A: Datasheet

Algorithm: cognitec_006

Developer: Cognitec Systems GmbH

Submission Date: 2022_02_10

Template size: 2052 bytes

Template time (2.5 percentile): 445 msec

Template time (median): 463 msec

Template time (97.5 percentile): 483 msec

Investigation:

Frontal mugshot ranking 42 (out of 341) –– FNIR(1600000, 0, 1) = 0.0016 vs. lowest 0.0008 from sensetime_007

Mugshot webcam ranking 34 (out of 303) –– FNIR(1600000, 0, 1) = 0.0097 vs. lowest 0.0056 from sensetime_007

Mugshot profile ranking 141 (out of 272) –– FNIR(1600000, 0, 1) = 0.7028 vs. lowest 0.0521 from sensetime_007

Immigration visa–border ranking 107 (out of 230) –– FNIR(1600000, 0, 1) = 0.0069 vs. lowest 0.0008 from sensetime_007

Immigration visa–kiosk ranking 89 (out of 227) –– FNIR(1600000, 0, 1) = 0.1111 vs. lowest 0.0487 from cubox_000

Identification:

Frontal mugshot ranking 36 (out of 341) –– FNIR(1600000, T, L+1) = 0.0077, FPIR=0.001000 vs. lowest 0.0014 from sensetime_007
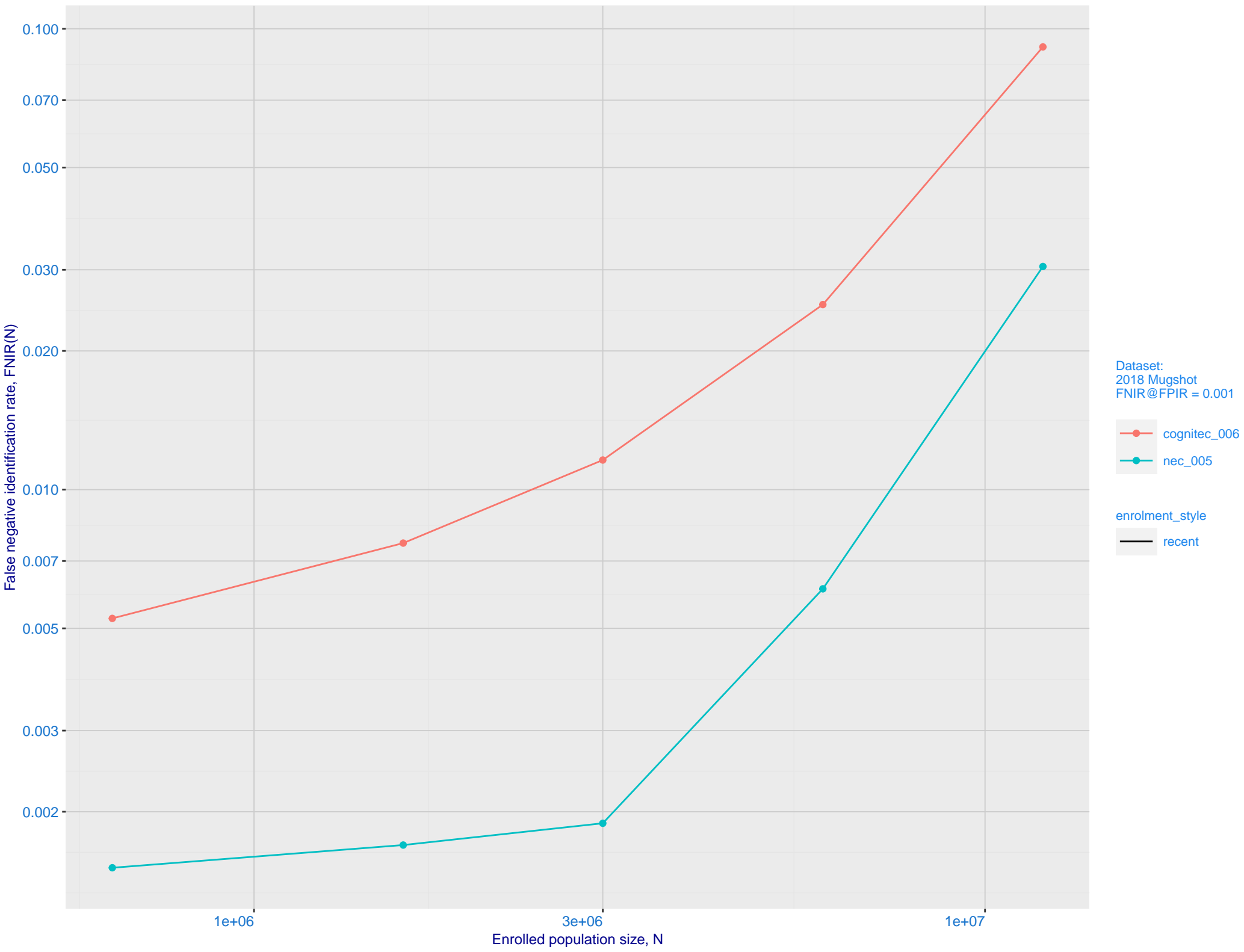
Mugshot webcam ranking 44 (out of 301) –– FNIR(1600000, T, L+1) = 0.0400, FPIR=0.001000 vs. lowest 0.0093 from sensetime_007

Mugshot profile ranking 266 (out of 271) –– FNIR(1600000, T, L+1) = 1.0000, FPIR=0.001000 vs. lowest 0.1093 from cloudwalk_mt_000
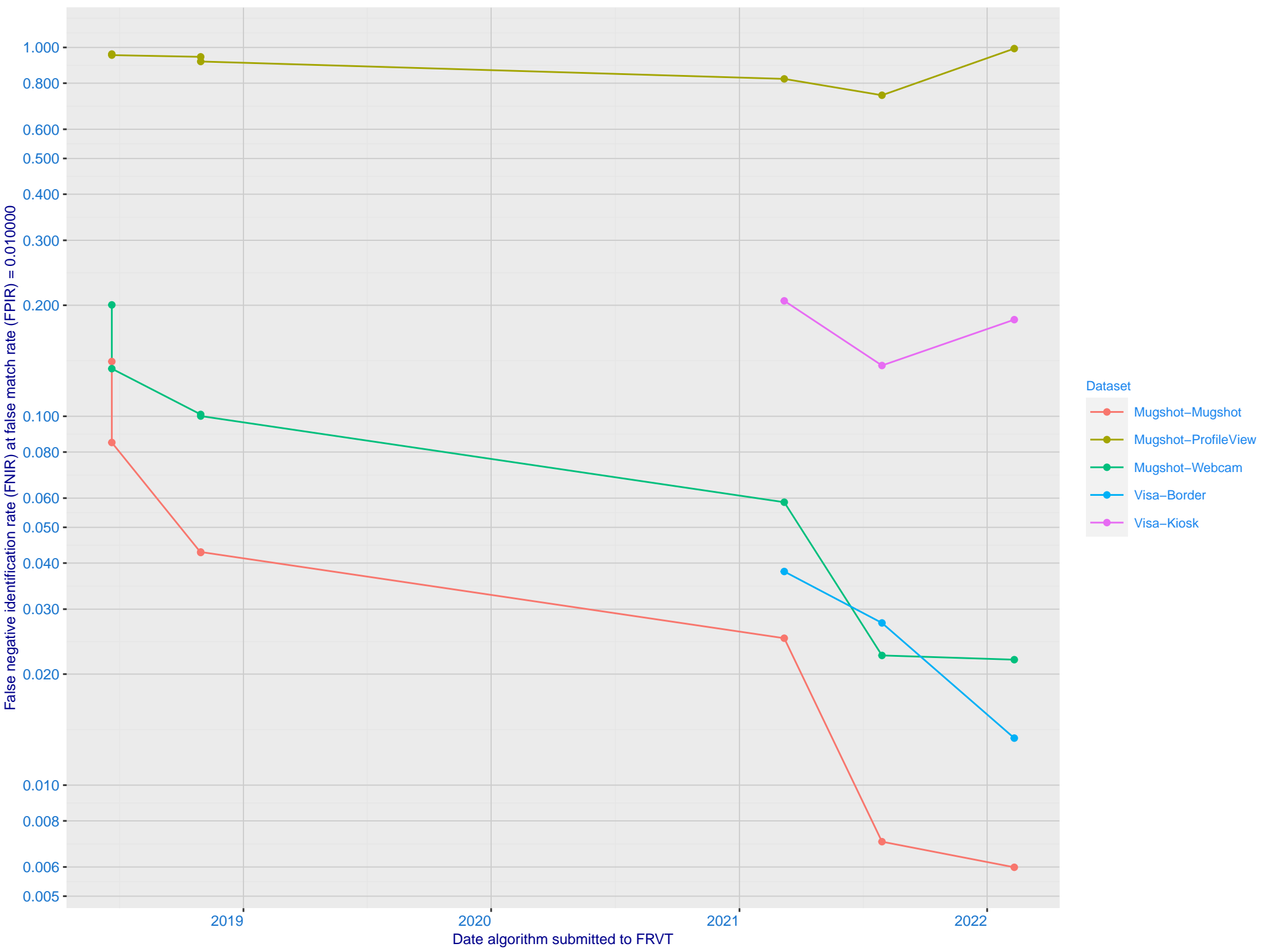
Immigration visa–border ranking 73 (out of 229) –– FNIR(1600000, T, L+1) = 0.0303, FPIR=0.001000 vs. lowest 0.0024 from cloudwalk_mt_000

