

A: Datasheet

Algorithm: qnap_000

Developer: Qnap Security

Submission Date: 2021_07_28

Template size: 2048 bytes

Template time (2.5 percentile): 455 msec

Template time (median): 457 msec

Template time (97.5 percentile): 464 msec

Investigation:

Frontal mugshot ranking 136 (out of 298) -- FNIR(1600000, 0, 1) = 0.0078 vs. lowest 0.0009 from sensetime_006

Mugshot webcam ranking 137 (out of 260) -- FNIR(1600000, 0, 1) = 0.0274 vs. lowest 0.0057 from sensetime_006

Mugshot profile ranking 71 (out of 229) -- FNIR(1600000, 0, 1) = 0.5217 vs. lowest 0.0550 from sensetime_006

Immigration visa-border ranking 96 (out of 187) -- FNIR(1600000, 0, 1) = 0.0132 vs. lowest 0.0009 from sensetime_006

Immigration visa-kiosk ranking 94 (out of 184) -- FNIR(1600000, 0, 1) = 0.1582 vs. lowest 0.0487 from cubox_000

Identification:

Frontal mugshot ranking 182 (out of 298) -- FNIR(1600000, T, L+1) = 0.1289, FPIR=0.001000 vs. lowest 0.0018 from sensetime_004

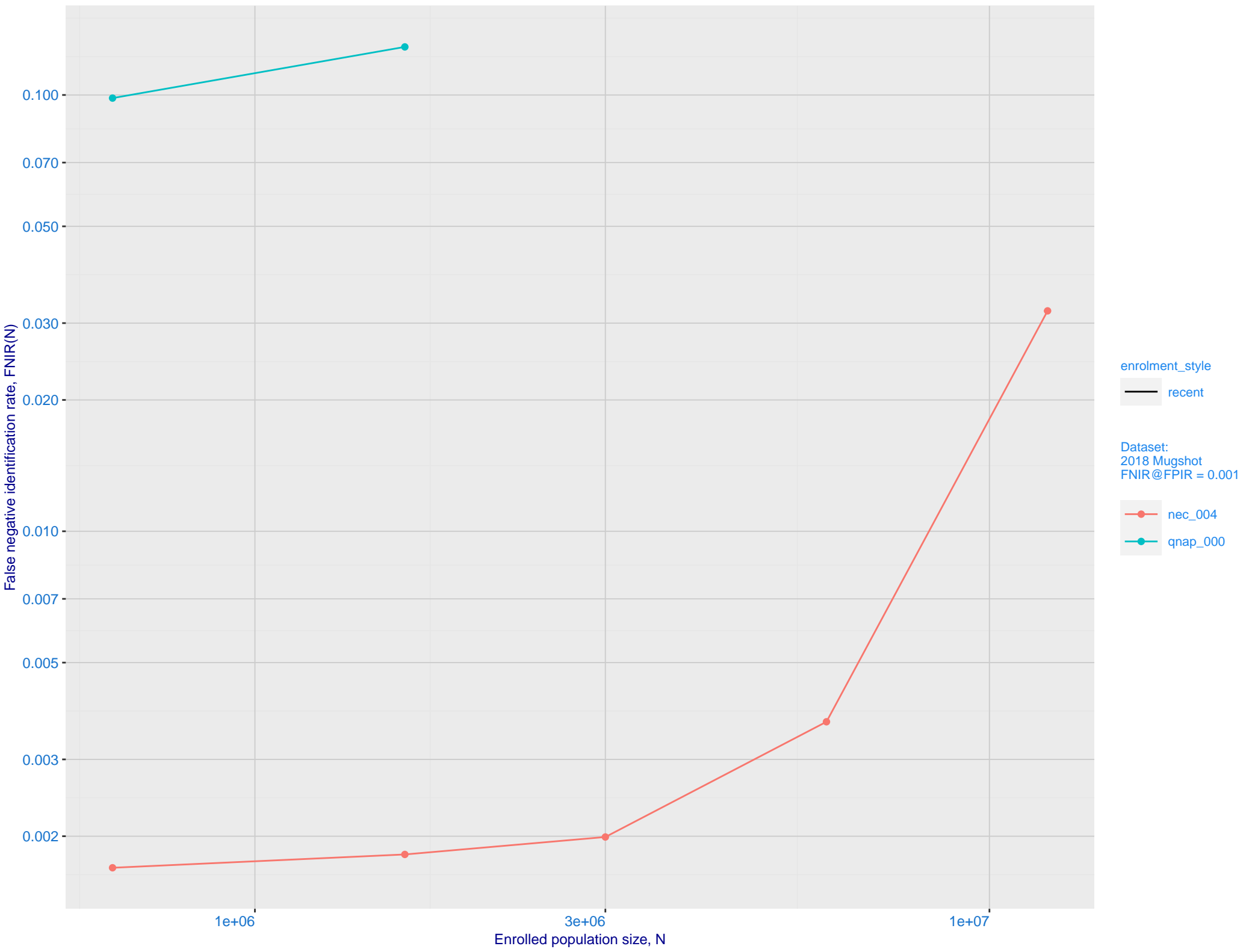
Mugshot webcam ranking 168 (out of 258) -- FNIR(1600000, T, L+1) = 0.2379, FPIR=0.001000 vs. lowest 0.0122 from sensetime_003

Mugshot profile ranking 218 (out of 228) -- FNIR(1600000, T, L+1) = 1.0000, FPIR=0.001000 vs. lowest 0.1331 from cloudwalk_hr_000

