

A: Datasheet

Algorithm: qnap\_004

Developer: Qnap Security

Submission Date: 2023\_05\_05

Template size: 2048 bytes

Template time (2.5 percentile): 364 msec

Template time (median): 365 msec

Template time (97.5 percentile): 371 msec

Investigation:

Frontal mugshot ranking 119 (out of 416) -- FNIR(1600000, 0, 1) = 0.0019 vs. lowest 0.0008 from interna\_001

Mugshot webcam ranking 151 (out of 376) -- FNIR(1600000, 0, 1) = 0.0142 vs. lowest 0.0054 from sensetime\_009

Mugshot profile ranking 81 (out of 345) -- FNIR(1600000, 0, 1) = 0.1188 vs. lowest 0.0517 from sensetime\_009

Immigration visa-border ranking 142 (out of 305) -- FNIR(1600000, 0, 1) = 0.0048 vs. lowest 0.0006 from cloudwalk\_mt\_002

Immigration visa-kiosk ranking 98 (out of 249) -- FNIR(1600000, 0, 1) = 0.0794 vs. lowest 0.0387 from cloudwalk\_mt\_002

Identification:

Frontal mugshot ranking 110 (out of 416) -- FNIR(1600000, T, L+1) = 0.0139, FPIR=0.001000 vs. lowest 0.0011 from idemia\_010

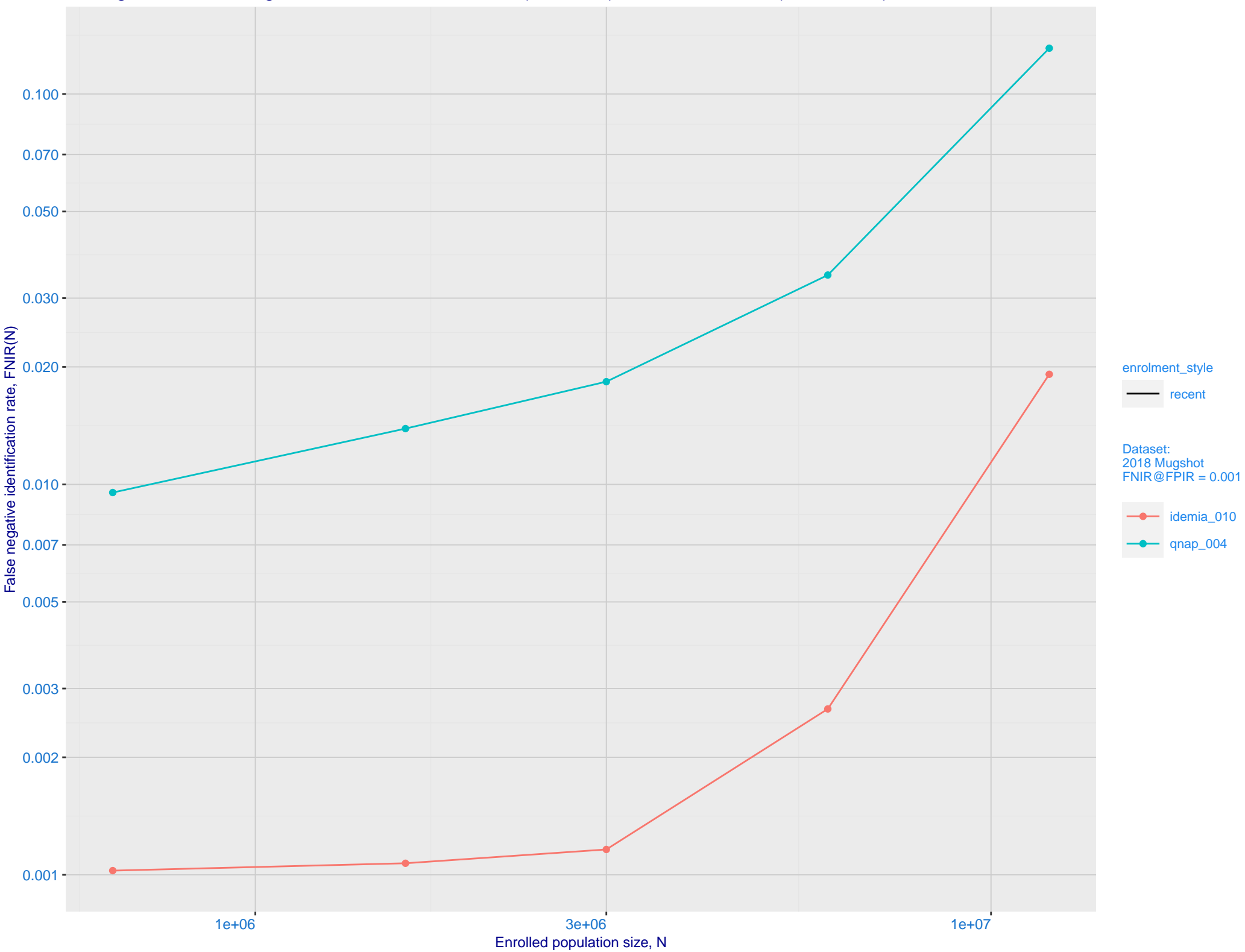
Mugshot webcam ranking 351 (out of 374) -- FNIR(1600000, T, L+1) = 0.8905, FPIR=0.001000 vs. lowest 0.0072 from sensetime\_009

Mugshot profile ranking 213 (out of 344) -- FNIR(1600000, T, L+1) = 0.9963, FPIR=0.001000 vs. lowest 0.0634 from cloudwalk\_mt\_002

