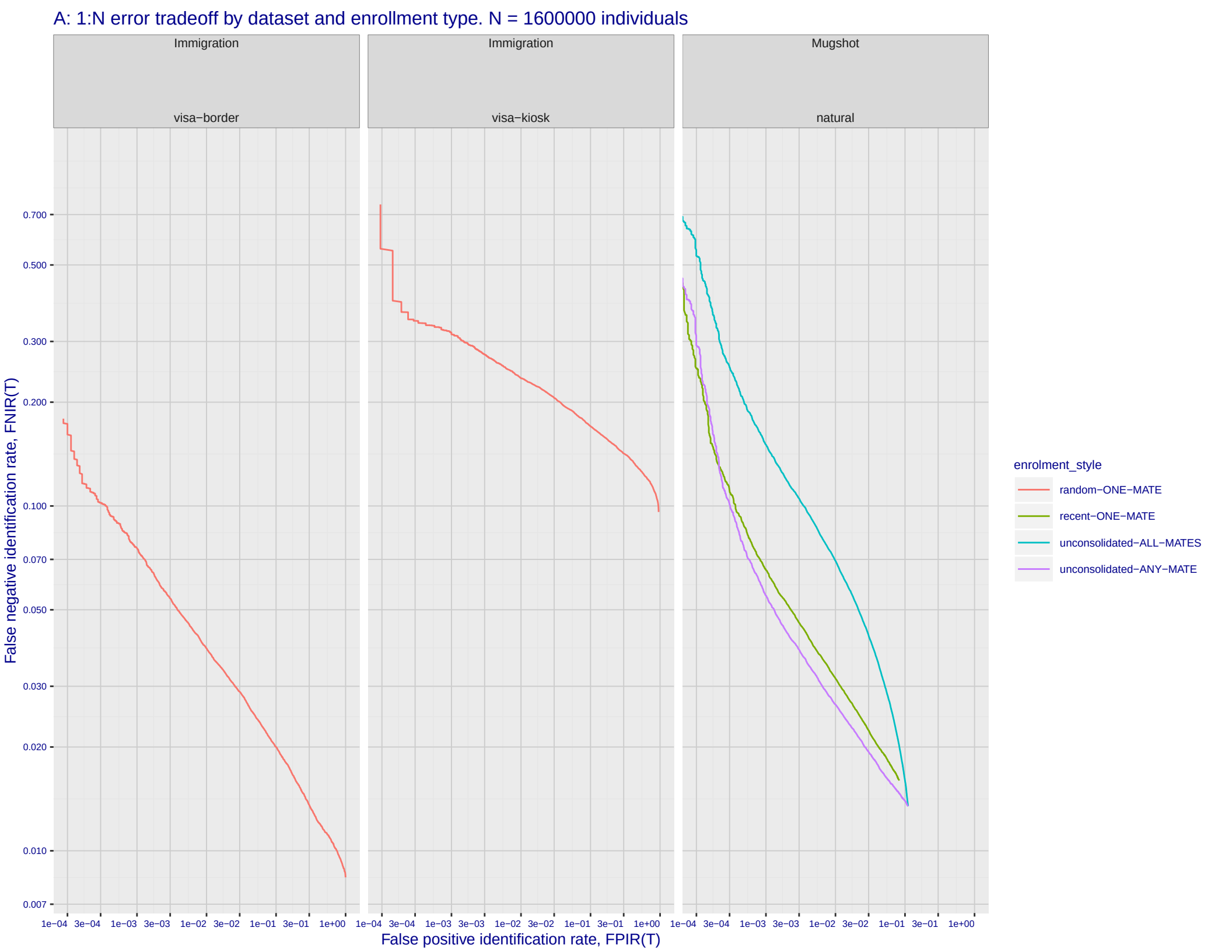
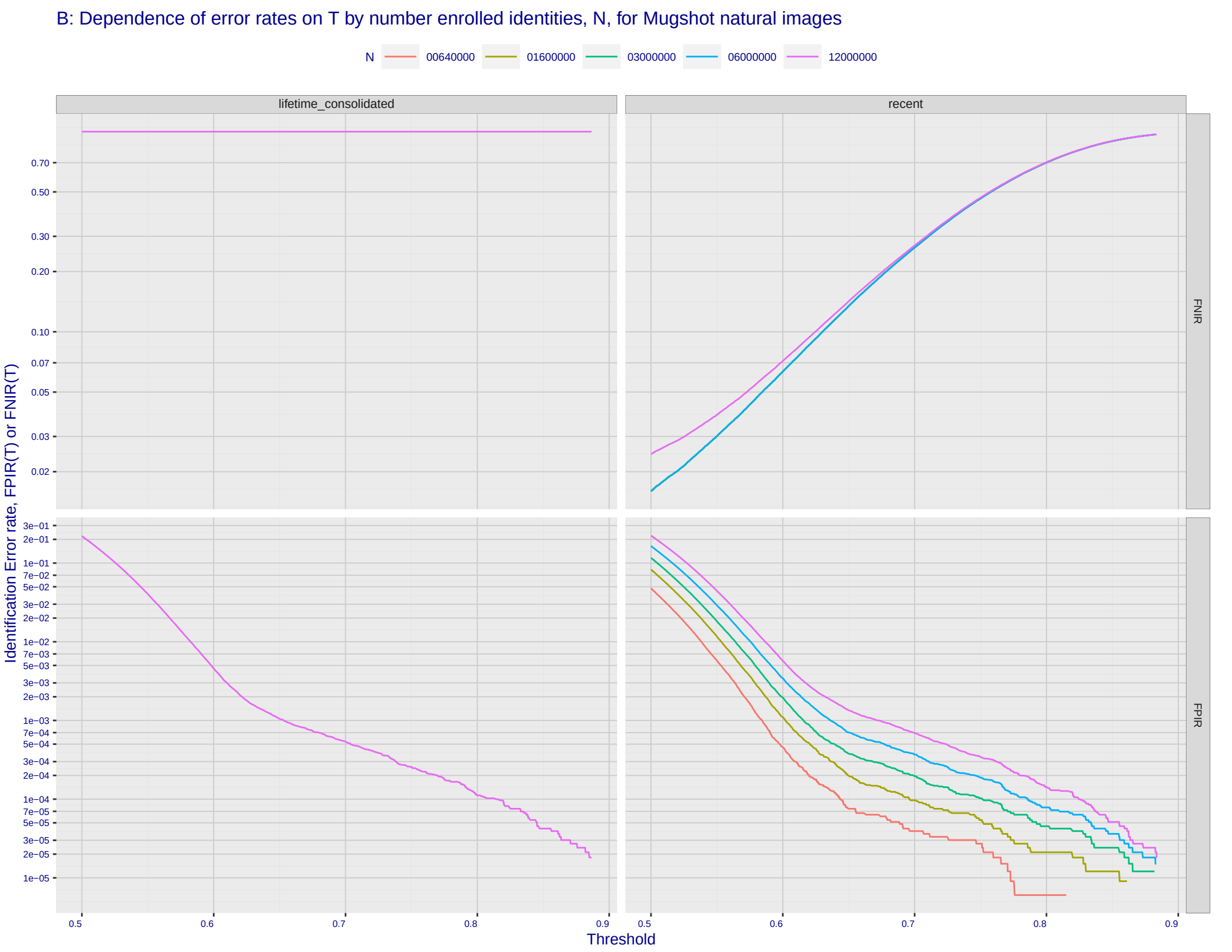
