A: Datasheet

Algorithm: imagus_008

Developer: Imagus Technology Pty Ltd

Submission Date: 2022_05_26

Template size: 2048 bytes

Template time (2.5 percentile): 405 msec

Template time (median): 446 msec

Template time (97.5 percentile): 463 msec

Investigation:

Mugshot webcam ranking 281 (out of 337) –– FNIR(1600000, 0, 1) = 0.0933 vs. lowest 0.0055 from sensetime_008

Mugshot profile ranking 100 (out of 306) –– FNIR(1600000, 0, 1) = 0.3051 vs. lowest 0.0521 from sensetime_007

Immigration visa–border ranking 179 (out of 264) –– FNIR(1600000, 0, 1) = 0.0213 vs. lowest 0.0006 from cloudwalk_mt_001

Immigration visa–kiosk ranking 121 (out of 209) –– FNIR(1600000, 0, 1) = 0.1104 vs. lowest 0.0395 from cloudwalk_mt_001

Identification:

Frontal mugshot ranking 363 (out of 375) –– FNIR(1600000, T, L+1) = 0.9739, FPIR=0.001000 vs. lowest 0.0013 from sensetime_008

Mugshot webcam ranking 307 (out of 335) –– FNIR(1600000, T, L+1) = 0.7722, FPIR=0.001000 vs. lowest 0.0090 from sensetime_008

Mugshot profile ranking 176 (out of 305) –– FNIR(1600000, T, L+1) = 0.9956, FPIR=0.001000 vs. lowest 0.0698 from cloudwalk_mt_001

Immigration visa–border ranking 215 (out of 263) –– FNIR(1600000, T, L+1) = 0.5202, FPIR=0.001000 vs. lowest 0.0013 from cloudwalk_mt_001

