Age- and Sex-Related Blood Cell Values in Healthy Black Americans

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Synopsis

Hemoglobin, mean corpuscular volume, erythrocyte count, and leukocyte count were measured, and hematocrit, mean corpuscular hemoglobin, and mean corpuscular hemoglobin concentration were computed electronically for 7,739 healthy black persons. The study population comprised 3,393 males and 4,346 females 1–84 years of age, all from the Washington, DC, metropolitan area. Persons with sickle cell disease and elevated hemoglobin F were excluded from analysis, but those with traits for hemoglobin S, C, and thalassemia were not. Mean and percentile values are presented in tabular form.

Hemoglobin, hematocrit, and mean corpuscular volumes were lower than those reported in surveys of white populations. Beginning with the 11–15-year age groups, black males had higher red cell values than black females. After age 30, mean hemoglobin levels for men gradually declined, while those in women rose, so that the sex difference diminished after 60 years of age. Leukocyte counts were higher in young children and in women, compared with men ages 21–50 years. After 60 years of age, the sex difference disappeared. Further large surveys that exclude data on persons with iron deficiency are needed in black populations.

RED BLOOD CELL AND WHITE BLOOD CELL values are known to vary according to age, sex, and race. Studies have consistently shown that black Americans have lower mean and percentile hemoglobin and hematocrit values than whites. Studies have also revealed lower mean and percentile leukocyte count values for blacks. These racial differences were confirmed by the second National Health and Nutrition Examination Survey (NHANES II) (*1*). There may be a need for separate reference hematological values for black populations. We measured blood cell counts in a large number of apparently healthy, noninstitutionalized black persons, and we report our results for different age and sex groups in tabular form.

Methods

The study population comprised 7,739 black persons, 3,393 males and 4,346 females. Their ages ranged from 1 through 84 years. All subjects were presumably healthy individuals living near sea level who requested sickle cell screening for themselves or their children from a mobile health unit operating in Washington, DC, and the surrounding counties in Maryland and Virginia (*2*). The investigation was carried out from 1977 through 1980.

The prevalence of the sickle cell trait in this population of black Americans was 7.3 percent. All tests were carried out between 9 a.m. and 4 p.m. Fasting prior to the procedure was not required. Pregnant women were not excluded. Capillary blood was collected in heparinized tubes and analyzed using an electronic blood cell counter (JTB 700, J. T. Baker Instrument Division, Milford, CT) in the mobile unit. The cell counter measured hemoglobin, erythrocyte count (RBC), mean corpuscular volume, and leukocyte count (WBC). Hematocrit, mean corpuscular hemoglobin, and mean corpuscular hemoglobin concentration (MCHC) were computed by the instrument from the measured values. The cell counter was calibrated each day using commercial standards as recommended by the manufacturer (JTB 700 instruction manual, section IV).

Laboratory results were statistically analyzed using an IBM 370 computer and a standard statistical (SAS) software package. Before analysis,