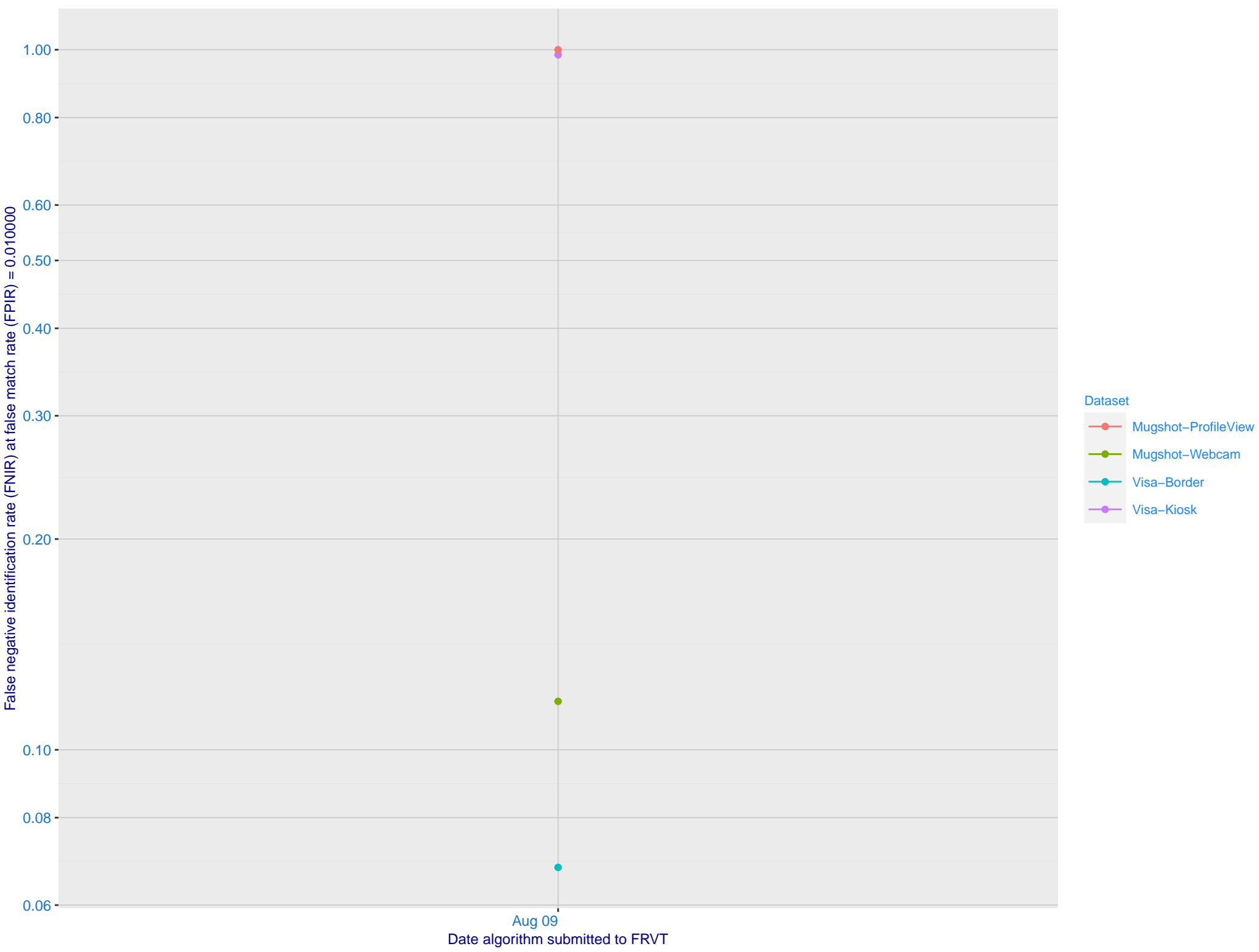
Immigration visa-border ranking 116 (out of 185) -- FNIR(1600000, T, L+1) = 0.1908, FPIR=0.001000 vs. lowest 0.0039 from sensetime_006

Immigration visa-kiosk ranking 158 (out of 180) -- FNIR(1600000, T, L+1) = 0.9980, FPIR=0.001000 vs. lowest 0.0925 from sensetime_006

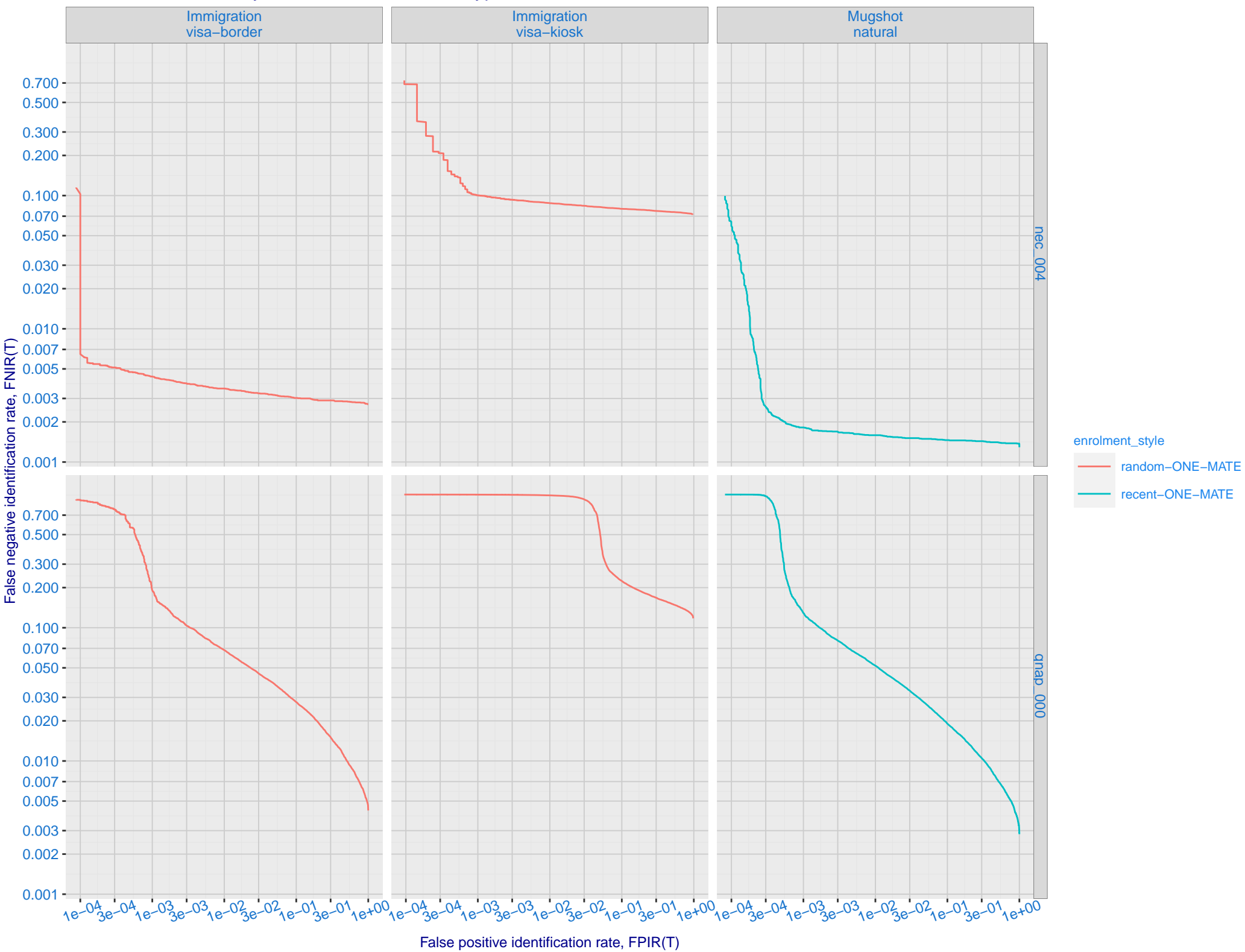
B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (nec_004)



