

**NISTIR 8280**

**Ongoing Face Recognition  
Vendor Test (FRVT)  
Part 3: Demographic Effects**

**Annex 14** : False negative rates by country for global  
application and border crossing photos

This document is an annex of NIST Interagency Report 8280:  
<https://doi.org/10.6028/NIST.IR.8280>

2019/12/19

**NIST**  
**National Institute of  
Standards and Technology**  
U.S. Department of Commerce

## 1 Overview

This annex includes figures that shows false non-match rates for each of 24 countries of birth. The results are reported also by sex, and split into two age groups over and under age 45. For each demographic, the figure shows a point FNMR estimate with a vertical line giving an uncertainty estimate.

## 2 Data

The figures are produced from genuine scores produced by comparing two kinds of images: The first reference sample is the high quality ISO application photo described in Annex 2. The second verification sample is a lower quality border crossing photo, described in Annex 4. The former is in reasonable conformance to the ISO/IEC 39794-5 / ICAO specifications. The second deviates significantly from standards in that the pose is often non-frontal, and the background illumination leads to underexposure of the face.

Each algorithm executed 1 442 511 genuine comparisons as follows

#	Birth		Genuine comparison count				Total
	Region	Country	Male $\leq$ 45	Male $>$ 45	Female $\leq$ 45	Female $>$ 45	
1	1	Poland	6445	17741	4441	8029	36656
2	1	Russia	5194	20390	2508	5966	34058
3	1	Ukraine	4650	13269	3300	7331	28550
4	2	El Salvador	13472	10832	9833	11136	45273
5	2	Mexico	67101	97558	44815	83383	292857
6	2	Nicaragua	5798	5696	4032	4332	19858
7	3	Ghana	1741	3748	1935	5460	12884
8	3	Liberia	373	632	561	868	2434
9	3	Nigeria	3901	7238	4136	9861	25136
10	4	Haiti	8980	9525	9586	12943	41034
11	4	Jamaica	13514	27990	9446	22766	73716
12	5	Ethiopia	2113	3974	1239	2995	10321
13	5	Kenya	1297	4316	1414	4464	11491
14	5	Somalia	146	560	257	1064	2027
15	6	India	27572	85515	25761	102332	241180
16	6	Iran	6416	8051	5560	5996	26023
17	6	Iraq	1891	2908	1736	3887	10422
18	6	Pakistan	5919	11621	4633	10898	33071
19	7	China	34265	66507	30149	37017	167938
20	7	Japan	12925	32387	5671	6501	57484
21	7	Korea	18689	44928	16062	24520	104199
22	7	Phillippines	25692	46804	13369	18712	104577
23	7	Thailand	3913	14559	1151	3302	22925
24	7	Vietnam	9051	16536	5559	7251	38397

## 3 Fixed Threshold

A false match is declared if the comparison score is equal to, or exceeds, a threshold. This same value applies to all countries, sexes and age groups. The threshold value could be any reasonable value germane to that

comparison algorithm. The threshold value was taken from a different experiment in which mugshot impostor pairs were compared. It is the value that gave a FMR of 0.00001 over that set.

## 4 Plot

Each plot contains two panels, one for each sex. Within each panel there are 48 lines and 48 points, corresponding to two age groups and twenty four countries of birth. The vertical lines express uncertainty in the measurement: They connect two point  $FNMR_l$  and  $FNMR_u$  which define the interval covering 95% of bootstrapped FNMR estimates, from the 2.5-th to 97.5-th percentiles. The lines are short for large samples i.e. large numbers of genuine comparisons. The two square points correspond to the median FNMR of the bootstrapped estimates.