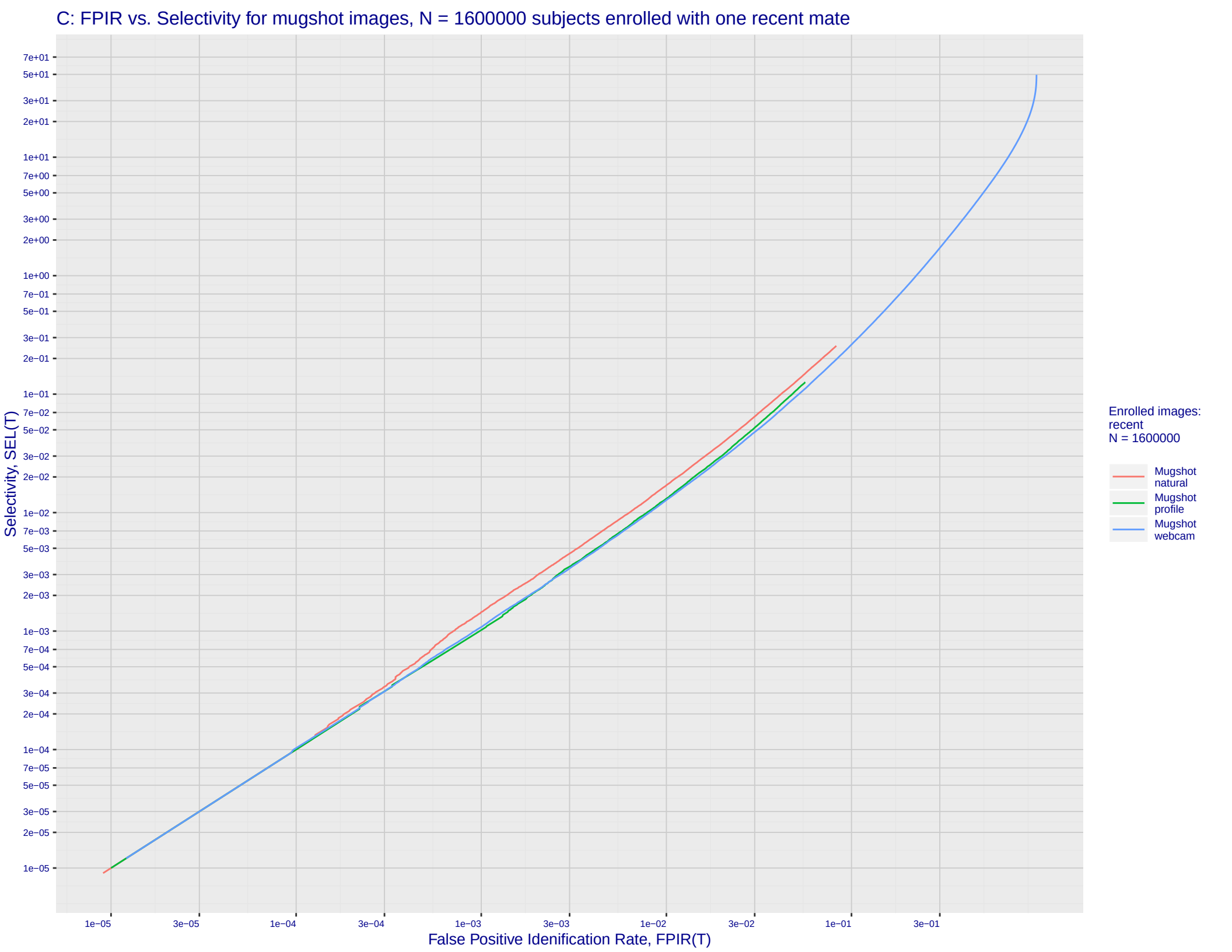
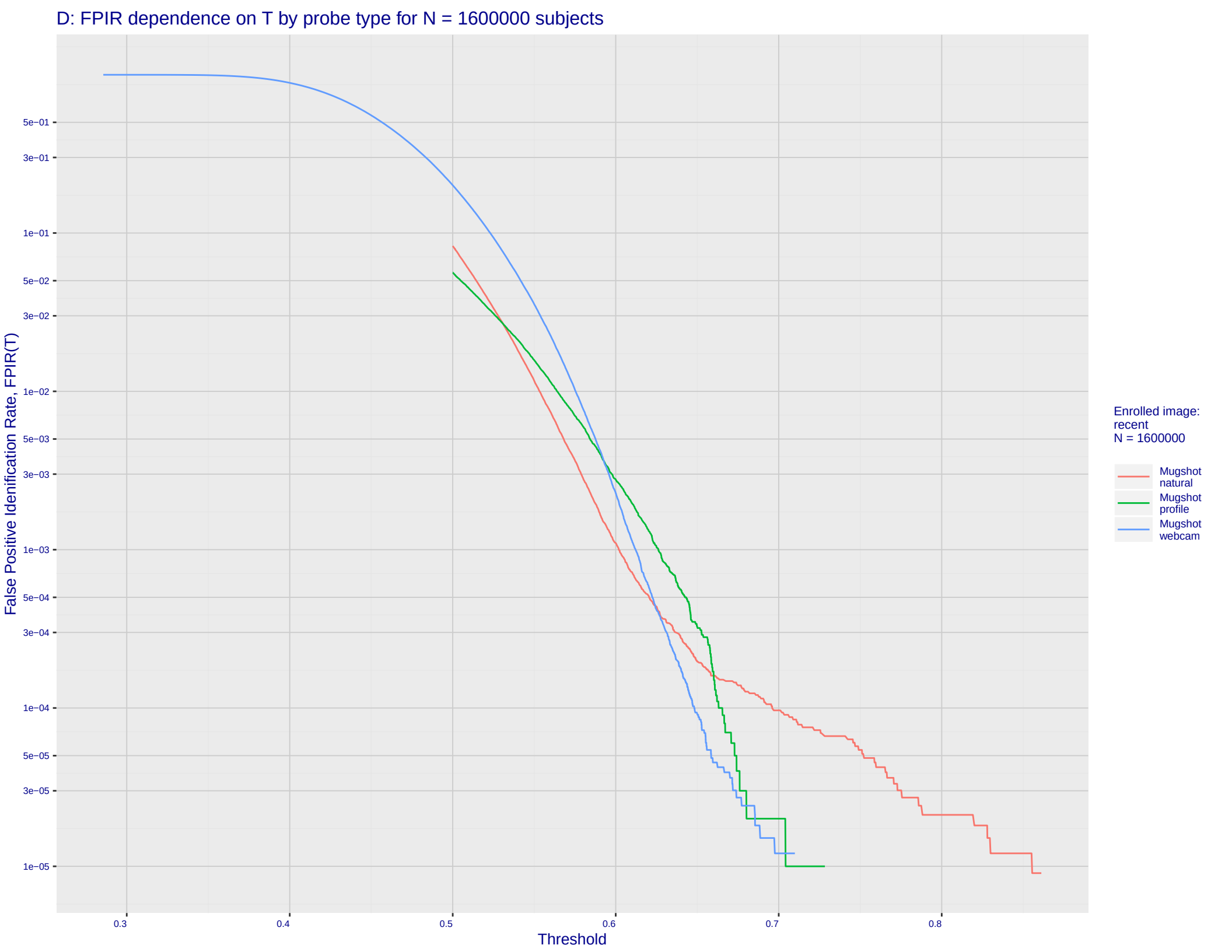
