

A: Datasheet

Algorithm: vts\_003

Developer: Viettel Group

Submission Date: 2022\_07\_14

Template size: 2048 bytes

Template time (2.5 percentile): 696 msec

Template time (median): 703 msec

Template time (97.5 percentile): 710 msec

Investigation:

Mugshot webcam ranking 15 (out of 337) — FNIR(1600000, 0, 1) = 0.0071 vs. lowest 0.0055 from sensetime\_008

Mugshot profile ranking 33 (out of 306) — FNIR(1600000, 0, 1) = 0.0744 vs. lowest 0.0521 from sensetime\_007

Immigration visa–border ranking 31 (out of 264) — FNIR(1600000, 0, 1) = 0.0016 vs. lowest 0.0006 from cloudwalk\_mt\_001

Immigration visa–kiosk ranking 8 (out of 209) — FNIR(1600000, 0, 1) = 0.0497 vs. lowest 0.0395 from cloudwalk\_mt\_001

Identification:

Frontal mugshot ranking 52 (out of 375) — FNIR(1600000, T, L+1) = 0.0073, FPIR=0.001000 vs. lowest 0.0013 from sensetime\_008

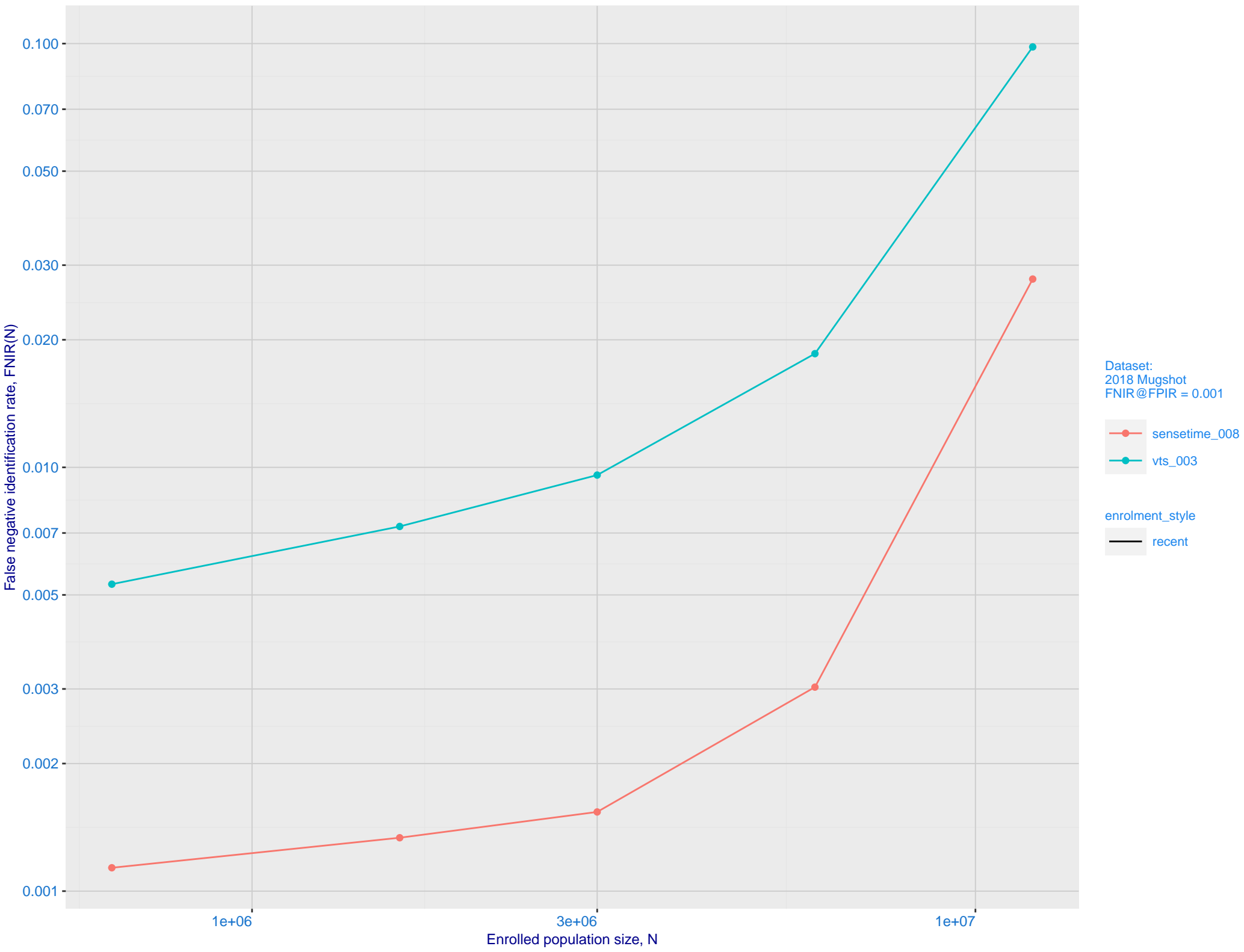
Mugshot webcam ranking 52 (out of 335) — FNIR(1600000, T, L+1) = 0.0328, FPIR=0.001000 vs. lowest 0.0090 from sensetime\_008

Mugshot profile ranking 258 (out of 305) — FNIR(1600000, T, L+1) = 0.9999, FPIR=0.001000 vs. lowest 0.0698 from cloudwalk\_mt\_001

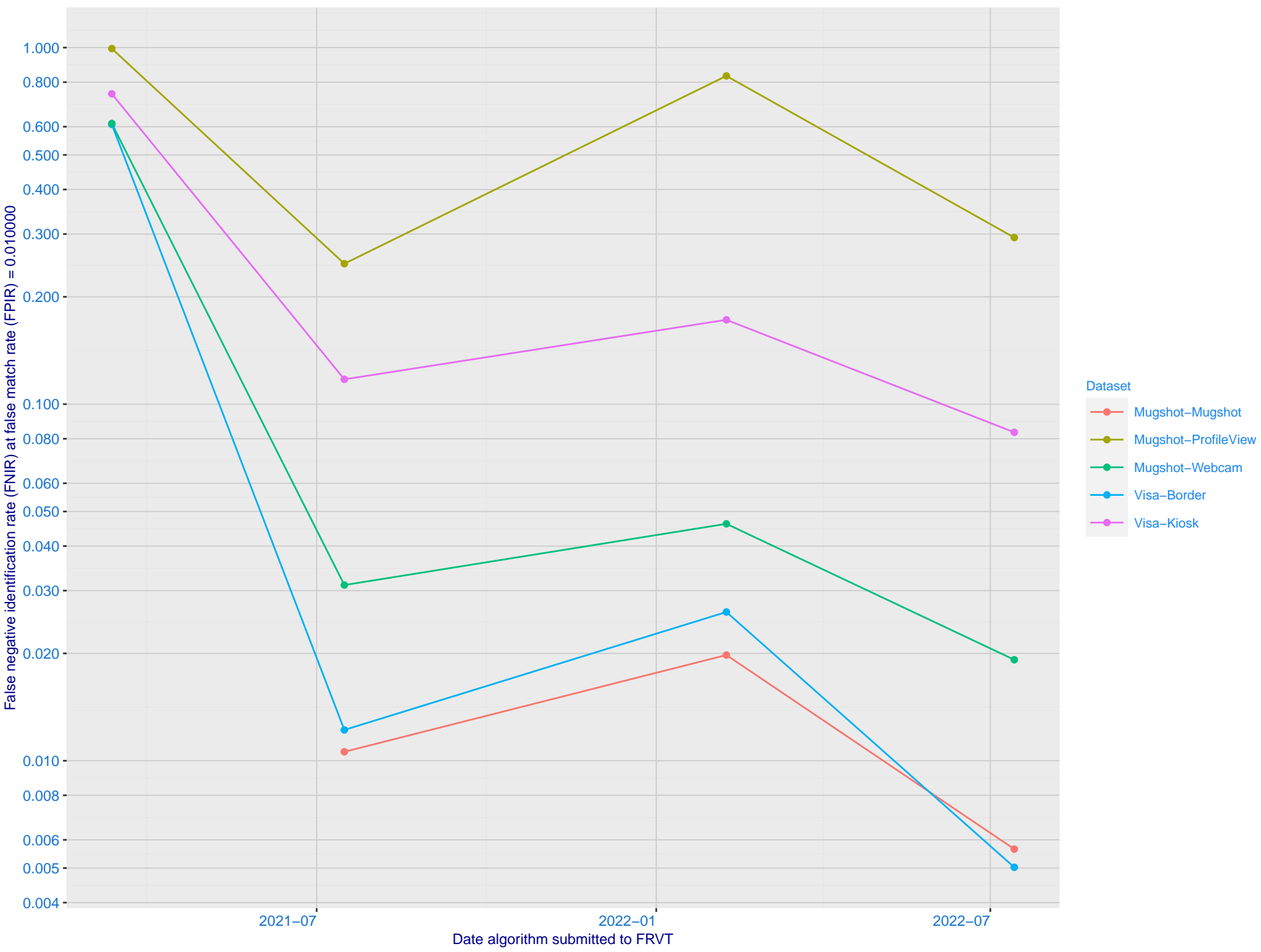
Immigration visa–border ranking 53 (out of 263) — FNIR(1600000, T, L+1) = 0.0135, FPIR=0.001000 vs. lowest 0.0013 from cloudwalk\_mt\_001