Immigration visa–kiosk ranking 154 (out of 209) –– FNIR(1600000, T, L+1) = 0.7059, FPIR=0.001000 vs. lowest 0.0532 from cloudwalk_mt_001
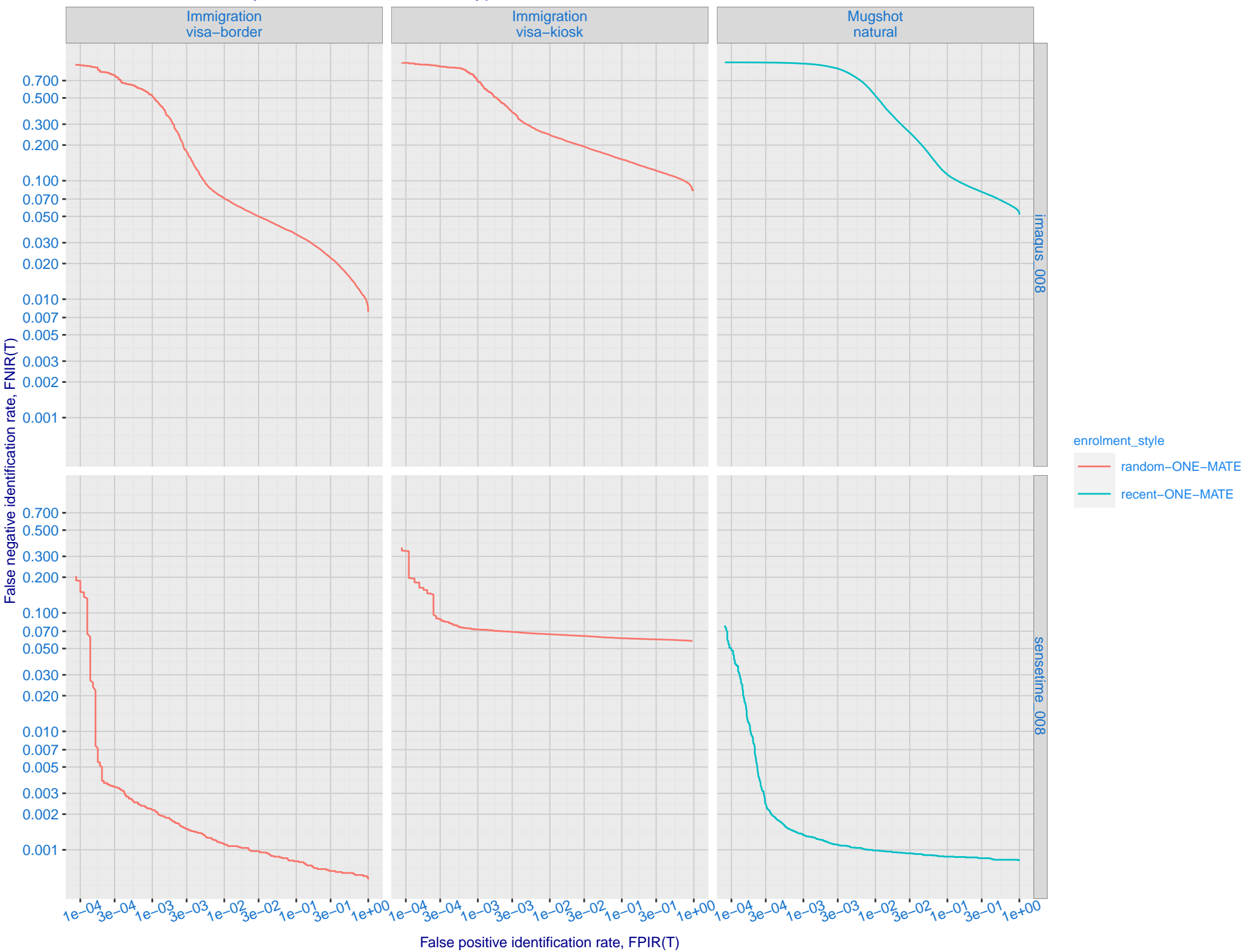