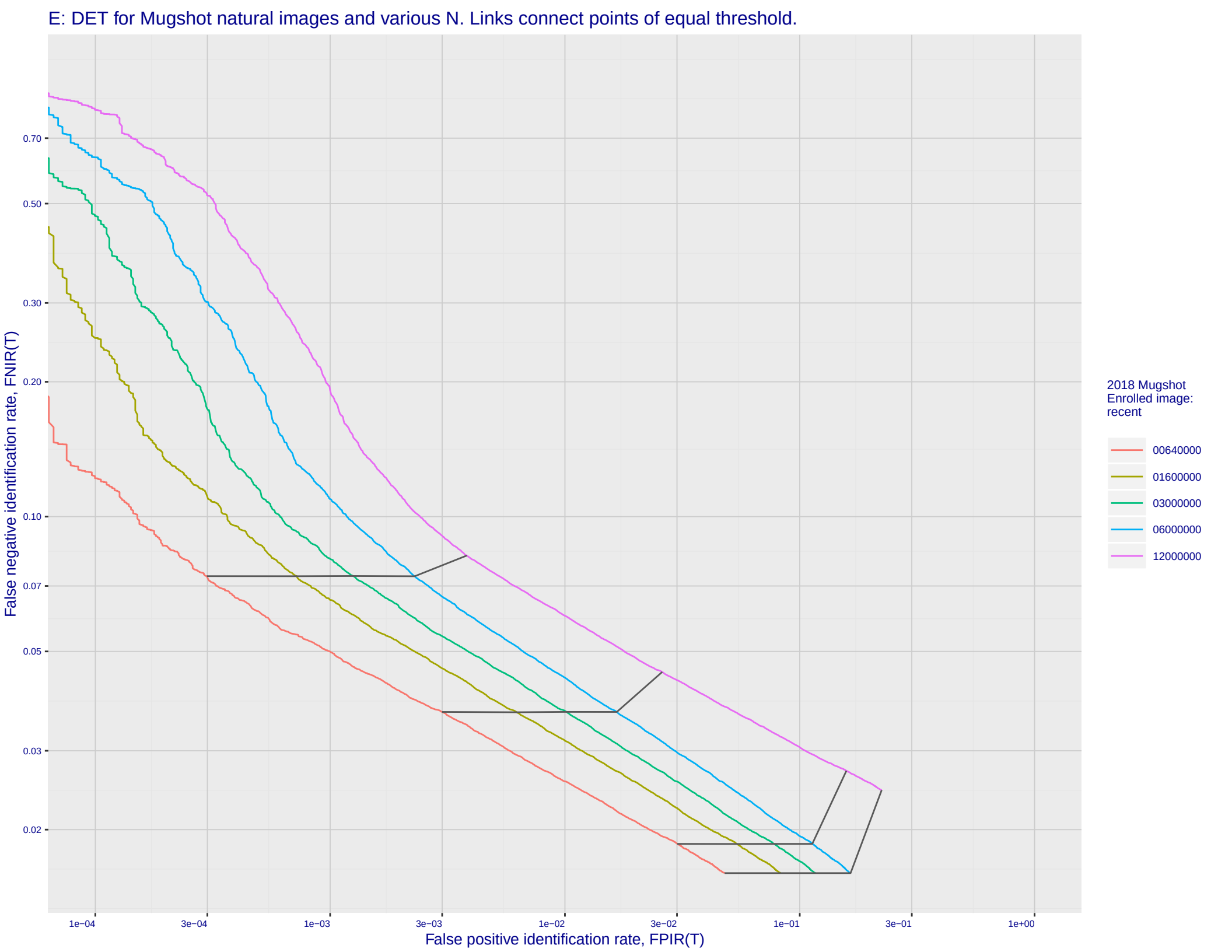
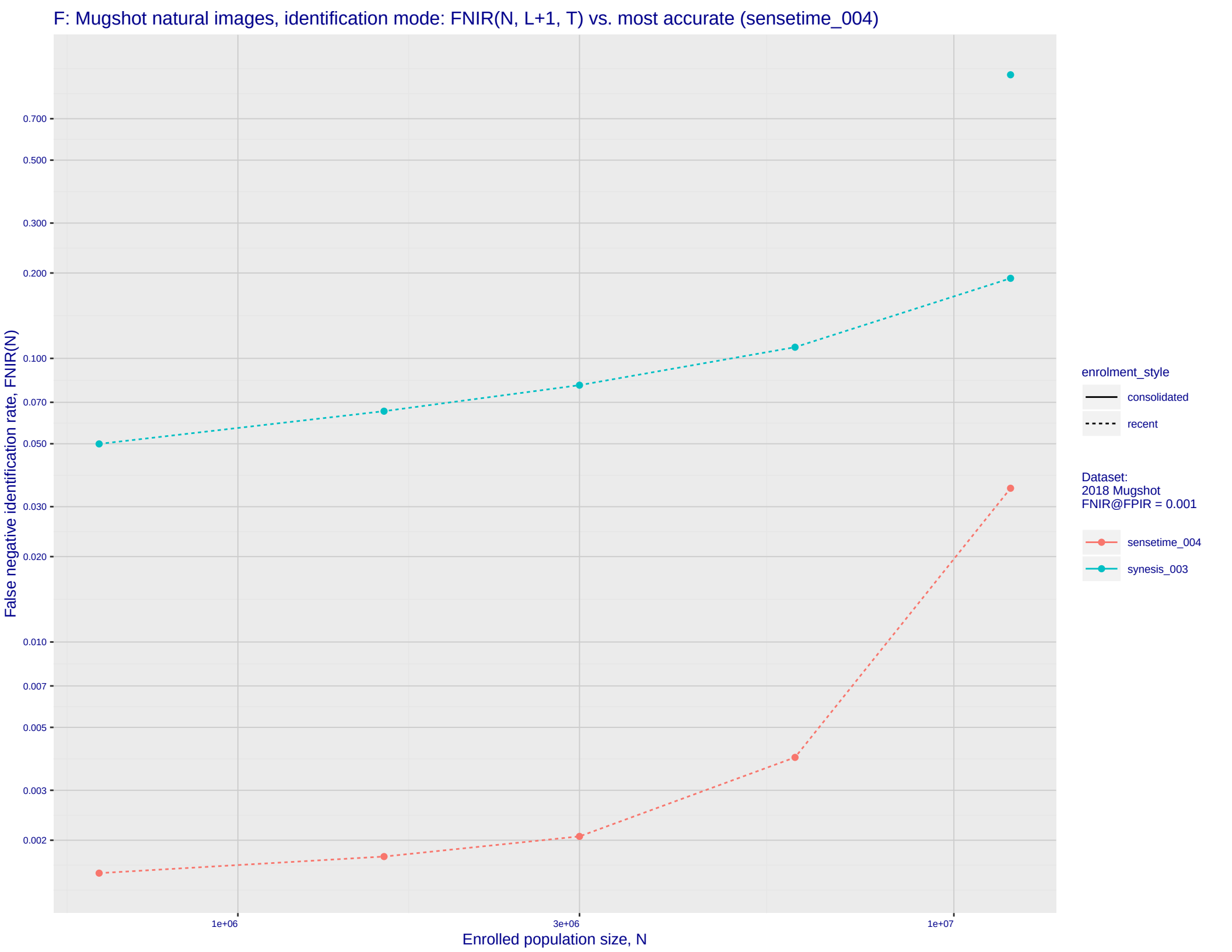