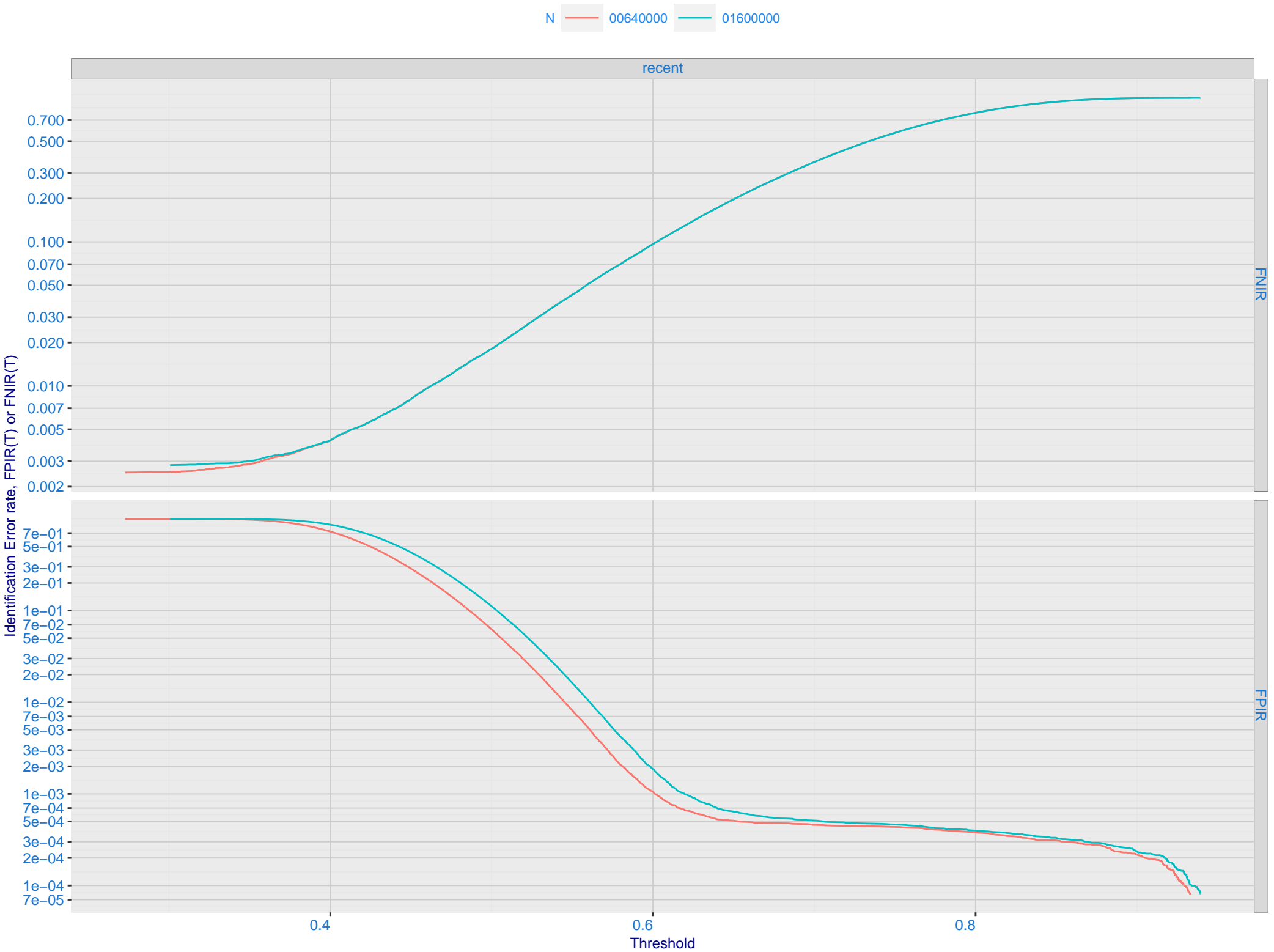
C: Evolution of accuracy for QNAP algorithms on three datasets 2018 – present



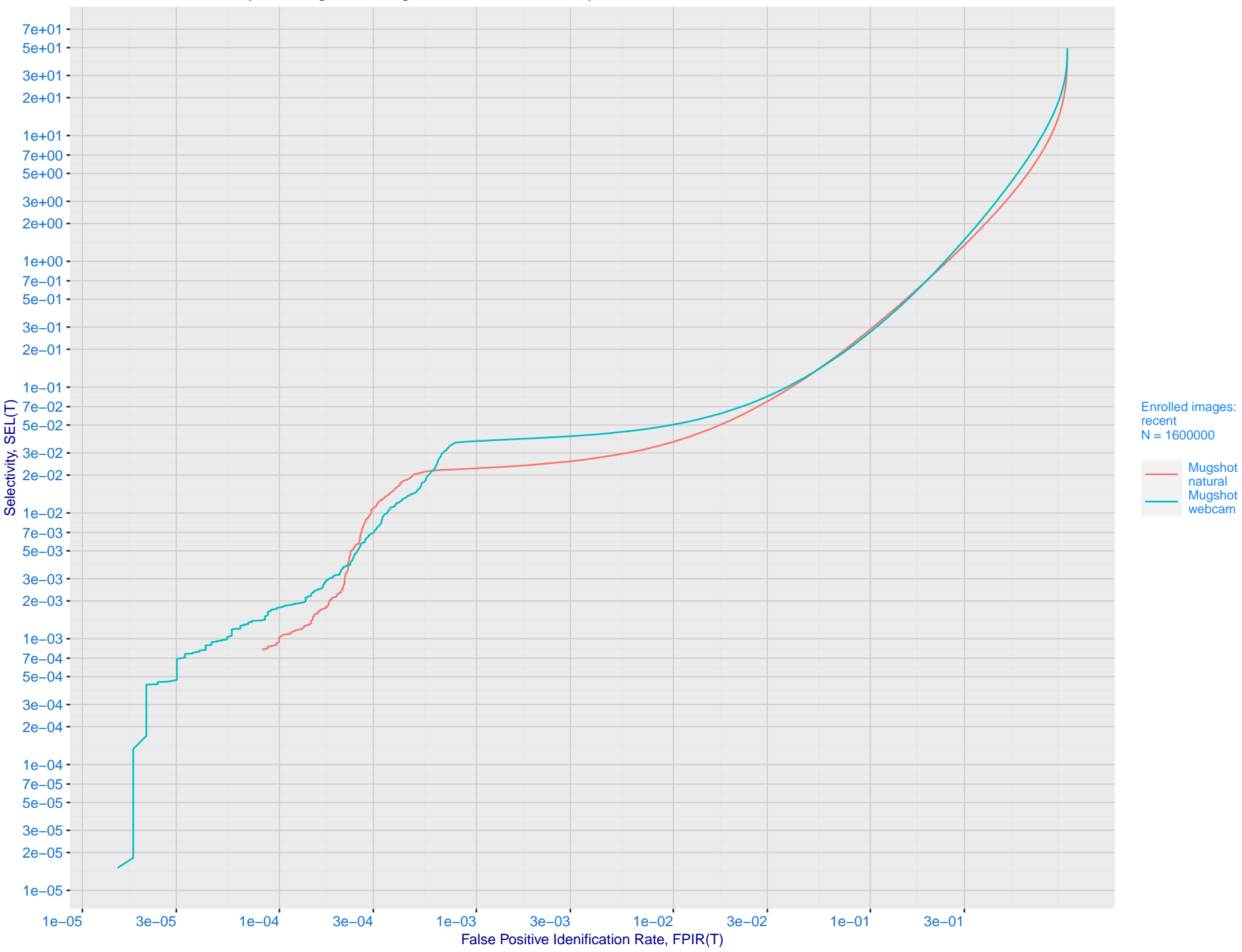
D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals



