

KEEP 2010

Summary Figures

KEEP DATA ANALYSES

DIABETES

Self-reported diabetes, self-reported diabetic retinopathy, receiving medication for diabetes, or elevated blood glucose (WHO); fasting blood sugar ≥ 126 mg/dl or non-fasting blood sugar ≥ 200 mg/dl, or A1c $\geq 7\%$ (if available)

SELF-REPORTED DIABETES

Self-reported diabetes or self-reported diabetic retinopathy

GLYCEMIC CONTROL

Fasting blood sugar < 126 mg/dl or non-fasting blood sugar < 200 mg/dl, and A1c $< 7\%$ (if available)

HYPERTENSION

Self-reported history hypertension, receiving a medication for hypertension, or elevated blood pressure (JNC7): Diabetes or CKD; systolic ≥ 130 mmHg or diastolic ≥ 80 mmHg, otherwise systolic ≥ 140 mmHg or diastolic ≥ 90 mmHg

SELF-REPORTED HYPERTENSION

Self-reported hypertension

BLOOD PRESSURE CONTROL

Diabetes or CKD: systolic < 130 mmHg and diastolic < 80 mmHg, otherwise systolic < 140 mmHg and diastolic < 90 mmHg

HIGH CHOLESTEROL

Self-reported high cholesterol or receiving medication for cholesterol, or cholesterol level > 200 mg/dl

SELF-REPORTED HIGH CHOLESTEROL

Self-reported high cholesterol

CHOLESTEROL CONTROL

Total cholesterol levels of ≤ 200 mg/dl

SELF-REPORTED CARDIOVASCULAR DISEASE

Participant reports any of the following cardiac events: heart attack, bypass surgery, heart angioplasty, stroke, heart failure, abnormal heart rhythm, or PVD (only for KEEP version 2)

MICROALBUMINURIA

Albumin/creatinine ratio ≥ 30 mg/g

CHRONIC KIDNEY DISEASE

eGFR < 60 mL/min/1.73 m² or eGFR ≥ 60 mL/min/1.73 m² and albumin-creatinine ratio (ACR) ≥ 30 mg/g. GFR estimated using the IDMS-traceable 4-variable Modification of Diet in Renal Disease (MDRD) Study equation or Chronic Kidney Disease Epidemiology Collaboration equation (CKD-EPI) for calibrated serum creatinine (Scr) values

CKD STAGES

Stage 1: eGFR ≥ 90 mL/min/1.73 m², and ACR ≥ 30 mg/g
 Stage 2: eGFR 60–89 mL/min/1.73 m², and ACR ≥ 30 mg/g
 Stage 3: eGFR 30–59 mL/min/1.73 m²
 Stage 4: eGFR 15–29 mL/min/1.73 m²
 Stage 5: eGFR < 15 mL/min/1.73 m²

ANEMIA**WHO**

Male: hemoglobin < 13 g/dl
 Female: < 12 g/dl

KDOQI (2006)

Males: hemoglobin < 13.5 g/dl
 Women < 12 g/dl

BODY MASS INDEX CATEGORIES

UW: underweight, BMI < 18.5
 N: normal, BMI 18.5–24.9
 OW: overweight, BMI 25–29.9
 OB: obese, BMI 30–39.9
 EOB: extremely obese, BMI ≥ 40

EDUCATIONAL STATUS

GSL: Grade school or less
 SHS: Some high school
 HSG: High school graduate
 SC+: Some college, college graduate, post-graduate

NHANES 1999–2006 DATA ANALYSES

SELF-REPORTED DIABETES

To be classified as having self-reported diabetes, participants had to report being told by a doctor, at any time, that they had diabetes or sugar diabetes other than that related to pregnancy. Participants answering “borderline” to the question were classified as non-diabetic.

SELF-REPORTED HYPERTENSION

Self-reported hypertension was identified by an affirmative answer to the question: “Have you ever been told by a doctor that you had hypertension, also called high blood pressure.”

SELF-REPORTED HIGH CHOLESTEROL

Self-reported high cholesterol was identified by an affirmative answer to the question: “Have you ever been told by a doctor or other health professional that your blood cholesterol level was high?”

SELF-REPORTED CARDIOVASCULAR DISEASE

Participant reports any of the following cardiac events: coronary heart disease, angina/angina pectoris, heart attack, congestive heart failure, or stroke.

MICROALBUMINURIA

Albumin/creatinine ratio ≥ 30 mg/g

CHRONIC KIDNEY DISEASE

eGFR < 60 mL/min/1.73 m² or eGFR ≥ 60 mL/min/1.73 m² and albumin-creatinine ratio (ACR) ≥ 30 mg/g. GFR estimated using the IDMS-traceable 4-variable Modification of Diet in Renal Disease (MDRD) Study equation or Chronic Kidney Disease Epidemiology Collaboration equation (CKD-EPI) for calibrated serum creatinine (Scr) values

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 Stage 3: eGFR 30–59 mL/min/1.73 m²
 Stage 4: eGFR 15–29 mL/min/1.73 m²
 Stage 5: eGFR < 15 mL/min/1.73 m²

