A: Datasheet

Algorithm: s1_000

Developer: Samsung S1 Corp

Submission Date: 2021_06_03

Template size: 4096 bytes

Template time (2.5 percentile): 864 msec

Template time (median): 865 msec

Template time (97.5 percentile): 871 msec

Investigation:

Frontal mugshot ranking 49 (out of 279) –– FNIR(1600000, 0, 1) = 0.0024 vs. lowest 0.0009 from sensetime_005

Mugshot webcam ranking 65 (out of 241) –– FNIR(1600000, 0, 1) = 0.0166 vs. lowest 0.0062 from sensetime_005

Mugshot profile ranking 30 (out of 210) –– FNIR(1600000, 0, 1) = 0.2581 vs. lowest 0.0587 from xforwardai_002

Immigration visa–border ranking 45 (out of 168) –– FNIR(1600000, 0, 1) = 0.0054 vs. lowest 0.0013 from visionlabs_010

Immigration visa–kiosk ranking 21 (out of 165) –– FNIR(1600000, 0, 1) = 0.0896 vs. lowest 0.0568 from cloudwalk_hr_000

Identification:

Frontal mugshot ranking 57 (out of 279) –– FNIR(1600000, T, L+1) = 0.0279, FPIR=0.001000 vs. lowest 0.0018 from sensetime_004

Mugshot profile ranking 201 (out of 209) –– FNIR(1600000, T, L+1) = 1.0000, FPIR=0.001000 vs. lowest 0.1331 from cloudwalk_hr_000

Immigration visa–border ranking 51 (out of 167) –– FNIR(1600000, T, L+1) = 0.0471, FPIR=0.001000 vs. lowest 0.0047 from idemia_008