Immigration visa–kiosk ranking 153 (out of 209) — FNIR(1600000, T, L+1) = 0.6705, FPIR=0.001000 vs. lowest 0.0532 from cloudwalk\_mt\_001

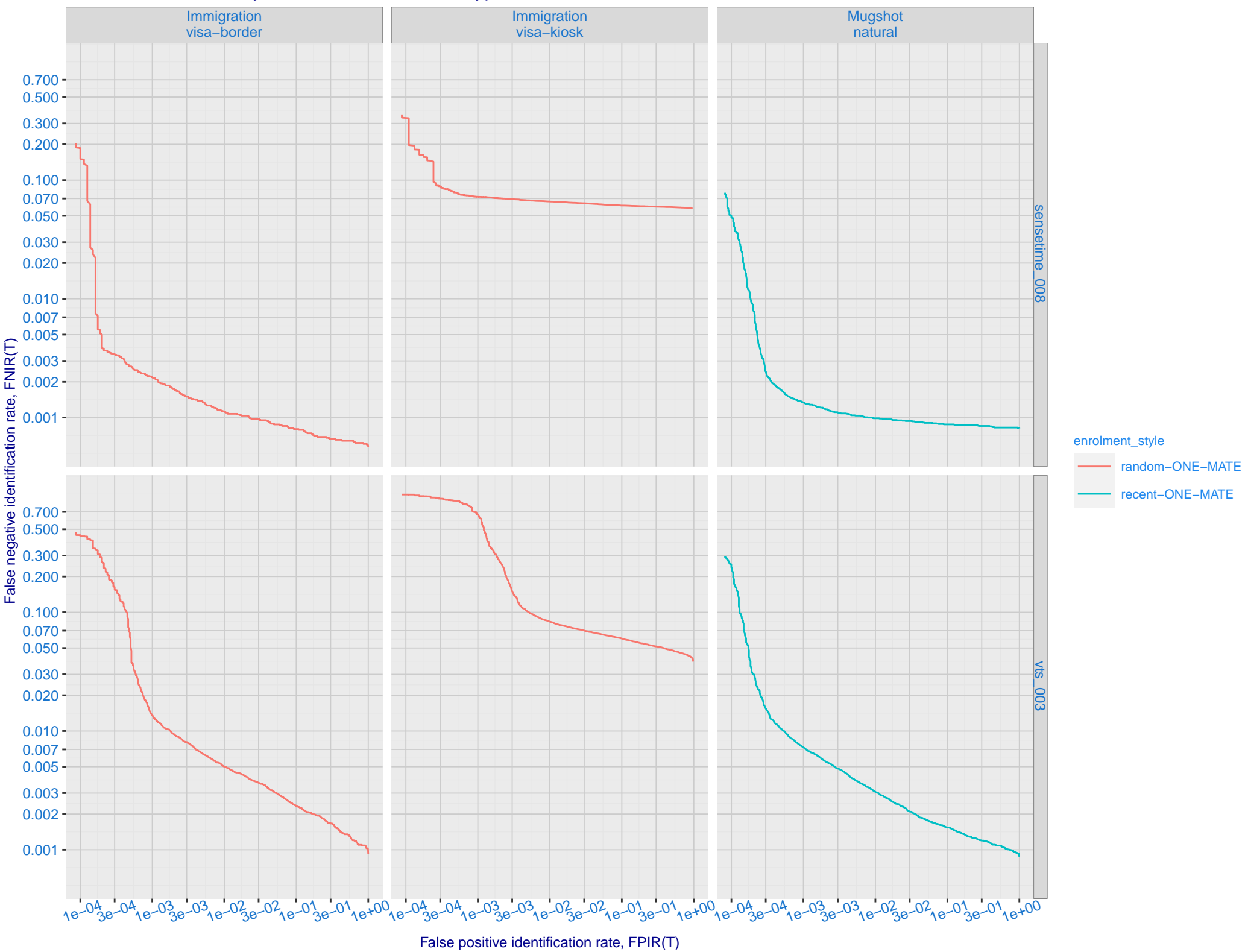
B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (sensetime\_008)