ANEMIA**WHO**

Male: hemoglobin < 13 g/dl
 Female: < 12 g/dl

KDOQI (2006)

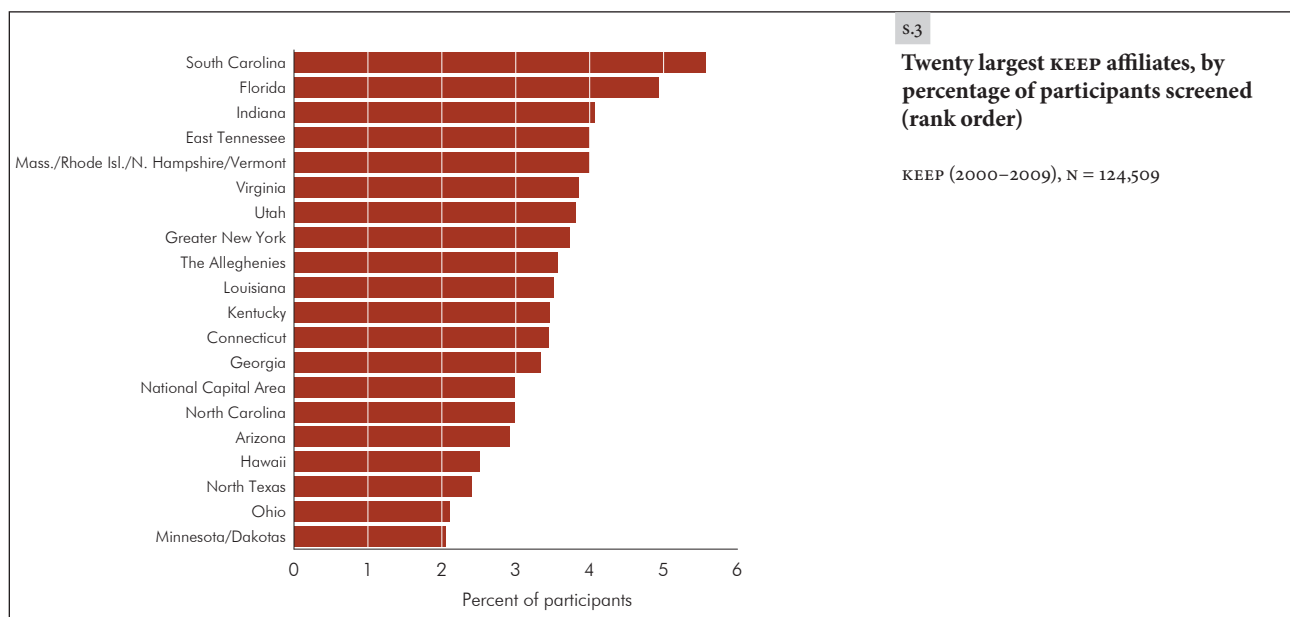
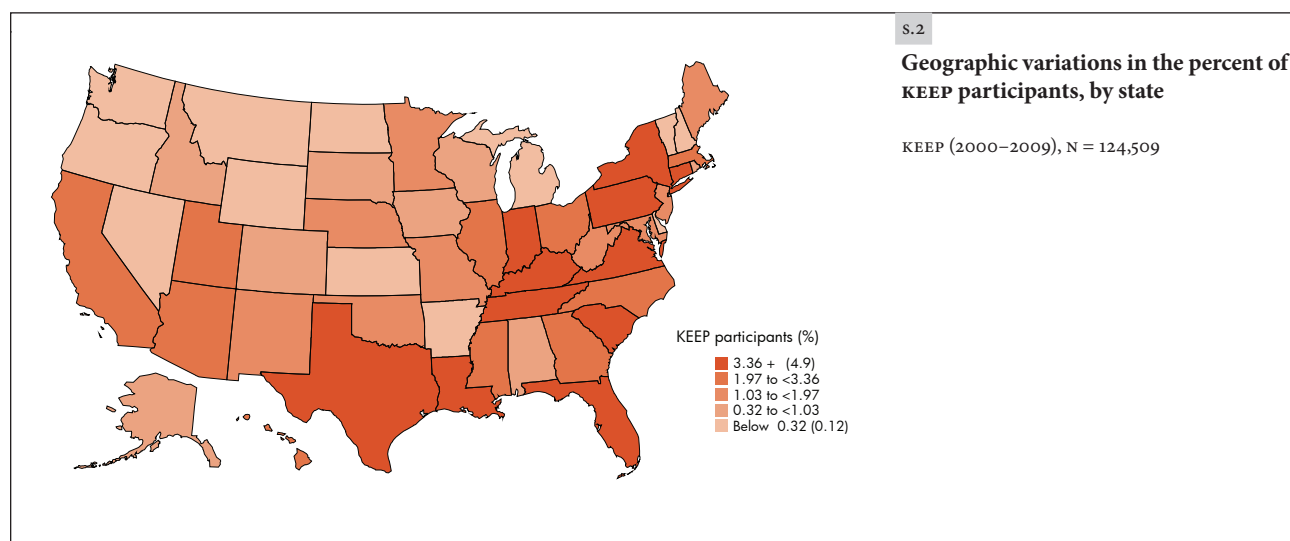
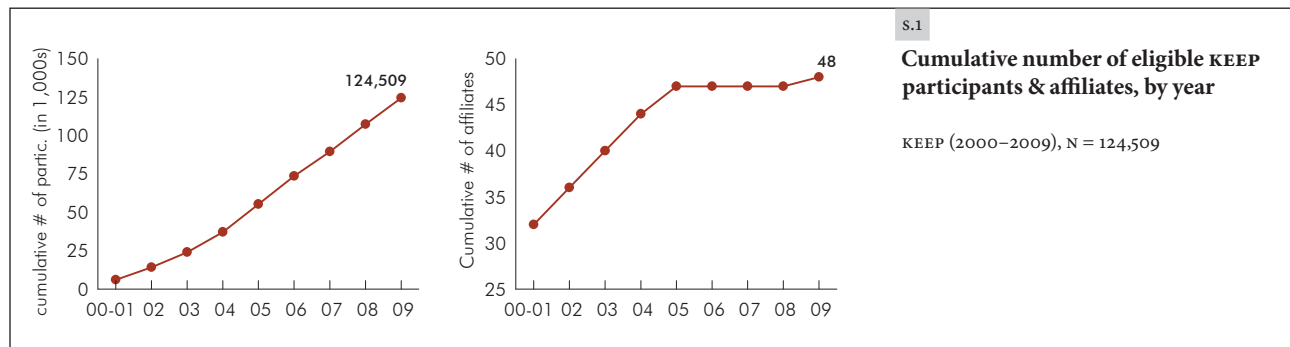
Males: hemoglobin < 13.5 g/dl
 Women < 12 g/dl