A: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals
Immigration
visa−border
Immigration
visa−kiosk
Mugshot
natural
False negative identification rate, FNIR(T)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
1e−04 3e−04 1e−03 3e−03 1e−02 3e−02 1e−01 3e−01 1e+00
False positive identification rate, FPIR(T)
enrolment_style
random−ONE−MATE
recent−ONE−MATE
unconsolidated−ALL−MATES
unconsolidated−ANY−MATE


B: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images
N
00640000
01600000
03000000
06000000
12000000
lifetime_consolidated
recent
FNIR
FPIR
Identification Error rate, FPIR(T) or FNIR(T)
Threshold
0.70
0.50
0.30
0.20
0.10
0.07
0.05
0.03
0.02
3e−01
2e−01
1e−01
7e−02
5e−02
3e−02
2e−02
1e−02
7e−03
5e−03
3e−03
2e−03
1e−03
7e−04
5e−04
3e−04
2e−04
1e−04
7e−05
5e−05
3e−05
2e−05
1e−05
0.5
0.6
0.7
0.8
0.9


C: FPIR vs. Selectivity for mugshot images, N = 1600000 subjects enrolled with one recent mate
Selectivity, SEL(T)
7e+01
5e+01
3e+01
2e+01
1e+01
7e+00
5e+00
3e+00
2e+00
1e+00
7e−01
5e−01
3e−01
2e−01
1e−01
7e−02
5e−02
3e−02
2e−02
1e−02
7e−03
5e−03
3e−03
2e−03
1e−03
7e−04
5e−04
3e−04
2e−04
1e−04
7e−05
5e−05
3e−05
2e−05
1e−05
1e−05
3e−05
1e−04
3e−04
1e−03
3e−03
1e−02
3e−02
1e−01
3e−01
False Positive Idenification Rate, FPIR(T)
Enrolled images:
recent
N = 1600000
Mugshot
natural
Mugshot
profile
Mugshot
webcam