Immigration visa–kiosk ranking 154 (out of 162) –– FNIR(1600000, T, L+1) = 1.0000, FPIR=0.001000 vs. lowest 0.0996 from cloudwalk_hr_000
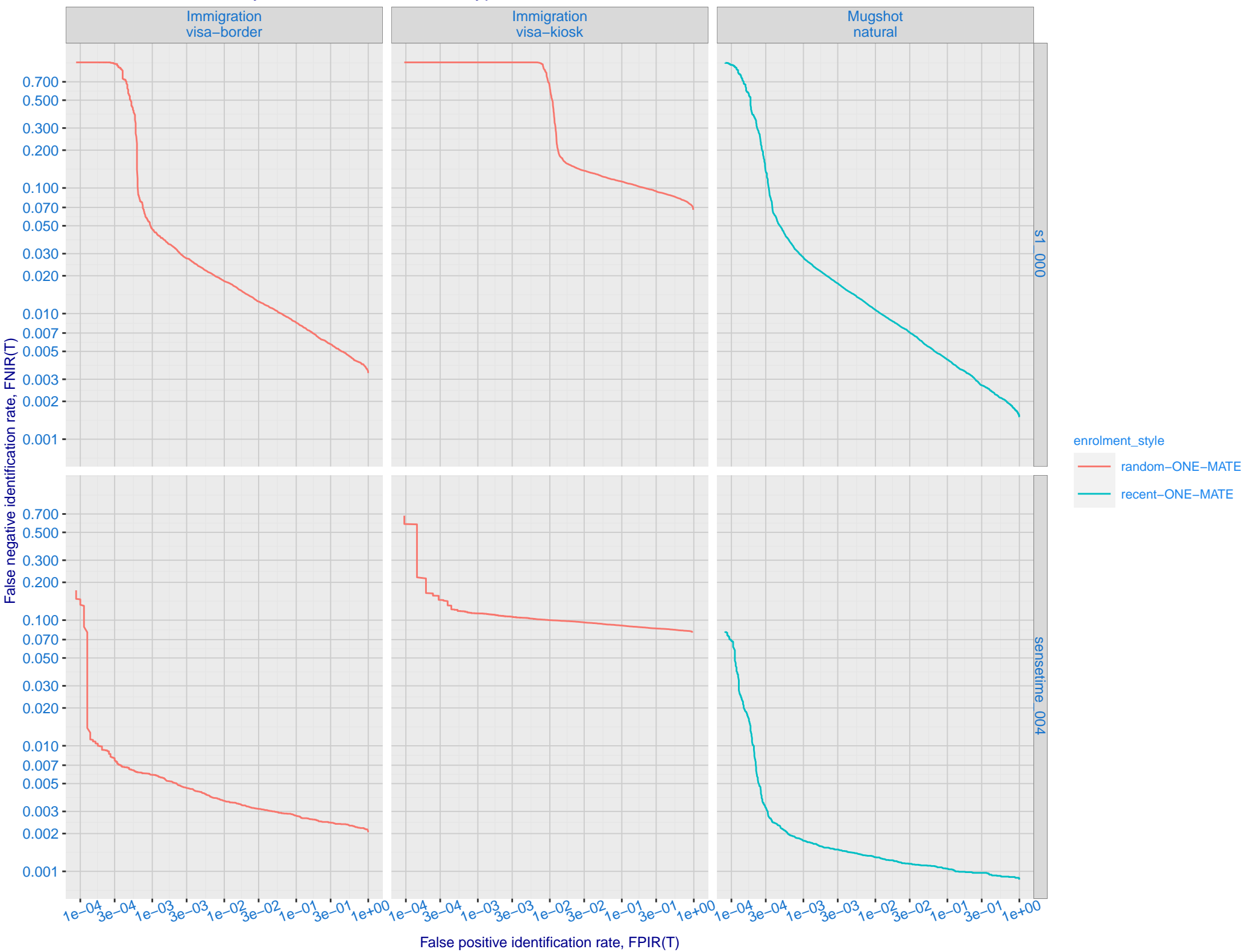
