

Supplementary Table 3 Age- and sex-specific reference intervals (P2.5–P97.5 with 90% bootstrap confidence intervals) and out-of-range rates under current uniform intervals for 16 laboratory biomarkers.

Indicator	Sex	Age_	N	Mean	SD	Media	P2.5	P97.5	P2.5_90CI	P97.5_90CI	Existing	OOB
		Group				n					RI	existing_pct
ALT	Male	18-34	406	26.35	18.66	21	9	82.88	8.0-9.0	66.0-96.5	9-50	11.1
ALT	Male	35-49	427	29.98	19.28	25	10	83	8.0-11.0	75.0-90.0	9-50	12.4
ALT	Male	50-59	291	23.38	9.72	21	11	51	11.0-12.0	46.8-53.8	9-50	4.1
ALT	Male	60-69	399	21.35	9.76	19	10	42	9.0-11.0	39.0-47.1	9-50	2.5
ALT	Male	70+	370	19.74	9.44	17	9	45.55	8.0-9.2	38.0-49.3	9-50	3.2
ALT	Female	18-34	437	13.7	7.7	12	6.9	35.1	6.0-7.0	30.1-36.7	7-40	3.9
ALT	Female	35-49	517	17.89	12.04	15	8	51	8.0-8.0	42.2-60.0	7-40	5.4
ALT	Female	50-59	485	21.43	14.18	18	8.1	54.7	8.0-9.0	47.7-63.9	7-40	6.6
ALT	Female	60-69	545	20.69	13.16	18	9	45	8.0-10.0	42.0-56.0	7-40	4.4
ALT	Female	70+	514	18.27	9.8	16	9	42.18	8.0-10.0	35.0-45.4	7-40	3.3
AST	Male	18-34	406	23.94	13.2	21	15	53.5	14.0-15.0	43.6-59.0	15-40	7.1
AST	Male	35-49	428	24.43	8.08	22	15	46.32	14.0-15.7	43.6-48.0	15-40	7.5
AST	Male	50-59	291	23.13	6.12	22	15	42.75	13.2-16.0	36.0-44.5	15-40	5.5
AST	Male	60-69	399	23.36	6.3	23	15	38.05	15.0-15.0	35.0-44.0	15-40	3.8
AST	Male	70+	370	24.05	6.27	23	14	41	13.2-16.0	37.8-43.0	15-40	6.2
AST	Female	18-34	437	18.36	4.7	18	13	31	12.0-13.0	27.1-32.4	15-40	15.1
AST	Female	35-49	517	20.11	6.24	19	13	35.1	13.0-14.0	32.1-42.0	15-40	9.7
AST	Female	50-59	485	23.26	7.7	22	15	41.9	14.0-15.0	39.0-51.9	15-40	5.8
AST	Female	60-69	545	23.96	8.9	22	15	41	14.6-16.0	39.0-49.4	15-40	4.6
AST	Female	70+	514	24.19	9.18	22	16	43.18	15.0-16.0	39.0-49.0	15-40	4.3

GGT	Male	18-34	406	25.04	19.17	19	10	73.75	9.0-10.1	64.0-94.0	10-60	6.7
GGT	Male	35-49	428	35.59	26.34	27	11	112.32	10.6-12.0	100.6-126.0	10-60	15.4
GGT	Male	50-59	289	31.62	25.51	24	11	95.2	10.0-12.0	69.0-145.0	10-60	8
GGT	Male	60-69	399	25.87	16.5	22	11	70.2	10.0-12.0	56.1-79.3	10-60	4.3
GGT	Male	70+	370	25.44	18.01	20	10	60.77	10.0-12.0	54.8-81.4	10-60	3.8
GGT	Female	18-34	437	13.79	8.84	12	7	36	7.0-7.0	28.5-47.3	10-60	26.1
GGT	Female	35-49	517	18.74	15.73	14	7	60.2	7.0-8.0	47.3-71.1	10-60	15.1
GGT	Female	50-59	485	21.93	20.19	17	8	51.8	7.0-9.0	47.0-80.8	10-60	7.8
GGT	Female	60-69	545	22.21	16.55	18	10	65.2	9.0-10.0	54.4-70.0	10-60	5.5
GGT	Female	70+	514	21.21	14.7	17	10	58.7	9.0-10.8	48.0-72.0	10-60	4.7