Table 1. Hemoglobin percentile and mean values for black Americans

Age	Number	Hemoglobin (grams per deciliter)									
		3rd	5th	10th	25th	50th	75th	90th	95th	97th	Mean	SD
Males												
1–2 years	70	10.9	10.9	11.1	11.6	12.1	12.7	13.0	13.4	13.4	12.1	0.7
3 years	322	10.3	10.8	11.0	11.5	12.0	12.6	13.0	13.5	13.8	12.1	0.8
4 years	444	10.9	11.1	11.2	11.7	12.3	12.8	13.3	13.6	13.8	12.3	0.8
5 years	135	10.8	11.0	11.4	11.9	12.4	13.0	13.3	13.6	13.8	12.4	0.8
6–10 years	189	10.9	11.3	11.6	12.1	12.6	13.1	13.7	14.1	14.4	12.6	0.8
11–15 years	255	11.3	11.6	12.2	12.7	13.5	14.3	14.8	15.1	15.3	13.5	1.1
16–20 years	460	12.4	12.8	13.2	14.1	14.8	15.5	16.3	16.7	17.0	14.8	1.2
21–30 years	691	12.8	13.3	13.8	14.4	15.2	15.9	16.6	17.0	17.2	15.2	1.1
31–40 years	364	12.8	12.9	13.5	14.3	15.0	15.8	16.5	16.8	17.0	15.0	1.1
41–50 years	197	12.2	12.8	13.3	14.1	14.8	15.7	16.5	16.9	17.2	14.9	1.3
51–60 years	144	11.8	12.3	13.1	13.8	14.7	15.6	16.3	16.7	17.2	14.7	1.3
Older than 60 years	76	11.6	11.7	12.9	13.5	14.3	14.9	15.9	16.4	16.4	14.3	1.2
Females												
1–2 years	85	10.6	10.9	11.1	11.6	12.1	12.6	13.2	13.4	13.6	12.1	0.8
3 years	298	10.8	11.0	11.2	11.7	12.2	12.8	13.2	13.6	13.9	12.2	0.8
4 years	462	10.8	11.0	11.2	11.7	12.3	12.8	13.4	13.7	13.9	12.3	0.8
5 years	125	10.9	11.0	11.2	11.8	12.3	12.9	13.4	13.8	14.4	12.4	0.9
6–10 years	238	10.7	11.2	11.6	12.1	12.7	13.2	13.7	14.2	14.2	12.6	0.9
11–15 years	411	11.2	11.4	11.8	12.3	12.9	13.5	14.1	14.4	14.6	12.9	0.9
16–20 years	575	11.1	11.3	11.9	12.4	13.1	13.7	14.3	14.8	15.2	13.1	1.0
21–30 years	993	11.2	11.4	11.8	12.6	13.3	14.0	14.7	15.3	15.5	13.3	1.1
31–40 years	570	11.2	11.5	12.0	12.6	13.3	14.0	14.7	15.1	15.3	13.3	1.1
41–50 years	325	11.1	11.5	12.0	12.6	13.4	14.2	14.8	15.2	15.4	13.4	1.1
51–60 years	177	11.6	11.8	12.2	12.8	13.3	14.2	14.6	15.3	15.6	13.5	1.0
Older than 60 years	83	11.7	11.8	11.9	12.9	13.7	14.3	15.1	15.2	15.3	13.6	1.1

persons with values that were clearly due to laboratory or transcription error were deleted from the total of 7,783 subjects. Nine persons with sickle cell disease or an "AF" hemoglobin electrophoretic pattern, which indicates the presence of delta-beta thalassemia trait or the trait for hereditary persistence of fetal hemoglobin, were also excluded from analysis. The total number of subjects whose results were deleted was 44, or 0.57 percent of the total.

Results

The mean and percentile values for hemoglobin, hematocrit, mean corpuscular volume, erythrocyte count, mean corpuscular hemoglobin, mean corpuscular hemoglobin, mean corpuscular hemoglobin concentration, and leukocyte count are listed according to age and sex for the study population in tables 1–7.

Hemoglobin, hematocrit, mean corpuscular volume, and erythrocyte count levels were lowest in preschool and school-age children. The values increased with age, with a sex difference in hemoglobin, hematocrit, and MCHC becoming evident at puberty. Hemoglobin, hematocrit, and erythrocyte counts were higher for 11–15-year-old boys than for girls in the same age group. The values for men continued to rise until they peaked in the 21–30-year age group and thereafter gradually fell. Hemoglobin and hematrocit values for women continued to rise, slowly but steadily, so that after age 60 they approached those of men in the corresponding age group. Mean corpuscular volume and mean corpuscular hemoglobin were not appreciably influenced by age.

Leukocyte counts were highest in the 1–2-year age group for both sexes and then gradually decreased to reach a nadir at ages 11–15 in boys and 6–10 in girls. After puberty, the mean leukocyte counts increased for both sexes, with women having higher values than in men ages 11–40. After age 40 there was no appreciable difference in WBC between the sexes, and values fell, so they were lower for both men and women after age 60 than they had been between ages 21 and 50.

