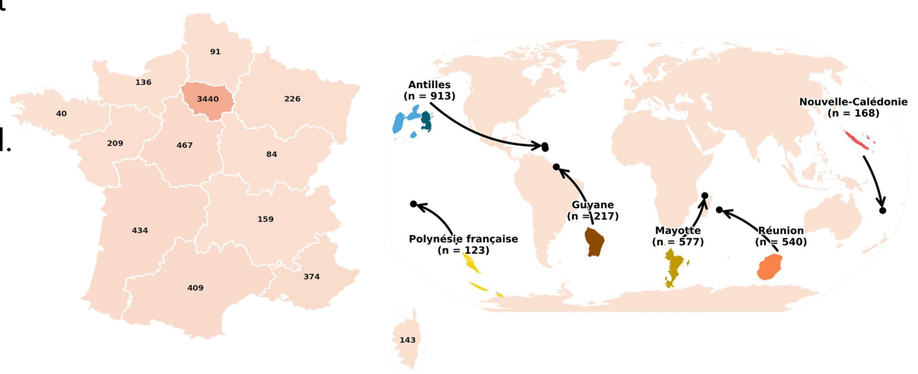

Figure 2. Distribution of included sequences across French territories

	HIV new diagnostics (2013-24)	N available sequences (patients)	Database coverage estimation
Metropolitan France	56607	6156	11%
La Réunion	580	540	93%
Mayotte	669	577	86%
Guadeloupe *(French Antilles)*	1263	452	36%
French Guiana	2564	217	8%

Table 1. Estimated sequence database coverage, based on the number of new diagnostics across territories (Santé Publique France). No consolidated data available for New Caledonia and French Polynesia (ongoing).

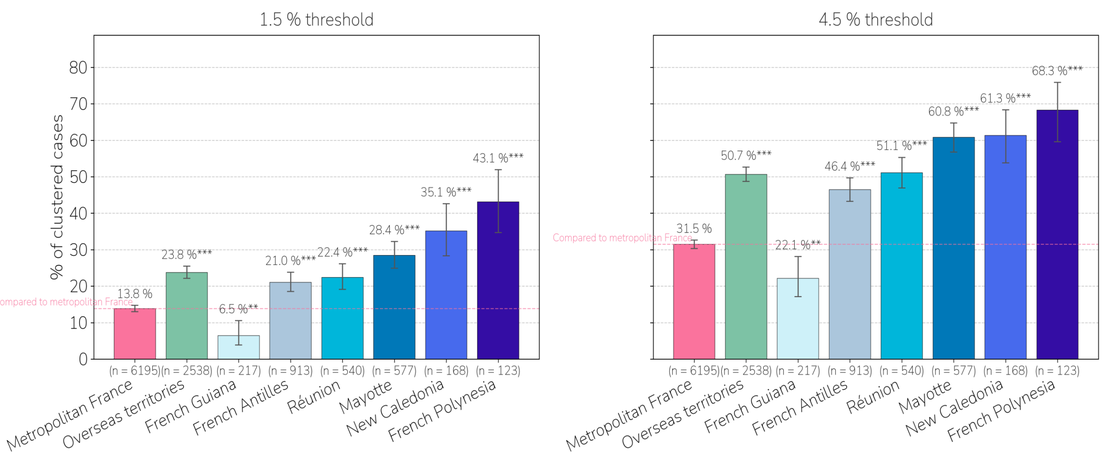

Figure 3. Proportion of clustered cases in metropolitan France and overseas territories