## 5 Results

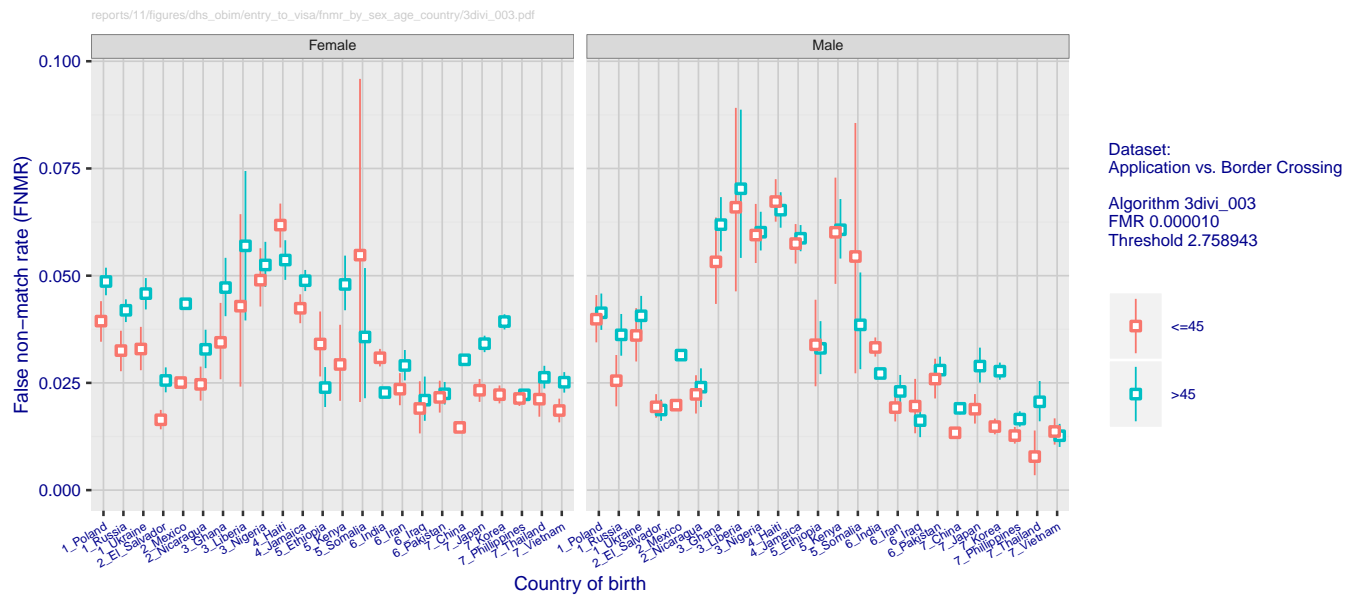


Figure 1: FNMR by sex, age and country of birth, 3divi-003

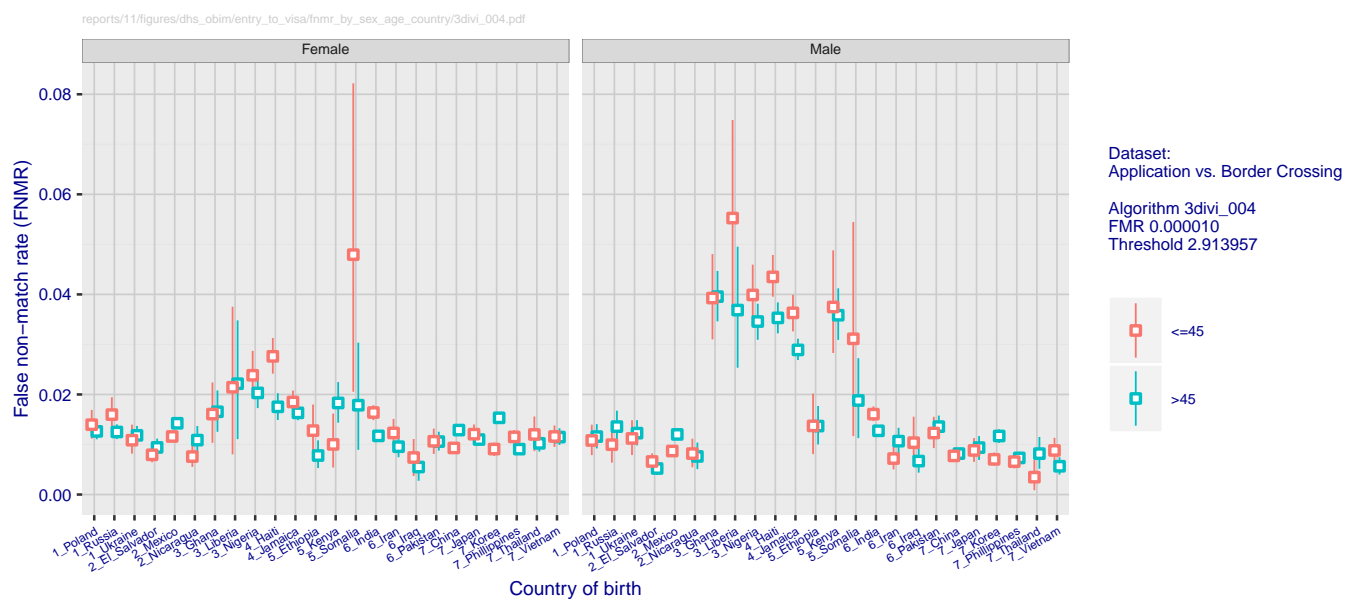


Figure 2: FNMR by sex, age and country of birth, 3divi-004

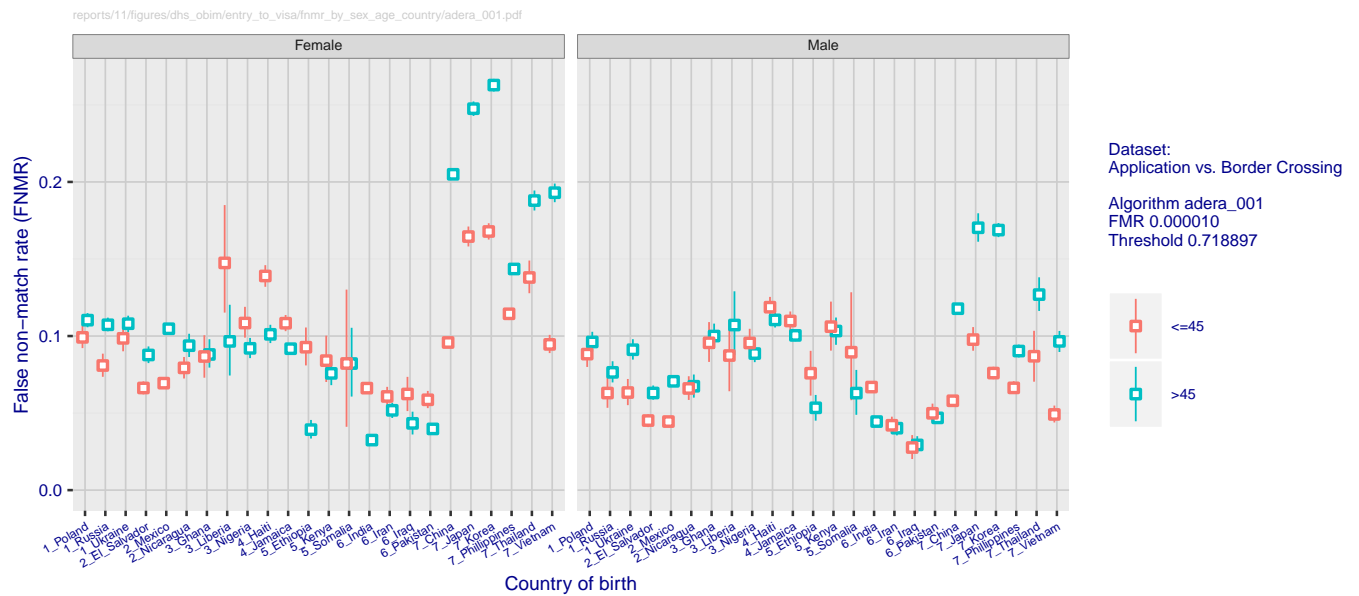


Figure 3: FNMR by sex, age and country of birth, adera-001

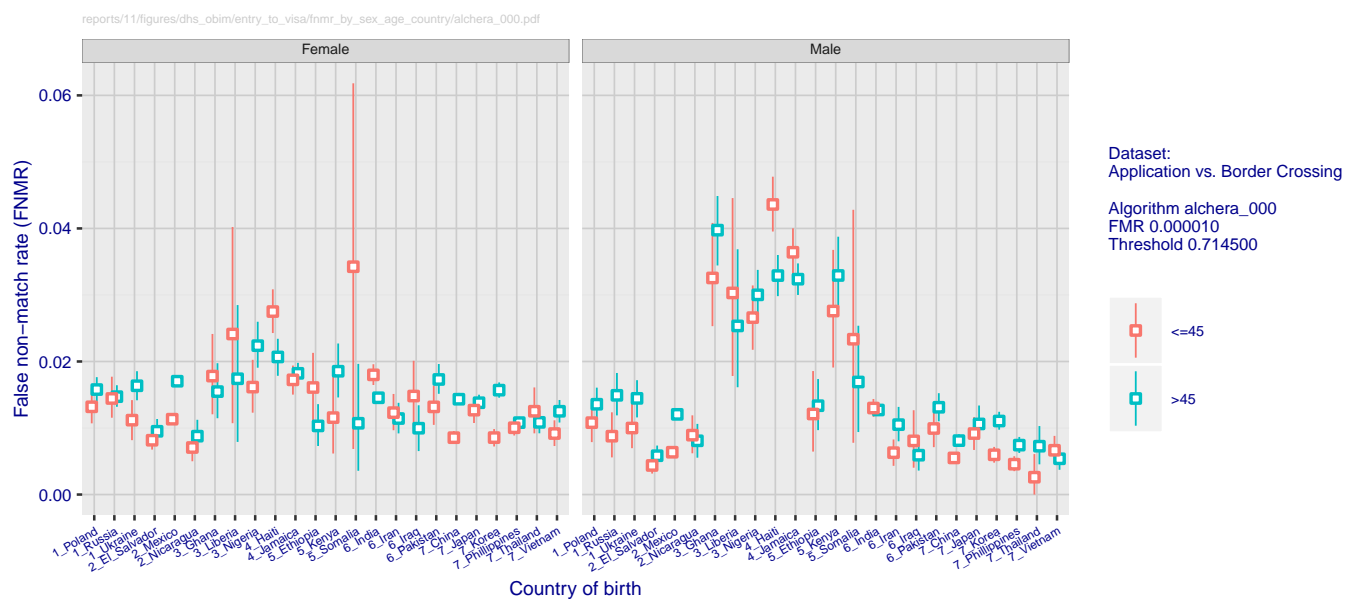


Figure 4: FNMR by sex, age and country of birth, alchera-000

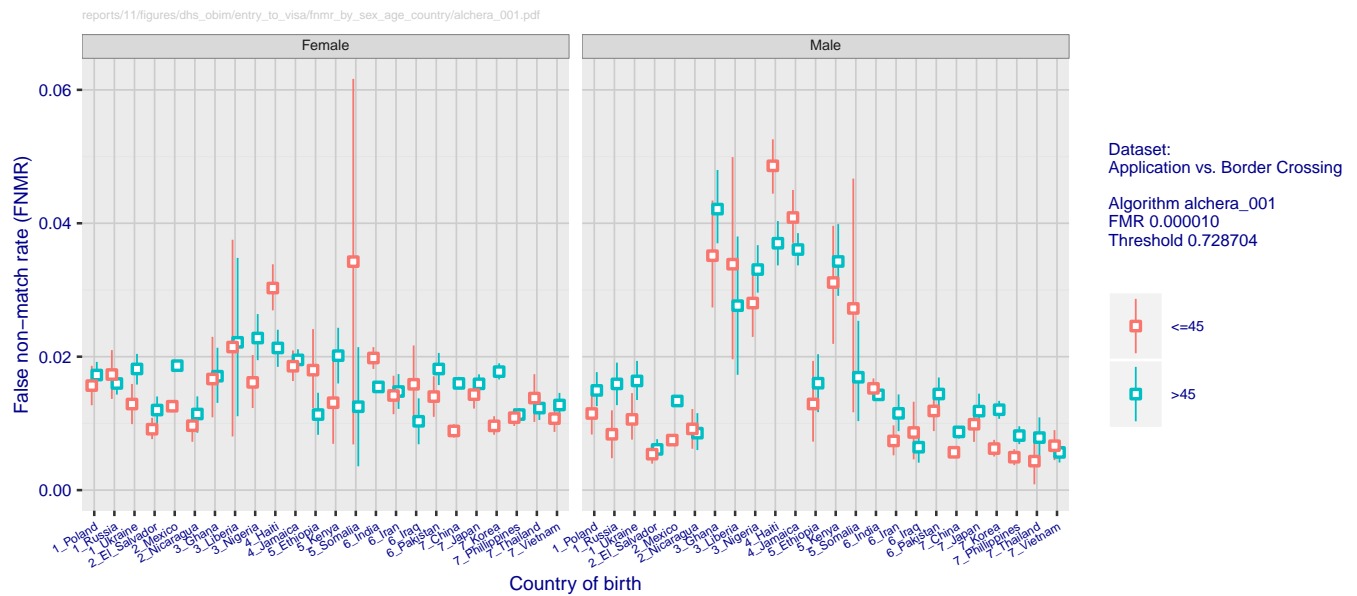


Figure 5: FNMR by sex, age and country of birth, alchera-001

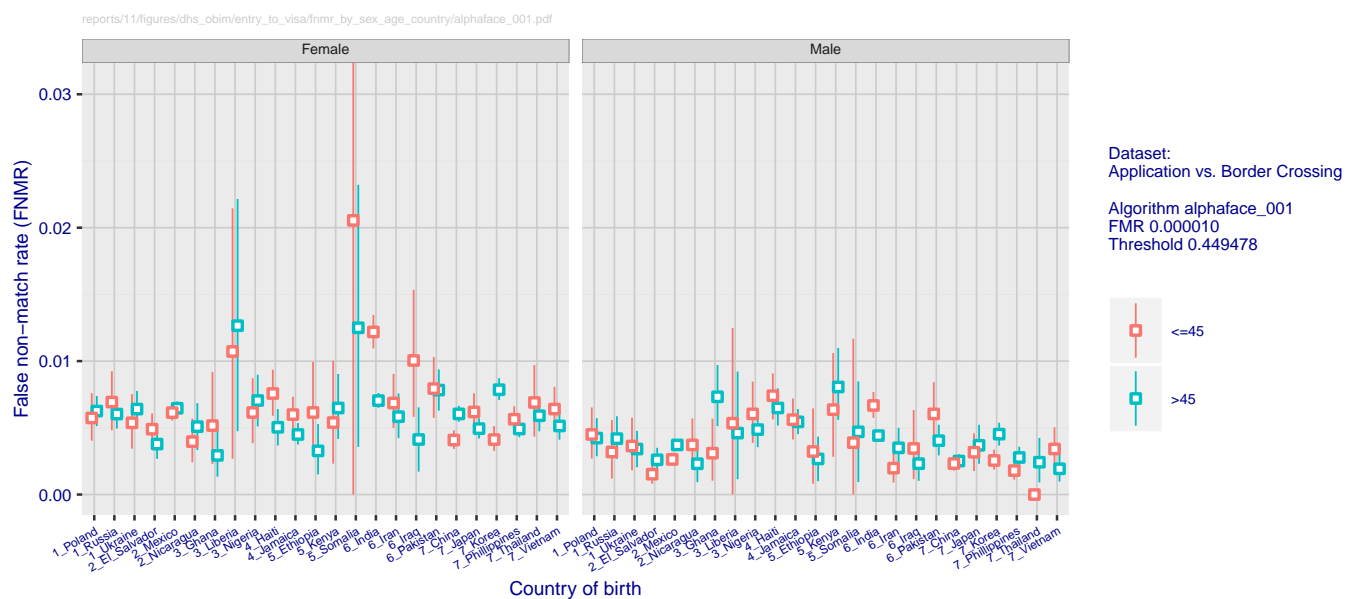


Figure 6: FNMR by sex, age and country of birth, alphaface-001

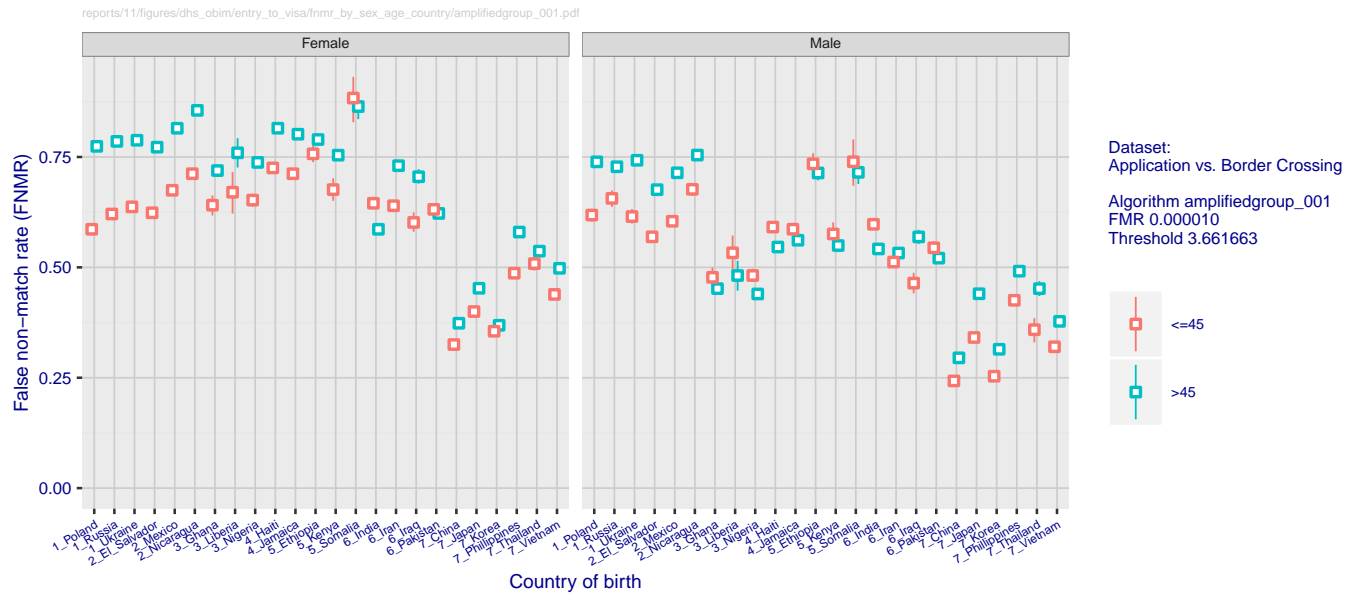


Figure 7: FNMR by sex, age and country of birth, amplifiedgroup-001

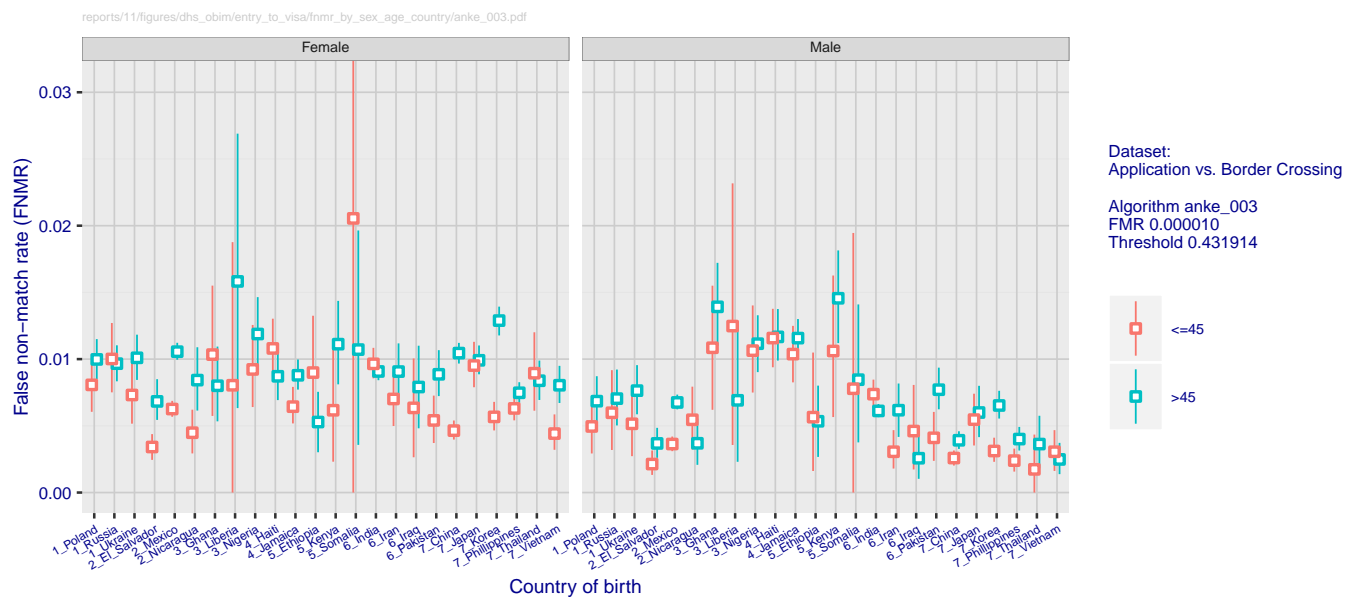


Figure 8: FNMR by sex, age and country of birth, anke-003

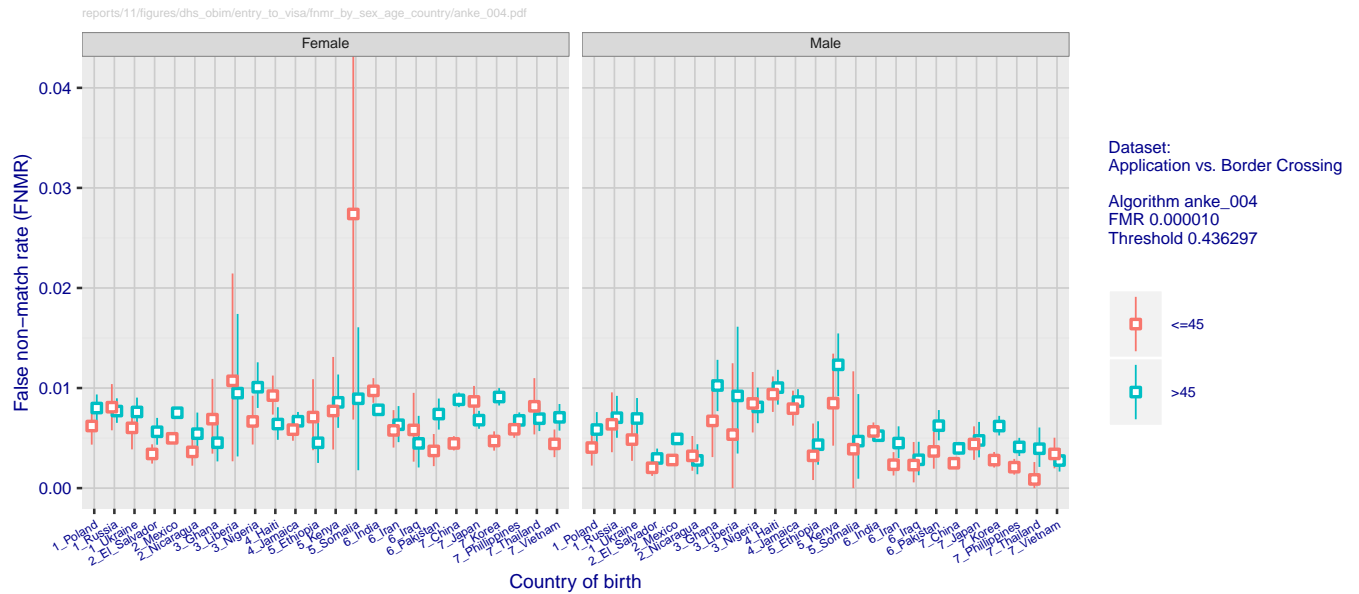


Figure 9: FNMR by sex, age and country of birth, anke-004

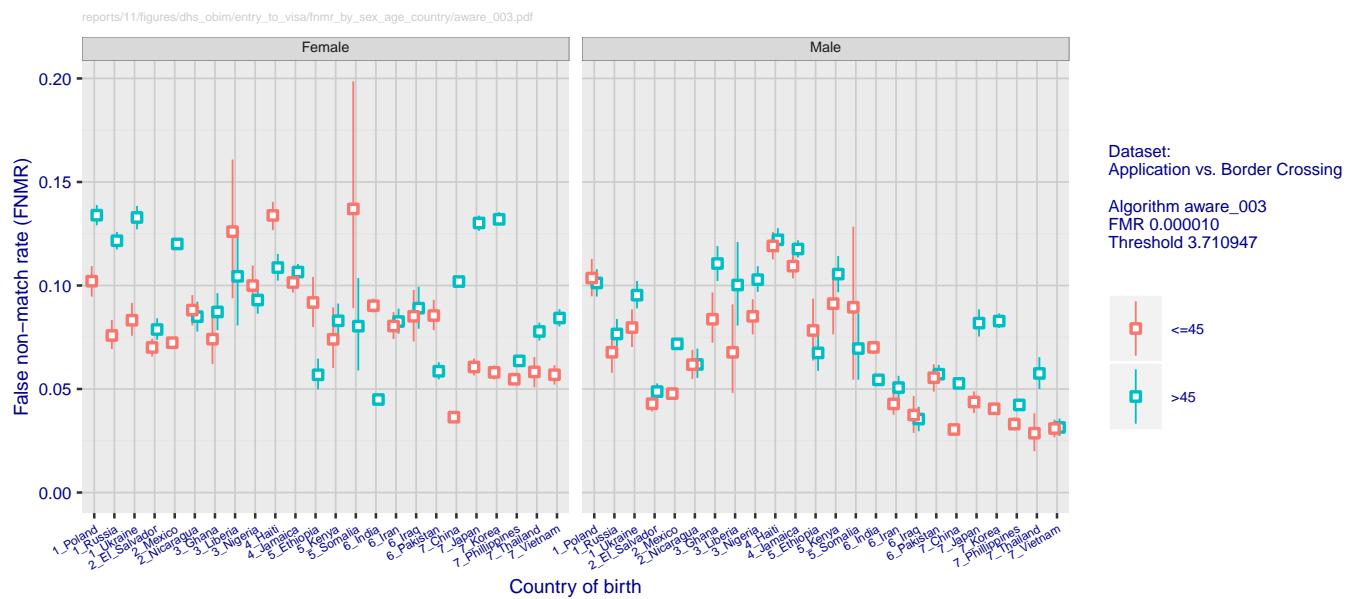


Figure 10: FNMR by sex, age and country of birth, aware-003



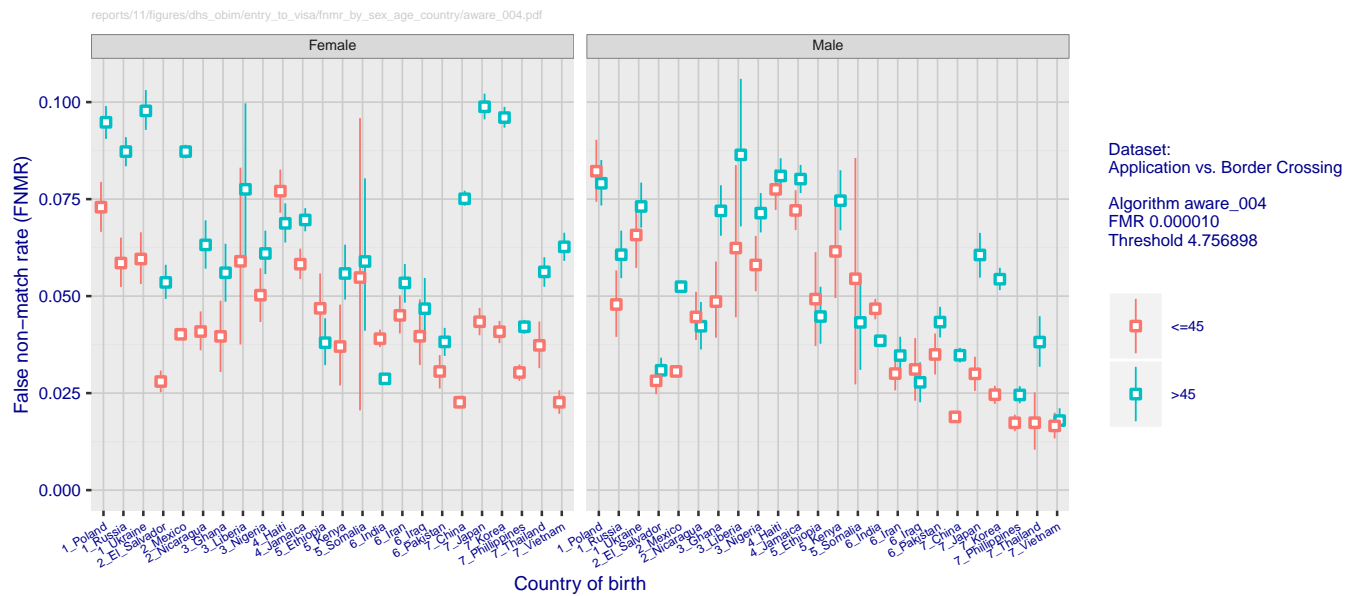


Figure 11: FNMR by sex, age and country of birth, aware-004

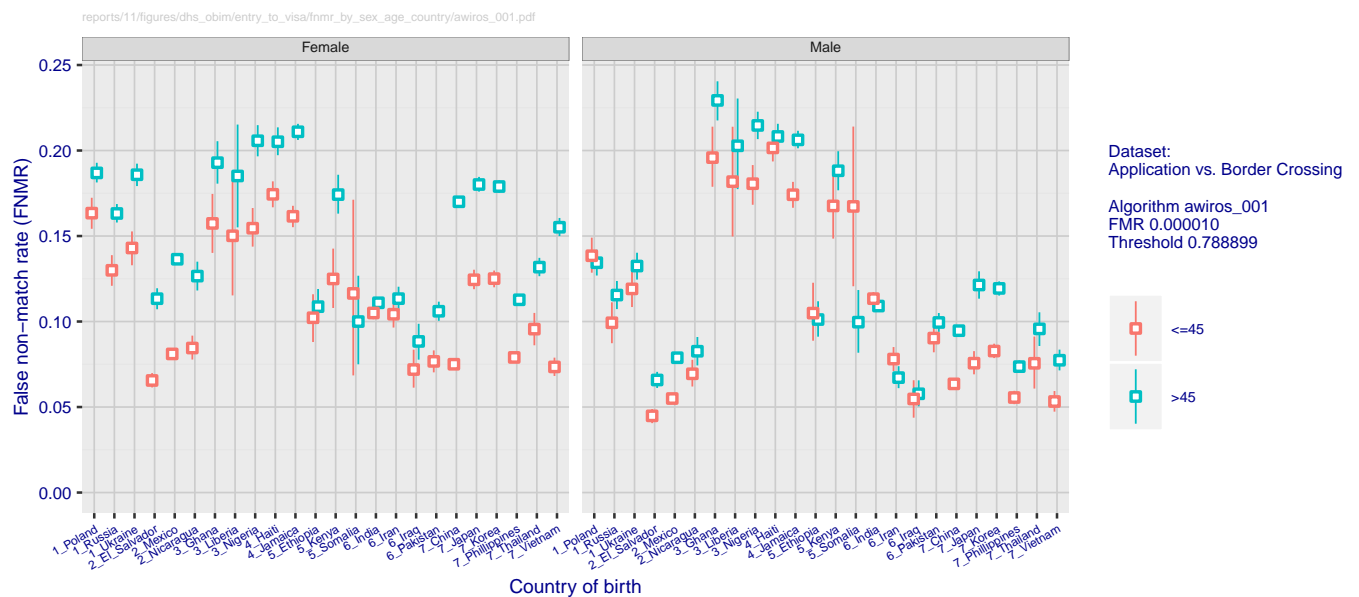


Figure 12: FNMR by sex, age and country of birth, awiros-001

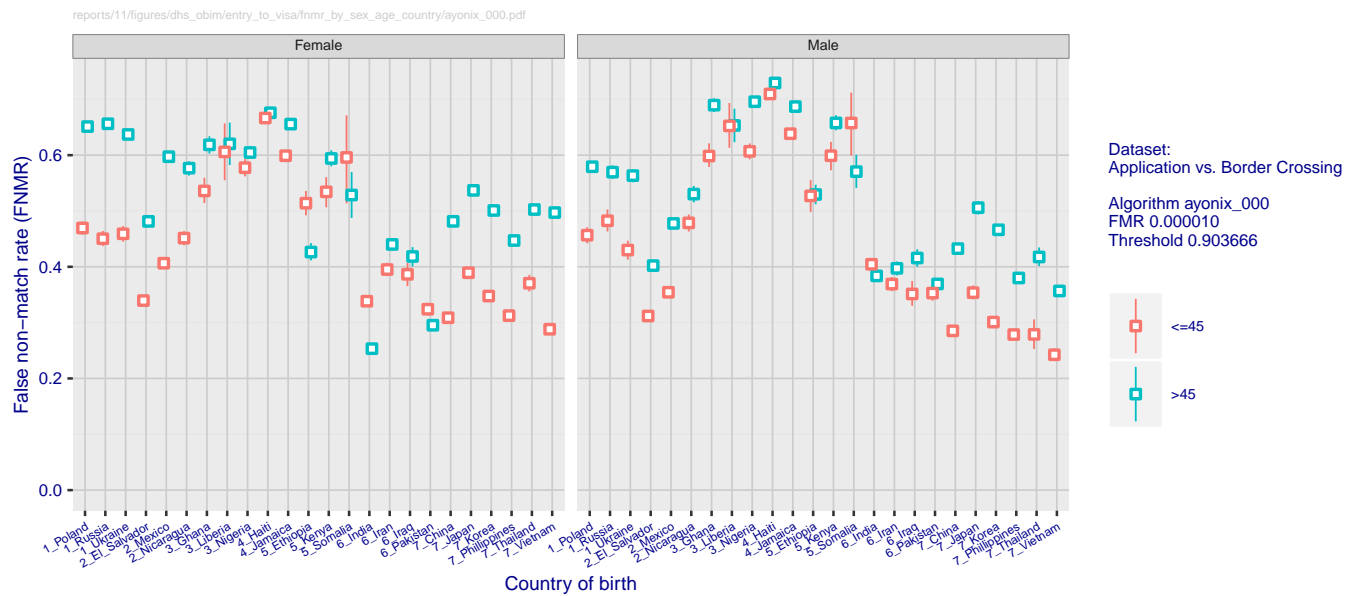


Figure 13: FNMR by sex, age and country of birth, ayonix-000

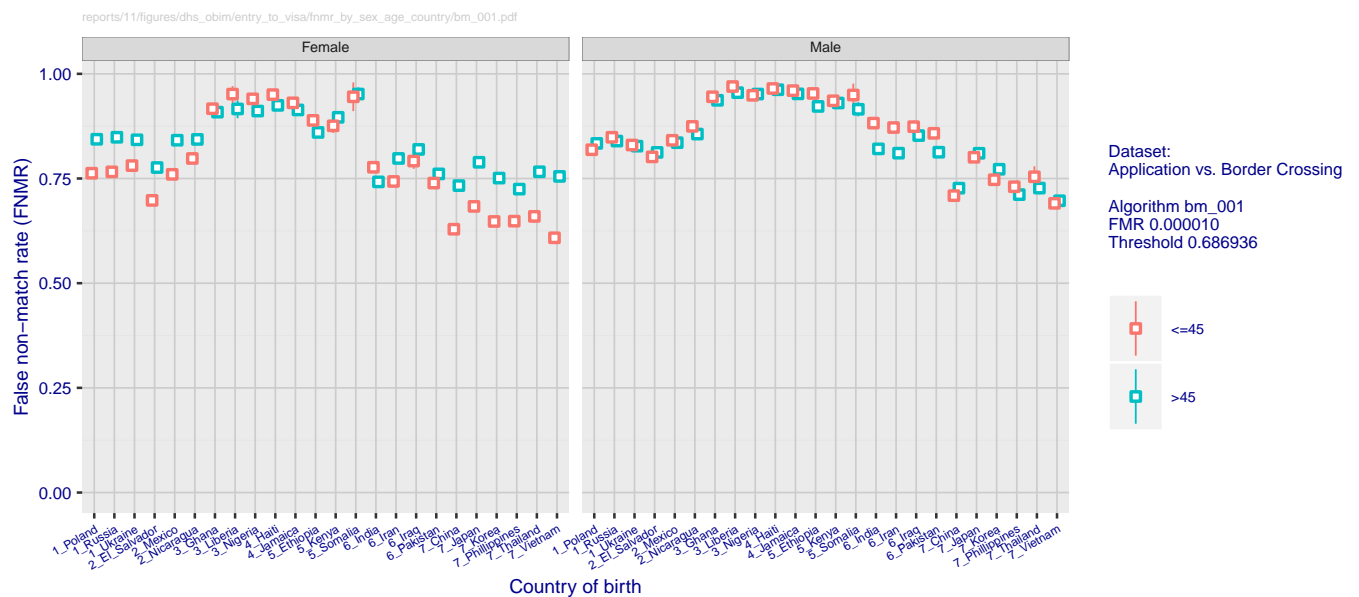


Figure 14: FNMR by sex, age and country of birth, bm-001

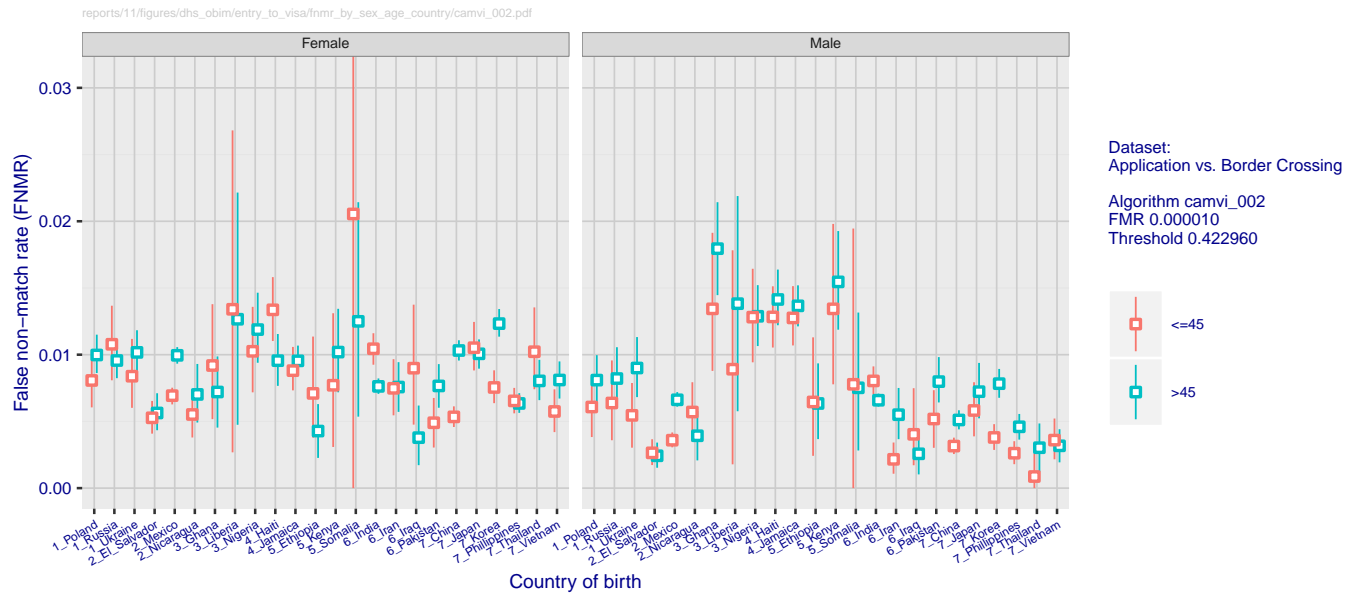


Figure 15: FNMR by sex, age and country of birth, camvi-002

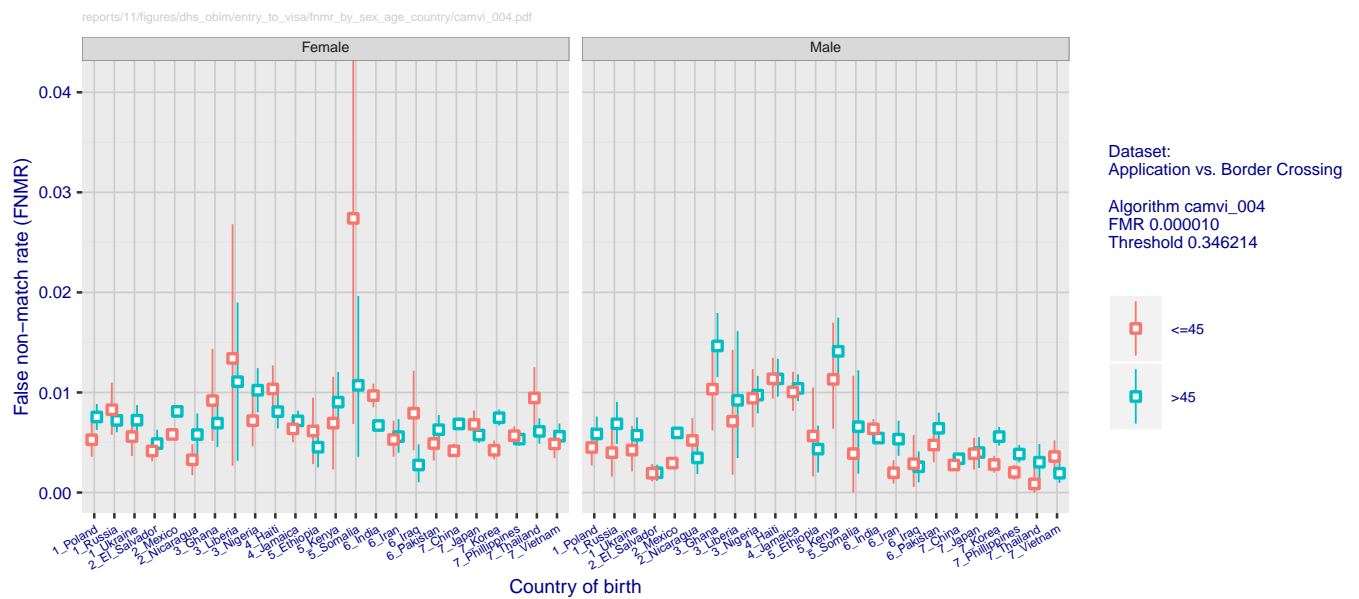


Figure 16: FNMR by sex, age and country of birth, camvi-004

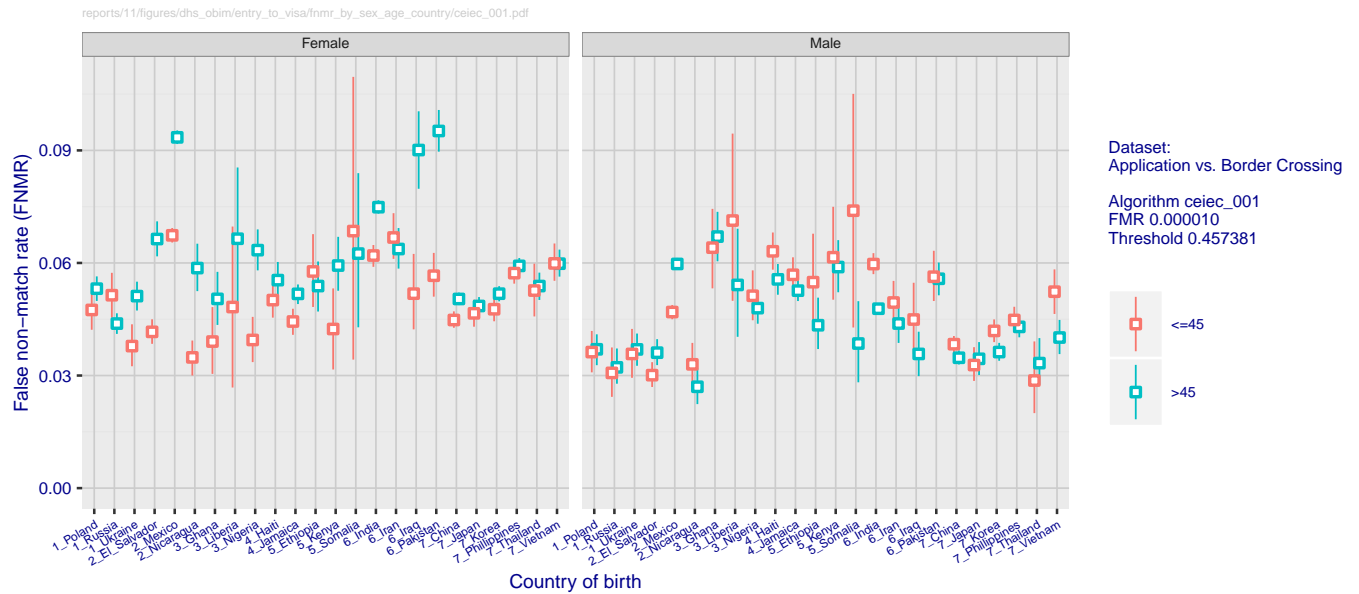


Figure 17: FNMR by sex, age and country of birth, ceiec-001

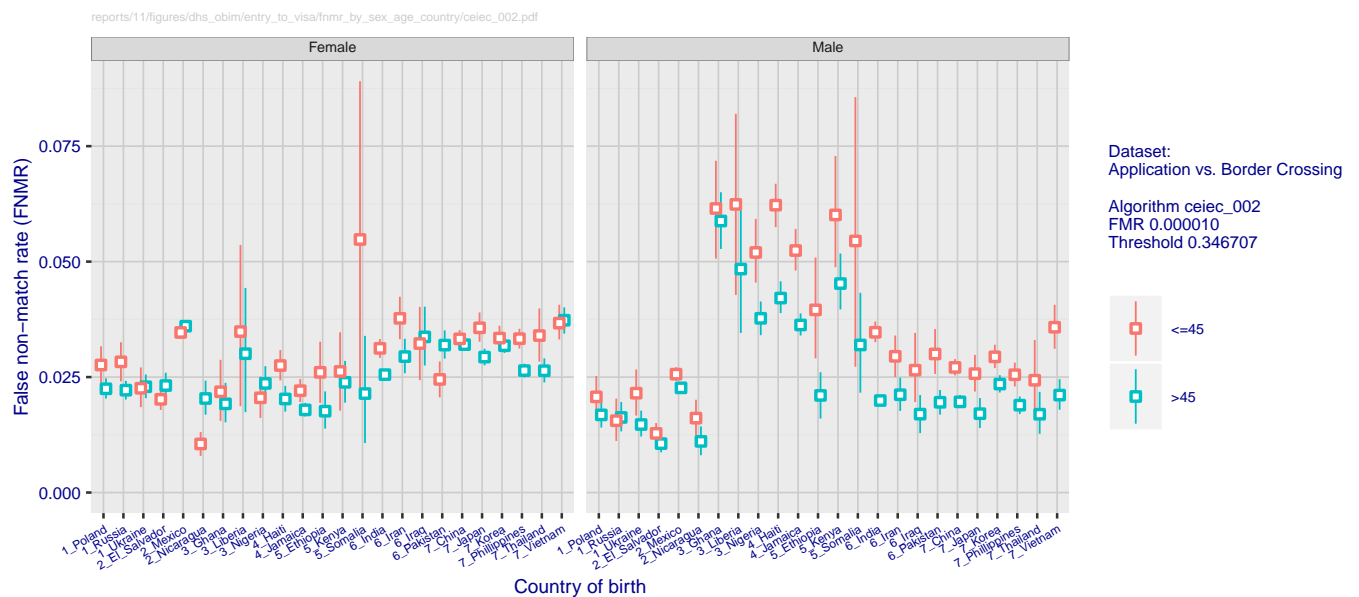


Figure 18: FNMR by sex, age and country of birth, ceiec-002

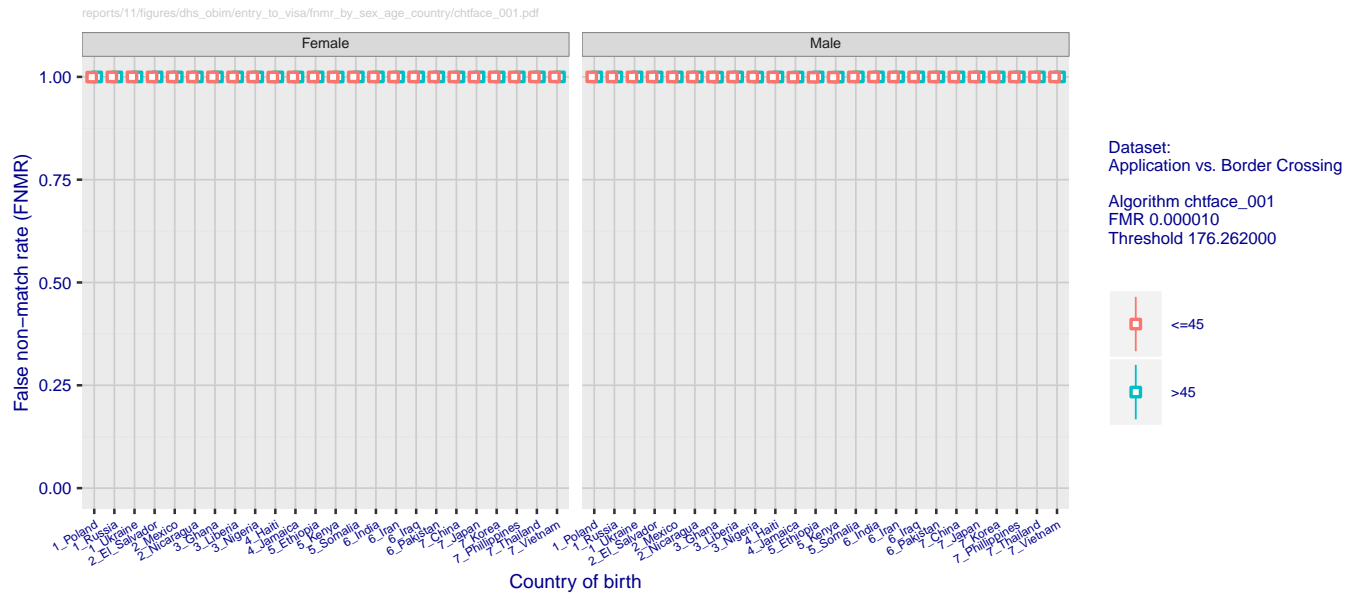


Figure 19: FNMR by sex, age and country of birth, chtface-001

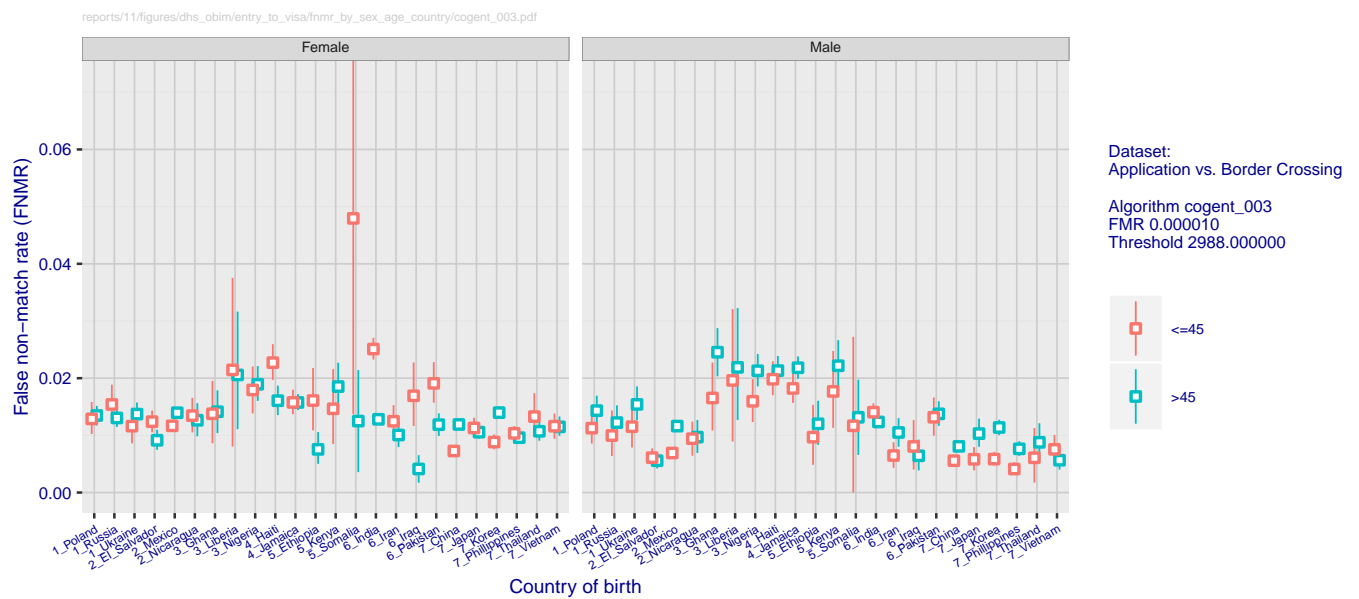


Figure 20: FNMR by sex, age and country of birth, cogent-003