B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (sensetime_008)
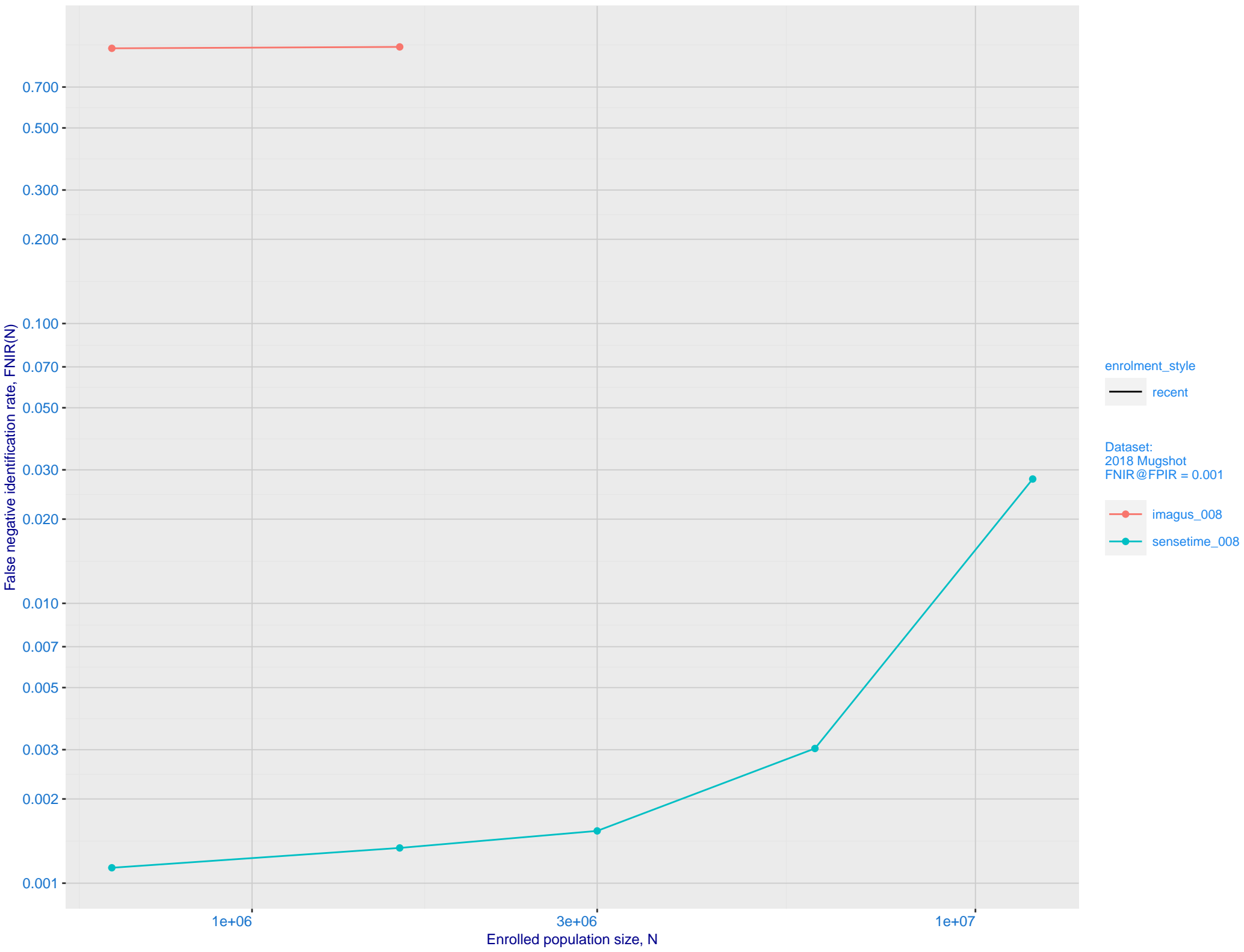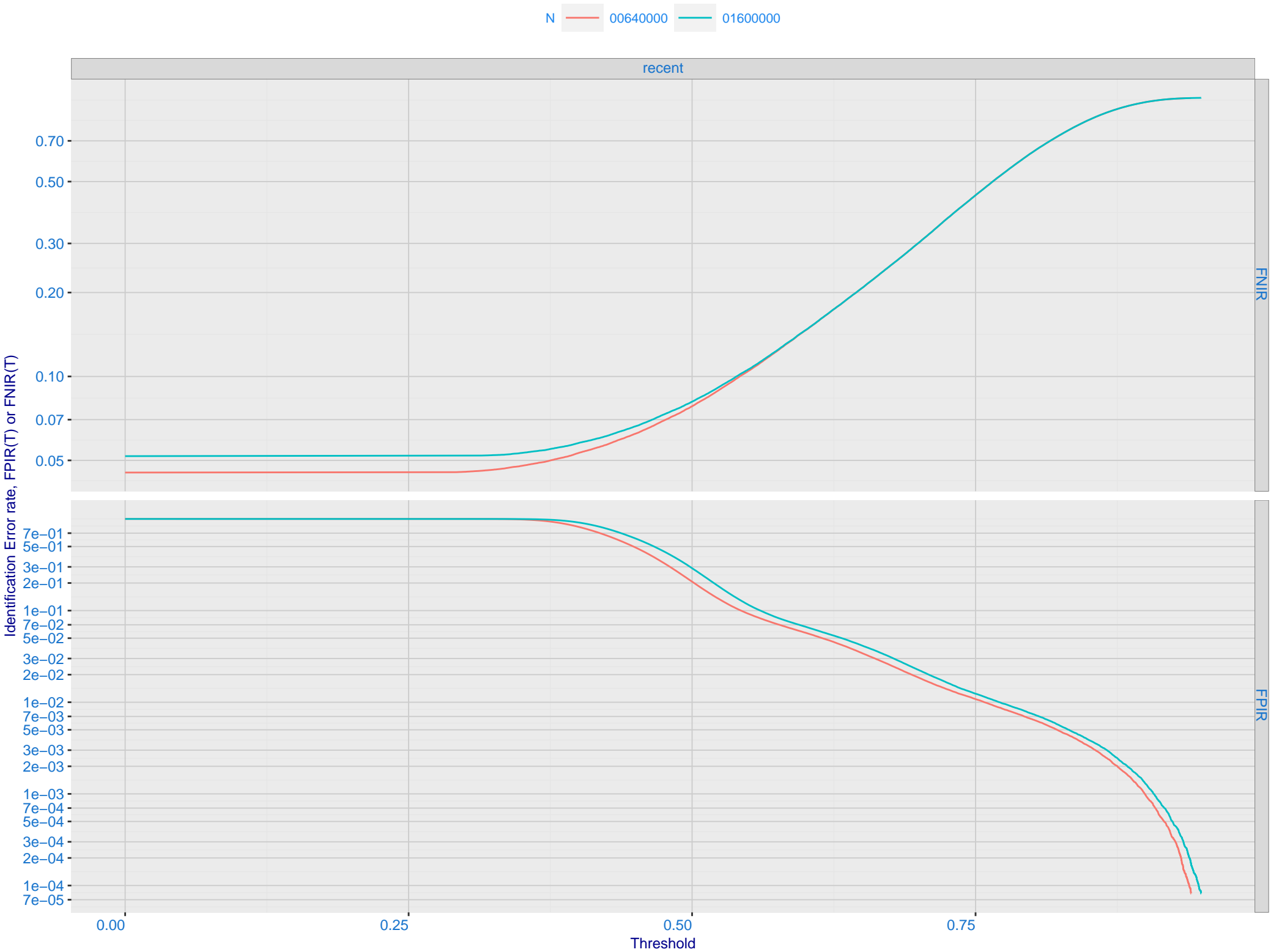
C: Evolution of accuracy for IMAGUS algorithms on three datasets 2018 – present