ALP	Male	18-34	406	78.21	23.14	76	44.12	136.62	42.2-47.1	126.0-139.0	45-125	7.1
ALP	Male	35-49	428	74.9	18.67	73	44	116.32	42.0-46.7	110.0-121.0	45-125	4.4
ALP	Male	50-59	291	76.07	18.97	74	45.25	119.75	42.0-47.2	111.0-123.0	45-125	3.1
ALP	Male	60-69	399	77.51	20.69	74	45	124.15	42.0-49.0	118.0-131.0	45-125	4.8
ALP	Male	70+	370	74.93	20.19	71	43	121.55	40.2-46.0	117.5-125.0	45-125	5.4
ALP	Female	18-34	437	60.16	18.05	57	34	103.1	32.9-36.0	96.0-114.4	45-125	16.5
ALP	Female	35-49	517	61.49	17.13	59	36	103.1	32.9-38.0	100.0-108.0	45-125	14.3
ALP	Female	50-59	485	81.19	22.91	79	44.1	133.9	43.0-47.0	124.0-138.0	45-125	6.6
ALP	Female	60-69	545	85.57	21.93	83	52	131	47.6-54.2	126.0-137.0	45-125	5.5
ALP	Female	70+	514	83.29	23.02	80	46	135.35	45.0-49.0	127.2-154.0	45-125	5.4
TBIL	Male	18-34	406	15.12	6.59	13.9	6.51	31.45	5.8-6.7	27.6-33.7	3.4-20.5	16
TBIL	Male	35-49	428	14.68	6.07	13.5	6	31.33	5.7-6.5	29.2-32.7	3.4-20.5	12.1
TBIL	Male	50-59	290	15.5	5.34	15.05	6.67	27.62	6.3-7.5	25.5-28.9	3.4-20.5	14.5
TBIL	Male	60-69	399	16.86	6.56	16	7.9	34.38	7.5-8.2	30.1-38.0	3.4-20.5	21.8
TBIL	Male	70+	370	17.22	6.08	16.05	8.8	33.63	8.0-9.4	30.5-35.6	3.4-20.5	21.9
TBIL	Female	18-34	437	12.28	5.06	11.3	5.1	24.5	5.0-5.6	23.6-26.3	3.4-20.5	7.1

TBIL	Female	35-49	517	11.91	4.94	11.1	5.09	23.73	4.4-5.5	21.2-24.7	3.4-20.5	5.4
TBIL	Female	50-59	485	12.29	4.75	11.4	5.51	23.36	5.1-6.0	22.1-25.0	3.4-20.5	6
TBIL	Female	60-69	545	14.21	4.87	13.4	6.86	26	6.1-7.7	25.1-26.6	3.4-20.5	11
TBIL	Female	70+	514	14.95	5.09	14.4	7.26	26.6	6.9-7.9	25.4-28.1	3.4-20.5	11.5
CREA	Male	18-34	406	85.04	12.52	86	61.12	107.88	58.1-63.1	104.0-111.0	54-106	3.9
CREA	Male	35-49	428	82.01	11.81	82	60.68	107.32	59.0-62.1	102.3-109.0	54-106	3.5
CREA	Male	50-59	291	81.97	12.16	83	57	106	54.0-61.0	101.0-109.2	54-106	3.8
CREA	Male	60-69	399	81.71	14	81	55.95	110	52.0-58.0	109.0-114.1	54-106	6.8
CREA	Male	70+	370	89.4	16.04	87.5	65	123.77	63.0-67.0	120.0-129.0	54-106	13.2
CREA	Female	18-34	437	64.07	10.32	64	47	85	46.0-48.0	83.0-87.0	44-97	0.7
CREA	Female	35-49	517	63.59	10.46	63	46	84	45.0-47.0	81.1-85.0	44-97	1.2
CREA	Female	50-59	485	64.54	11.88	64	45	88	43.0-46.0	85.0-95.9	44-97	3.1
CREA	Female	60-69	545	66.75	12.38	66	46	90	43.0-48.0	88.0-94.6	44-97	3.3
CREA	Female	70+	514	71.85	12.21	71	50.82	97	49.7-54.0	94.5-106.0	44-97	2.7
UA	Male	18-34	406	363.74	69.43	358.5	233.62	524.88	220.0-250.1	490.8-553.8	200-420	18.5
UA	Male	35-49	428	362.97	77.87	358	228.02	519	218.6-238.1	509.9-524.0	200-420	25.7
