A: Datasheet

Algorithm: intellivision_002

Developer: Intellivision

Submission Date: 2022_07_28

Template size: 2056 bytes

Template time (2.5 percentile): 330 msec

Template time (median): 331 msec

Template time (97.5 percentile): 357 msec

Investigation:

Mugshot webcam ranking 207 (out of 331) –– FNIR(1600000, 0, 1) = 0.0308 vs. lowest 0.0055 from sensetime_008

Mugshot profile ranking 240 (out of 300) –– FNIR(1600000, 0, 1) = 0.9424 vs. lowest 0.0521 from sensetime_007

Immigration visa–border ranking 167 (out of 258) –– FNIR(1600000, 0, 1) = 0.0175 vs. lowest 0.0006 from cloudwalk_mt_001

Immigration visa–kiosk ranking 162 (out of 203) –– FNIR(1600000, 0, 1) = 0.1865 vs. lowest 0.0395 from cloudwalk_mt_001

Identification:

Frontal mugshot ranking 253 (out of 369) –– FNIR(1600000, T, L+1) = 0.1538, FPIR=0.001000 vs. lowest 0.0013 from sensetime_008

Mugshot webcam ranking 218 (out of 329) –– FNIR(1600000, T, L+1) = 0.1959, FPIR=0.001000 vs. lowest 0.0090 from sensetime_008

Mugshot profile ranking 204 (out of 299) –– FNIR(1600000, T, L+1) = 0.9988, FPIR=0.001000 vs. lowest 0.0698 from cloudwalk_mt_001

Immigration visa–border ranking 166 (out of 257) –– FNIR(1600000, T, L+1) = 0.1337, FPIR=0.001000 vs. lowest 0.0013 from cloudwalk_mt_001