Immigration visa–kiosk ranking 139 (out of 224) –– FNIR(1600000, T, L+1) = 0.6841, FPIR=0.001000 vs. lowest 0.0719 from cloudwalk_mt_000

B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (nec_005)

False negative identification rate, FNIR(N)

Enrolled population size, N

Dataset:
2018 Mugshot
FNIR@FPIR = 0.001

cognitec_006

nec_005

enrolment_style

recent

C: Evolution of accuracy for COGNITEC algorithms on three datasets 2018 – present
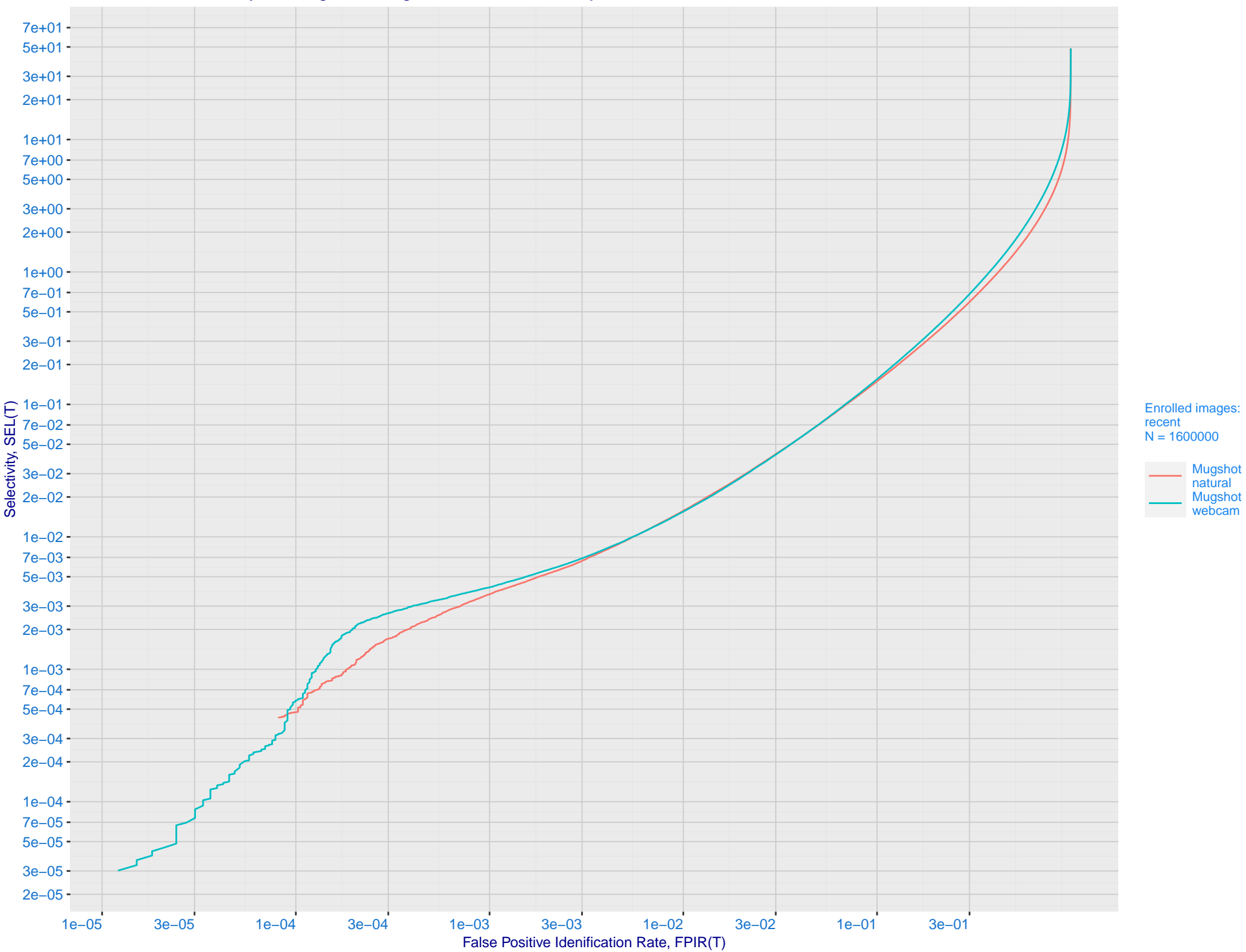
D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals
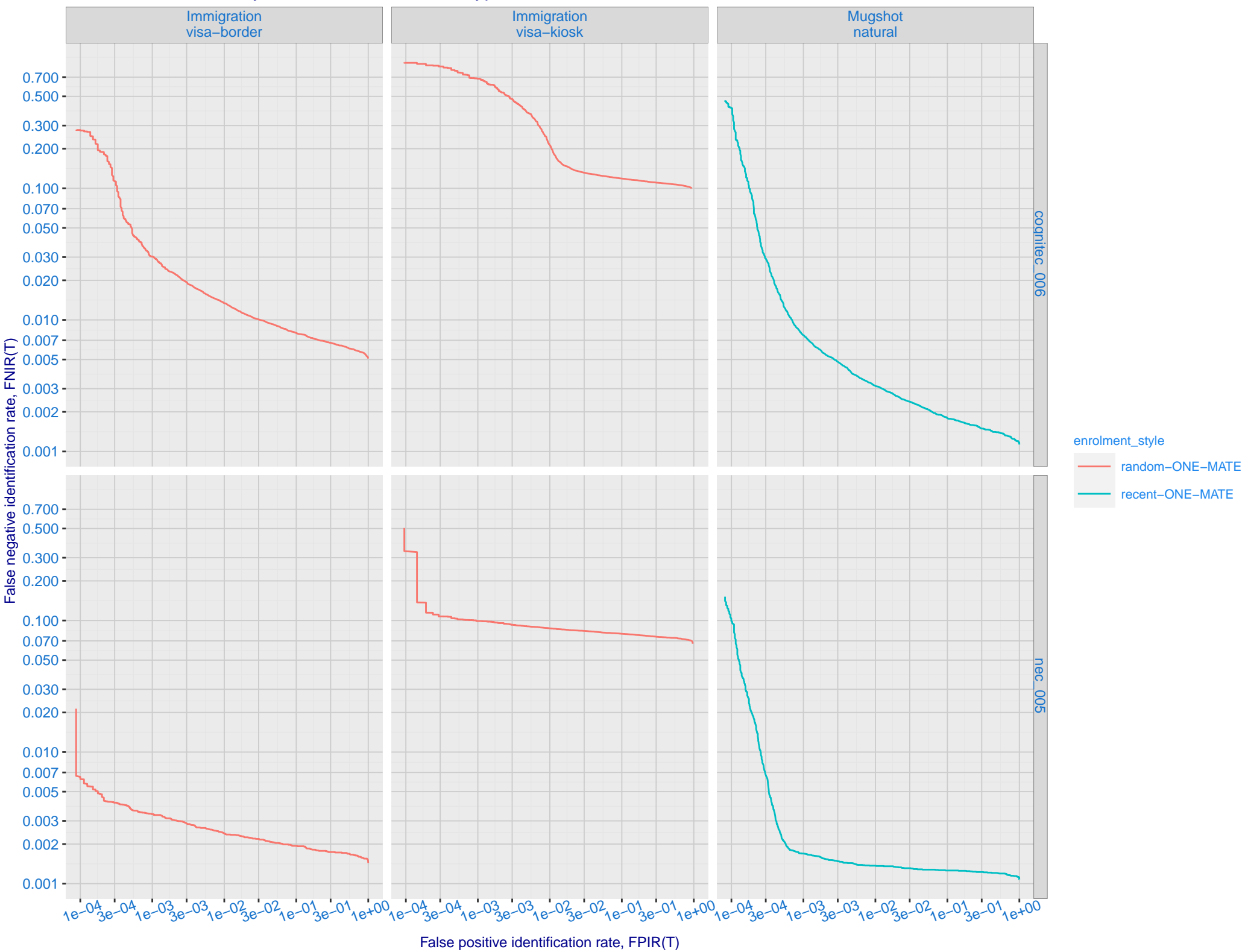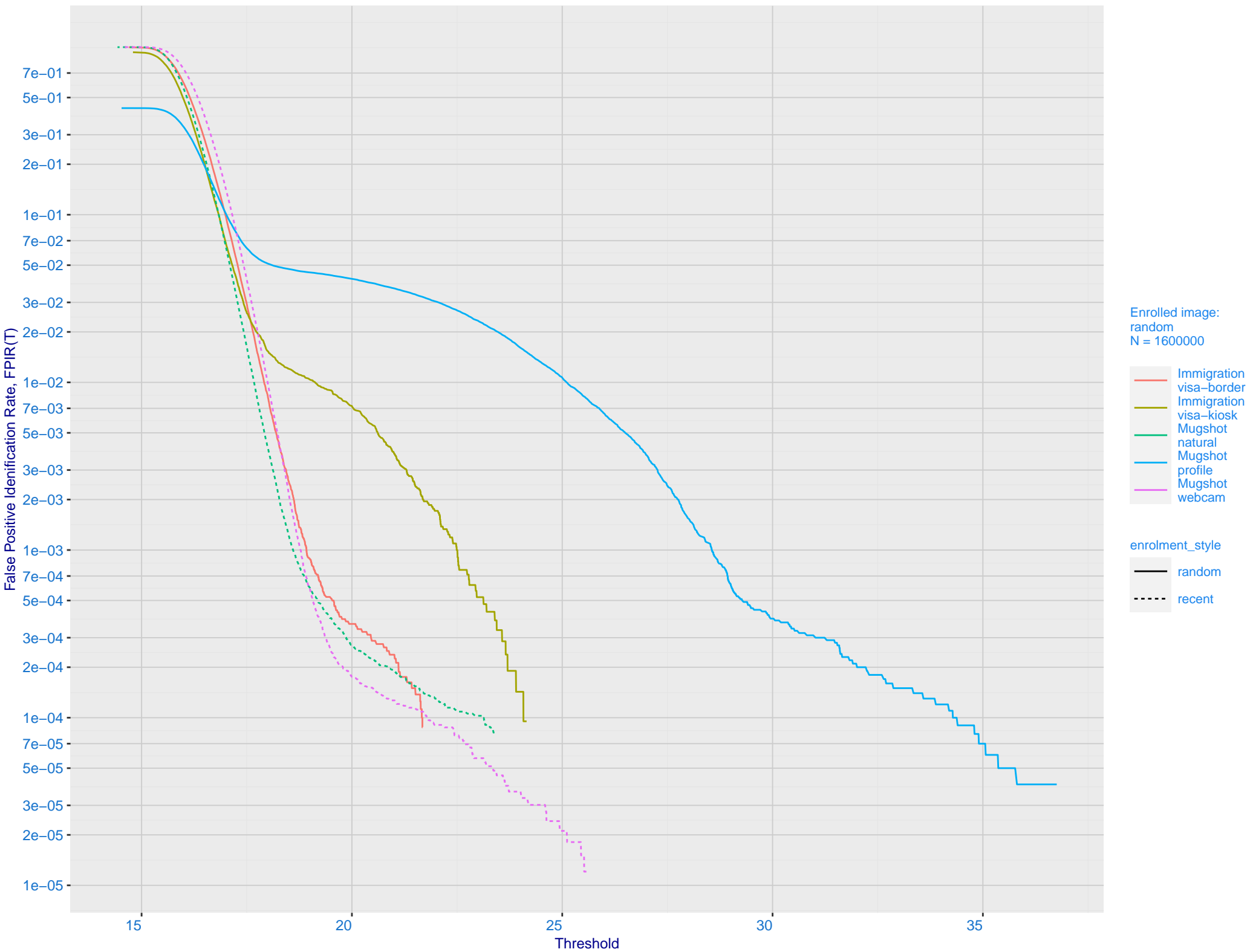