Discussion

Our study of red and white blood cell values from 7,739 healthy blacks ages 1–84 is the largest of its kind reported to date (*3–5*). NHANES II, which was carried out at approximately the same

Table 2. Hematocrit percentile and mean values for black Americans

Age	Number	Hematocrit										
		3rd	5th	10th	25th	50th	75th	90th	95th	97th	Mean	SD
Males												
1–2 years	70	31.5	31.9	32.9	33.9	35.4	37.5	39.1	39.6	40.1	35.7	2.4
3 years	322	30.5	31.5	32.5	34.2	35.8	37.8	39.5	40.5	41.0	35.9	2.8
4 years	441	31.8	32.4	33.3	35.0	36.9	38.7	40.2	41.3	42.1	36.9	2.7
5 years	134	31.4	31.8	33.0	34.9	36.2	37.8	39.7	41.2	42.1	36.4	2.8
6–10 years	188	33.1	33.7	34.4	35.4	37.1	39.0	40.4	42.3	43.1	37.4	2.6
11–15 years	255	33.5	34.2	35.5	38.3	40.6	43.2	45.3	46.3	47.9	40.6	3.7
16–20 years	462	36.7	38.2	39.2	41.5	43.6	46.4	49.4	51.1	52.2	44.0	3.9
21–30 years	713	37.9	39.2	40.7	42.9	45.3	47.6	49.8	51.5	52.6	45.3	3.7
31–40 years	369	37.8	38.6	40.0	42.2	45.0	47.7	49.6	51.2	51.8	44.9	3.9
41–50 years	205	34.7	37.2	39.1	41.9	44.8	46.8	50.1	51.8	53.5	44.4	4.5
51–60 years	149	35.2	35.8	36.7	40.7	43.7	46.6	49.3	50.4	50.7	43.5	4.5
Older than 60 years	76	33.5	33.9	36.4	40.6	42.4	44.9	47.7	48.5	48.6	42.4	4.0
Females												
1–2 years	85	30.1	31.4	32.6	34.0	35.7	37.8	39.4	40.0	40.2	35.8	2.7
3 years	298	31.5	32.2	33.1	34.8	36.6	38.1	39.8	41.1	42.1	36.6	2.7
4 years	461	32.0	32.6	33.5	35.0	36.7	38.3	39.9	41.6	42.2	36.7	2.6
5 years	126	31.6	32.0	32.6	33.8	35.7	37.8	40.4	41.1	41.6	36.1	2.9
6–10 years	236	32.5	33.1	33.9	35.5	37.7	39.4	41.2	42.7	44.0	37.7	3.0
11–15 years	410	33.2	34.0	35.1	37.1	39.2	41.1	42.9	44.7	45.4	39.1	3.1
16–20 years	576	32.2	33.1	34.5	36.8	38.9	41.1	43.3	44.8	45.7	39.0	3.5
21–30 years	992	32.6	33.5	34.7	36.9	39.5	41.8	44.1	45.4	46.4	39.4	3.6
31–40 years	572	32.3	33.2	35.0	37.0	39.5	42.0	44.2	45.7	46.5	39.5	3.7
41–50 years	324	32.6	33.5	35.2	37.6	40.1	42.2	44.4	45.9	46.7	39.9	3.7
51–60 years	177	33.7	34.2	36.0	38.2	40.7	42.9	45.3	46.9	47.2	40.6	3.8
Older than 60 years	83	32.0	32.9	34.2	37.4	39.8	43.4	44.8	46.4	48.0	40.0	4.2