B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (sensetime_004)
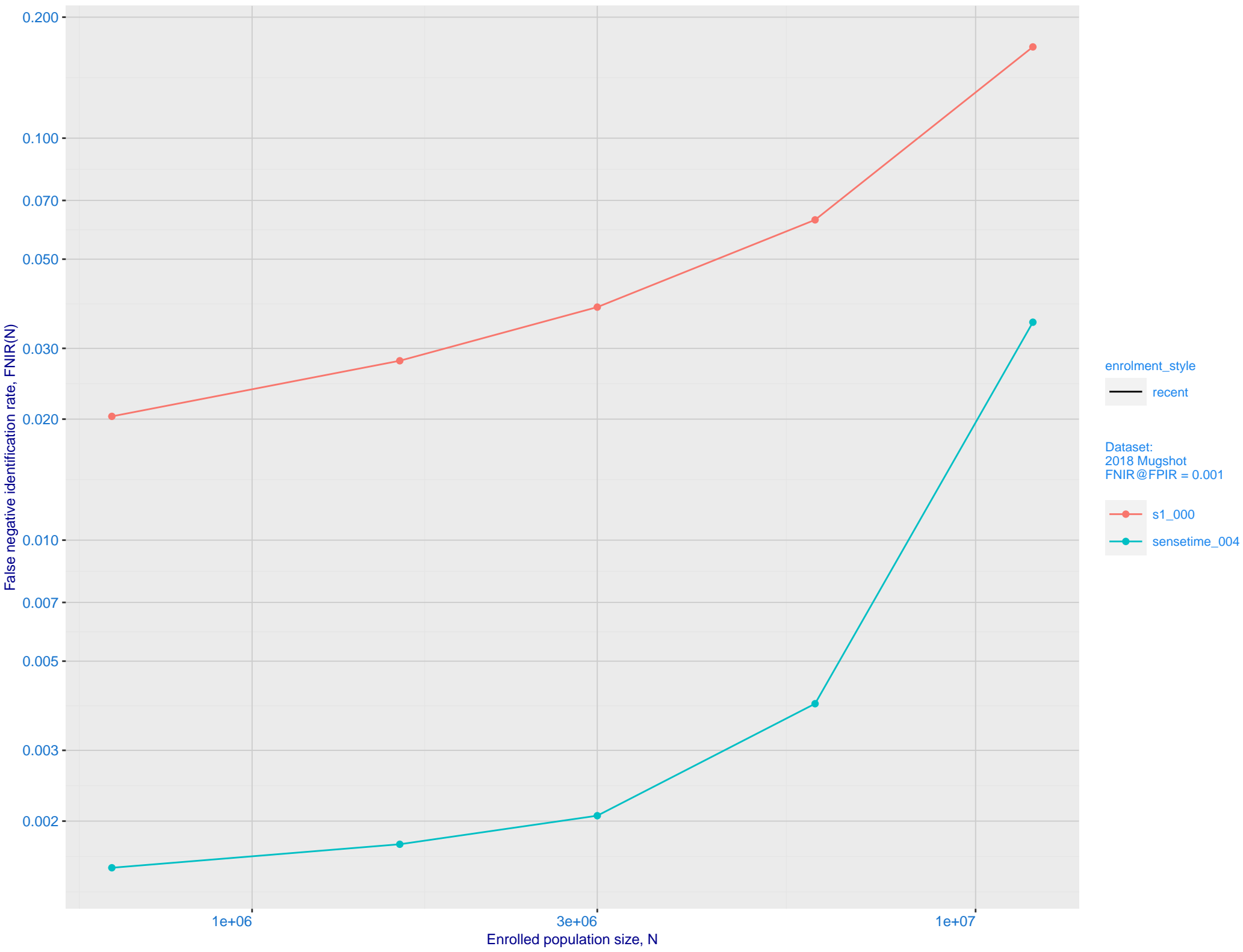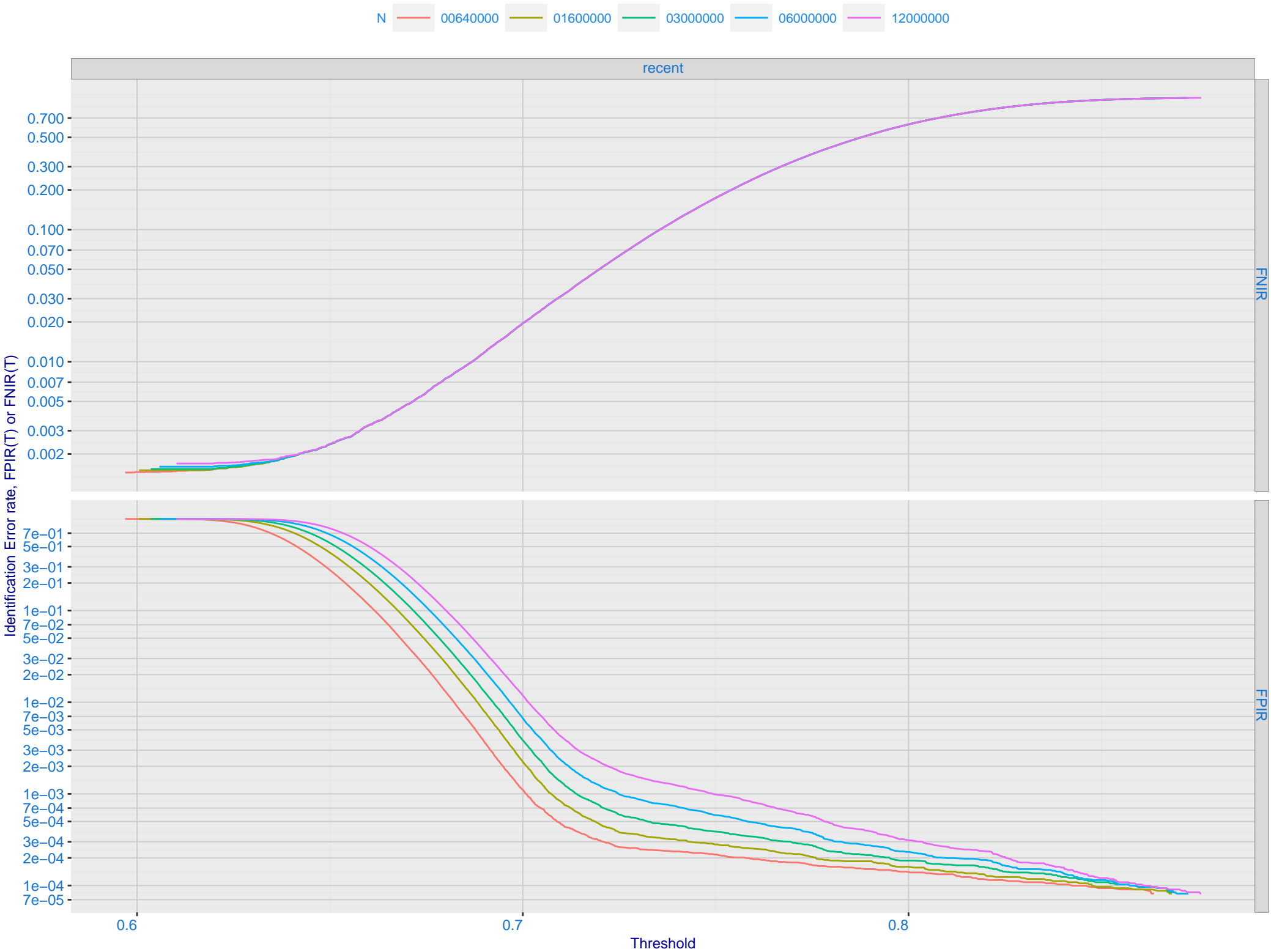
C: Evolution of accuracy for S1 algorithms on three datasets 2018 – present