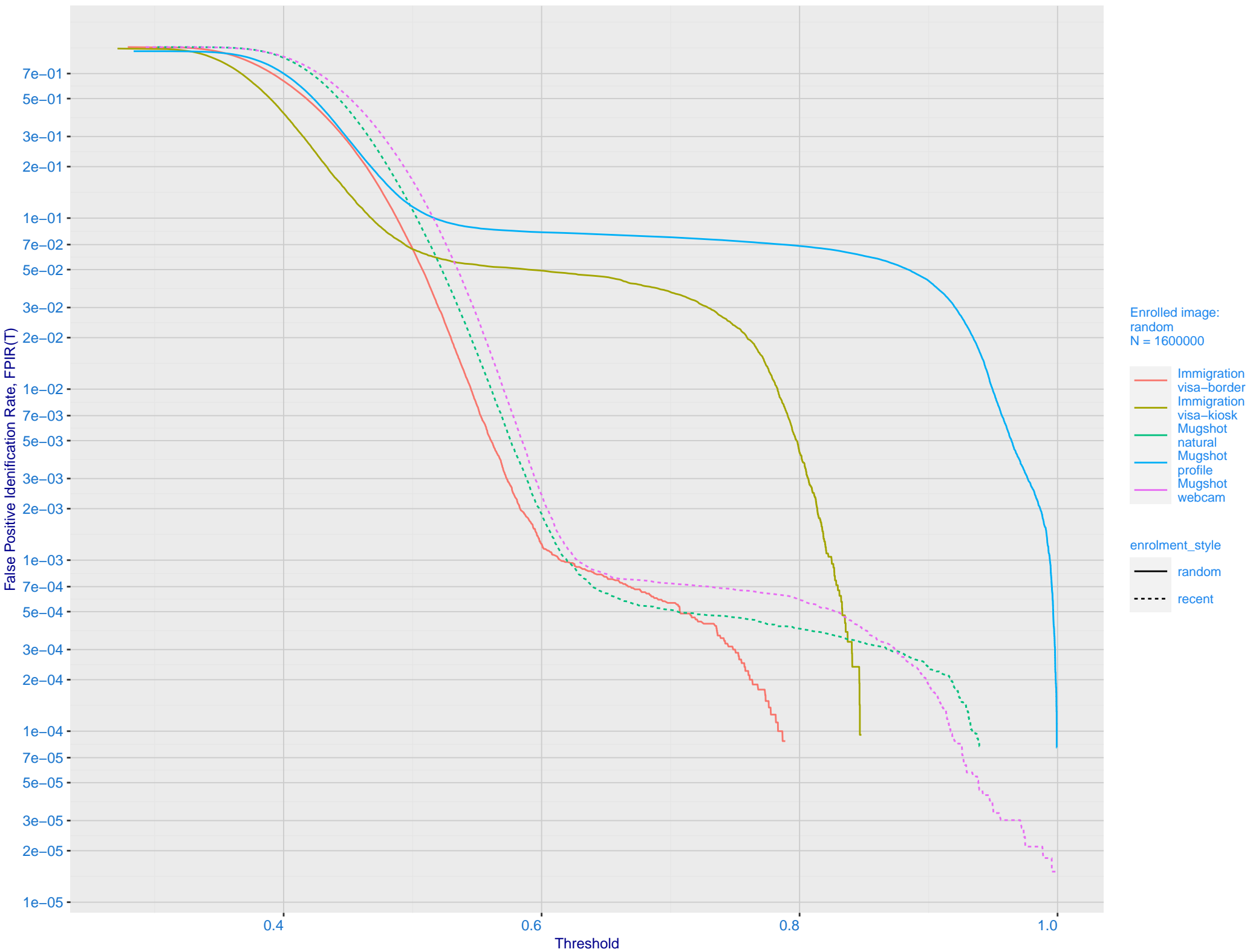
E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images