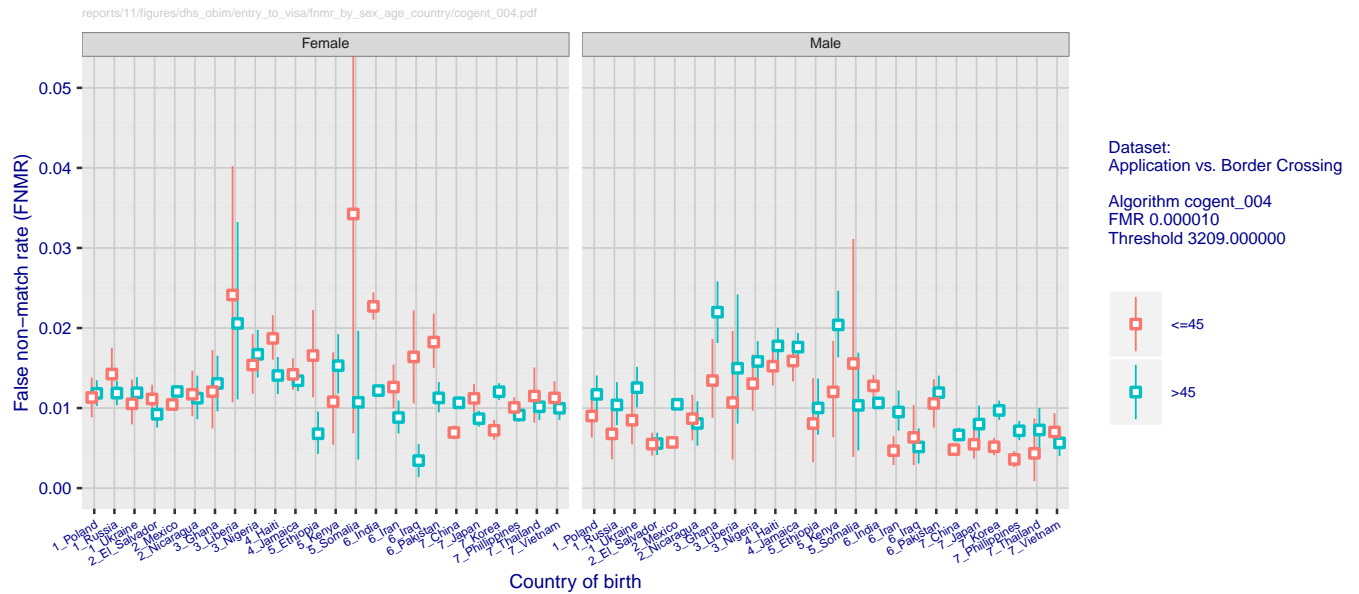


Figure 21: FNMR by sex, age and country of birth, cogent-004

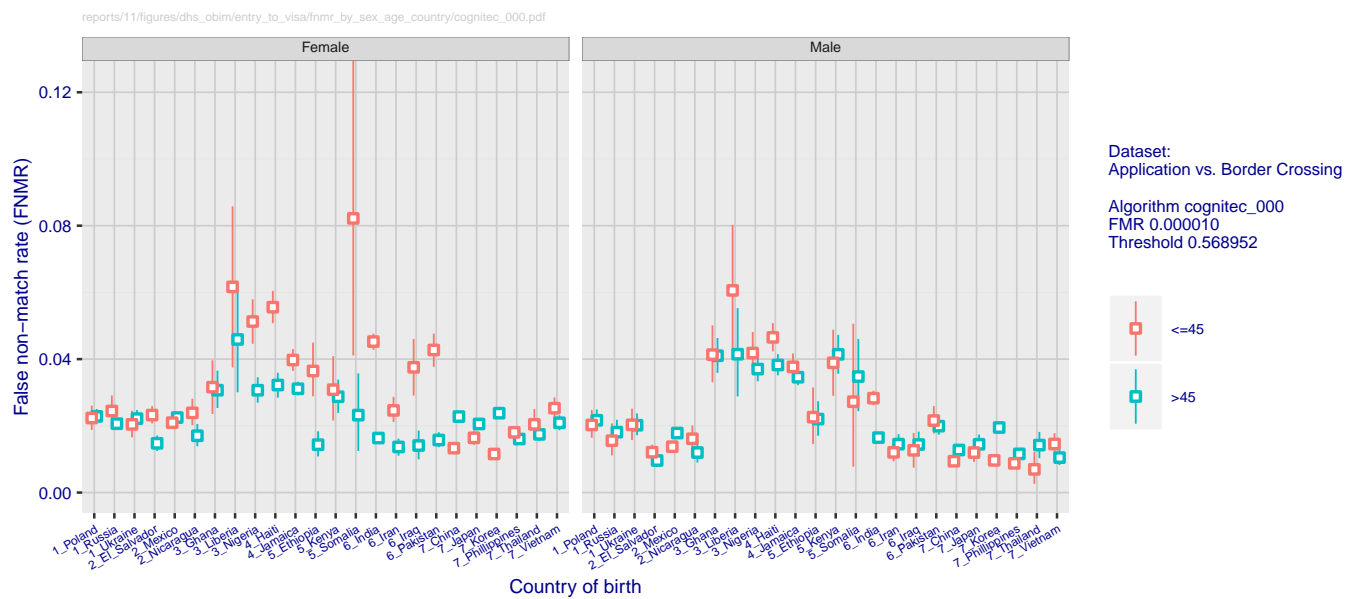


Figure 22: FNMR by sex, age and country of birth, cognitec-000

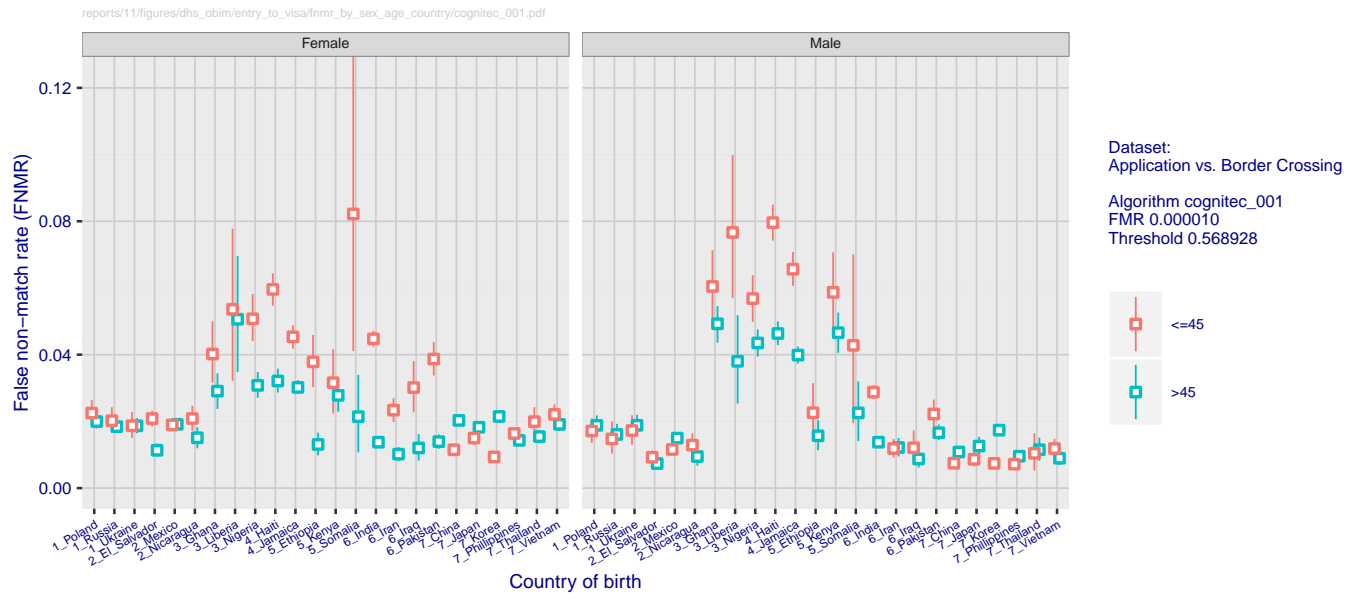


Figure 23: FNMR by sex, age and country of birth, cognitec-001

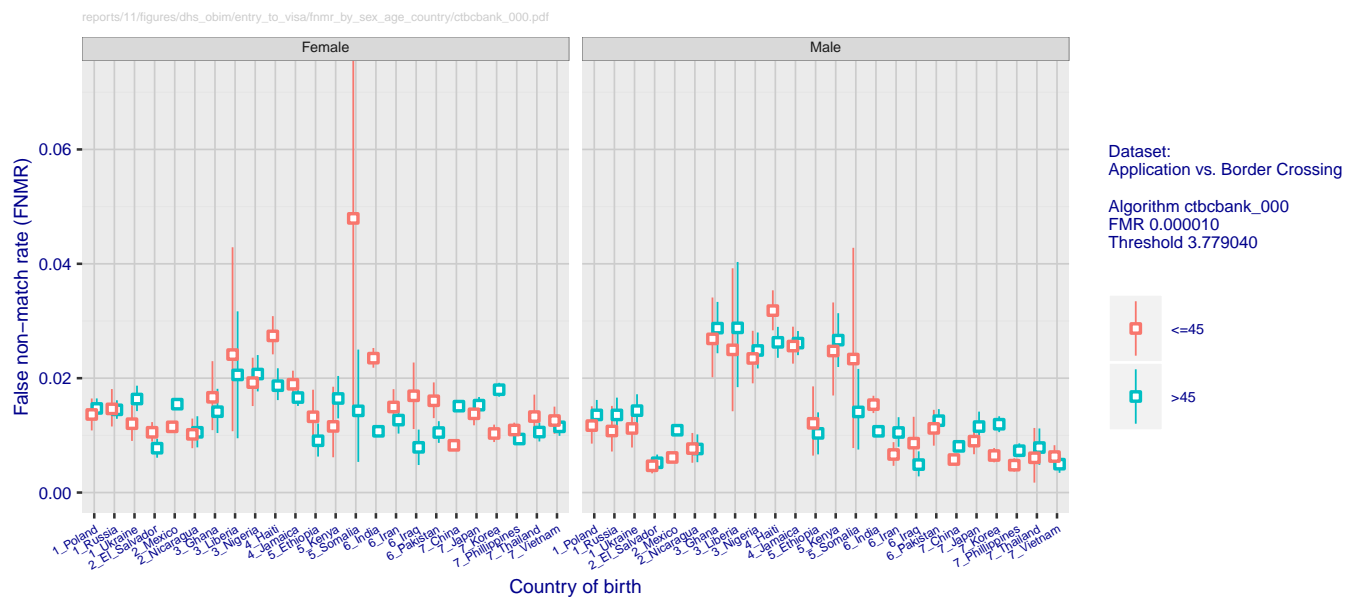


Figure 24: FNMR by sex, age and country of birth, ctcbank-000

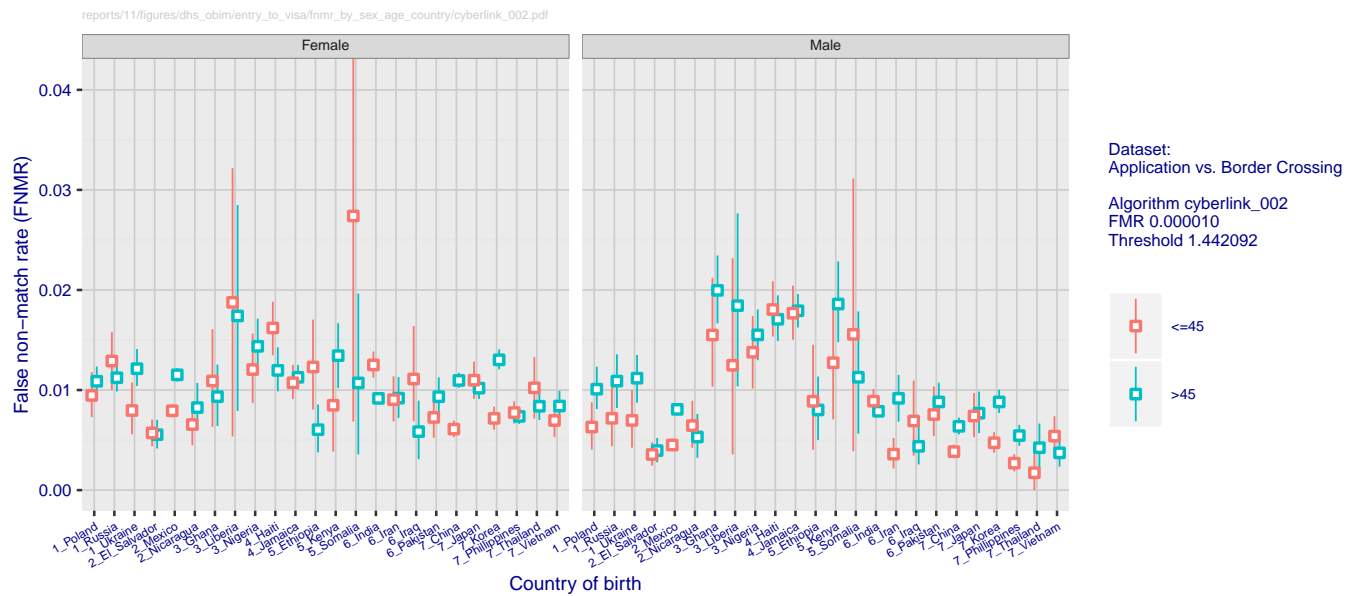


Figure 25: FNMR by sex, age and country of birth, cyberlink-002

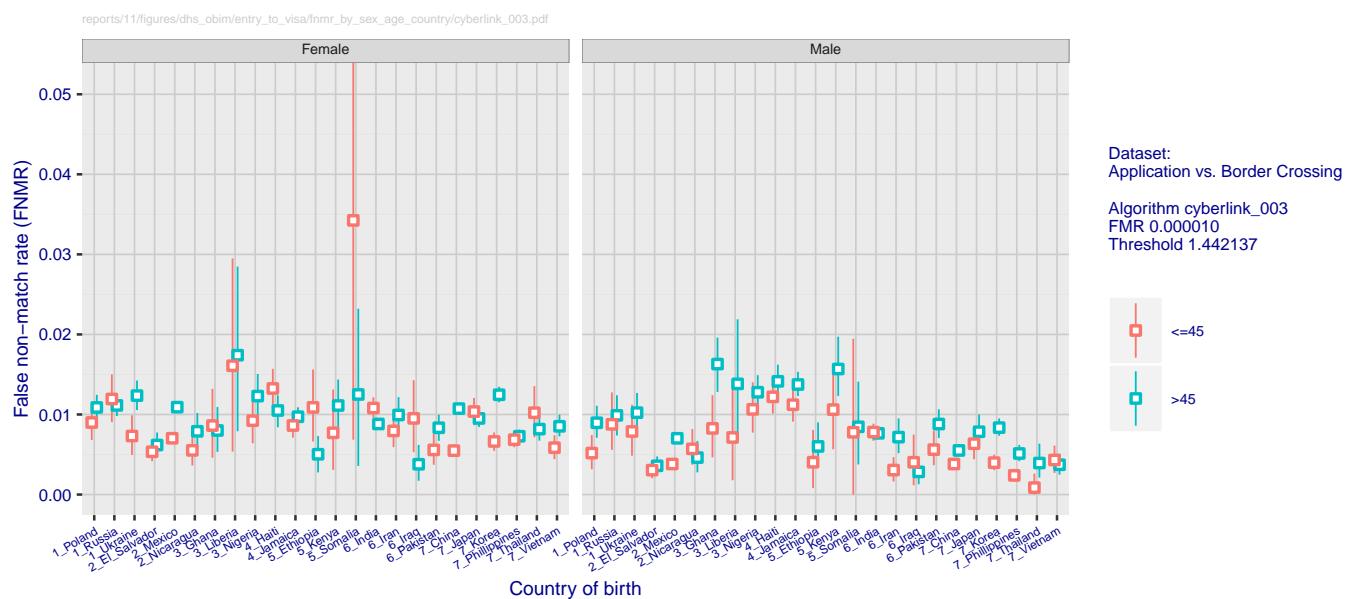


Figure 26: FNMR by sex, age and country of birth, cyberlink-003



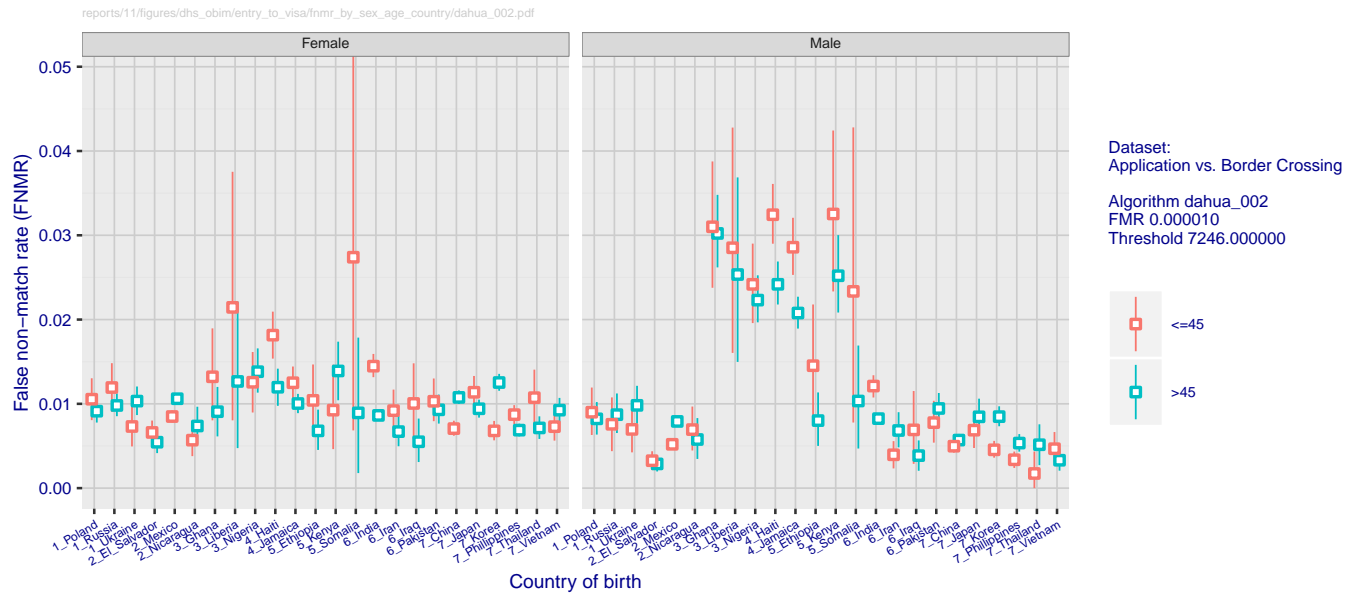


Figure 27: FNMR by sex, age and country of birth, dahua-002

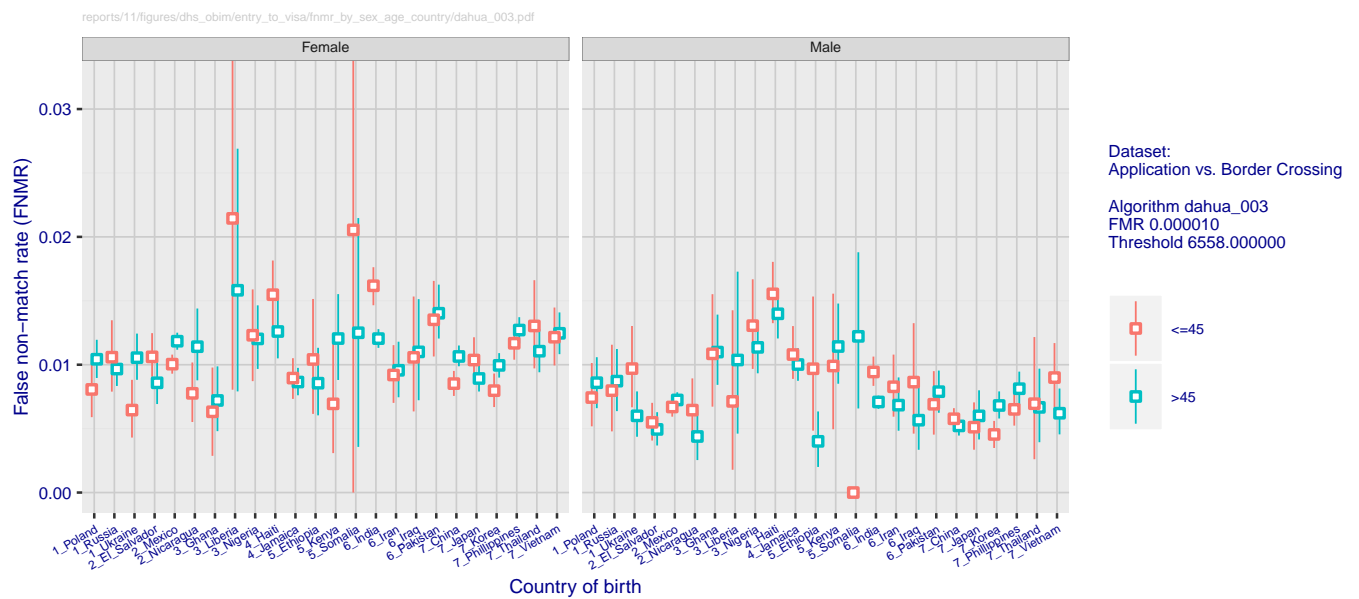


Figure 28: FNMR by sex, age and country of birth, dahua-003

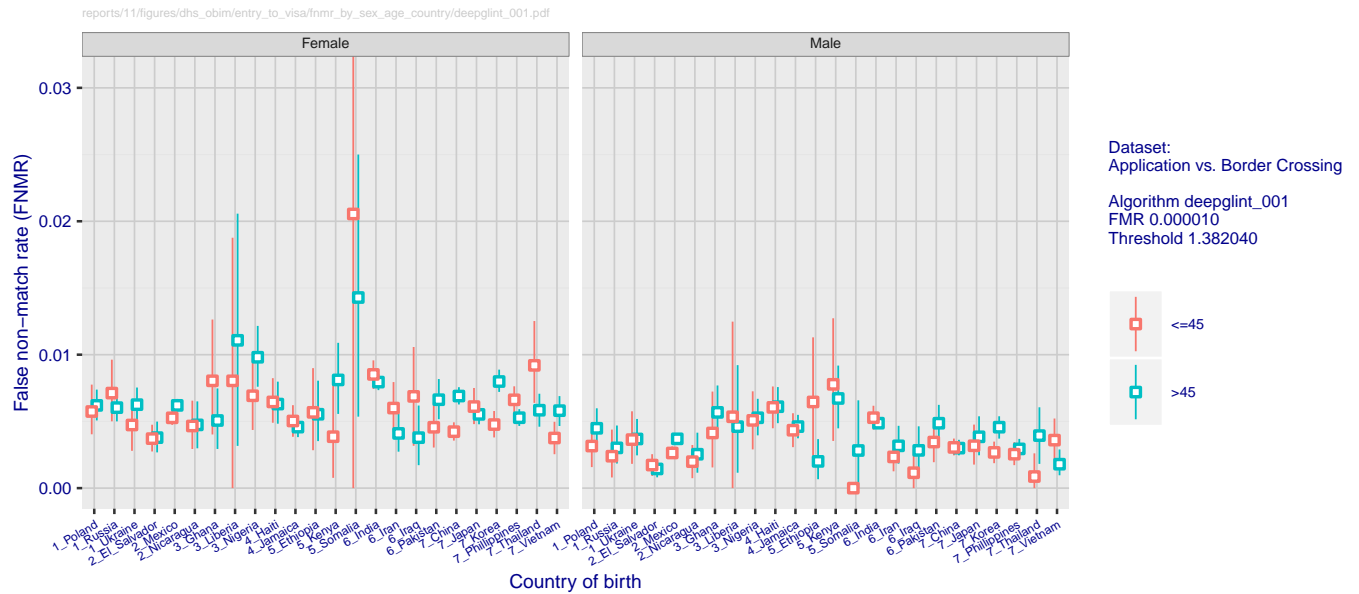


Figure 29: FNMR by sex, age and country of birth, deepglint-001

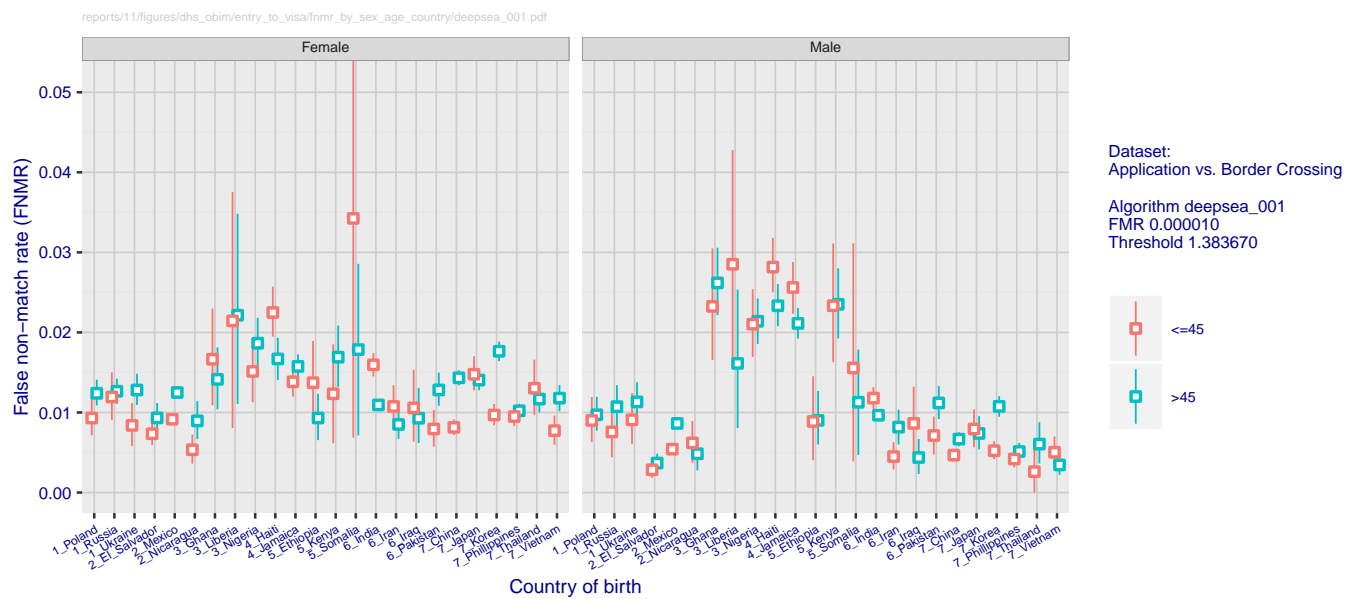


Figure 30: FNMR by sex, age and country of birth, deepsea-001

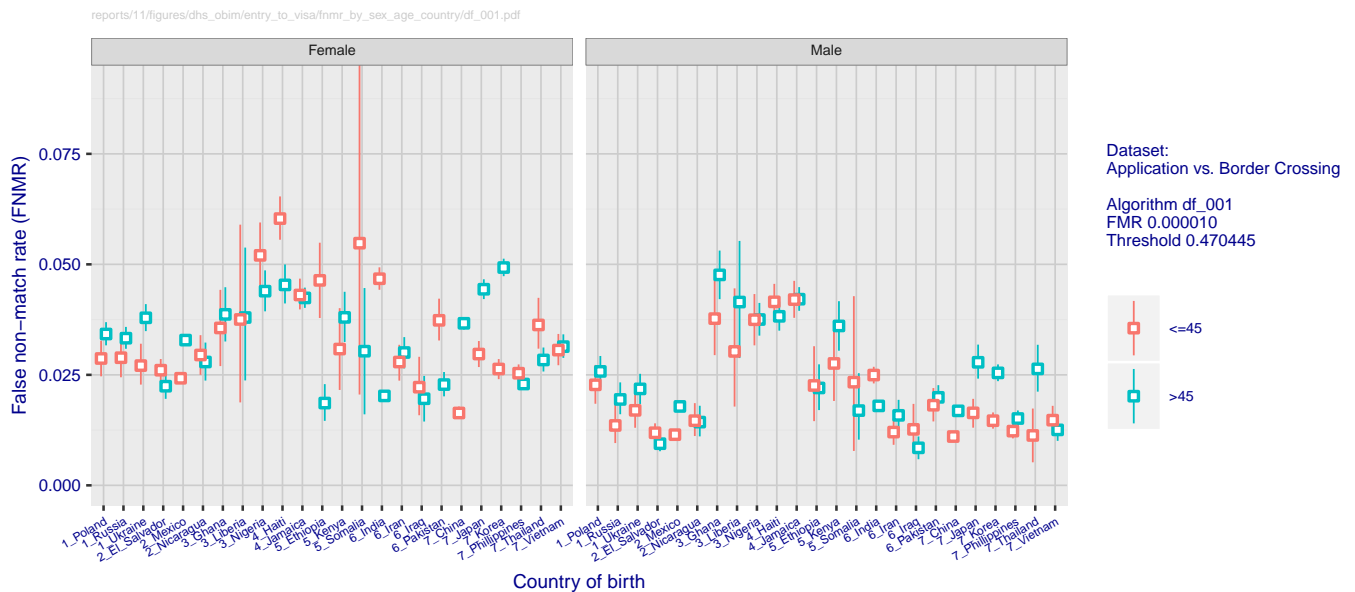


Figure 31: FNMR by sex, age and country of birth, df-001

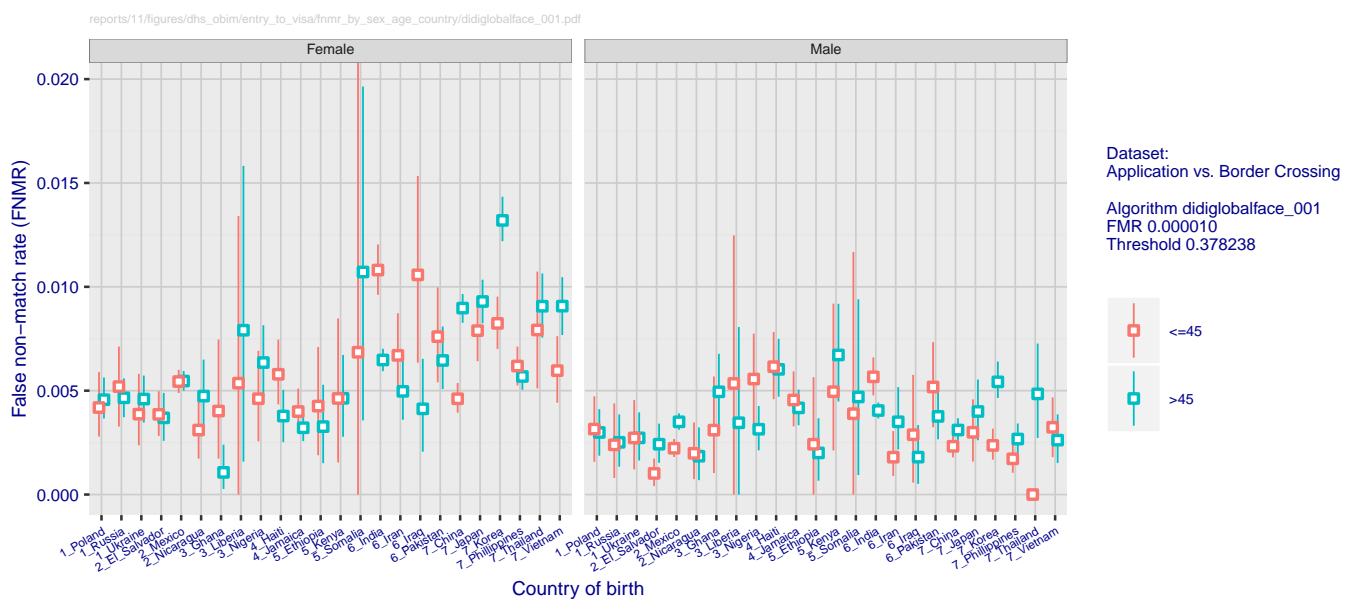


Figure 32: FNMR by sex, age and country of birth, didiglobalface-001

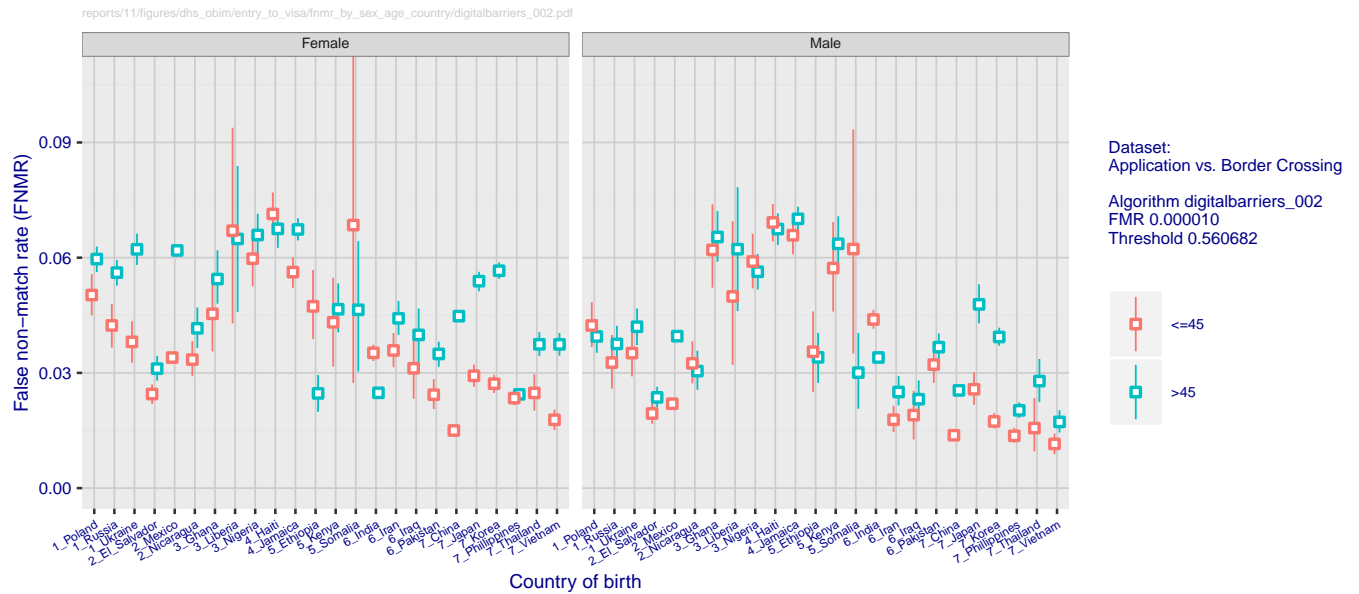


Figure 33: FNMR by sex, age and country of birth, digitalbarriers-002

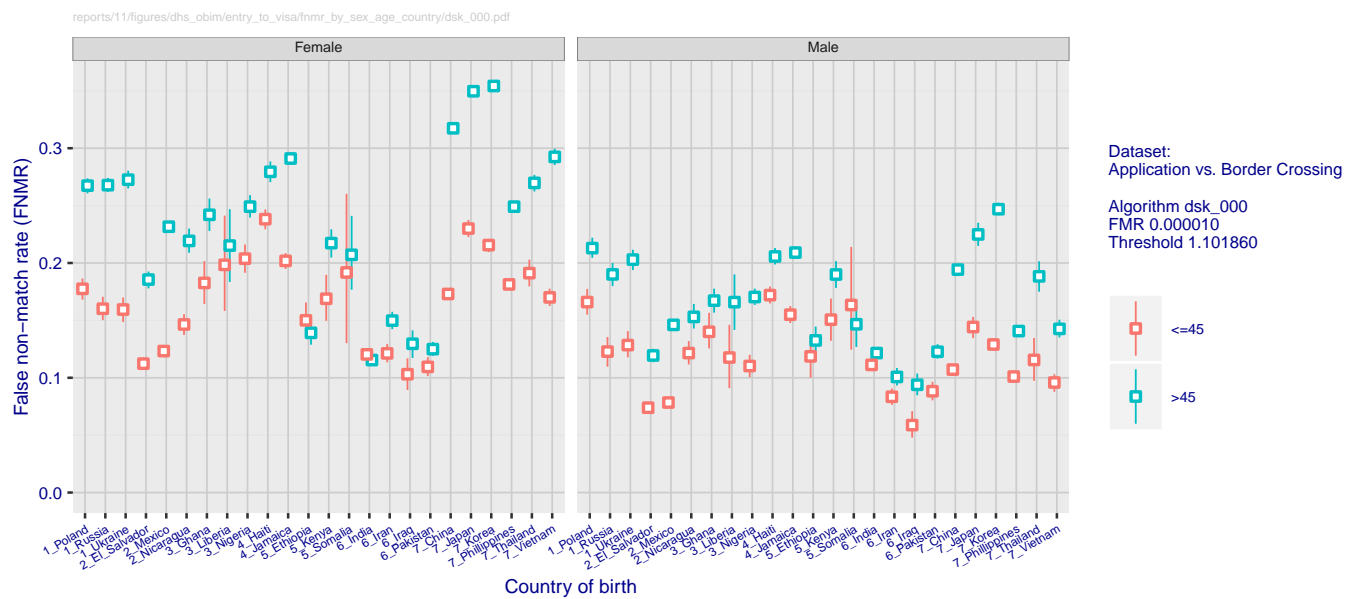


Figure 34: FNMR by sex, age and country of birth, dsk-000

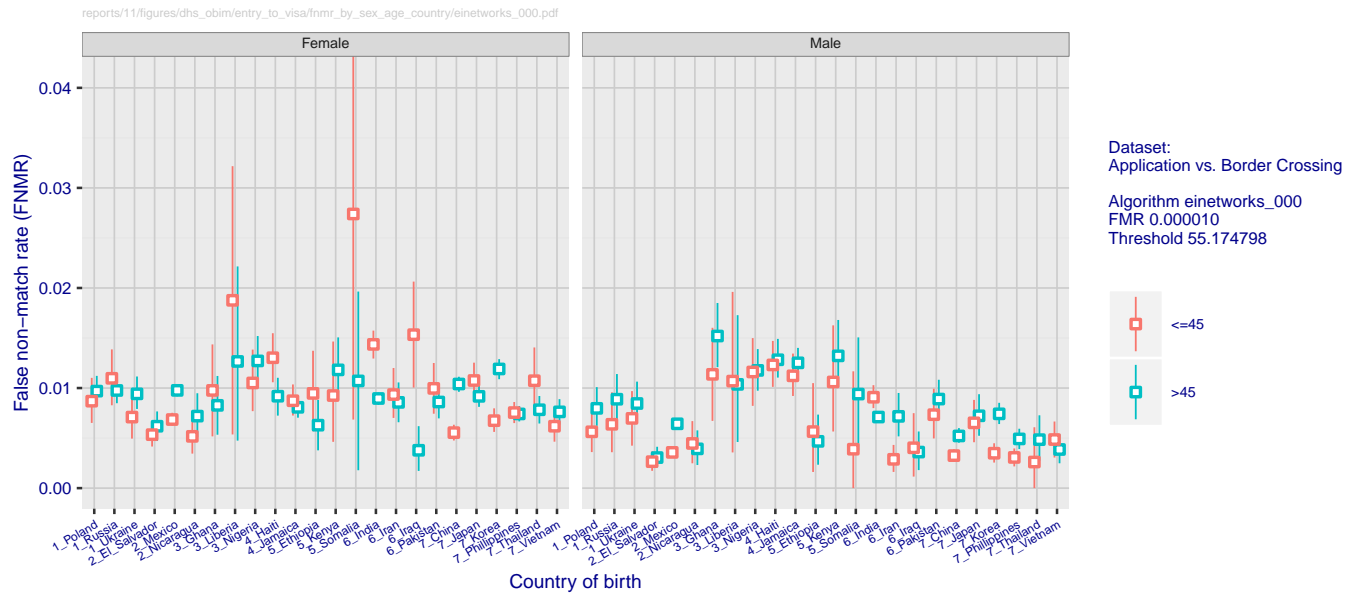


Figure 35: FNMR by sex, age and country of birth, einetworks-000

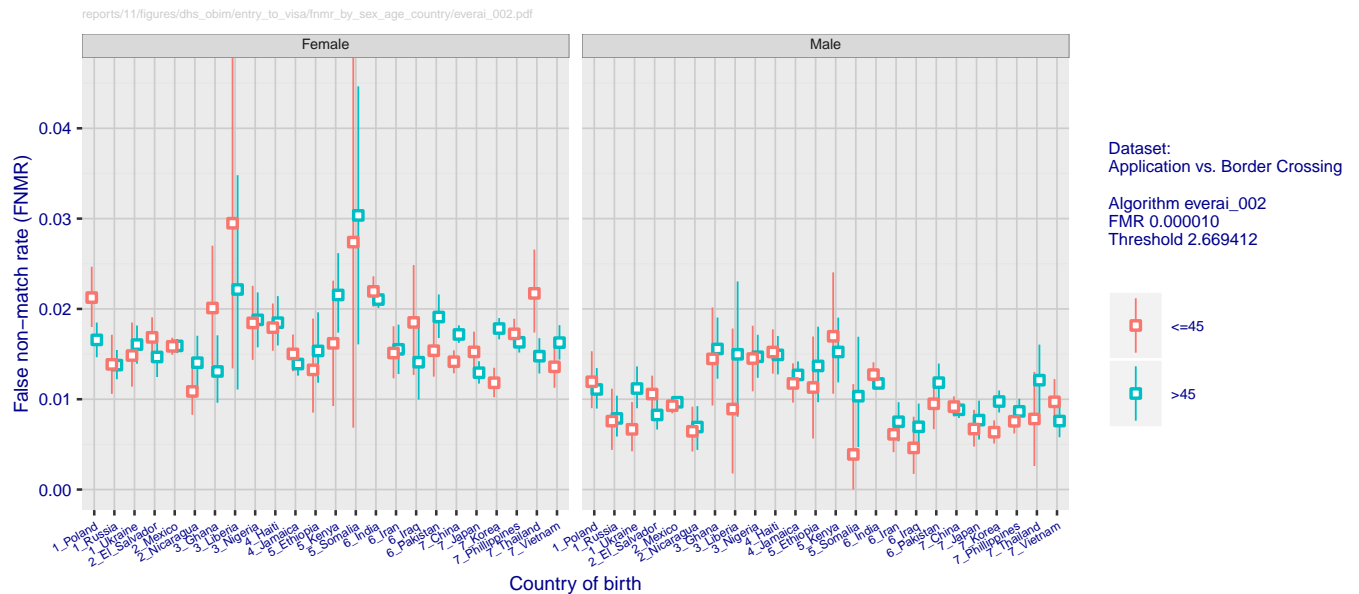


Figure 36: FNMR by sex, age and country of birth, everai-002

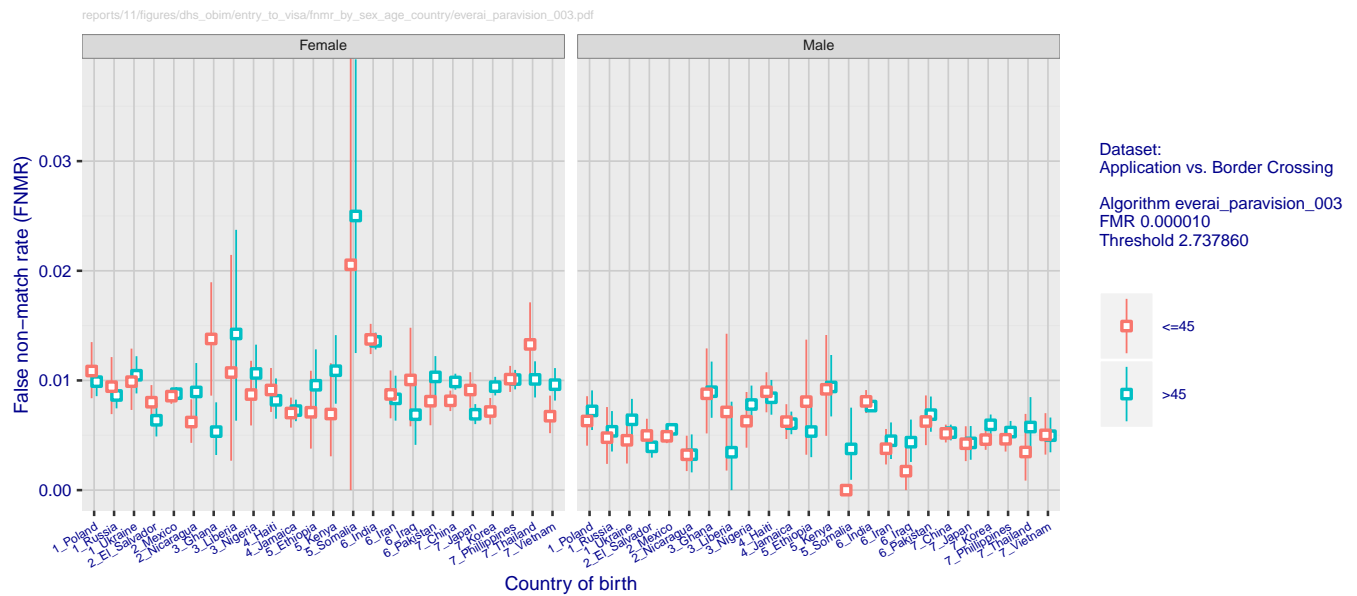


Figure 37: FNMR by sex, age and country of birth, everai-paravision-003

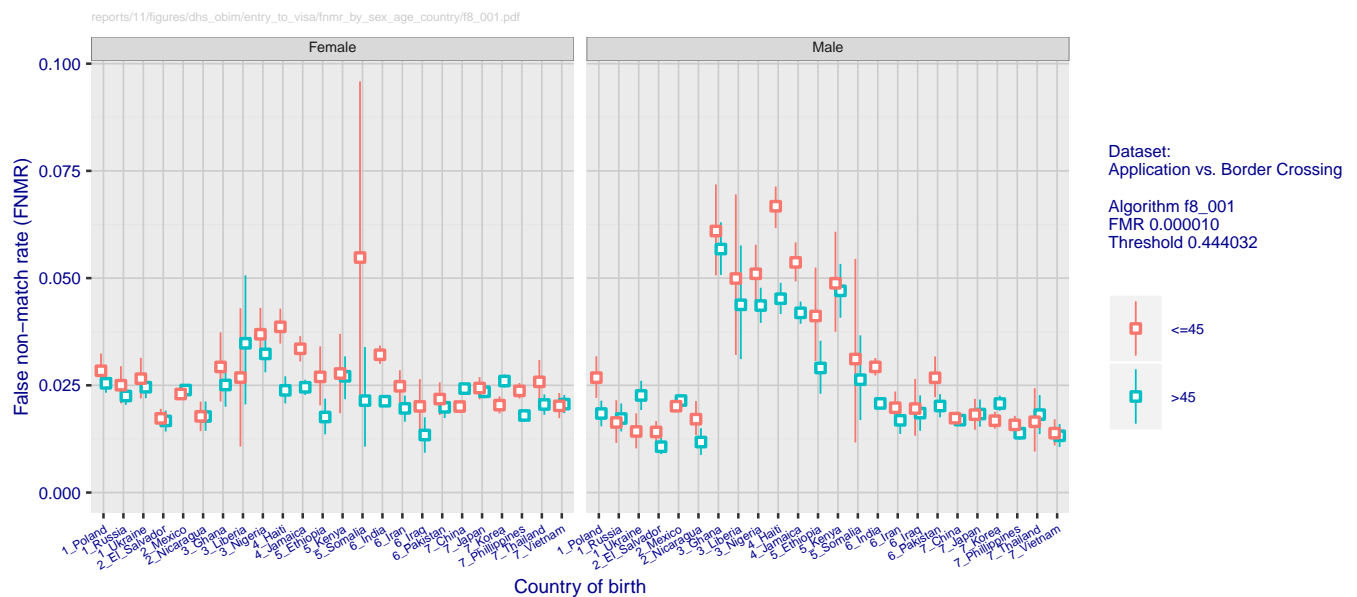


Figure 38: FNMR by sex, age and country of birth, f8-001

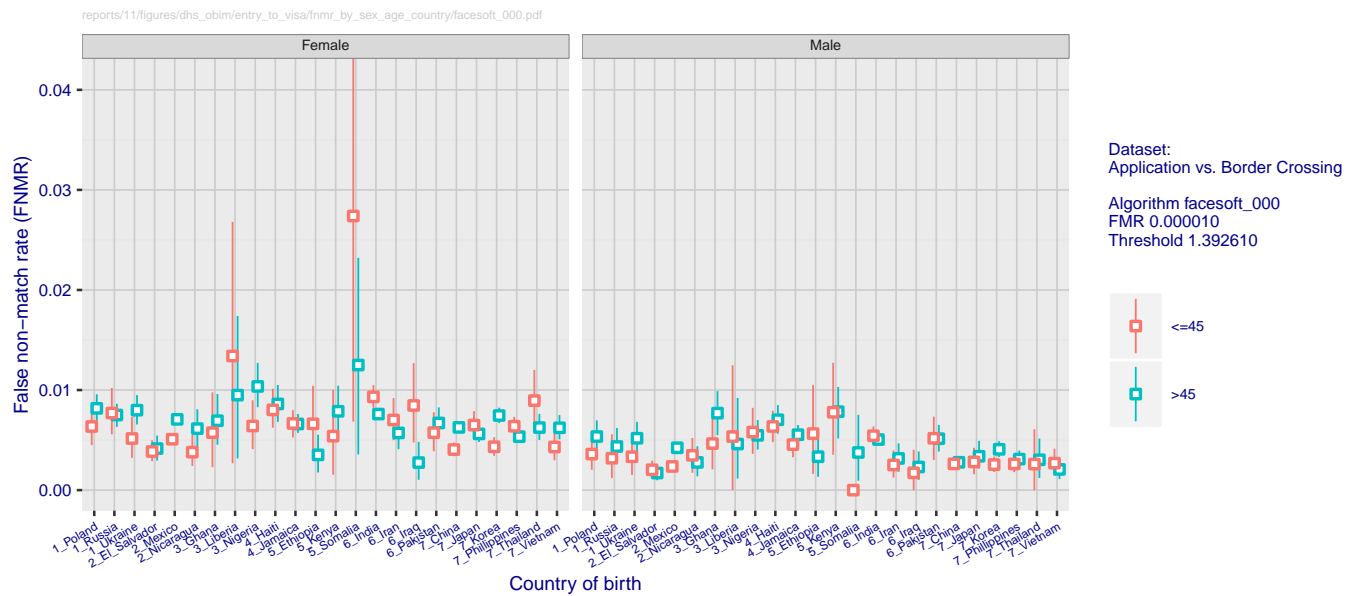


Figure 39: FNMR by sex, age and country of birth, facesoft-000

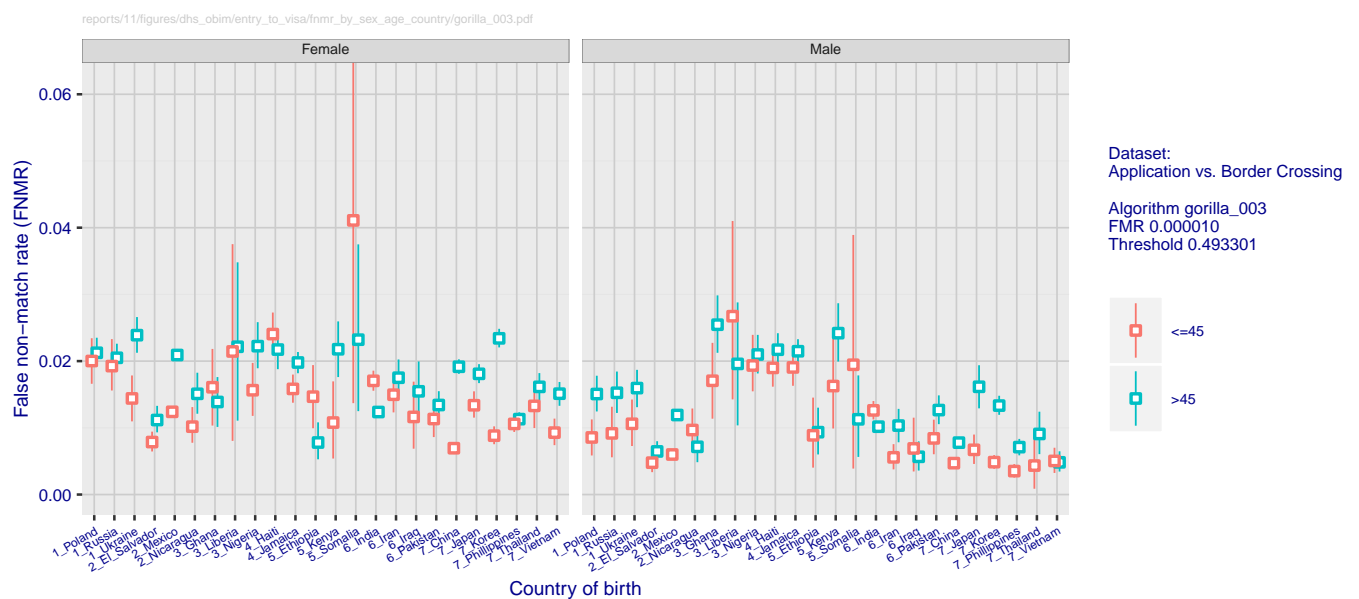