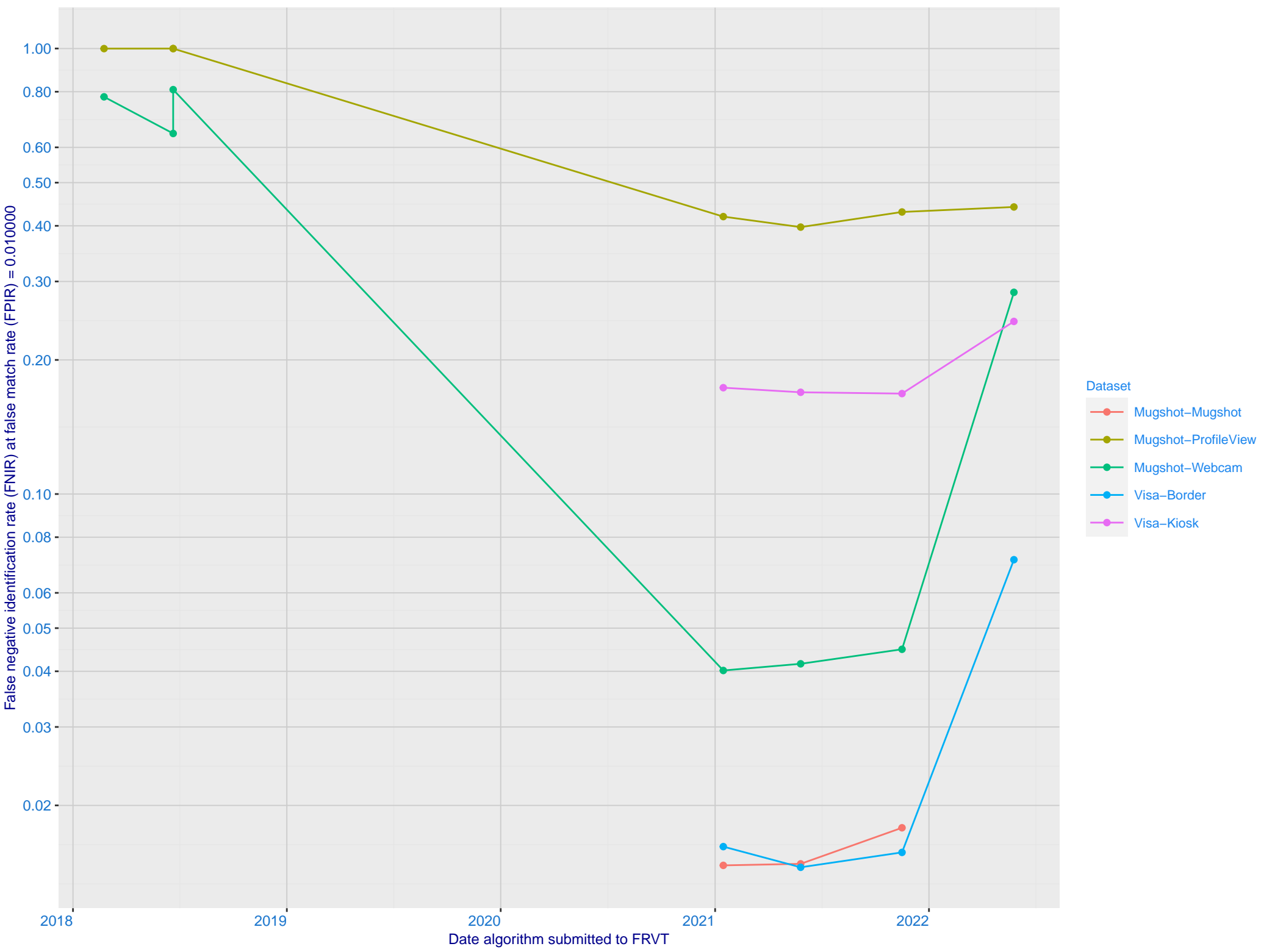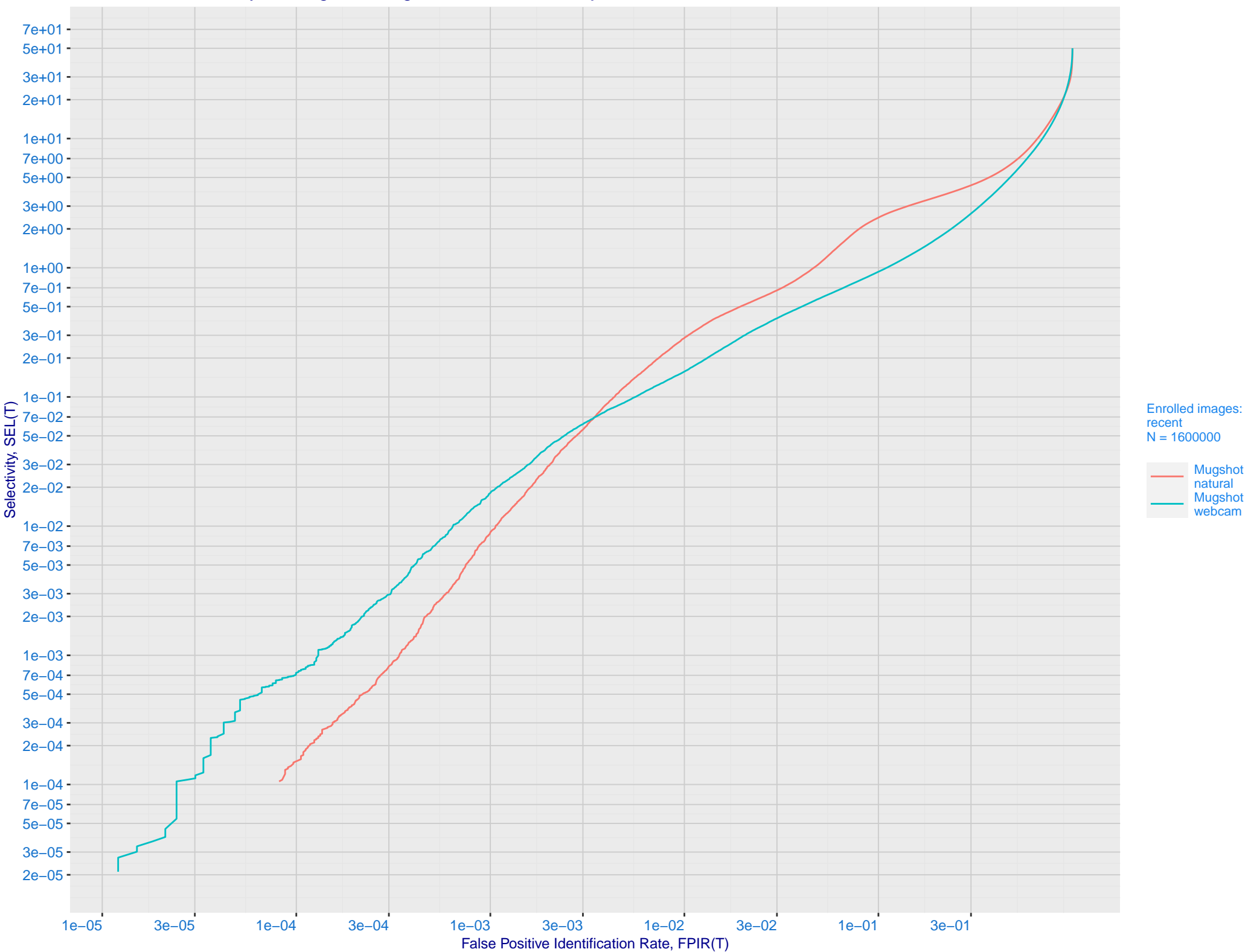
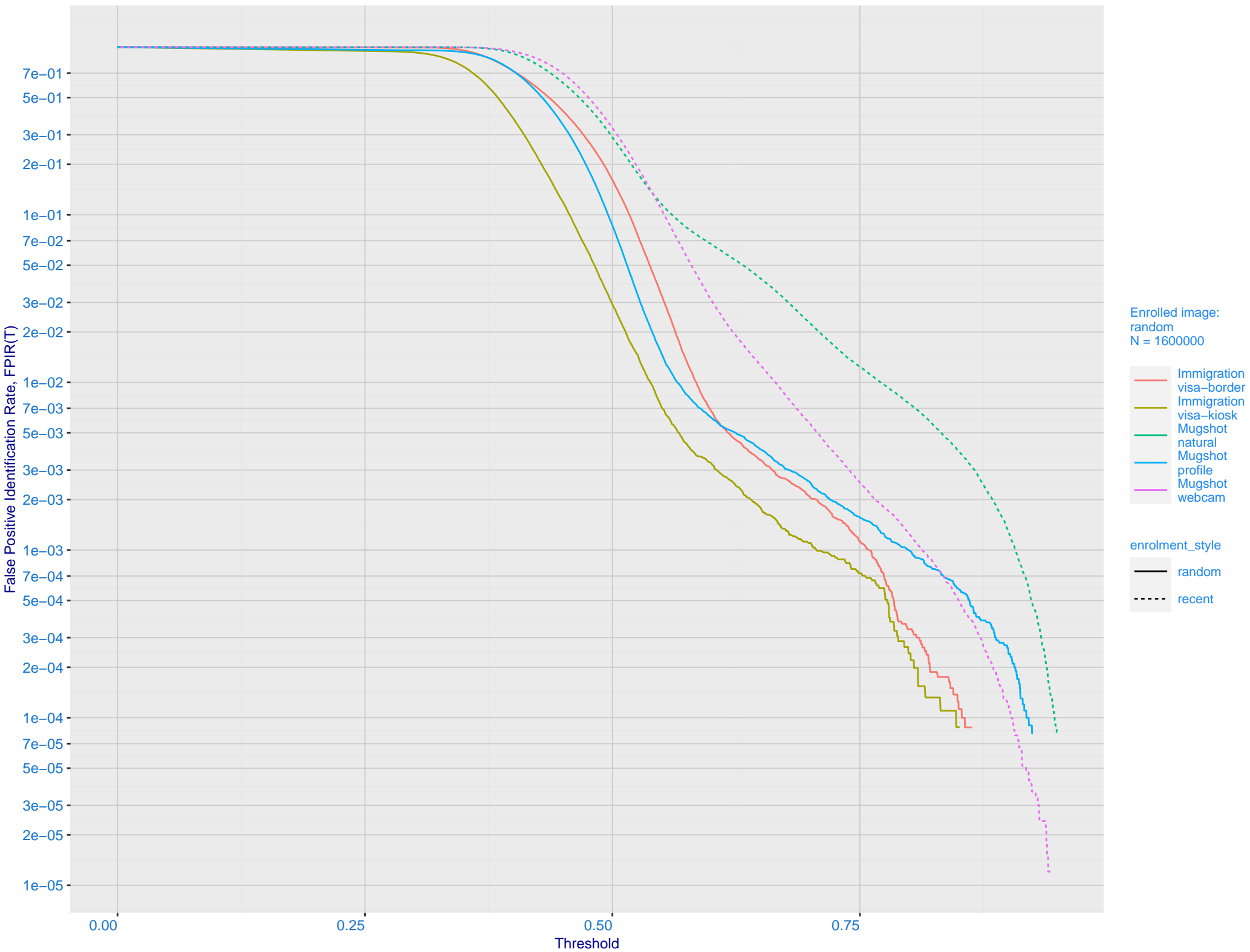D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals

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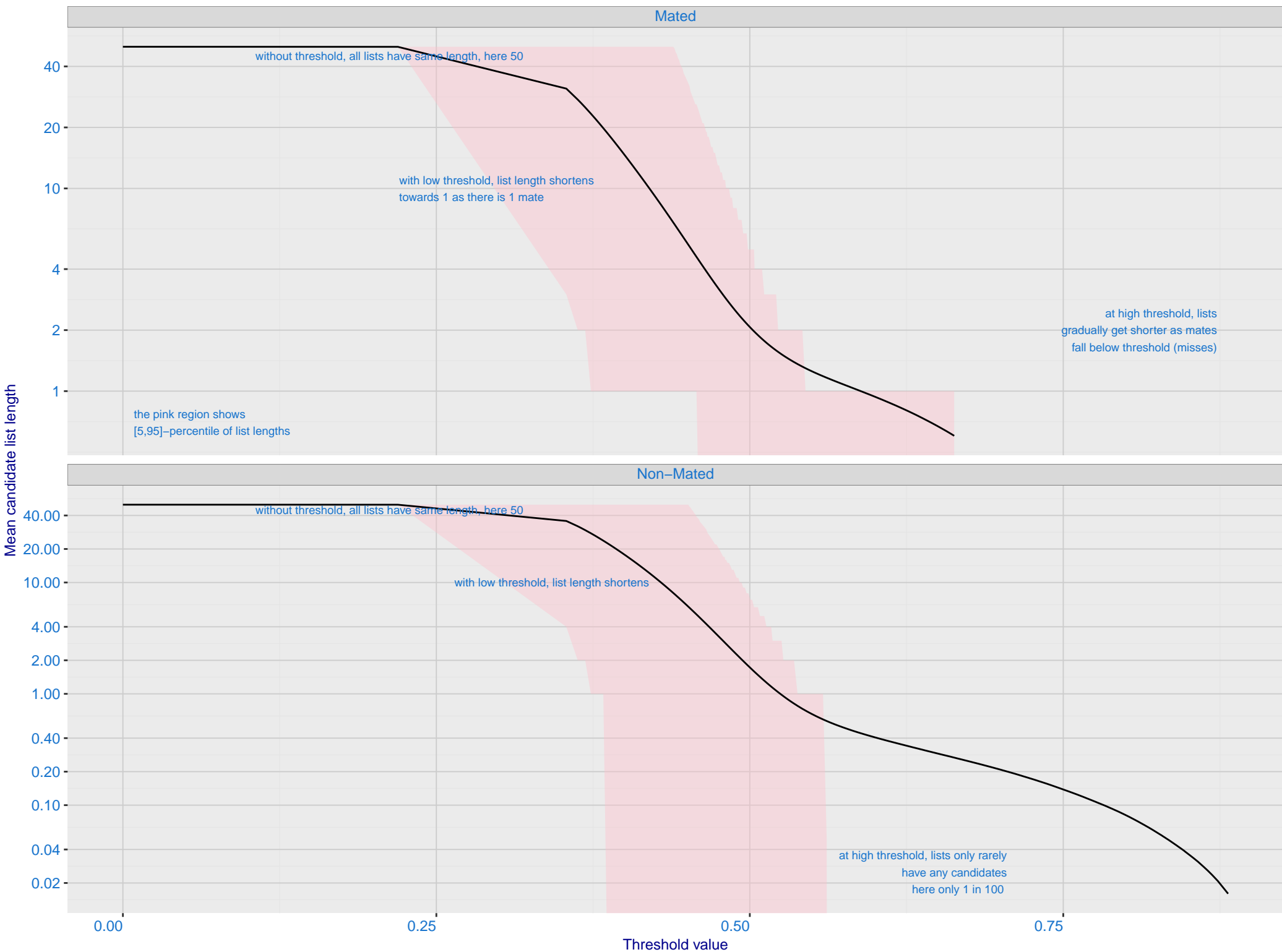
G: FPIR dependence on T by probe type for N = 1600000 subjects