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

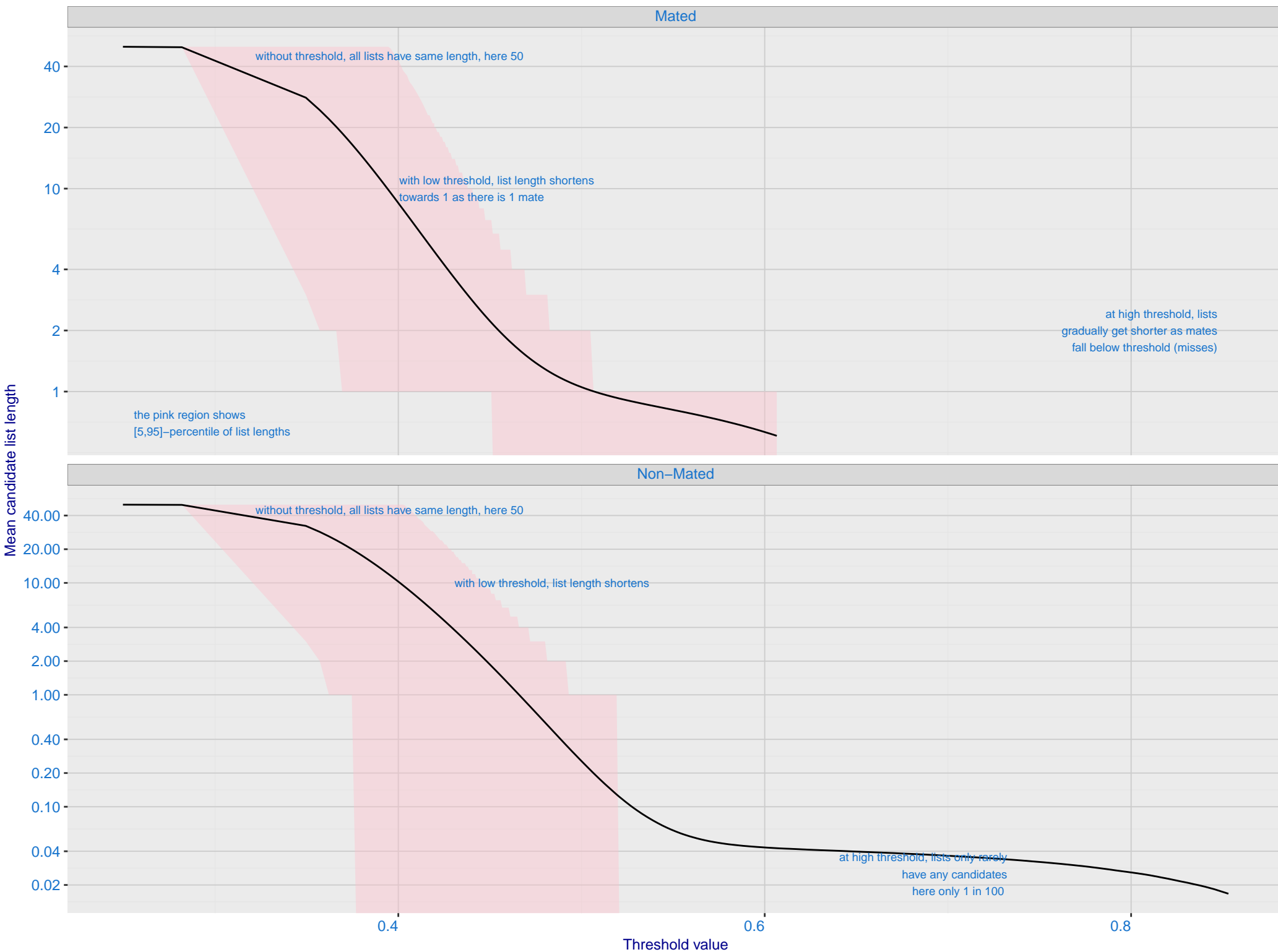


G: FPIR dependence on T by probe type for N = 1600000 subjects



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

False {Negative | Positive} Identification Rate

FNIR(T)

1.00

0.40

0.20

0.10

0.04

0.02

FPIR(T)