D: FPIR dependence on T by probe type for N = 1600000 subjects
False Positive Idenification Rate, FPIR(T)
5e−01
3e−01
1e−01
5e−02
3e−02
1e−02
5e−03
3e−03
1e−03
5e−04
3e−04
1e−04
5e−05
3e−05
1e−05
0.3
0.4
0.5
0.6
0.7
0.8
Threshold
Enrolled image:
recent
N = 1600000
Mugshot
natural
Mugshot
profile
Mugshot
webcam


E: DET for Mugshot natural images and various N. Links connect points of equal threshold.
False negative identification rate, FNIR(T)
0.70
0.50
0.30
0.20
0.10
0.07
0.05
0.03
0.02
1e−04
3e−04
1e−03
3e−03
1e−02
3e−02
1e−01
3e−01
1e+00
False positive identification rate, FPIR(T)
2018 Mugshot Enrolled image: recent
00640000
01600000
03000000
06000000
12000000


F: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (sensetime_004)
False negative identification rate, FNIR(N)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
1e+06
3e+06
1e+07
Enrolled population size, N
enrolment_style
consolidated
recent
Dataset:
2018 Mugshot
FNIR@FPIR = 0.001
sensetime_004
synesis_003

G: Datasheet

Algorithm: synesis_003

Developer: Synesis

Submission Date: 2019_07_04

Template size: 2048 bytes

Template time (2.5 percentile): 200 msec

Template time (median): 212 msec

Template time (97.5 percentile): 244 msec

Frontal mugshot investigation rank 141 −− FNIR(1600000, 0, 1) = 0.0162 vs. lowest 0.0010 from sensetime_004

natural investigation rank 78 −− FNIR(1600000, 0, 1) = 0.0231 vs. lowest 0.0067 from sensetime_003

natural investigation rank 147 −− FNIR(1600000, 0, 1) = 0.6854 vs. lowest 0.0492 from paravision_005

natural investigation rank 147 −− FNIR(1600000, 0, 1) = 0.6854 vs. lowest 0.0492 from paravision_005

natural investigation rank 52 −− FNIR(1600000, 0, 1) = 0.0125 vs. lowest 0.0014 from visionlabs_009

natural investigation rank 45 −− FNIR(1600000, 0, 1) = 0.1359 vs. lowest 0.0694 from cib_000

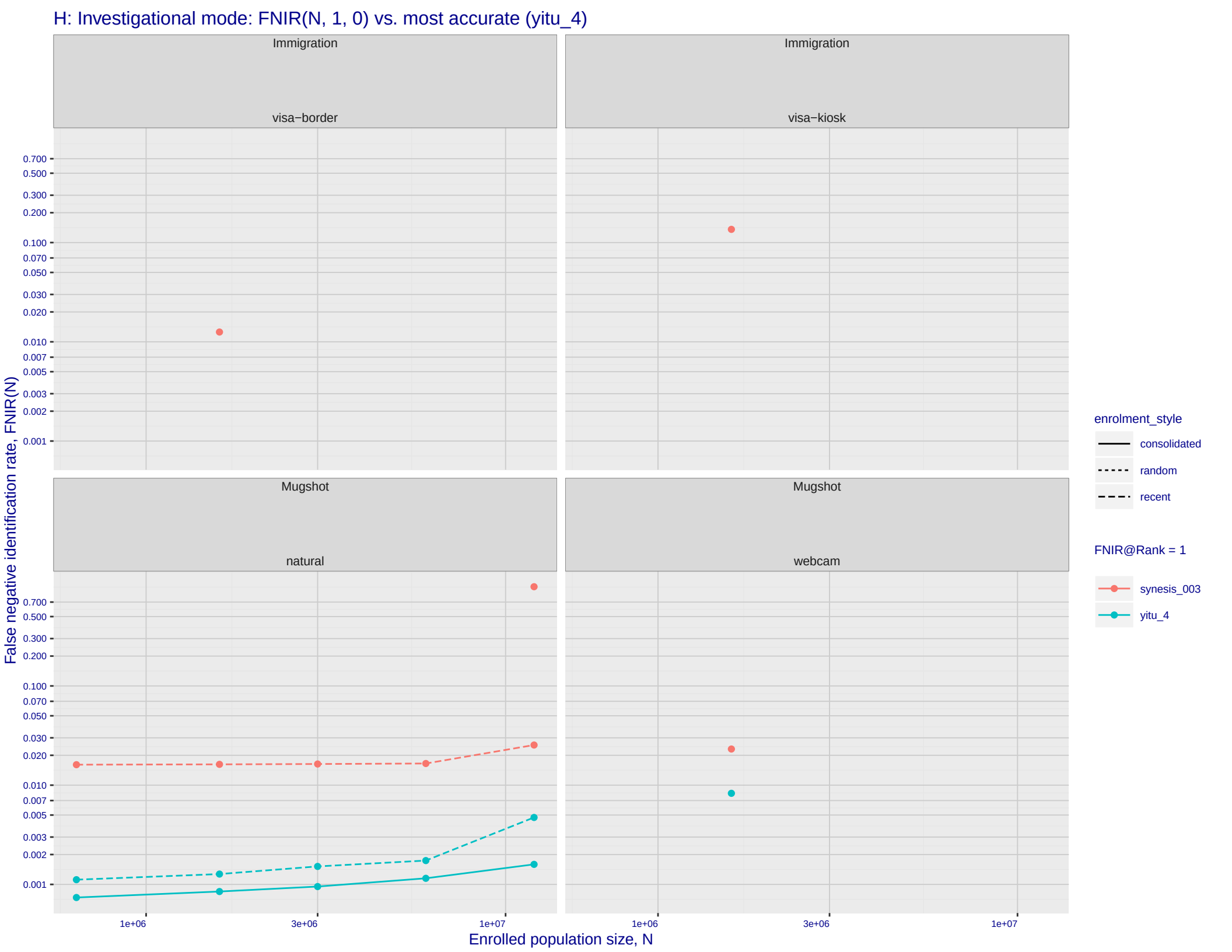
Frontal mugshot identification rank 93 −− FNIR(1600000, T, L+1) = 0.0651 vs. lowest 0.0018 from sensetime_004