Immigration visa–kiosk ranking 117 (out of 203) –– FNIR(1600000, T, L+1) = 0.4288, FPIR=0.001000 vs. lowest 0.0532 from cloudwalk_mt_001
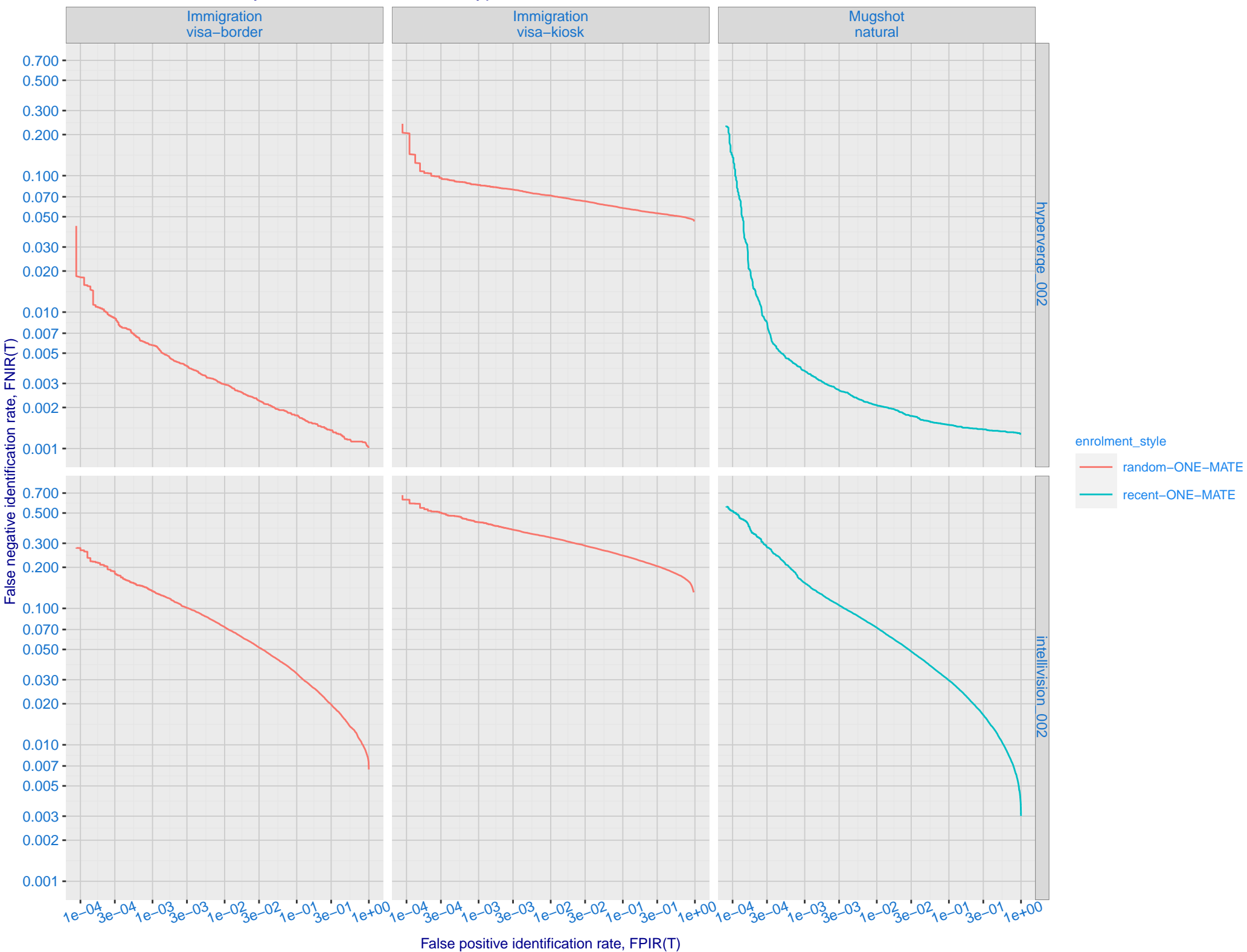
B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (hyperverge_002)
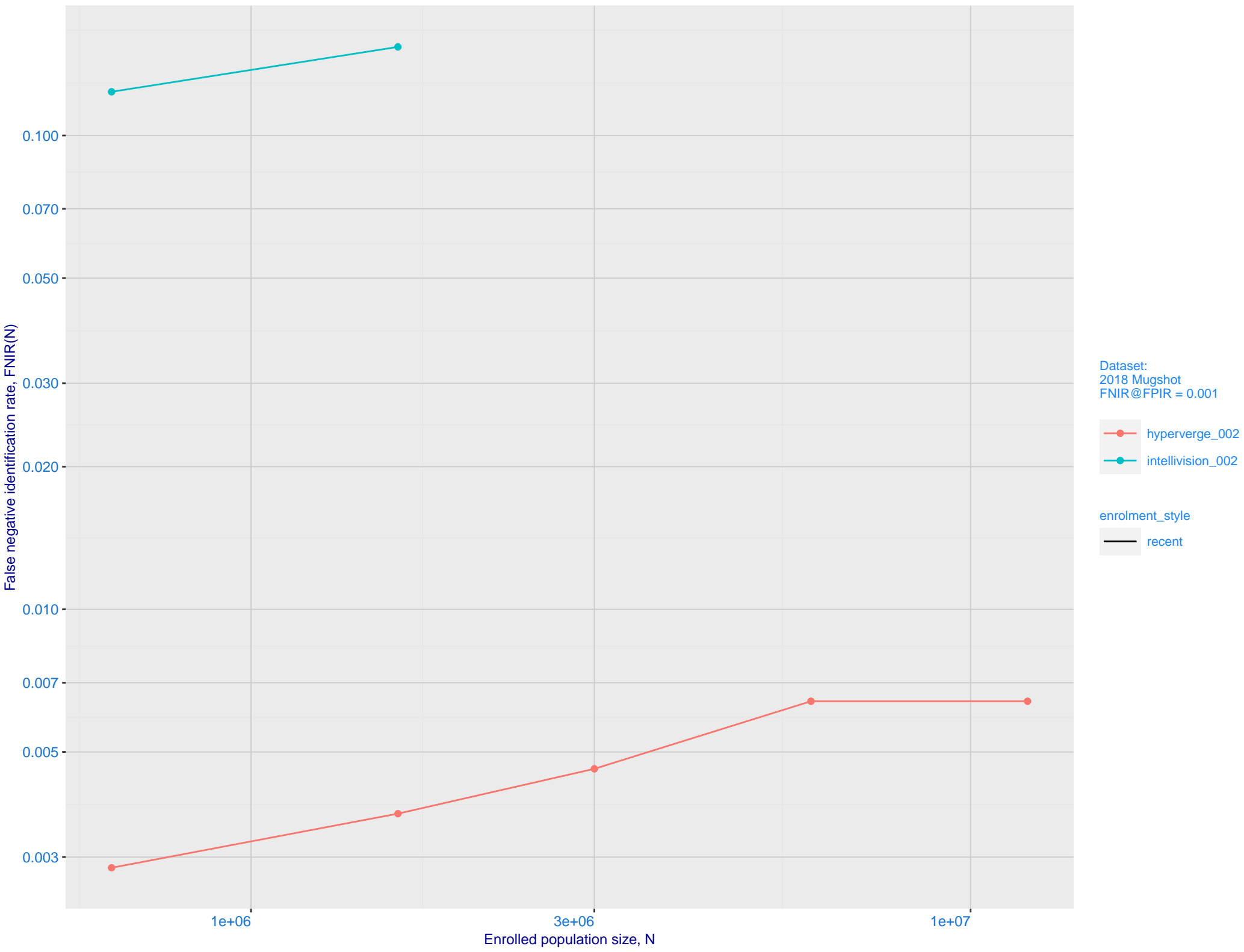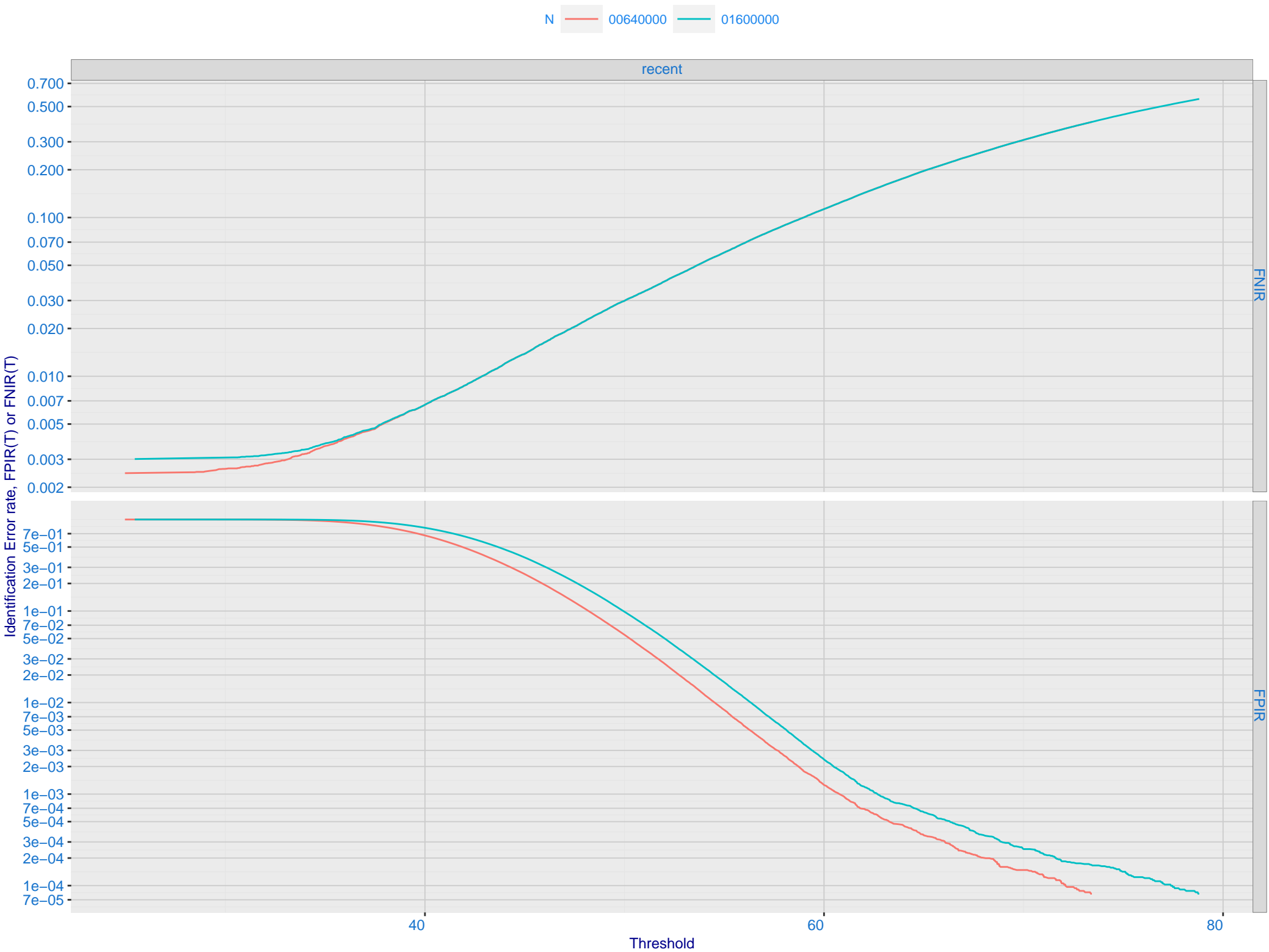