Table 3. Mean corpuscular volume percentile and mean values for black Americans

Age	Number	Mean corpuscular volume (femtoliters)										
		3rd	5th	10th	25th	50th	75th	90th	95th	97th	Mean	SD
Males												
1–2 years	70	68	70	71	76	81	85	88	89	90	80	6
3 years	322	69	72	74	78	83	87	90	92	93	82	6
4 years	444	72	74	77	81	85	89	92	94	96	85	6
5 years	135	71	72	76	79	83	87	90	91	91	82	6
6–10 years	189	71	73	76	80	84	88	92	93	95	84	7
11–15 years	255	72	75	78	82	86	91	94	97	98	86	7
16–20 years	463	75	78	81	86	90	94	97	100	102	90	7
21–30 years	715	76	78	81	87	92	96	100	102	103	91	7
31–40 years	370	76	79	82	86	92	96	101	104	105	91	8
41–50 years	205	74	77	82	89	93	97	100	104	104	92	8
51–60 years	147	80	80	83	87	92	98	102	104	104	92	7
Older than 60 years	75	76	77	82	88	94	98	101	104	105	92	8
Females												
1–2 years	84	69	71	71	76	80	86	89	91	94	81	7
3 years	297	69	72	75	79	84	88	91	94	95	83	7
4 years	461	72	73	77	81	85	89	93	94	95	85	6
5 years	126	69	72	74	78	83	88	92	94	96	83	7
6–10 years	237	71	72	75	81	85	89	94	96	97	85	7
11–15 years	411	72	74	78	83	88	92	96	98	99	87	7
16–20 years	575	74	76	80	85	90	94	98	101	103	89	7
21–30 years	994	74	77	80	85	90	95	99	101	103	90	7
31–40 years	574	76	79	82	86	91	96	100	104	105	91	8
41–50 years	321	77	80	81	86	92	96	100	103	104	91	7
51–60 years	177	73	79	83	88	93	96	99	102	103	92	7
Older than 60 years	82	78	79	82	87	91	96	100	102	106	91	7

Table 4. Erythrocyte count percentile and mean values for black Americans

Age	Number	Erythrocyte count ($\times 10^6/mm^3$)										
		3rd	5th	10th	25th	50th	75th	90th	95th	97th	Mean	SD
Males												
1–2 years	70	3.92	3.96	4.04	4.21	4.43	4.72	4.95	5.03	5.05	4.46	0.34
3 years	322	3.70	3.82	3.92	4.12	4.37	4.63	4.89	5.01	5.20	4.40	0.40
4 years	444	3.69	3.77	3.93	4.13	4.36	4.59	4.84	5.02	5.14	4.37	0.37
5 years	135	3.78	3.84	3.97	4.22	4.44	4.63	4.85	4.95	5.01	4.42	0.33
6–10 years	188	3.88	3.99	4.05	4.24	4.43	4.70	4.97	5.13	5.29	4.48	0.37
11–15 years	255	3.96	4.01	4.18	4.40	4.71	4.99	5.32	5.50	5.56	4.73	0.45
16–20 years	463	4.11	4.28	4.41	4.63	4.89	5.20	5.54	5.71	5.92	4.93	0.46
21–30 years	715	4.14	4.25	4.43	4.70	5.00	5.30	5.59	5.78	5.89	5.00	0.46
31–40 years	370	3.98	4.12	4.32	4.60	4.93	5.23	5.53	5.79	5.93	4.93	0.50
41–50 years	204	3.80	3.91	4.21	4.54	4.82	5.15	5.56	5.74	5.85	4.85	0.54
51–60 years	149	3.70	3.80	4.09	4.40	4.72	5.10	5.36	5.6	5.78	4.71	0.53
Older than 60 years	76	3.73	3.74	3.98	4.26	4.58	4.86	5.17	5.31	5.66	4.60	0.50
Females												
1–2 years	85	3.80	3.86	3.91	4.19	4.49	4.70	4.94	5.12	5.17	4.46	0.38
3 years	298	3.75	3.82	3.91	4.13	4.40	4.63	4.90	5.10	5.21	4.41	0.40
4 years	460	3.70	3.78	3.89	4.11	4.33	4.56	4.78	4.94	5.04	4.34	0.37
5 years	126	3.70	3.78	3.89	4.09	4.39	4.58	4.97	5.22	5.36	4.38	0.41
6–10 years	238	3.80	3.86	3.98	4.18	4.46	4.73	5.04	5.27	5.31	4.48	0.42
11–15 years	411	3.83	3.92	4.02	4.24	4.49	4.74	4.98	5.19	5.26	4.50	0.40
16–20 years	574	3.64	3.71	3.86	4.10	4.36	4.63	4.90	5.10	5.25	4.37	0.42
21–30 years	994	3.67	3.73	3.90	4.12	4.38	4.67	4.96	5.12	5.26	4.41	0.42
31–40 years	574	3.67	3.73	3.84	4.07	4.32	4.62	4.93	5.13	5.29	4.37	0.44
41–50 years	325	3.62	3.65	3.90	4.10	4.36	4.61	4.88	5.13	5.24	4.37	0.42
51–60 years	176	3.66	3.77	3.94	4.14	4.45	4.73	4.91	5.12	5.27	4.44	0.41
Older than 60 years	83	3.60	3.69	3.81	3.99	4.34	4.71	4.99	5.07	5.16	4.37	0.44