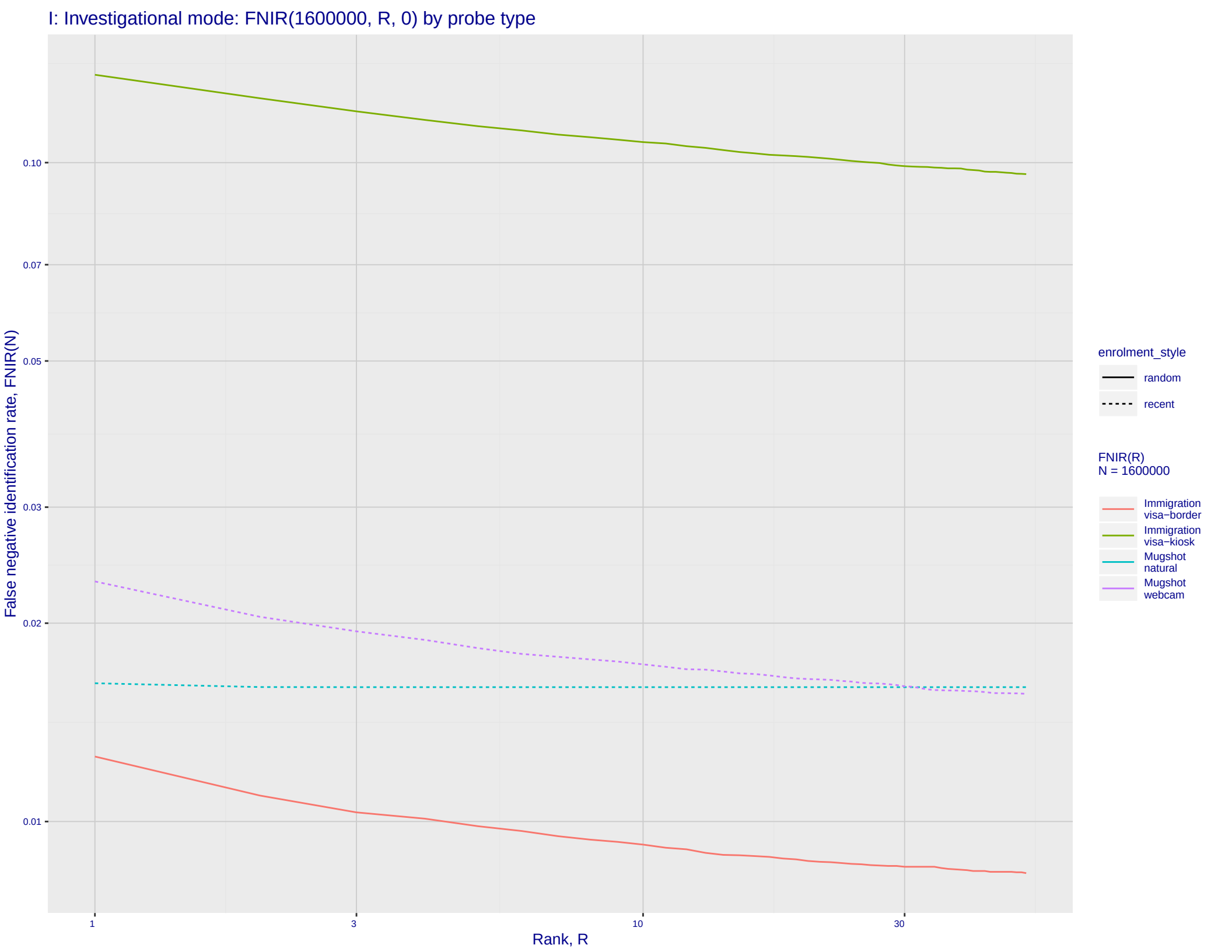
natural identification rank 75 −− FNIR(1600000, T, L+1) = 0.1227 vs. lowest 0.0122 from sensetime_003

natural identification rank 34 −− FNIR(1600000, T, L+1) = 0.8927 vs. lowest 0.1020 from sensetime_004