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

Mated

without threshold, all lists have same length, here 50

with low threshold, list length shortens
towards 1 as there is 1 mate

at high threshold, lists
gradually get shorter as mates
fall below threshold (misses)

the pink region shows
[5,95]−percentile of list lengths

Non−Mated

without threshold, all lists have same length, here 50

with low threshold, list length shortens

at high threshold, lists only rarely
have any candidates
here only 1 in 100

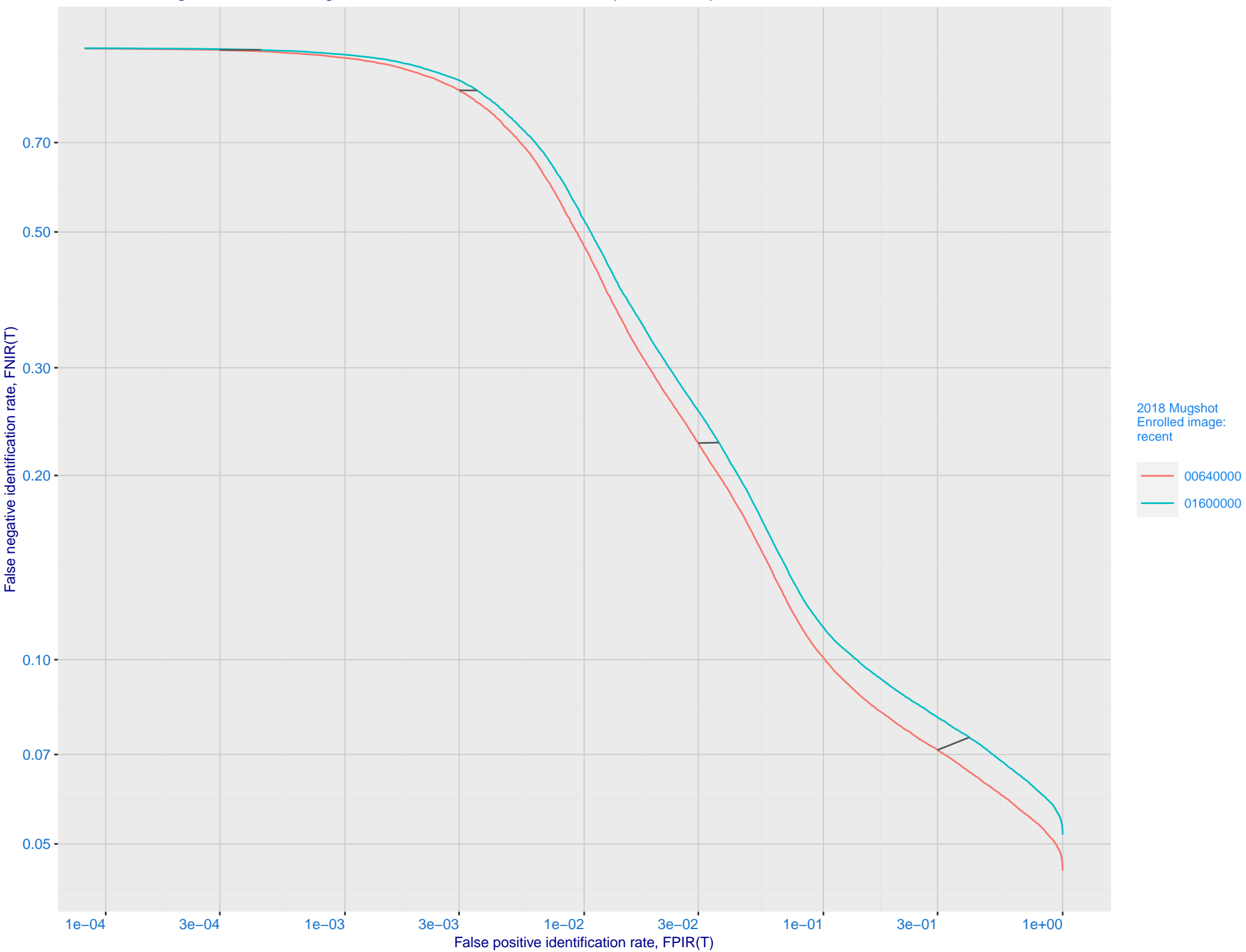Mean candidate list length

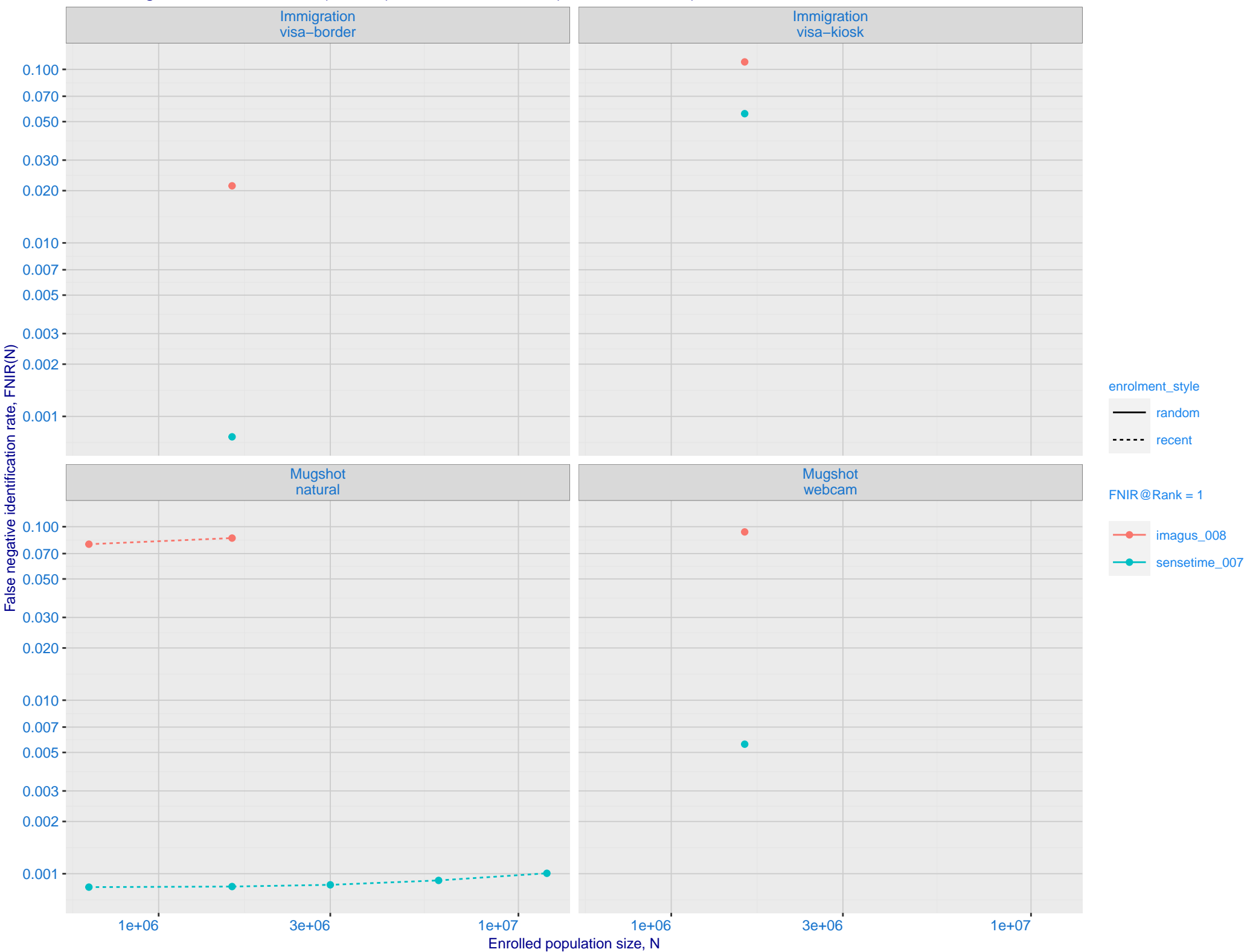Threshold value

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
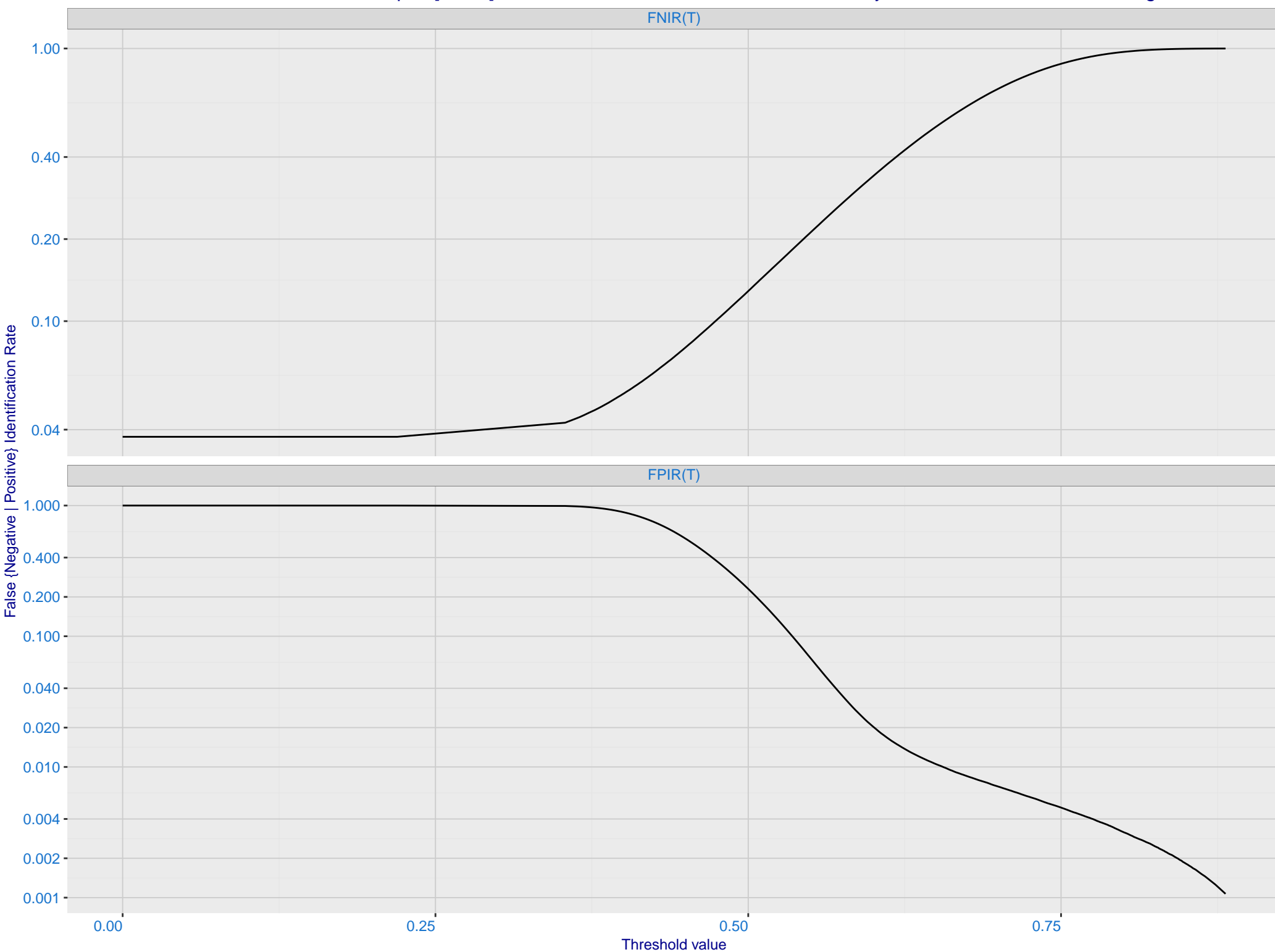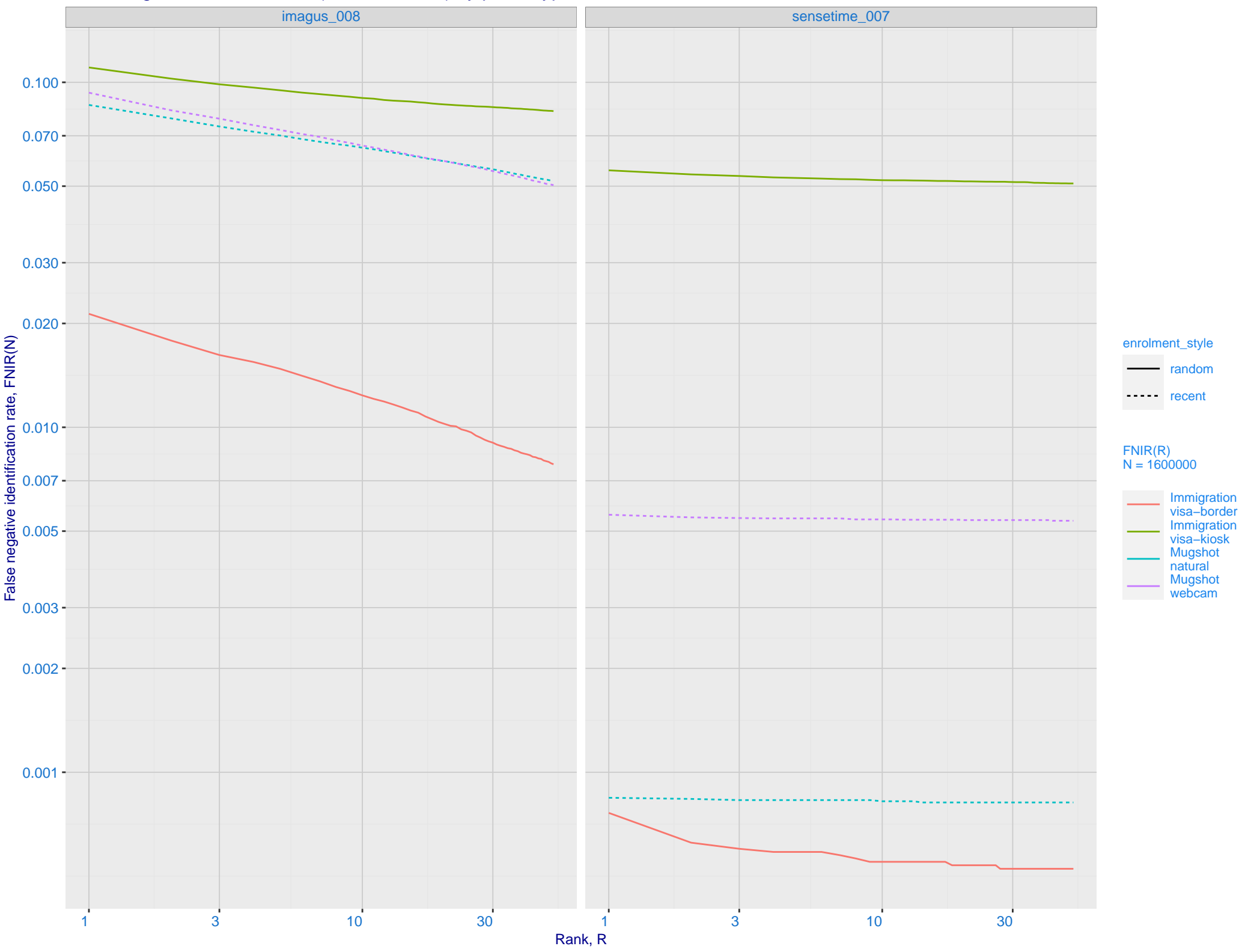
J: DET for Mugshot natural images and various N. Links connect points of equal threshold.
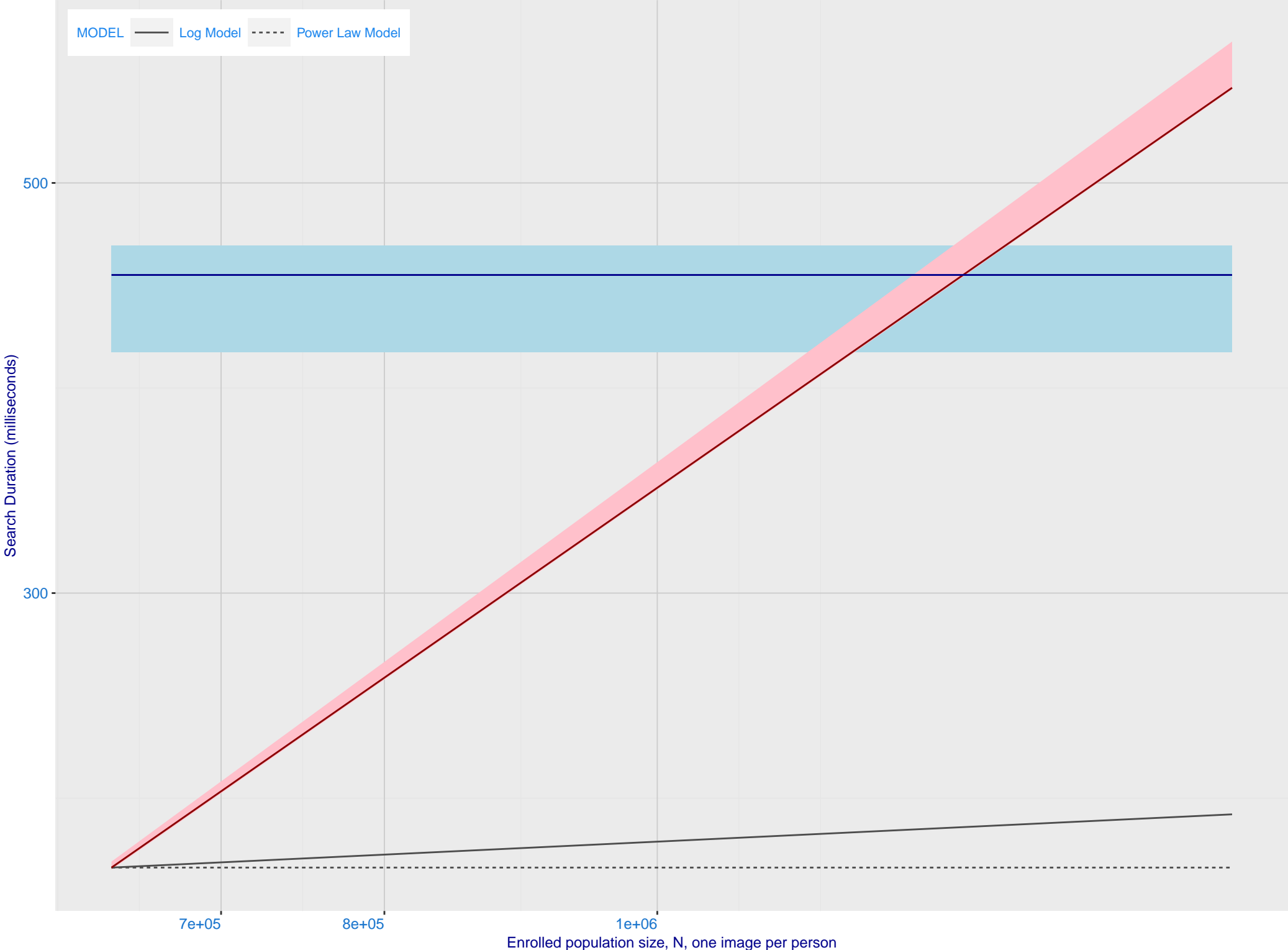
K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_007)