1e+00

4e-01

2e-01

1e-01

4e-02

2e-02

1e-02

4e-03

2e-03

1e-03

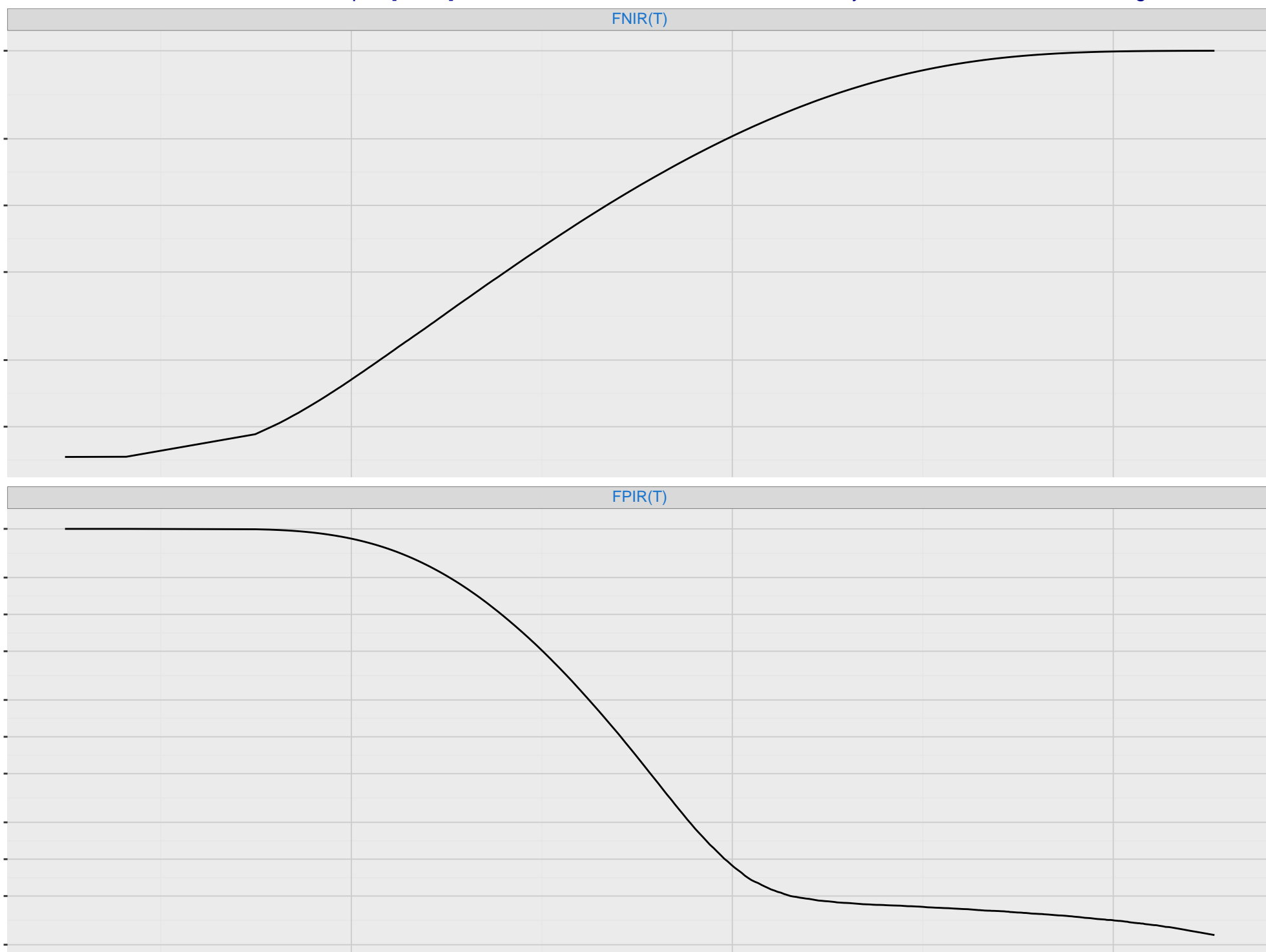
4e-04

Threshold value

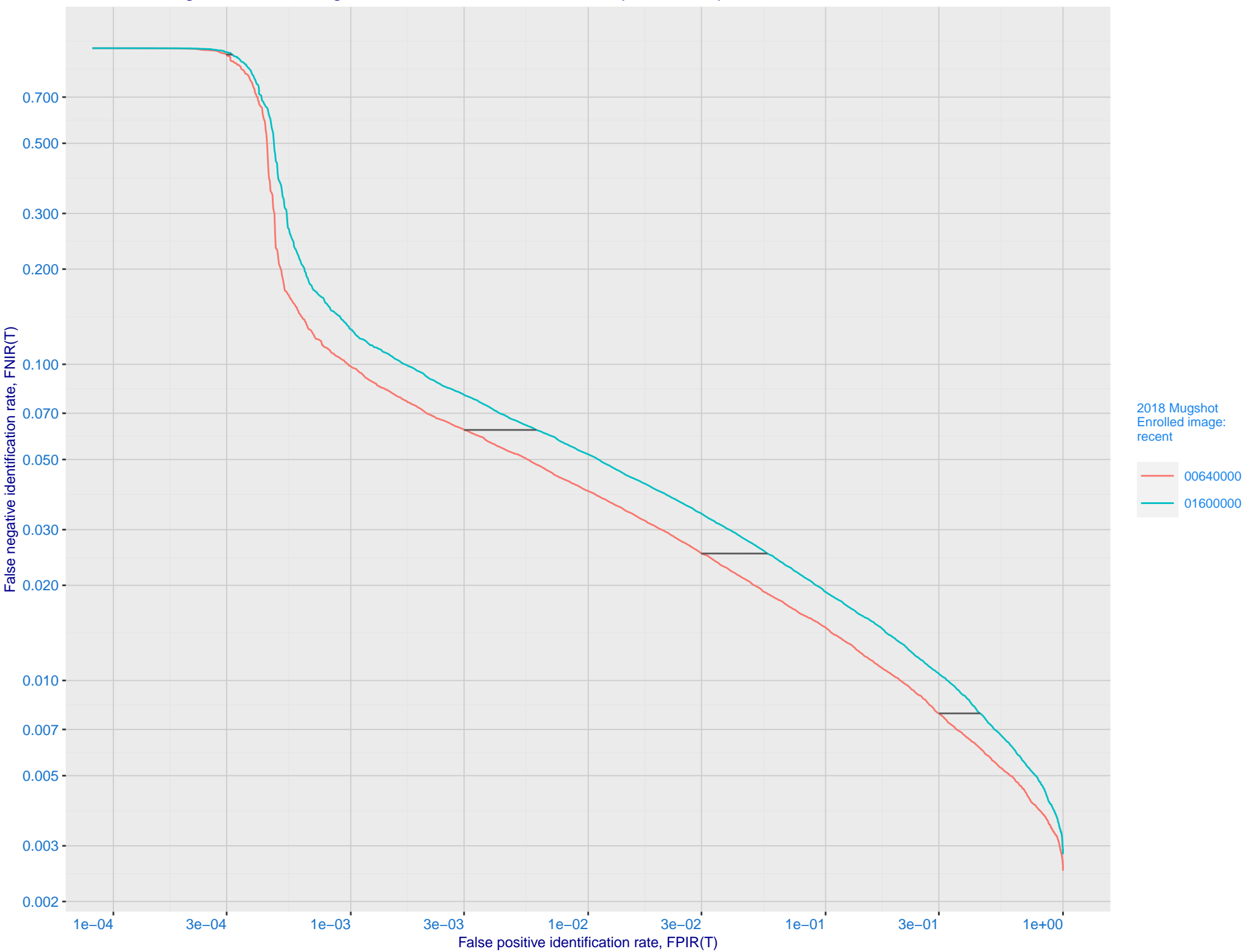
0.4

0.6