UA	Male	50-59	291	347.7	71.64	340	212.5	483.75	198.0-231.5	475.4-497.8	200-420	18.6
UA	Male	60-69	399	342.32	73.38	335	216.9	491.8	210.9-233.5	487.0-530.0	200-420	15
UA	Male	70+	370	353.01	73.74	350	188.45	508.55	182.0-233.5	491.6-514.4	200-420	21.1
UA	Female	18-34	437	258.43	56.64	253	168	394.1	154.7-178.0	372.5-408.8	150-360	7.3
UA	Female	35-49	517	257.93	59.64	250	154.9	390.4	150.0-163.0	377.5-434.0	150-360	6.4
UA	Female	50-59	485	281.64	65.03	278	175	419.6	168.0-180.0	404.2-451.3	150-360	10.7
UA	Female	60-69	545	294.44	65.51	288	187.6	433.4	175.2-195.0	417.0-453.8	150-360	16
UA	Female	70+	514	305.86	71.21	297.5	185.82	466	173.7-197.3	436.2-486.5	150-360	20
Urea	Male	18-34	406	4.93	1.14	4.8	3	7.49	2.8-3.2	7.0-7.7	2.9-8.2	2.2
Urea	Male	35-49	428	5.27	1.17	5.1	3.37	7.8	3.3-3.6	7.4-8.1	2.9-8.2	1.9

Urea	Male	50-59	291	5.47	1.29	5.3	3.4	8.4	3.3-3.5	7.9-8.6	2.9-8.2	3.1
Urea	Male	60-69	399	5.76	1.3	5.7	3.5	8.71	3.4-3.8	8.3-9.1	2.9-8.2	5
Urea	Male	70+	370	6.15	1.5	5.9	3.8	9.8	3.5-3.9	9.3-10.5	2.9-8.2	8.6
Urea	Female	18-34	437	4.14	1.06	4.1	2.4	6.6	2.2-2.6	6.1-6.9	2.9-8.2	8.5
Urea	Female	35-49	517	4.38	1.03	4.3	2.59	6.6	2.4-2.8	6.3-6.9	2.9-8.2	5
Urea	Female	50-59	485	5	1.17	4.9	3.2	7.49	3.1-3.4	7.2-8.1	2.9-8.2	1.6
Urea	Female	60-69	545	5.31	1.25	5.2	3.1	8.1	3.0-3.3	7.6-8.2	2.9-8.2	2
Urea	Female	70+	514	5.57	1.44	5.4	3.3	8.74	3.2-3.4	8.4-9.6	2.9-8.2	4.5
GLU	Male	18-34	406	5.08	0.55	5.05	4.1	6.2	4.1-4.2	5.9-6.3	3.9-6.1	3.4
GLU	Male	35-49	428	5.54	1.15	5.3	4.37	8.93	4.2-4.5	8.1-9.7	3.9-6.1	13.6
GLU	Male	50-59	291	5.73	1.1	5.5	4.6	8.59	4.5-4.7	7.9-9.5	3.9-6.1	19.9
GLU	Male	60-69	398	5.66	1.23	5.4	4.19	8.6	4.1-4.2	7.6-10.0	3.9-6.1	20.4
GLU	Male	70+	369	5.64	0.98	5.45	4.3	7.98	4.1-4.4	7.3-9.1	3.9-6.1	23.3
GLU	Female	18-34	437	4.85	0.43	4.84	4	5.54	3.9-4.2	5.5-5.8	3.9-6.1	2.1
GLU	Female	35-49	517	5.2	0.59	5.16	4.3	6.32	4.1-4.3	6.2-6.6	3.9-6.1	5.4
GLU	Female	50-59	485	5.47	1	5.27	4.48	8.61	4.4-4.6	7.1-9.1	3.9-6.1	11.1
GLU	Female	60-69	544	5.58	1.15	5.32	4.3	8.74	4.2-4.3	8.1-9.6	3.9-6.1	17.3
GLU	Female	70+	509	5.6	0.97	5.4	4.3	8.13	4.2-4.4	7.7-9.0	3.9-6.1	21.6
TG	Male	18-34	406	1.28	0.84	1.04	0.45	3.59	0.4-0.5	3.1-3.7	0.56-1.7	26.8
TG	Male	35-49	428	1.79	1.22	1.44	0.5	5.5	0.5-0.6	4.7-6.1	0.56-1.7	41.4
TG	Male	50-59	291	1.6	1.01	1.37	0.53	4.88	0.5-0.6	3.6-5.2	0.56-1.7	35.7
TG	Male	60-69	399	1.57	1.04	1.29	0.59	5.08	0.6-0.6	4.6-5.4	0.56-1.7	30.3
TG	Male	70+	370	1.67	1.2	1.23	0.54	5.14	0.5-0.6	4.6-5.5	0.56-1.7	33.2