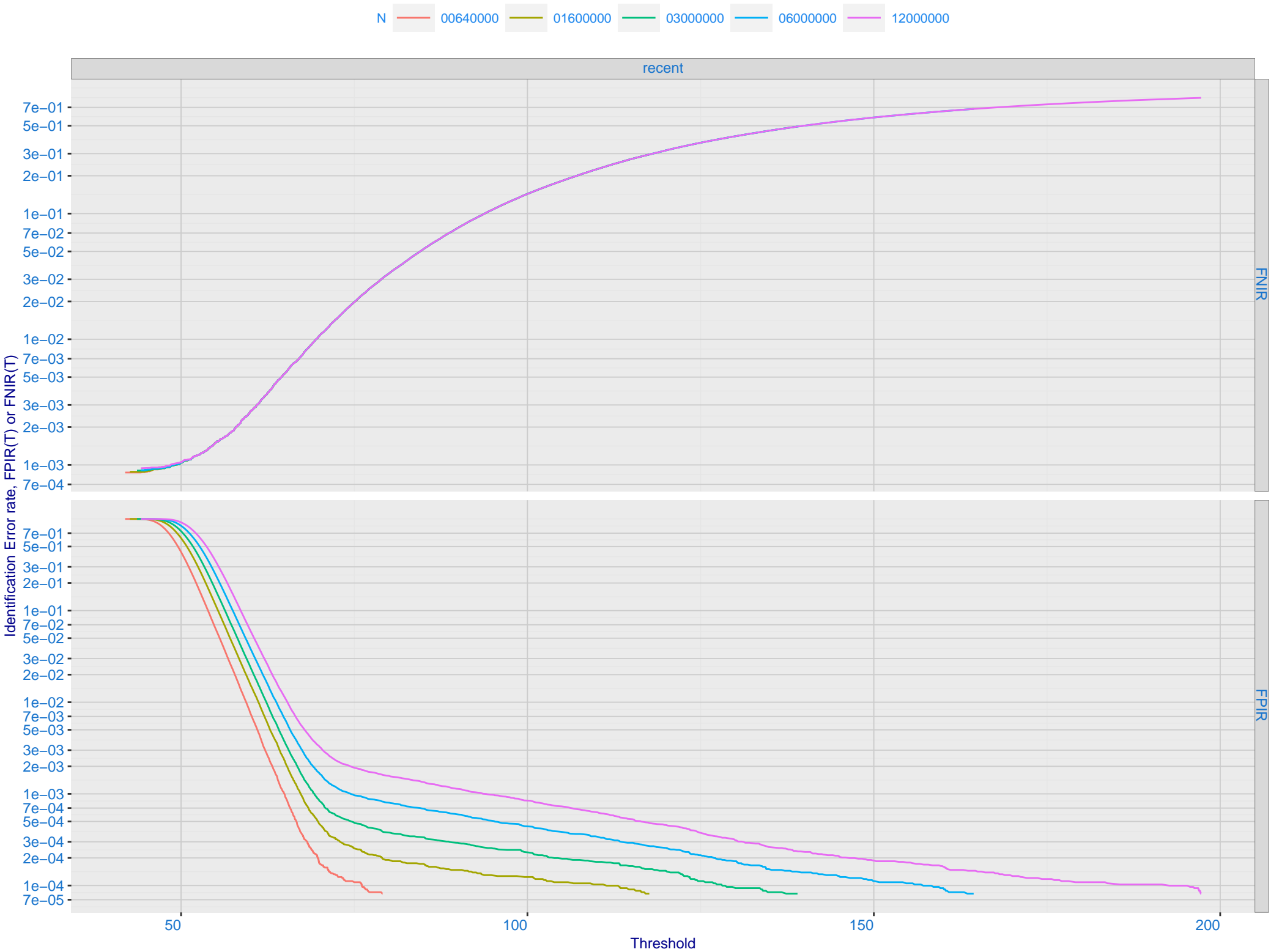
C: Evolution of accuracy for VTS algorithms on three datasets 2018 – present



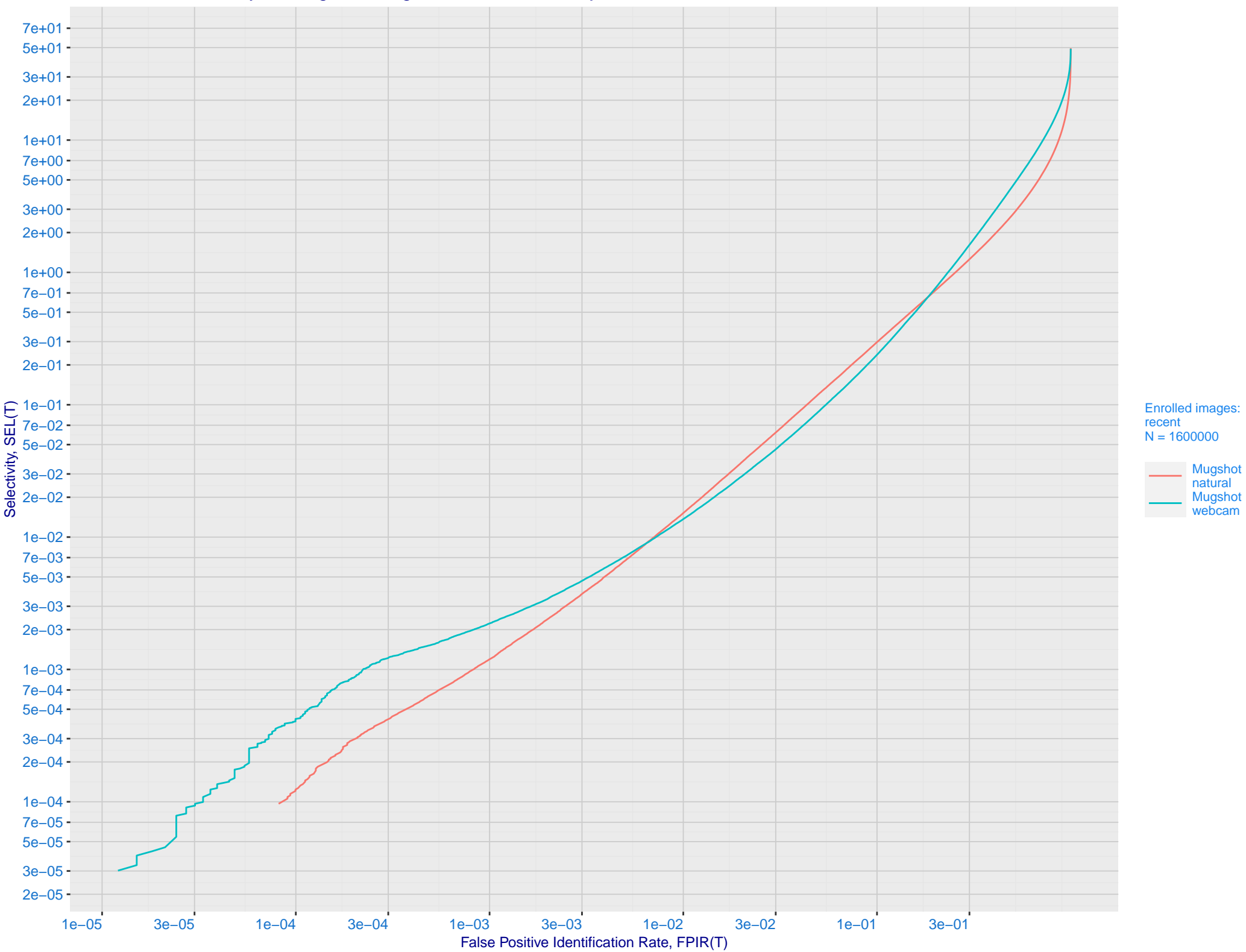
D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals



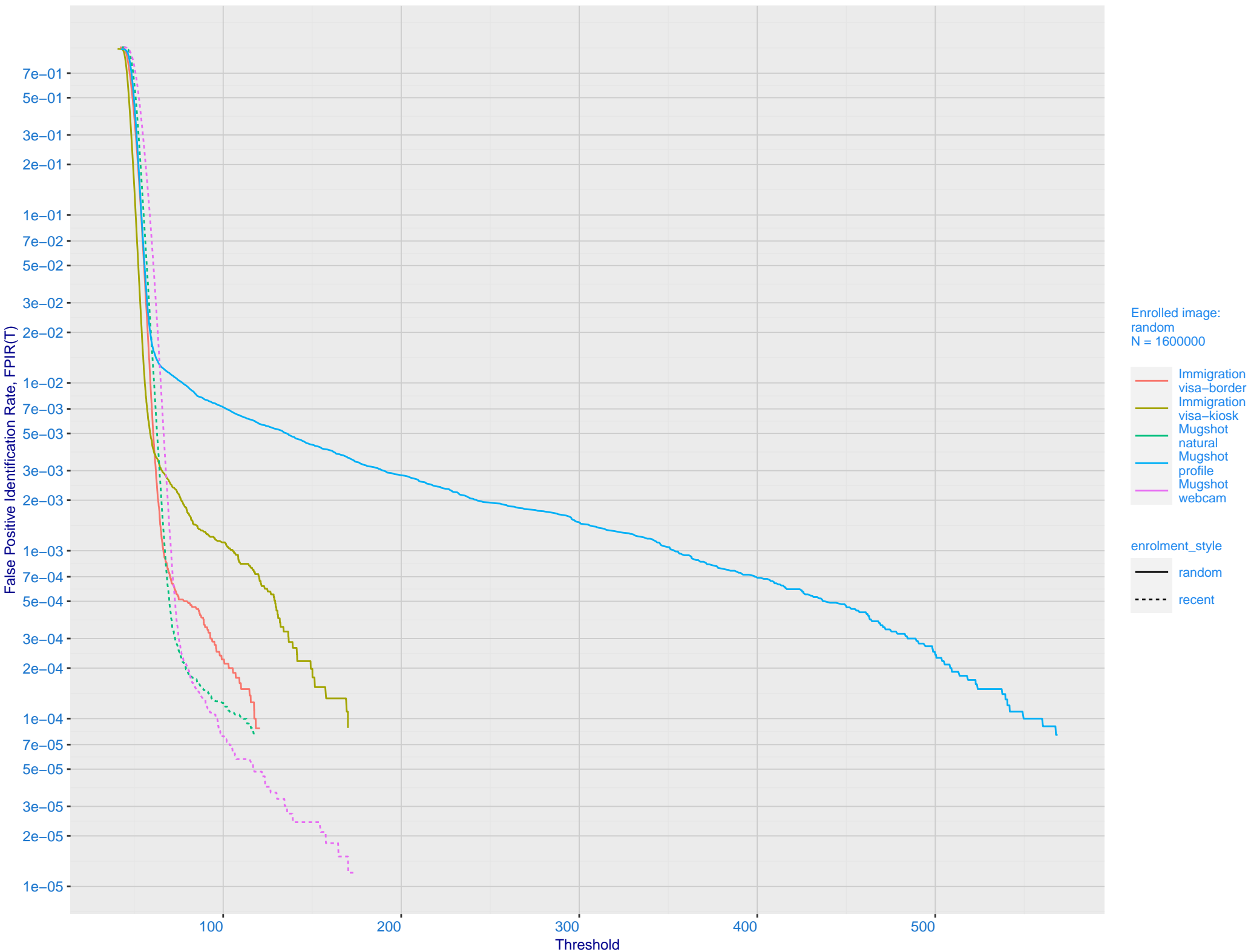
E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images



F: FPIR vs. Selectivity for mugshot images, N = 1600000 subjects enrolled with one recent mate