Figure 40: FNMR by sex, age and country of birth, gorilla-003

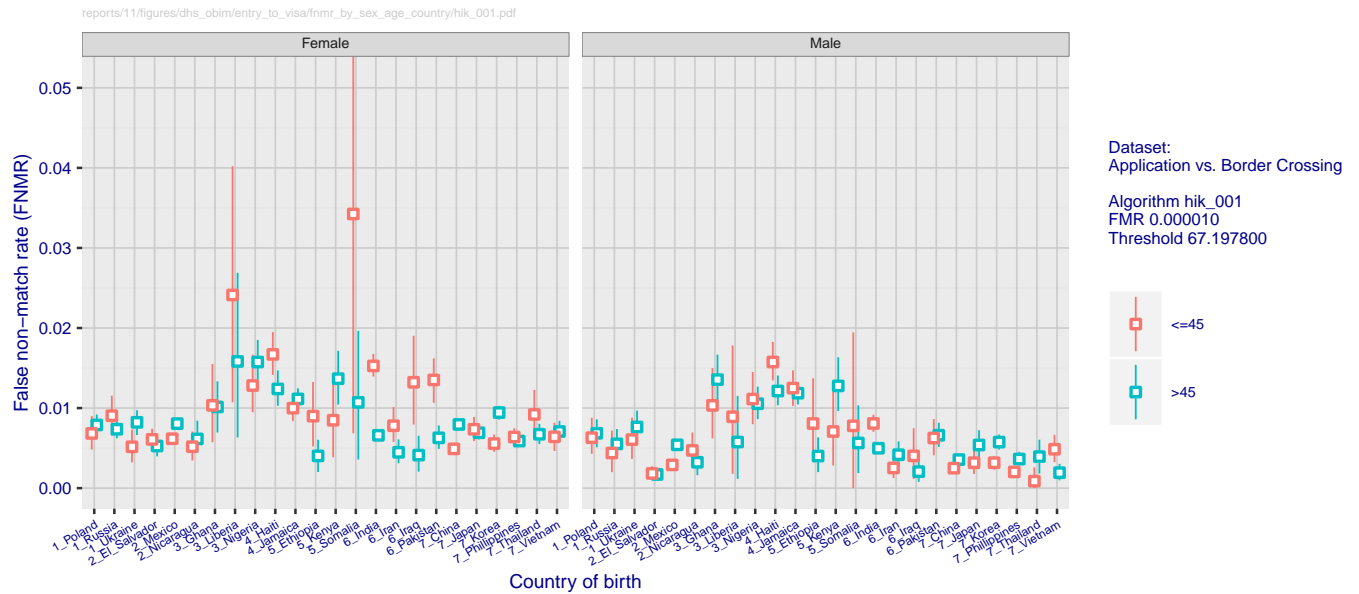


Figure 41: FNMR by sex, age and country of birth, hik-001

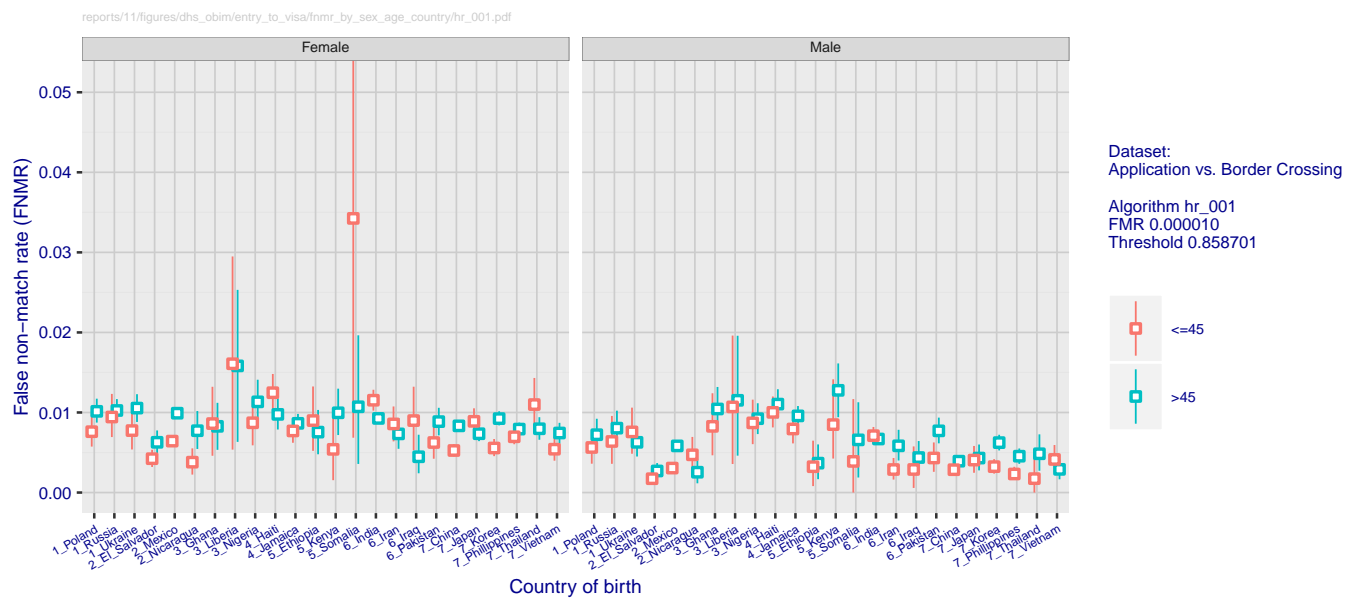


Figure 42: FNMR by sex, age and country of birth, hr-001



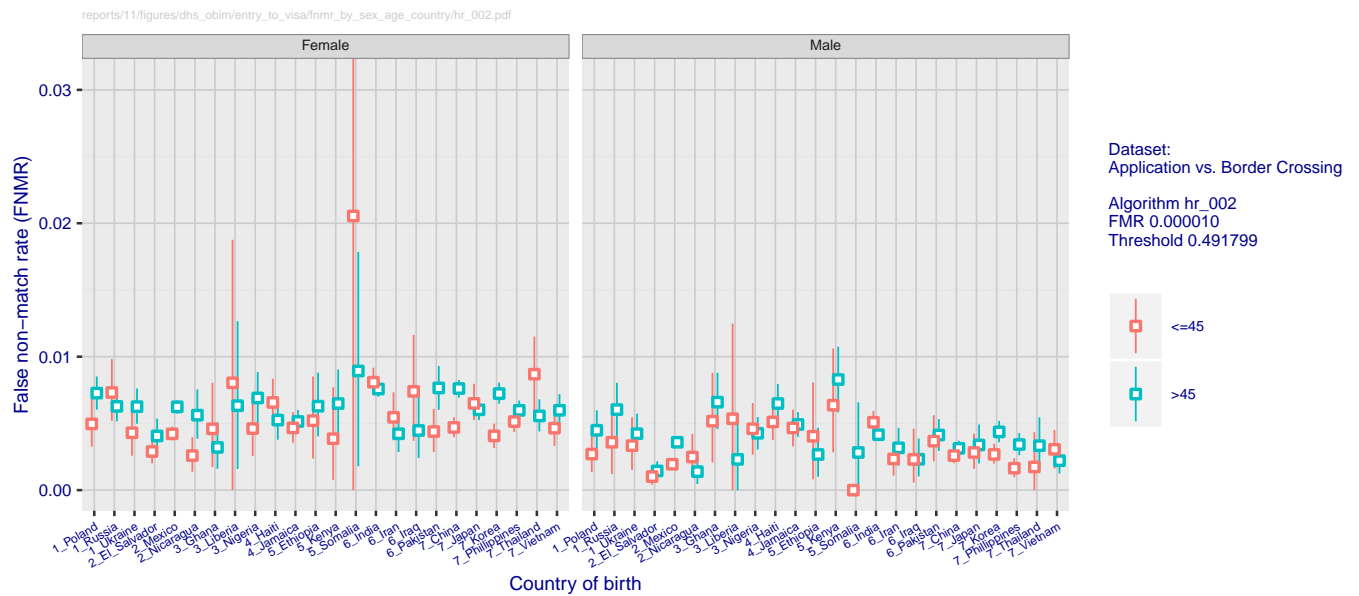


Figure 43: FNMR by sex, age and country of birth, hr-002

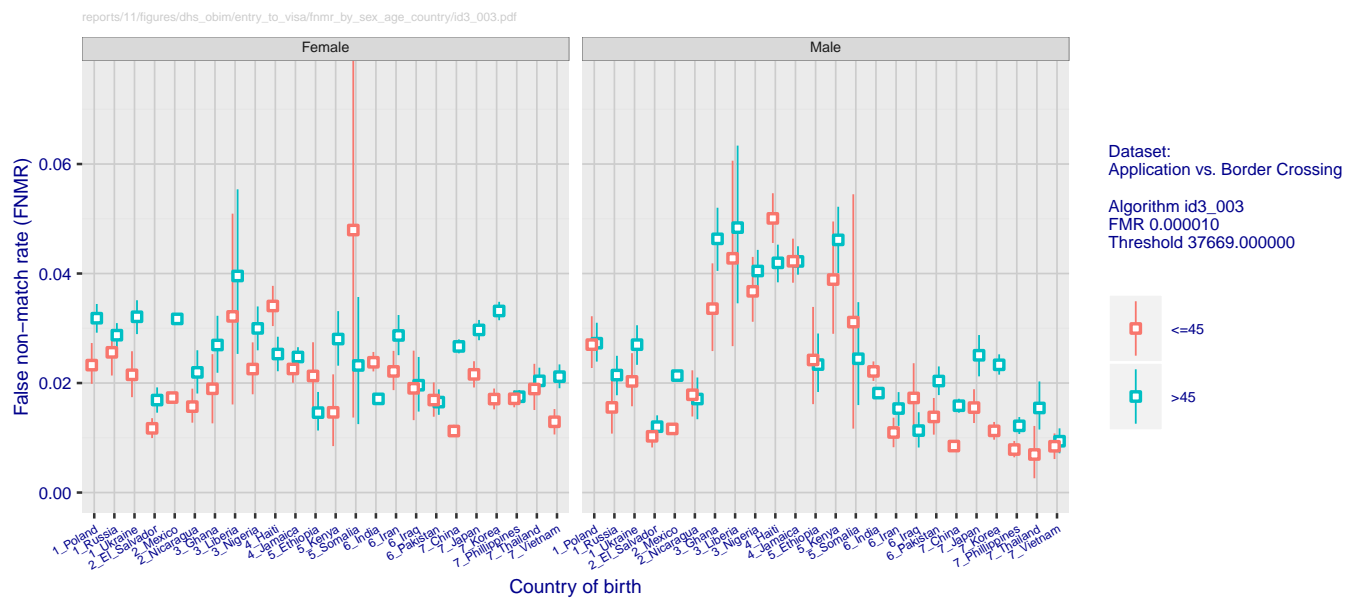


Figure 44: FNMR by sex, age and country of birth, id3-003

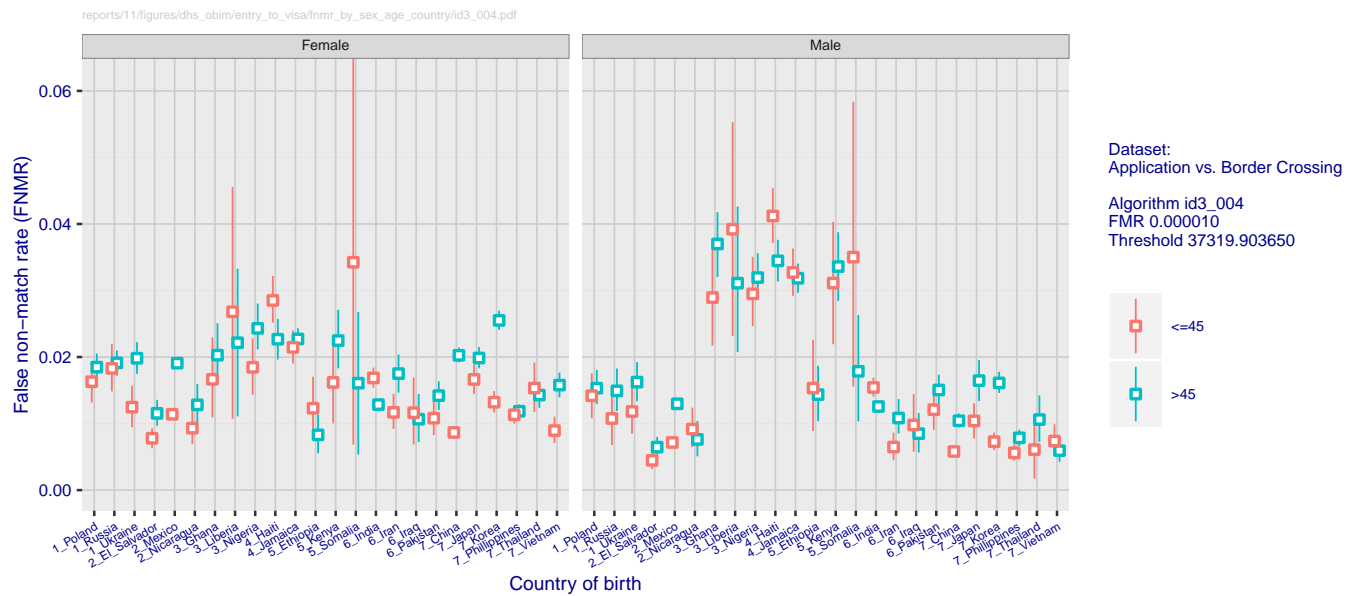


Figure 45: FNMR by sex, age and country of birth, id3-004

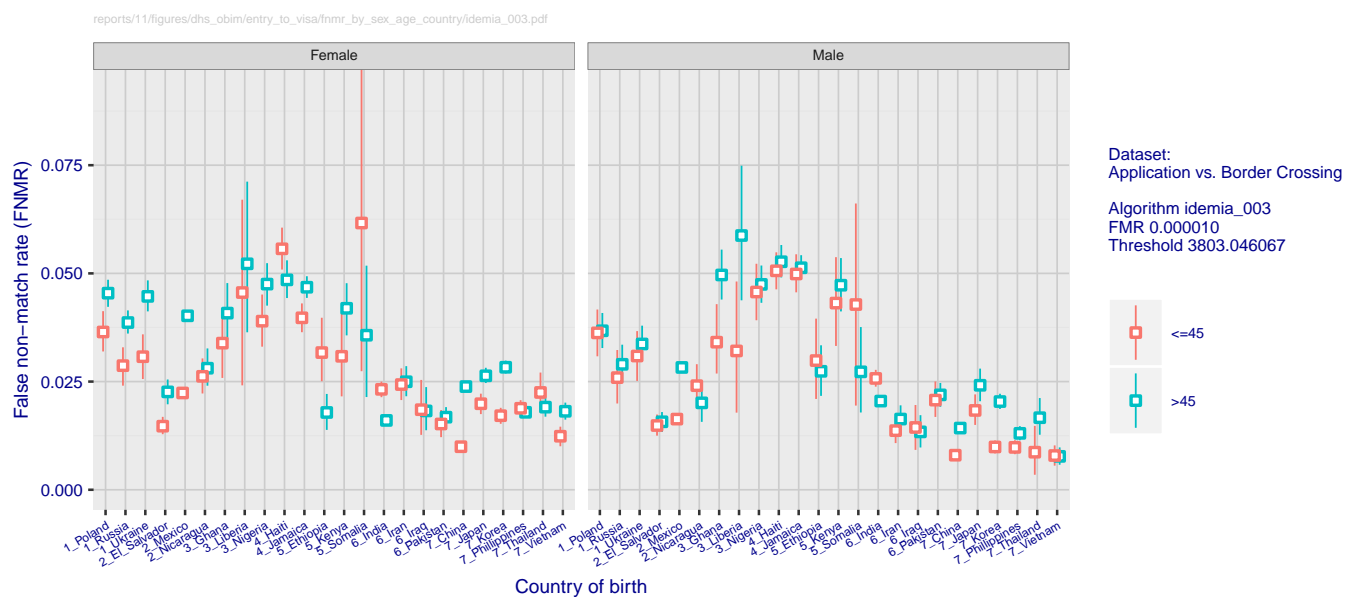


Figure 46: FNMR by sex, age and country of birth, idemia-003

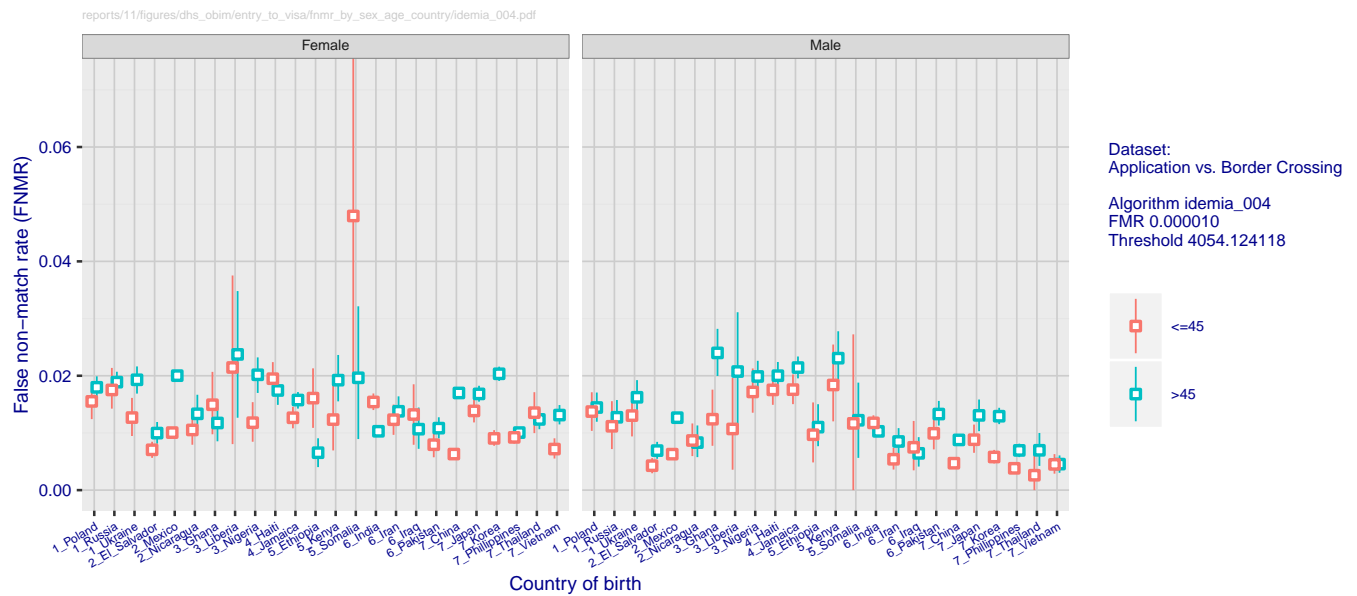


Figure 47: FNMR by sex, age and country of birth, idemia-004

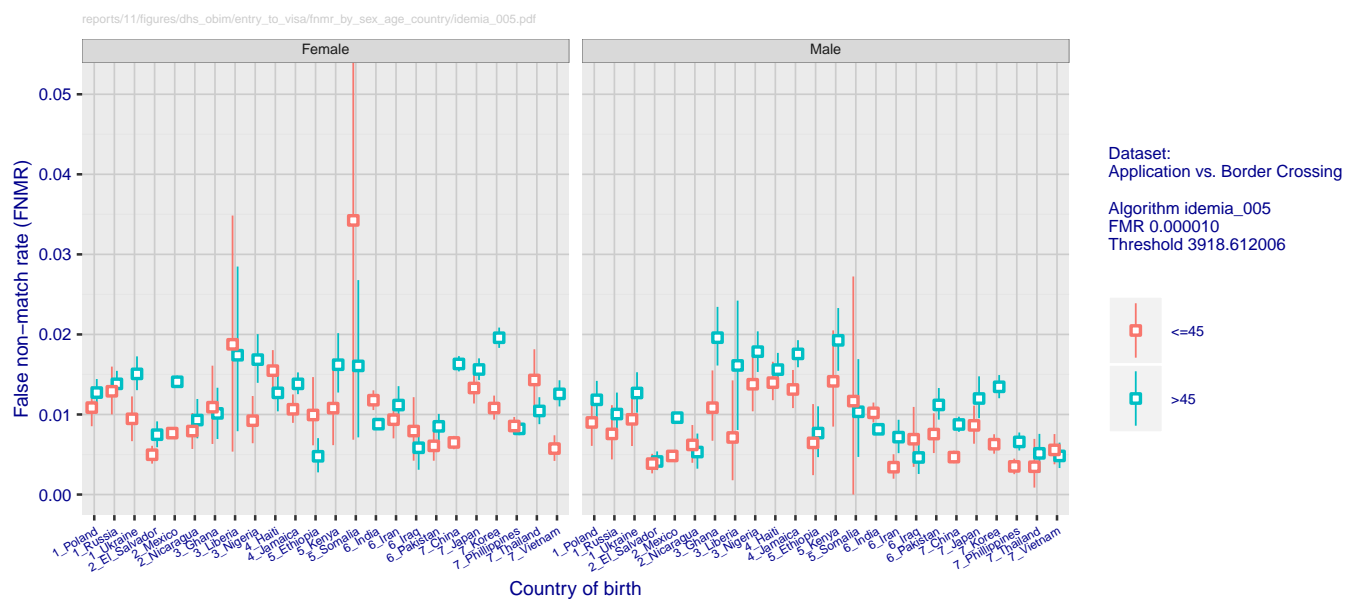


Figure 48: FNMR by sex, age and country of birth, idemia-005

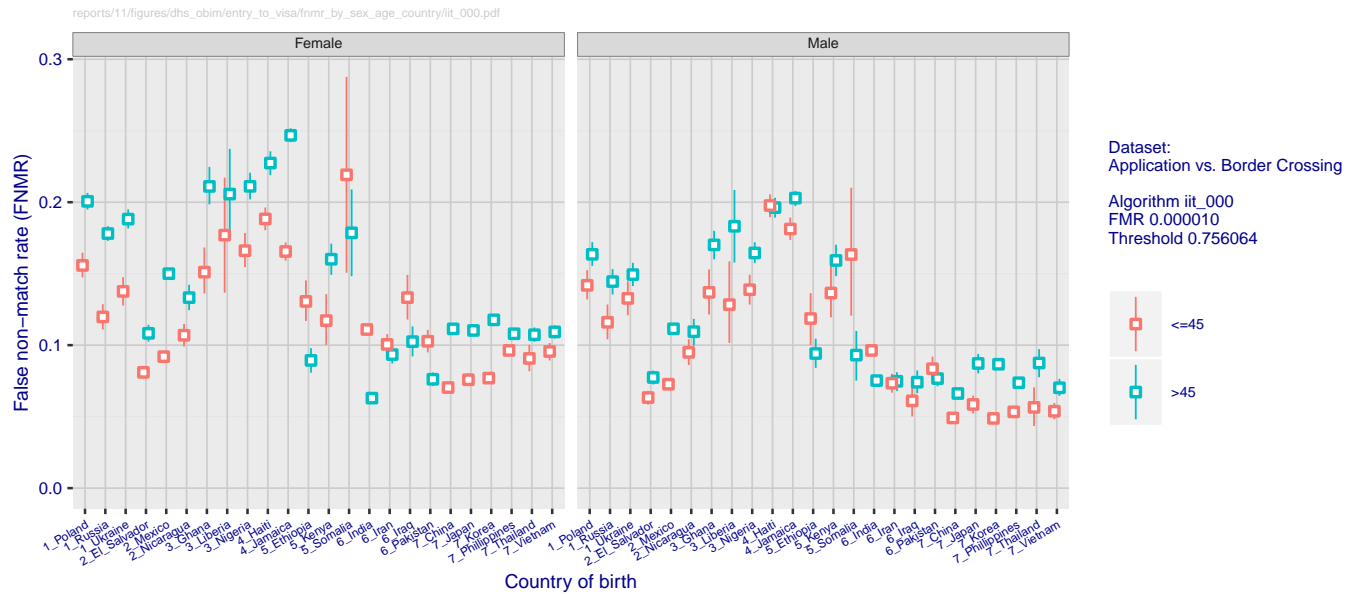


Figure 49: FNMR by sex, age and country of birth, iit-000

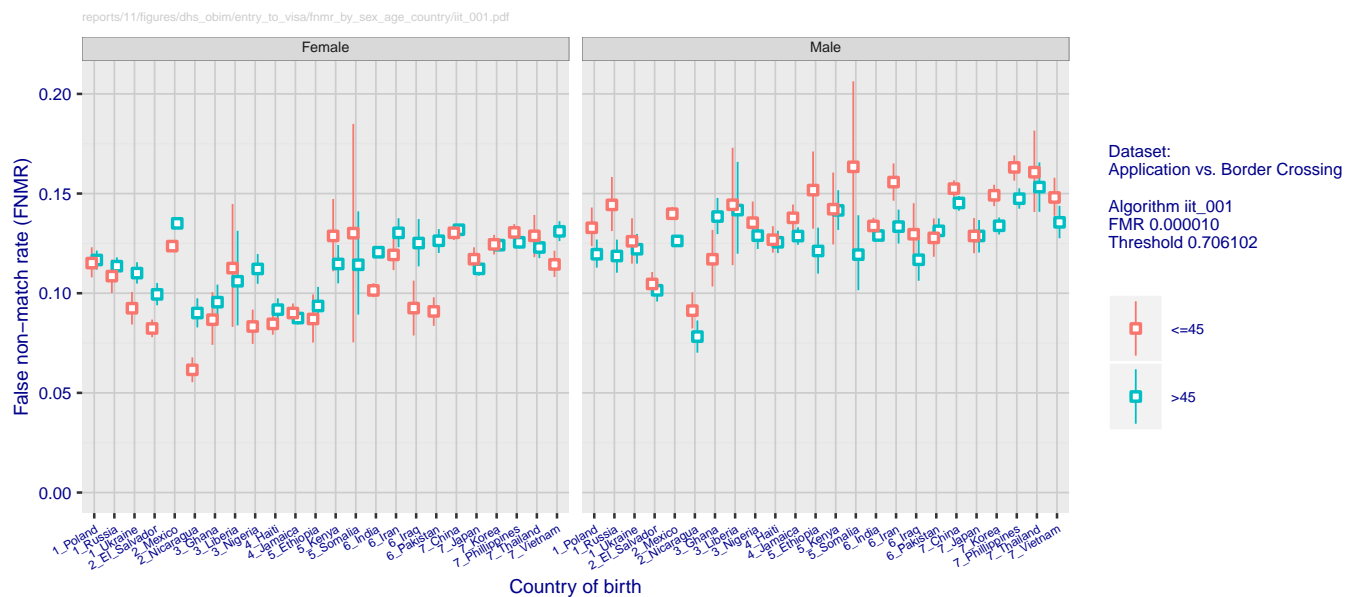


Figure 50: FNMR by sex, age and country of birth, iit-001

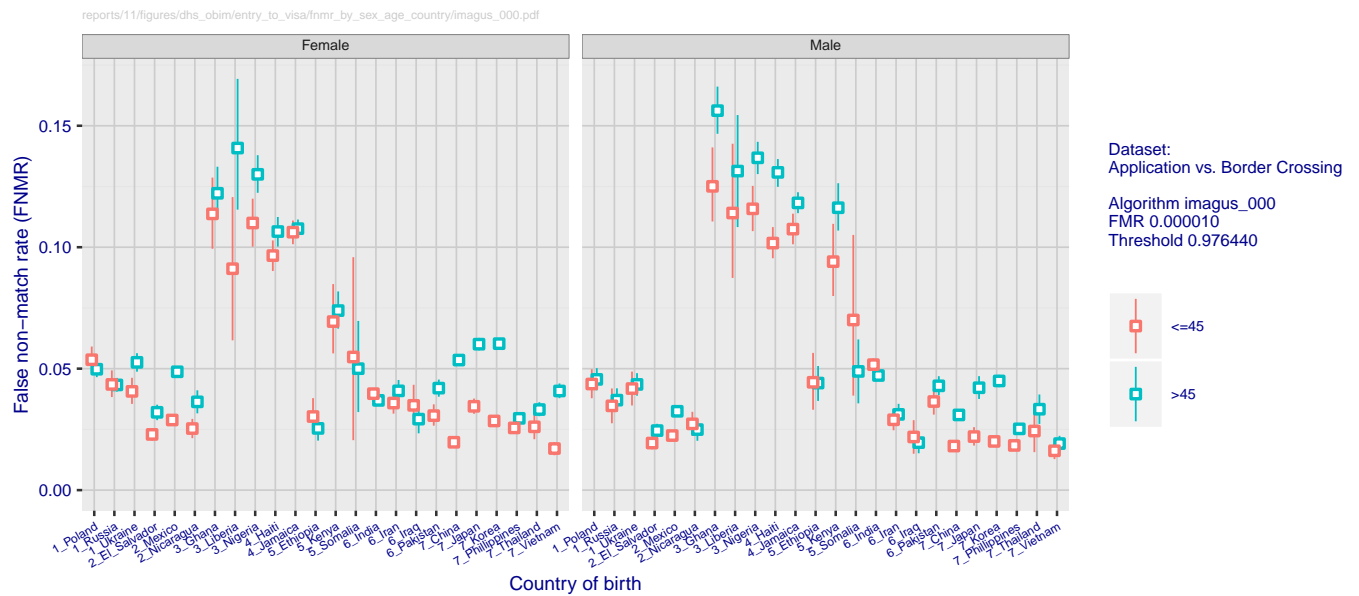


Figure 51: FNMR by sex, age and country of birth, imagus-000

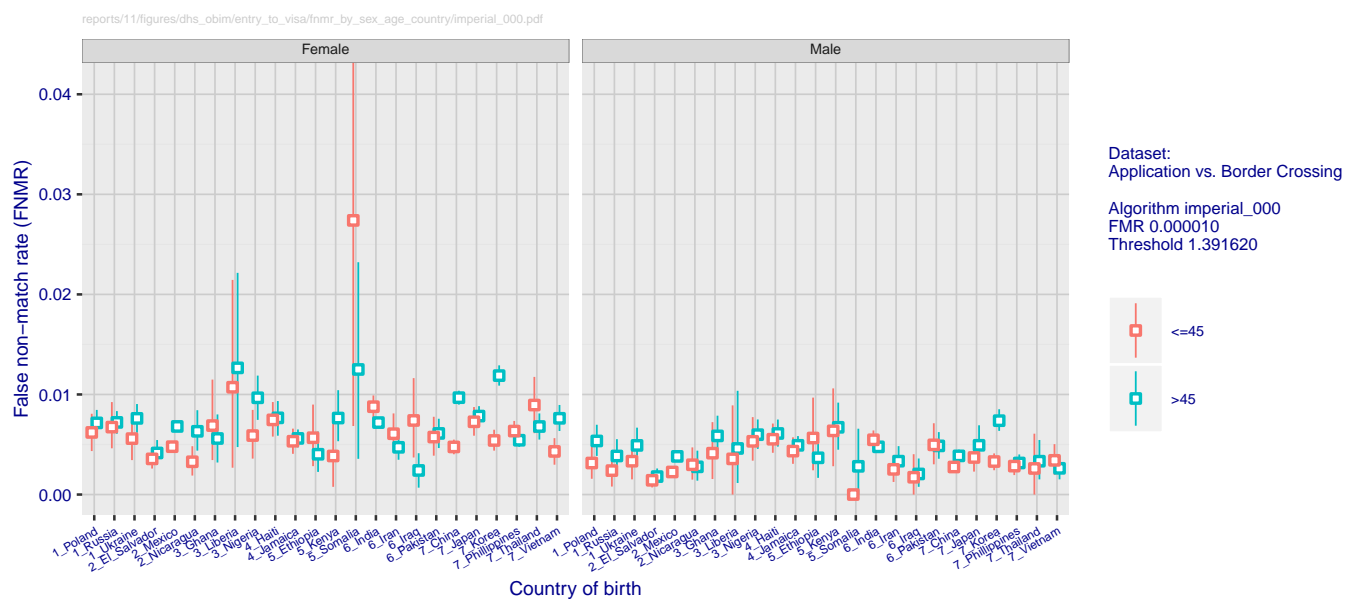


Figure 52: FNMR by sex, age and country of birth, imperial-000

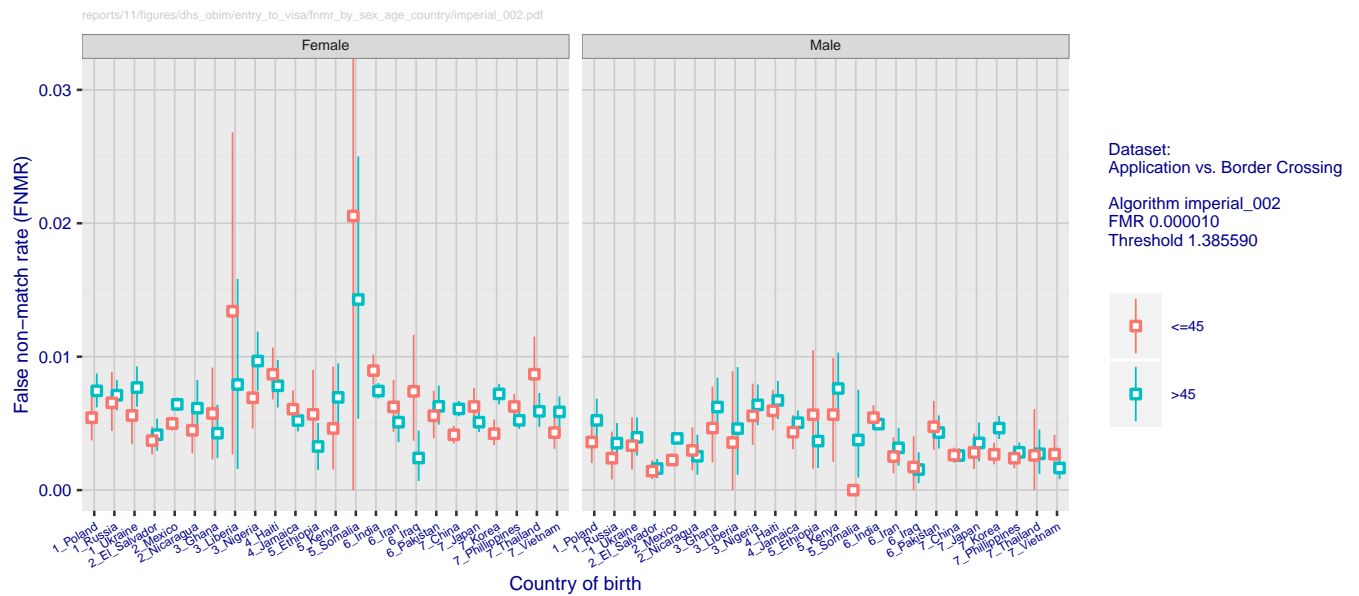


Figure 53: FNMR by sex, age and country of birth, imperial-002

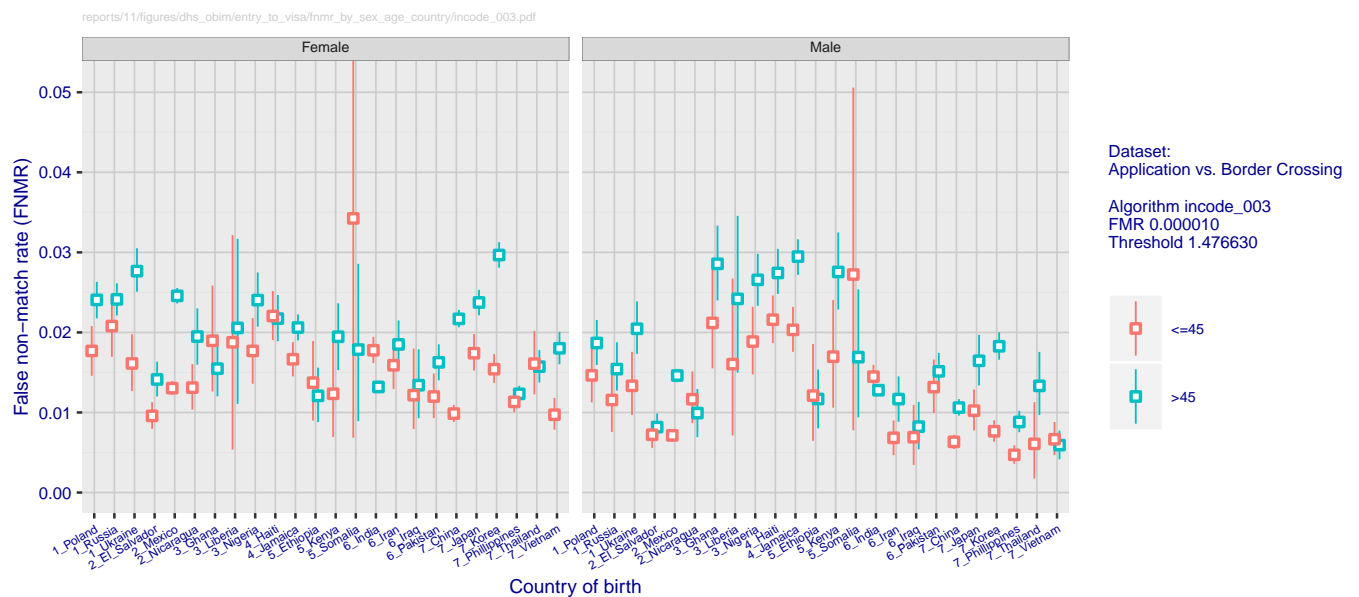


Figure 54: FNMR by sex, age and country of birth, incode-003

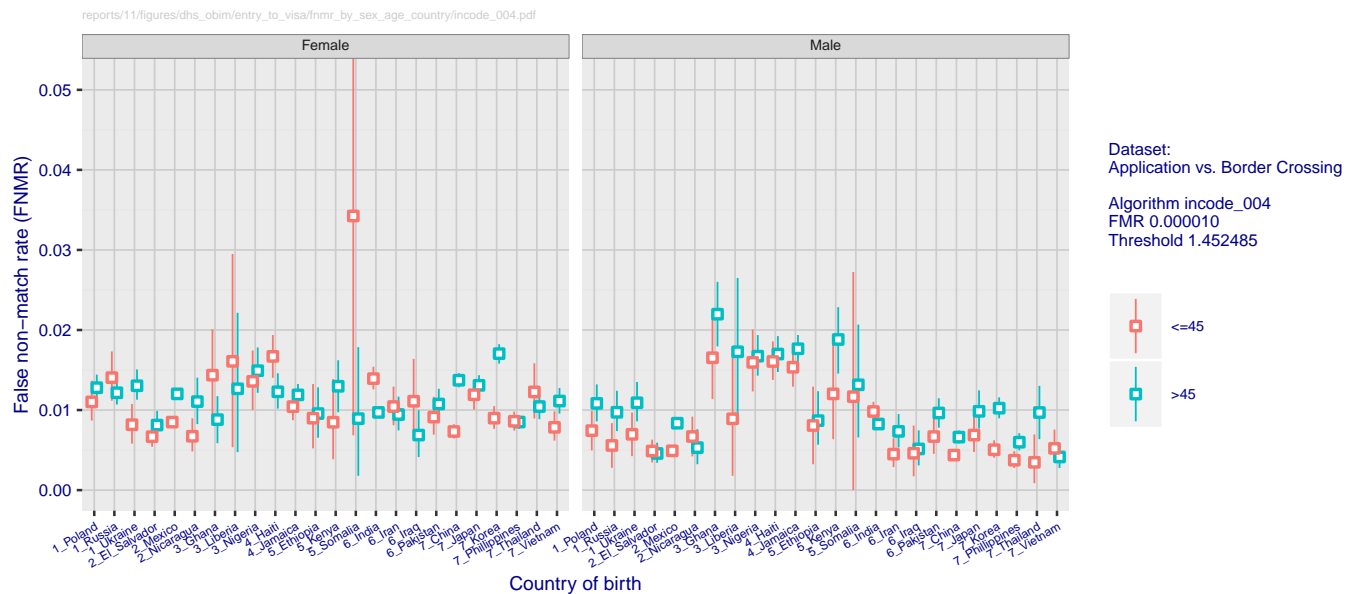


Figure 55: FNMR by sex, age and country of birth, incode-004

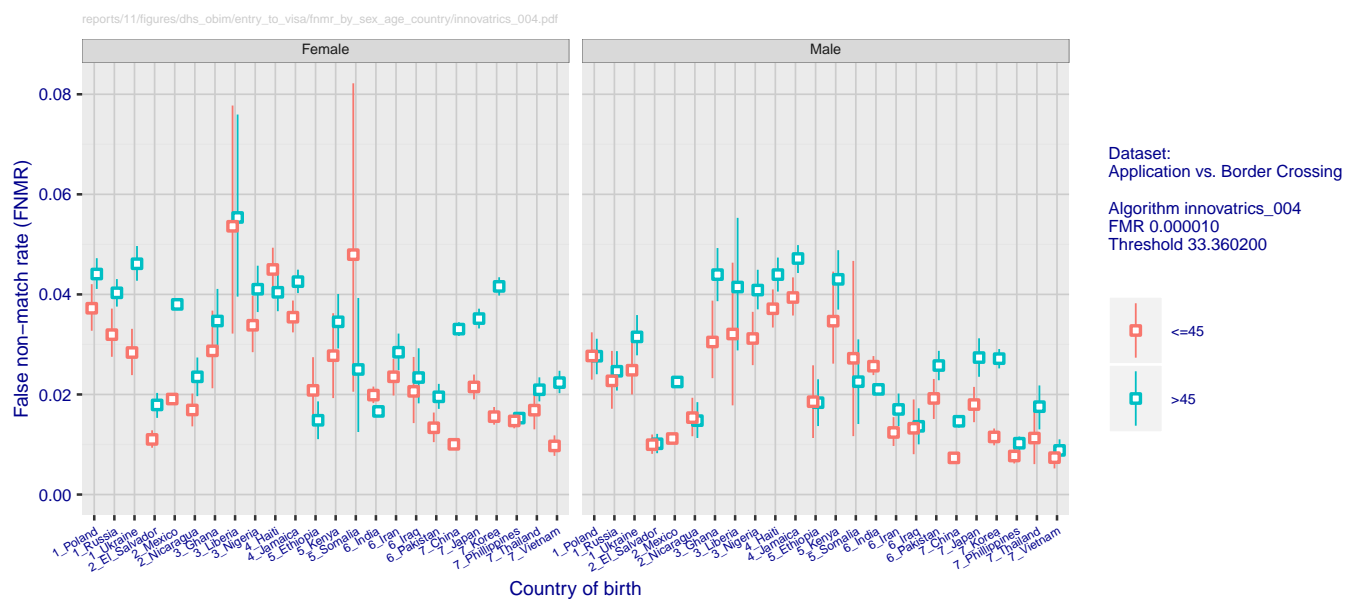


Figure 56: FNMR by sex, age and country of birth, innovatrics-004

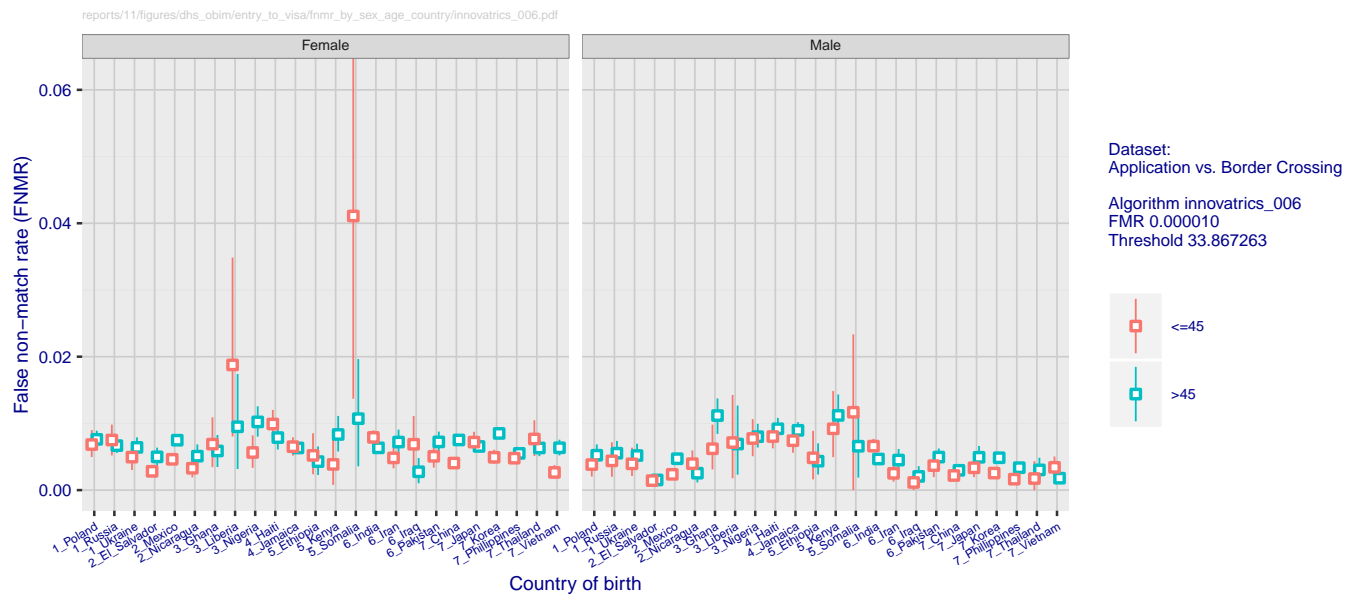


Figure 57: FNMR by sex, age and country of birth, innovatrics-006

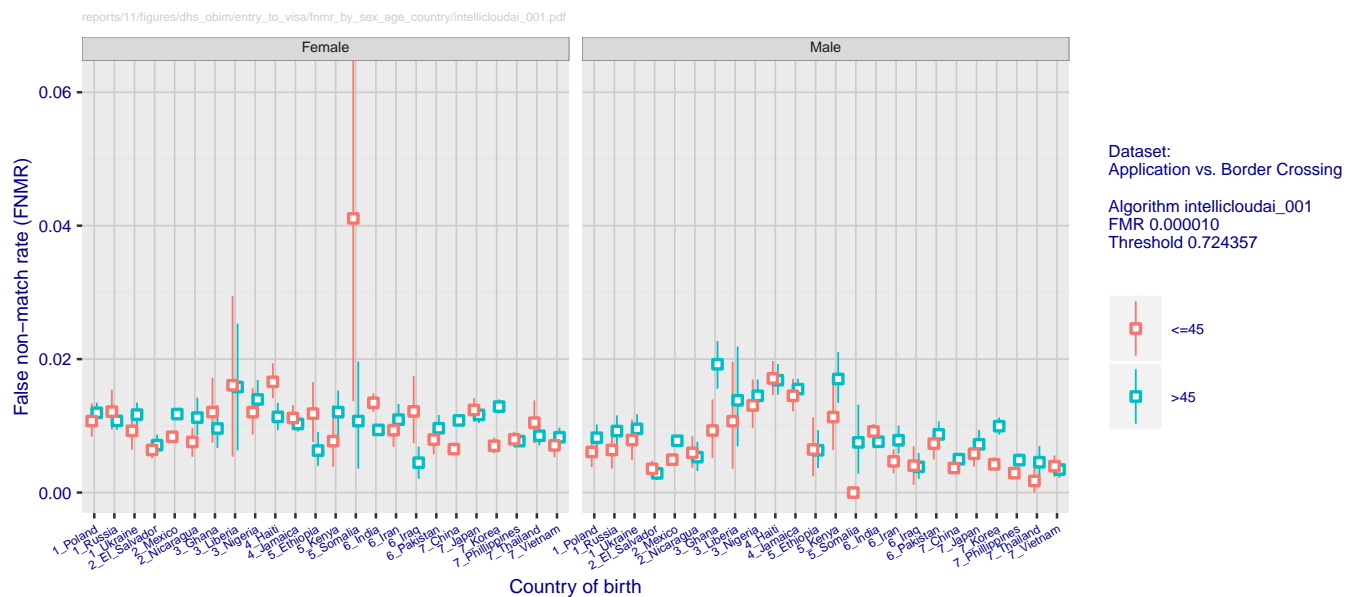


Figure 58: FNMR by sex, age and country of birth, intellicloudai-001



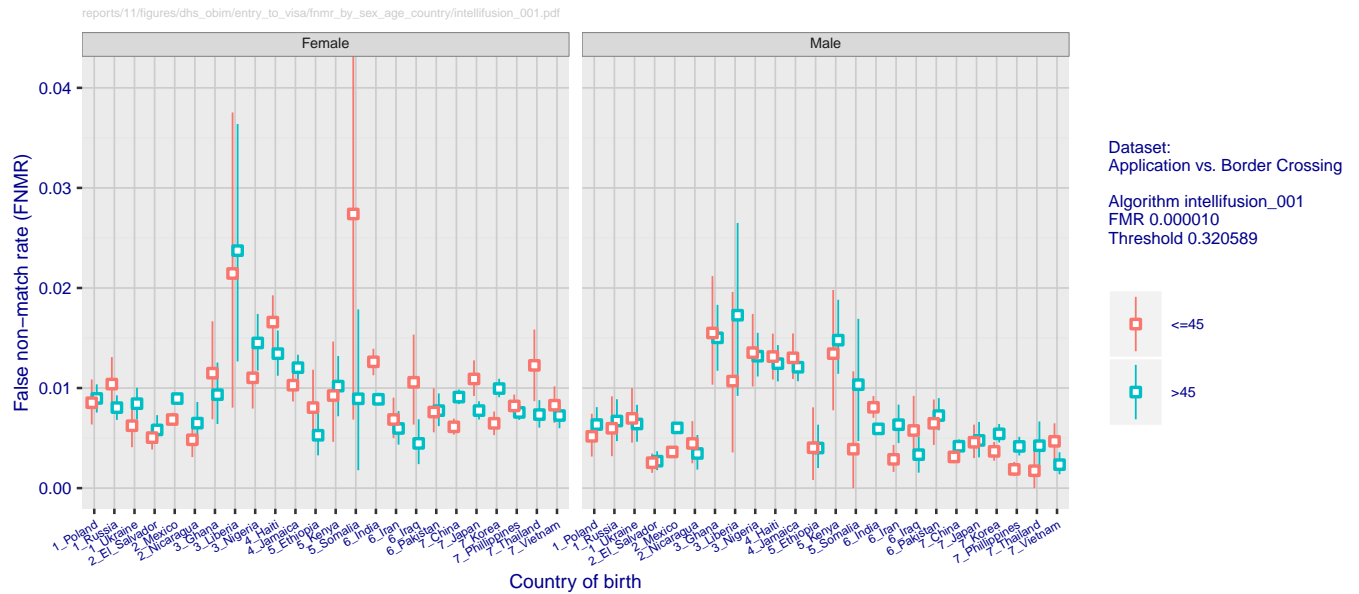


Figure 59: FNMR by sex, age and country of birth, intellifusion-001