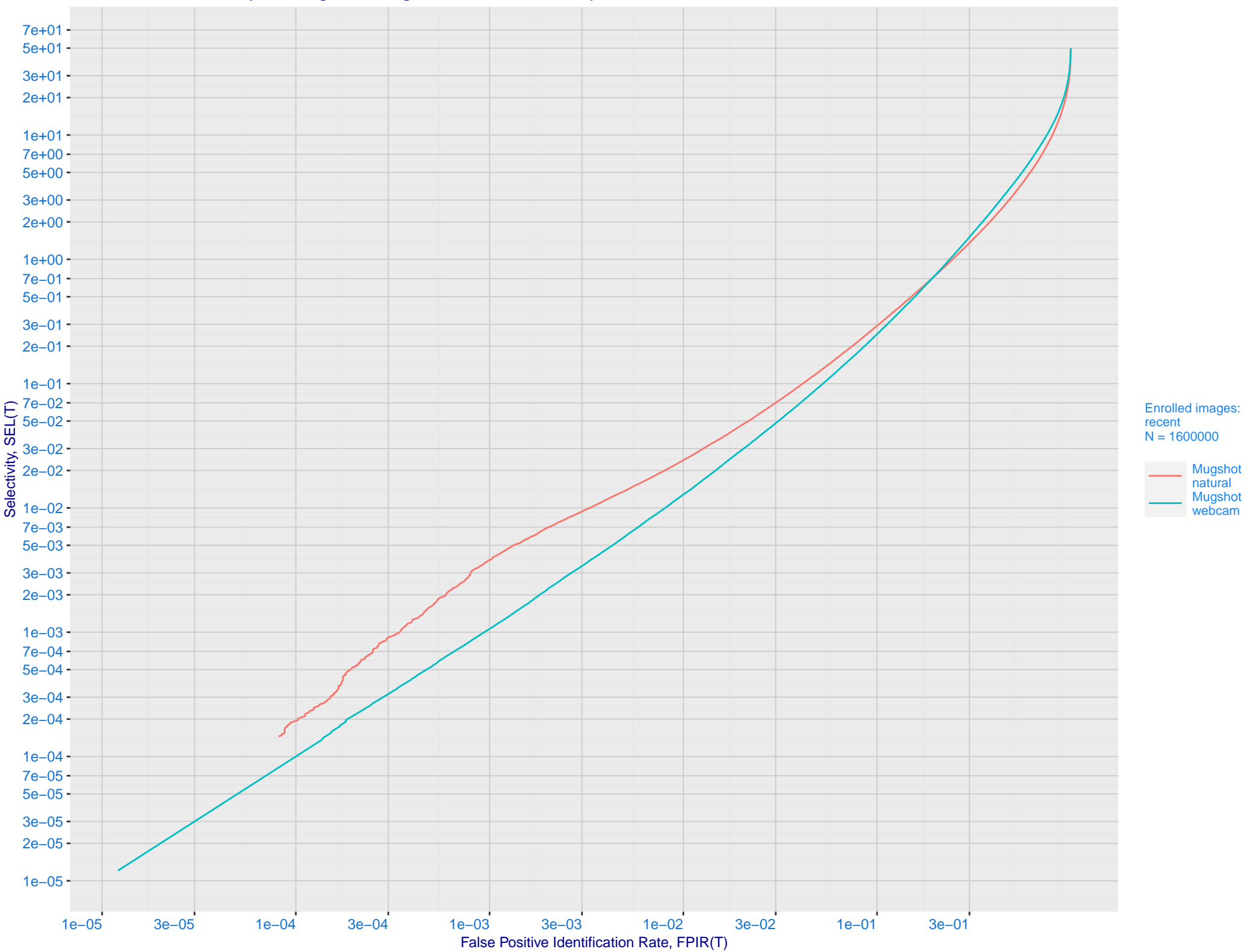C: Evolution of accuracy for INTELLIVISION algorithms on three datasets 2018 – present
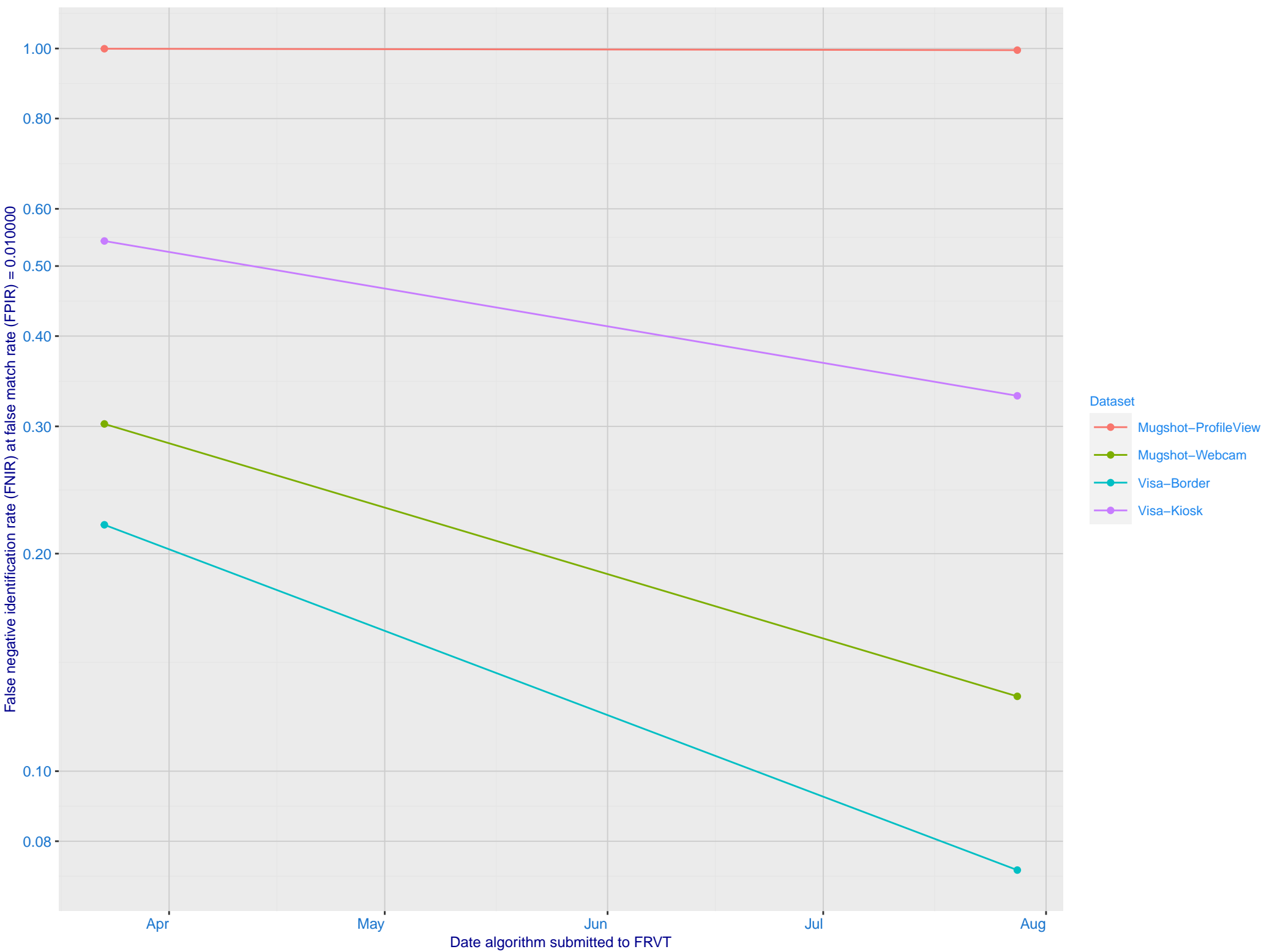
D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals
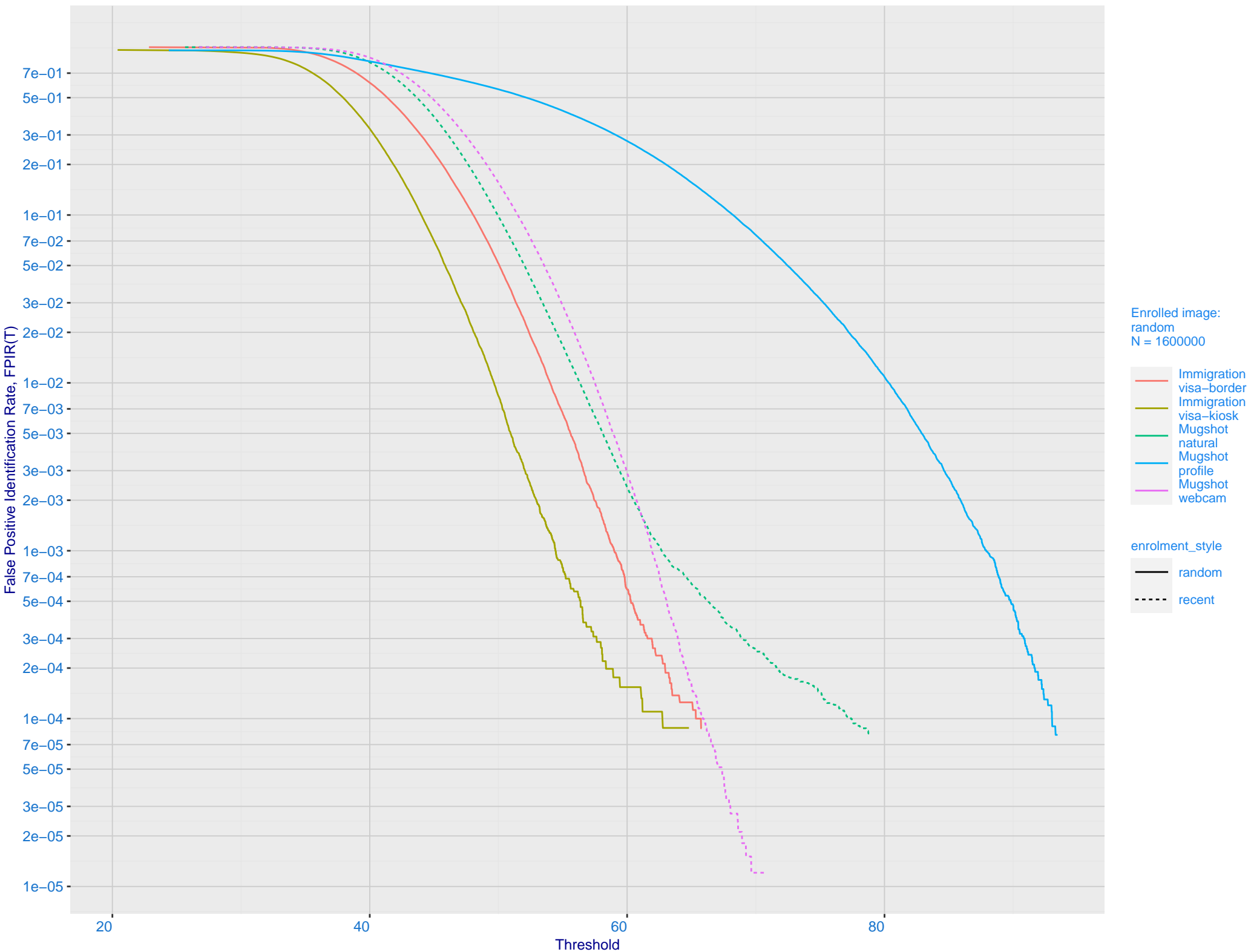
E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images