E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images
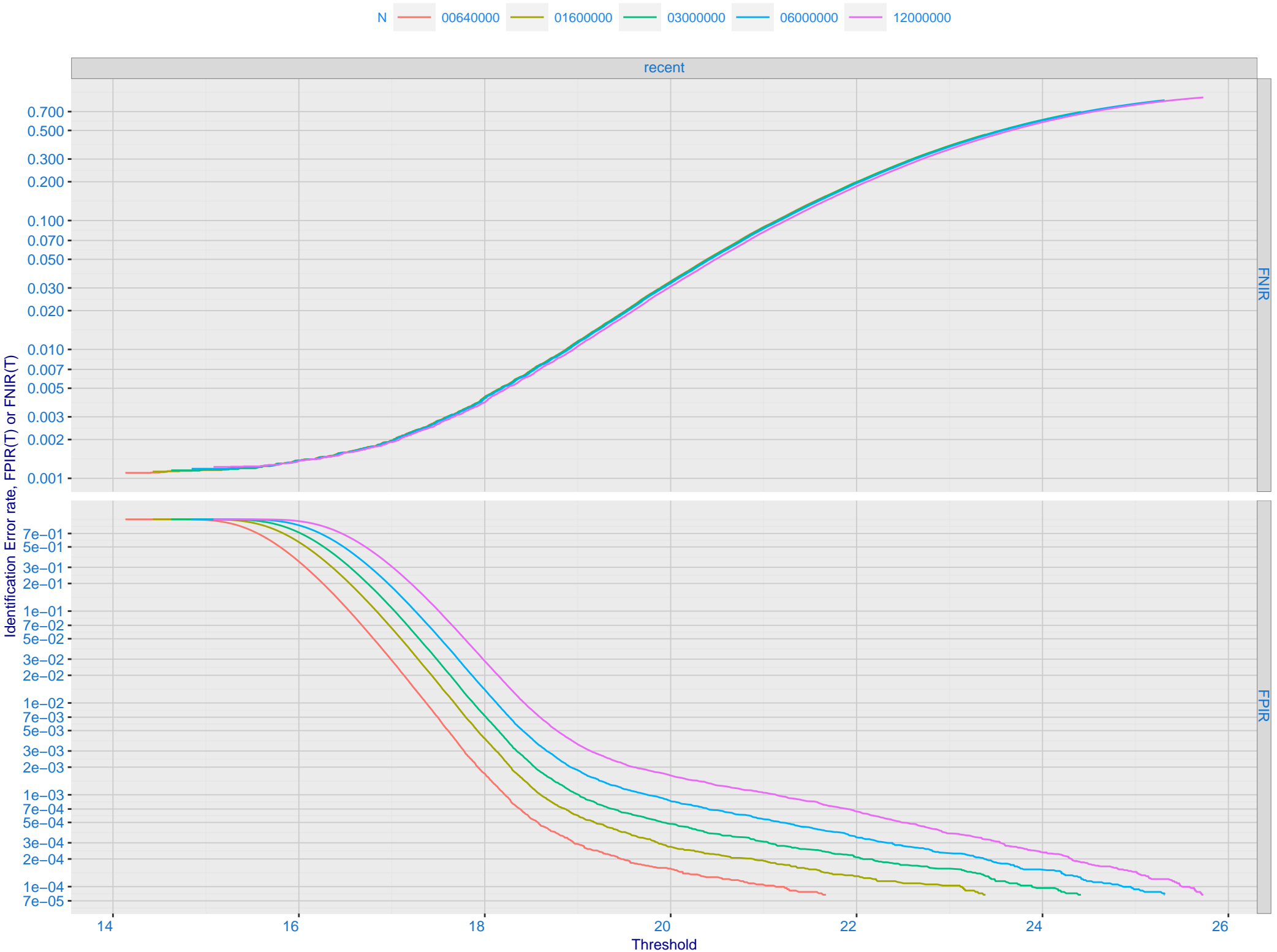
F: FPIR vs. Selectivity for mugshot images, N = 1600000 subjects enrolled with one recent mate
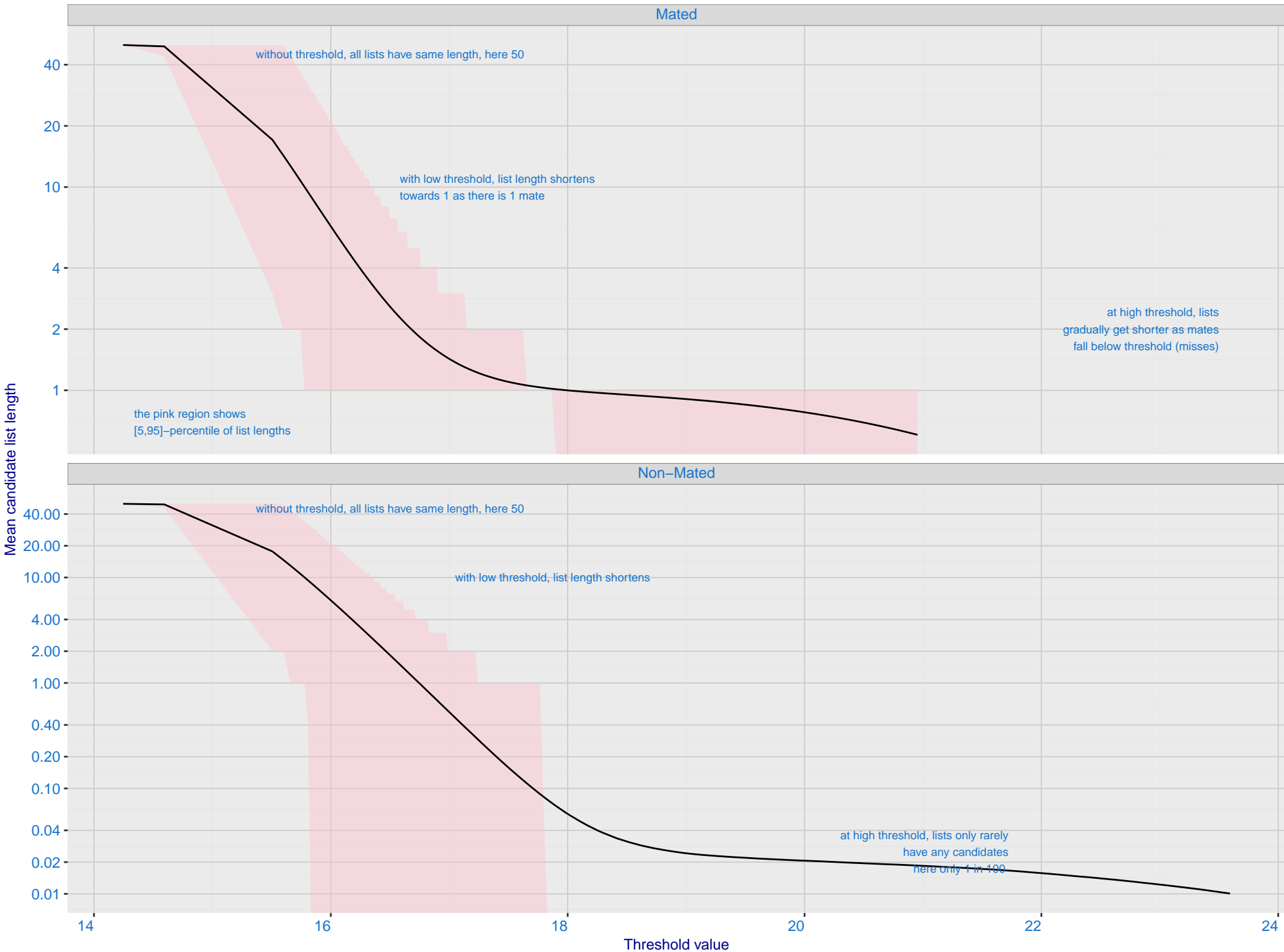
G: FPIR dependence on T by probe type for N = 1600000 subjects