Table 5. Mean corpuscular hemoglobin percentile and mean values for black Americans

Age	Number	Mean corpuscular hemoglobin (picograms)										
		3rd	5th	10th	25th	50th	75th	90th	95th	97th	Mean	SD
Males												
1–2 years	70	22.5	23.3	24.4	26.0	27.5	28.5	29.3	30.4	30.9	27.3	2.3
3 years	322	22.3	23.3	24.5	26.2	27.9	29.2	30.2	31.0	31.8	27.6	2.4
4 years	444	23.3	24.4	25.6	26.8	28.2	29.7	31.0	31.6	32.3	28.2	2.3
5 years	135	24.1	24.2	25.4	27.0	28.2	29.5	30.2	30.5	30.9	28.1	2.0
6–10 years	189	22.7	24.0	25.3	27.0	28.6	30.0	31.1	31.8	32.2	28.3	2.4
11–15 years	255	23.4	24.6	26.2	27.3	28.6	30.1	31.5	32.2	32.7	28.6	2.4
16–20 years	463	24.4	25.8	27.2	28.8	30.3	31.7	33.0	33.6	34.2	30.1	2.4
21–30 years	715	24.9	26.1	27.6	29.3	30.9	32.3	33.5	34.3	34.9	30.7	2.5
31–40 years	370	24.8	25.6	27.4	29.0	30.8	32.5	34.1	35.1	35.7	30.7	2.8
41–50 years	205	26.3	26.6	28.1	29.7	31.2	32.5	34.2	35.2	36.5	31.1	2.7
51–60 years	149	26.4	27.6	28.4	29.7	31.6	33.0	34.4	35.1	35.9	31.4	2.5
Older than 60 years	76	25.3	25.7	27.8	29.9	31.3	33.2	34.5	35.4	36.1	31.3	2.8
Females												
1–2 years	84	22.5	23.4	24.0	25.5	27.2	28.7	30.1	31.2	32.2	27.2	2.4
3 years	298	22.3	24.1	24.9	26.4	28.0	29.4	30.8	31.5	31.9	27.9	2.4
4 years	462	23.1	24.1	25.5	27.1	28.6	30.0	31.1	31.7	32.3	28.4	2.3
5 years	126	22.4	23.5	25.1	27.1	28.4	29.9	31.4	32.4	32.9	28.3	2.5
6–10 years	238	22.5	23.0	25.1	27.1	28.6	30.0	31.0	32.0	32.2	28.4	2.5
11–15 years	411	23.0	23.6	25.8	27.4	29.2	30.6	32.0	32.5	33.1	28.9	2.6
16–20 years	576	24.2	25.1	26.6	28.5	30.3	31.8	33.0	33.9	34.8	30.0	2.6
21–30 years	994	24.4	25.2	26.7	28.7	30.6	32.2	33.5	34.4	35.1	30.3	2.7
31–40 years	572	25.1	26.1	27.3	29.0	30.8	32.4	33.9	34.9	35.8	30.6	2.7
41–50 years	325	24.9	26.1	27.3	29.0	31.0	32.3	34.0	34.8	35.3	30.7	2.6
51–60 years	177	24.6	23.8	27.3	29.2	30.7	32.2	33.3	34.4	34.6	30.5	2.6
Older than 60 years	83	25.4	26.8	28.5	29.7	31.3	33.1	34.2	34.3	34.9	31.2	2.4

Table 6. Mean corpuscular hemoglobin concentration percentile and mean values for black Americans