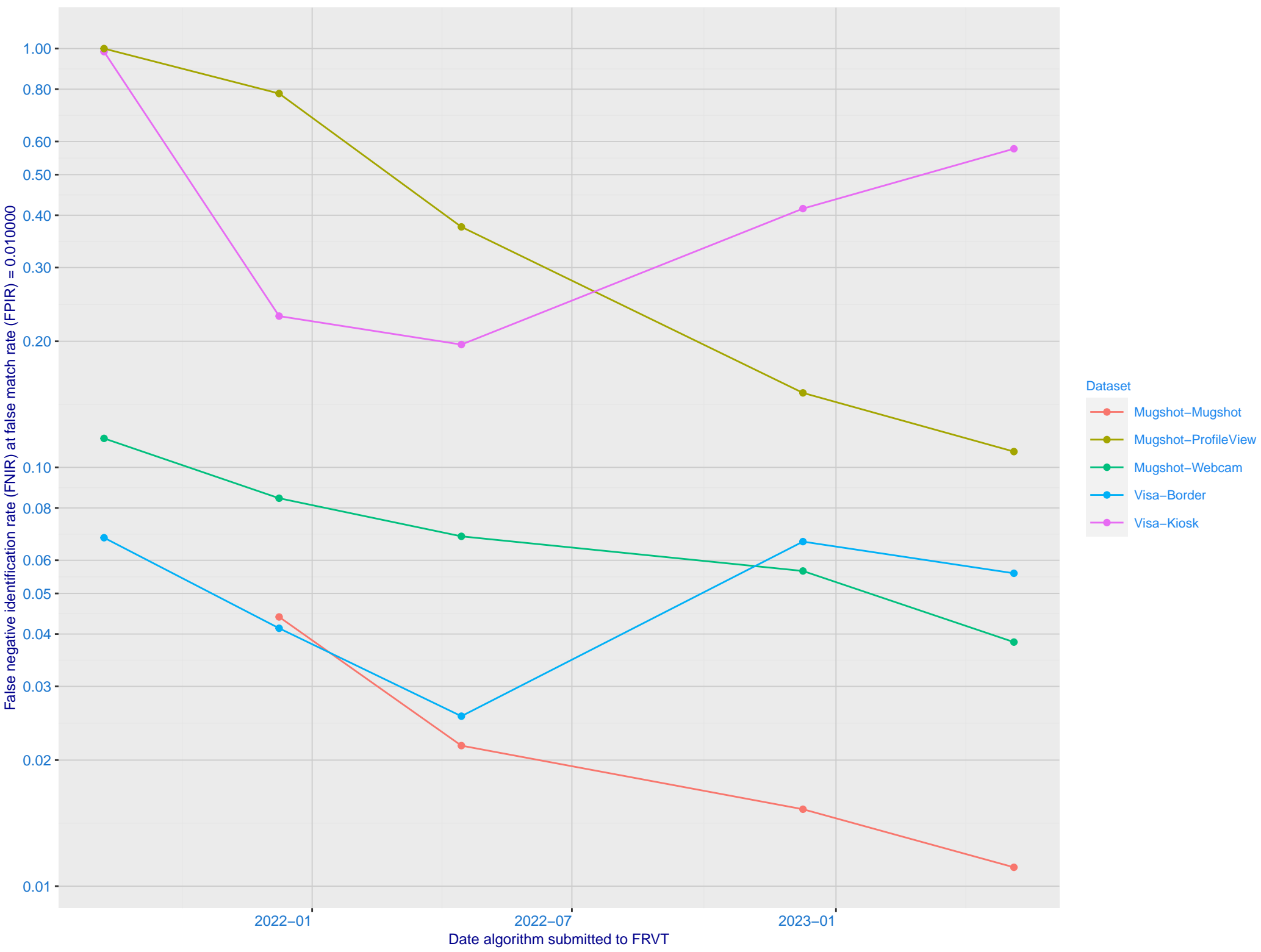
Immigration visa-border ranking 250 (out of 303) -- FNIR(1600000, T, L+1) = 0.5011, FPIR=0.001000 vs. lowest 0.0010 from cloudwalk\_mt\_002

Immigration visa-kiosk ranking 211 (out of 248) -- FNIR(1600000, T, L+1) = 0.9132, FPIR=0.001000 vs. lowest 0.0517 from cloudwalk\_mt\_002

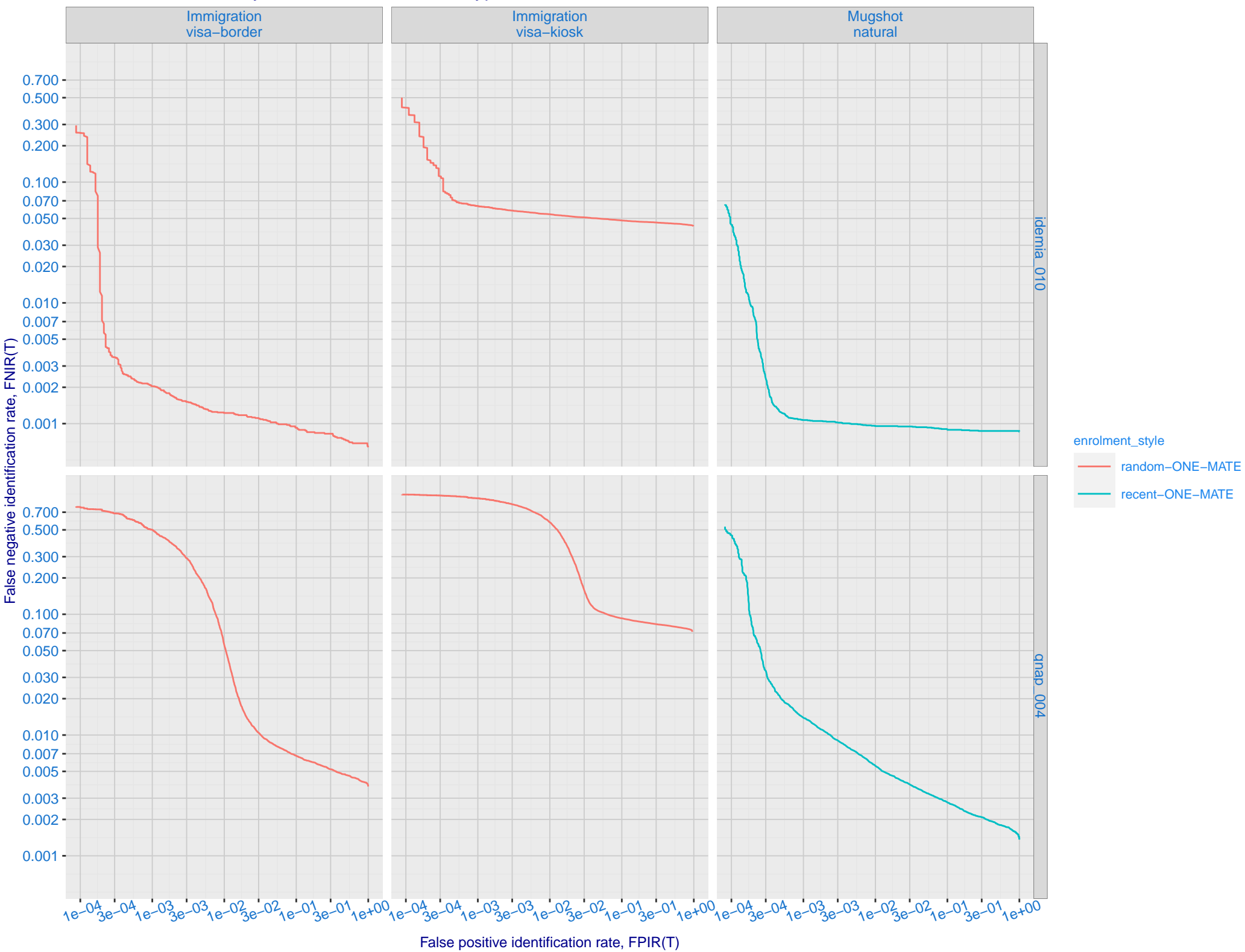
B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (idemia\_010)