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

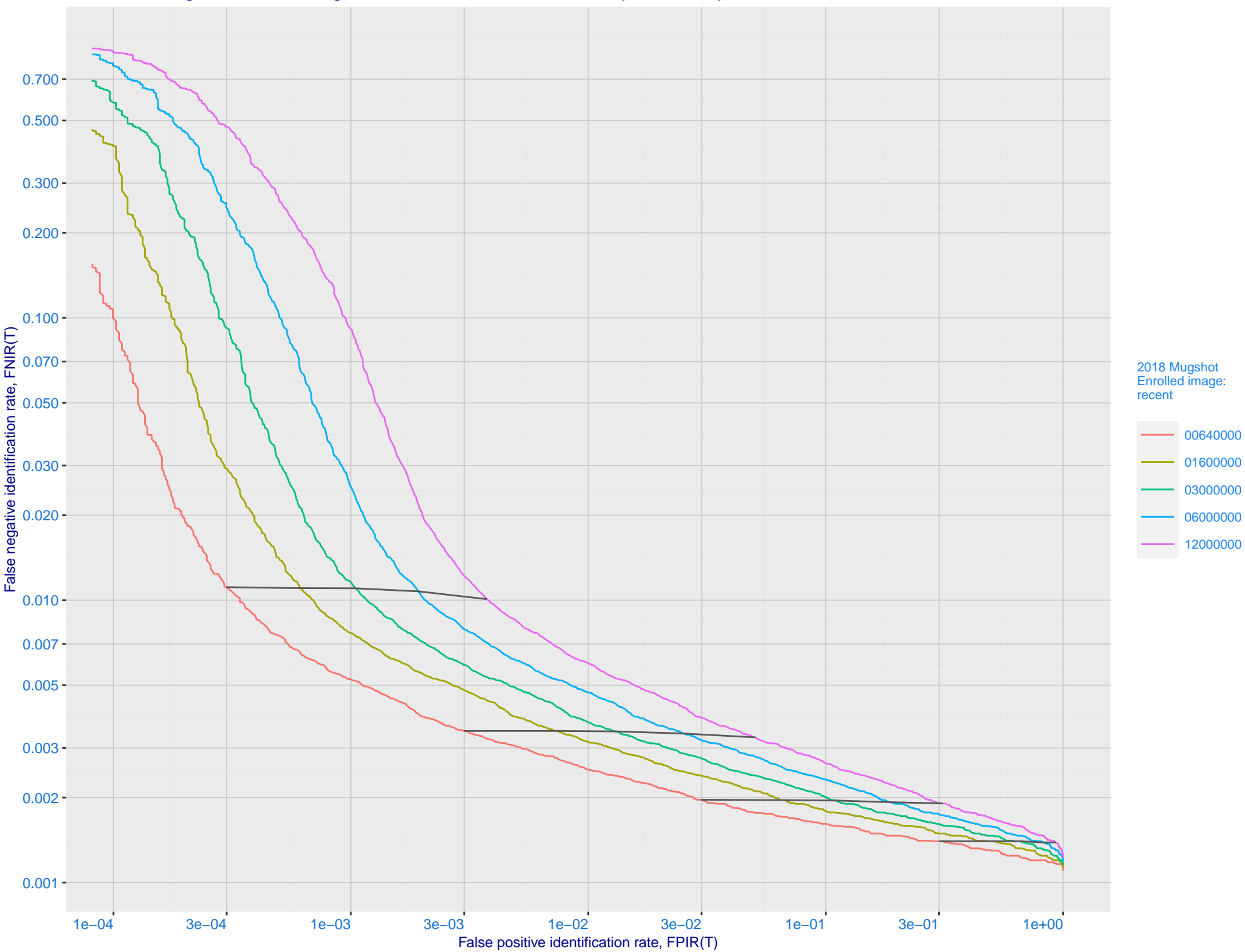Threshold value

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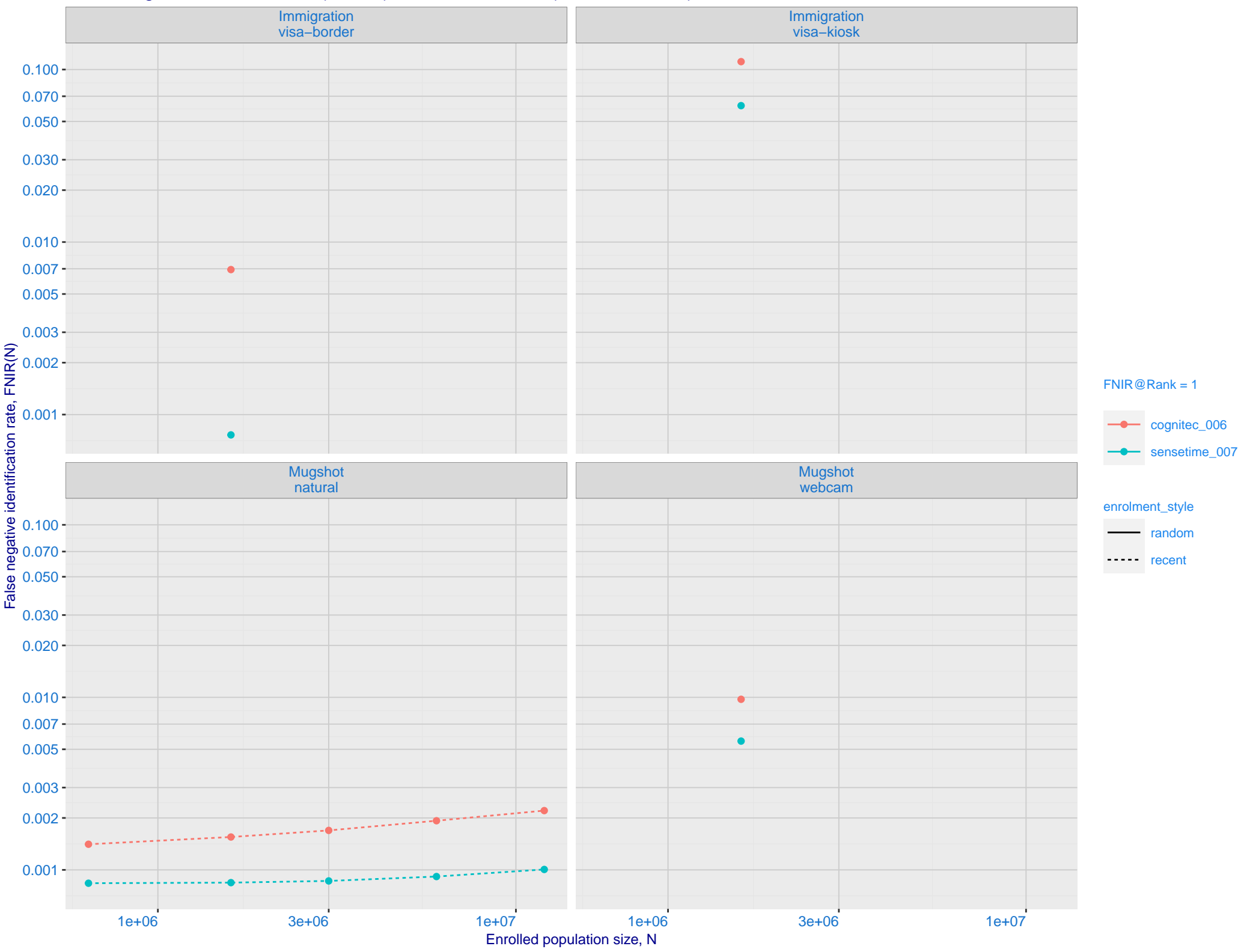
I: FNIR and FPIR dependence on threshold