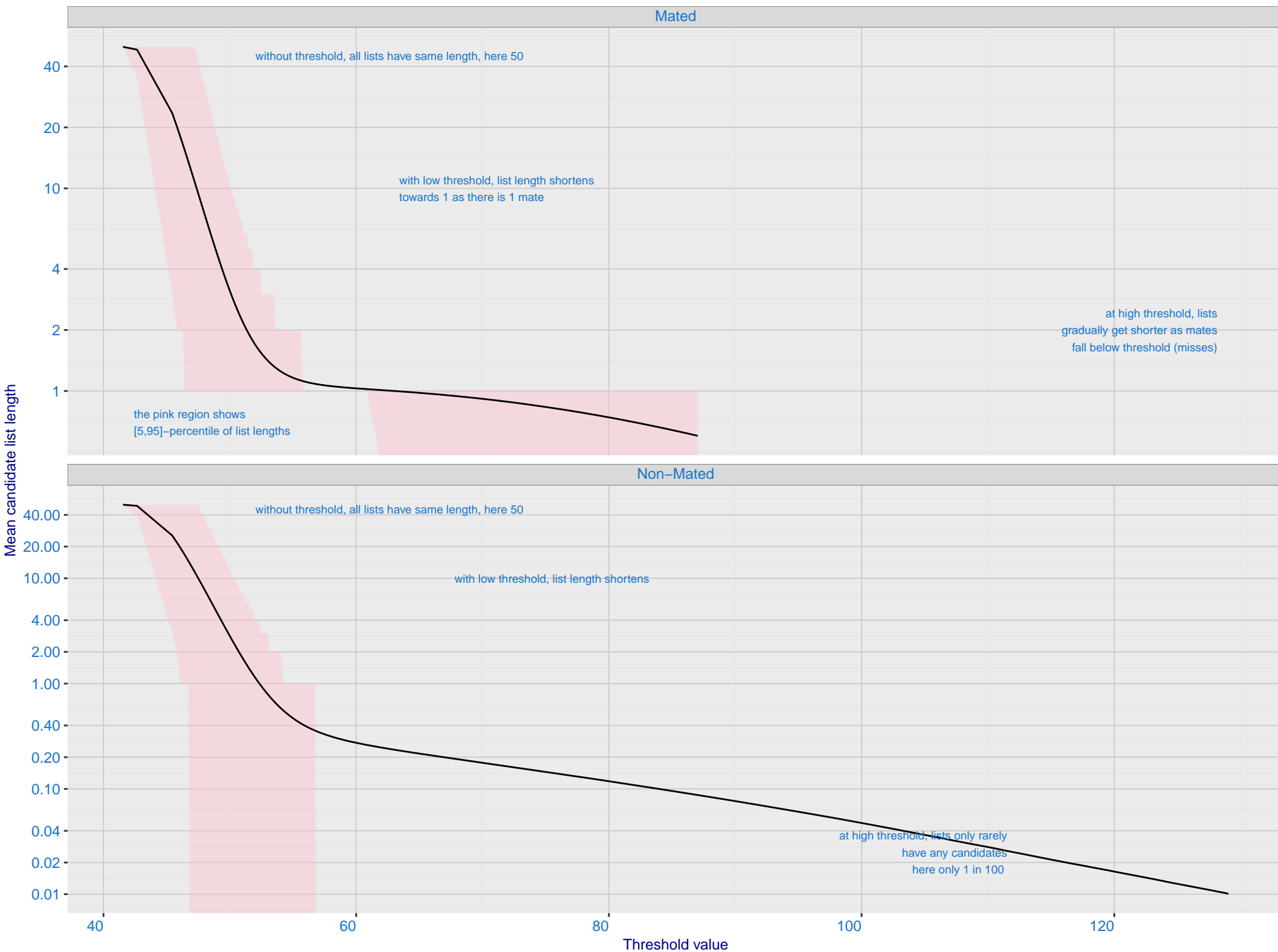


G: FPIR dependence on T by probe type for N = 1600000 subjects



# H: Reduced length candidate lists for human review

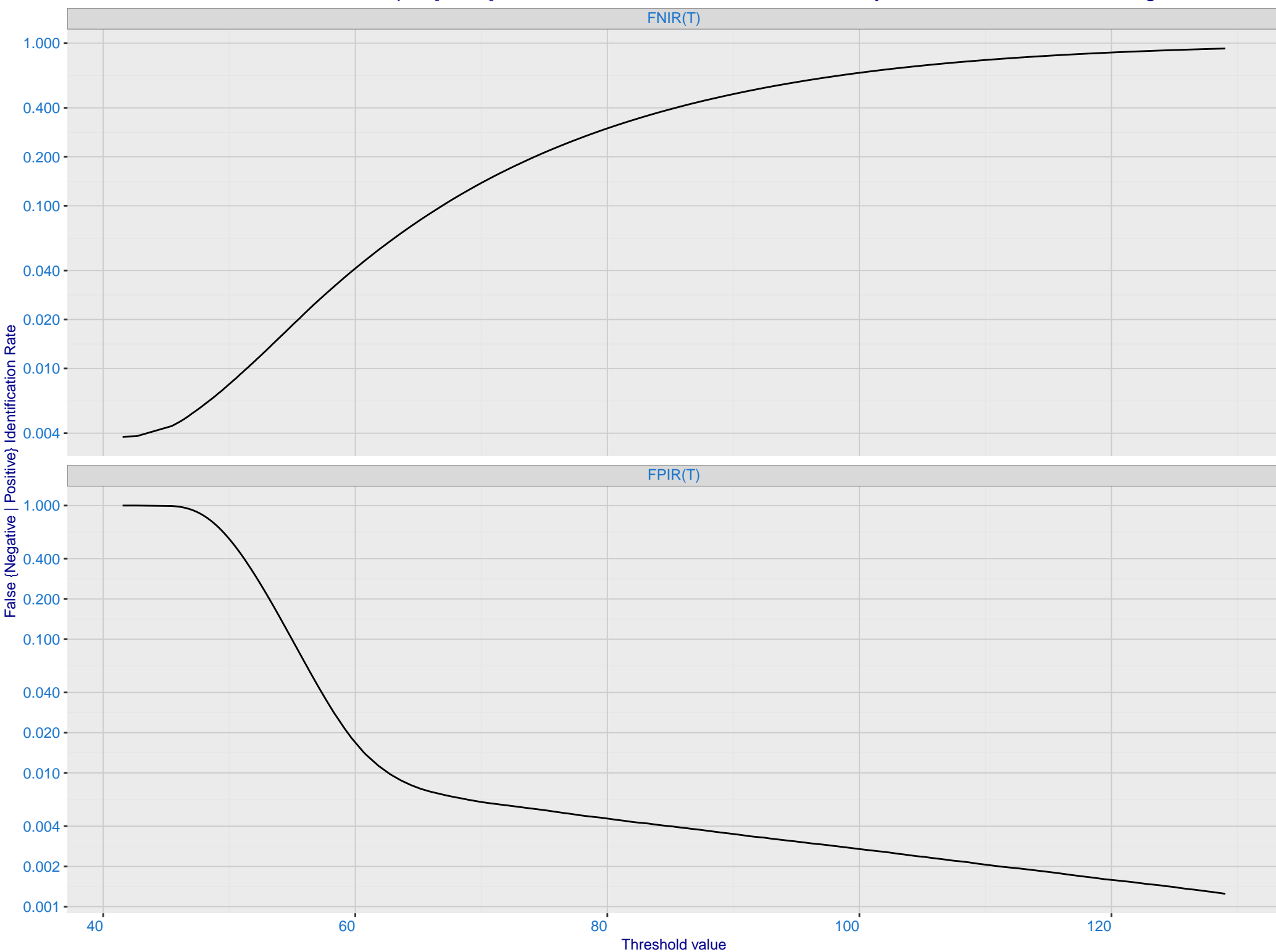
Dataset is border–border with time–lapse [10,15] YRS with N = 1600000. Probes are 10–15 years later than enrollment image