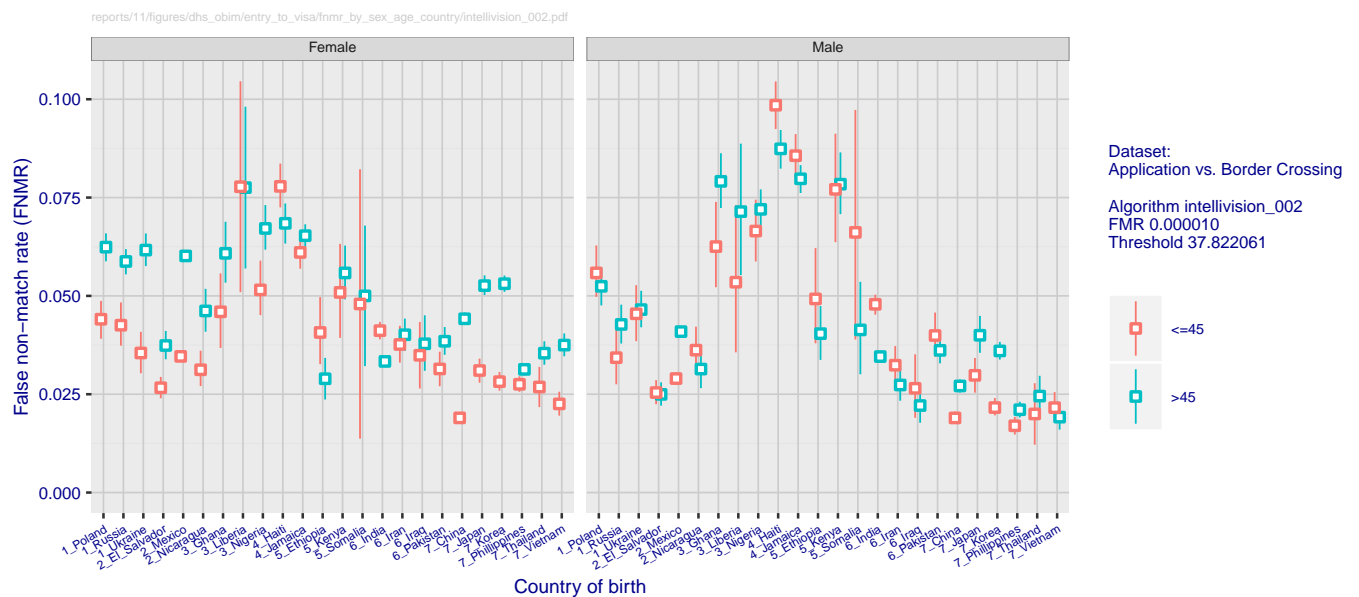


Figure 60: FNMR by sex, age and country of birth, intellivision-002

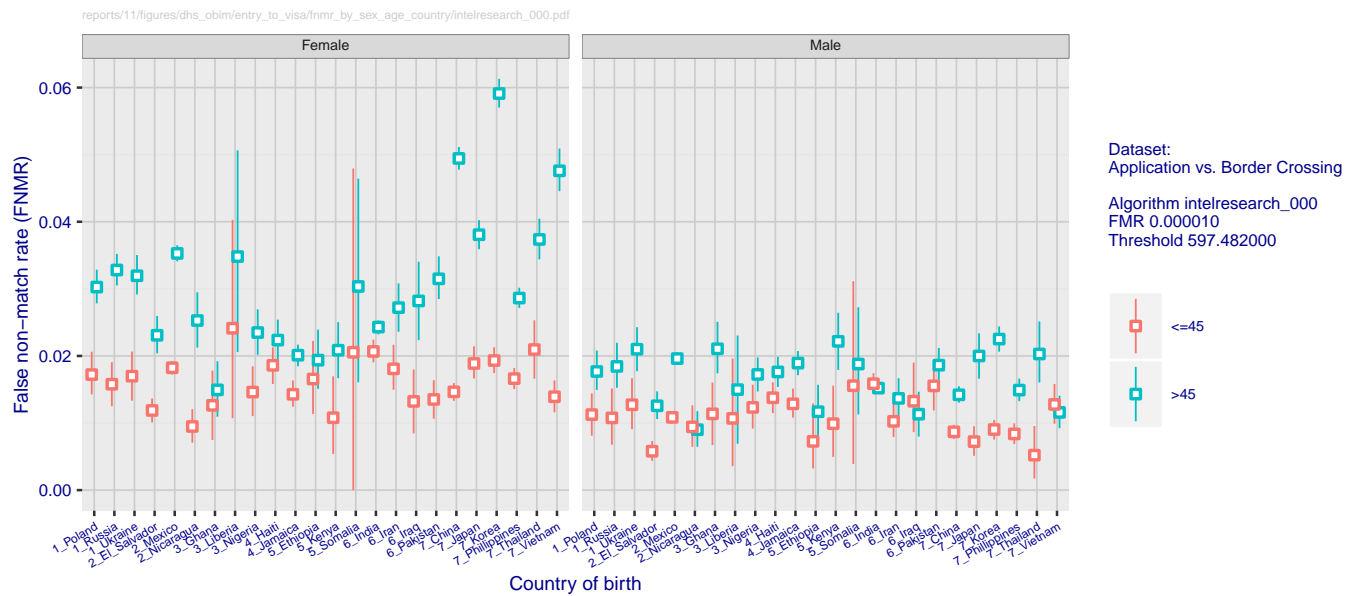


Figure 61: FNMR by sex, age and country of birth, intelresearch-000

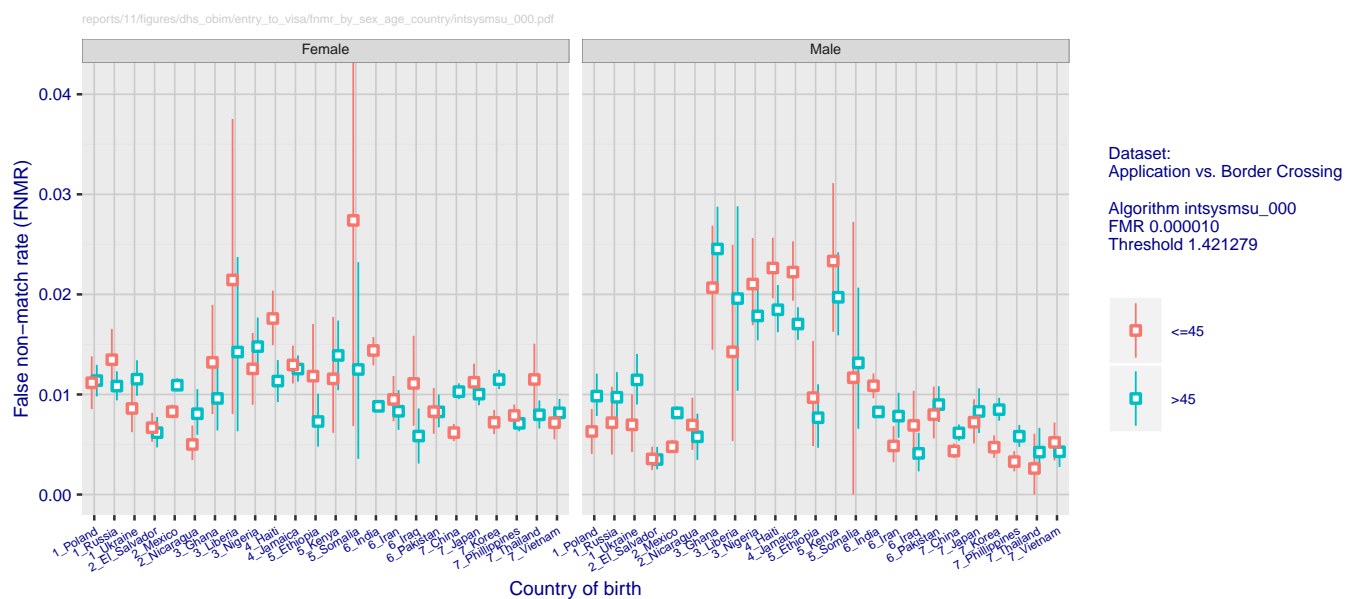


Figure 62: FNMR by sex, age and country of birth, intsysmsu-000

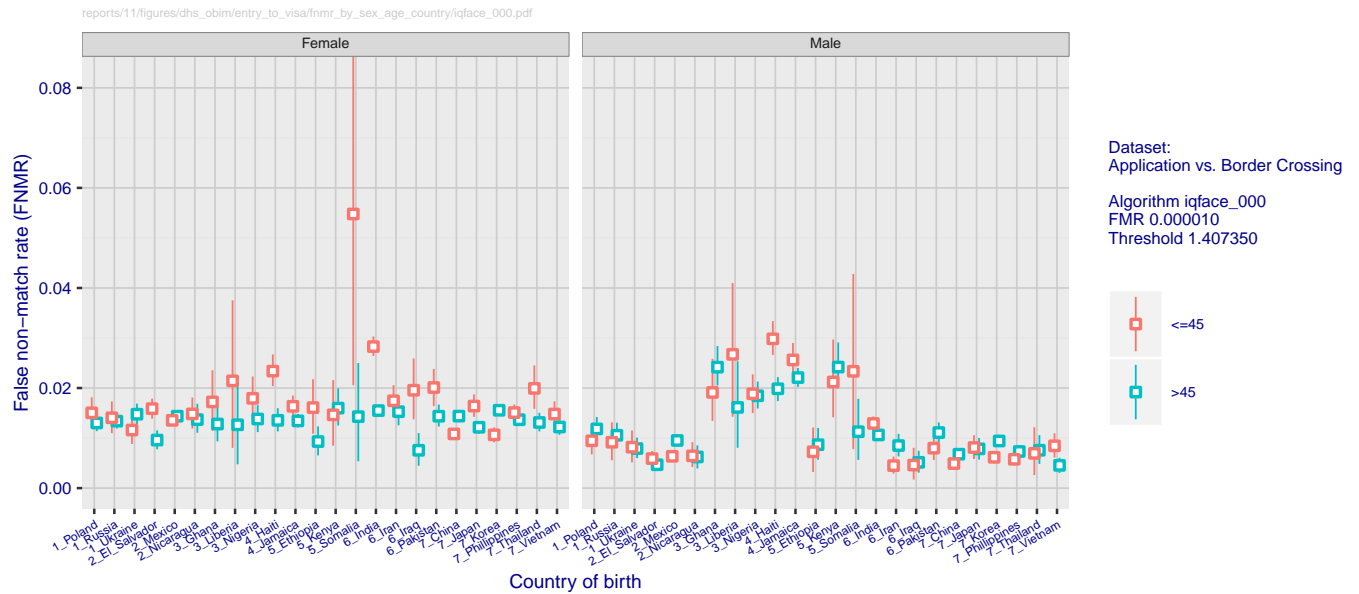


Figure 63: FNMR by sex, age and country of birth, iqface-000

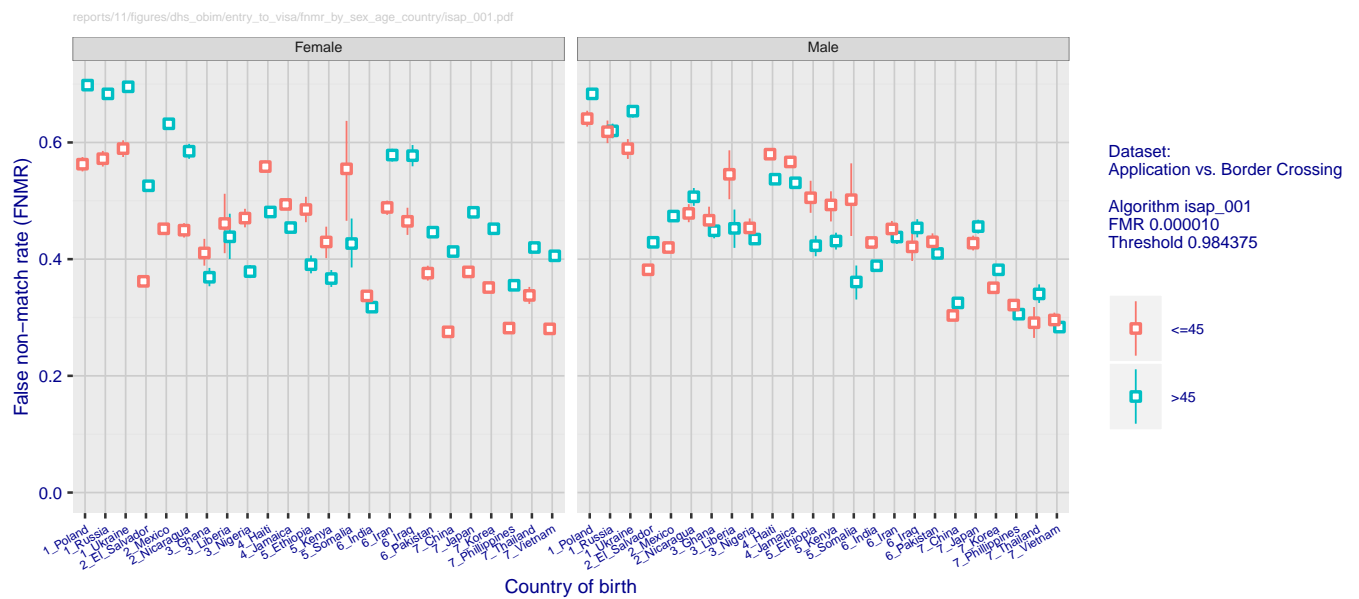


Figure 64: FNMR by sex, age and country of birth, isap-001

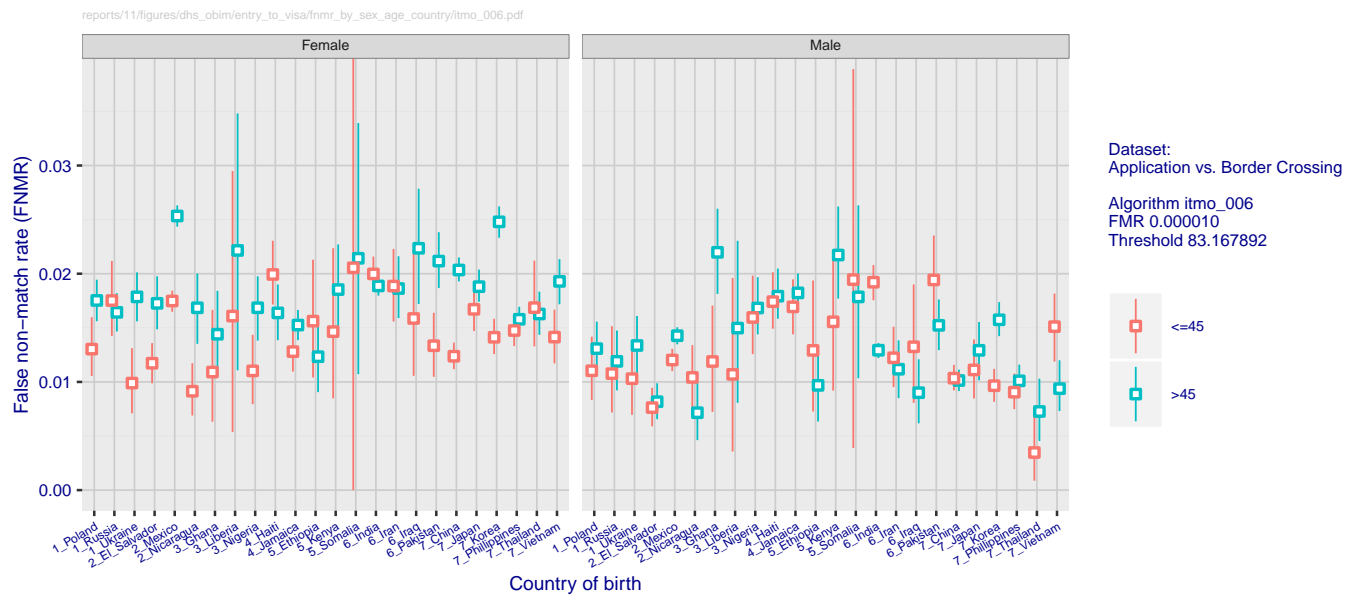


Figure 65: FNMR by sex, age and country of birth, itmo-006

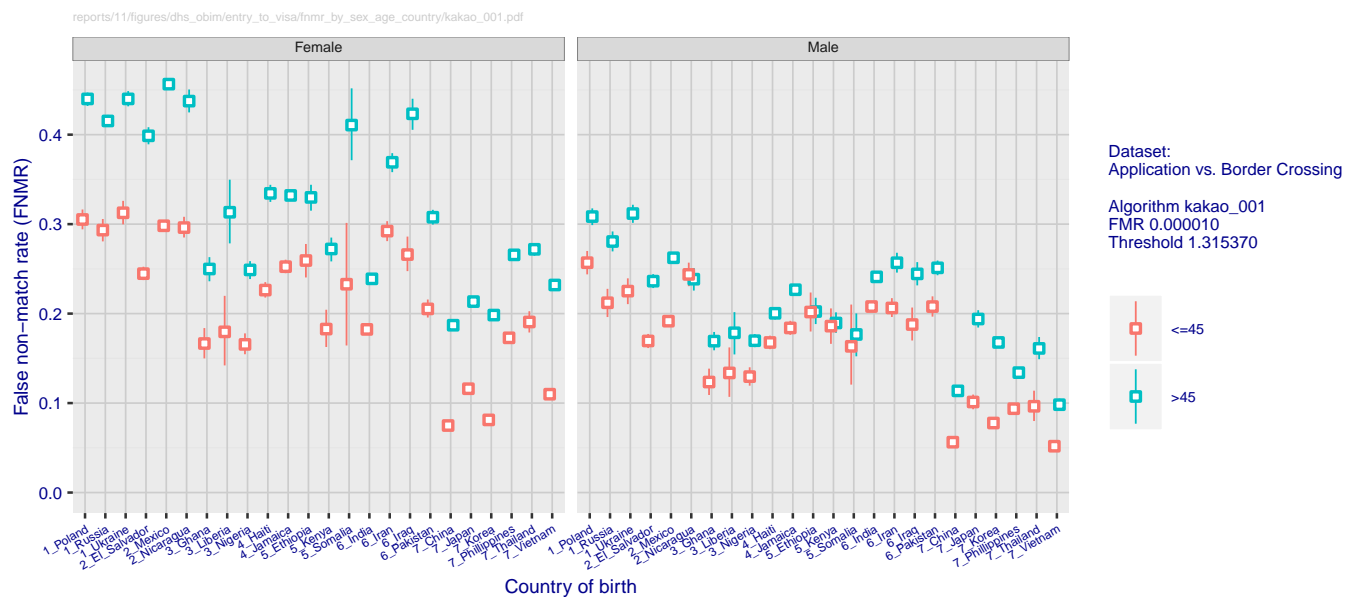


Figure 66: FNMR by sex, age and country of birth, kakao-001

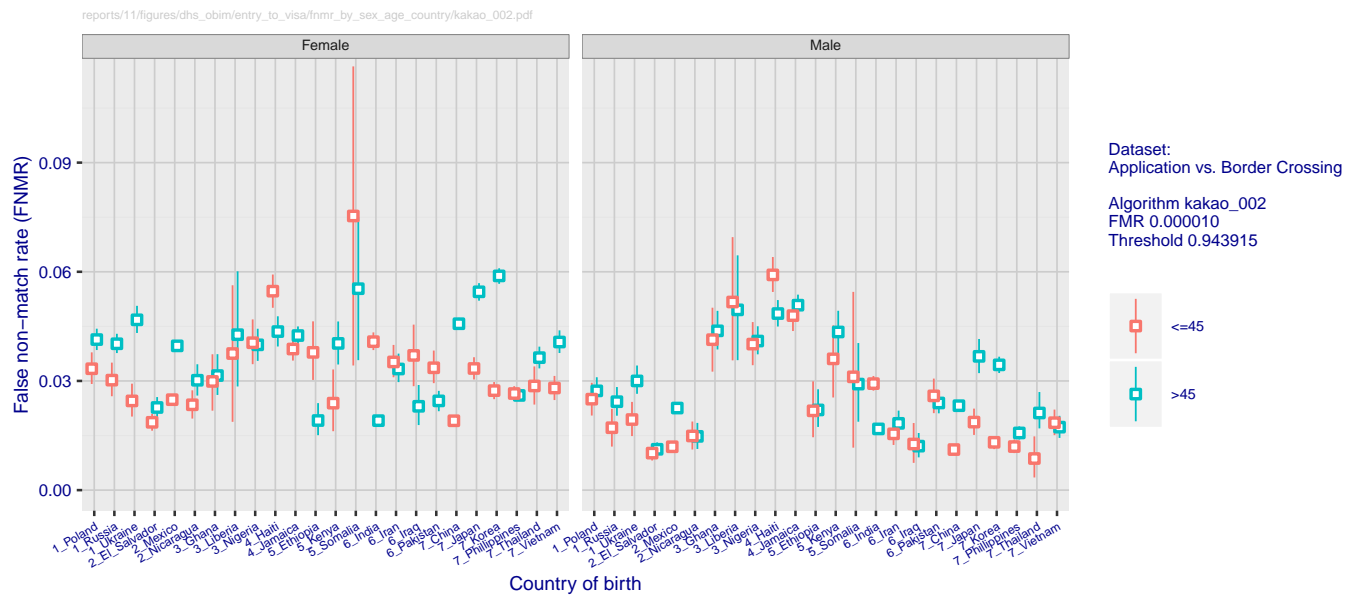


Figure 67: FNMR by sex, age and country of birth, kakao-002

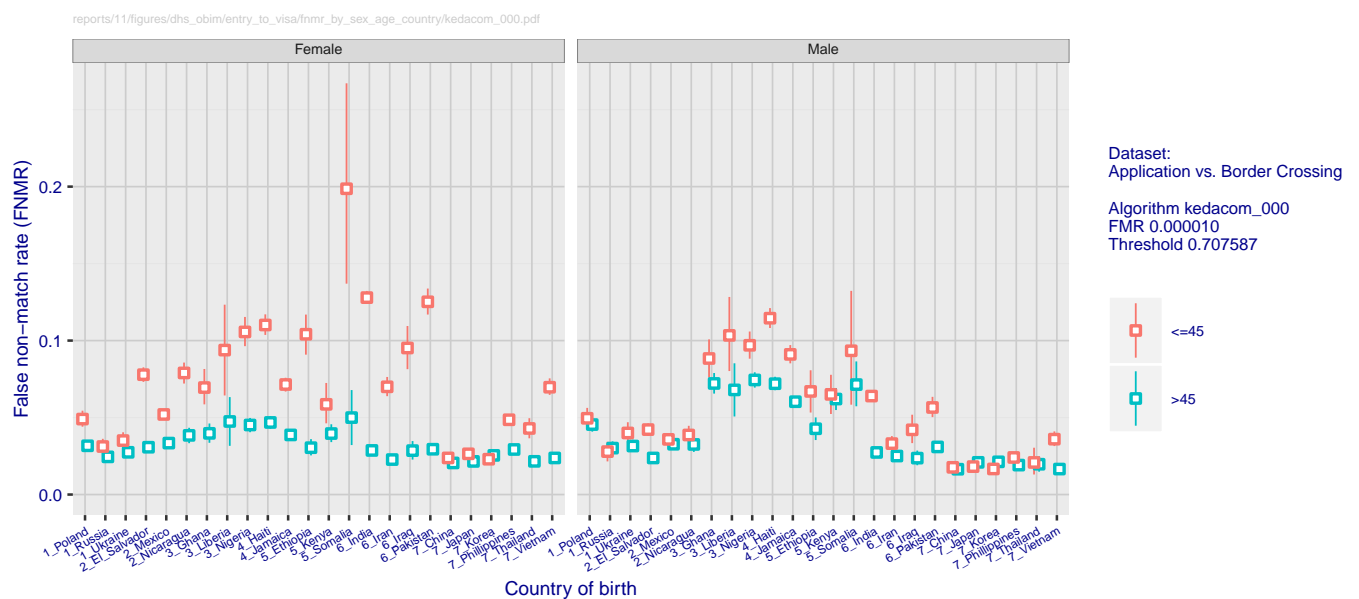


Figure 68: FNMR by sex, age and country of birth, kedacom-000

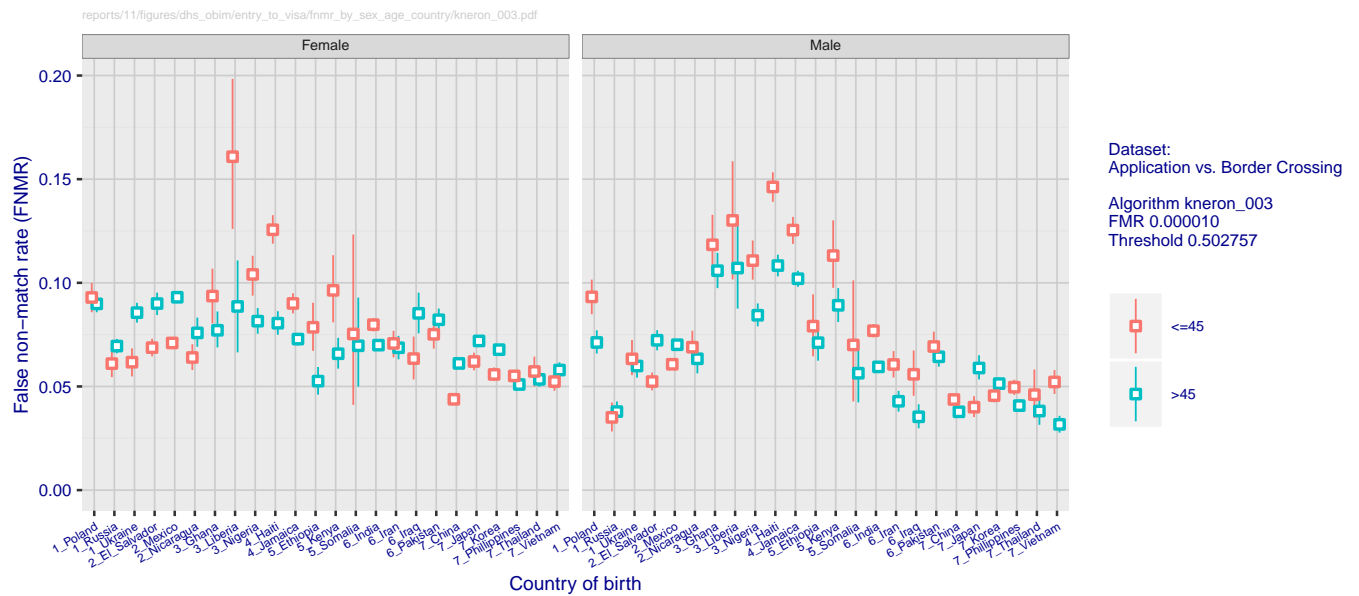


Figure 69: FNMR by sex, age and country of birth, kneron-003

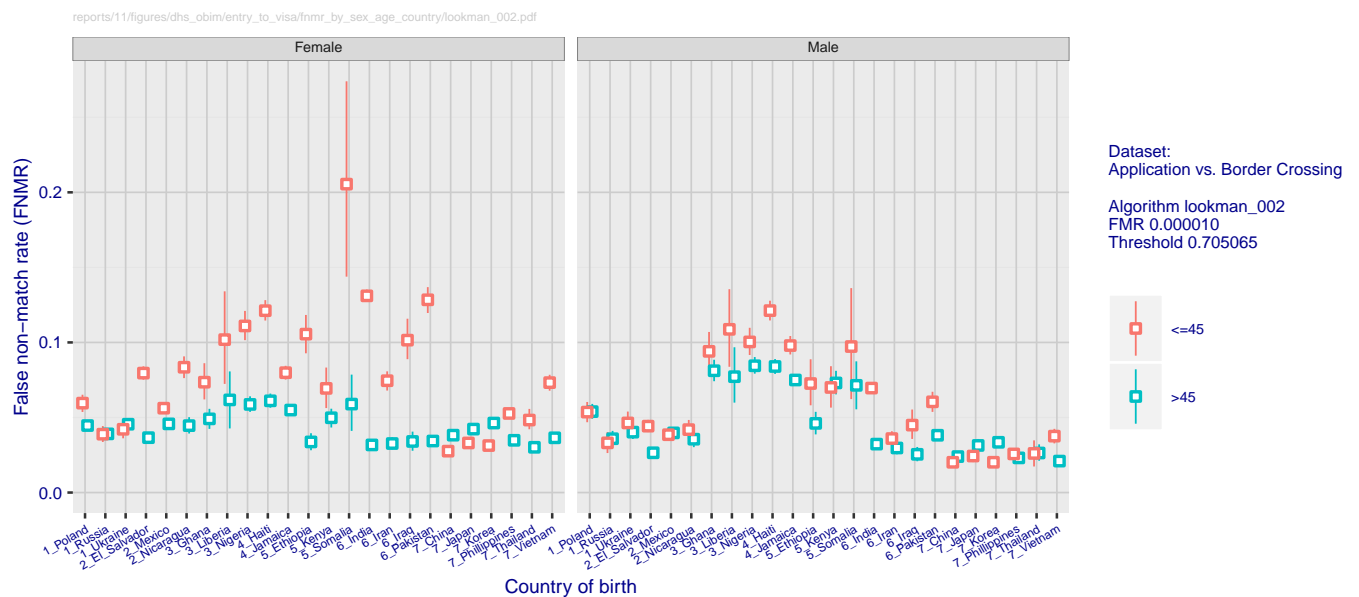


Figure 70: FNMR by sex, age and country of birth, lookman-002

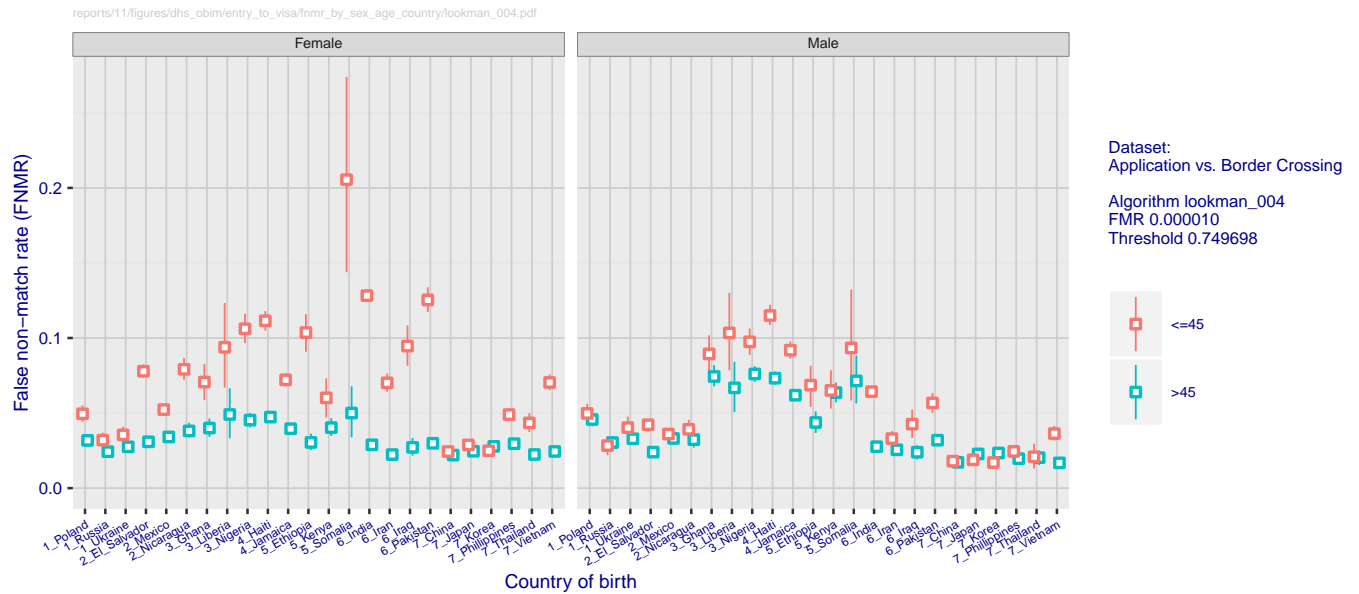


Figure 71: FNMR by sex, age and country of birth, lookman-004

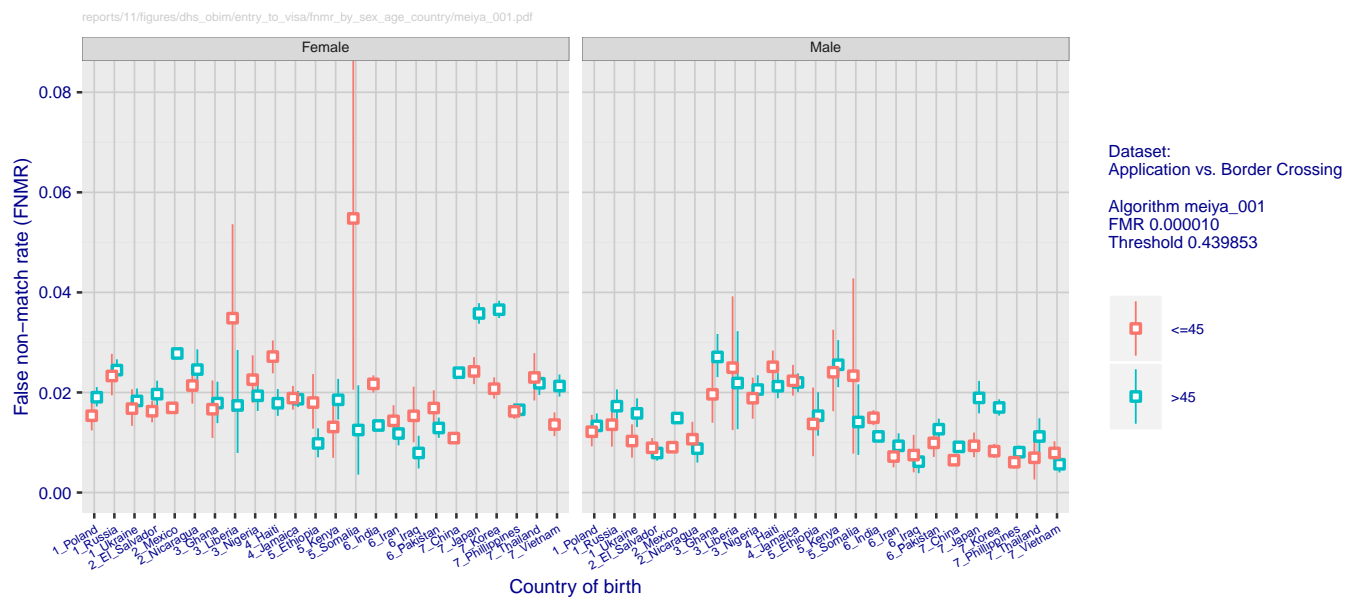


Figure 72: FNMR by sex, age and country of birth, meiya-001

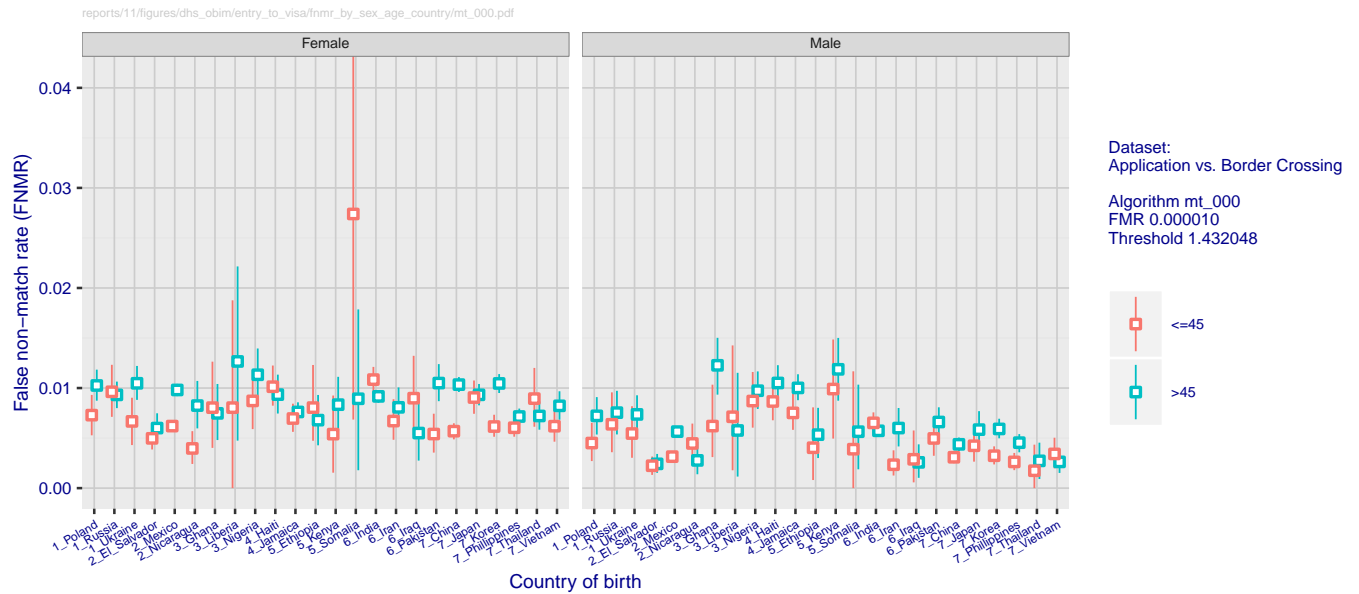


Figure 73: FNMR by sex, age and country of birth, mt-000

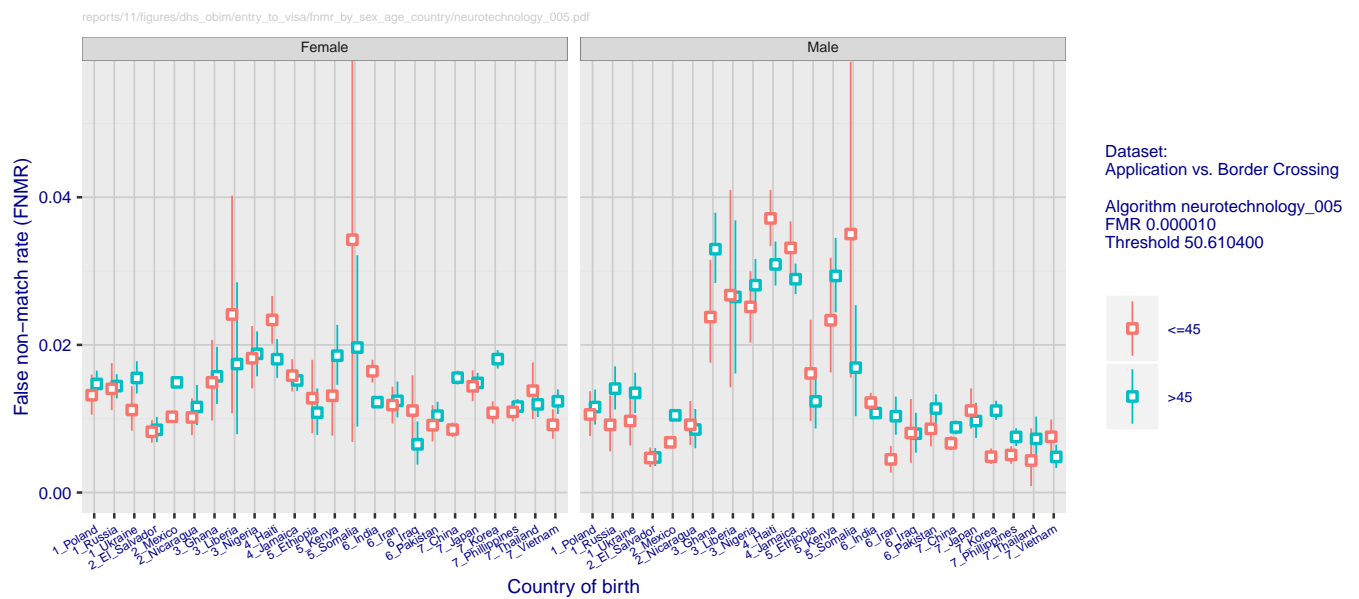


Figure 74: FNMR by sex, age and country of birth, neurotechnology-005



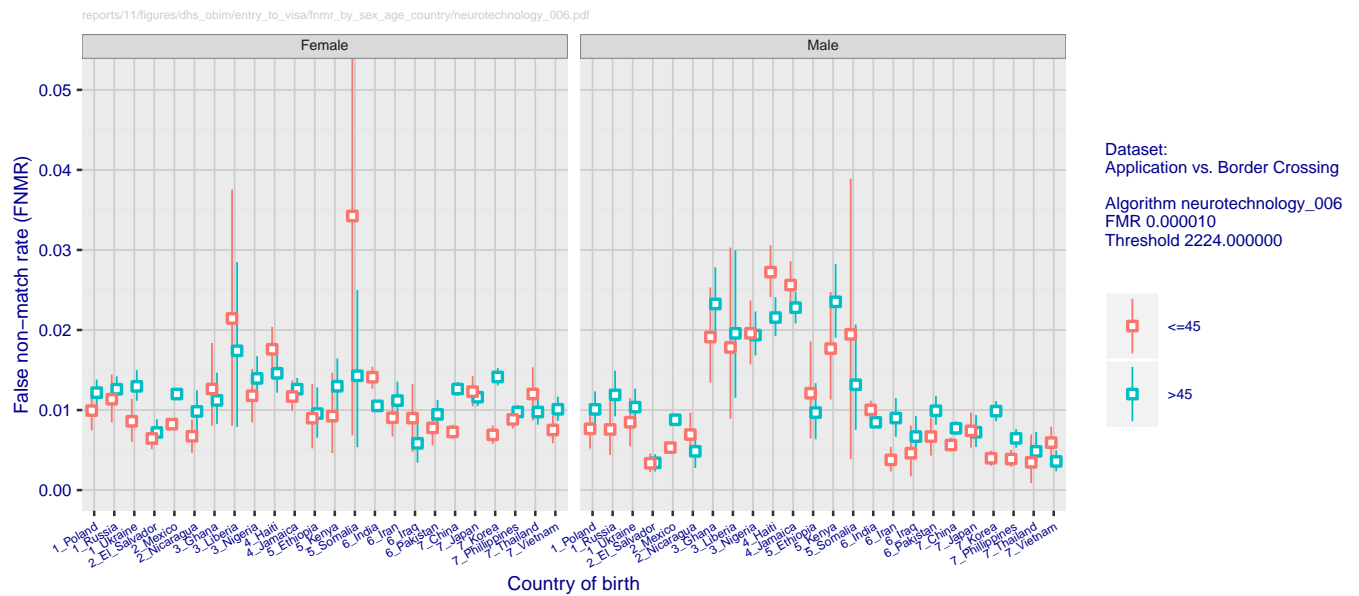


Figure 75: FNMR by sex, age and country of birth, neurotechnology-006

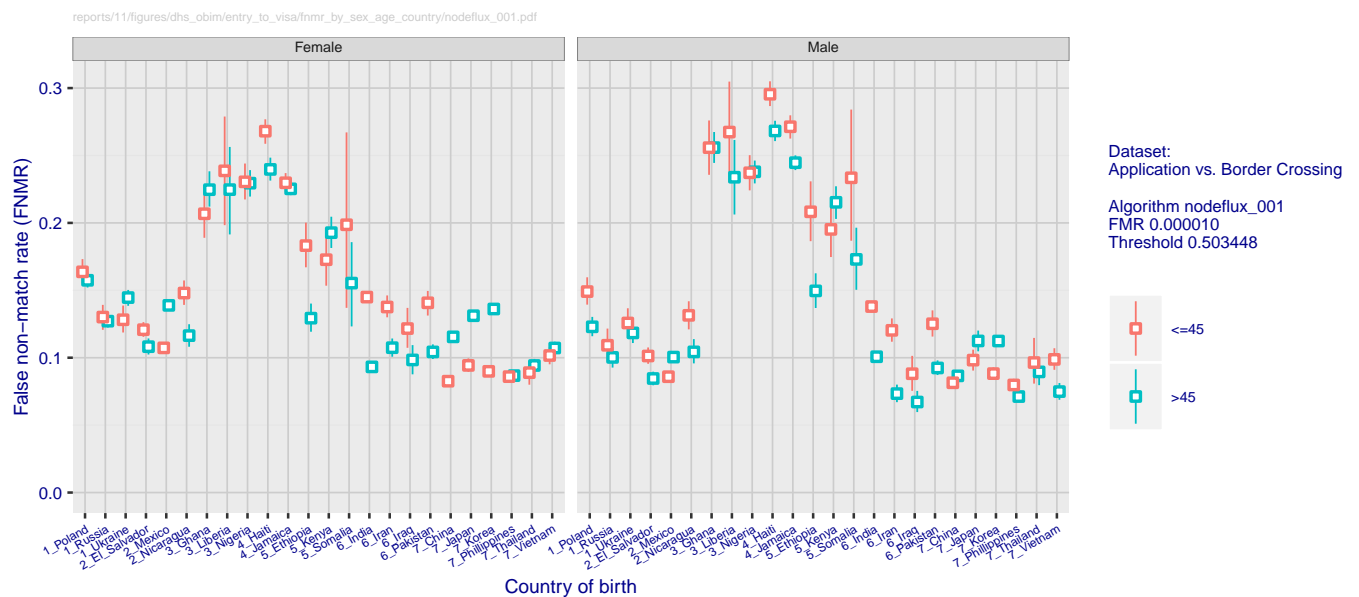


Figure 76: FNMR by sex, age and country of birth, nodeflux-001

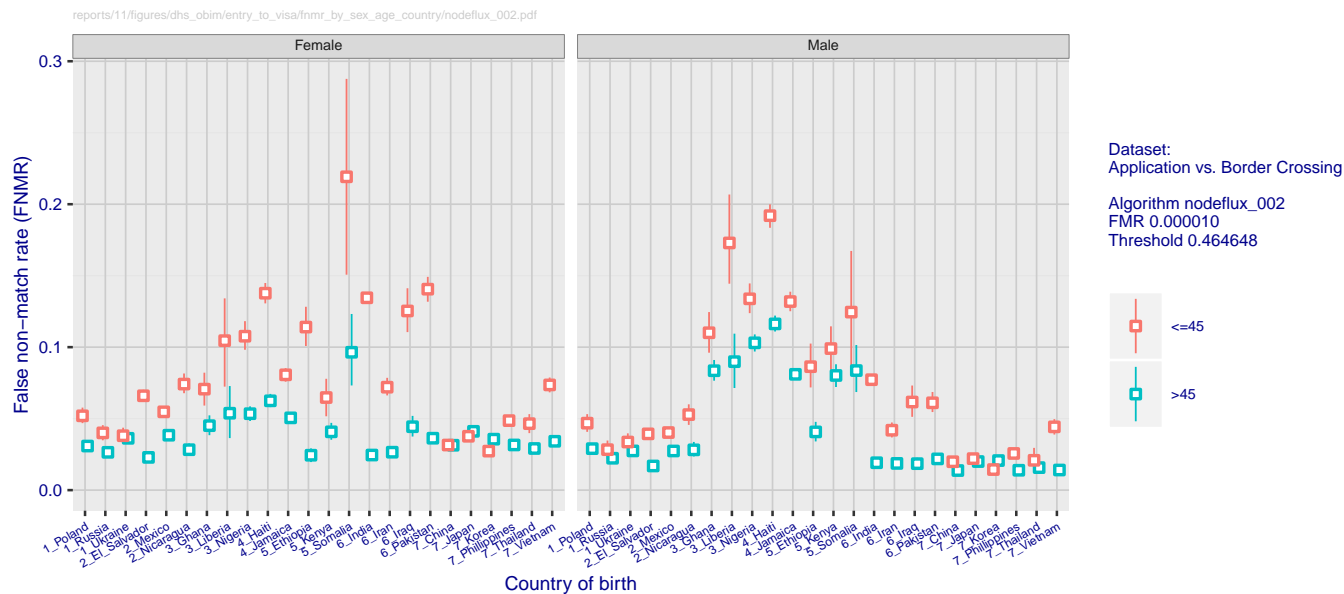


Figure 77: FNMR by sex, age and country of birth, nodeflux-002

7768452869147518687240781498335478993599708055446273817346263666041886298056322725781755811145389706522427464217637137866096641546384013861320853097