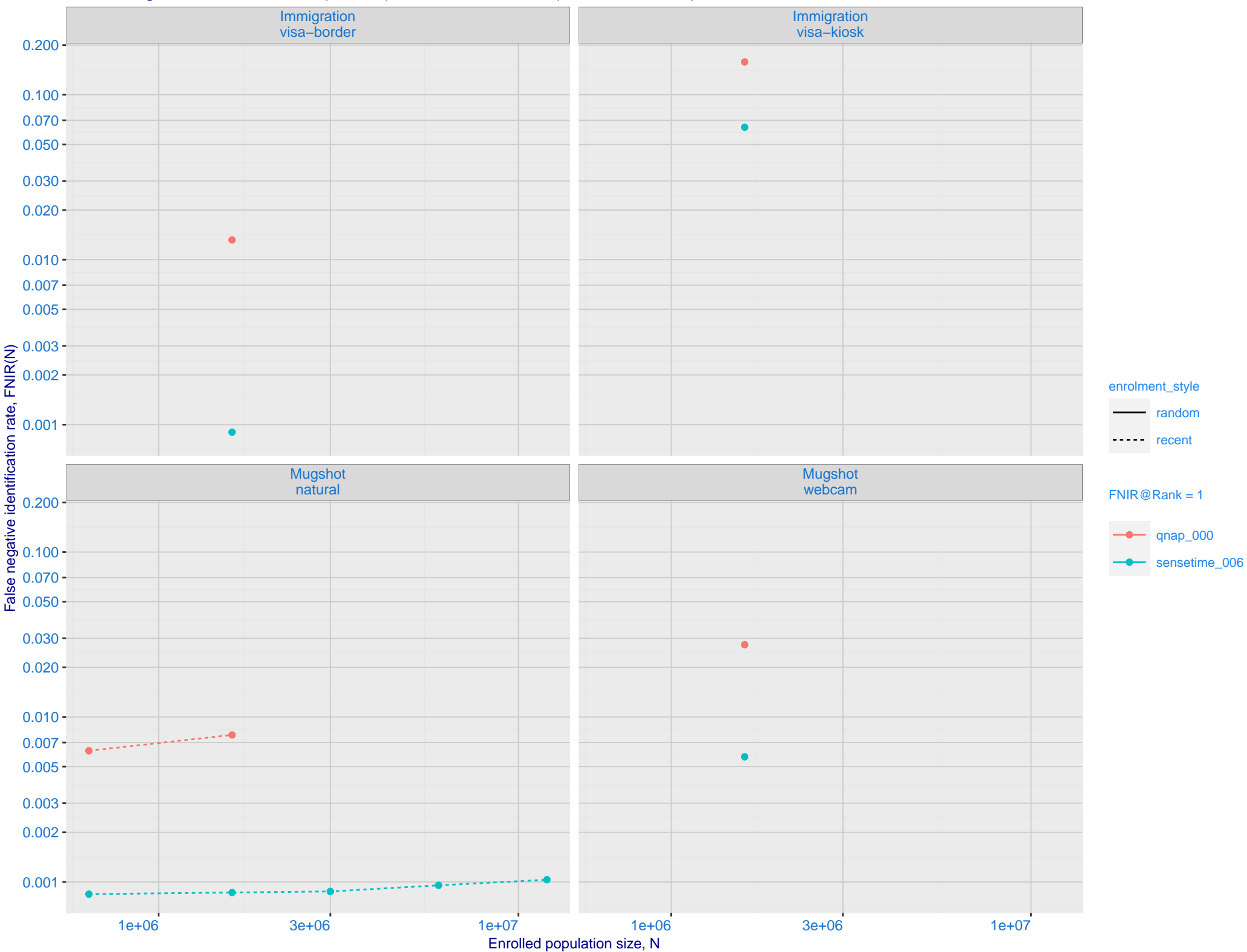
0.8



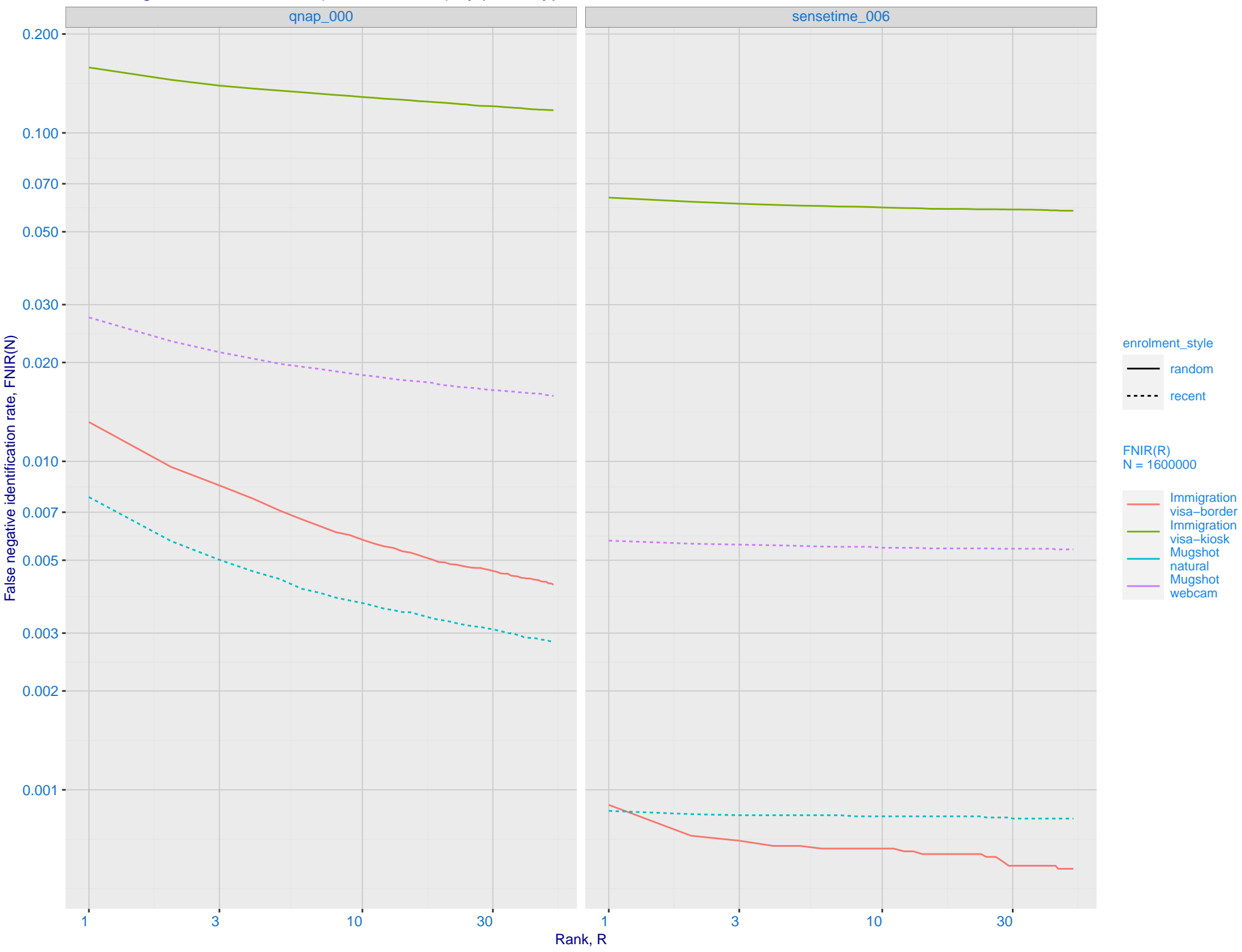
J: DET for Mugshot natural images and various N. Links connect points of equal threshold.