Dataset is border–border with time–lapse [10,15] YRS with N = 1600000. Probes are 10–15 years later than enrollment image
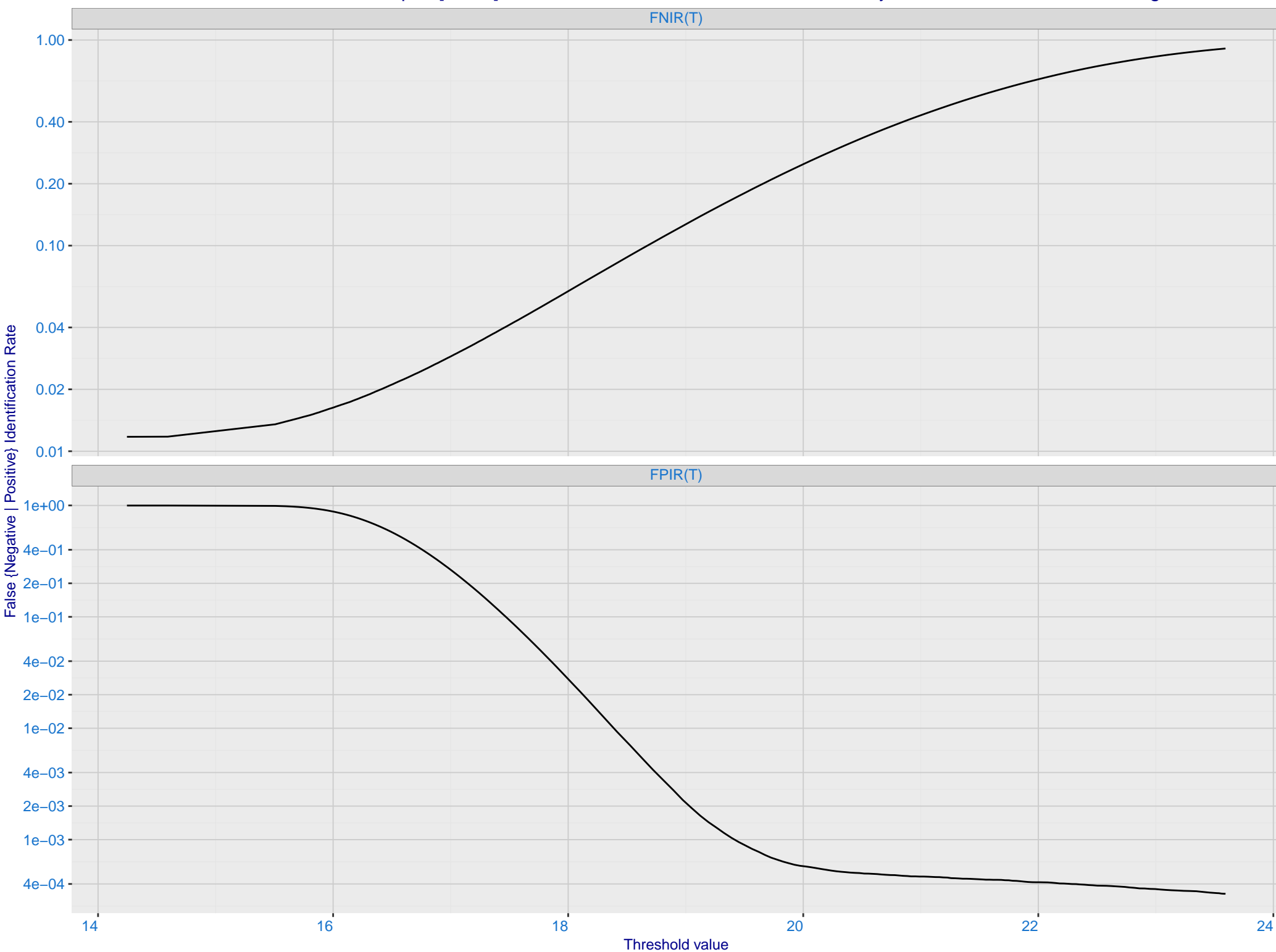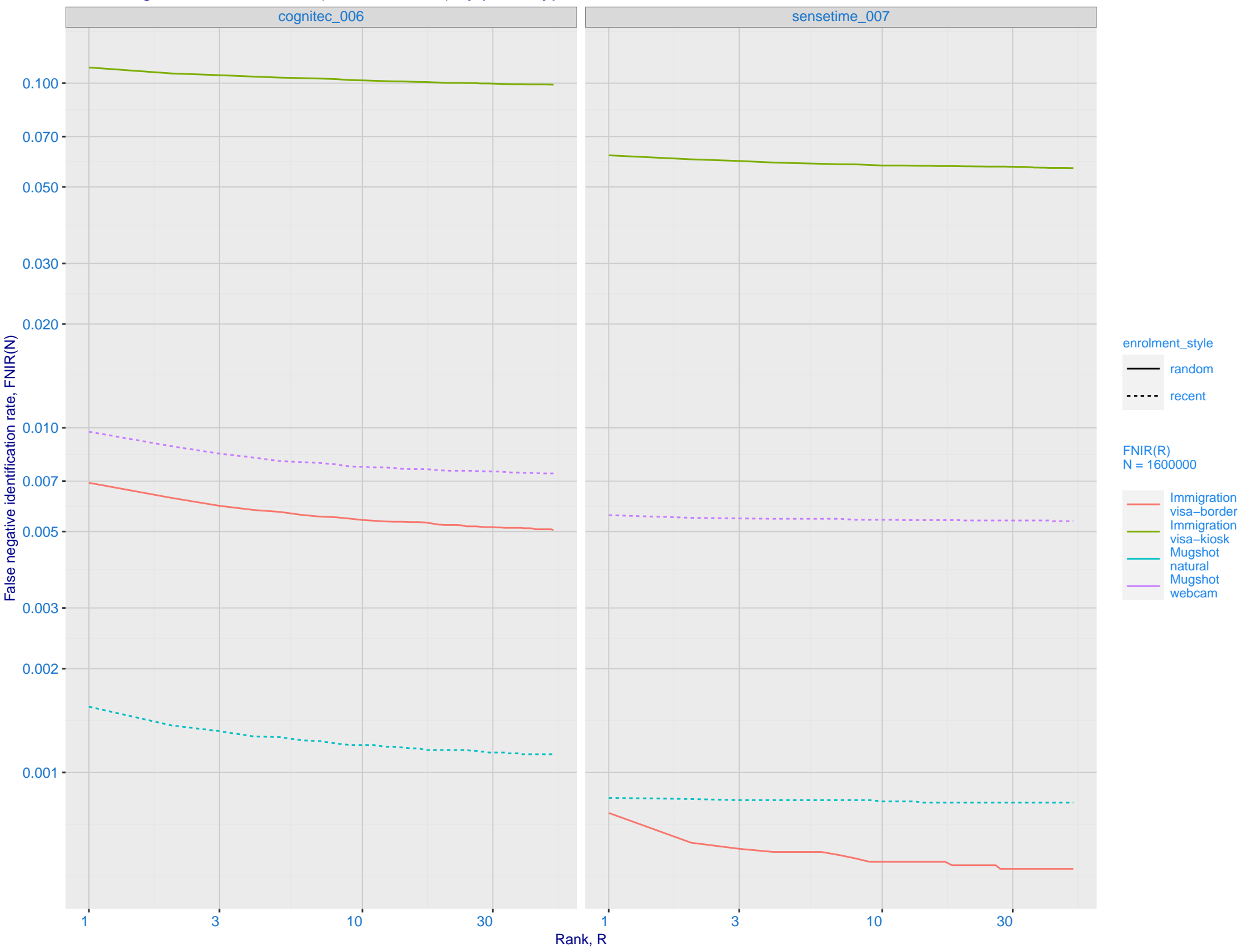
J: DET for Mugshot natural images and various N. Links connect points of equal threshold.