TG	Female	18-34	437	0.83	0.37	0.73	0.39	1.76	0.4-0.4	1.7-1.9	0.56-1.7	25.9
TG	Female	35-49	517	1.15	0.64	0.96	0.44	2.9	0.4-0.5	2.5-3.2	0.56-1.7	24.6
TG	Female	50-59	485	1.46	0.81	1.27	0.53	3.88	0.5-0.6	3.4-4.1	0.56-1.7	30.7

TG	Female	60-69	545	1.72	1.05	1.42	0.63	5.11	0.6-0.7	4.6-5.5	0.56-1.7	33.8
TG	Female	70+	514	1.9	1.3	1.48	0.66	5.87	0.6-0.7	5.3-6.1	0.56-1.7	39.1
CHOL	Male	18-34	406	4.62	0.93	4.53	3.21	6.62	3.1-3.3	6.3-7.2	2.8-5.2	23.2
CHOL	Male	35-49	428	5.04	0.98	5	3.34	6.87	3.2-3.5	6.6-7.1	2.8-5.2	41.4
CHOL	Male	50-59	291	5.12	0.9	5.08	3.44	6.9	3.2-3.7	6.7-7.3	2.8-5.2	47.4
CHOL	Male	60-69	399	4.73	1.18	4.8	1.47	6.81	1.2-2.3	6.7-7.1	2.8-5.2	40.1
CHOL	Male	70+	370	4.32	1.29	4.47	0.93	6.39	0.8-1.1	6.2-6.6	2.8-5.2	35.1
CHOL	Female	18-34	437	4.49	0.77	4.45	3.1	6.24	3.0-3.2	5.9-6.4	2.8-5.2	16.2
CHOL	Female	35-49	517	4.98	0.84	4.97	3.44	6.9	3.3-3.6	6.6-7.1	2.8-5.2	36
CHOL	Female	50-59	485	5.47	0.98	5.44	3.62	7.66	3.5-3.8	7.4-7.9	2.8-5.2	58.8
CHOL	Female	60-69	545	5.12	1.29	5.2	1.51	7.4	1.1-1.9	7.1-7.7	2.8-5.2	54.5
CHOL	Female	70+	514	4.81	1.49	5.01	1.04	7.32	0.9-1.2	7.0-7.7	2.8-5.2	51
HDL	Male	18-34	406	1.33	0.29	1.29	0.86	2	0.8-0.9	1.9-2.1	1.0-1.9	14
HDL	Male	35-49	428	1.24	0.28	1.21	0.8	1.93	0.8-0.8	1.8-2.0	1.0-1.9	21.3
HDL	Male	50-59	291	1.33	0.32	1.29	0.81	2.13	0.8-0.9	1.9-2.3	1.0-1.9	17.2
HDL	Male	60-69	399	1.33	0.33	1.25	0.86	2.19	0.8-0.9	2.0-2.2	1.0-1.9	20.3
HDL	Male	70+	370	1.29	0.31	1.25	0.75	2.03	0.7-0.9	1.9-2.1	1.0-1.9	21.4
HDL	Female	18-34	437	1.62	0.35	1.6	1.07	2.39	1.0-1.1	2.3-2.6	1.0-1.9	20.6
HDL	Female	35-49	517	1.56	0.36	1.51	1.01	2.34	1.0-1.0	2.3-2.4	1.0-1.9	18.6
HDL	Female	50-59	485	1.55	0.38	1.48	0.98	2.48	0.9-1.0	2.4-2.5	1.0-1.9	20
HDL	Female	60-69	545	1.45	0.33	1.41	0.94	2.25	0.9-1.0	2.1-2.4	1.0-1.9	13.6
HDL	Female	70+	514	1.46	0.37	1.41	0.87	2.31	0.8-0.9	2.2-2.4	1.0-1.9	19.8
LDL	Male	18-34	406	2.93	0.82	2.84	1.61	4.57	1.5-1.7	4.4-4.9	N/A	25.9
LDL	Male	35-49	428	3.21	0.89	3.24	1.68	4.81	1.6-1.8	4.7-5.0	N/A	39.5
LDL	Male	50-59	291	3.26	0.79	3.22	1.81	4.87	1.7-1.9	4.7-5.0	N/A	39.2
LDL	Male	60-69	399	3.08	0.84	3.08	1.59	4.8	1.5-1.7	4.6-4.9	N/A	33.6

LDL	Male	70+	370	2.76	0.81	2.74	1.41	4.31	1.3-1.5	4.2-4.6	N/A	21.4
LDL	Female	18-34	437	2.62	0.66	2.55	1.43	4.02	1.4-1.5	3.9-4.2	N/A	12.4
LDL	Female	35-49	517	3.06	0.74	3.02	1.79	4.75	1.7-1.9	4.5-4.9	N/A	28.6
LDL	Female	50-59	485	3.42	0.87	3.46	1.77	5.24	1.7-1.9	5.0-5.5	N/A	52
LDL	Female	60-69	545	3.27	0.87	3.26	1.69	5.23	1.5-1.8	4.9-5.4	N/A	42.9