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

Selectivity, SEL(T)

False Positive Identification Rate, FPIR(T)

Enrolled images:
recent
N = 1600000
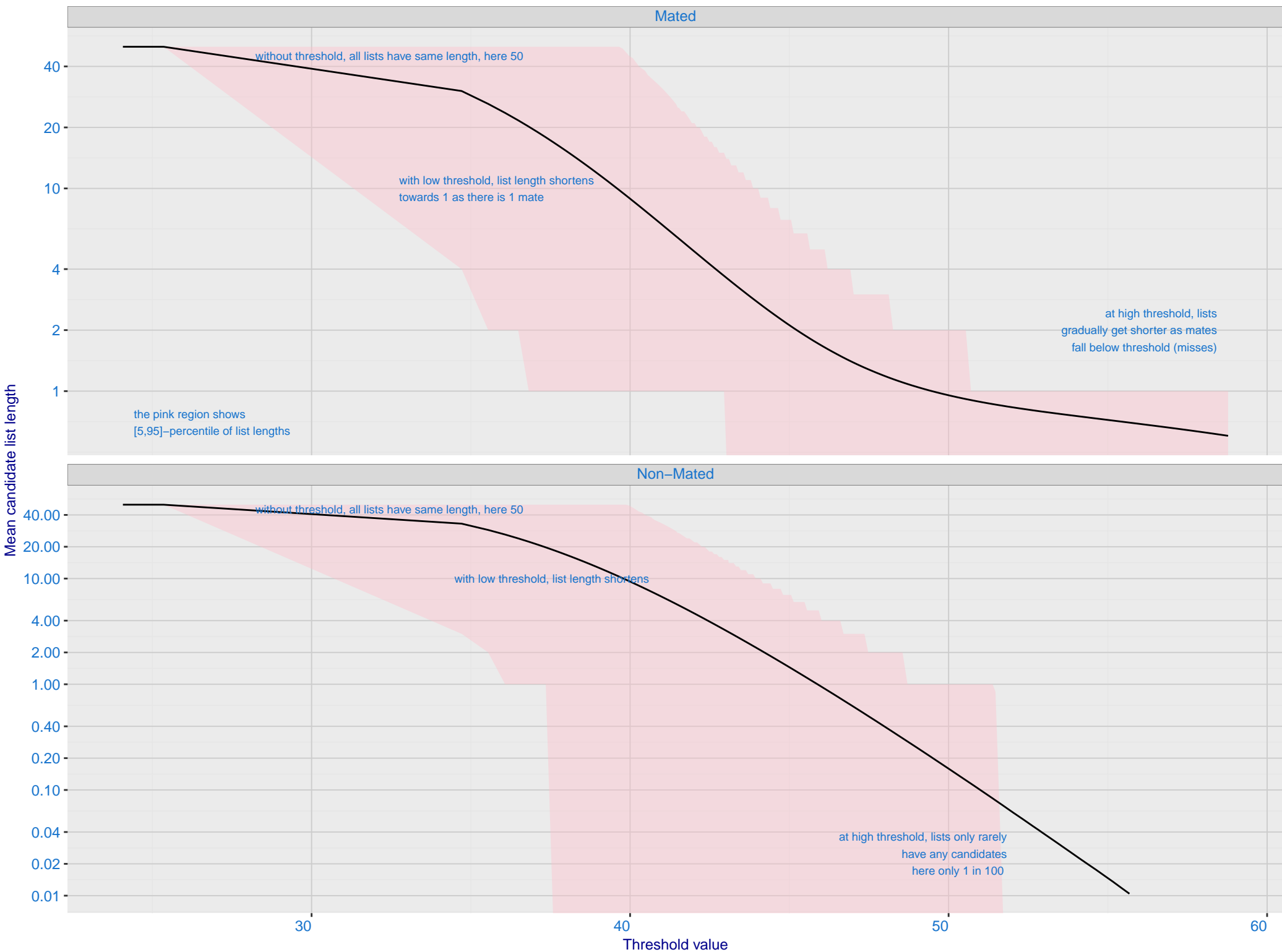
Mugshot
natural
Mugshot
webcam