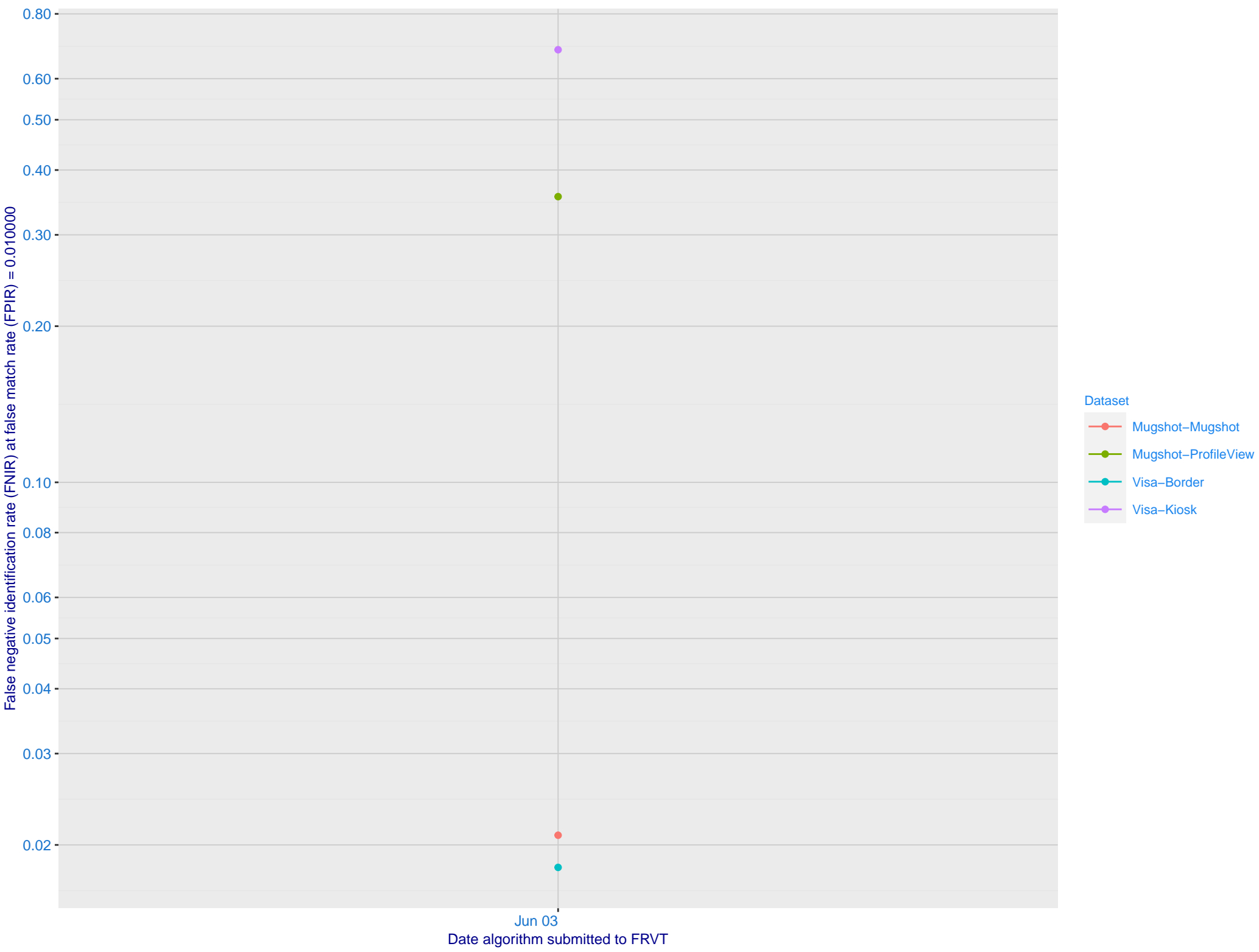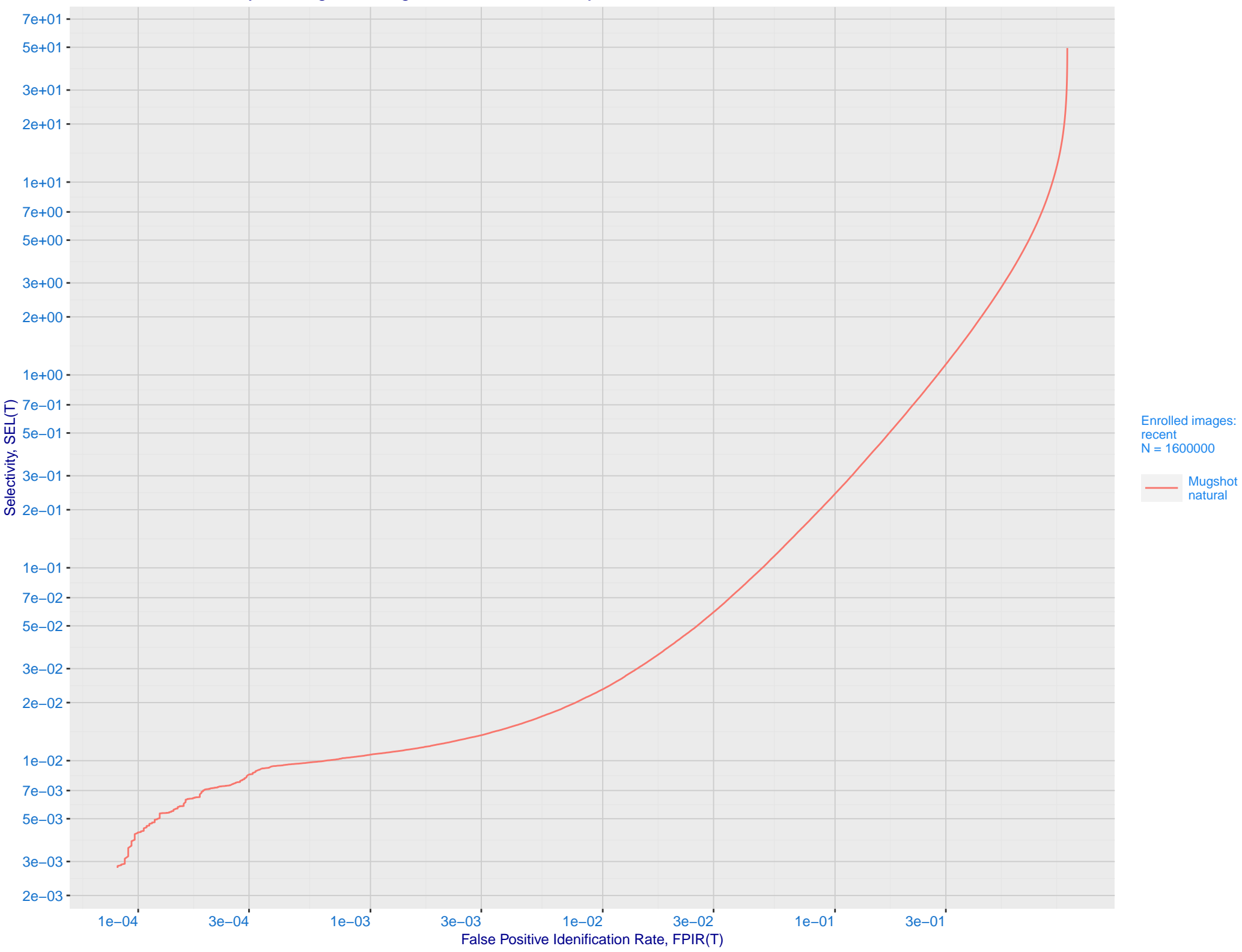
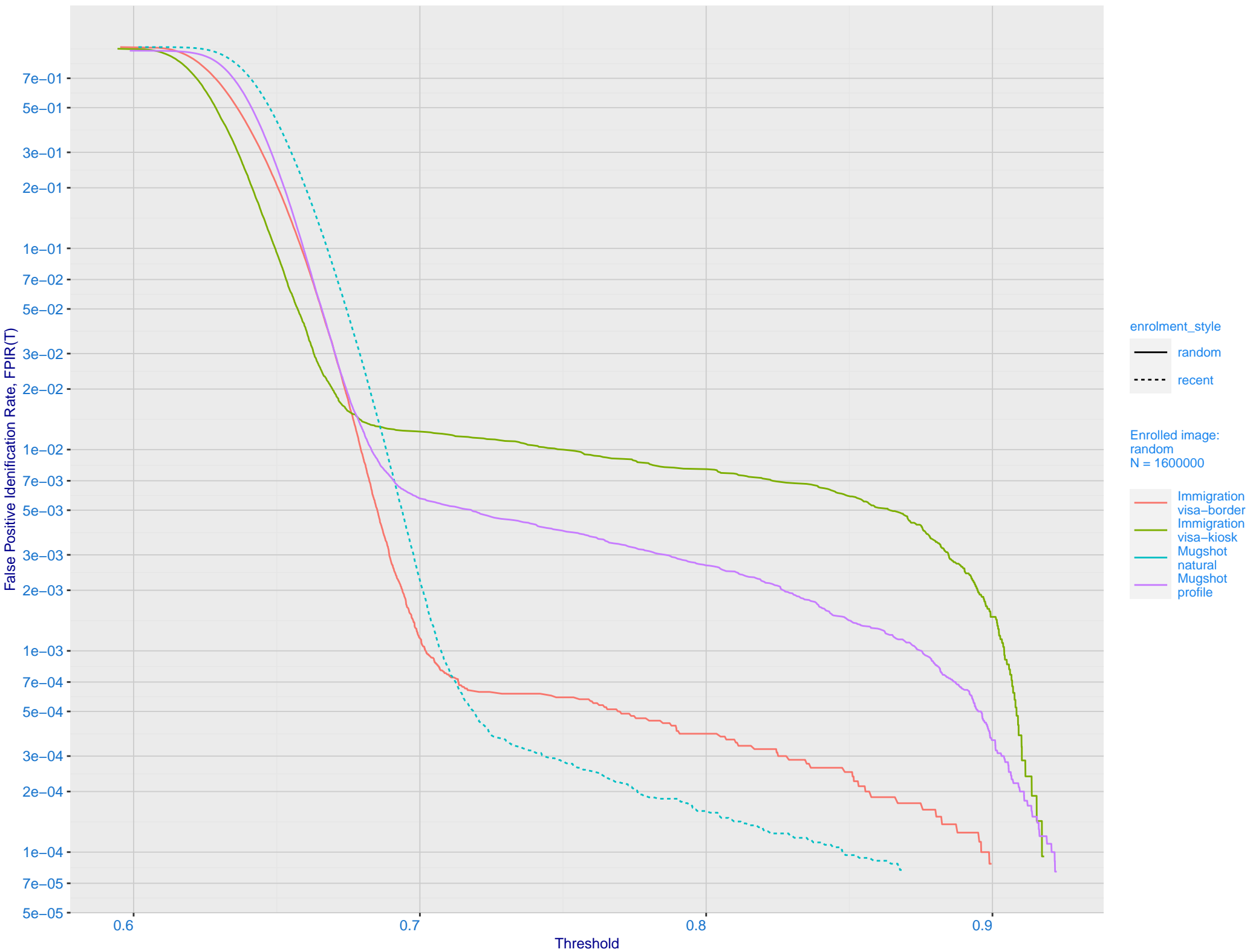D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals

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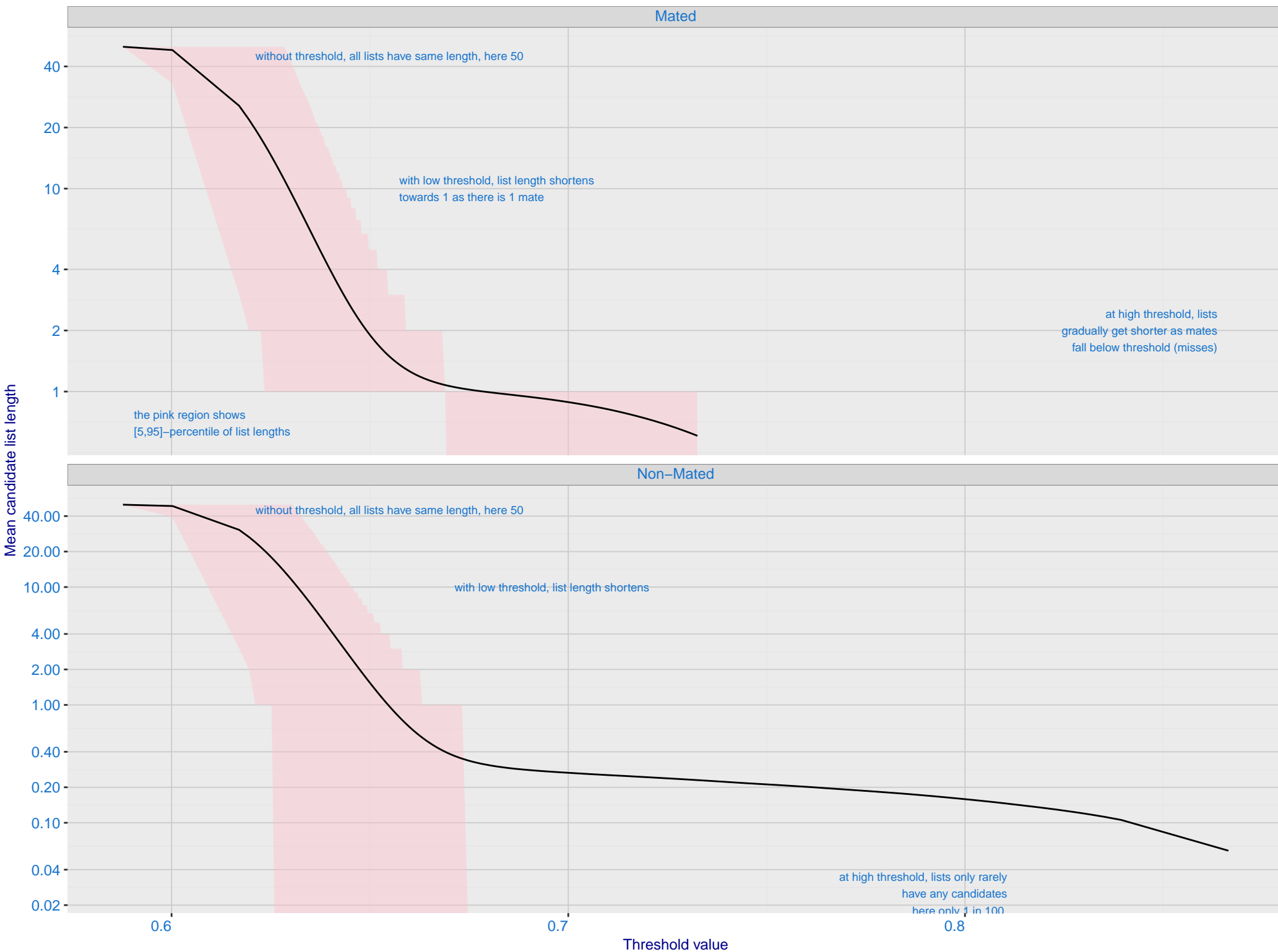
G: FPIR dependence on T by probe type for N = 1600000 subjects