Figure 78: FNMR by sex, age and country of birth, notiontag-000

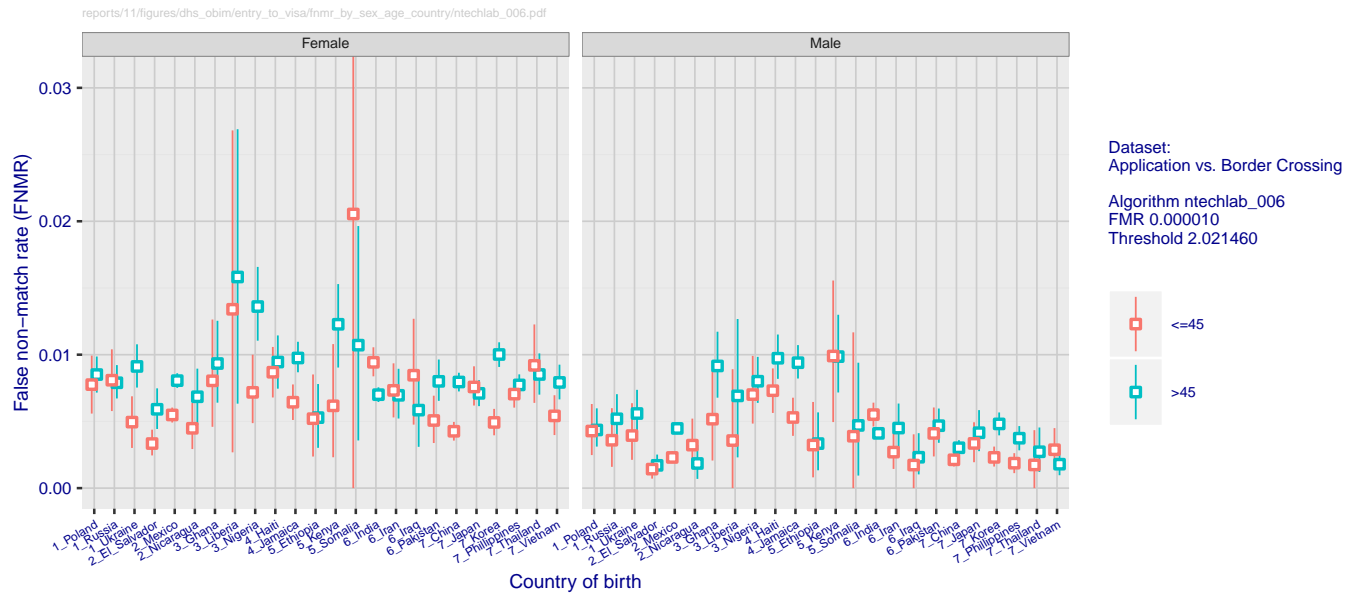


Figure 79: FNMR by sex, age and country of birth, ntechlab-006

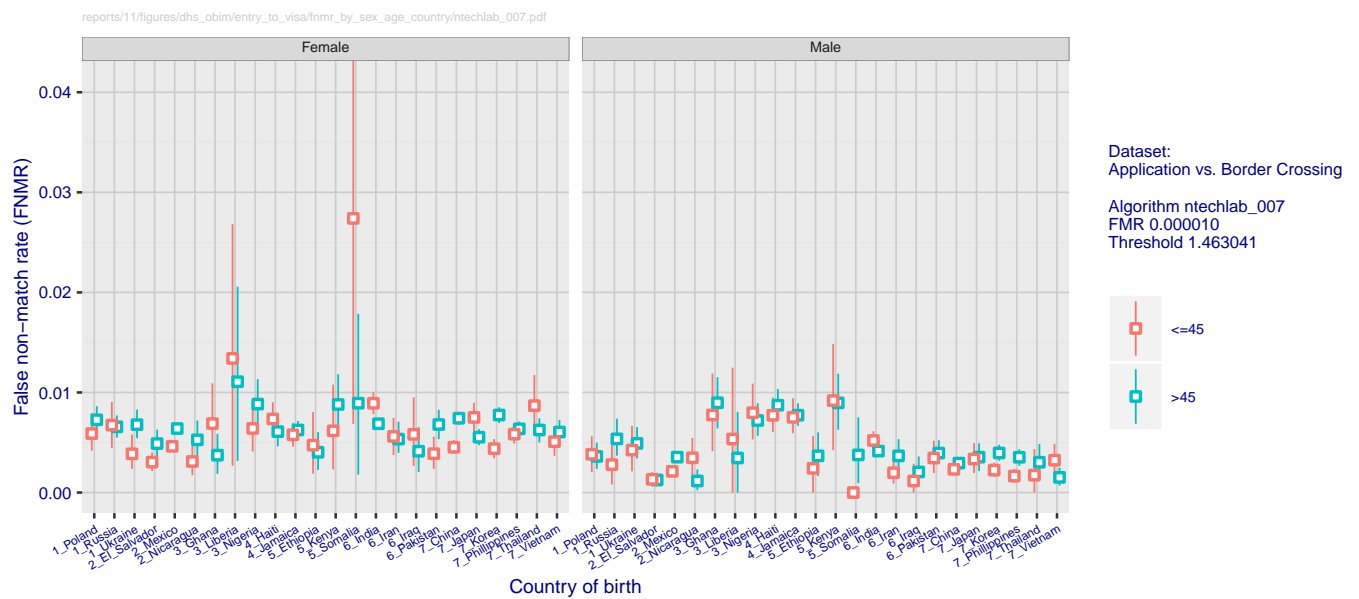


Figure 80: FNMR by sex, age and country of birth, ntechlab-007

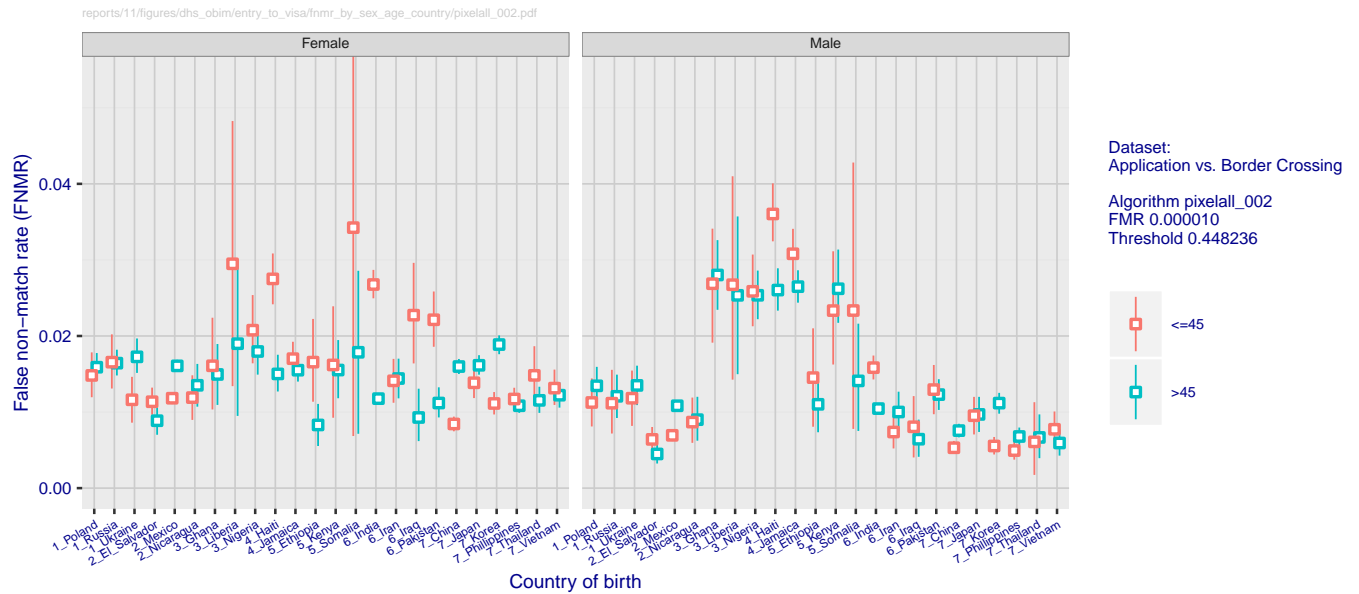


Figure 81: FNMR by sex, age and country of birth, pixelall-002

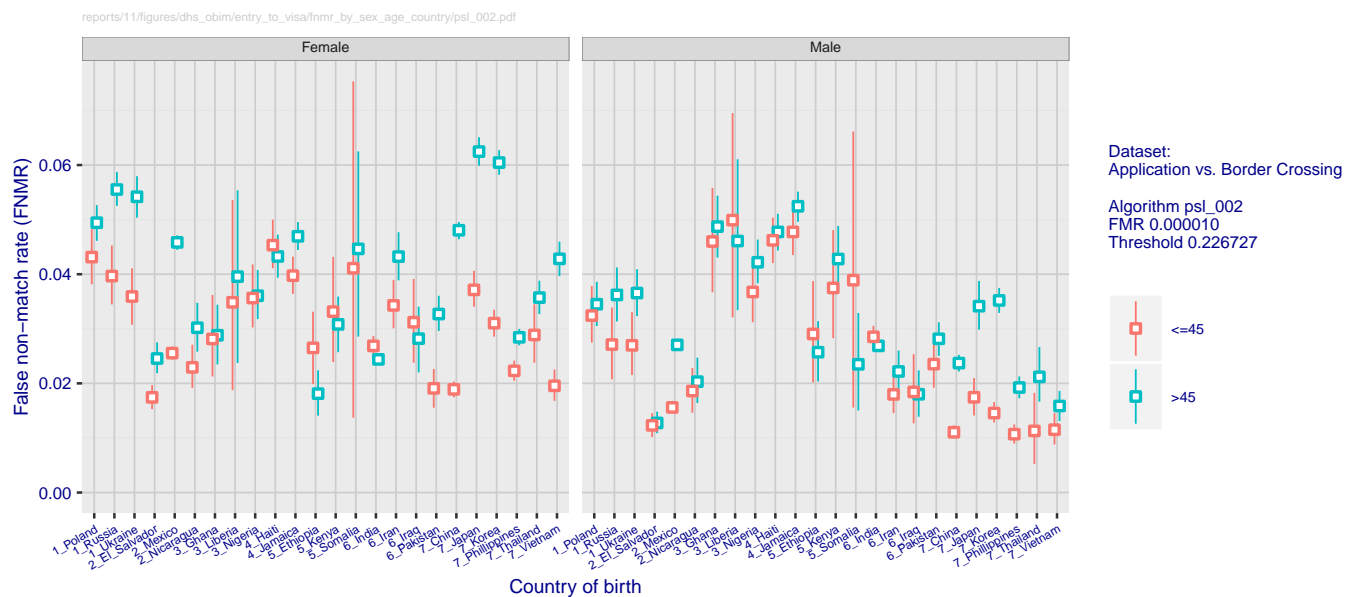


Figure 82: FNMR by sex, age and country of birth, psl-002

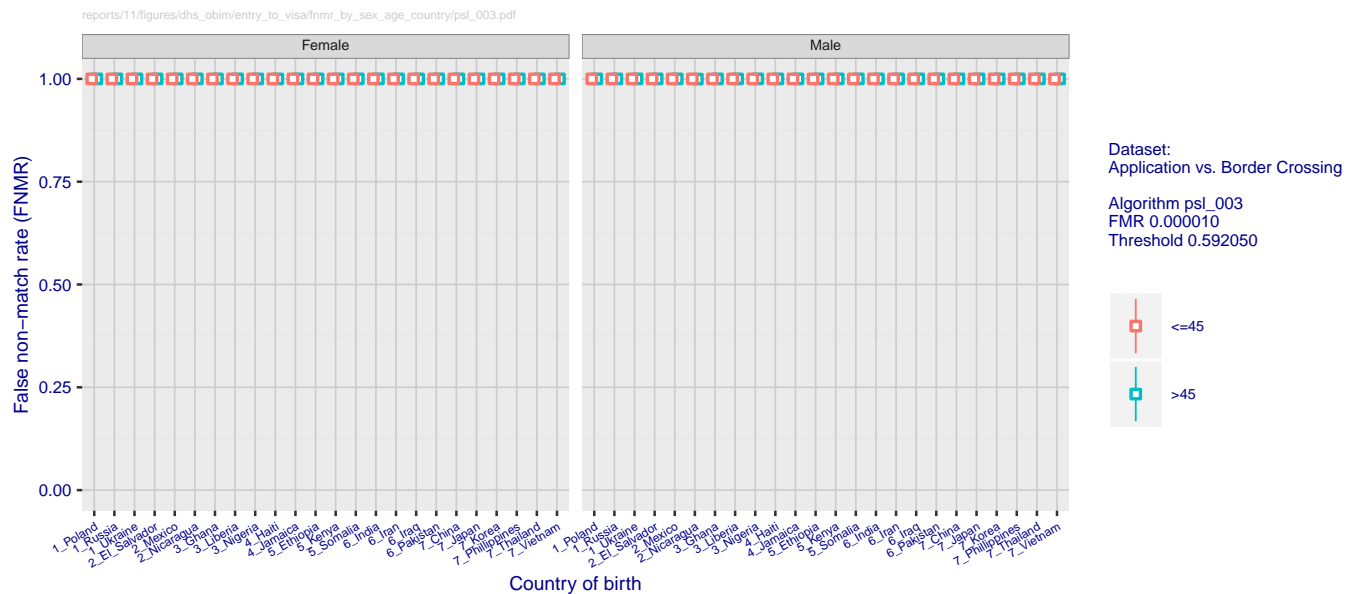


Figure 83: FNMR by sex, age and country of birth, psl-003

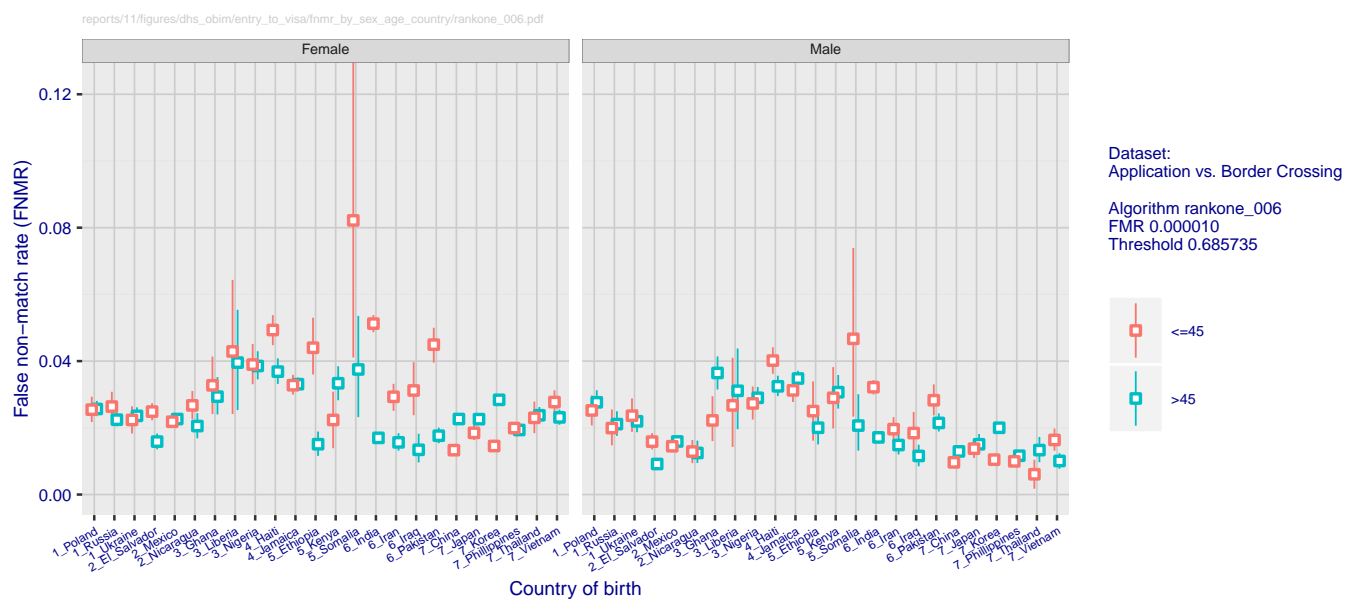


Figure 84: FNMR by sex, age and country of birth, rankone-006

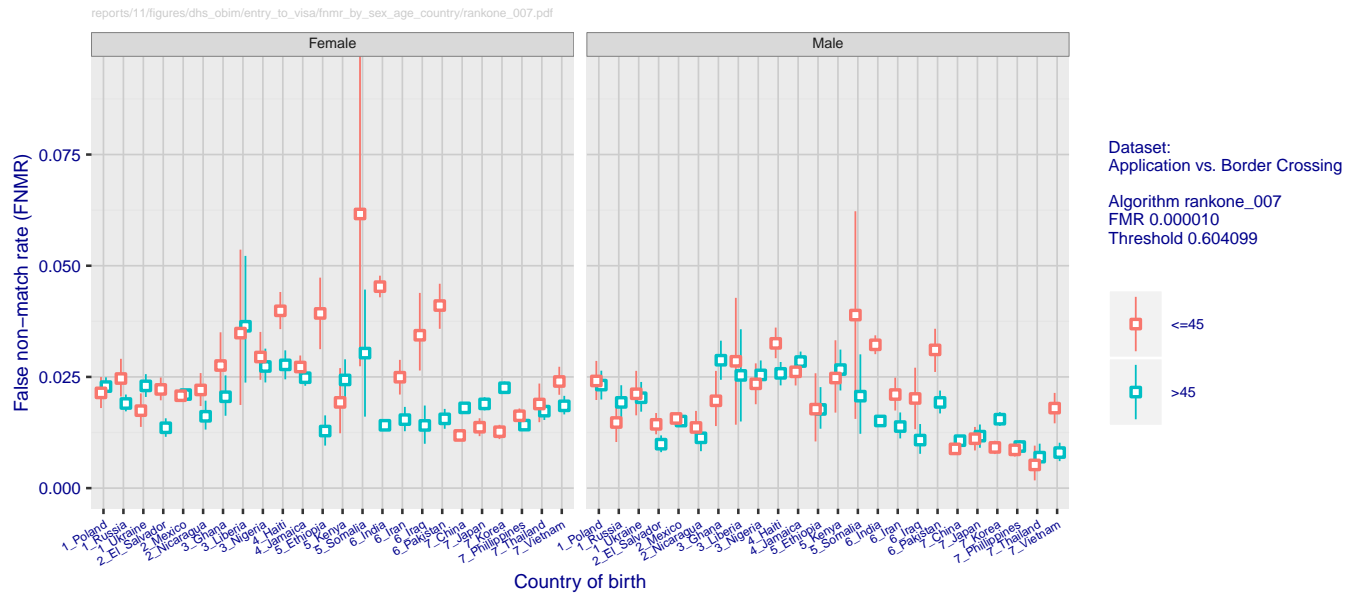


Figure 85: FNMR by sex, age and country of birth, rankone-007

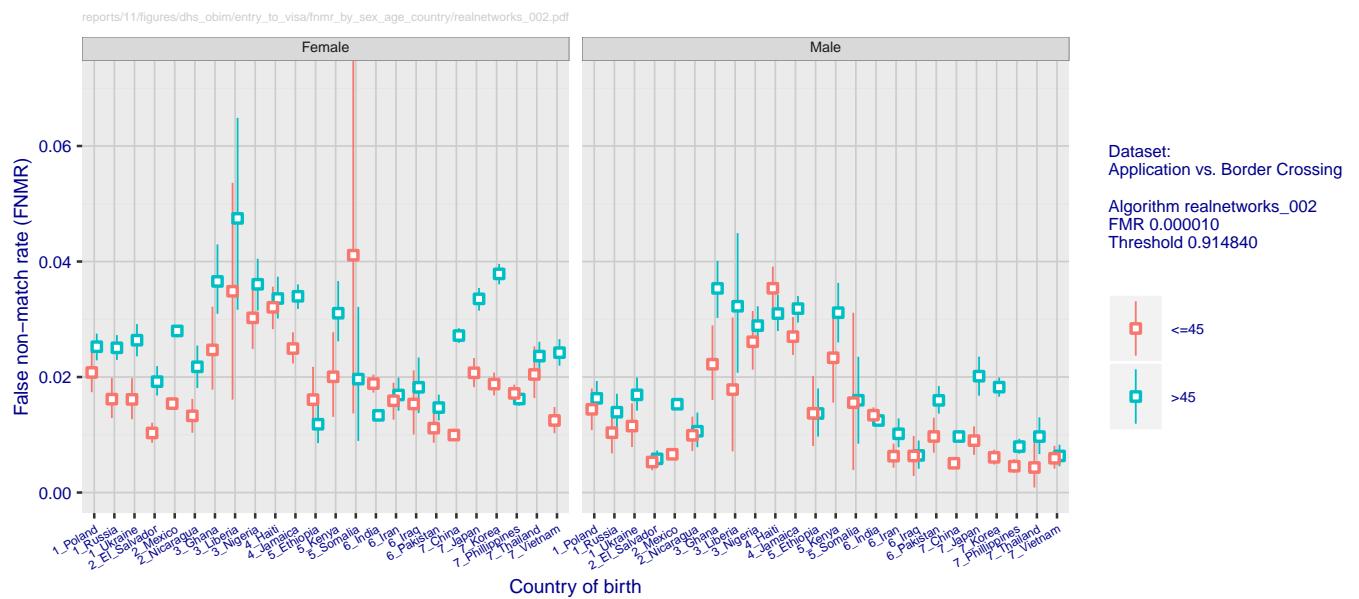


Figure 86: FNMR by sex, age and country of birth, realnetworks-002

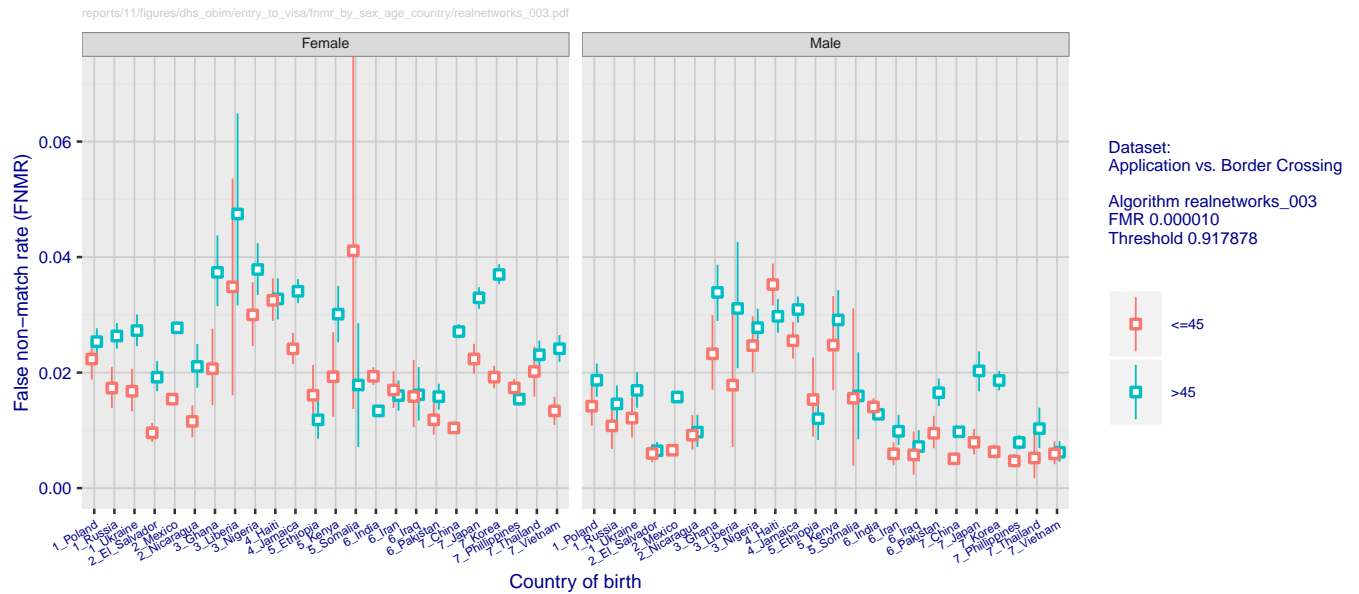


Figure 87: FNMR by sex, age and country of birth, realnetworks-003

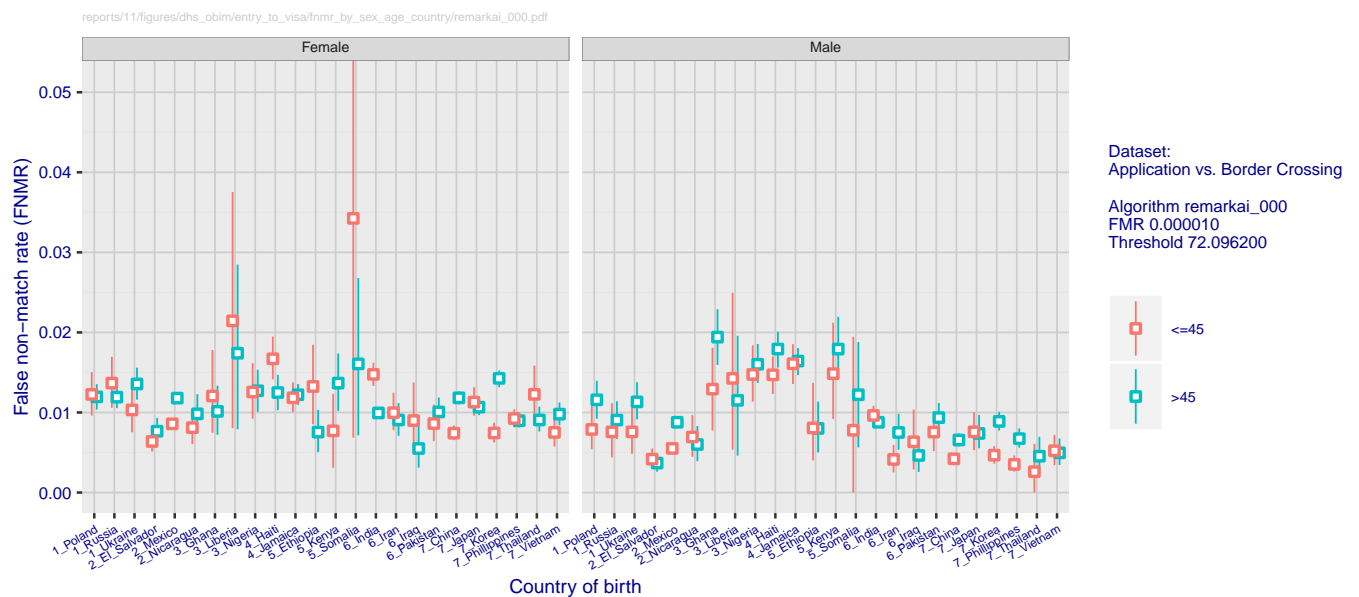


Figure 88: FNMR by sex, age and country of birth, remarkai-000

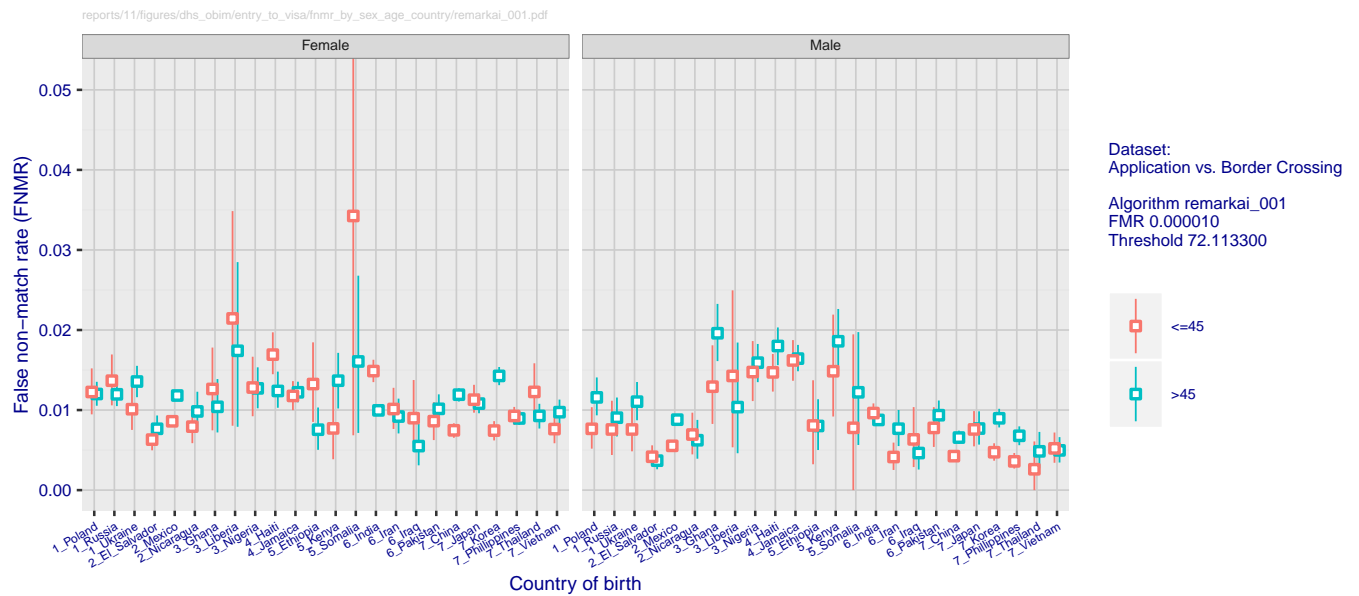


Figure 89: FNMR by sex, age and country of birth, remarkai-001

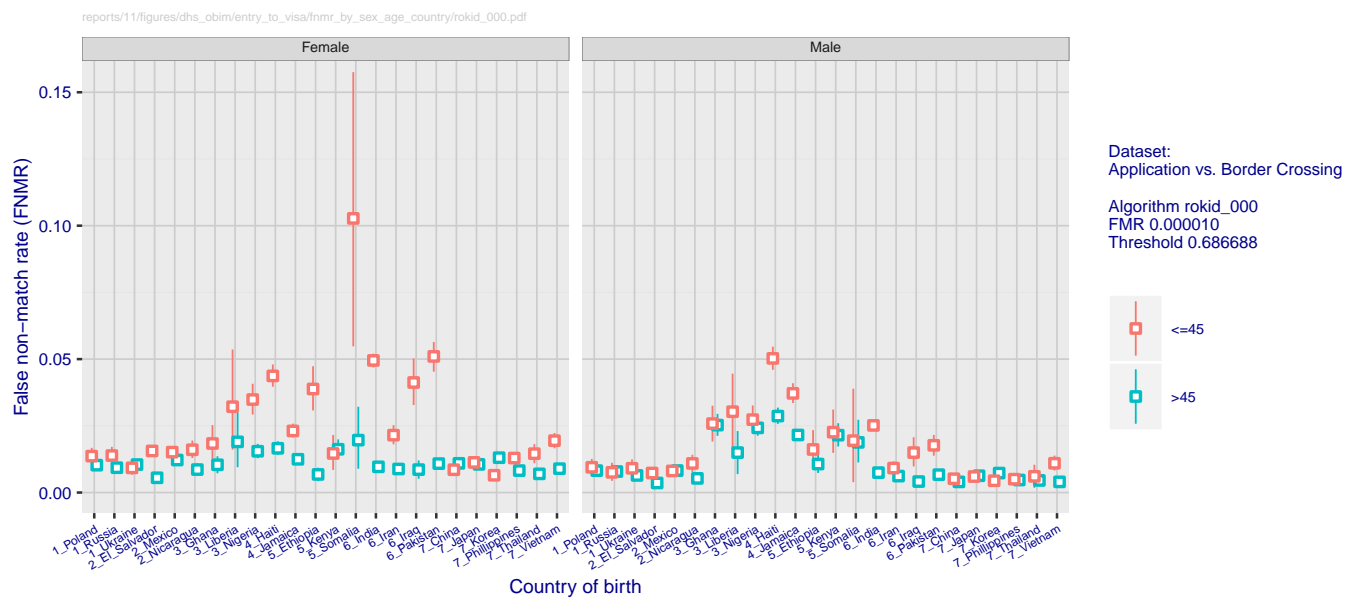


Figure 90: FNMR by sex, age and country of birth, rokid-000



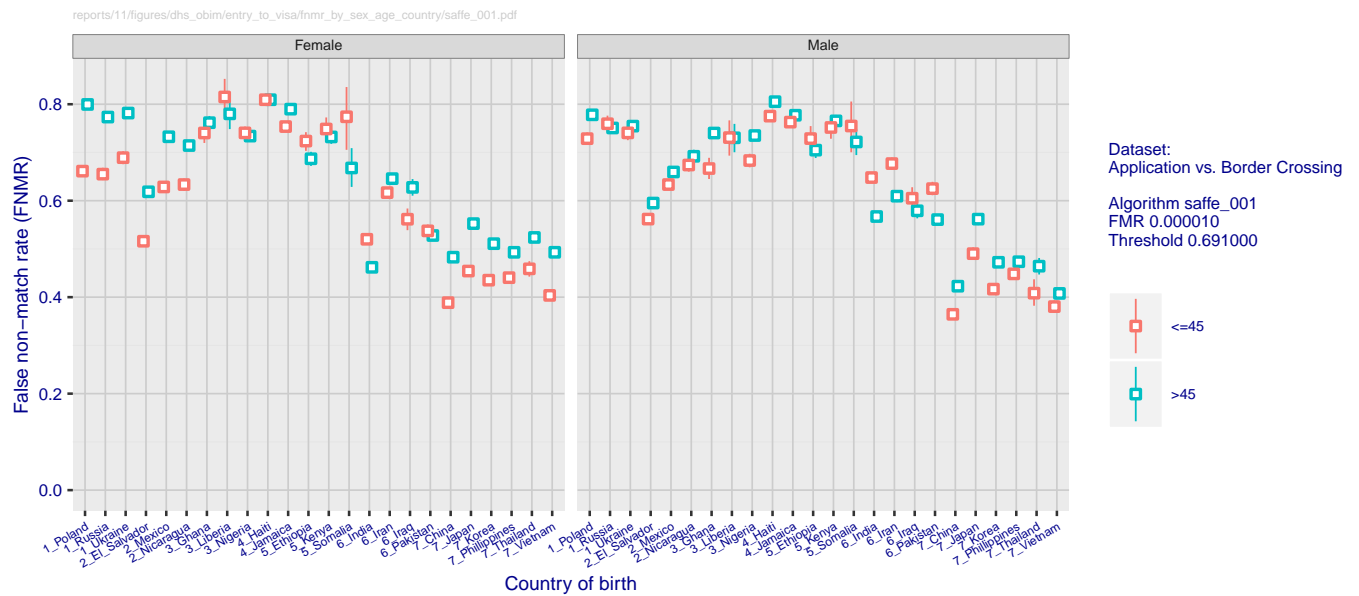


Figure 91: FNMR by sex, age and country of birth, saffe-001

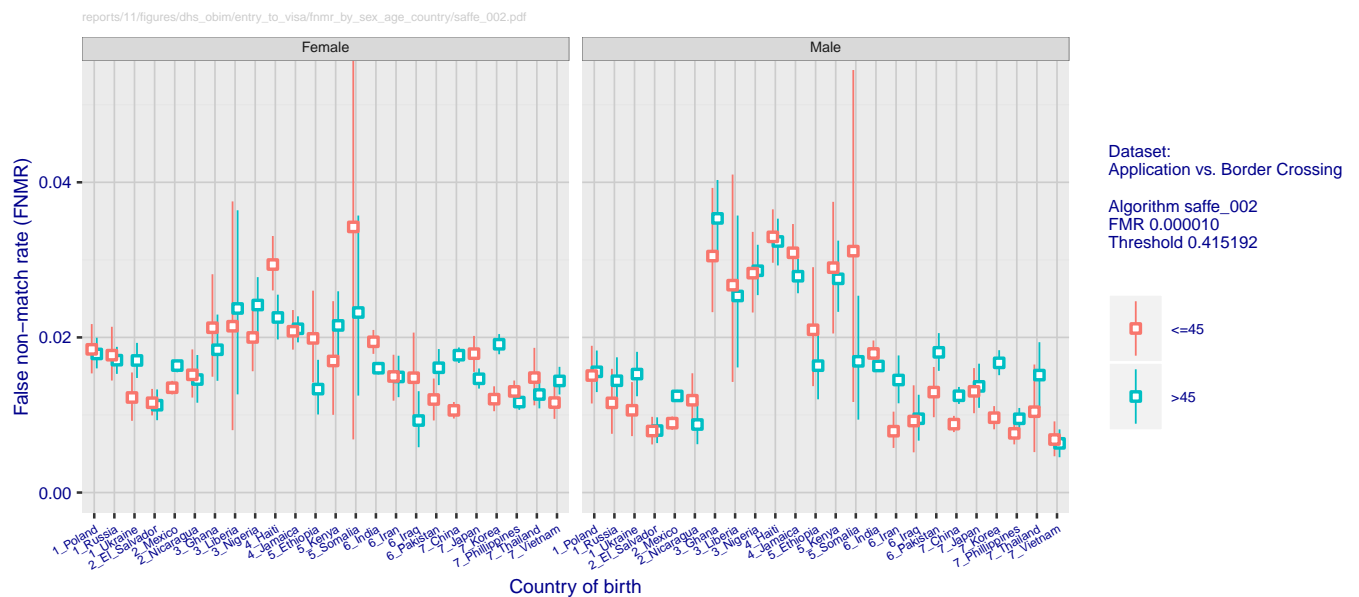


Figure 92: FNMR by sex, age and country of birth, saffe-002

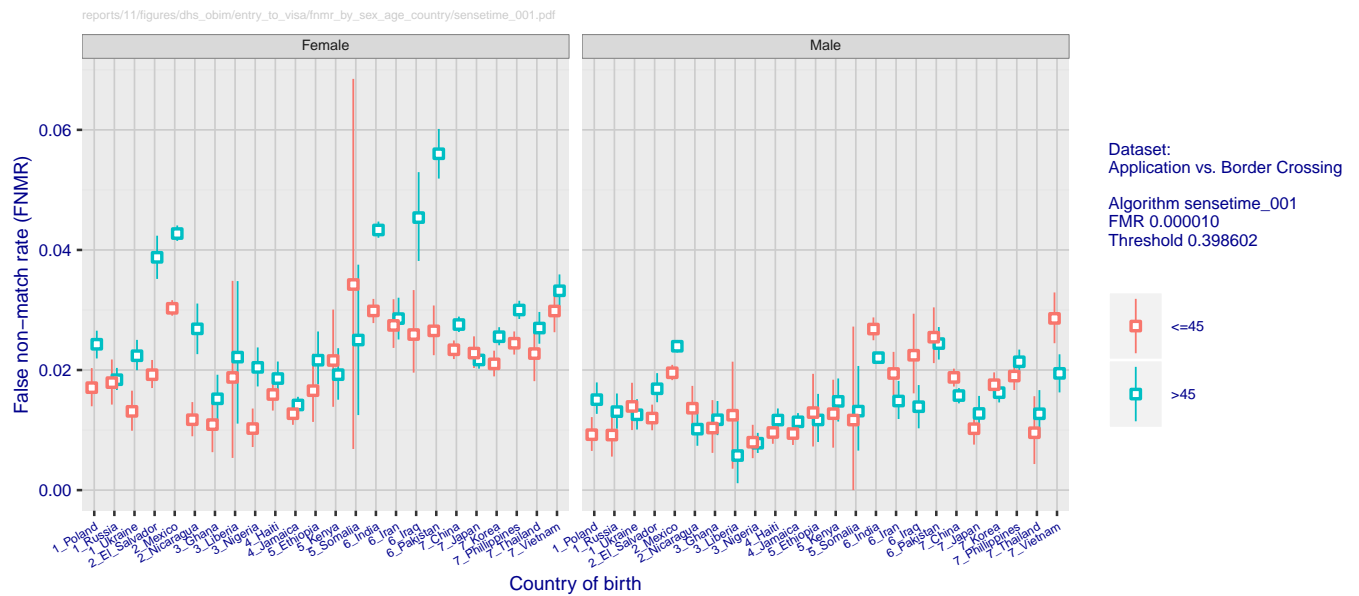


Figure 93: FNMR by sex, age and country of birth, sensetime-001

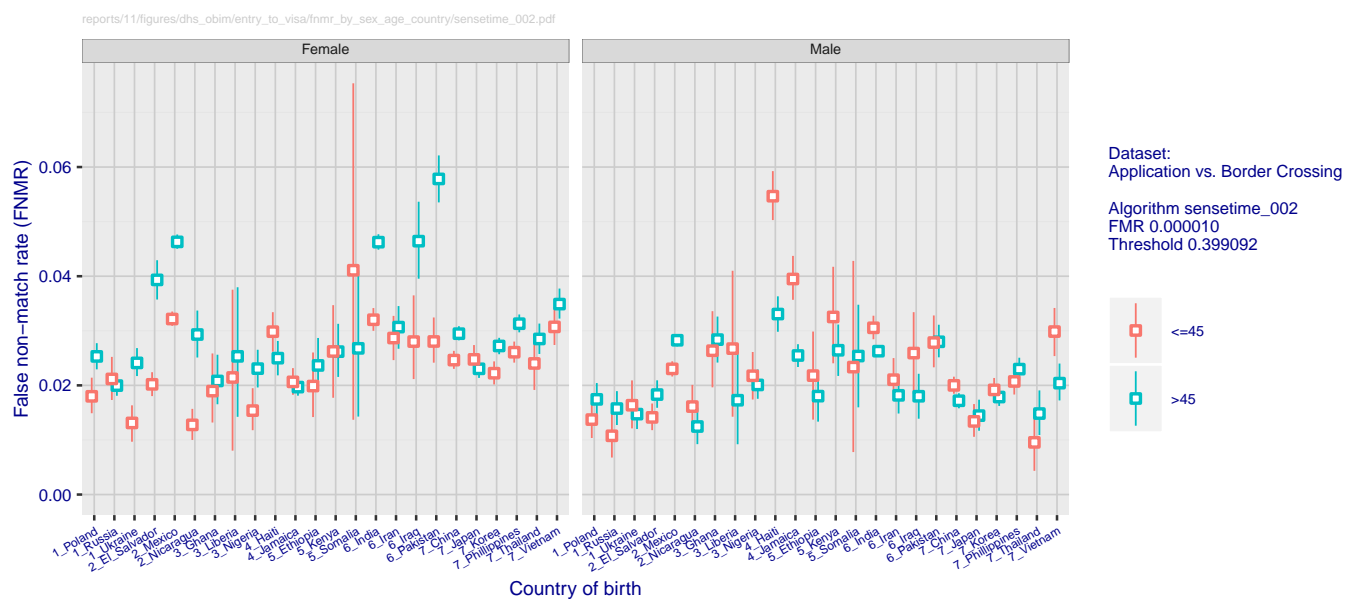


Figure 94: FNMR by sex, age and country of birth, sensetime-002

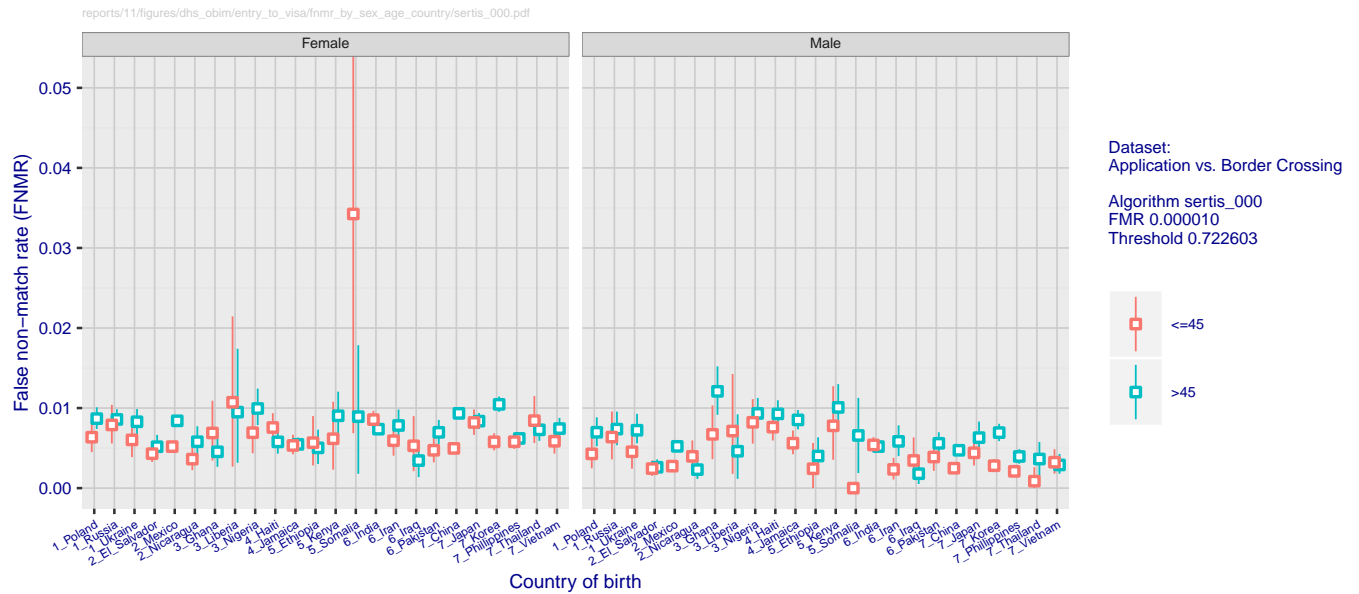


Figure 95: FNMR by sex, age and country of birth, sertis-000

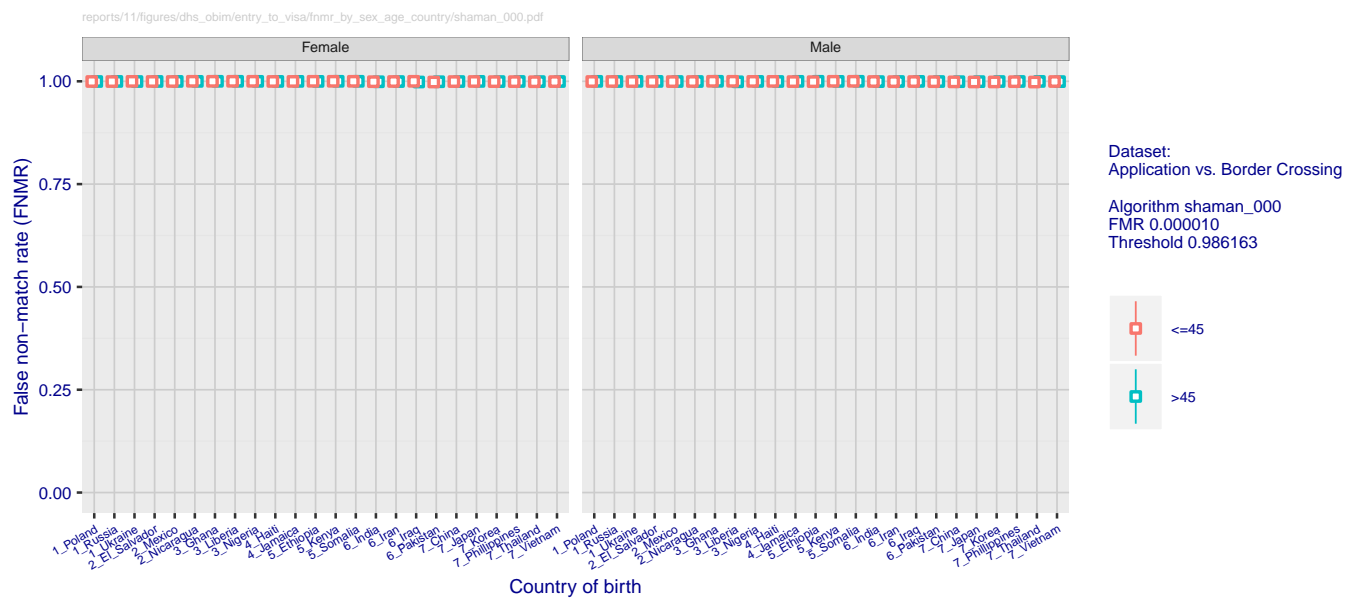


Figure 96: FNMR by sex, age and country of birth, shaman-000

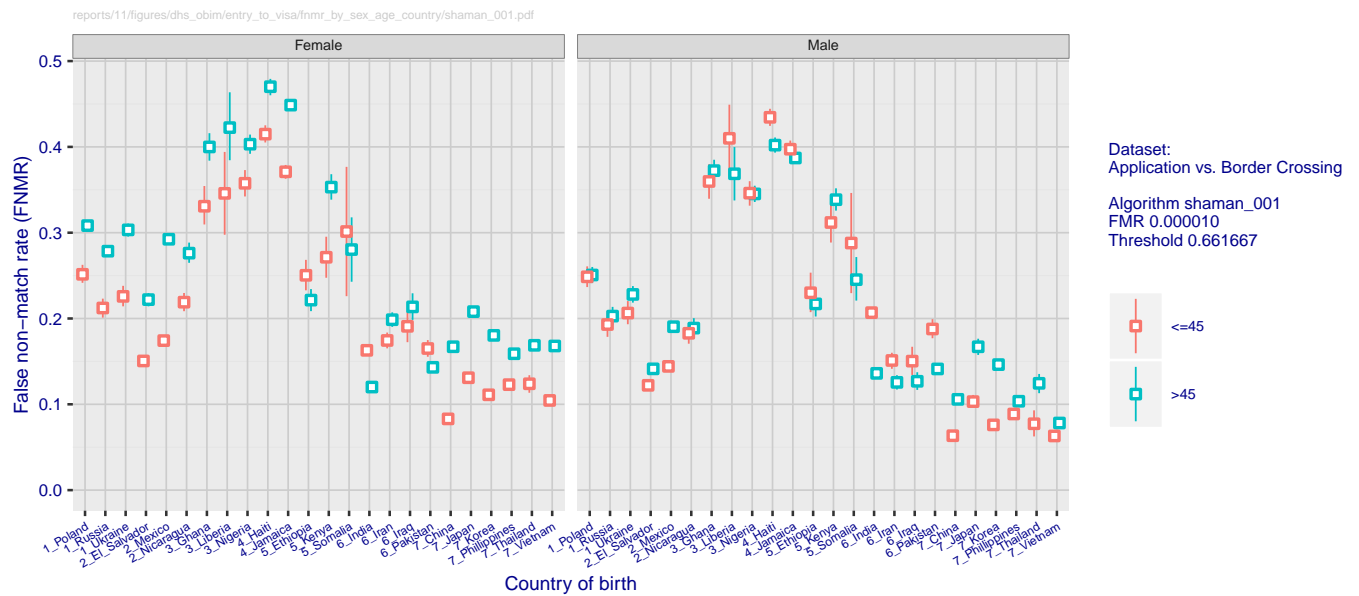