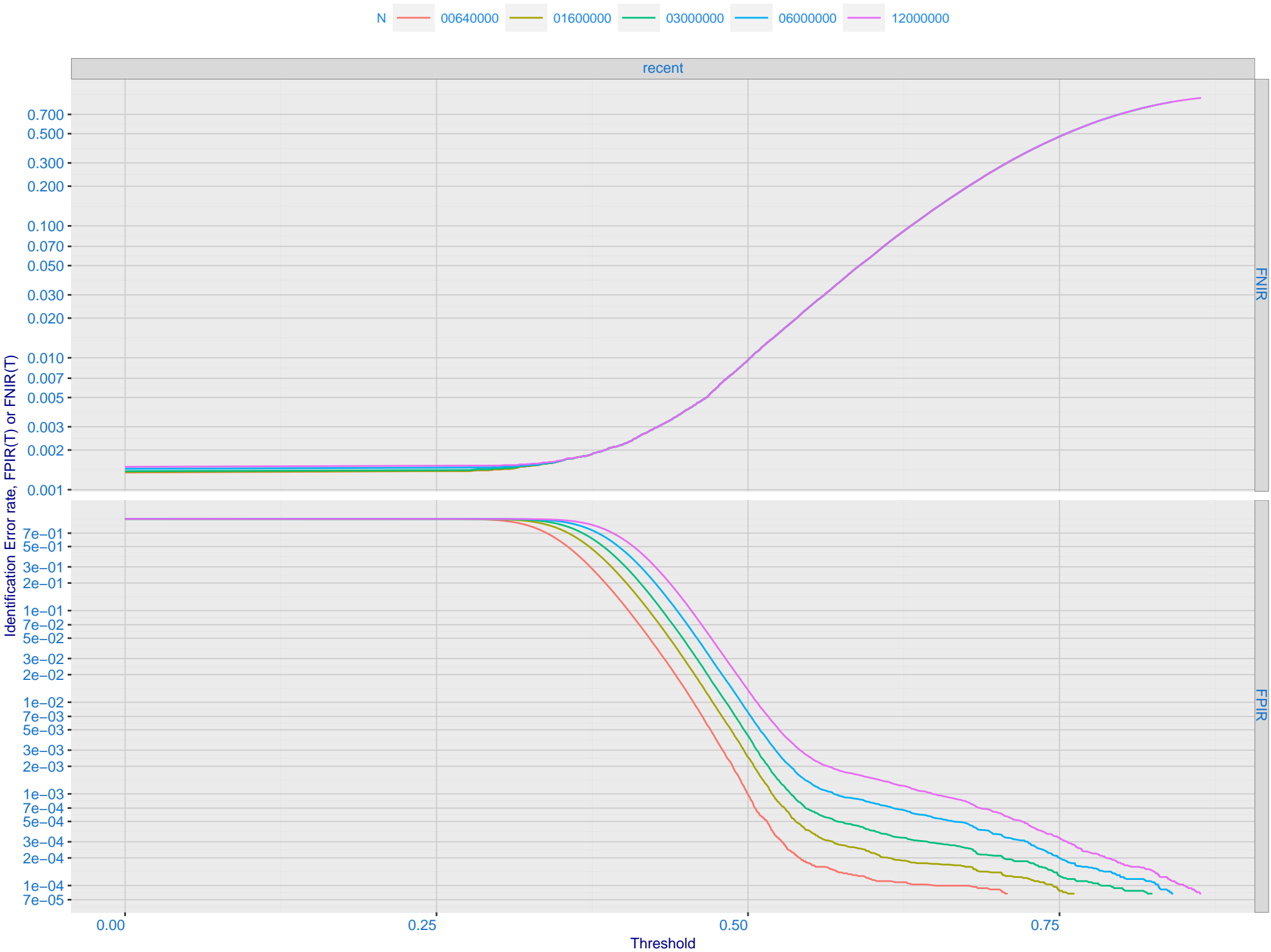
C: Evolution of accuracy for QNAP algorithms on three datasets 2018 – present



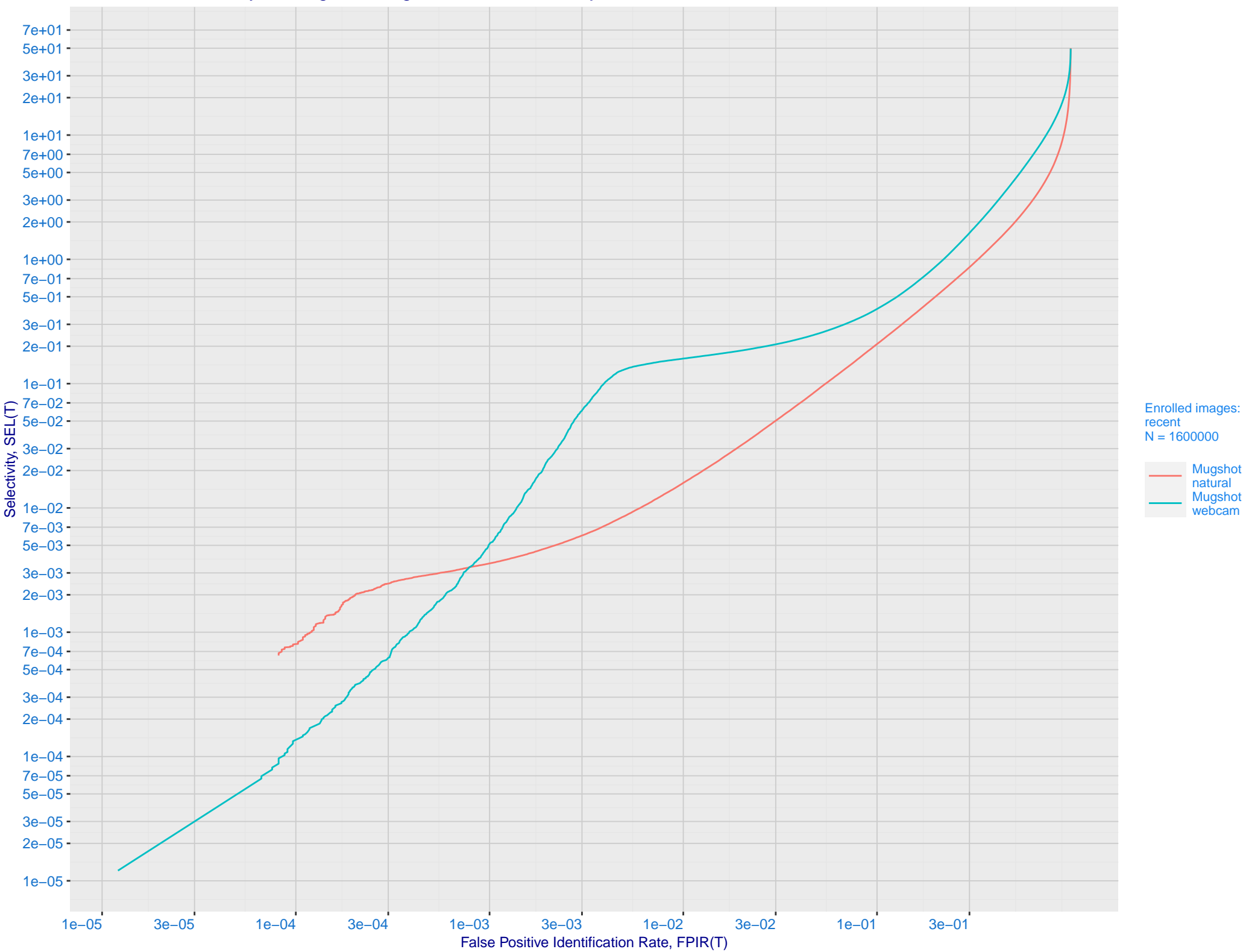
D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals



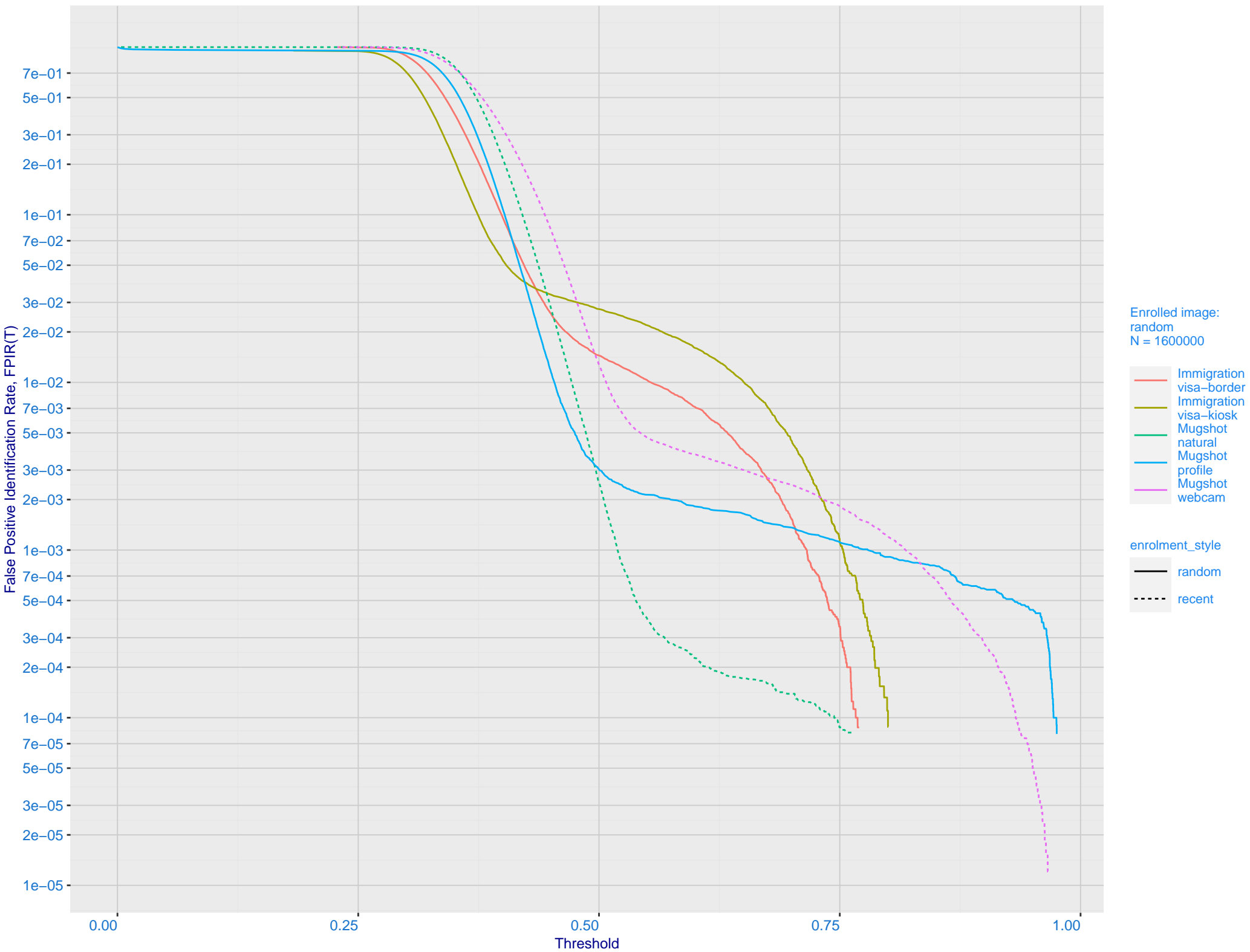
E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images