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

Threshold value

Mean candidate list length
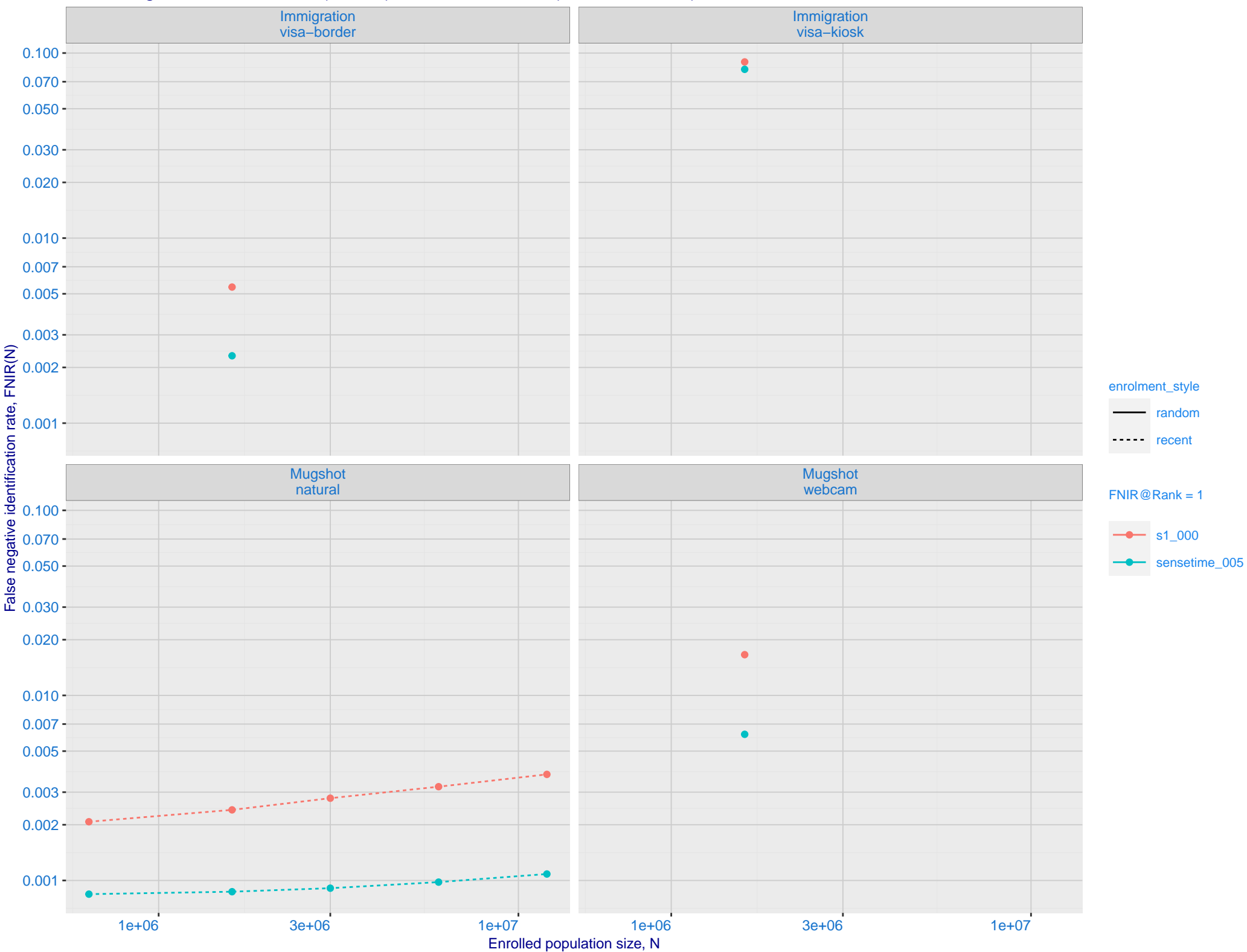
I: FNIR and FPIR dependence on threshold
Dataset is border–border with time–lapse [10,15] YRS with N = 1600000. Probes are 10–15 years later than enrollment image