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

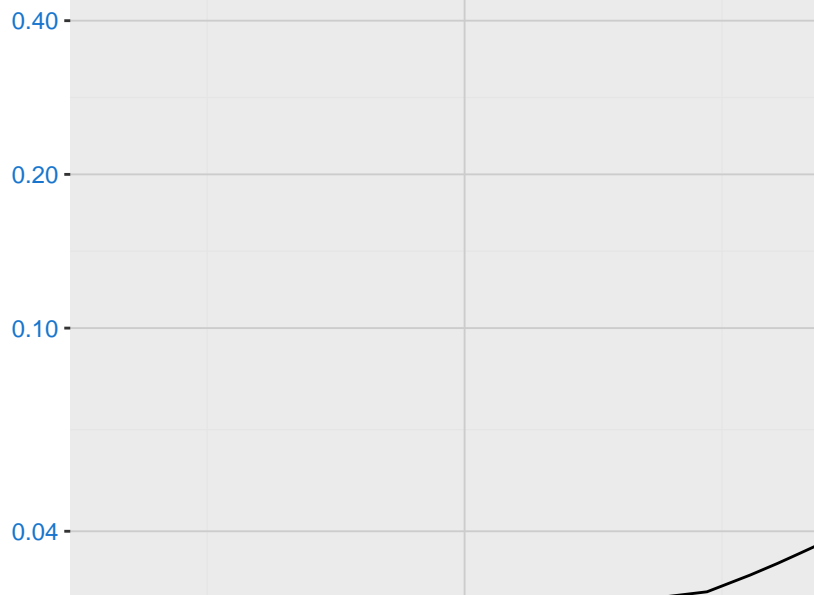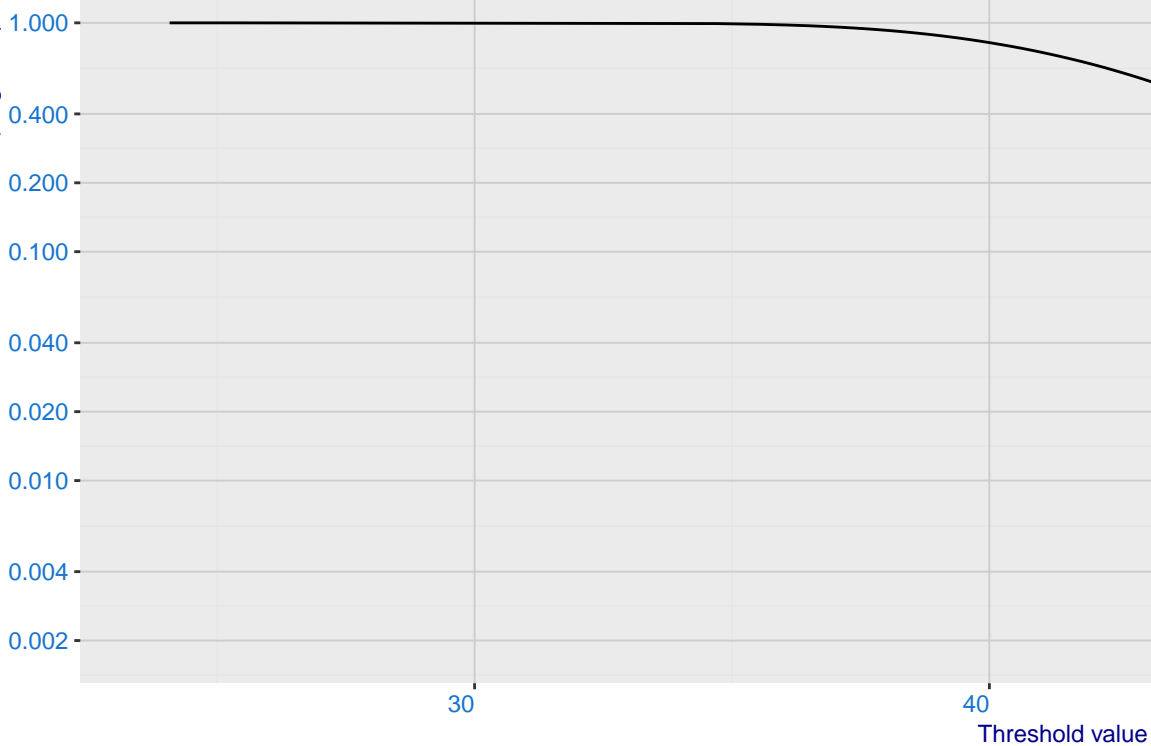Mean candidate list length

Threshold value

I: FNIR and FPIR dependence on threshold
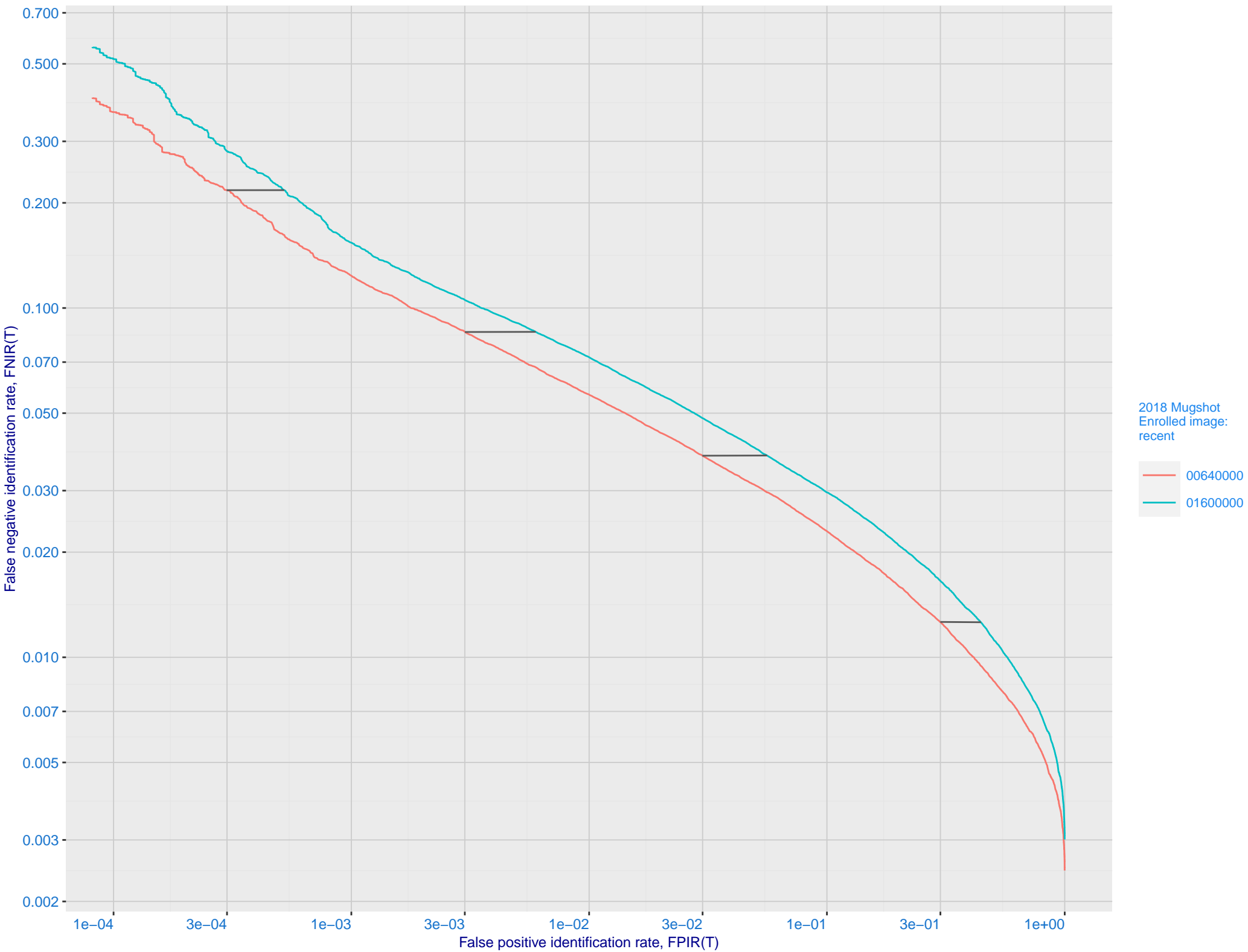Dataset is border–border with time–lapse [10,15] YRS with N = 1600000. Probes are 10–15 years later than enrollment image

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

False negative identification rate, FNIR(T)

False positive identification rate, FPIR(T)