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

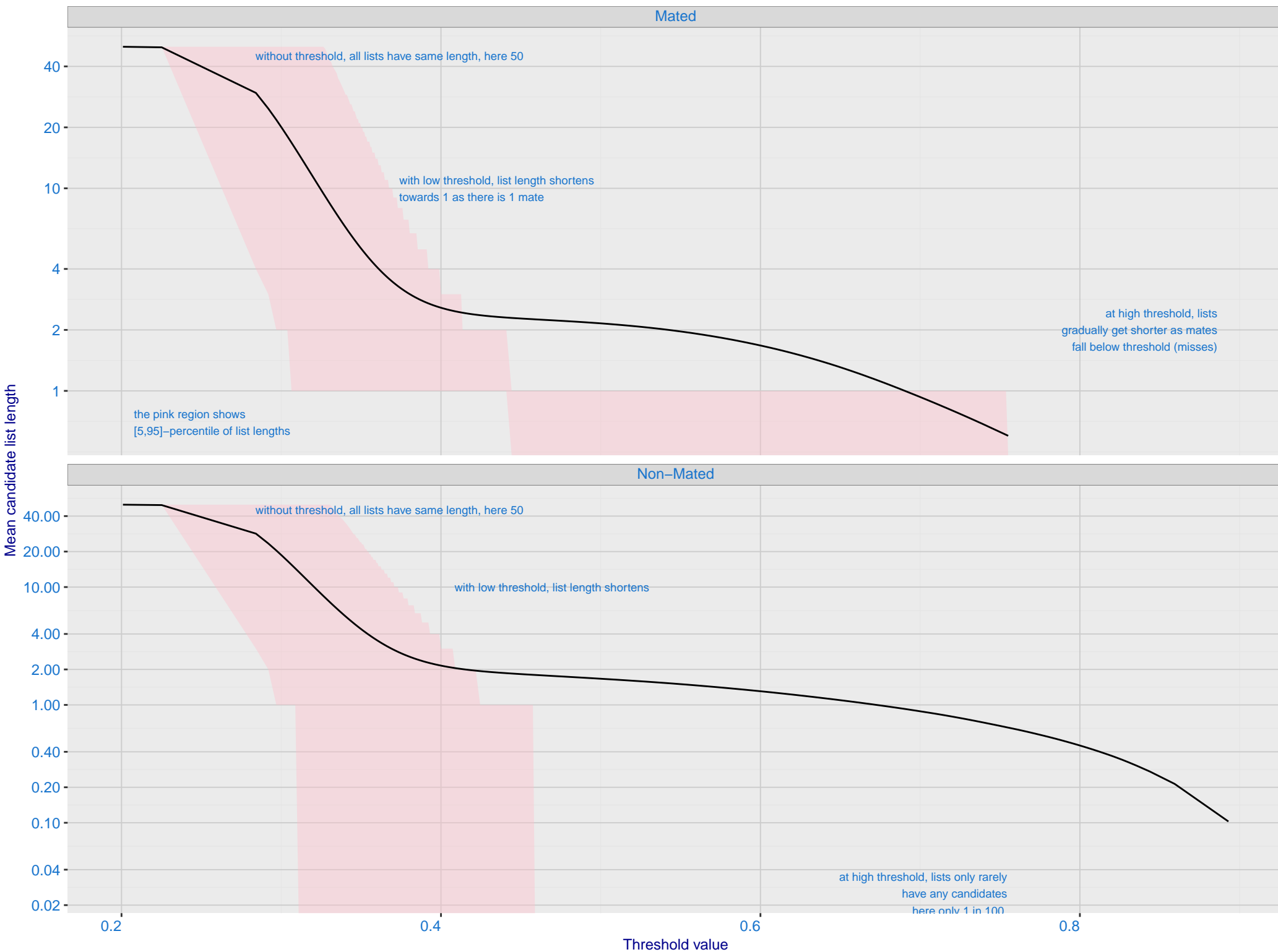


G: FPIR dependence on T by probe type for N = 1600000 subjects



# H: Reduced length candidate lists for human review

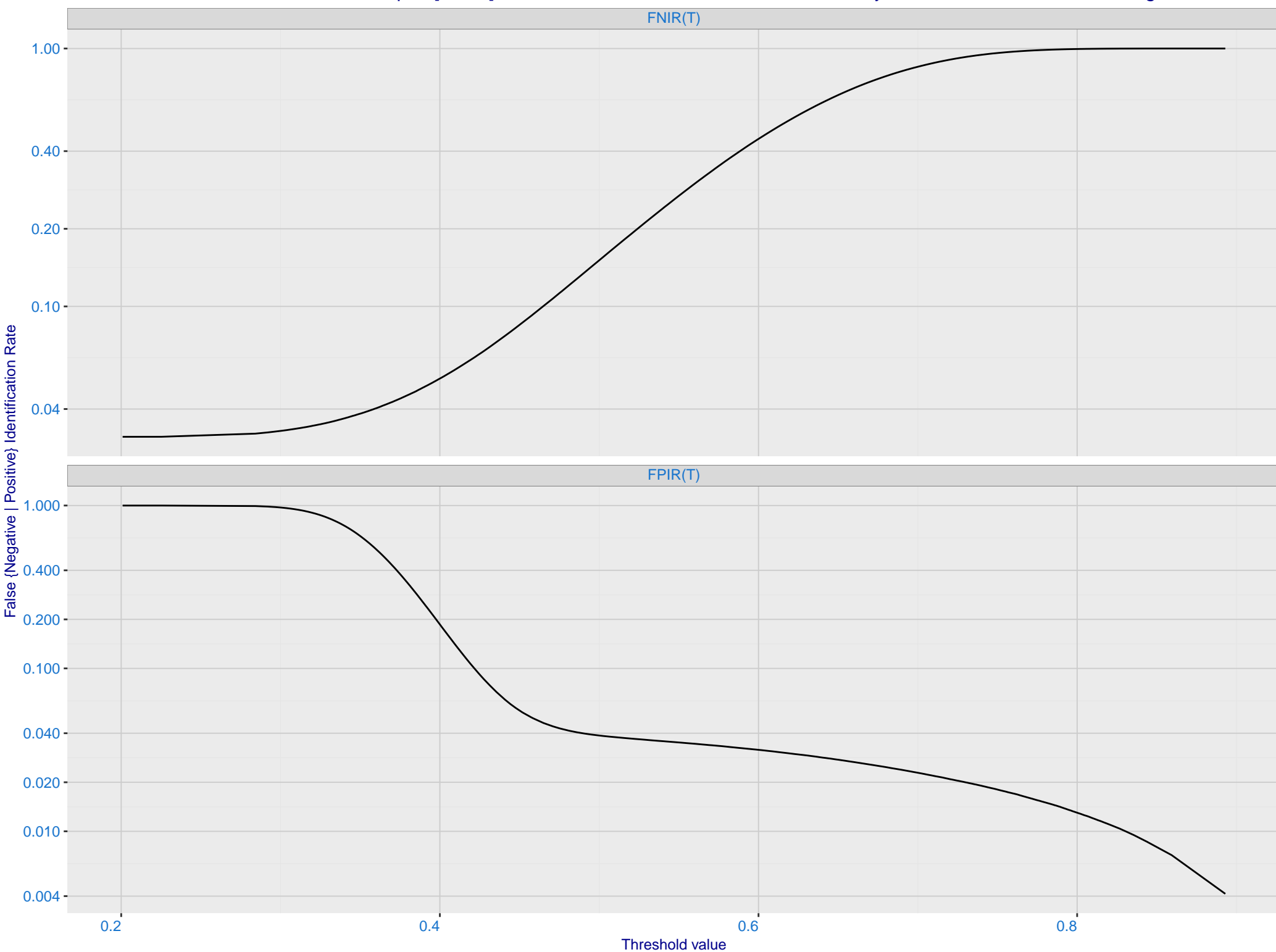
Dataset is border–border with time–lapse [10,15] YRS with N = 1600000. Probes are 10–15 years later than enrollment image