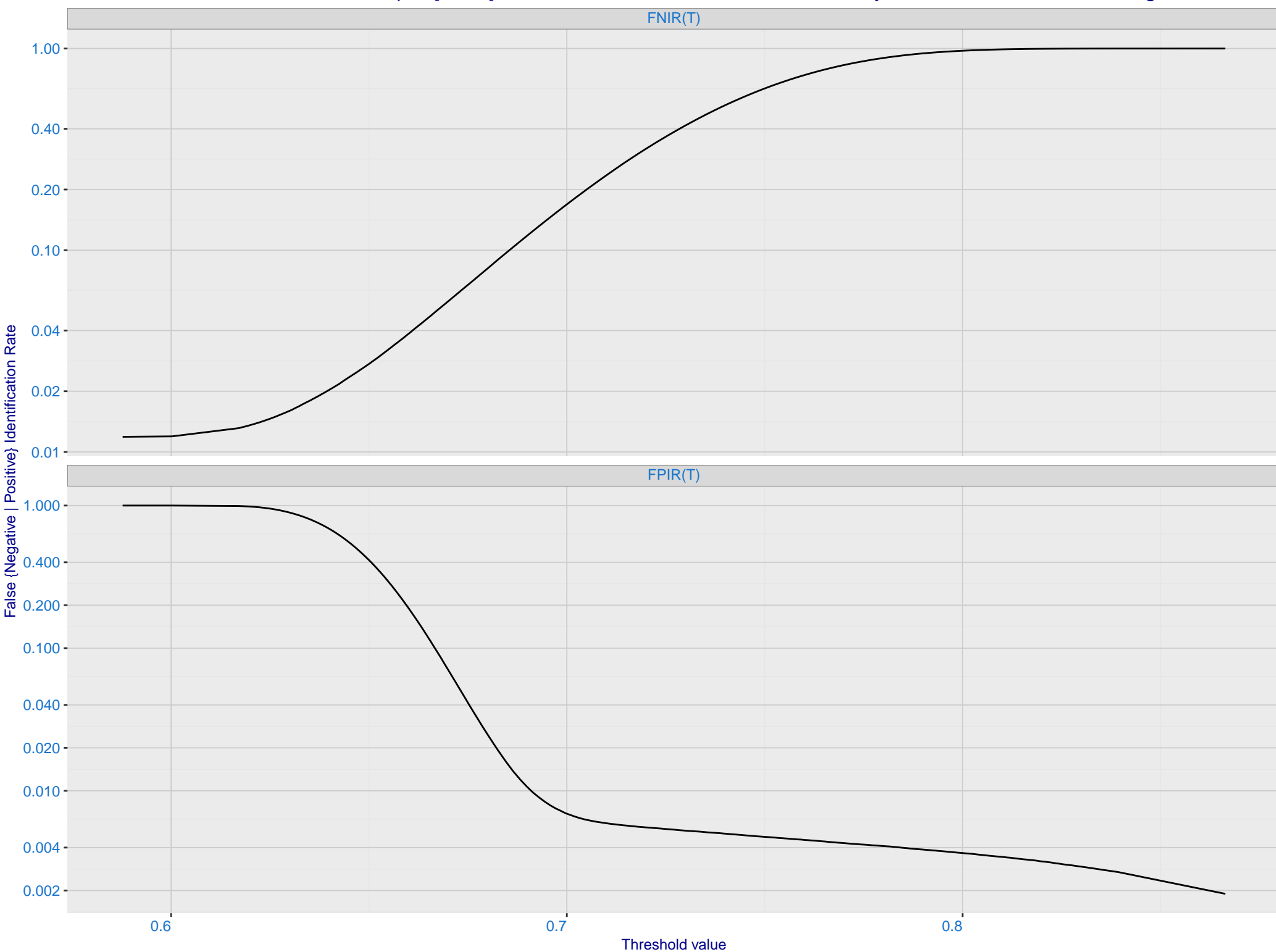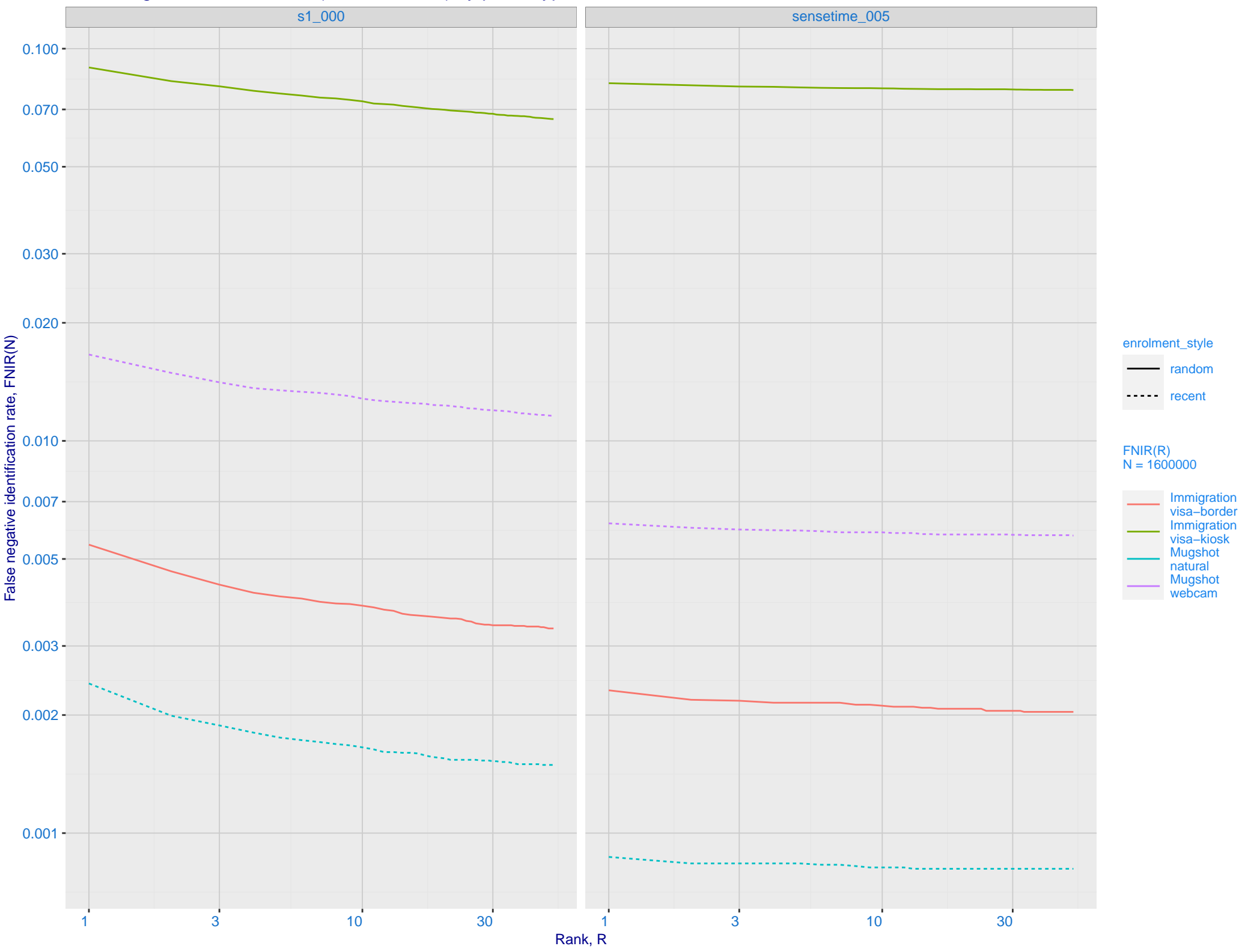
J: DET for Mugshot natural images and various N. Links connect points of equal threshold.
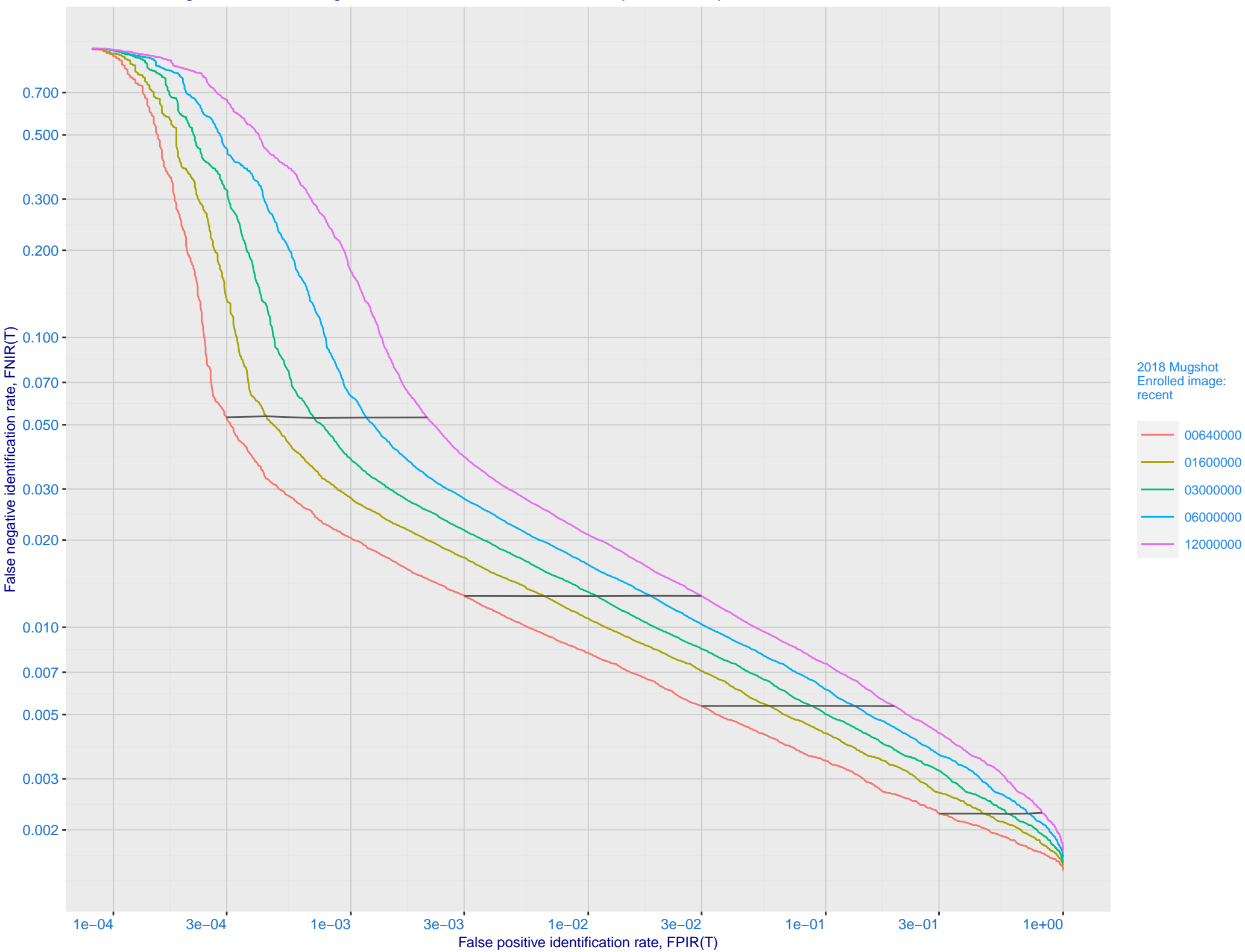
K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_005)