2018 Mugshot
Enrolled image:
recent

00640000
01600000

K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_007)
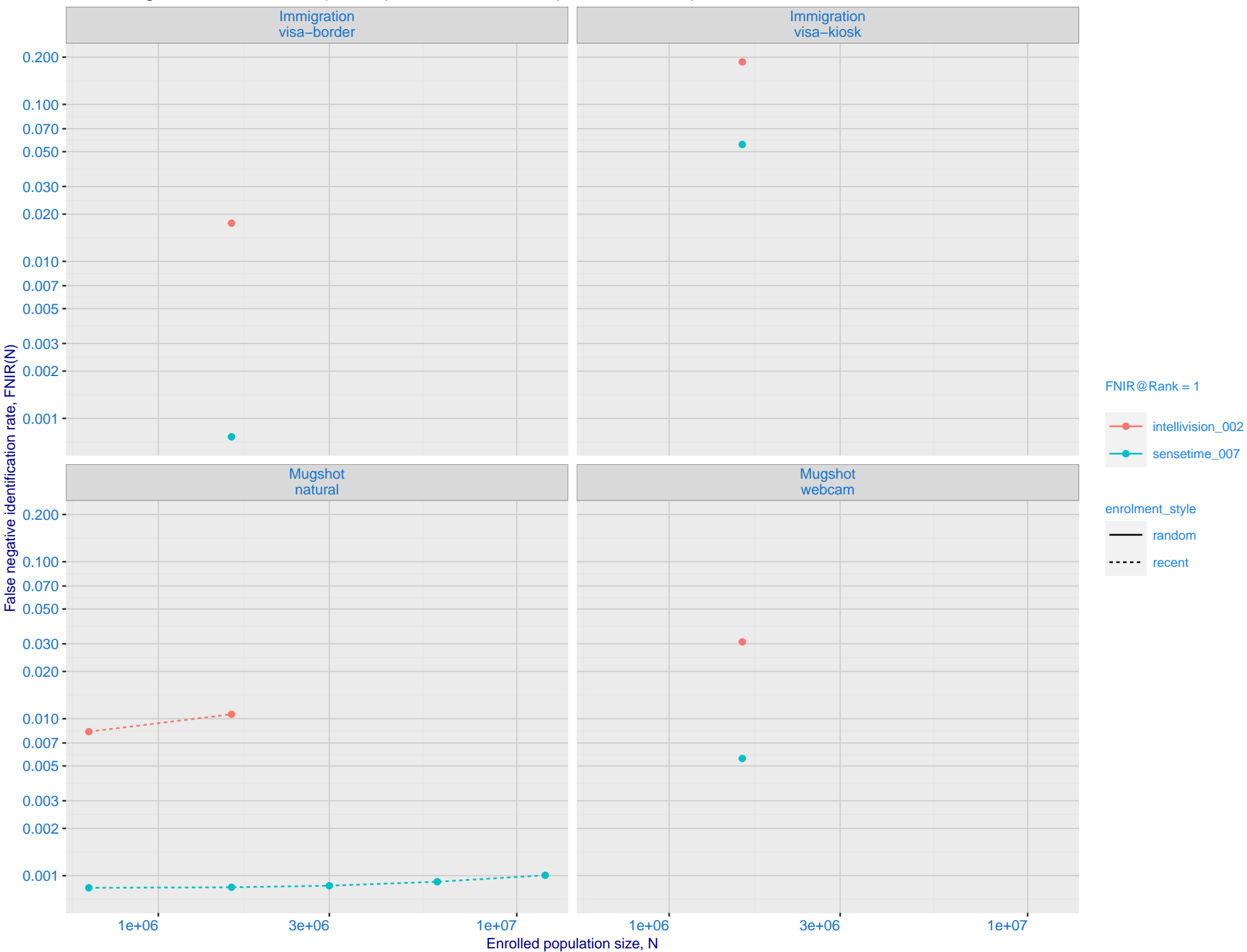
L: Investigational mode: FNIR(1600000, R, 0) by probe type
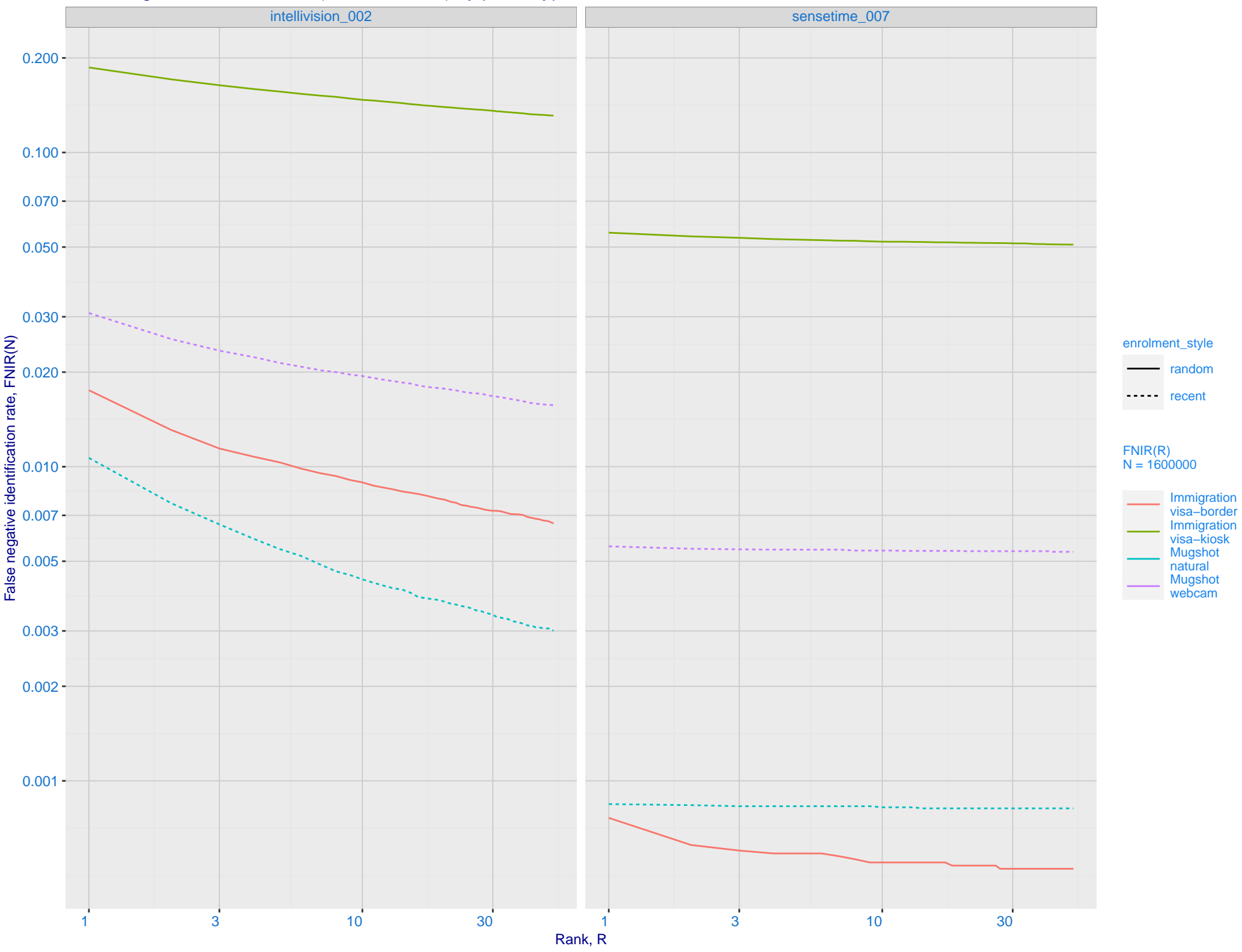
M: Template duration; search duration vs. N. The blue and pink ribbon covers 95 percent of observed measurements. The template generation time is independent of N. The log and power–law models are fit to the first two (N,T) observations