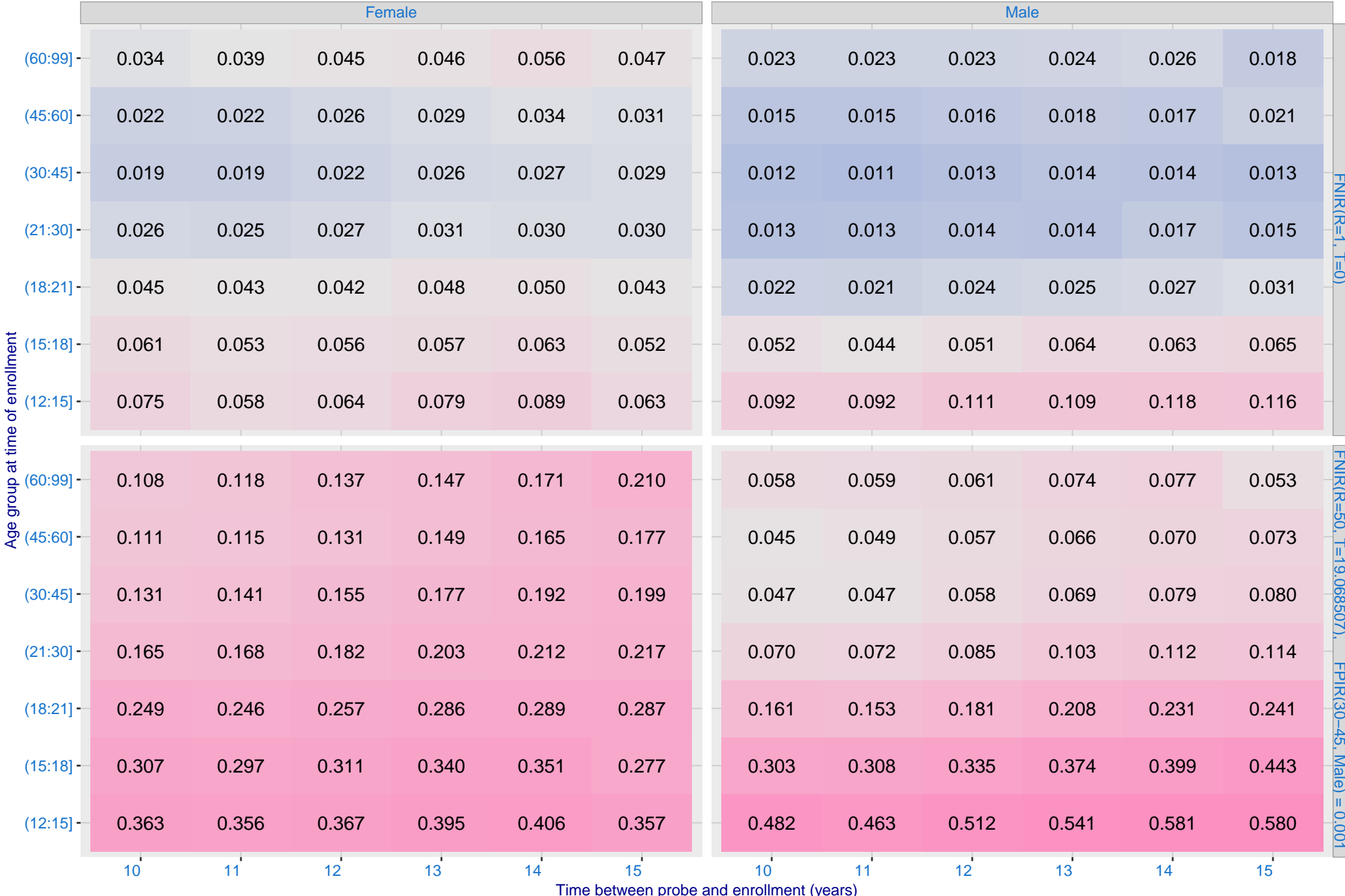K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_007)

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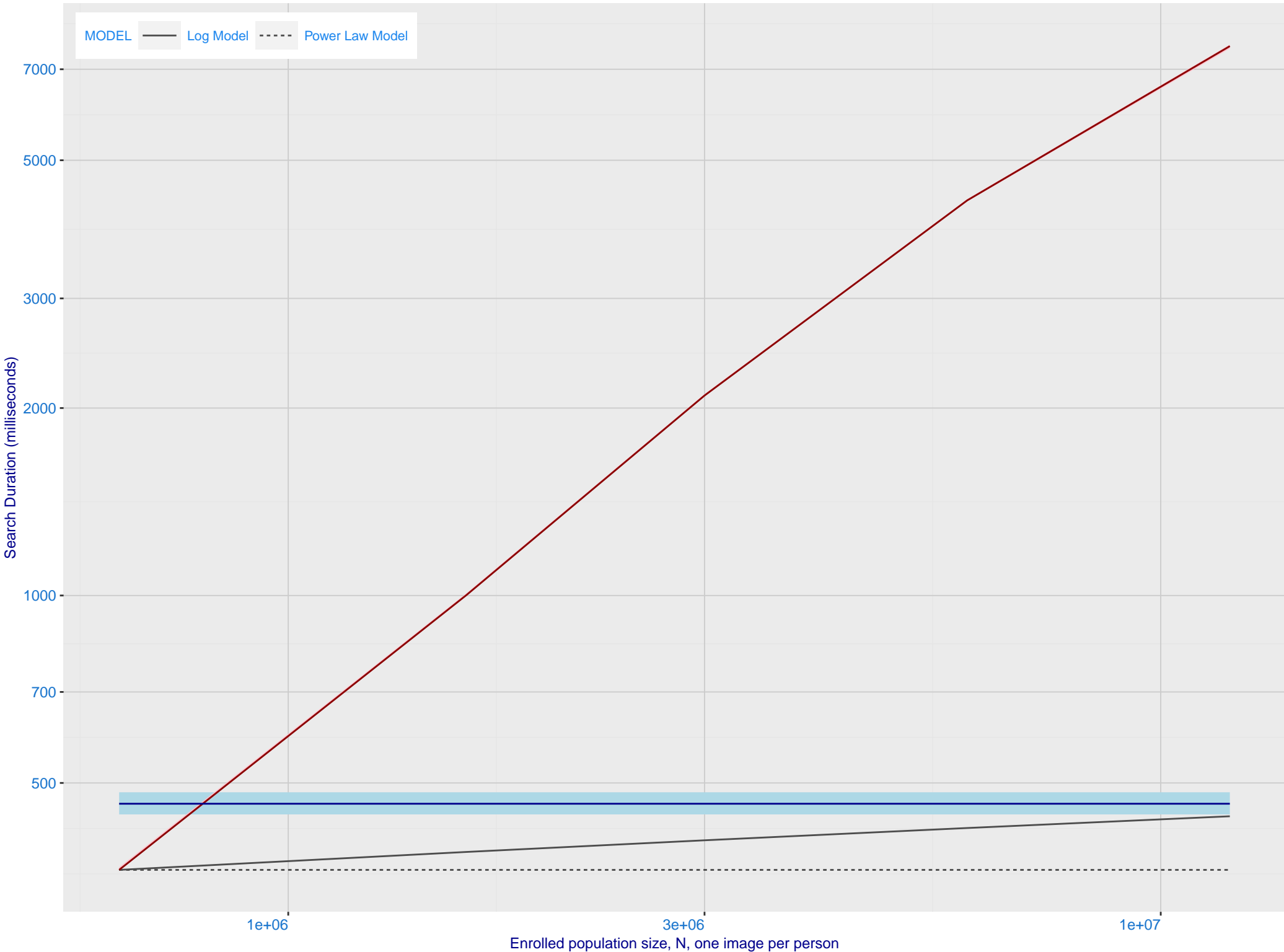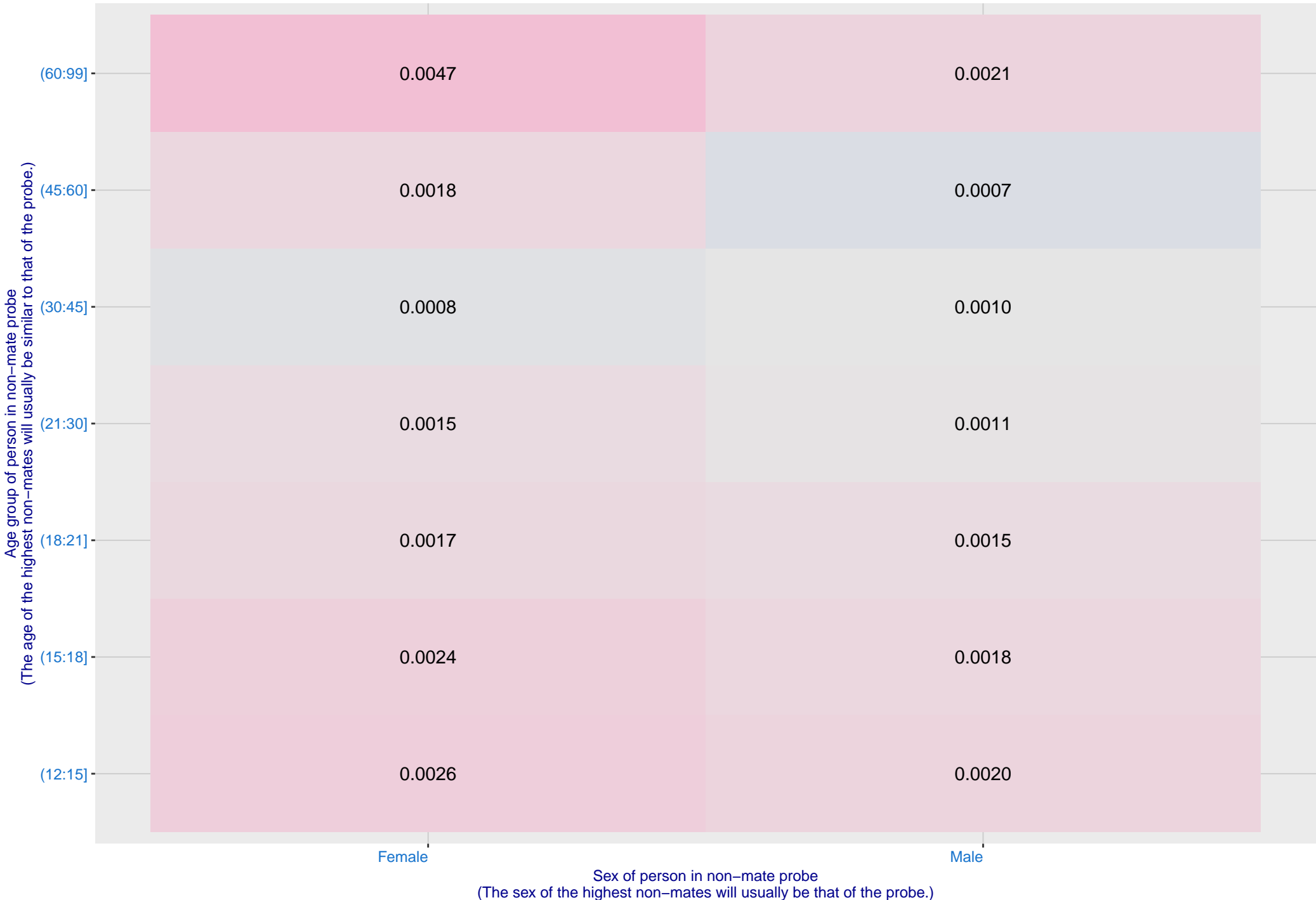
O: FNIR(T, N = 1.6 million) by sex, age and time−lapse. The top row gives investigational rank−1 miss rates. The bottom panels give high threshold for more lights−out identification with low FPIR.