Figure 97: FNMR by sex, age and country of birth, shaman-001

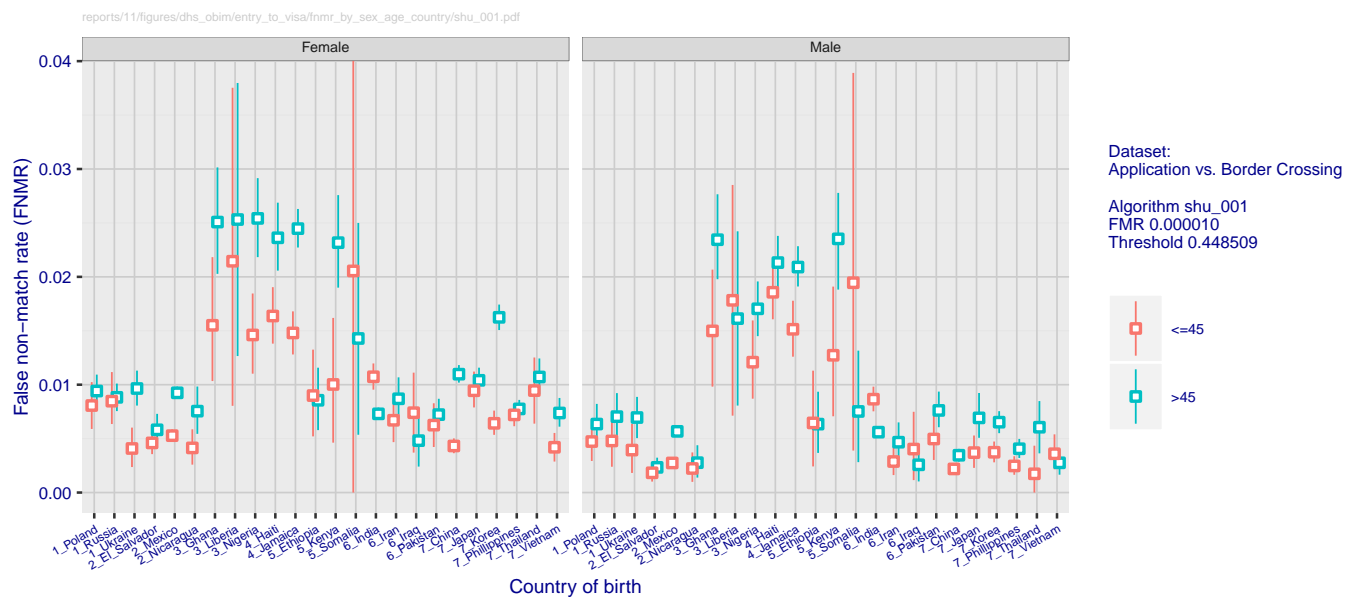


Figure 98: FNMR by sex, age and country of birth, shu-001

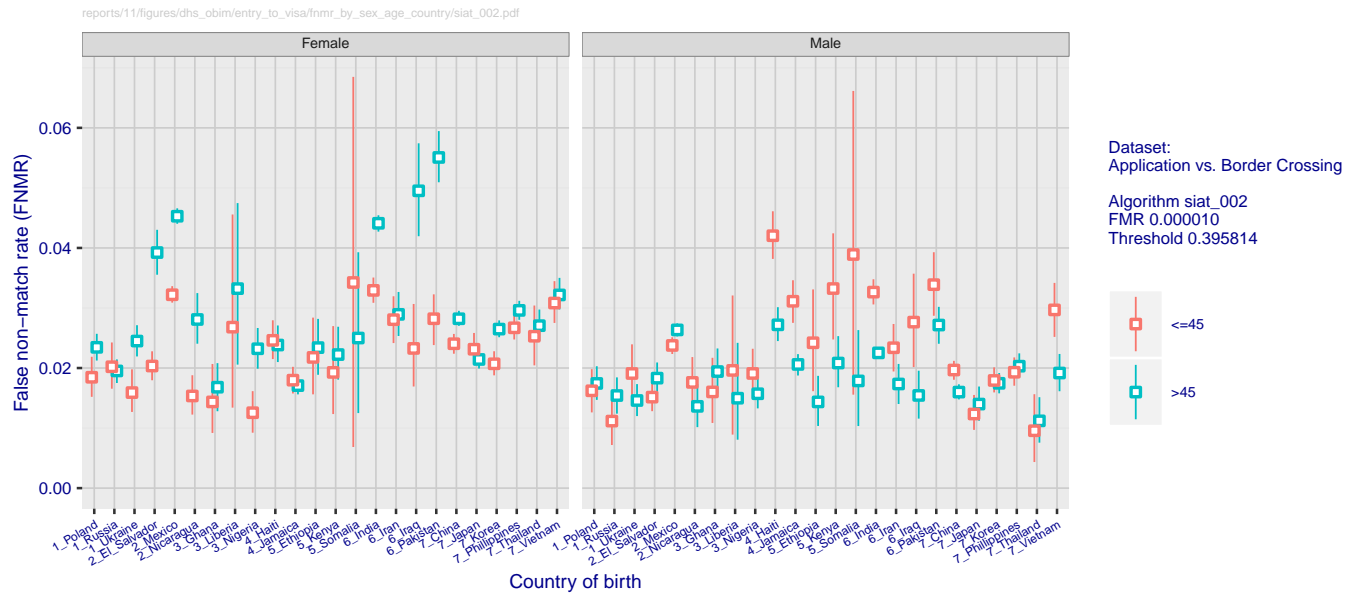


Figure 99: FNMR by sex, age and country of birth, siat-002

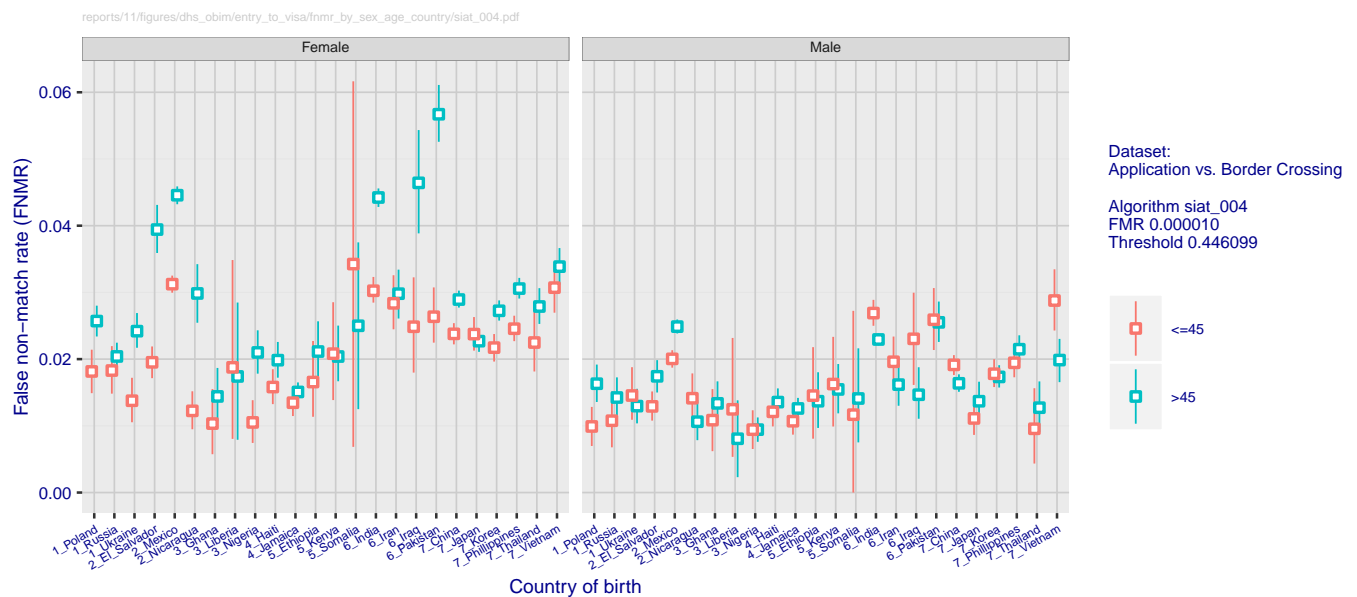


Figure 100: FNMR by sex, age and country of birth, siat-004

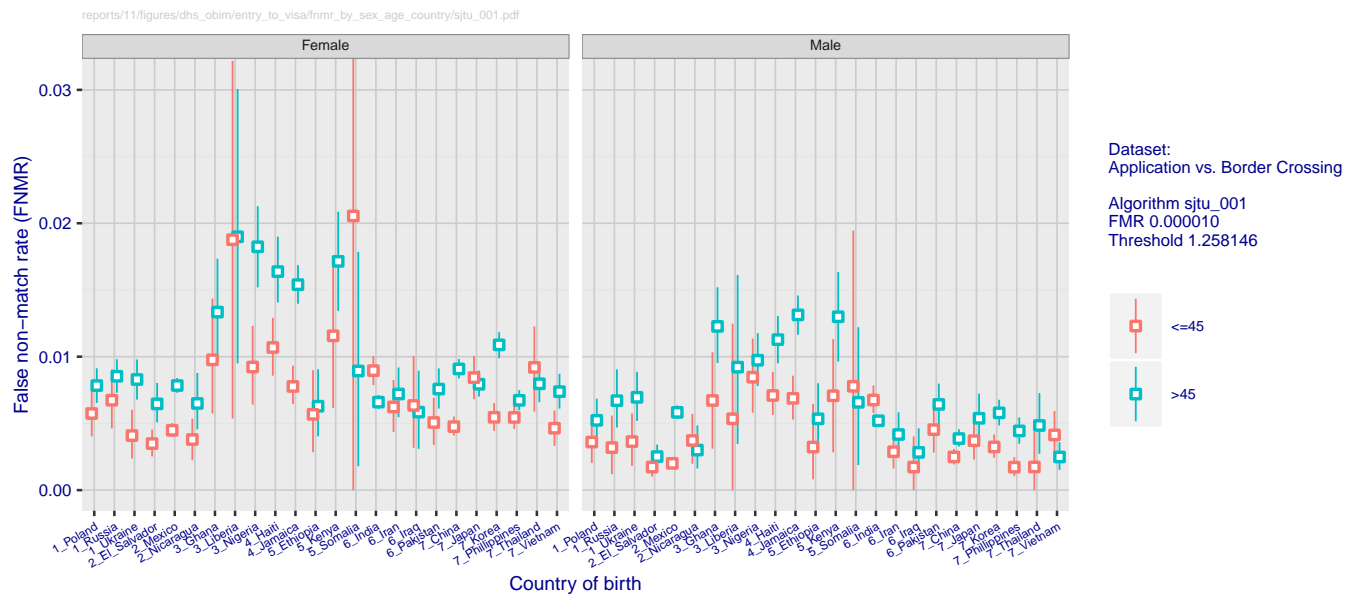


Figure 101: FNMR by sex, age and country of birth, sjtu-001

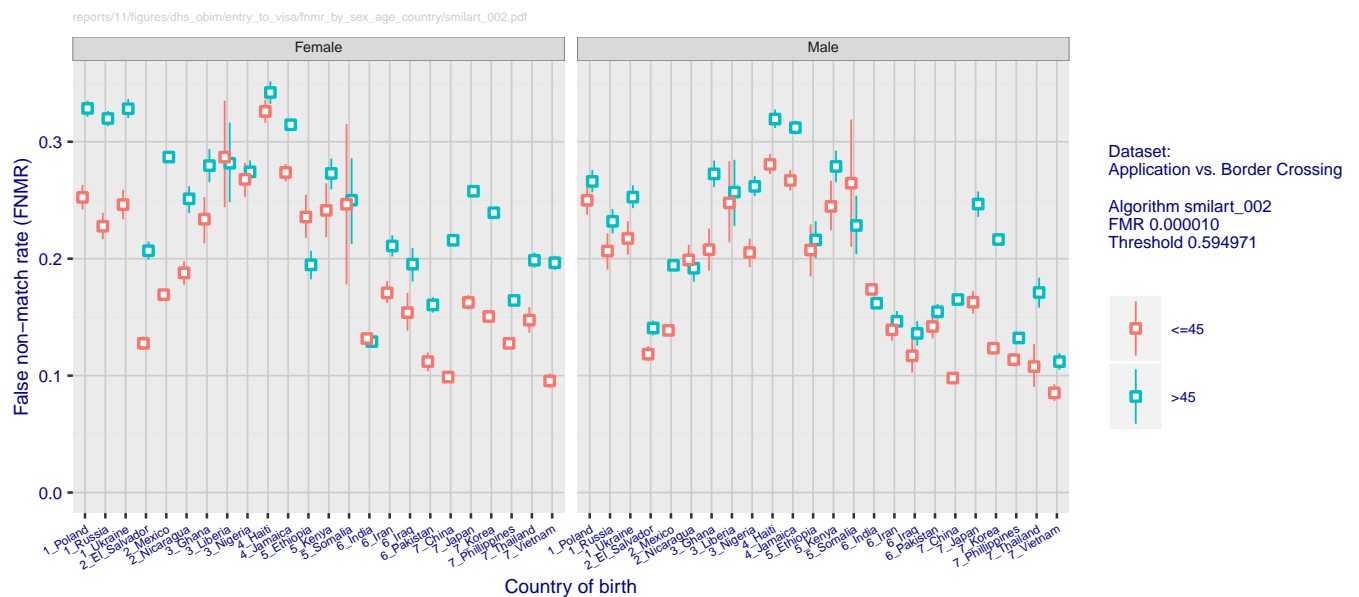


Figure 102: FNMR by sex, age and country of birth, smilart-002

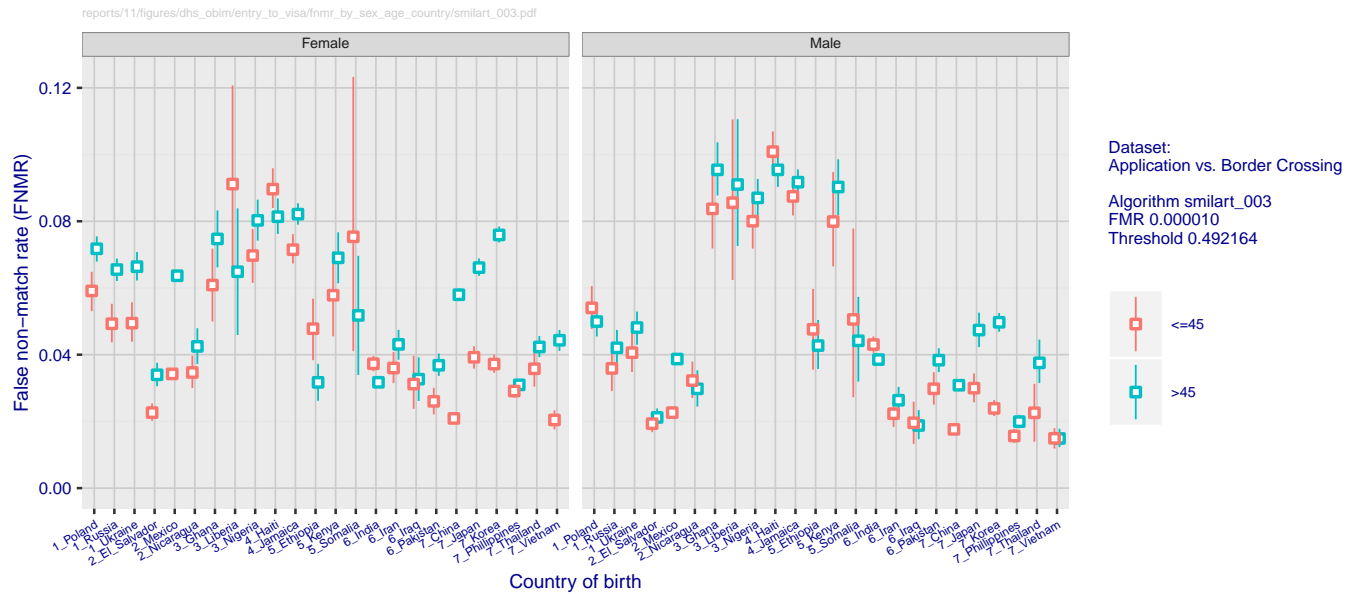


Figure 103: FNMR by sex, age and country of birth, smilart-003

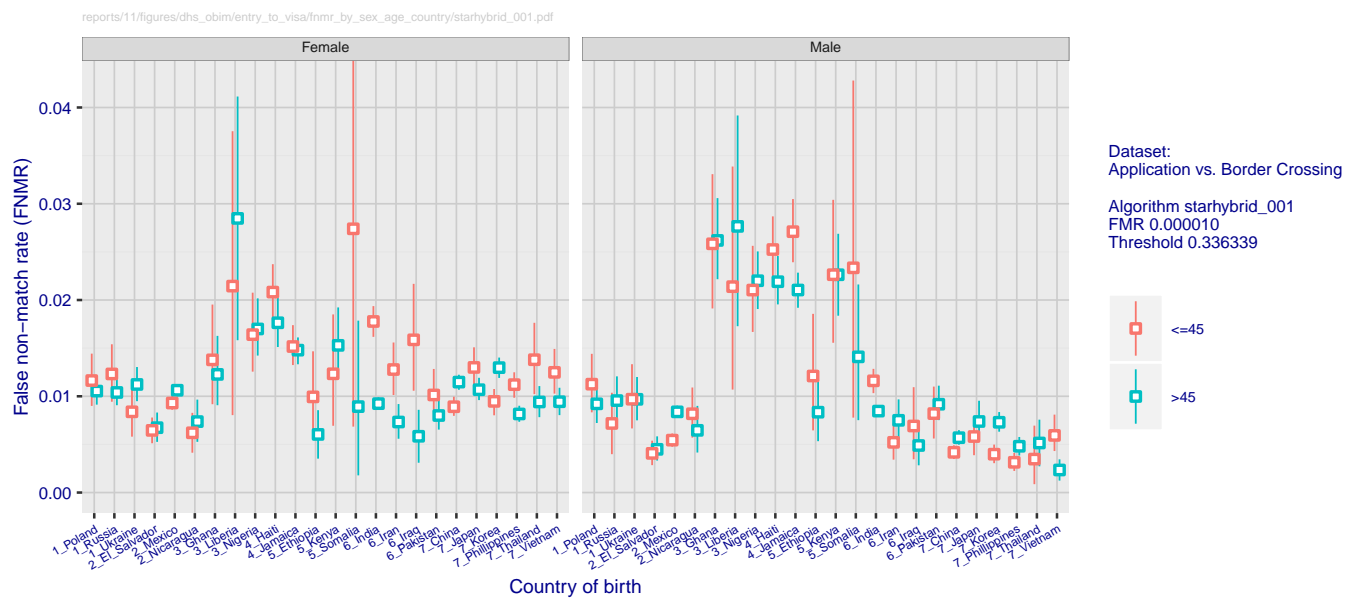


Figure 104: FNMR by sex, age and country of birth, starhybrid-001

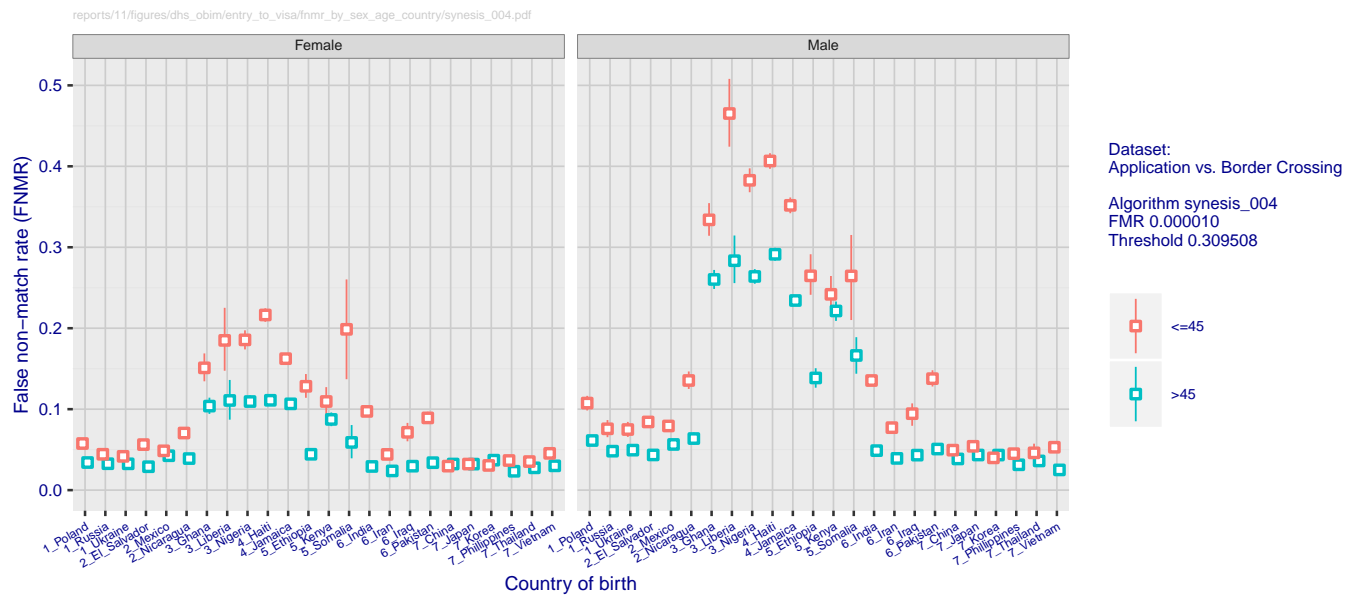


Figure 105: FNMR by sex, age and country of birth, synesis-004

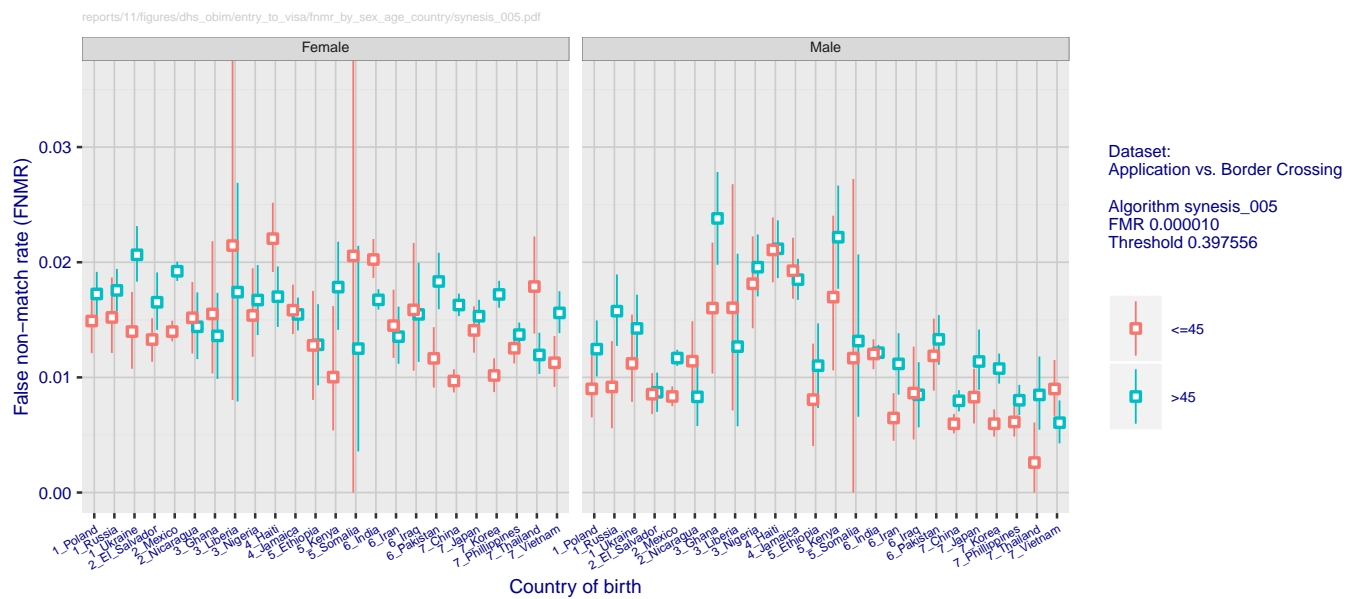


Figure 106: FNMR by sex, age and country of birth, synesis-005



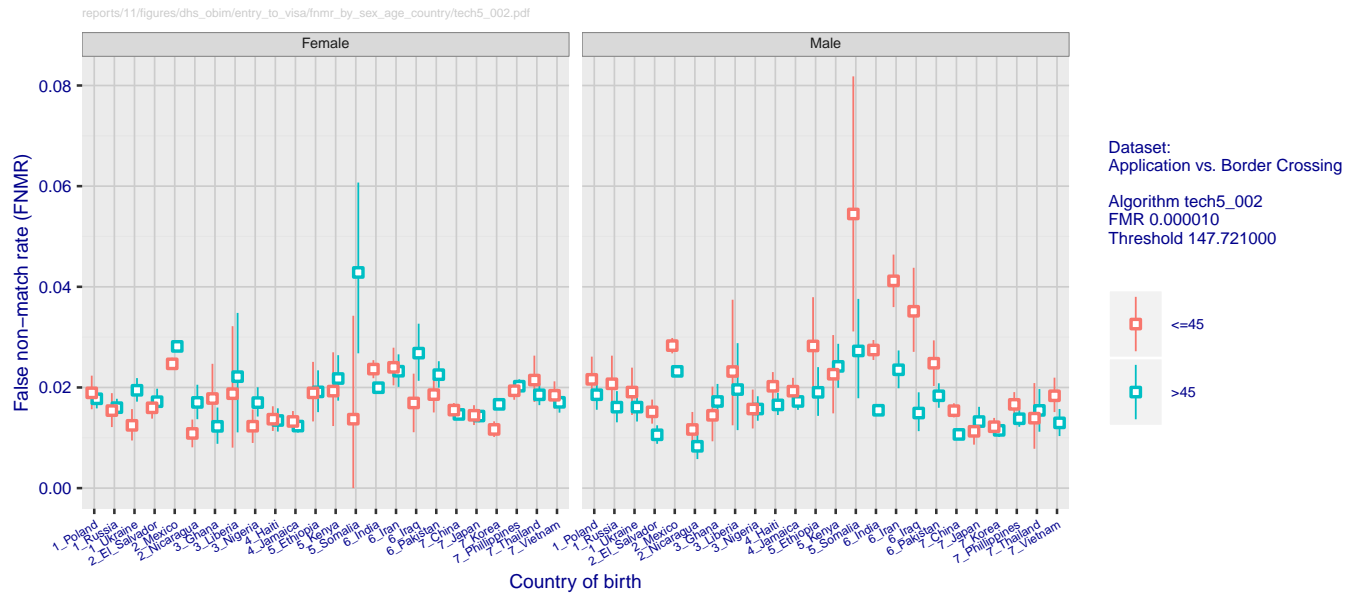


Figure 107: FNMR by sex, age and country of birth, tech5-002

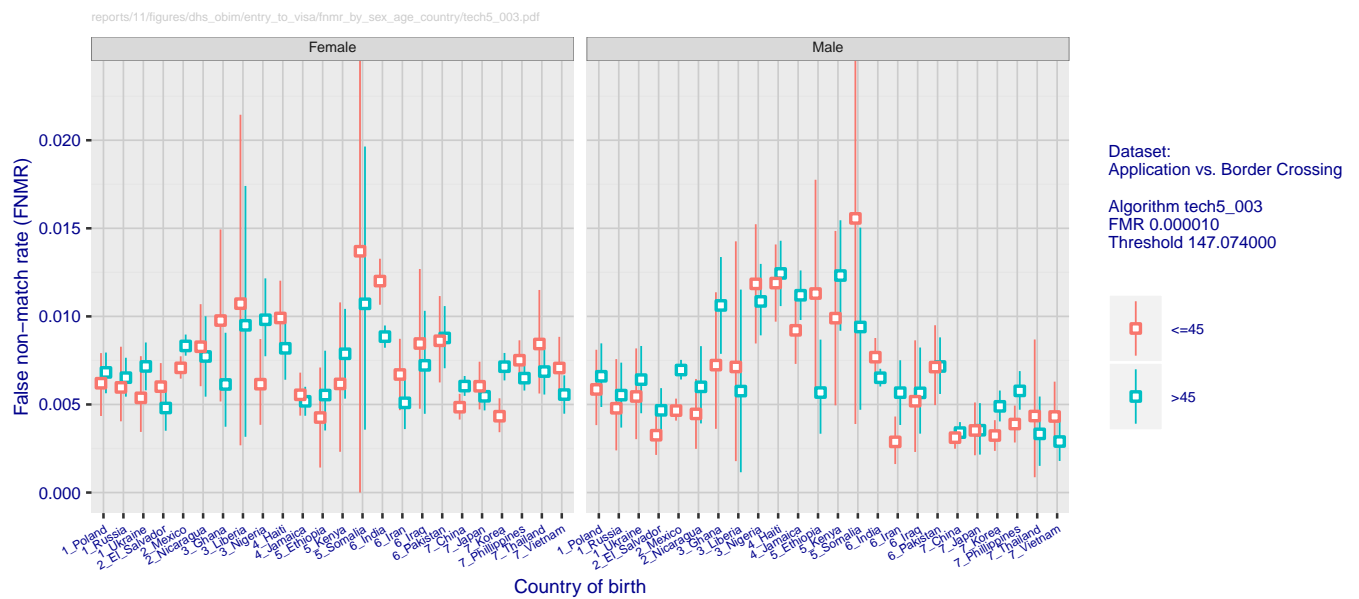


Figure 108: FNMR by sex, age and country of birth, tech5-003

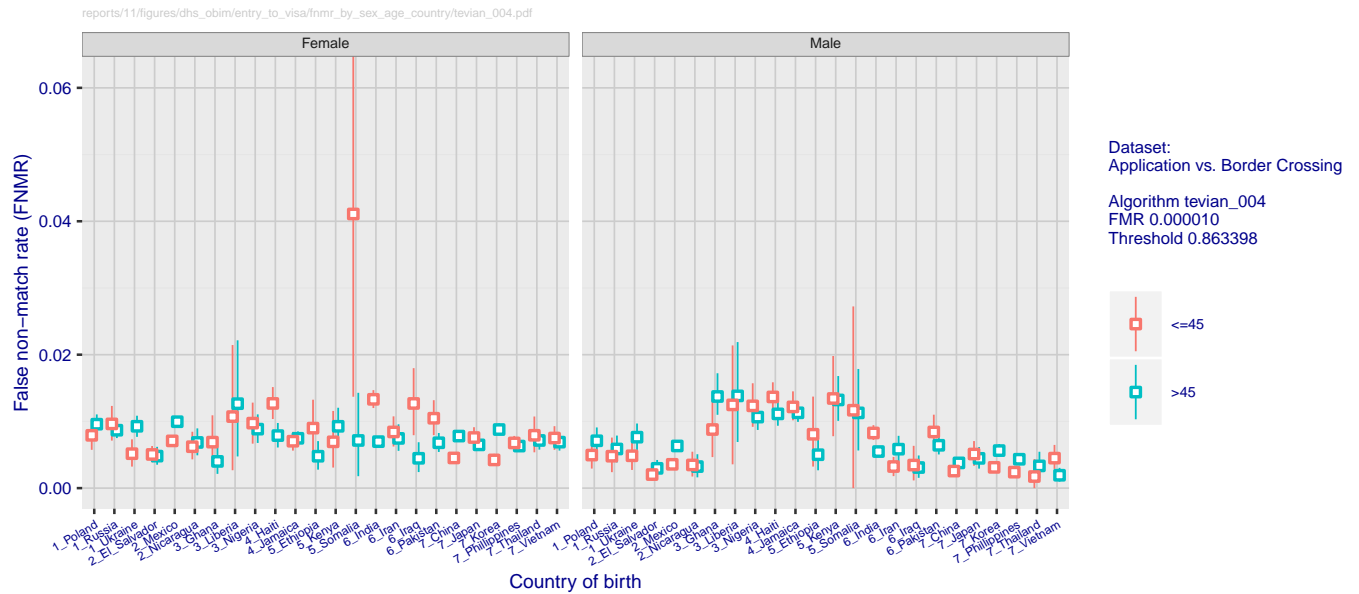


Figure 109: FNMR by sex, age and country of birth, tevia-004

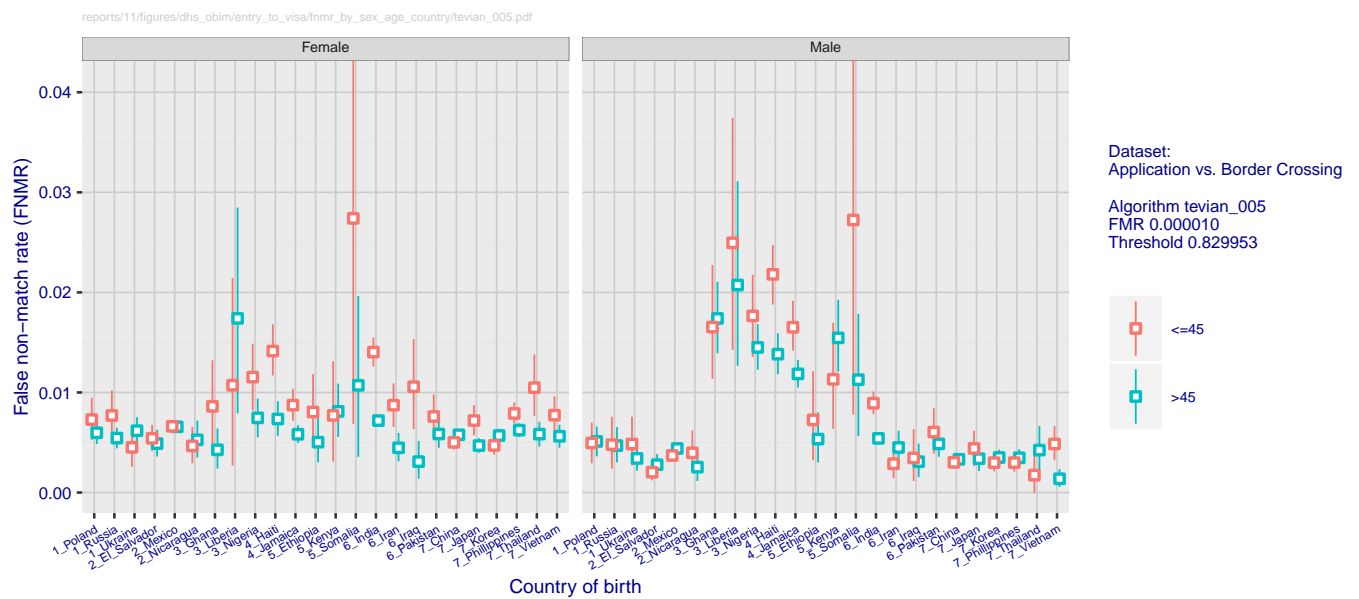


Figure 110: FNMR by sex, age and country of birth, tevia-005

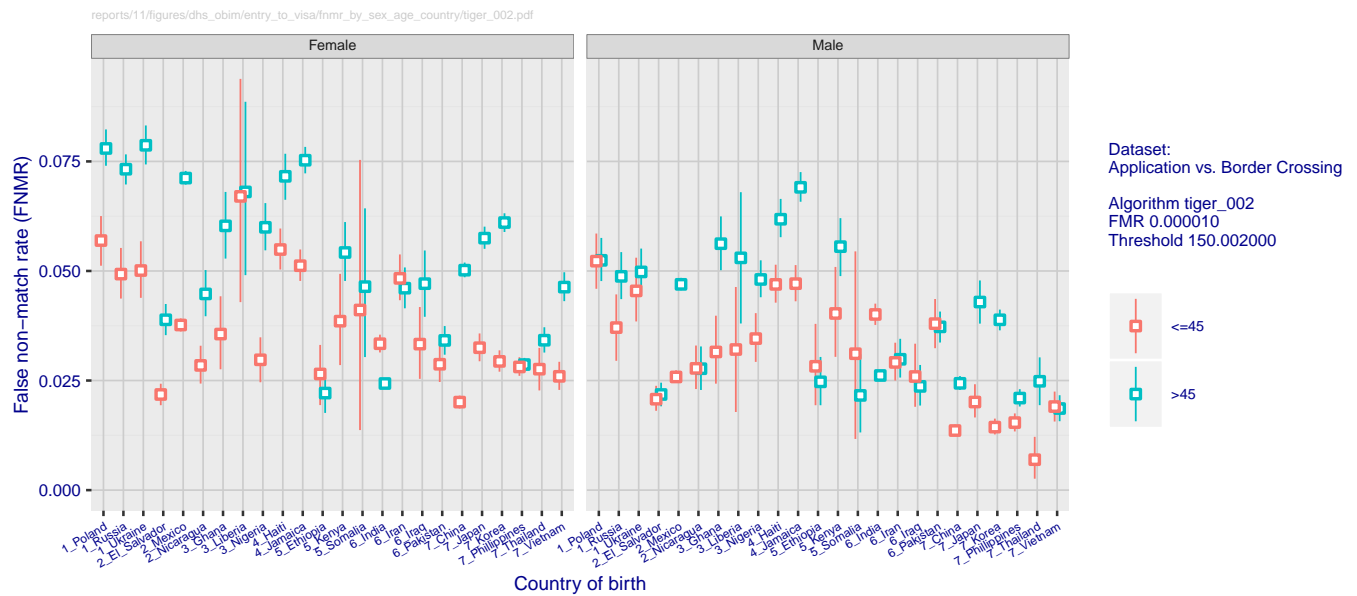


Figure 111: FNMR by sex, age and country of birth, tiger-002

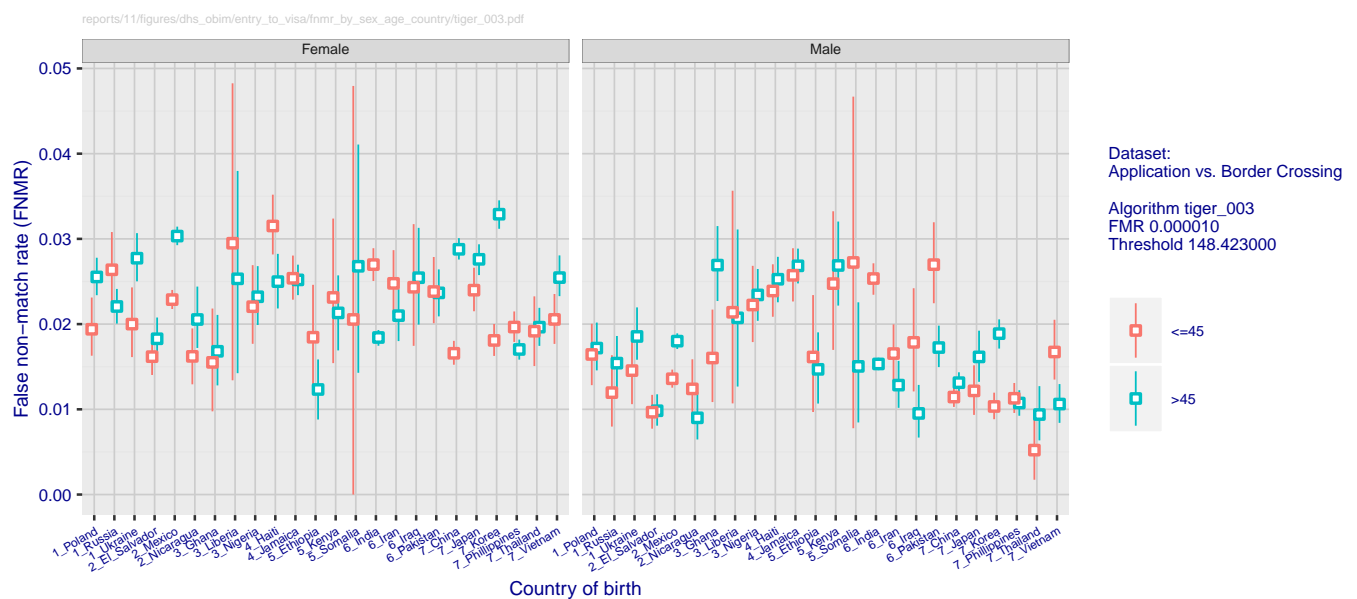


Figure 112: FNMR by sex, age and country of birth, tiger-003

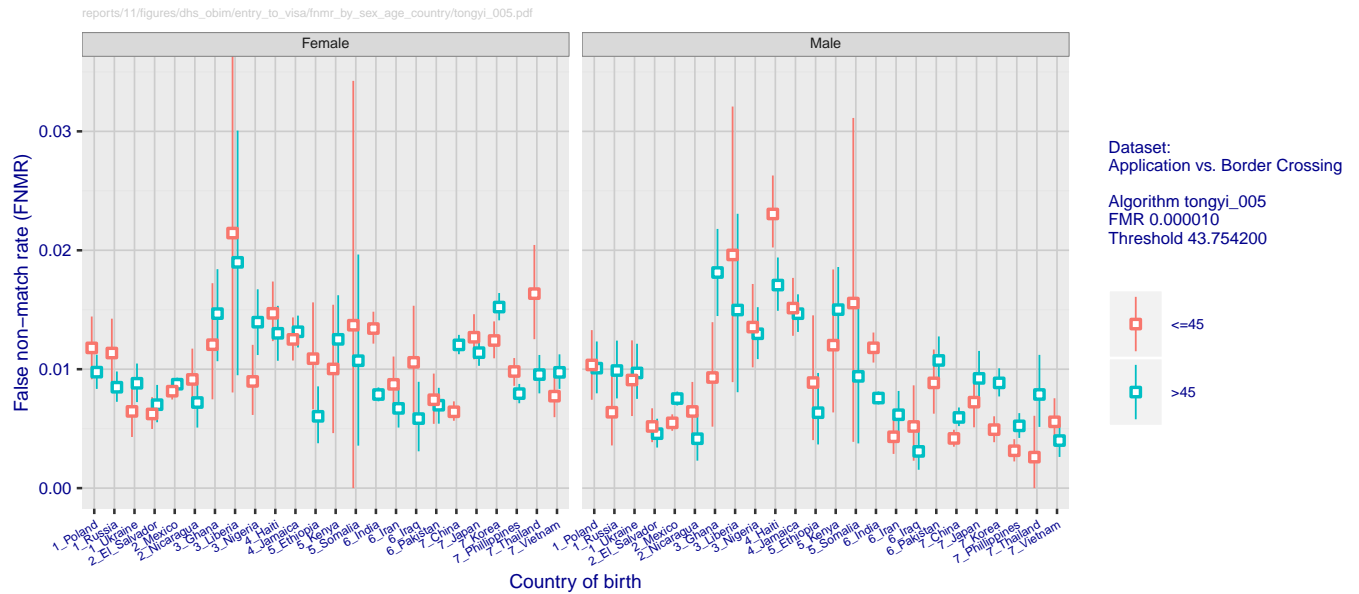


Figure 113: FNMR by sex, age and country of birth, tongyi-005

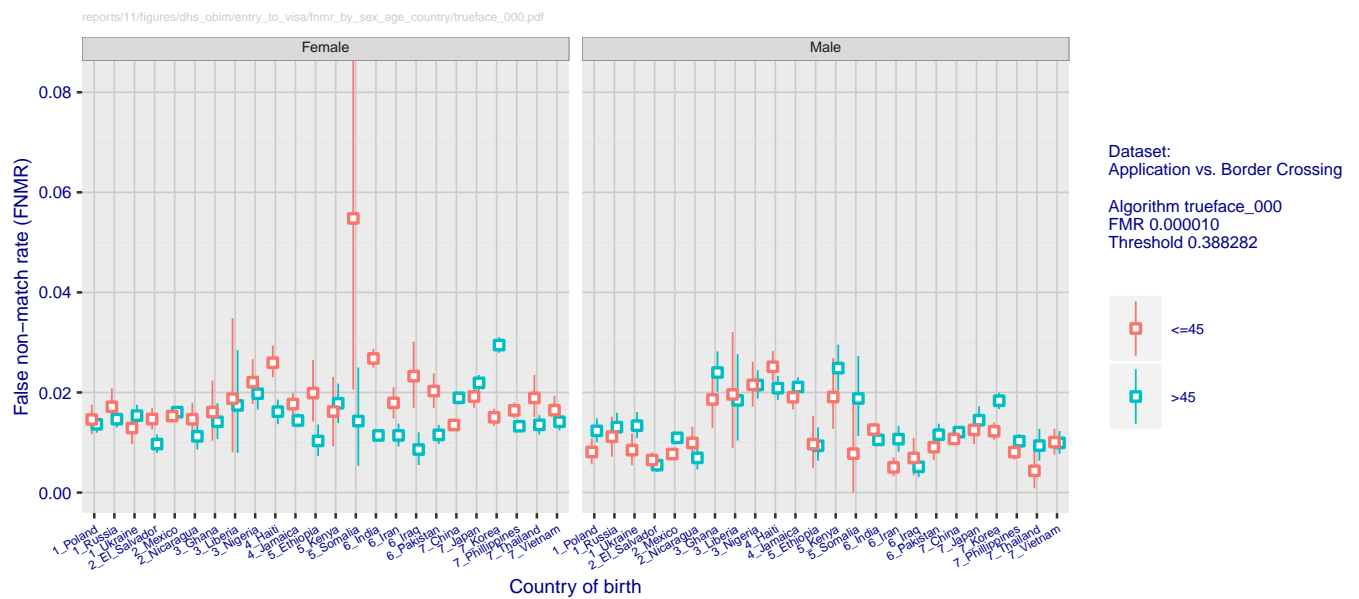


Figure 114: FNMR by sex, age and country of birth, trueface-000

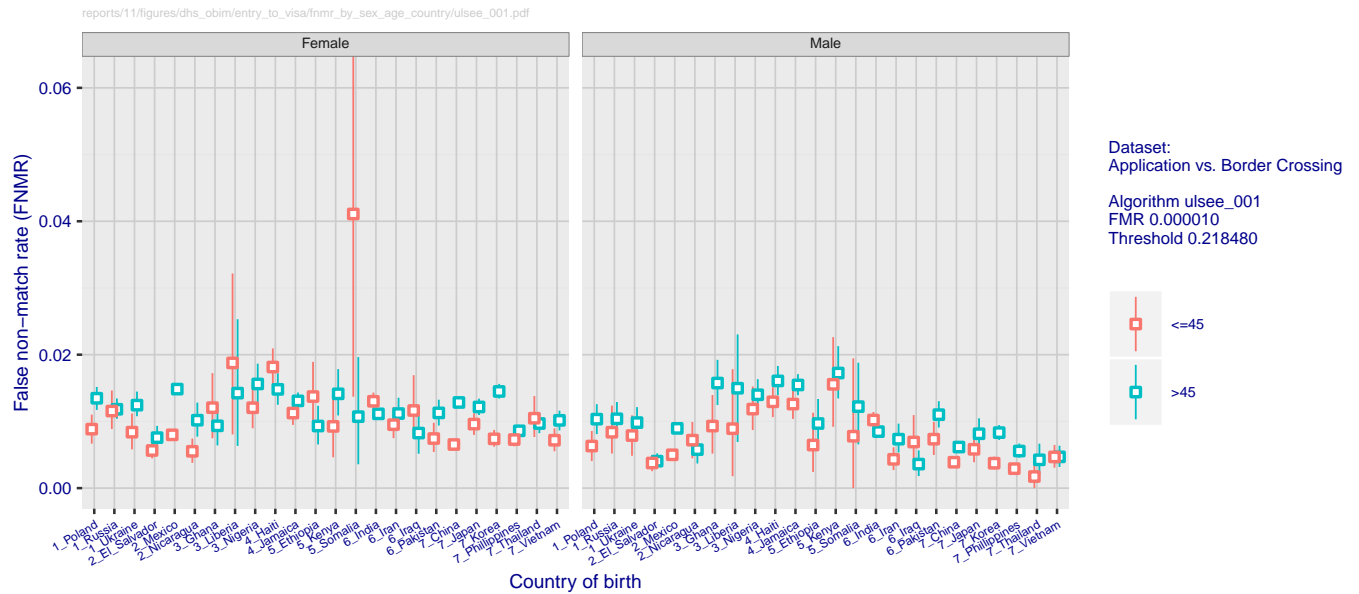


Figure 115: FNMR by sex, age and country of birth, ulsee-001

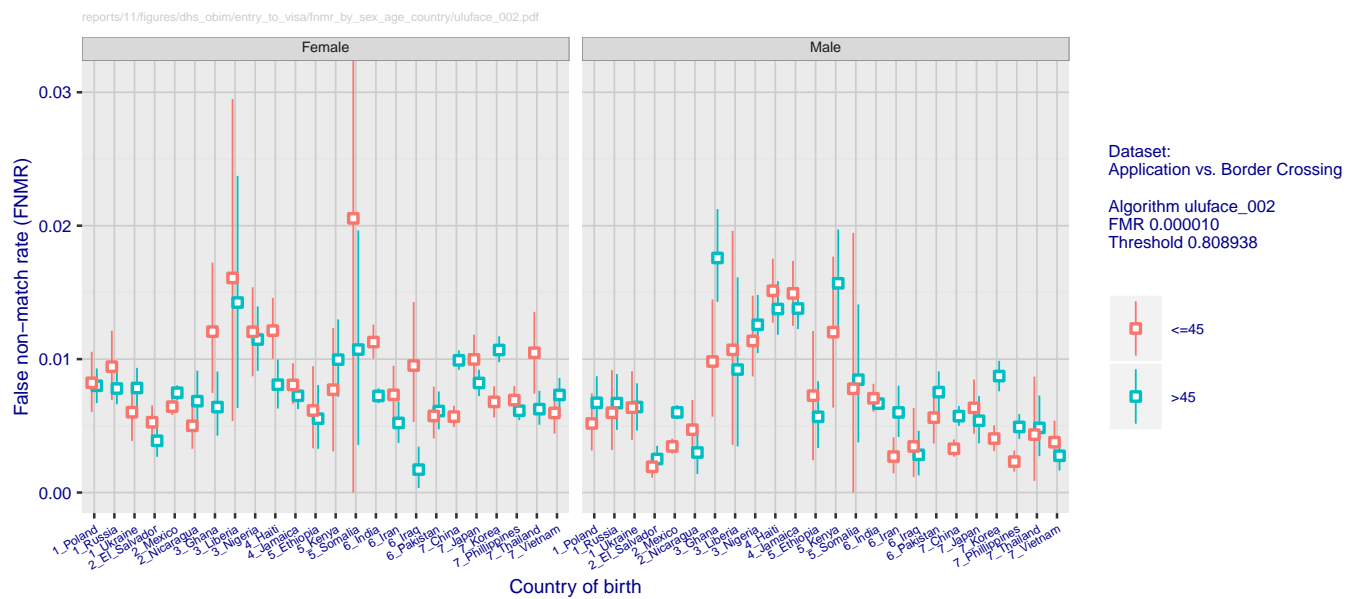


Figure 116: FNMR by sex, age and country of birth, uluface-002