Age	Number	Mean corpuscular hemoglobin concentration (percent)										
		3rd	5th	10th	25th	50th	75th	90th	95th	97th	Mean	SD
Males												
1–2 years	68	31.1	31.3	31.4	32.6	33.7	34.8	36.2	37.5	38.1	33.8	1.9
3 years	320	30.2	30.6	31.3	32.3	33.3	34.8	36.5	37.2	37.8	33.6	2.0
4 years	442	30.2	30.6	31.5	32.2	33.1	34.4	35.7	36.4	36.8	33.3	1.8
5 years	134	30.9	30.9	32.0	33.0	34.2	35.2	37.0	37.6	37.9	34.2	1.9
6–10 years	188	30.6	30.8	31.4	32.9	33.8	34.7	35.7	36.1	36.4	33.8	1.6
11–15 years	255	29.6	30.2	30.9	32.3	33.2	34.4	35.7	36.4	36.7	33.3	1.9
16–20 years	462	30.3	30.6	31.4	32.5	33.9	34.9	36.0	36.4	37.0	33.7	1.8
21–30 years	707	30.4	30.6	31.2	32.4	33.6	34.8	36.4	37.4	38.1	33.7	2.1
31–40 years	367	30.0	30.5	31.4	32.3	33.4	34.8	36.0	37.2	38.0	33.6	2.0
41–50 years	204	30.4	30.7	31.0	32.2	33.5	34.8	36.3	37.9	38.3	33.7	2.1
51–60 years	146	29.7	30.1	31.2	32.3	33.7	35.4	37.3	38.2	38.4	33.9	2.3
Older than 60 years	76	30.7	30.9	31.9	32.6	33.4	35.2	36.4	37.4	37.6	33.8	2.0
Females												
1–2 years	85	30.4	30.8	31.3	32.6	33.8	35.0	35.9	37.4	37.9	33.8	1.8
3 years	298	30.7	31.0	31.5	32.5	33.3	34.3	35.4	36.5	37.4	33.5	1.7
4 years	459	30.2	30.9	31.4	32.4	33.3	34.5	35.9	36.7	37.2	33.5	1.9
5 years	123	30.6	31.2	31.7	32.6	34.1	35.4	37.0	38.7	38.9	34.2	2.1
6–10 years	238	30.5	30.7	31.4	32.4	33.5	34.6	35.8	36.4	37.0	33.6	1.7
11–15 years	411	29.3	29.8	30.8	32.0	33.1	34.2	35.6	36.0	36.7	33.1	1.9
16–20 years	572	30.0	30.5	31.3	32.3	33.6	34.8	36.1	36.8	37.5	33.6	2.0
21–30 years	974	29.9	30.5	31.2	32.3	33.6	34.9	36.5	37.4	38.0	33.7	2.1
31–40 years	565	29.9	30.5	31.1	32.3	33.3	34.9	36.7	37.6	38.0	33.6	2.1
41–50 years	324	29.8	30.3	31.0	32.2	33.6	34.6	35.8	37.2	38.3	33.5	2.0
51–60 years	177	30.1	30.3	31.1	32.1	33.2	34.4	35.4	37.0	37.6	33.3	1.8
Older than 60 years	83	29.8	30.6	31.4	32.6	34.3	35.4	36.8	37.4	37.8	34.1	2.1

time, 1976–80, evaluated 2,297 blacks ages 3–74 (*1*). The number of blacks in our study was more than three times the number in NHANES II. Tables 1–7 include the 3rd and 97th percentiles in order to approximate the 95 percent reference range. The 5th and 95th percentiles are also indicated because less variability occurs at these percentiles than at the extreme outer ranges.

As expected, overall median and lower percentile hemoglobin, hematocrit, and mean corpuscular volume values for all age groups and both sexes were consistently lower than previously reported values for white populations (*6–10*). A geographically limited sample such as ours is not necessarily representative of the U.S. black population. The large number of subjects in our data base may, however, compensate for sampling differences between our study and the previously mentioned ones. The causes of the lower red cell values in black populations is unknown, but thalassemia traits (*11,12*) and an increased incidence of iron deficiency may play a role (*10*). Also, as expected, a sex difference in erythrocyte values became apparent in our study beginning with 11–15-year-old boys, who had higher values than the girls in that age group. The lower percentile hemoglobin and hematrocrit values we observed in older adolescent girls and young adult women were probably secondary to iron deficiency (*3,4*). Similar values in the 5-year-olds of both sexes may have had the same etiology (*3*). Hemoglobin values gradually decreased in males after a peak at 21–30 years, but gradually increased in females throughout adult life, so that the sex-related difference became considerably smaller after age 60 (*13*).