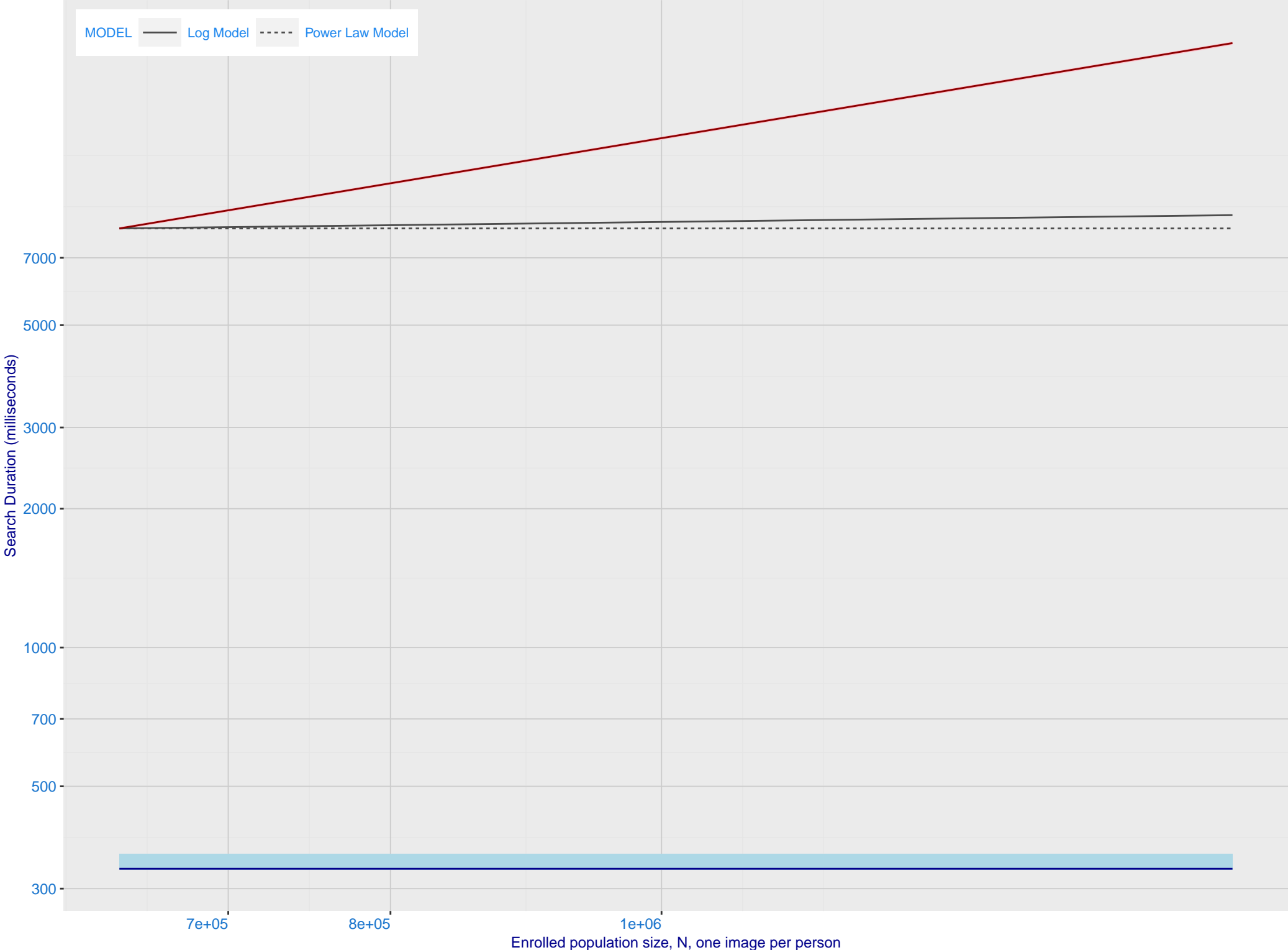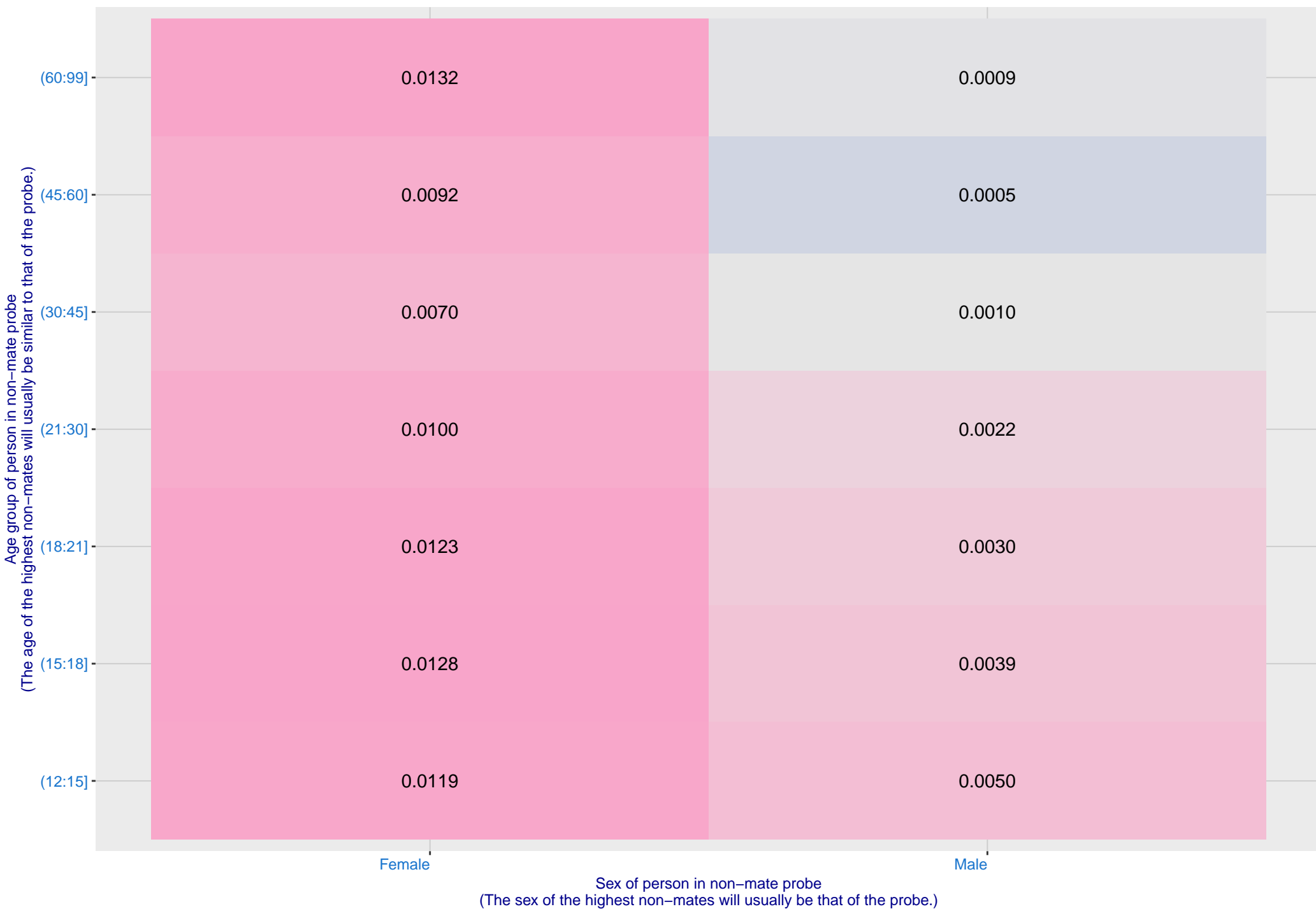
O: FNIR(T, N = 1.6 million) by sex, age and time–lapse. The top row gives investigational rank–1 miss rates. The bottom panels give high threshold for more lights–out identification with low FPIR.
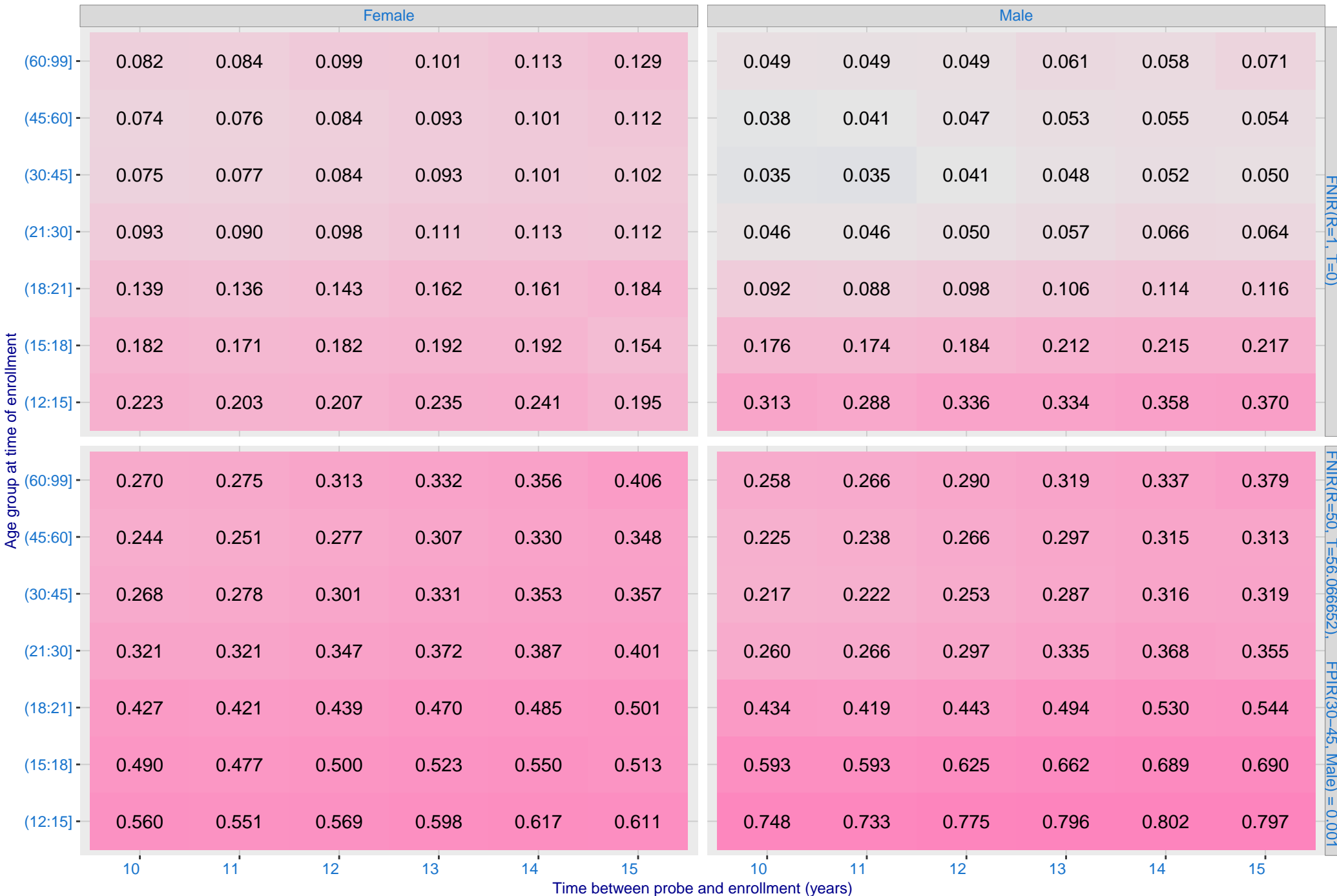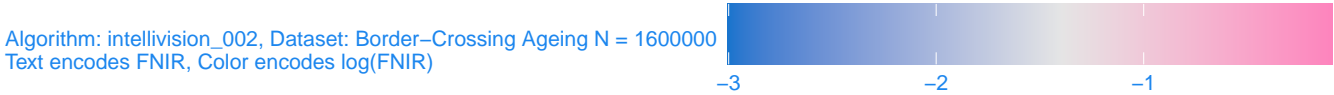
P: FPIR(N = 1.6 million) by sex and age. It is typical for false positive identification rates to be higher in women except in their teens.