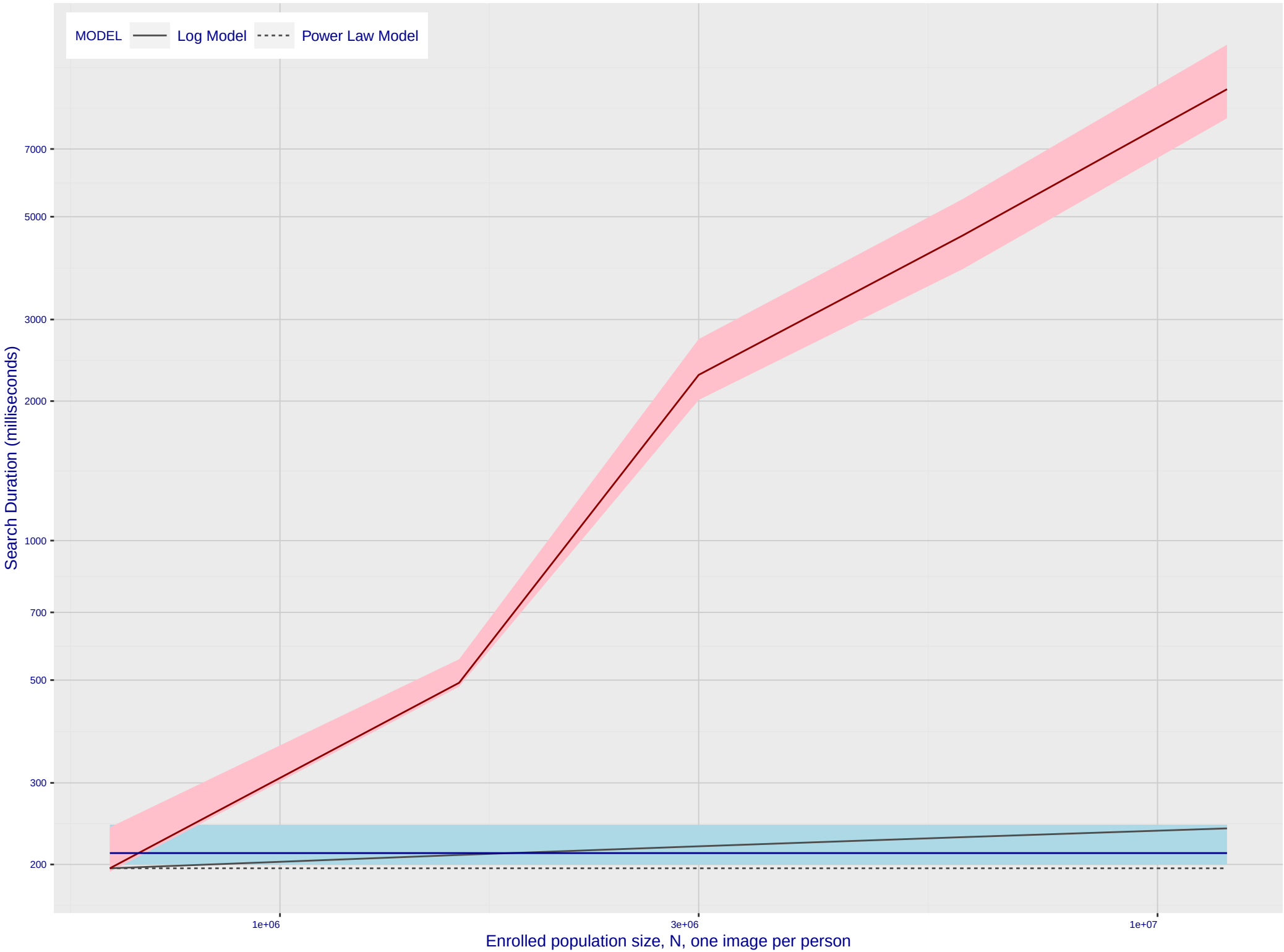
natural identification rank 47 −− FNIR(1600000, T, L+1) = 0.0754 vs. lowest 0.0059 from sensetime_004

natural identification rank 35 −− FNIR(1600000, T, L+1) = 0.3185 vs. lowest 0.1129 from visionlabs_009