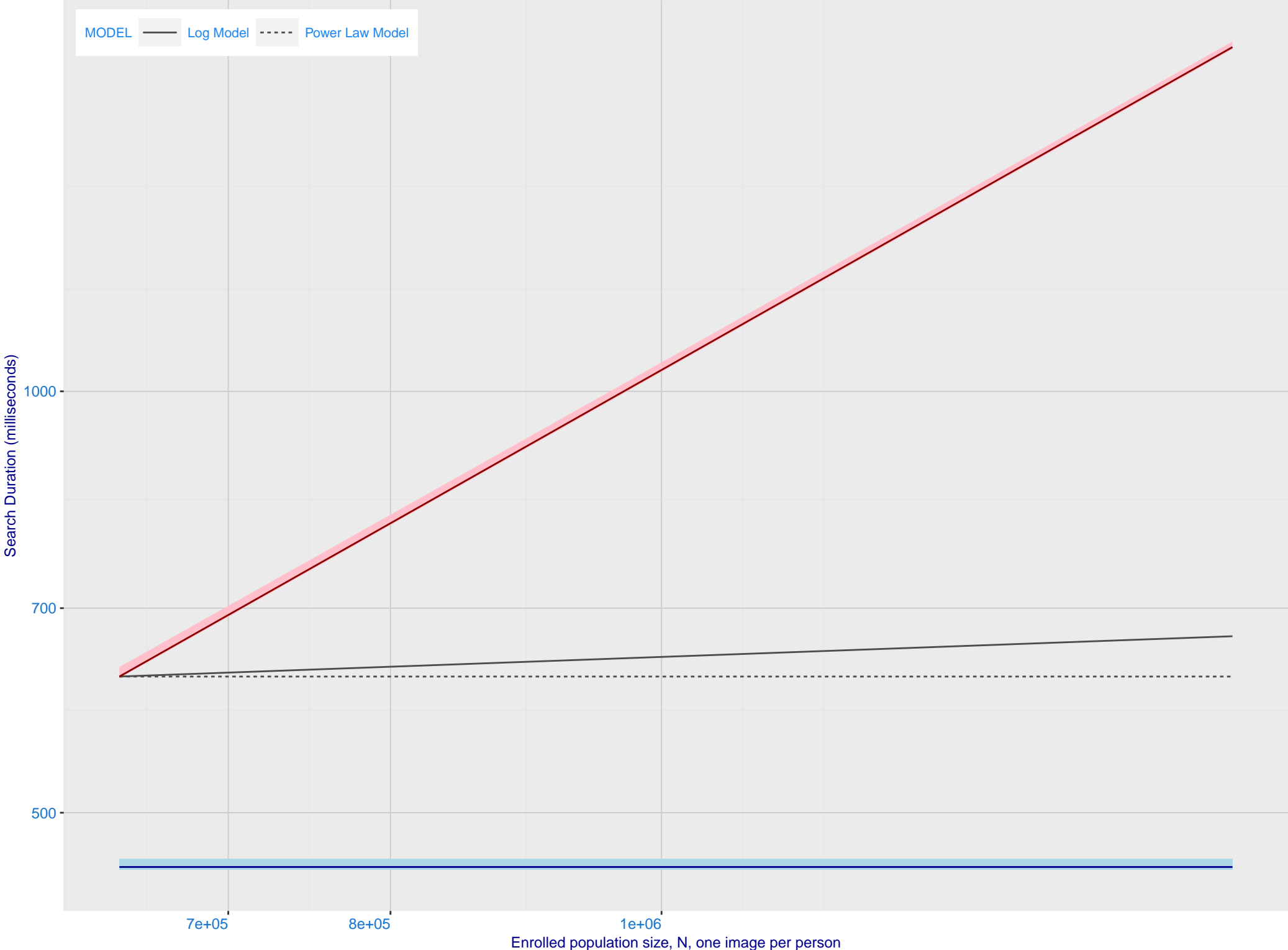
K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_006)



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

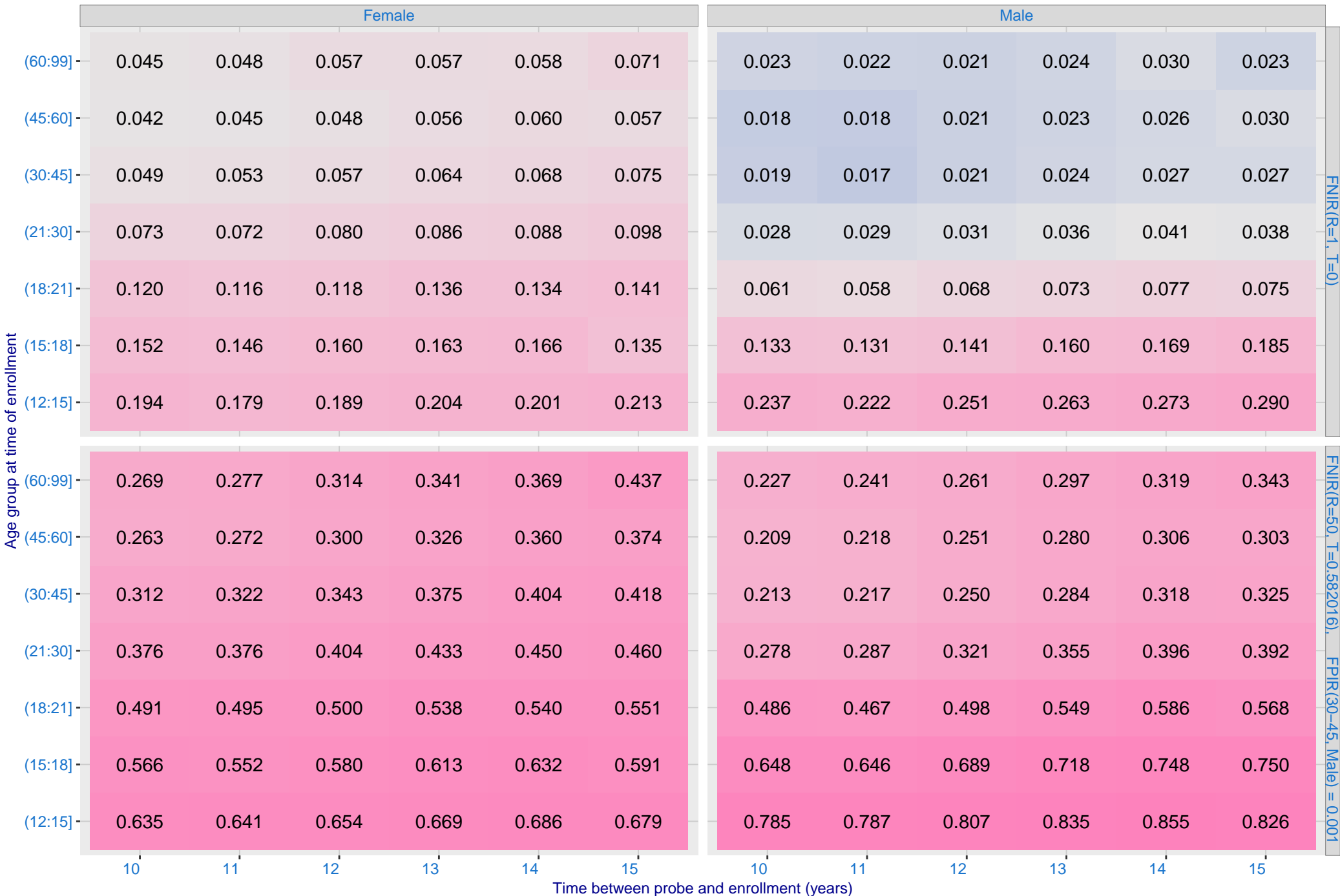


M: Template duration; search duration vs. N. The blue and pink ribbon covers 95 percent of observed measurements. The template generation time is independent of N. The log and power-law models are fit to the first two (N,T) observations



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: qnap_000, 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: qnap_000, Dataset: Border-Crossing Ageing
Threshold: 0.582016 set to achive FPIR(30-45, Male) = 0.001

Color encodes log(FPIR)



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

Dataset: 2018 Mugshot N = 3068801