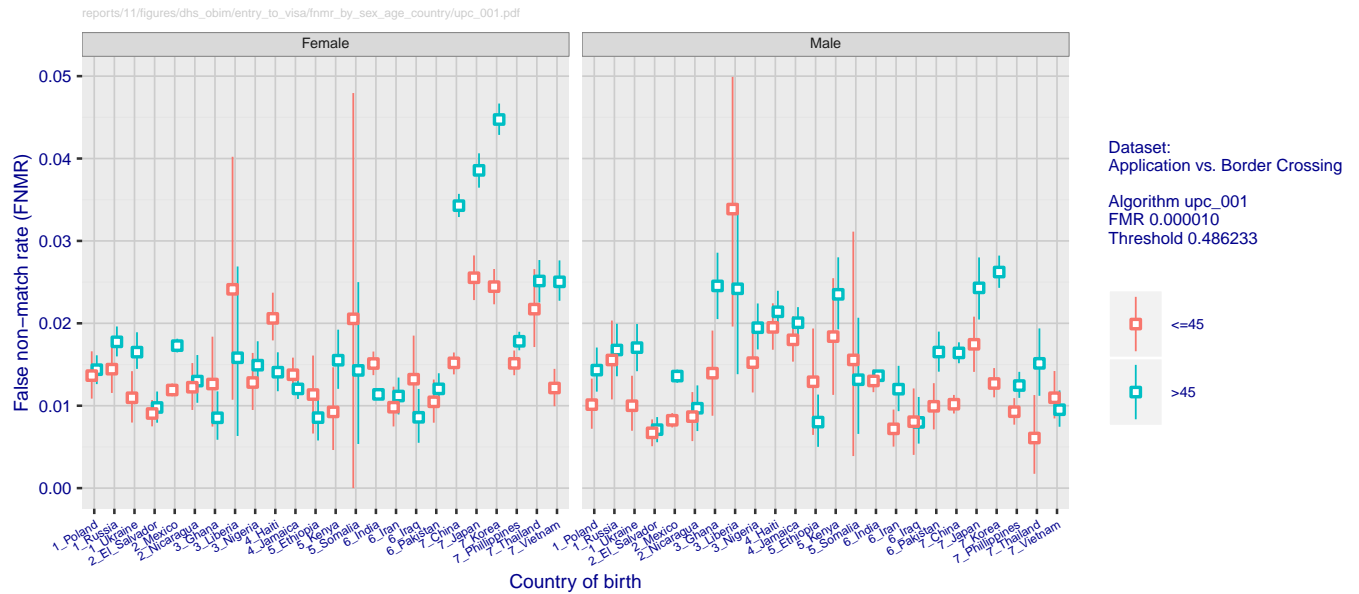


Figure 117: FNMR by sex, age and country of birth, upc-001

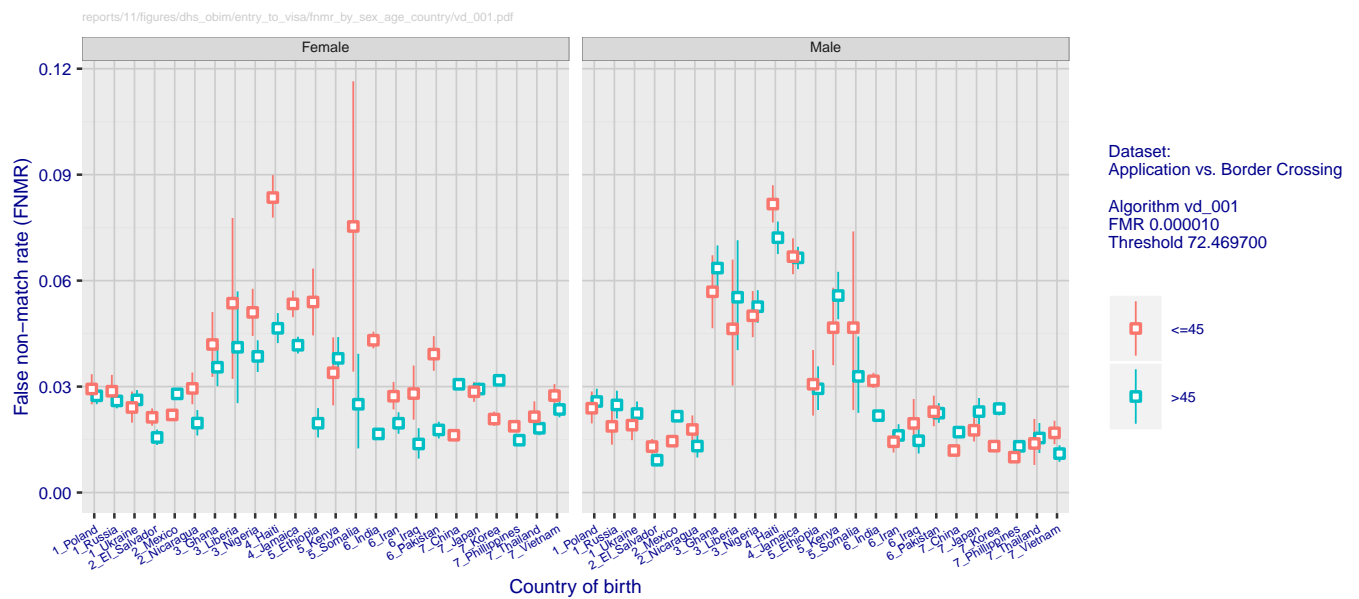


Figure 118: FNMR by sex, age and country of birth, vd-001

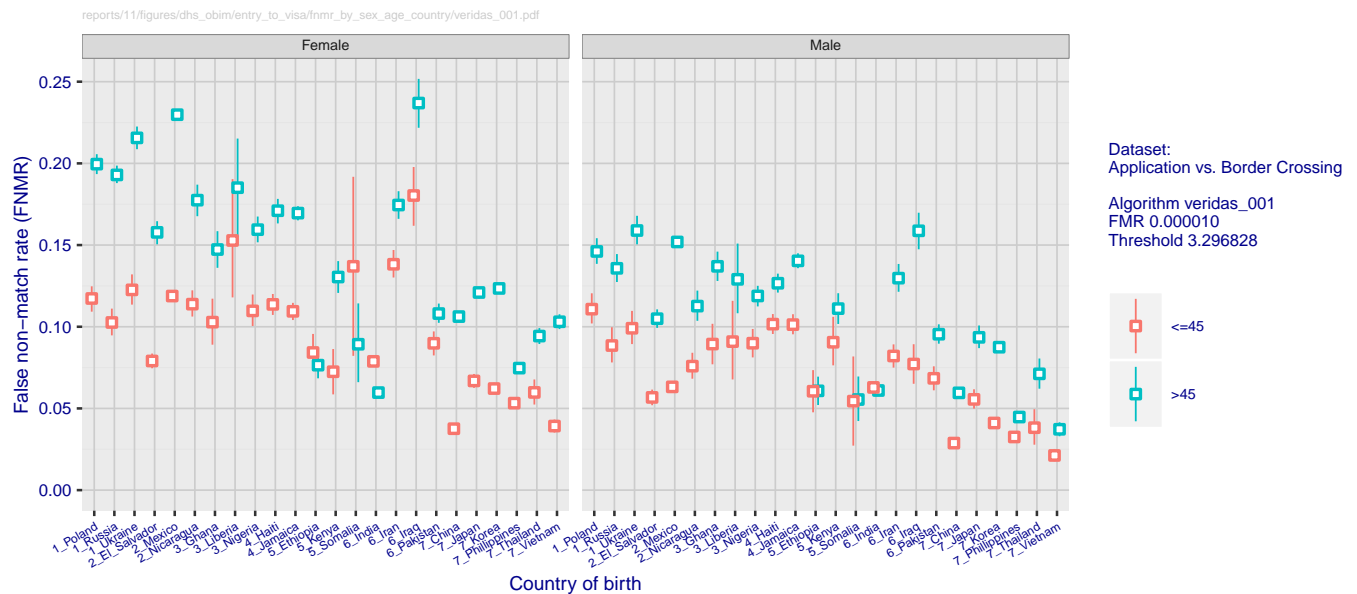


Figure 119: FNMR by sex, age and country of birth, veridas-001

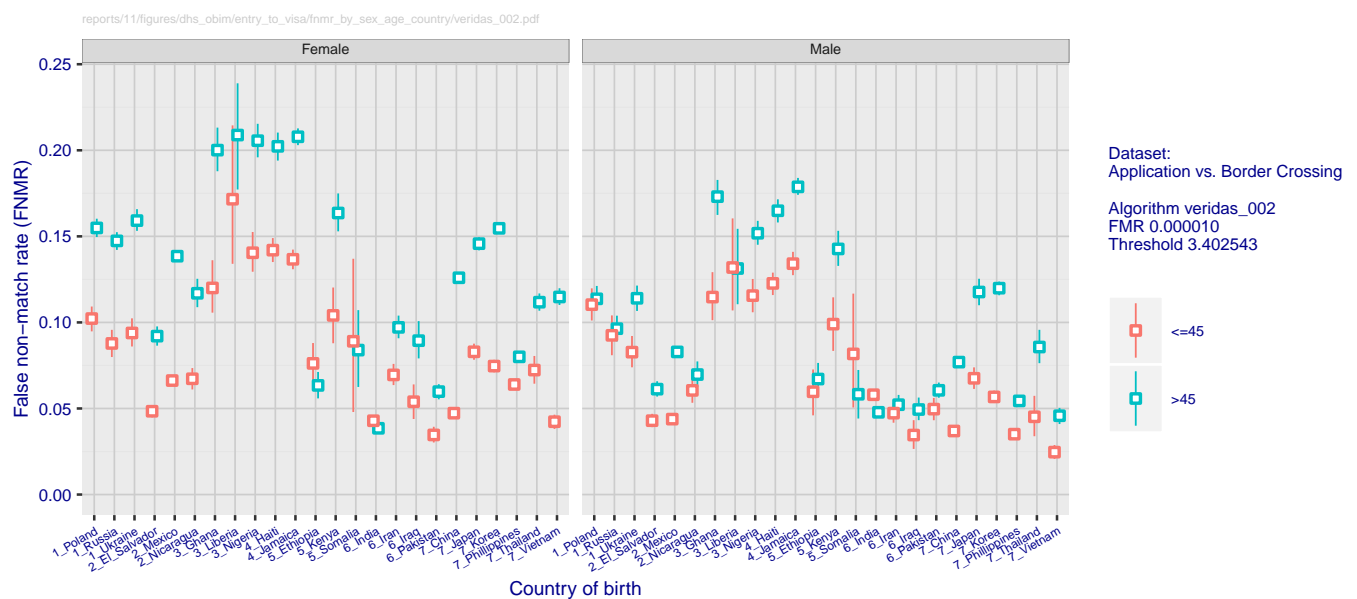


Figure 120: FNMR by sex, age and country of birth, veridas-002

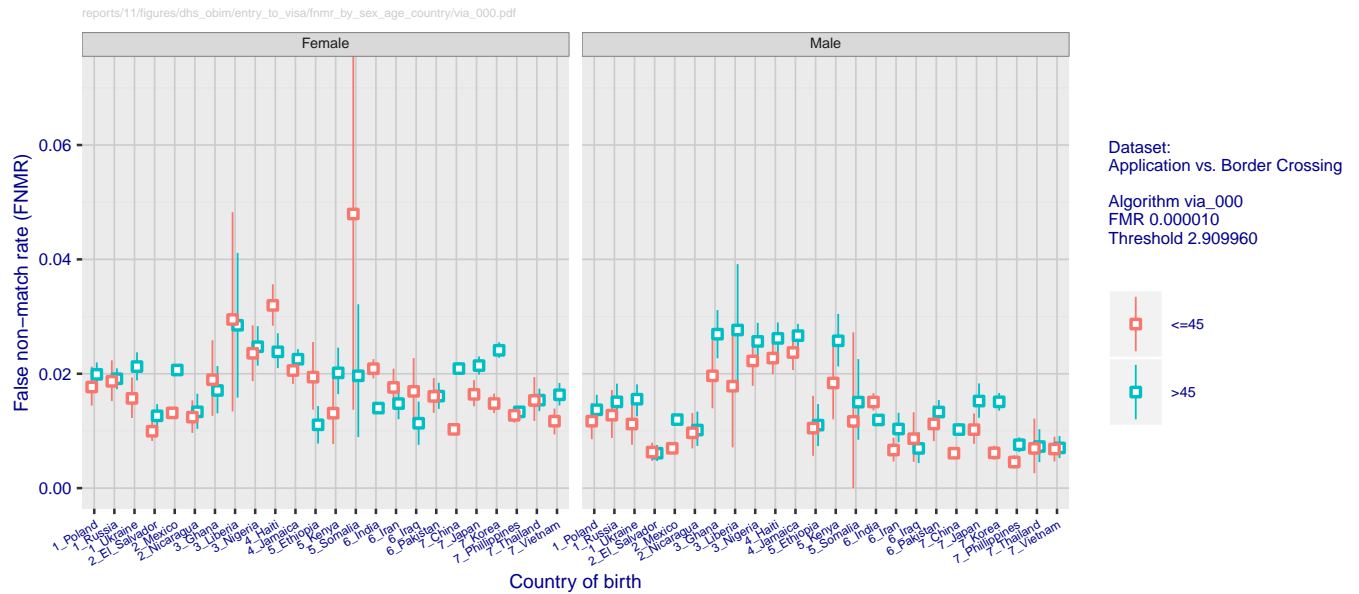


Figure 121: FNMR by sex, age and country of birth, via-000

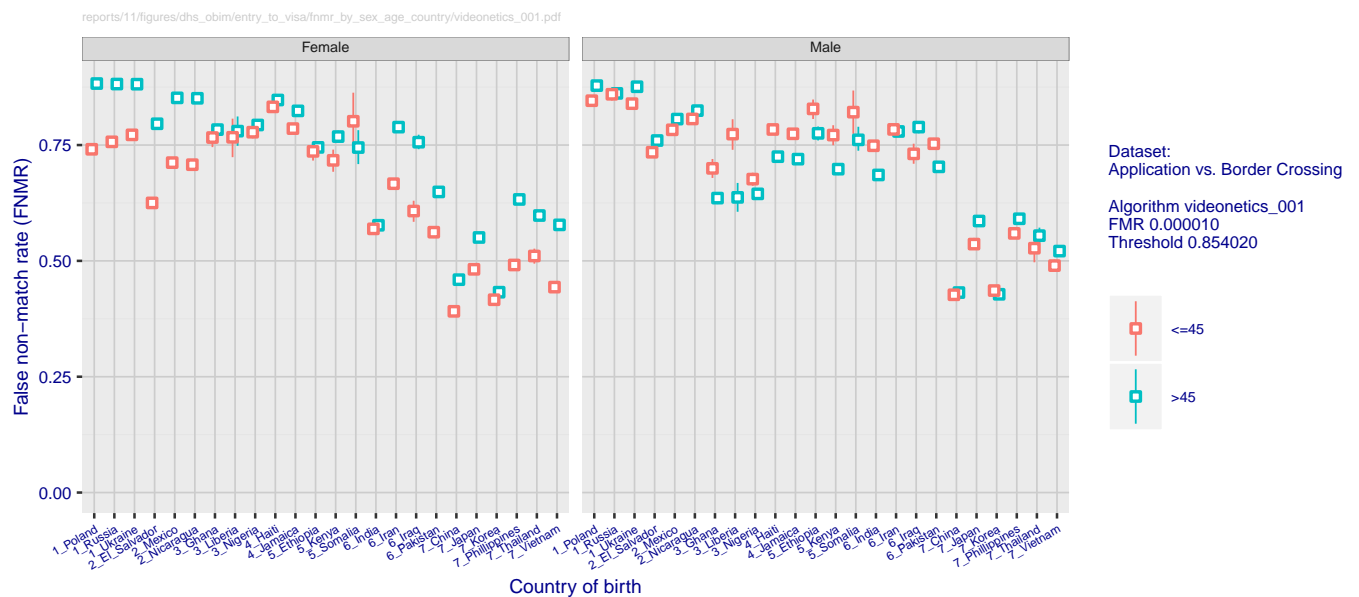


Figure 122: FNMR by sex, age and country of birth, videonetics-001



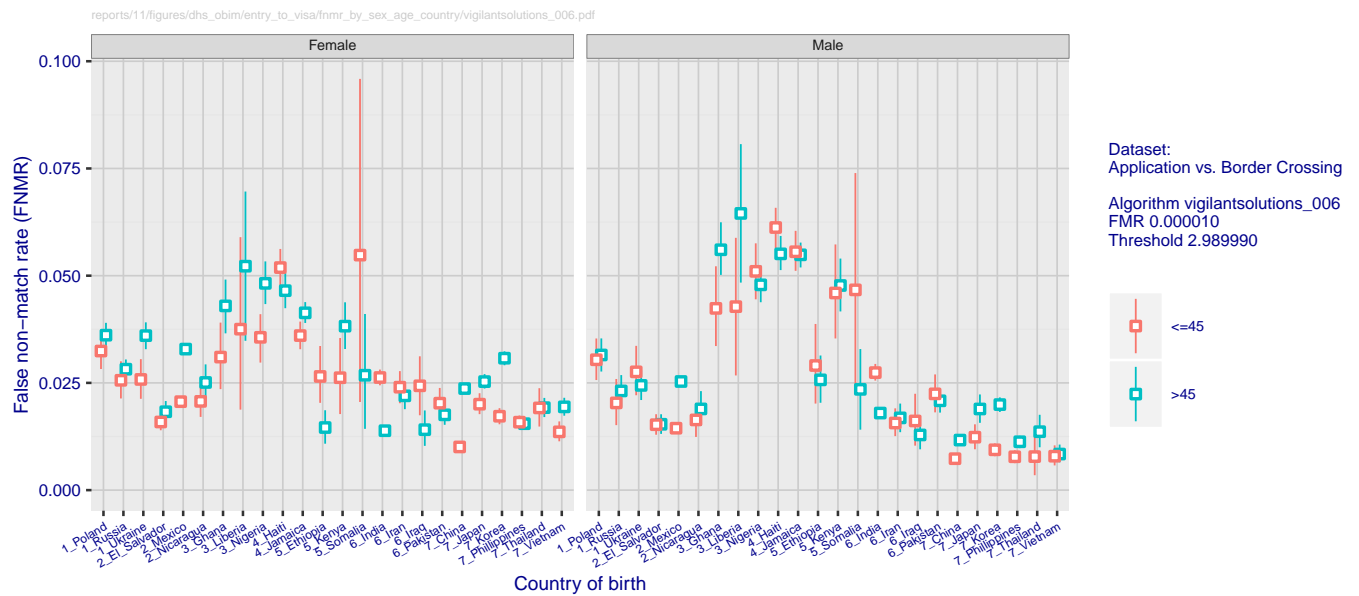


Figure 123: FNMR by sex, age and country of birth, vigilantsolutions-006

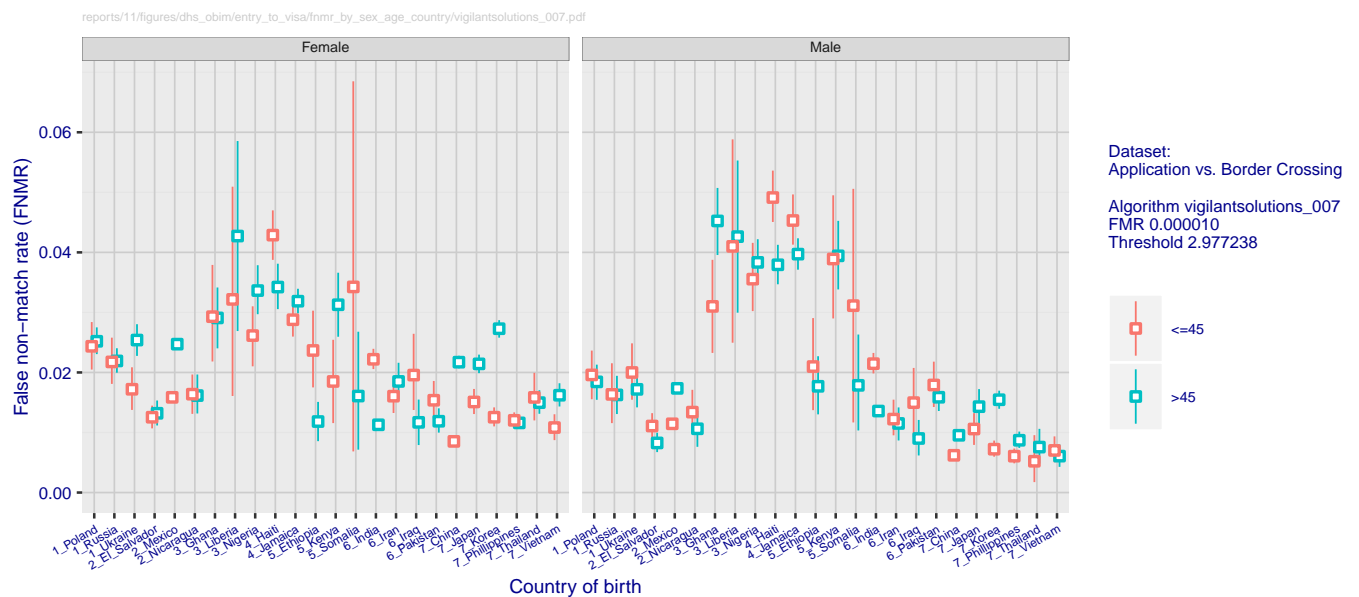


Figure 124: FNMR by sex, age and country of birth, vigilantsolutions-007

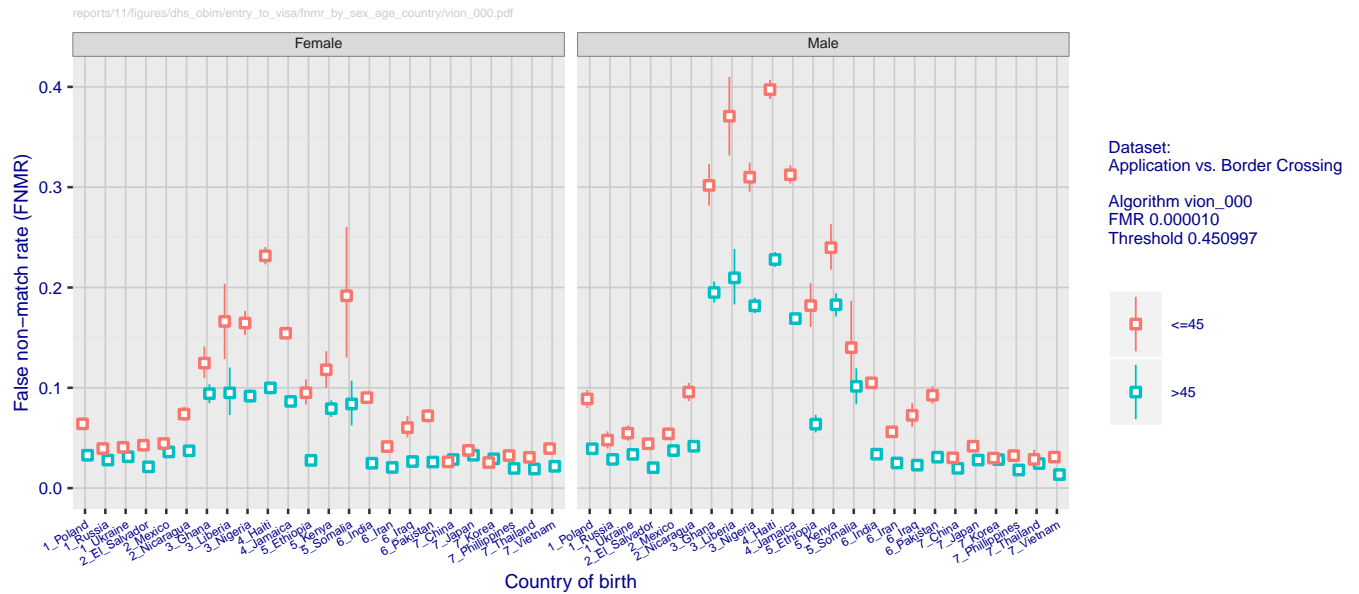


Figure 125: FNMR by sex, age and country of birth, vion-000

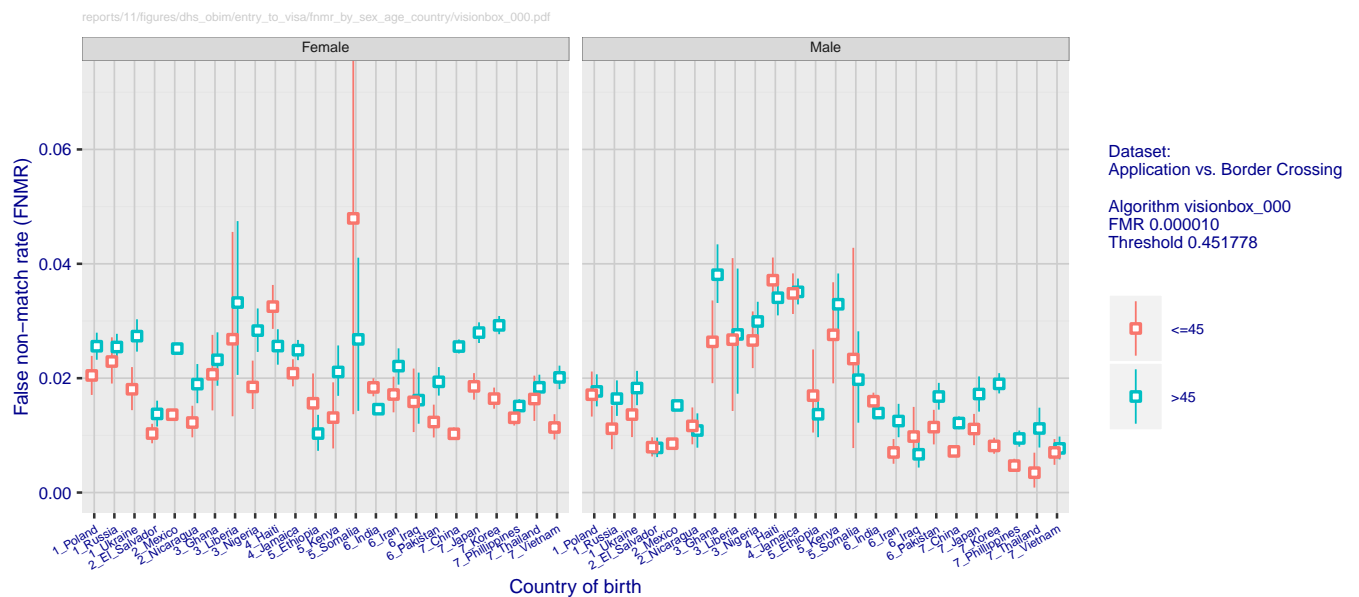


Figure 126: FNMR by sex, age and country of birth, visionbox-000

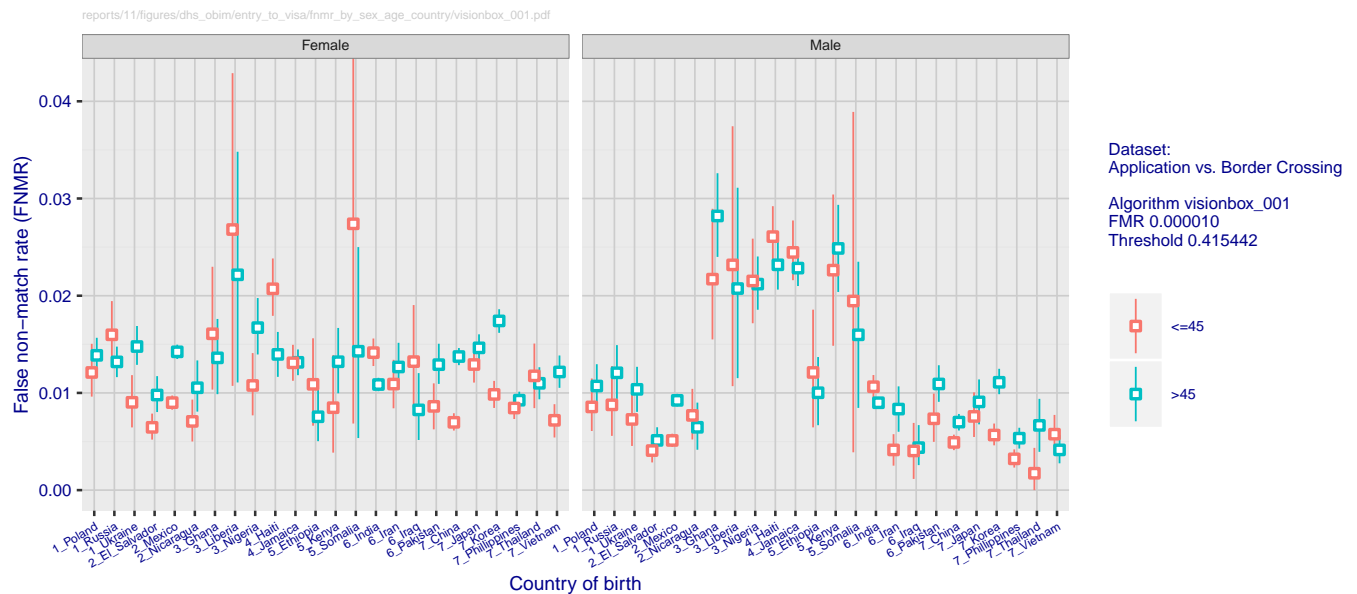


Figure 127: FNMR by sex, age and country of birth, visionbox-001

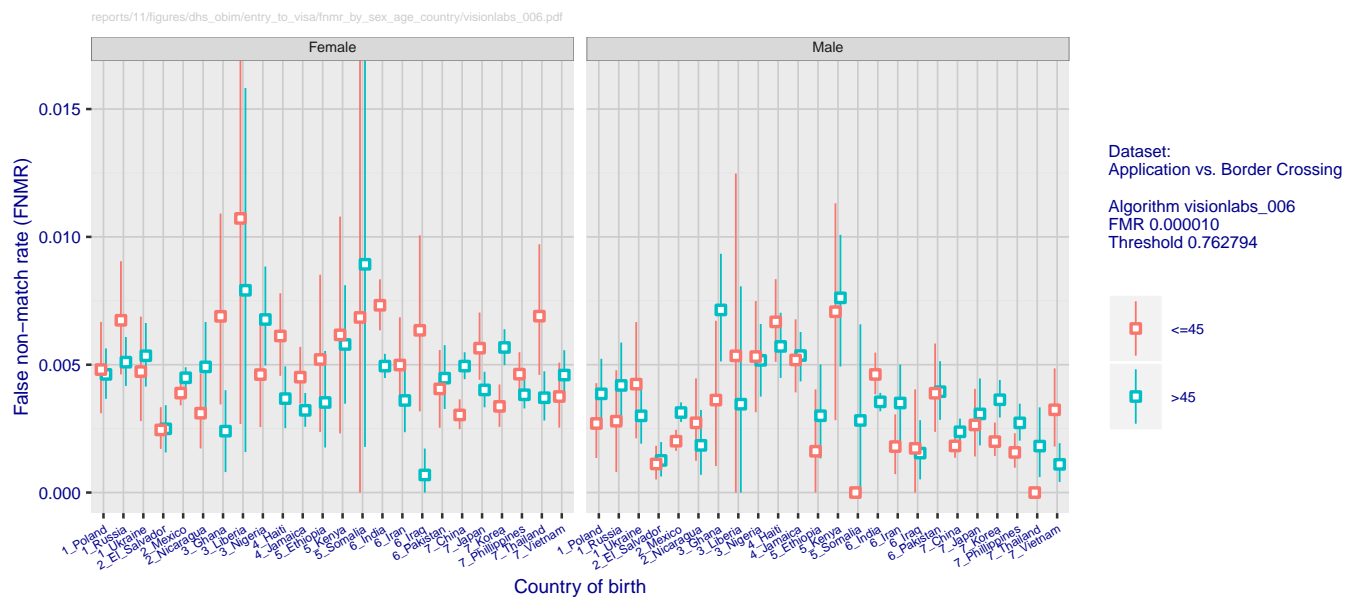


Figure 128: FNMR by sex, age and country of birth, visionlabs-006

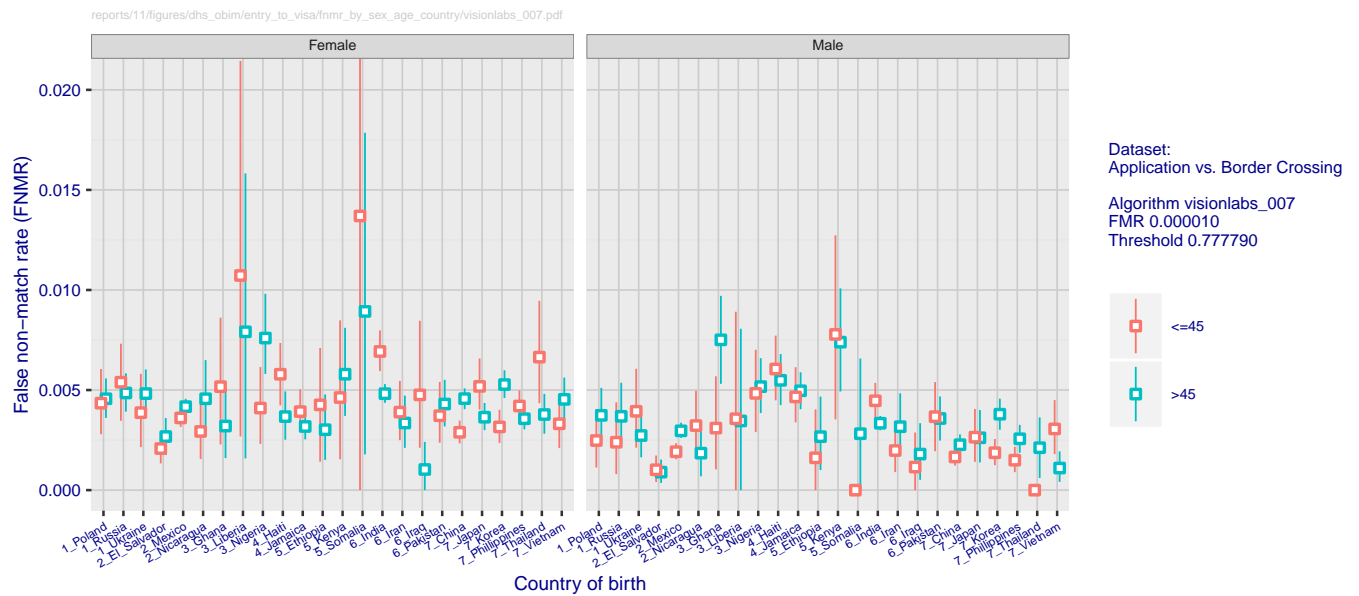


Figure 129: FNMR by sex, age and country of birth, visionlabs-007

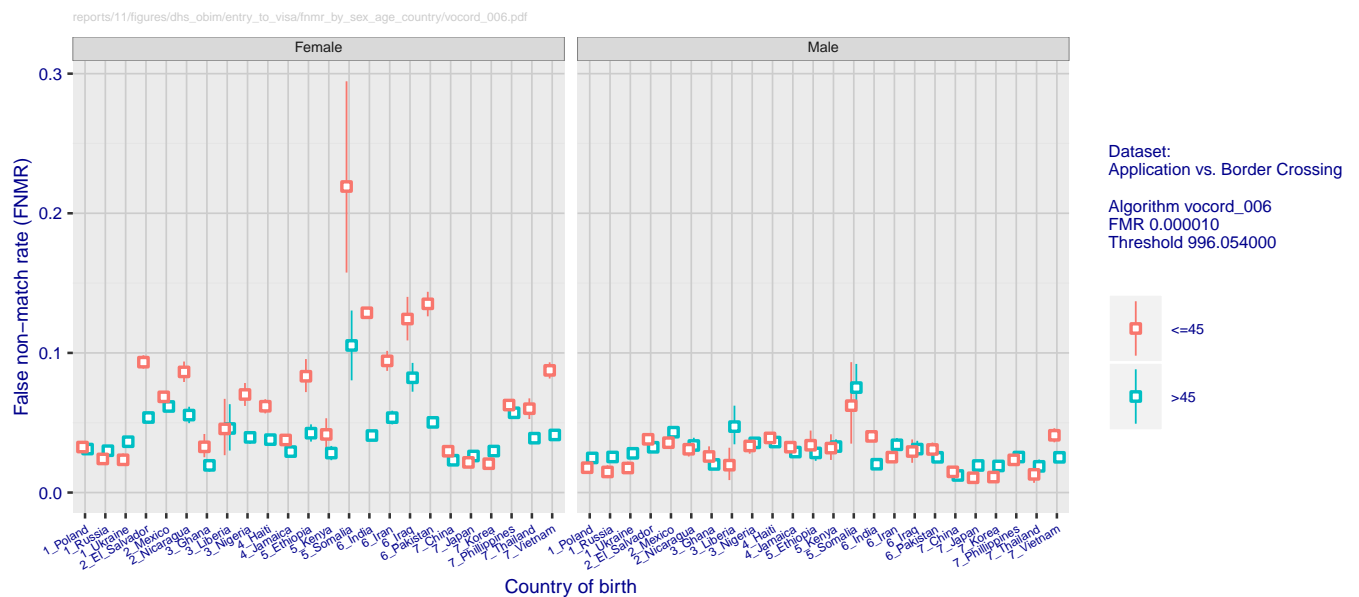


Figure 130: FNMR by sex, age and country of birth, vocord-006

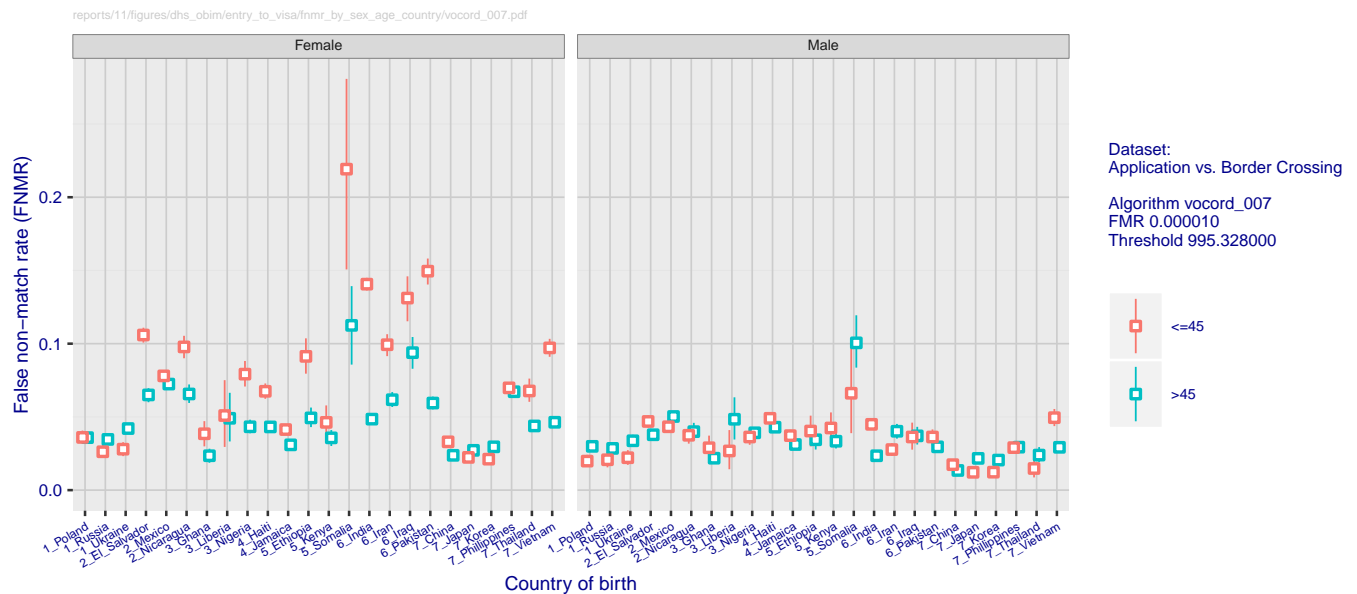


Figure 131: FNMR by sex, age and country of birth, vocord-007

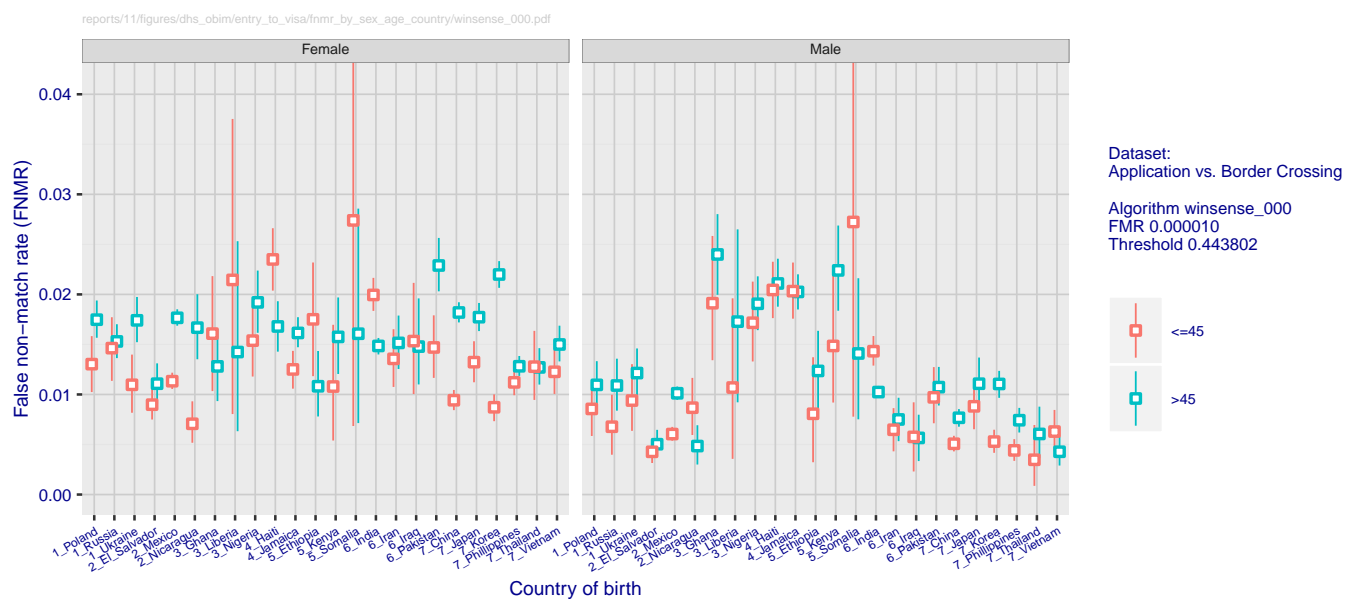


Figure 132: FNMR by sex, age and country of birth, winsense-000

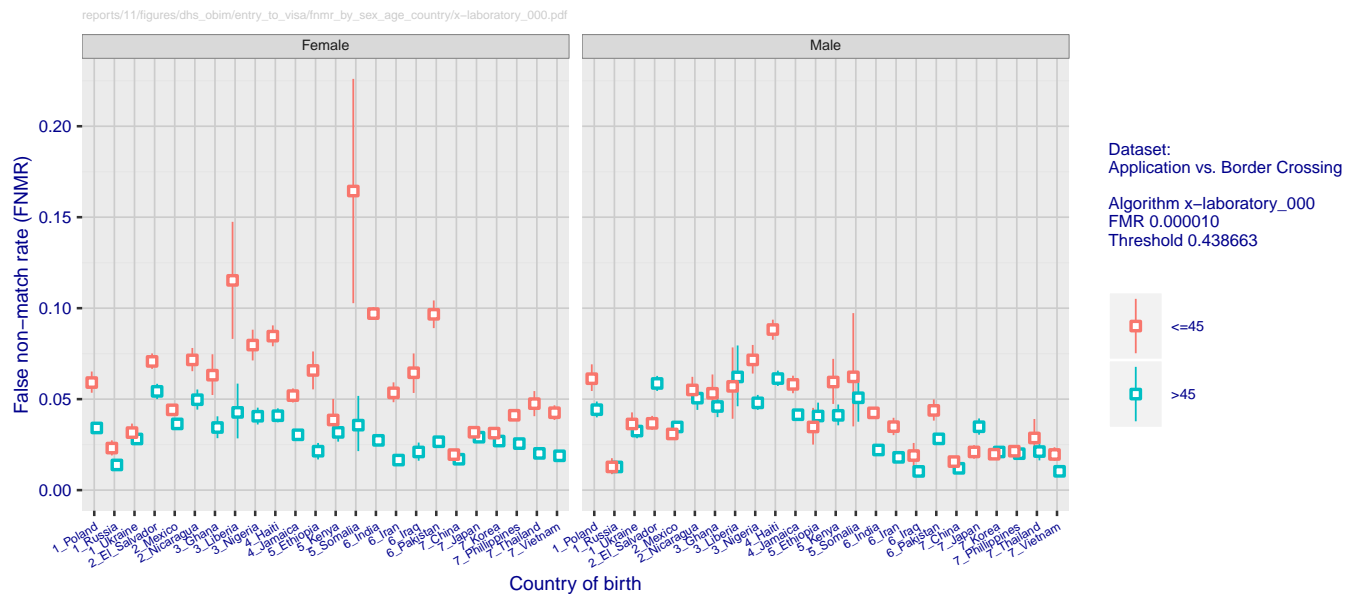


Figure 133: FNMR by sex, age and country of birth, x-laboratory-000

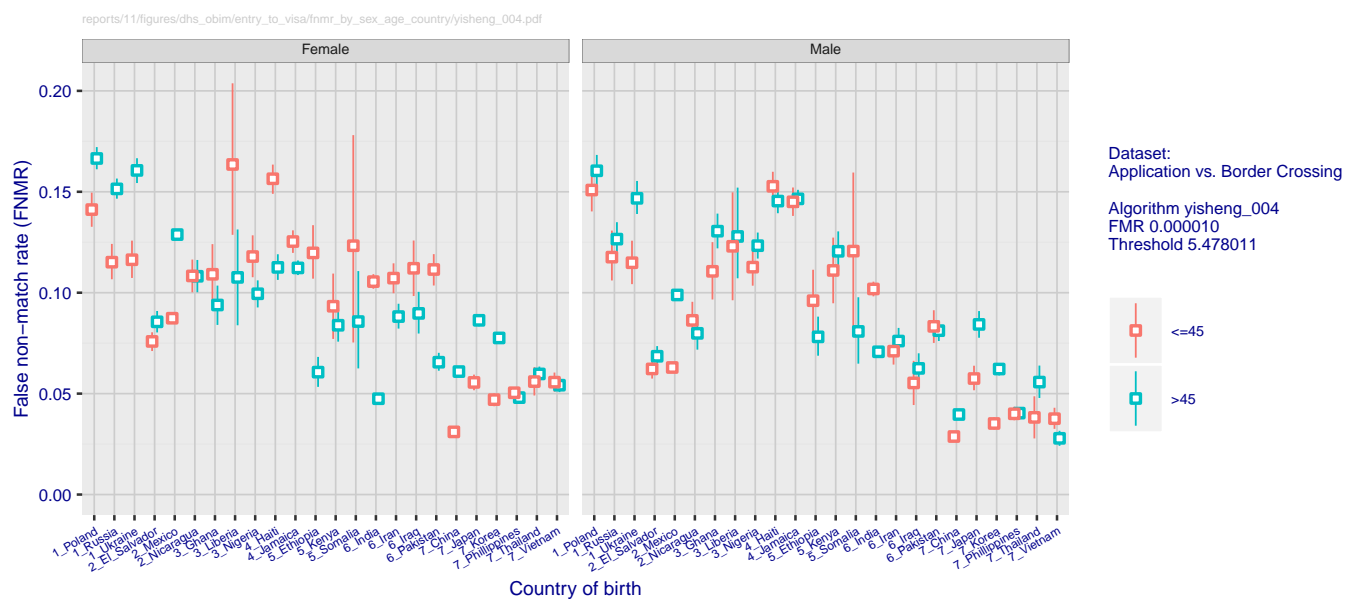


Figure 134: FNMR by sex, age and country of birth, yisheng-004

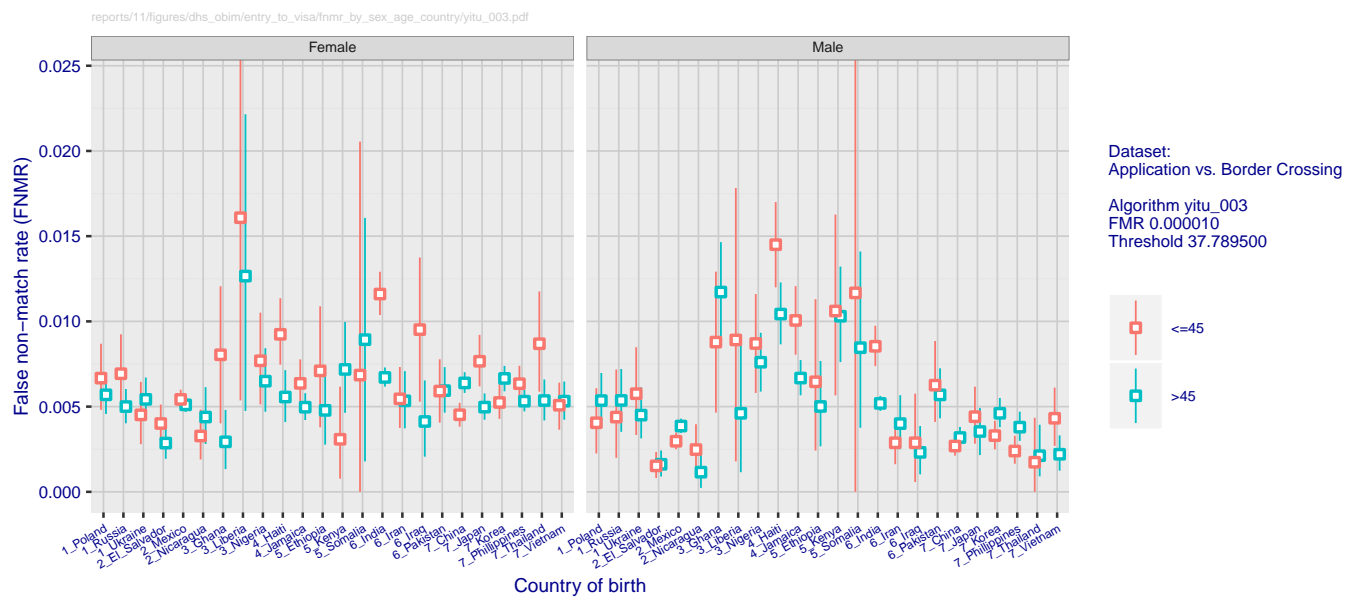


Figure 135: FNMR by sex, age and country of birth, yitu-003