Algorithm: intellivision_002, Dataset: Border−Crossing Ageing
Threshold: 56.066652 set to achive FPIR(30−45, Male) = 0.001

Color encodes log(FPIR)

Age group	Female	Male
(60:99]	0.0132	0.0009
(45:60]	0.0092	0.0005
(30:45]	0.0070	0.0010
(21:30]	0.0100	0.0022
(18:21]	0.0123	0.0030
(15:18]	0.0128	0.0039
(12:15]	0.0119	0.0050

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

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

Dataset: 2018 Mugshot   N = 3068801   (00,02]   (04,06]   (08,10]   (12,14]
                                          (02,04]   (06,08]   (10,12]   (14,18]
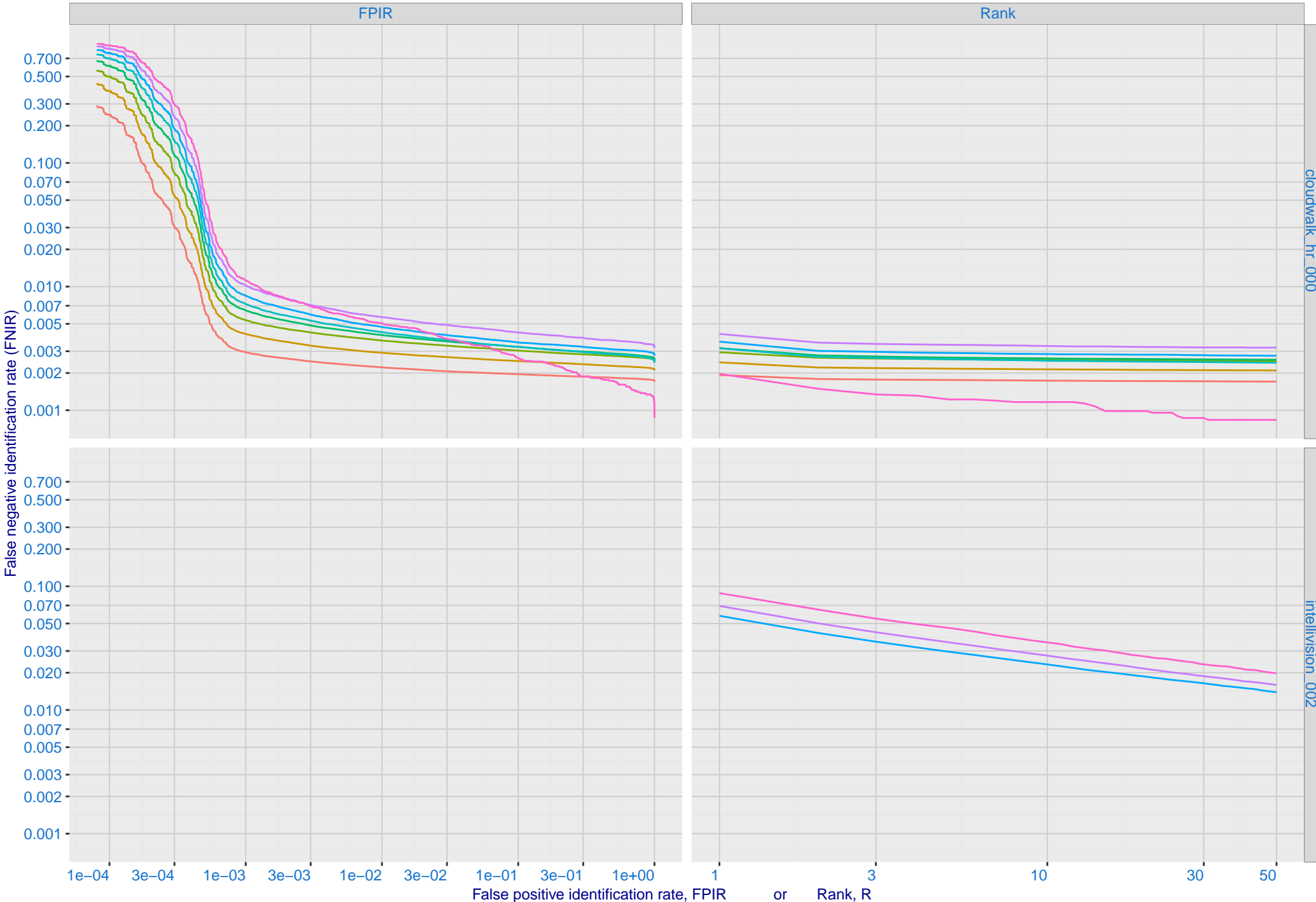
R: Decline of genuine scores with ageing, with some eventually dropping below typical thresholds shown by the horizontal lines