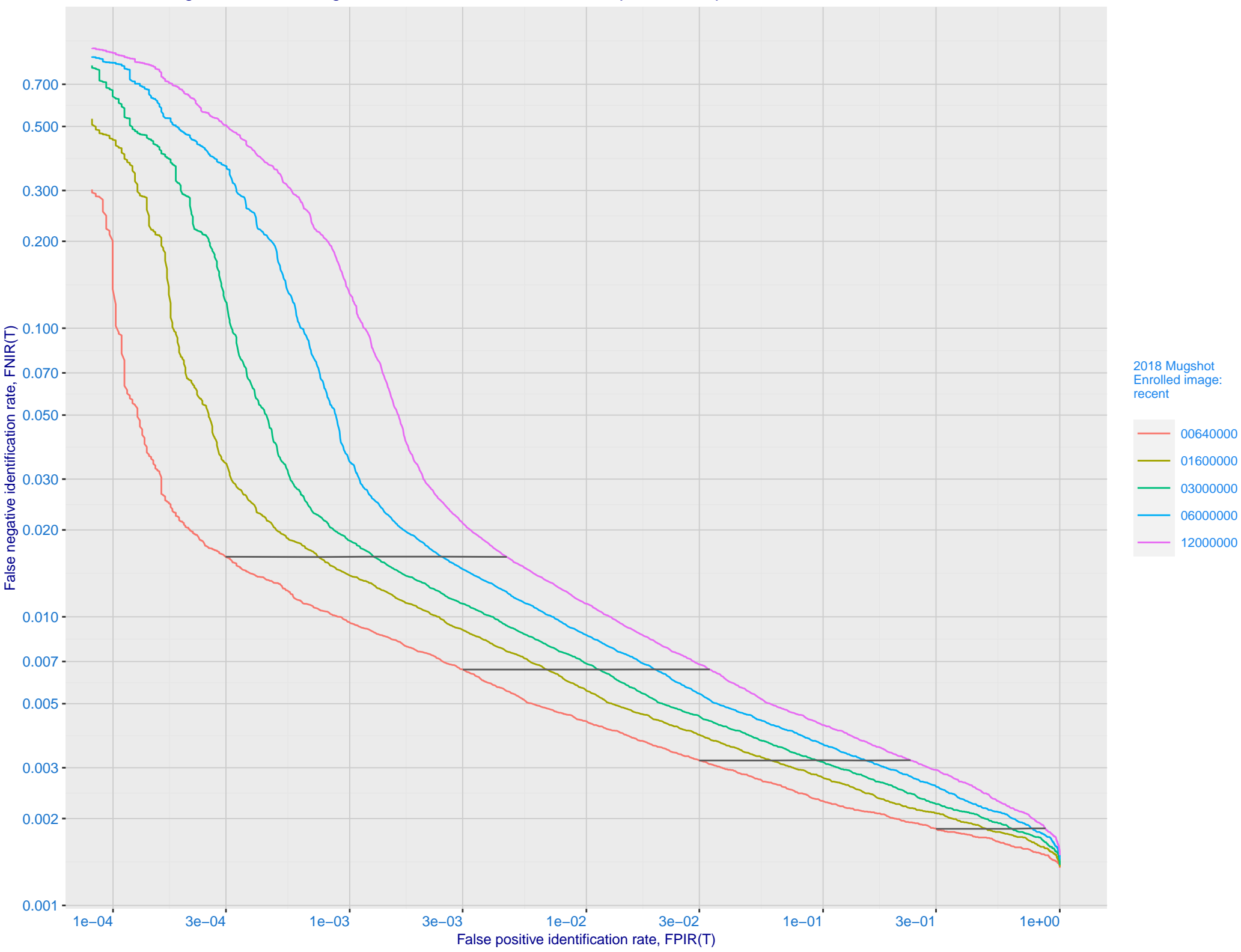


# I: FNIR and FPIR dependence on threshold

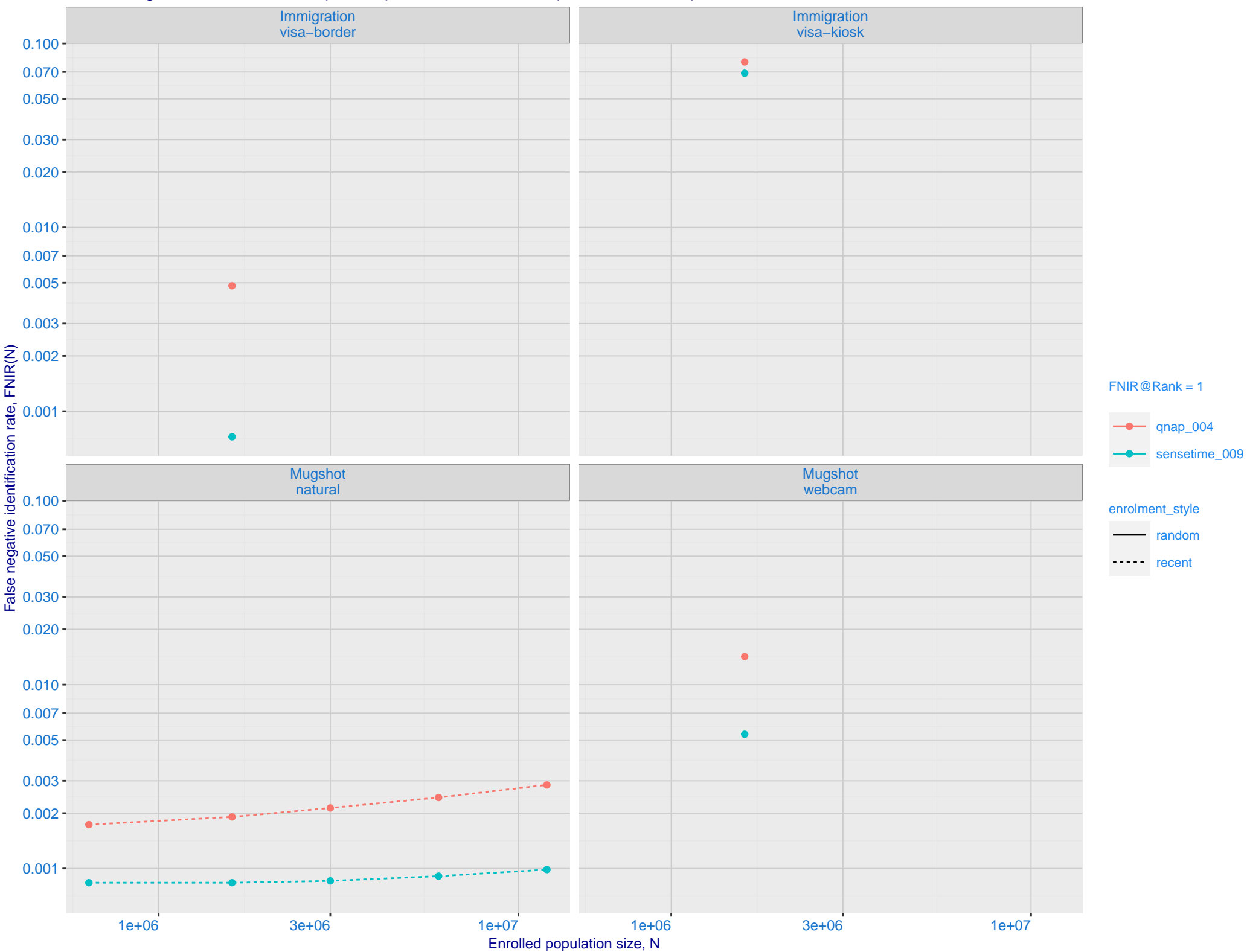
Dataset is border–border with time–lapse [10,15] YRS with N = 1600000. Probes are 10–15 years later than enrollment image