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

MODEL —— Log Model ---- Power Law Model

Search Duration (milliseconds)

500

300

7e+05   8e+05   1e+06

Enrolled population size, N, one image per person

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.
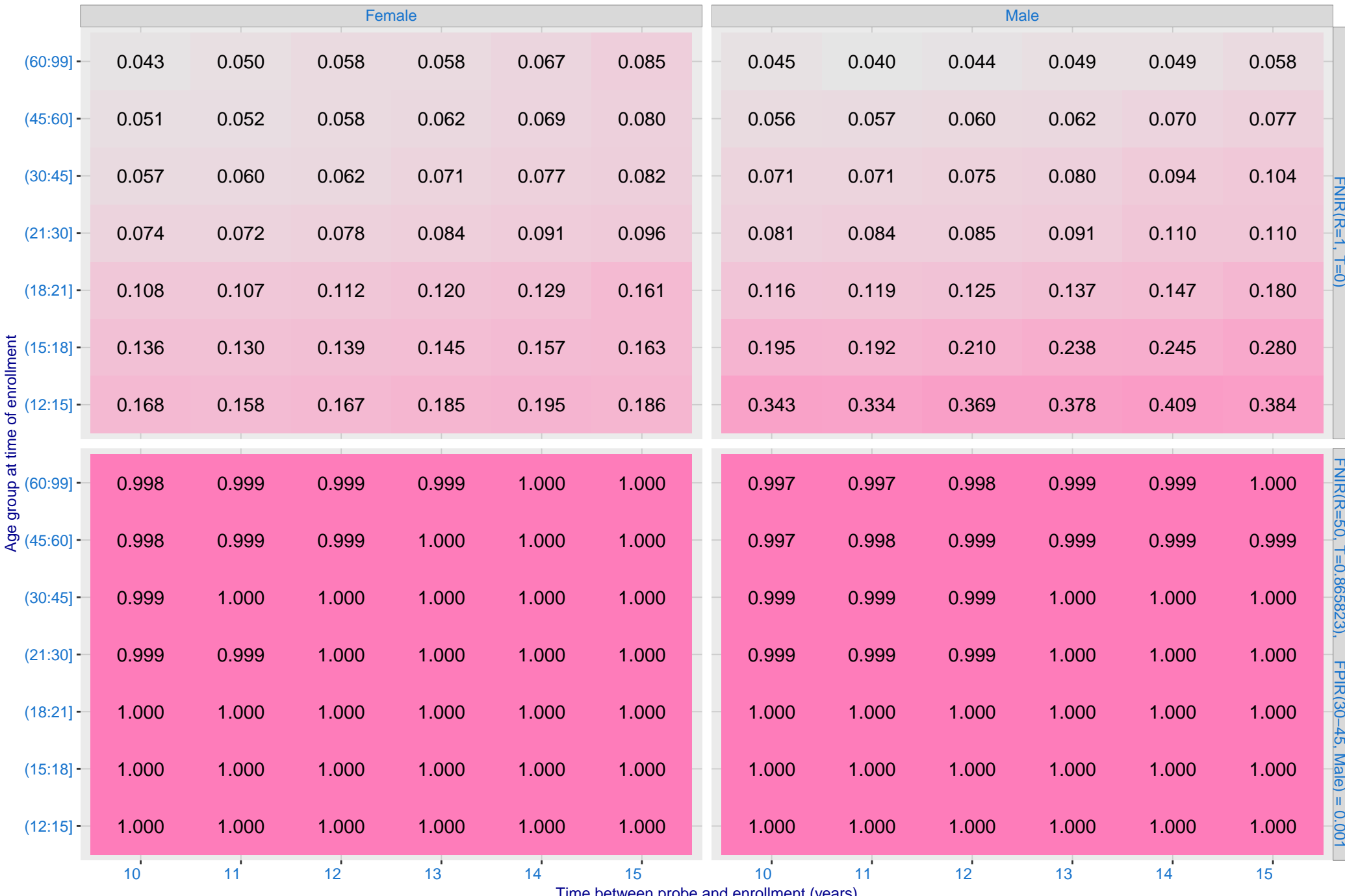
P: FPIR(N = 1.6 million) by sex and age. It is typical for false positive identification rates to be higher in women except in their teens.
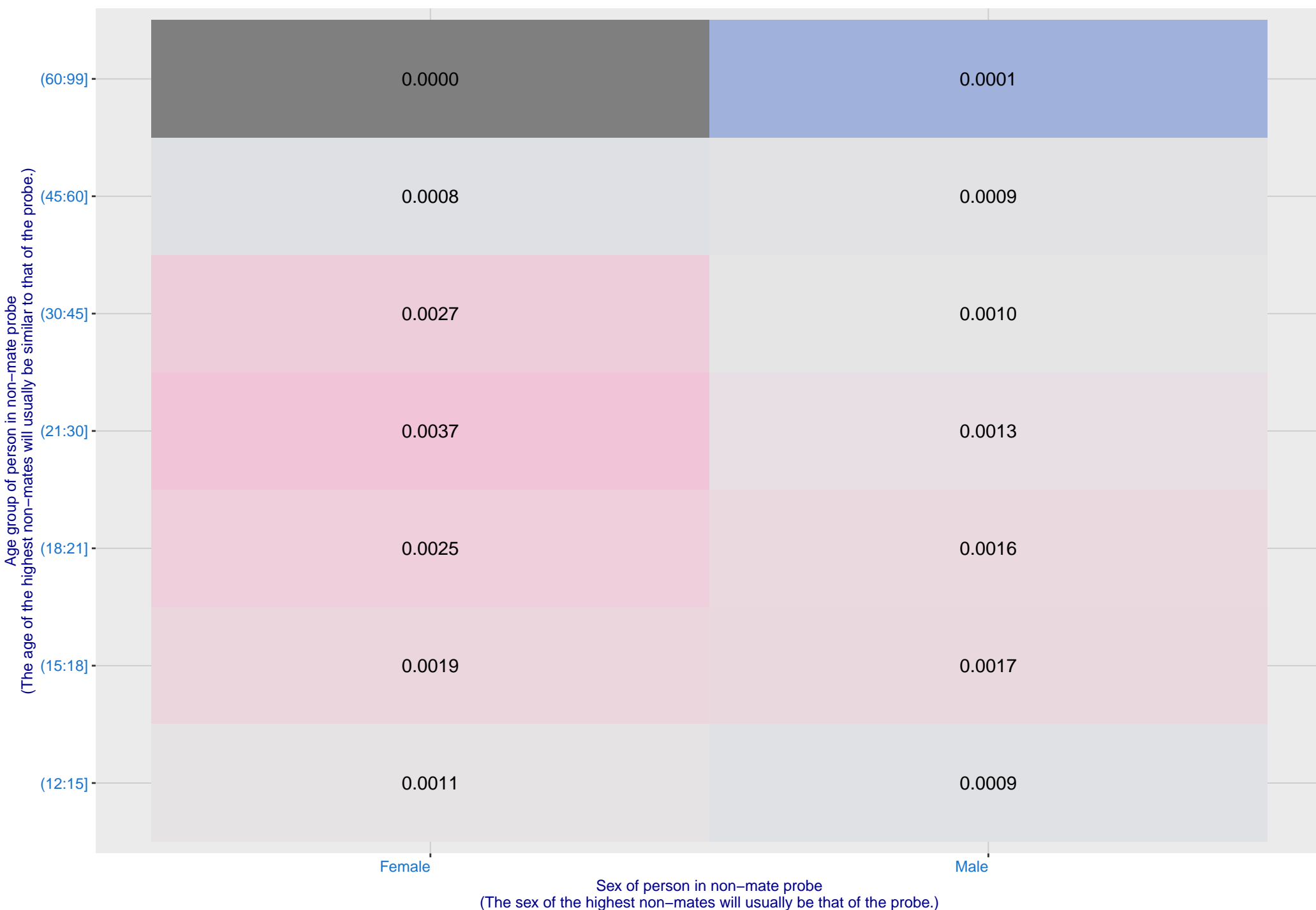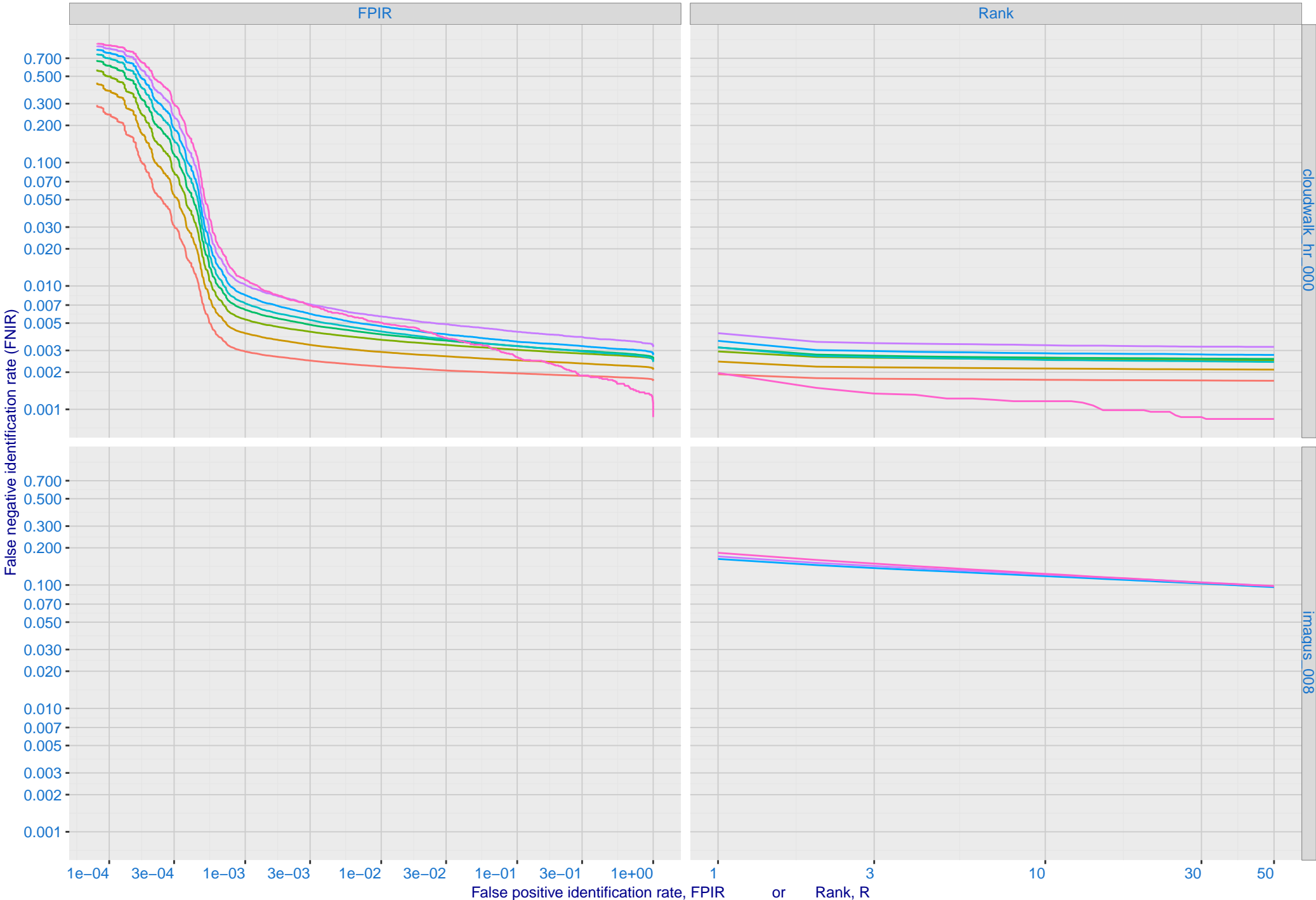
Q: Identification FNIR(N, T, L+1) and Investigational FNIR(N, 0, R) under ageing

Dataset: 2018 Mugshot   N = 3068801

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