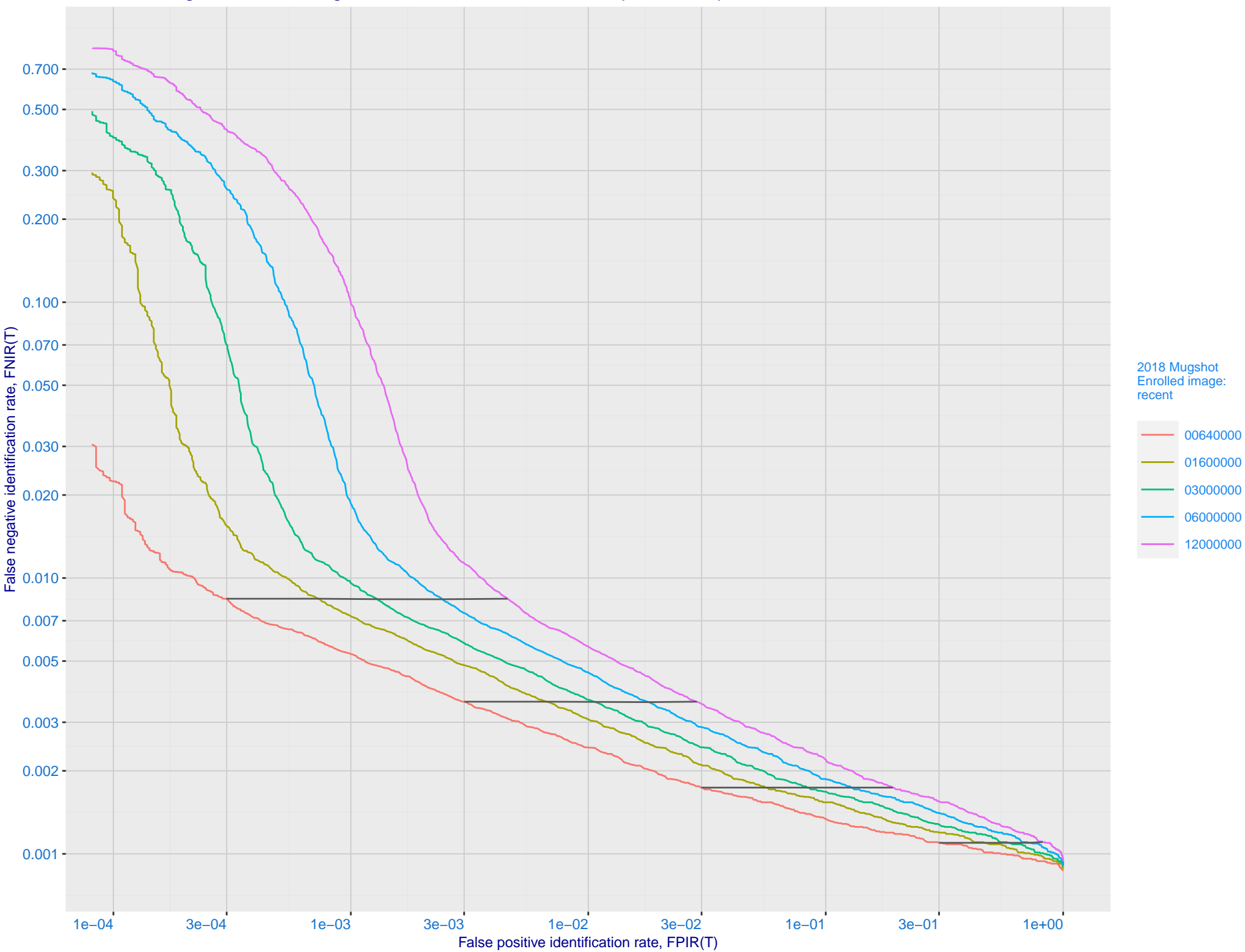


# I: FNIR and FPIR dependence on threshold

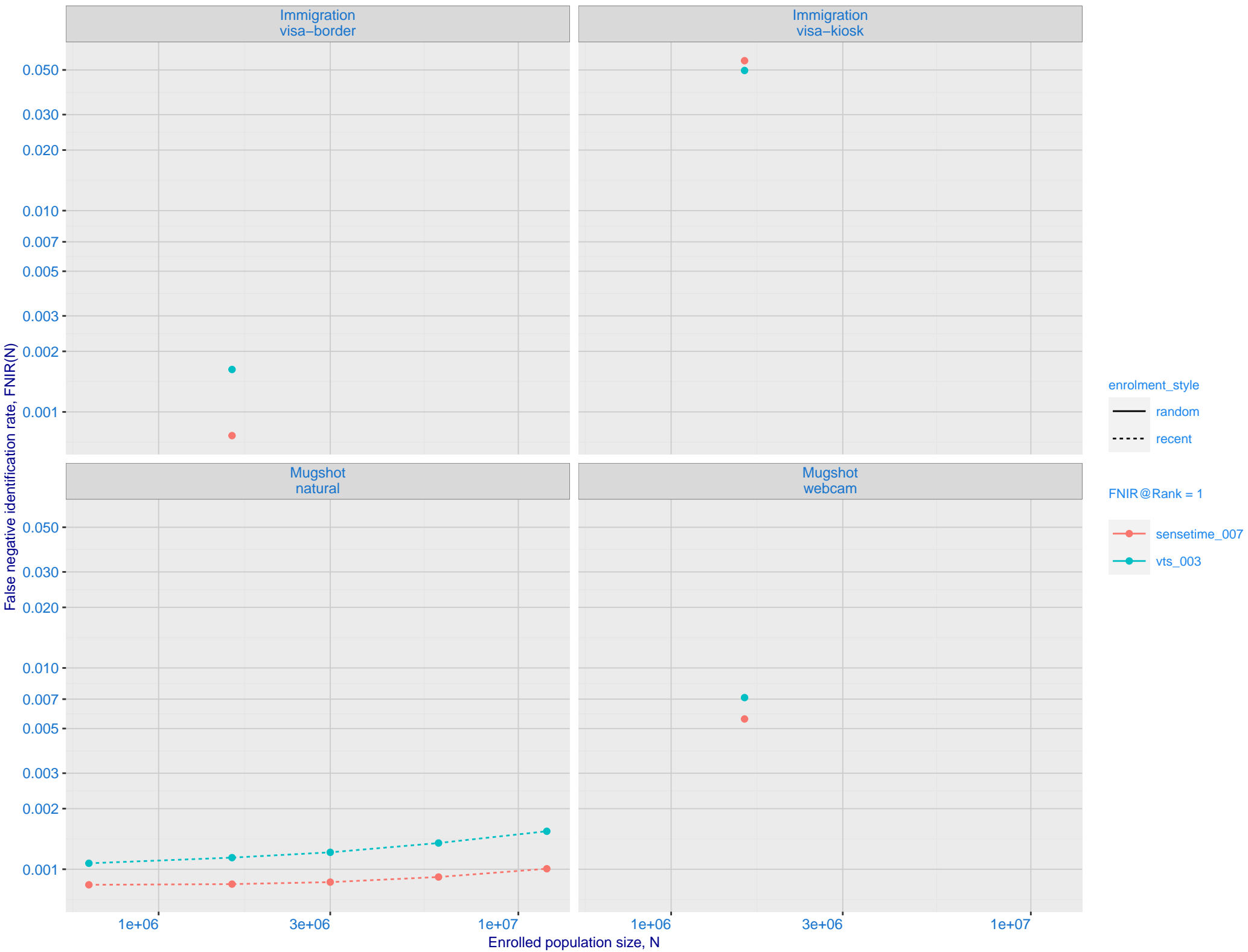
Dataset is border-border with time-lapse [10,15] YRS with N = 1600000. Probes are 10-15 years later than enrollment image



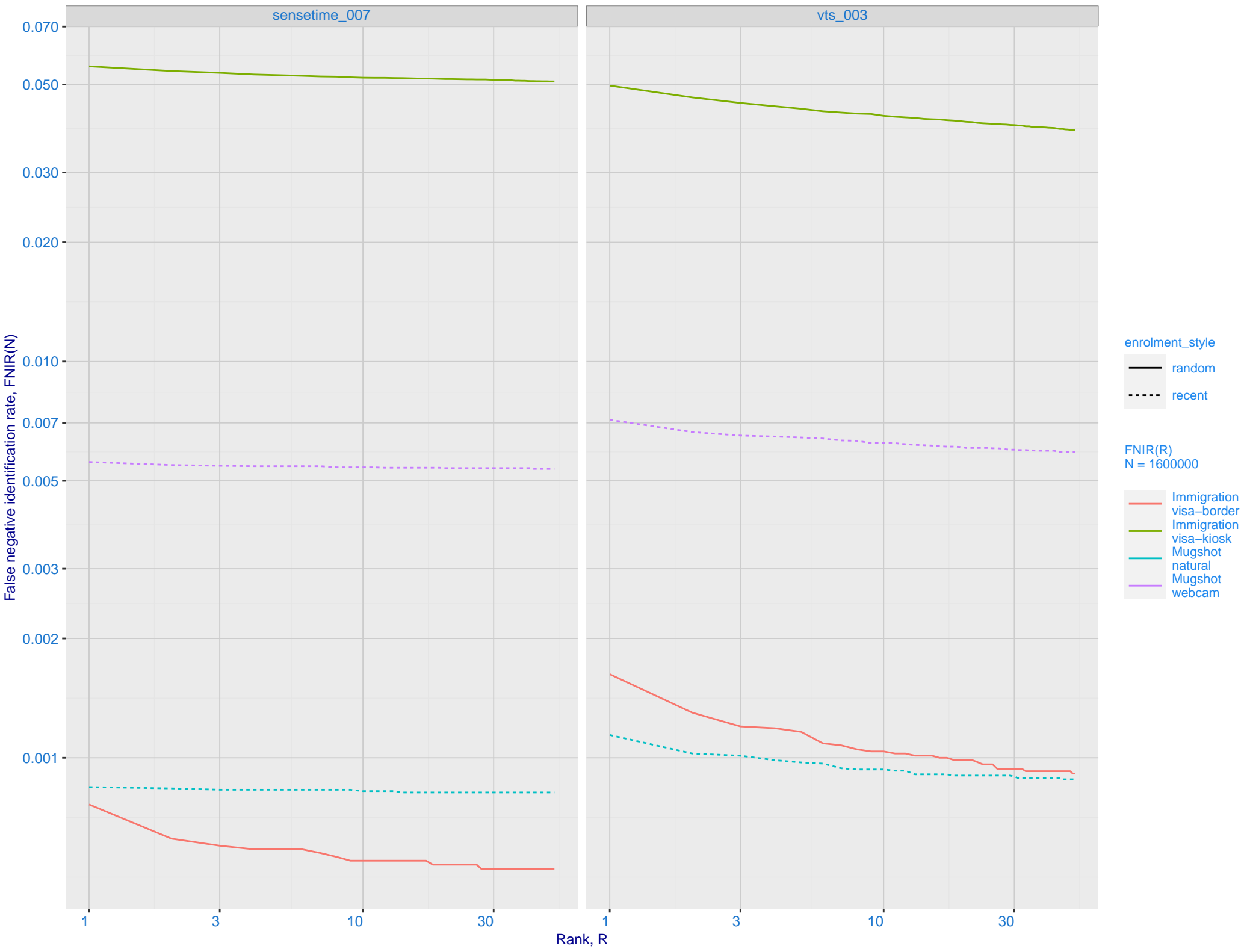
J: DET for Mugshot natural images and various N. Links connect points of equal threshold.