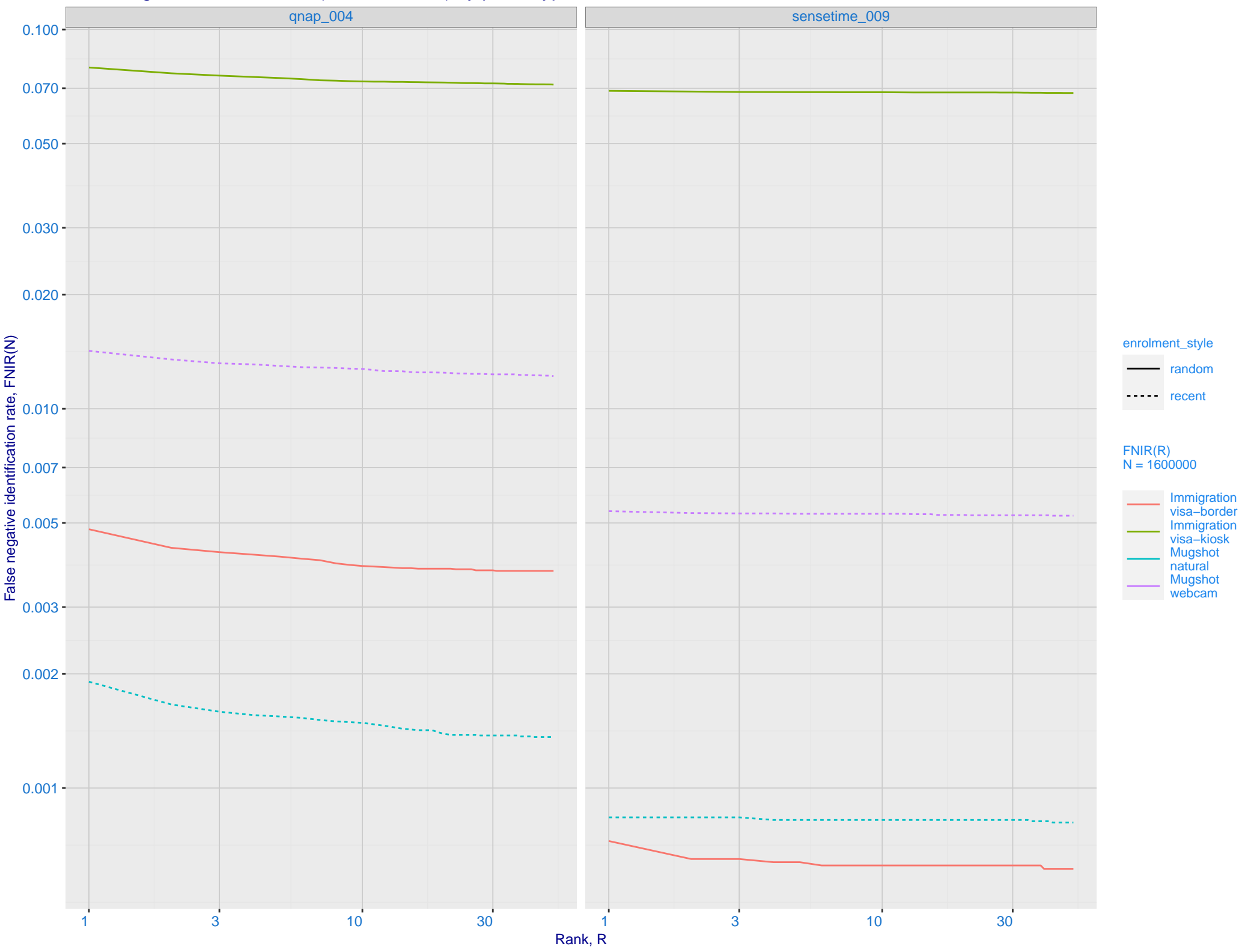
J: DET for Mugshot natural images and various N. Links connect points of equal threshold.



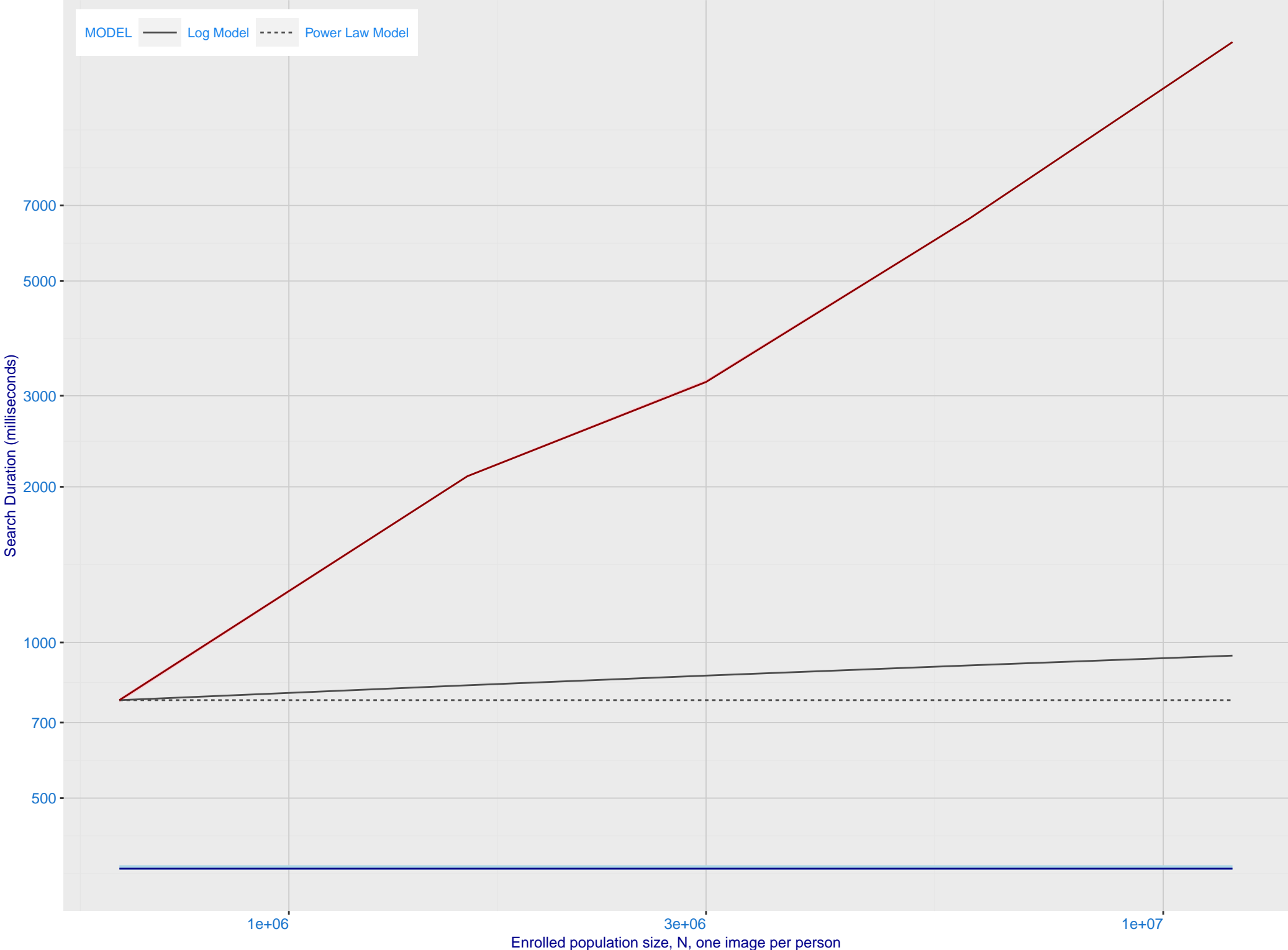
K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime\_009)