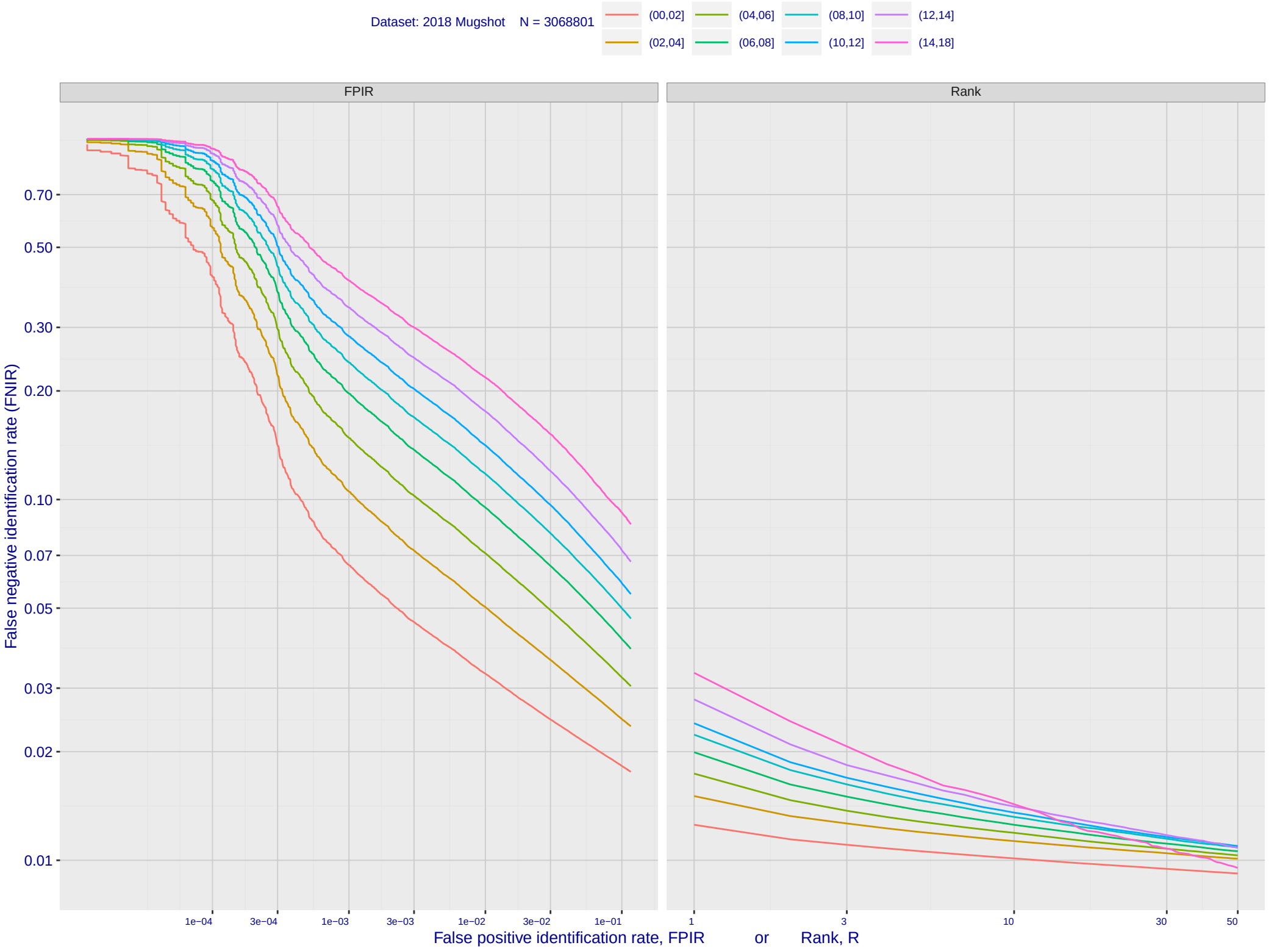

H: Investigational mode: FNIR(N, 1, 0) vs. most accurate (yitu_4)
Immigration
visa−border
Immigration
visa−kiosk
Mugshot
natural
Mugshot
webcam
False negative identification rate, FNIR(N)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
1e+06
3e+06
1e+07
Enrolled population size, N
enrolment_style
consolidated
random
recent
FNIR@Rank = 1
synesis_003
yitu_4

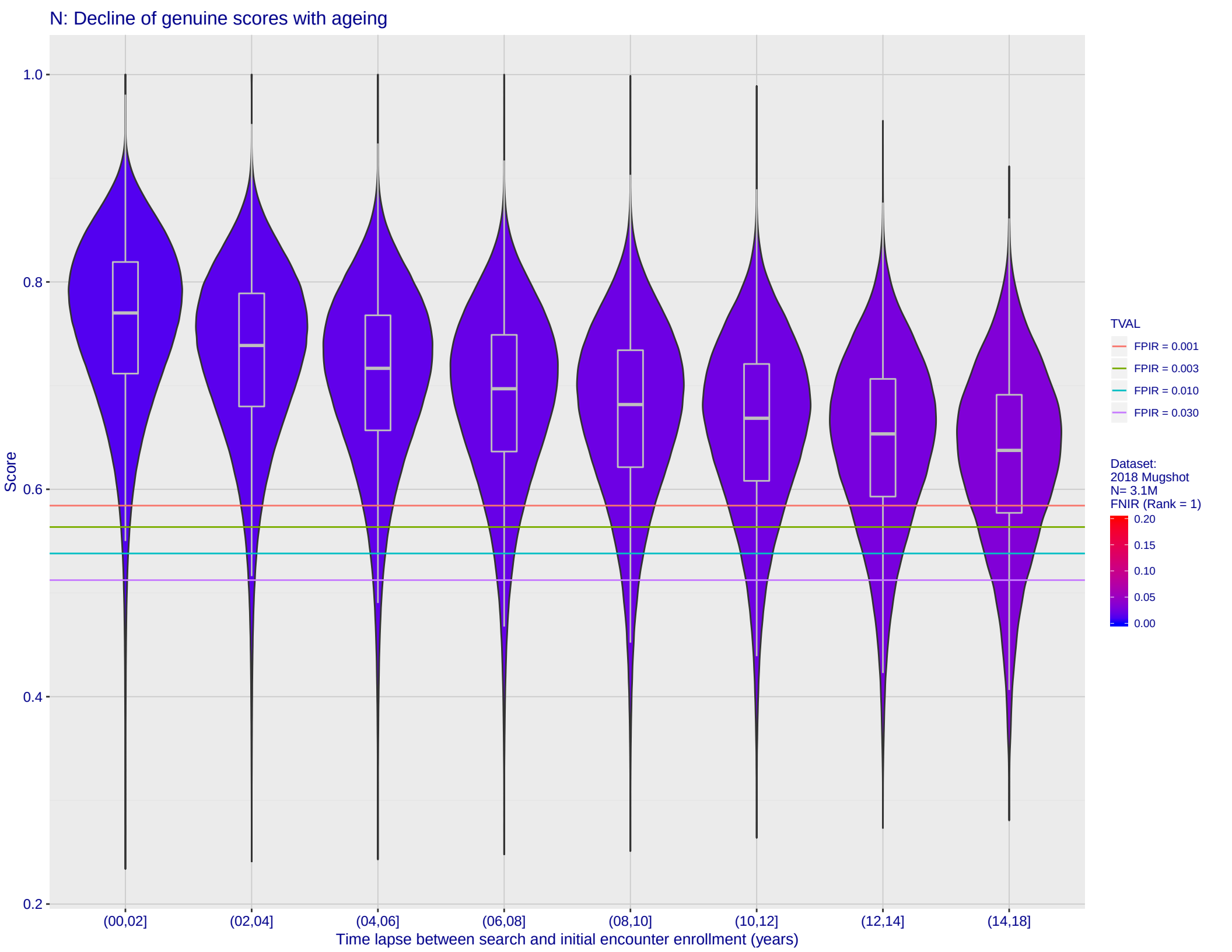

I: Investigational mode: FNIR(1600000, R, 0) by probe type
False negative identification rate, FNIR(N)
0.10
0.07
0.05
0.03
0.02
0.01
1
3
10
30
Rank, R
enrolment_style
random
recent
FNIR(R)
N = 1600000
Immigration visa−border
Immigration visa−kiosk
Mugshot natural
Mugshot webcam

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



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




N: Decline of genuine scores with ageing
1.0
0.8
0.6
0.4
0.2
Score
(00,02]
(02,04]
(04,06]
(06,08]
(08,10]
(10,12]
(12,14]
(14,18]
Time lapse between search and initial encounter enrollment (years)
TVAL
FPIR = 0.001
FPIR = 0.003
FPIR = 0.010
FPIR = 0.030
Dataset:
2018 Mugshot
N= 3.1M
FNIR (Rank = 1)
0.20
0.15
0.10
0.05
0.00