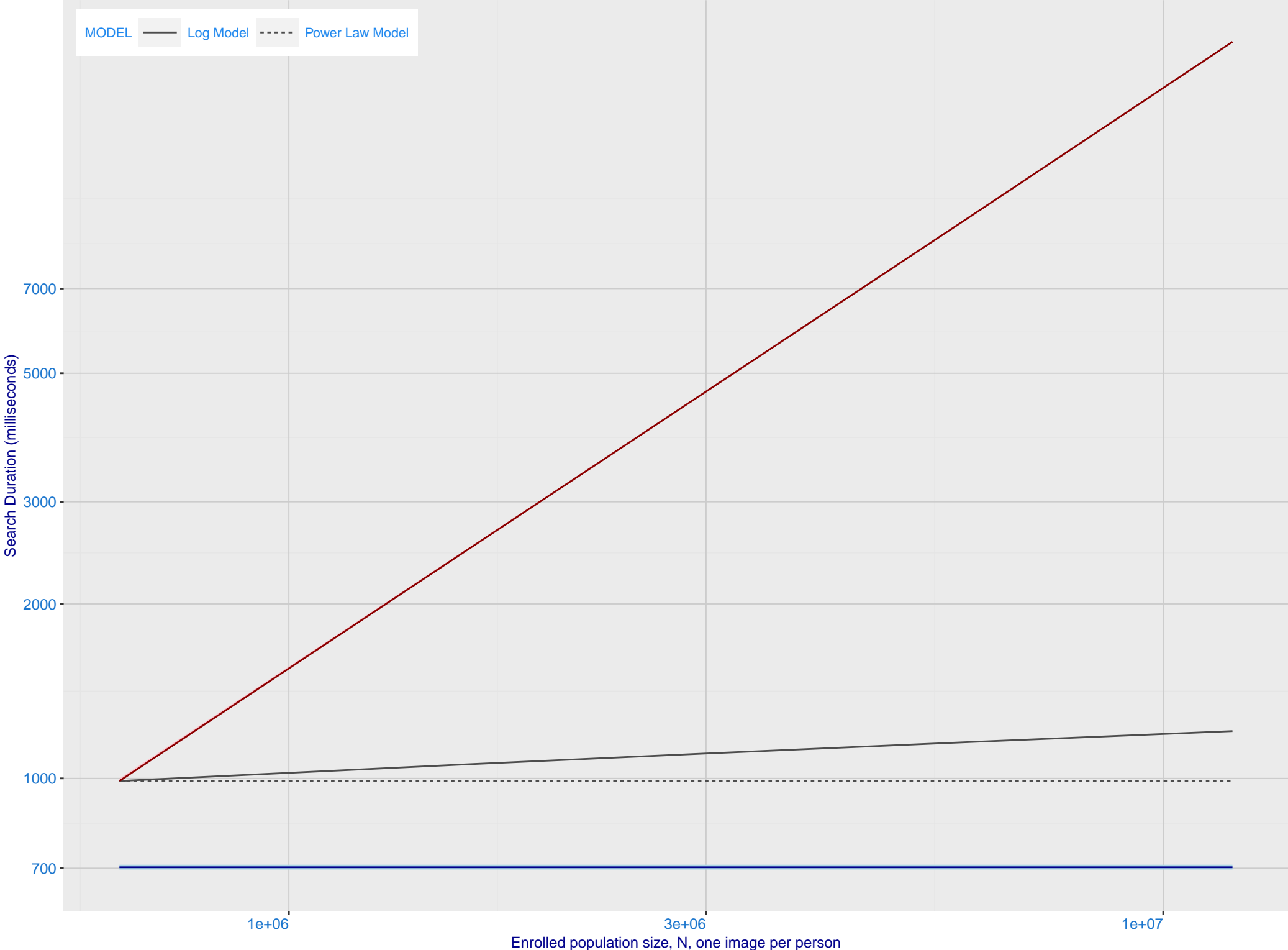
K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime\_007)



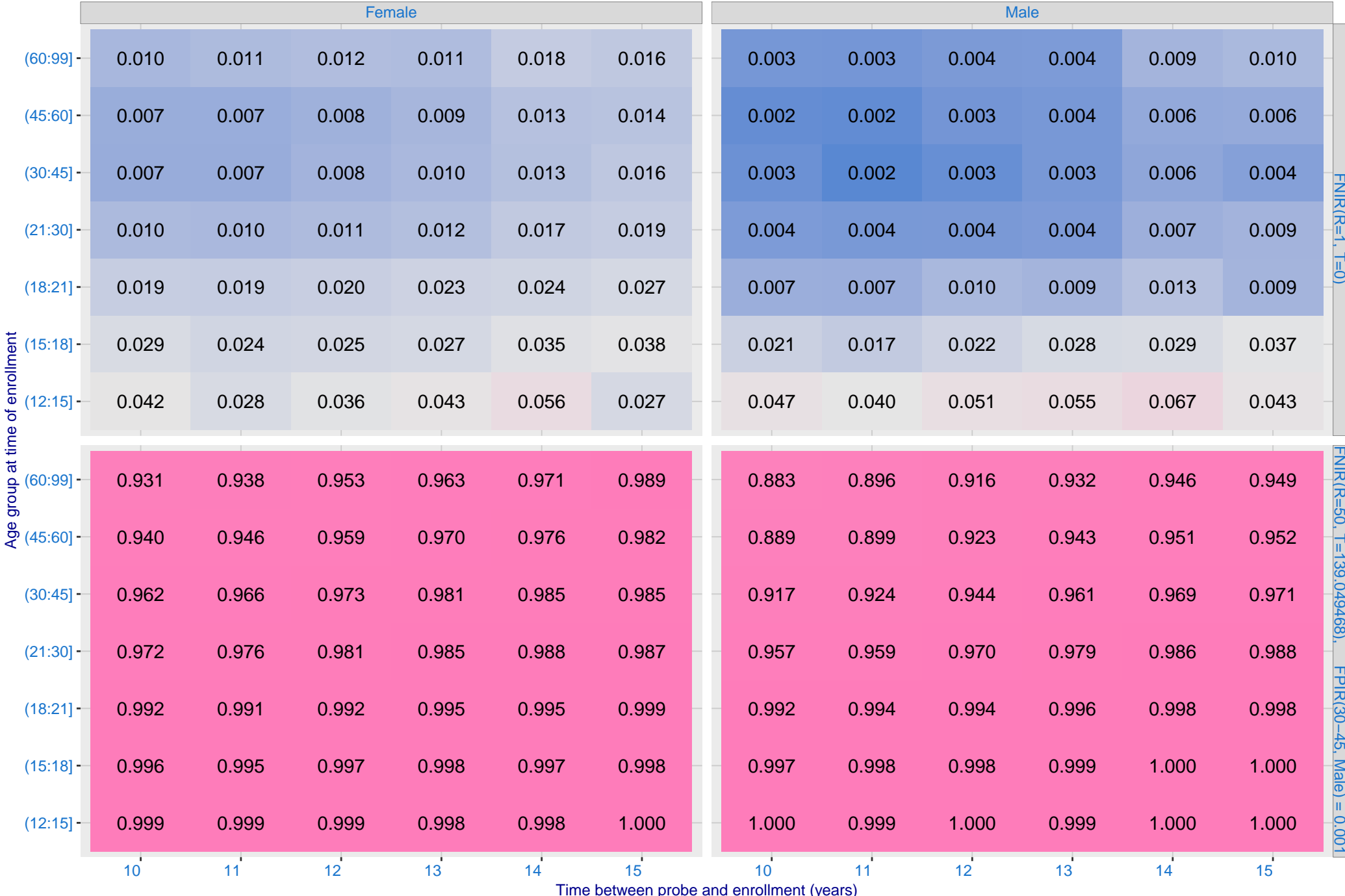
L: Investigational mode: FNIR(1600000, R, 0) by probe type



M: Template duration; search duration vs. N. The blue and pink ribbon covers 95 percent of observed measurements. The template generation time is independent of N. The log and power-law models are fit to the first two (N,T) observations