LDL	Female	70+	514	3.07	0.95	3.01	1.47	5	1.4-1.6	4.9-5.3	N/A	35
HGB	Male	18-34	406	159.9	10.84	160	140	179	131.5-143.0	177.9-180.9	130-175	7.1
HGB	Male	35-49	428	159.51	11.58	160	136	183.32	129.0-140.3	178.0-185.3	130-175	9.3
HGB	Male	50-59	291	157.56	10.7	158	134.5	176	127.9-140.2	174.0-179.5	130-175	5.2
HGB	Male	60-69	399	155	11.29	155	133	175.05	131.0-135.9	174.0-177.0	130-175	3.5
HGB	Male	70+	370	149.05	12.7	150	122	171	113.5-125.5	169.0-172.0	130-175	6.2
HGB	Female	18-34	437	135.35	10.69	136	112.9	154	109.6-115.0	152.0-155.1	115-150	9.6
HGB	Female	35-49	517	135.5	11.74	137	104.9	154	101.6-113.0	152.0-156.3	115-150	10.4
HGB	Female	50-59	485	138.77	10.15	139	118	159	115.0-121.0	157.0-161.8	115-150	11.3
HGB	Female	60-69	545	137.73	9.74	138	120	158	119.0-121.0	154.0-161.8	115-150	9.2
HGB	Female	70+	514	134.82	9.87	135	115	154	114.0-117.8	151.3-157.0	115-150	7.2
PLT	Male	18-34	406	240.6	48.91	240	153	342.62	138.0-161.0	332.7-367.0	100-300	8.6
PLT	Male	35-49	428	241.43	53.19	238.5	153.68	357.25	142.3-163.3	345.0-376.0	100-300	11.7
PLT	Male	50-59	291	230.86	45.57	228	153.5	332.75	143.9-161.5	313.0-345.8	100-300	8.6
PLT	Male	60-69	399	216.26	54.1	210	128.8	339.2	119.9-135.9	307.3-356.1	100-300	5.5
PLT	Male	70+	370	199.94	49.24	197	117.9	306	102.0-123.2	301.0-312.8	100-300	5.7
PLT	Female	18-34	437	257.47	58.55	254	161.9	393.3	147.6-168.7	366.0-415.2	100-300	21.1
PLT	Female	35-49	517	263.22	59.32	255	167	396	161.5-178.0	381.6-407.0	100-300	25.3
PLT	Female	50-59	485	252.09	57.14	248	146.2	367.9	138.0-158.5	346.0-386.6	100-300	19
PLT	Female	60-69	544	234.98	51.28	231	148.88	350.85	140.7-157.3	333.9-360.0	100-300	10.8
PLT	Female	70+	514	224.02	50.86	221.5	134.65	336.7	113.3-144.5	325.2-346.4	100-300	9.5

WBC	Male	18-34	406	6.22	1.4	6.1	3.89	9.5	3.7-4.0	8.7-9.7	3.5-9.5	3.7
WBC	Male	35-49	428	6.35	1.62	6.09	3.82	9.88	3.7-4.1	9.6-10.7	3.5-9.5	5.6
WBC	Male	50-59	291	6.44	1.62	6.15	3.95	10.48	3.7-4.2	9.9-10.9	3.5-9.5	6.5
WBC	Male	60-69	399	6.18	1.45	6.02	3.8	9.51	3.6-4.1	9.1-10.0	3.5-9.5	3.8
WBC	Male	70+	370	6.12	1.47	5.89	3.84	9.13	3.6-4.0	9.0-9.5	3.5-9.5	2.7
WBC	Female	18-34	437	6.02	1.64	5.83	3.49	9.79	3.2-3.8	9.2-10.8	3.5-9.5	5.5
WBC	Female	35-49	517	6	1.59	5.75	3.56	9.74	3.5-3.8	9.2-10.6	3.5-9.5	4.8
WBC	Female	50-59	485	5.67	1.43	5.42	3.32	8.89	3.2-3.5	8.5-9.3	3.5-9.5	5.8
WBC	Female	60-69	545	5.79	1.39	5.62	3.58	9.18	3.5-3.7	8.9-9.5	3.5-9.5	4.2
WBC	Female	70+	514	5.87	1.32	5.68	3.81	8.85	3.7-3.9	8.6-9.3	3.5-9.5	2.3