Algorithm: cognitec_006, Dataset: Border−Crossing Ageing N = 1600000
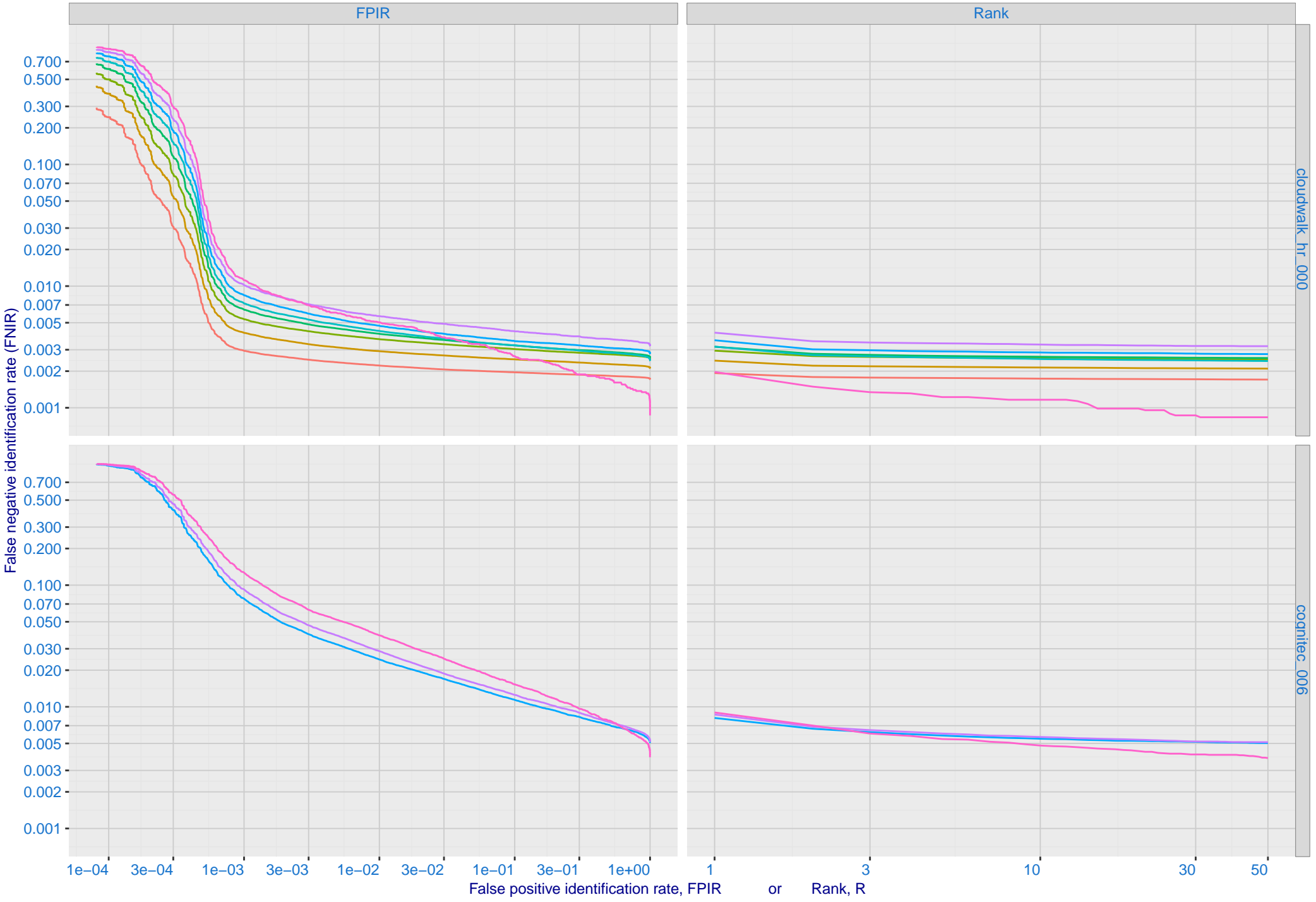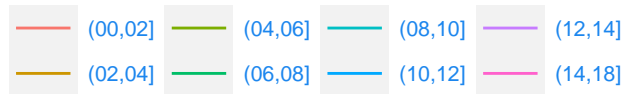Text encodes FNIR, Color encodes log(FNIR)

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: cognitec_006, Dataset: Border−Crossing Ageing
Threshold: 19.068507 set to achive FPIR(30−45, Male) = 0.001

Color encodes log(FPIR)
−4   −3   −2   −1

Age group	Female	Male
(60:99]	0.0047	0.0021
(45:60]	0.0018	0.0007
(30:45]	0.0008	0.0010
(21:30]	0.0015	0.0011
(18:21]	0.0017	0.0015
(15:18]	0.0024	0.0018
(12:15]	0.0026	0.0020

Age group of person in non−mate probe
(The age of the highest non−mates will usually be similar to that of the probe.)

Female   Male

Sex of person in non−mate probe
(The sex of the highest non−mates will usually be that of the probe.)

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

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