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
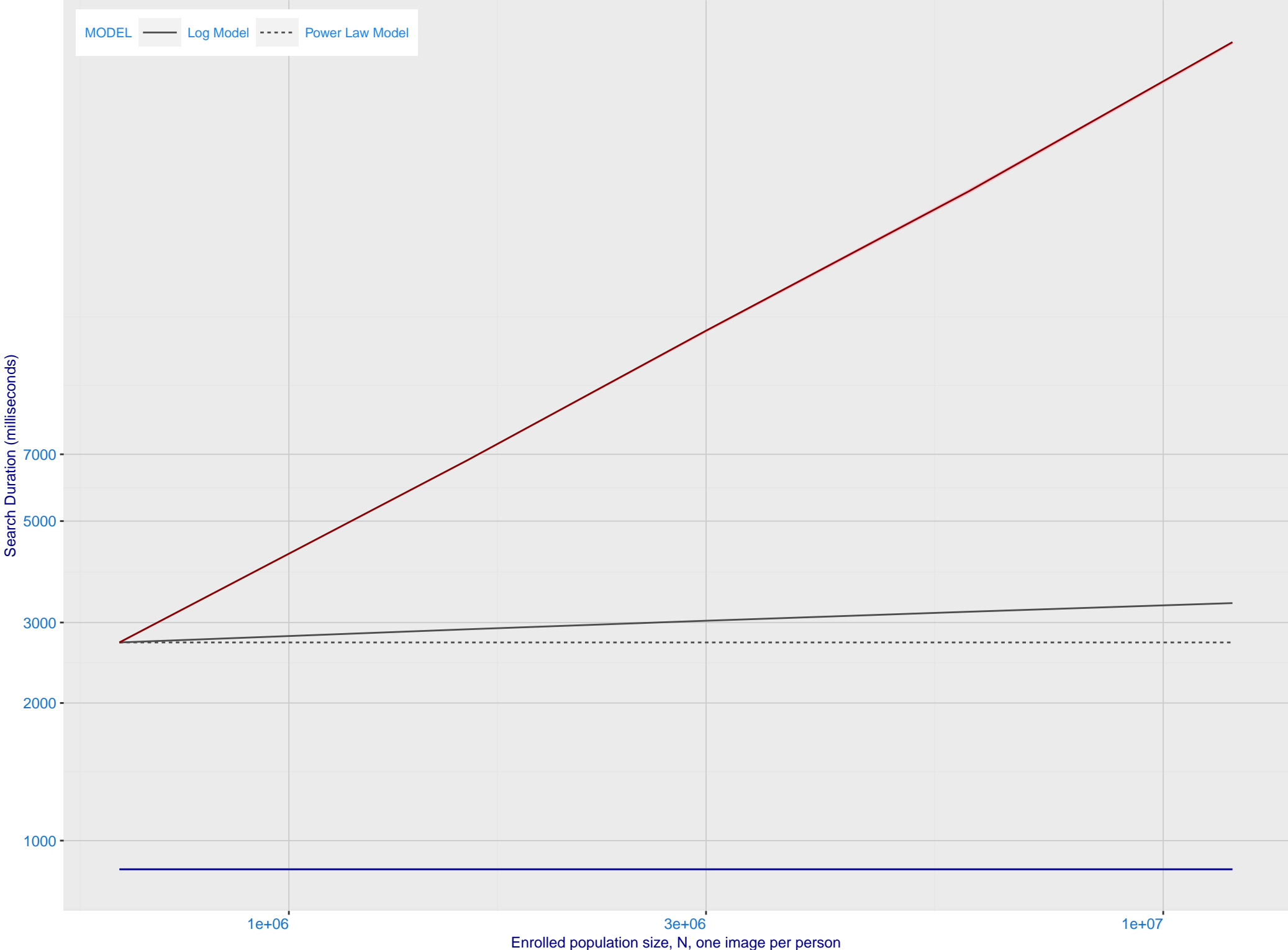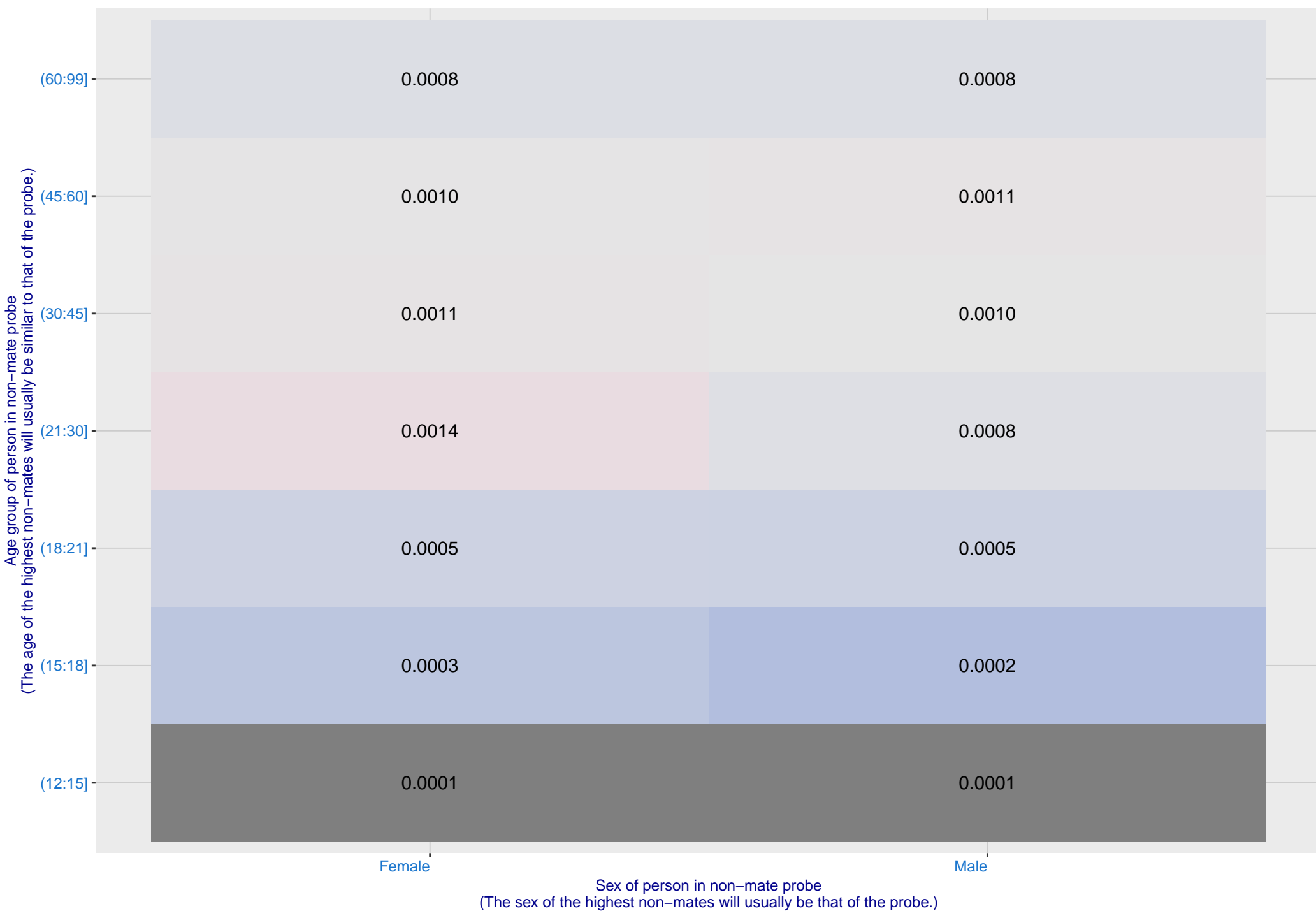
O: FNIR(T, N = 1.6 million) by sex, age and time−lapse. The top row gives investigational rank−1 miss rates. The bottom panels give high threshold for more lights−out identification with low FPIR.
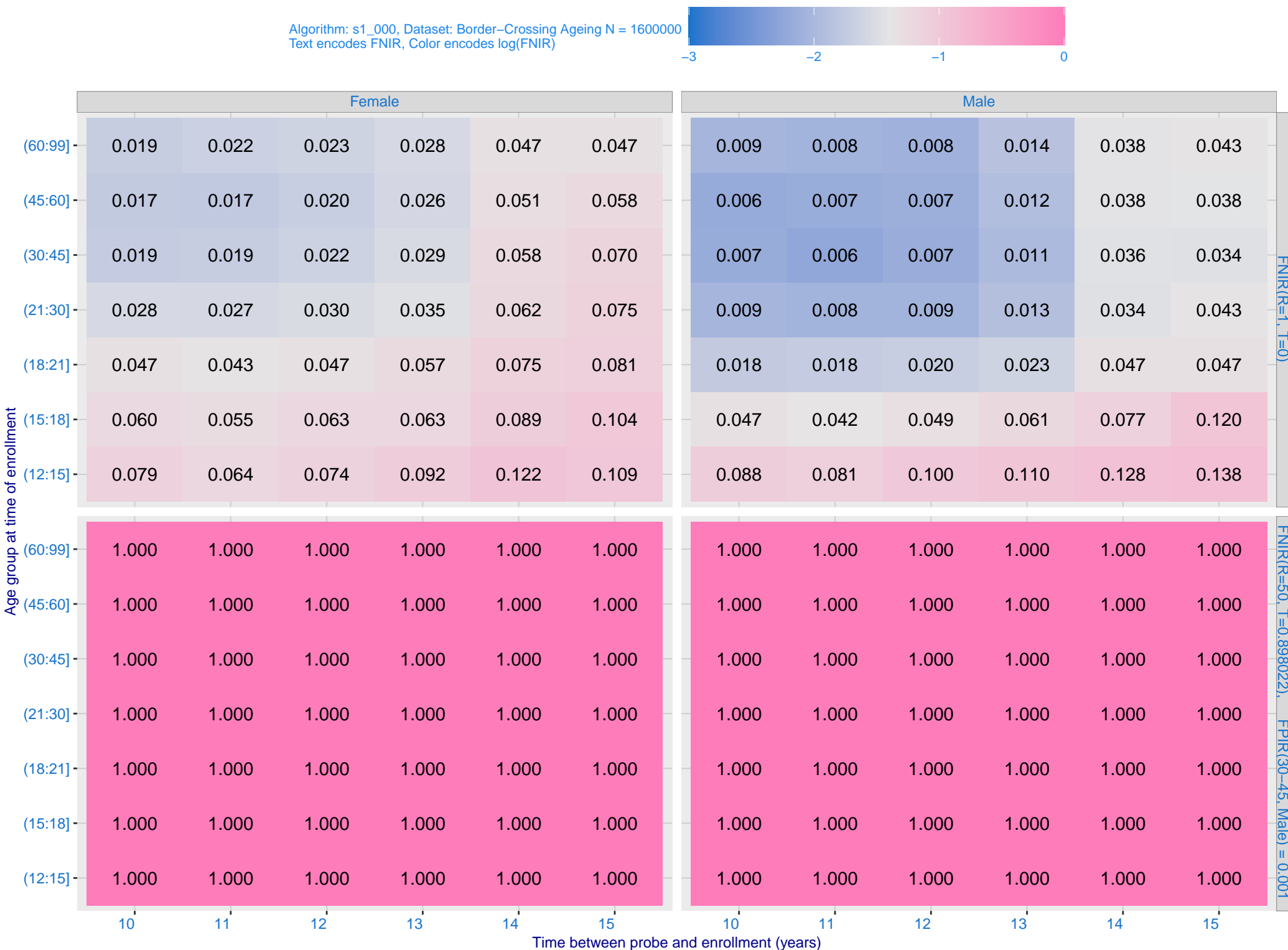
P: FPIR(N = 1.6 million) by sex and age. It is typical for false positive identification rates to be higher in women except in their teens.

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