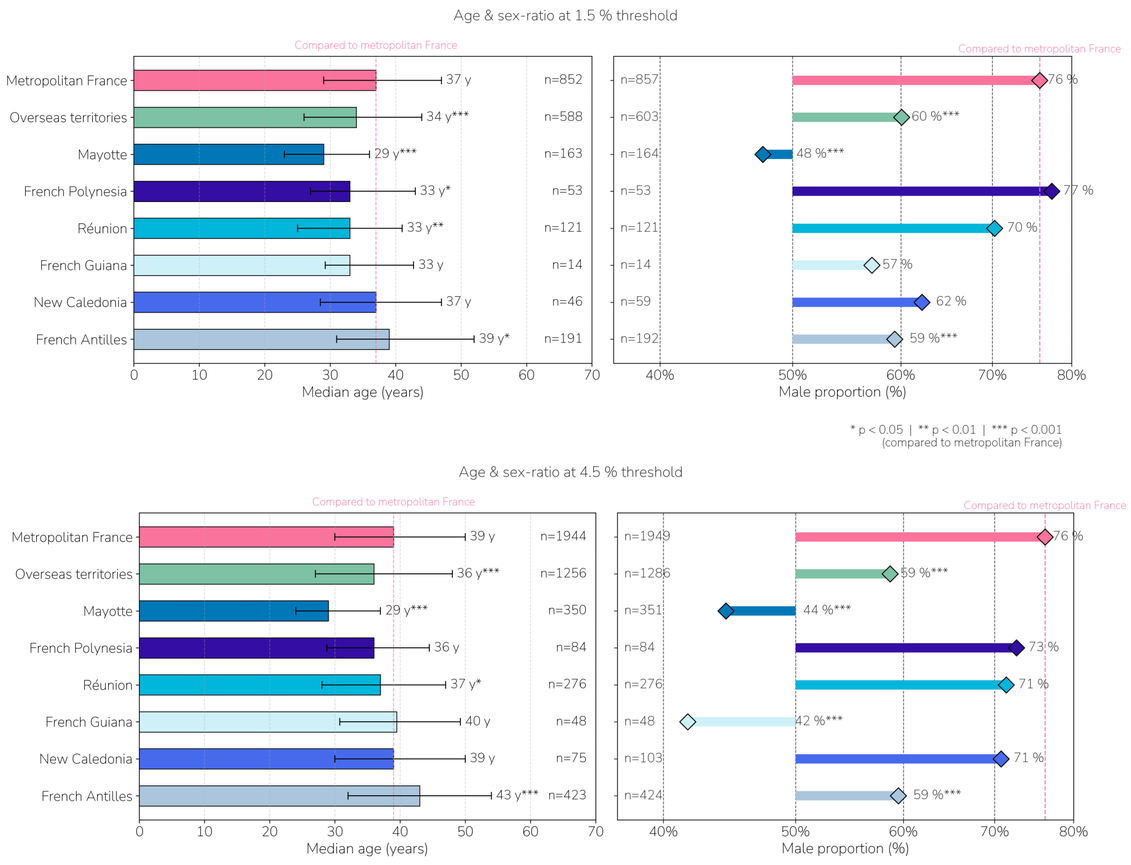

Figure 4. Distribution of median age and sex ratio of patients identified into recent transmission clusters across French territories

Sex and age distributions differed between overseas territories (Figure 4)

- In Mayotte, clustered cases were **significantly younger** and showed a **reversed sex ratio** compared with Metropolitan France.
- In French Polynesia, clustered cases were significantly younger and showed a higher proportion of males compared with Metropolitan France.

Some regions exhibited strong regional co-occurrence (Figure 3)

- Mayotte and Réunion exhibited **strong regional co-occurrence**, with numerous cases clustering both between these regions and with Metropolitan France.
- French Polynesia and New Caledonia exhibited more limited regional co-occurrence, with cases clustering between these regions but not with Metropolitan France, suggesting a potential geographic barrier or island effect.

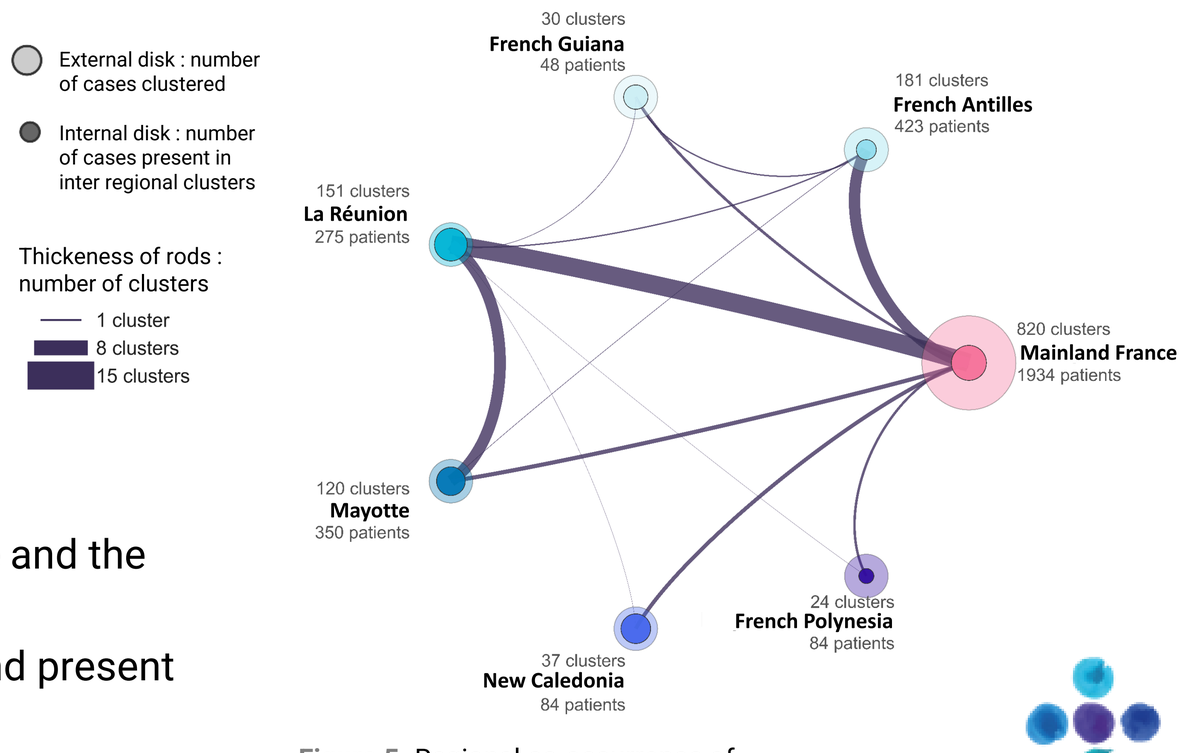

Figure 5. Regional co-occurrence of clustered cases at 4.5% threshold

Conclusion

- HIV clustering dynamics are different between metropolitan France and the overseas territories.
- Overseas clusters tend to be larger, composed of younger cases and present different male-to-female ratios compared to metropolitan France.
- These dynamics can help to locally adapt screening and prevention policies.

Cerba

ESCMID Global
Congress of the European Society of Clinical Microbiology and Infectious Diseases