Most (*14–16*) but not all (*17*) studies of leukocyte counts have demonstrated lower levels in blacks than in whites. NHANES II substantiated this difference, and the values found in our study were similar to those of NHANES II (*1*). Leukocyte counts were highest in children under age 2, decreased progressively in preschool and school-age children, and gradually increased throughout adolescence and adulthood (*5*). Mean leukocyte counts for females ages 11–50 were higher than for males of the same age, but both men and women had lower values after age 60 (*5*). Pregnant subjects were not excluded from the study, and they tend to have higher leukocyte counts (*18,19*). Because the sex-related difference persisted until late middle age but not after age 60, a relation to hormonal physiology is suggested (*13*).

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Table 7. Leukocyte count percentile and mean values for black Americans

Age	Number	Leukocyte count ($\times 10^3/mm^3$)										
		3rd	5th	10th	25th	50th	75th	90th	95th	97th	Mean	SD
Males												
1–2 years	70	3.6	4.1	4.6	6.0	7.6	9.0	11.1	13.3	13.5	7.9	2.8
3 years	322	4.2	4.3	4.8	5.5	6.8	8.1	9.5	10.5	12.0	7.1	2.3
4 years	444	4.1	4.2	4.7	5.6	6.6	7.8	9.2	10.0	10.6	6.9	1.9
5 years	135	3.8	4.0	4.7	5.7	6.6	8.2	9.3	9.6	9.7	6.8	1.8
6–10 years	189	3.8	4.1	4.4	5.1	6.1	7.9	9.4	10.0	11.2	6.6	2.0
11–15 years	255	3.5	3.8	4.1	4.9	5.7	6.9	8.1	8.8	9.4	6.0	1.6
16–20 years	463	3.6	3.9	4.4	5.1	6.1	7.5	9.1	10.3	11.2	6.5	2.1
21–30 years	715	3.7	3.9	4.4	5.3	6.5	7.8	9.3	10.3	11.0	6.7	2.0
31–40 years	370	3.9	4.1	4.4	5.1	6.5	7.7	9.5	10.4	11.3	6.7	2.2
41–50 years	205	3.5	4.1	4.5	5.4	6.5	8.0	9.4	10.9	11.5	6.9	2.2
51–60 years	149	4.1	4.1	4.5	5.6	6.7	8.2	9.7	10.3	10.8	6.9	1.9
Older than 60 years	76	3.9	4.2	4.5	5.2	6.1	7.1	7.9	9.2	9.6	6.3	1.5
Females												
1–2 years	85	4.0	5.2	5.4	6.1	7.6	9.4	11.1	12.1	12.3	7.9	2.3
3 years	298	4.5	4.8	5.2	5.9	7.1	8.6	10.1	11.4	12.8	7.5	2.2
4 years	461	4.3	4.4	4.9	5.7	6.8	8.2	9.8	10.8	11.7	7.1	2.2
5 years	126	4.1	4.5	4.8	5.5	6.6	8.2	10.2	12.2	14.0	7.3	2.6
6–10 years	238	3.6	3.9	4.4	5.3	6.2	7.5	8.5	9.5	10.0	6.4	1.7
11–15 years	410	3.6	3.8	4.2	5.2	6.4	7.7	9.4	10.7	11.8	6.6	2.1
16–20 years	575	4.2	4.4	5.0	5.9	7.2	8.5	10.1	11.4	12.3	7.4	2.1
21–30 years	994	4.3	4.5	4.9	5.8	6.9	8.3	9.7	10.8	11.5	7.2	2.0
31–40 years	574	4.1	4.4	4.8	5.6	6.7	8.2	9.7	11.0	11.8	7.1	2.0
41–50 years	325	4.0	4.3	4.8	5.7	7.0	8.2	9.5	10.6	11.4	7.1	2.1
51–60 years	177	3.4	3.7	4.5	5.6	6.4	7.4	8.8	10.6	11.5	6.6	2.0
Older than 60 years	83	4.1	4.1	4.4	5.5	6.3	7.3	8.3	8.7	9.9	6.4	1.6

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