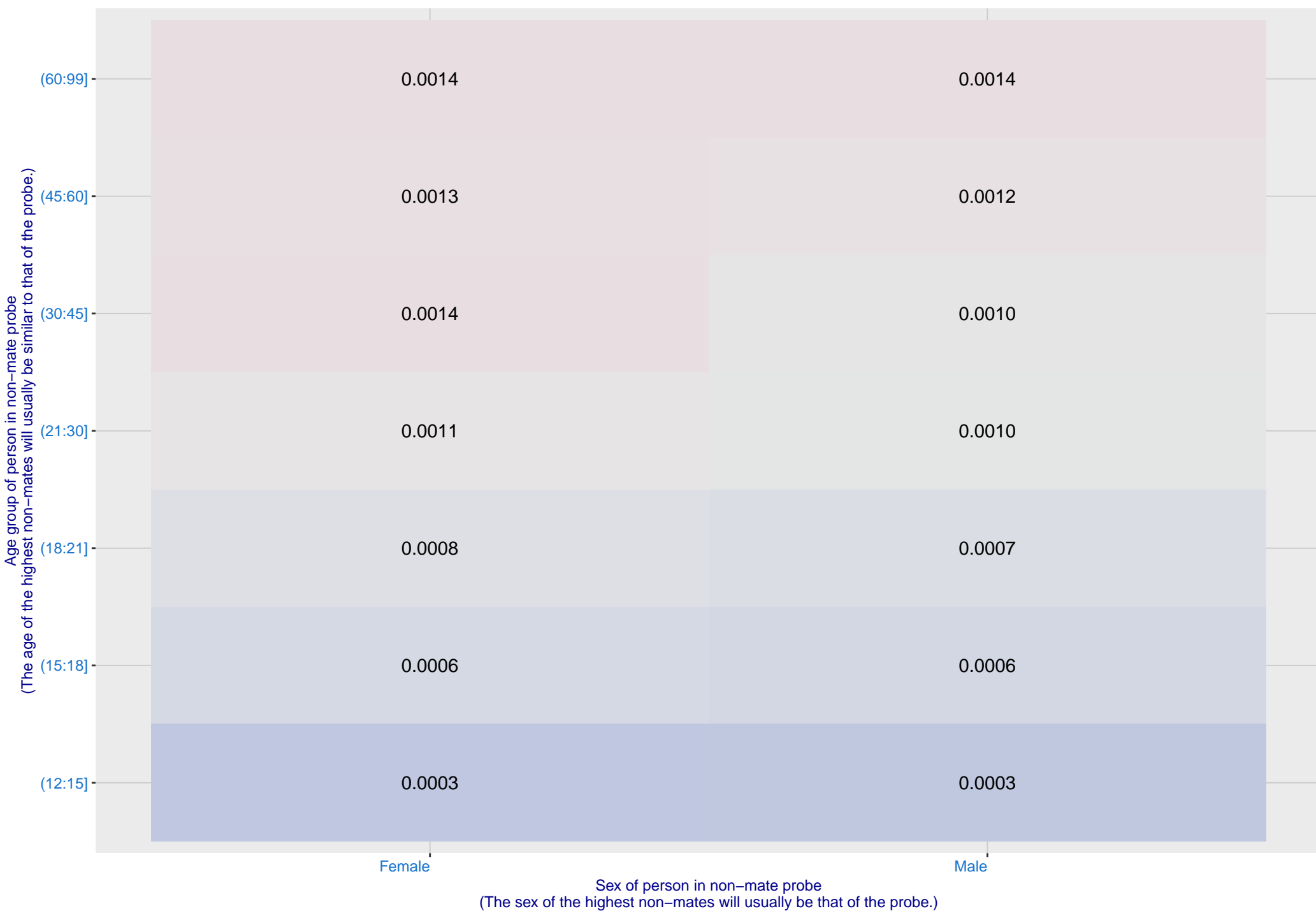
O: FNIR(T, N = 1.6 million) by sex, age and time-lapse. The top row gives investigational rank-1 miss rates. The bottom panels give high threshold for more lights-out identification with low FPIR.



P: FPIR(N = 1.6 million) by sex and age. It is typical for false positive identification rates to be higher in women except in their teens.

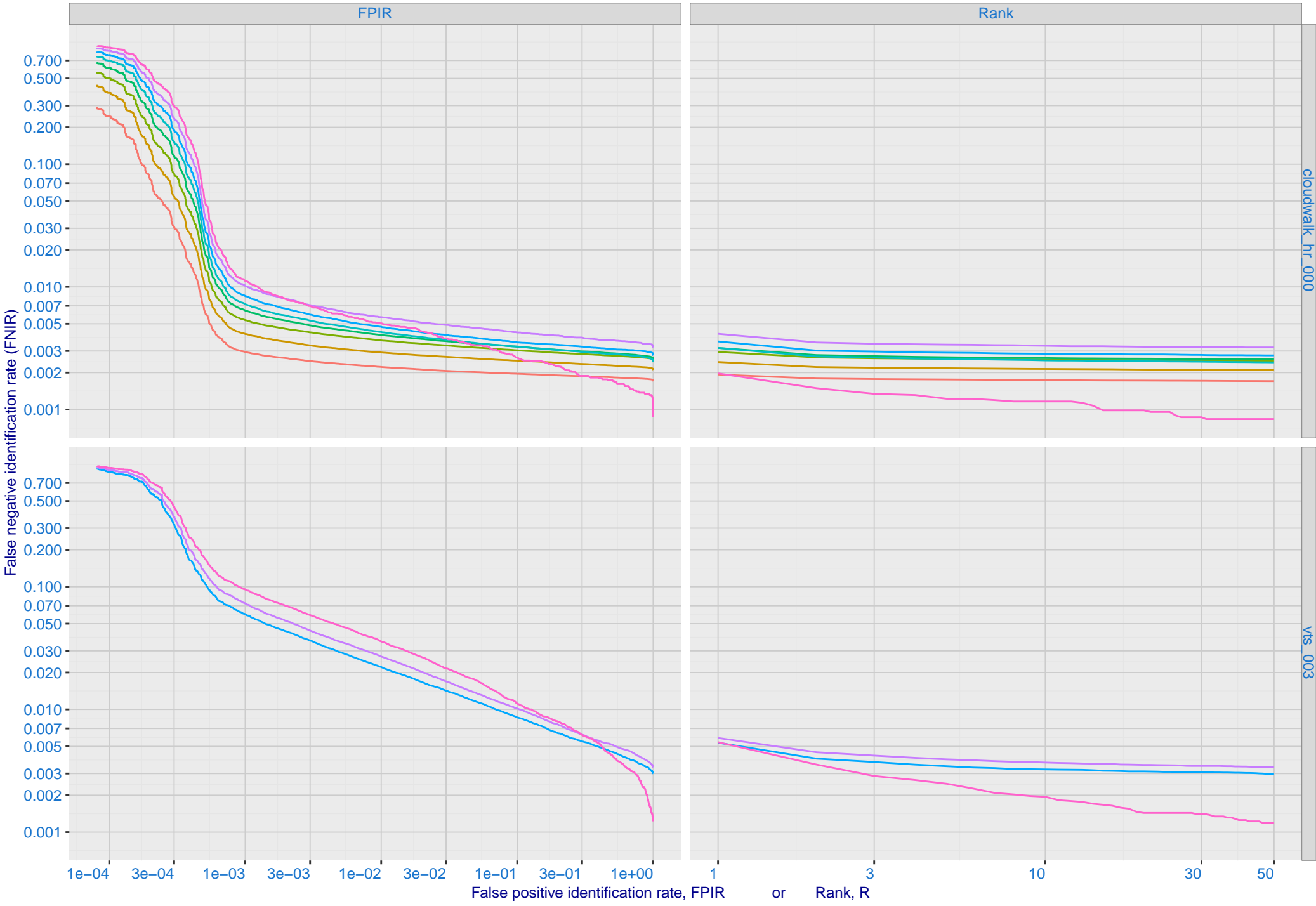
Algorithm: vts\_003, Dataset: Border-Crossing Ageing  
Threshold: 139.049468 set to achieve FPIR(30–45, Male) = 0.001

Color encodes  $\log(\text{FPIR})$



Q: Identification FNIR(N, T, L+1) and Investigational FNIR(N, 0, R) under ageing

Dataset: 2018 Mugshot N = 3068801





R: Decline of genuine scores with ageing, with some eventually dropping below typical thresholds shown by the horizontal lines