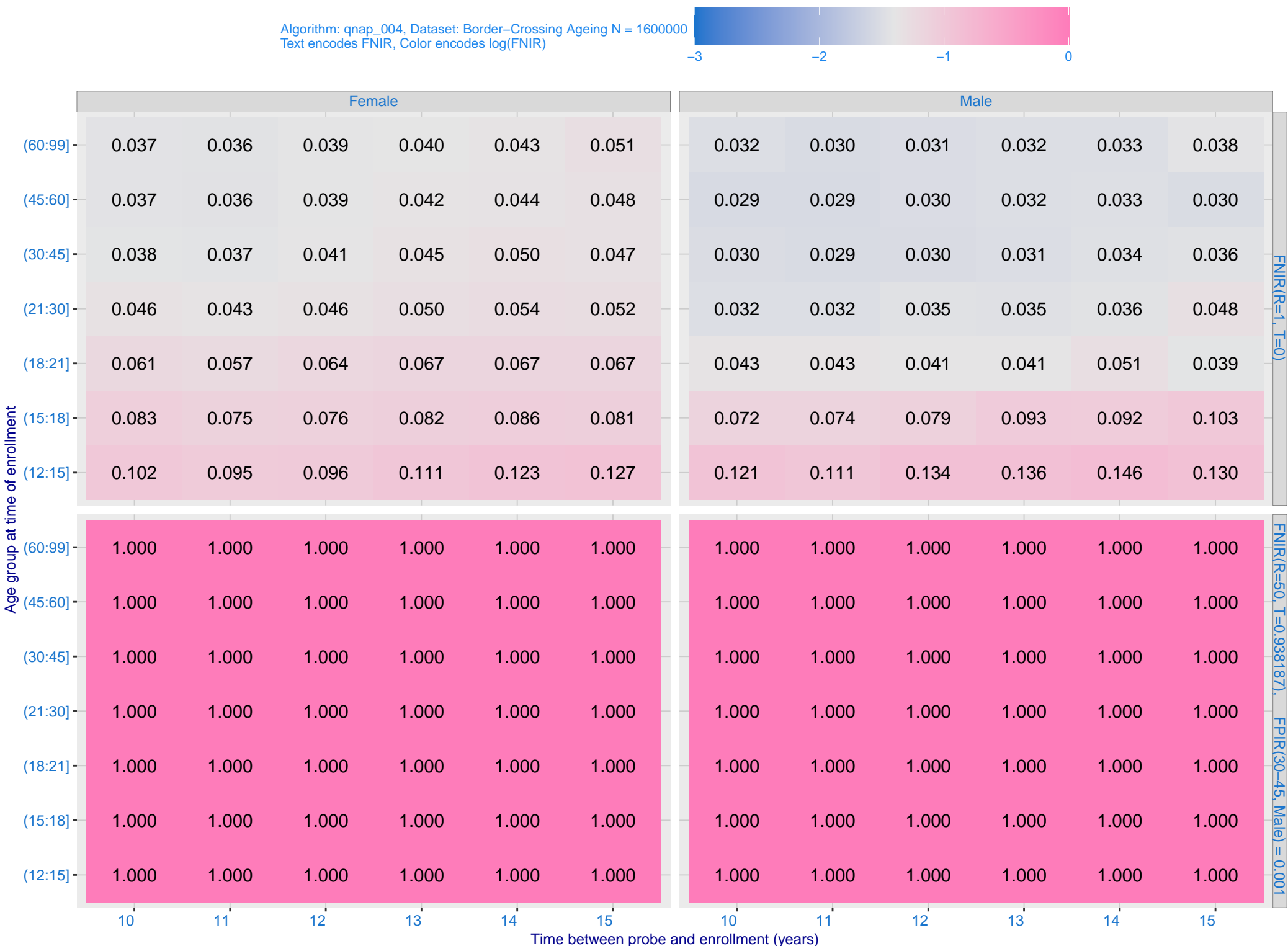
# L: Investigational mode: FNIR(1600000, R, 0) by probe type



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.

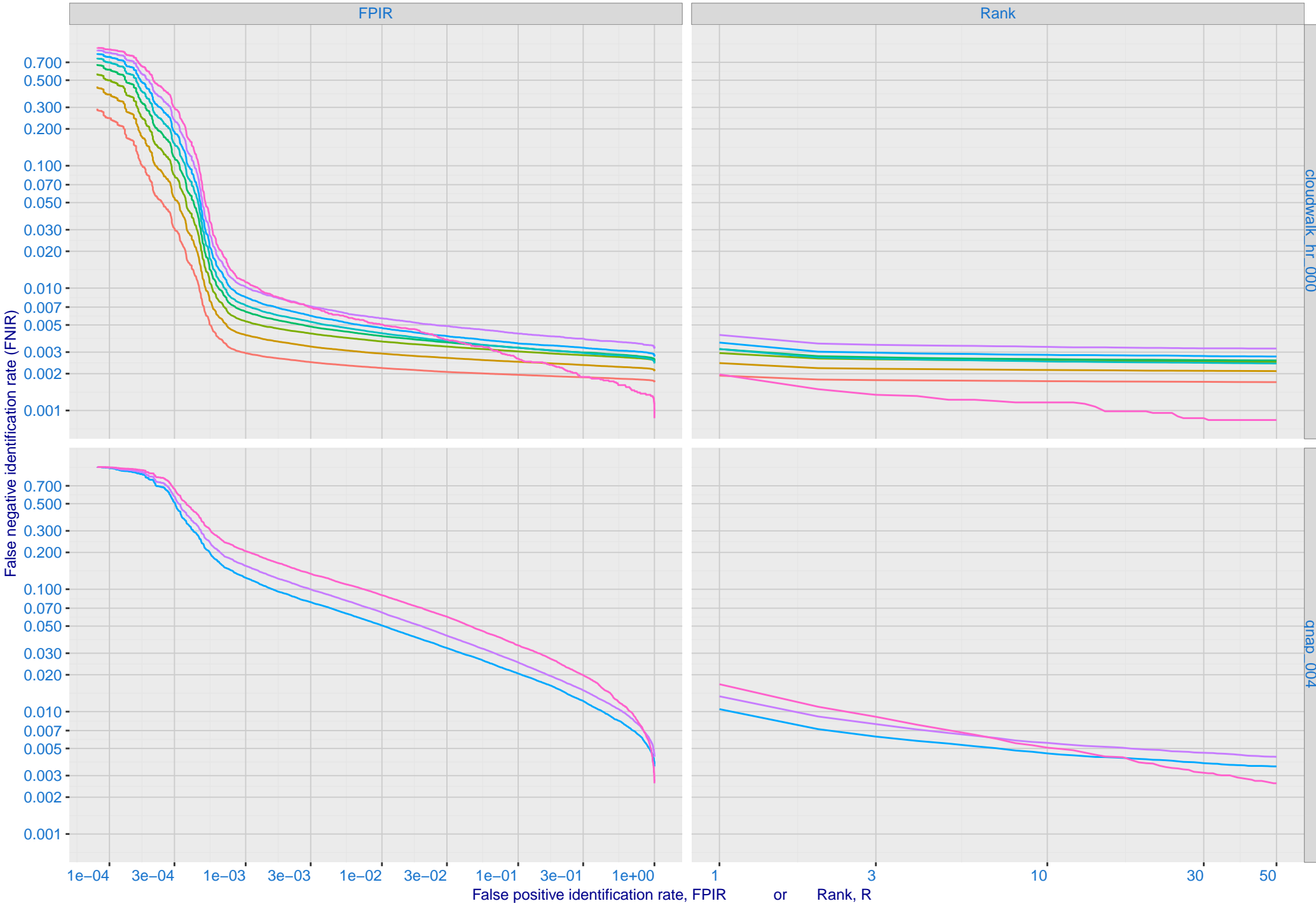
Algorithm: qnap\_004, Dataset: Border-Crossing Ageing  
Threshold: 0.938187 set to achieve FPIR(30–45, Male) = 0.001

Color encodes log(FPIR)



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

Dataset: 2018 Mugshot N = 3068801





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