BODY MASS INDEX CATEGORIES

UW: underweight, BMI < 18.5
 N: normal, BMI 18.5–24.9
 OW: overweight, BMI 25–29.9
 OB: obese, BMI 30–39.9
 EOB: extremely obese, BMI ≥ 40

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GSL: Grade school or less
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 SC+: Some college, college graduate, post graduate



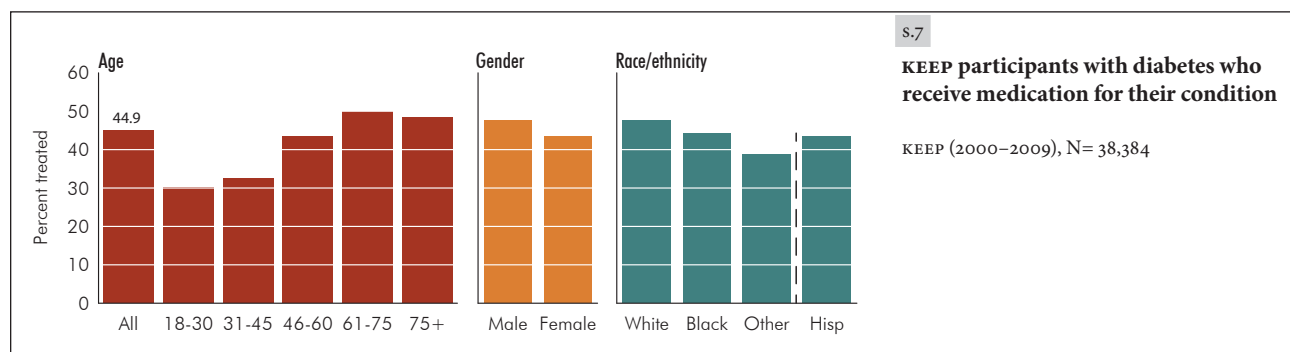
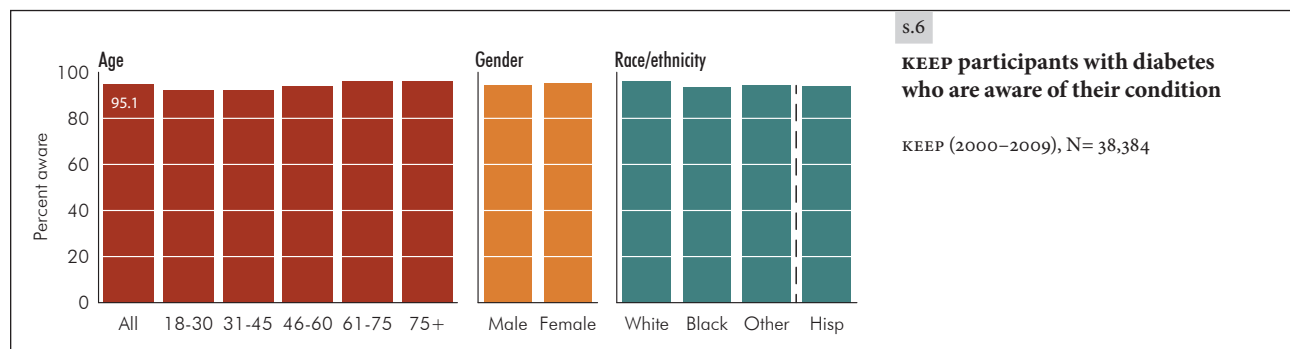
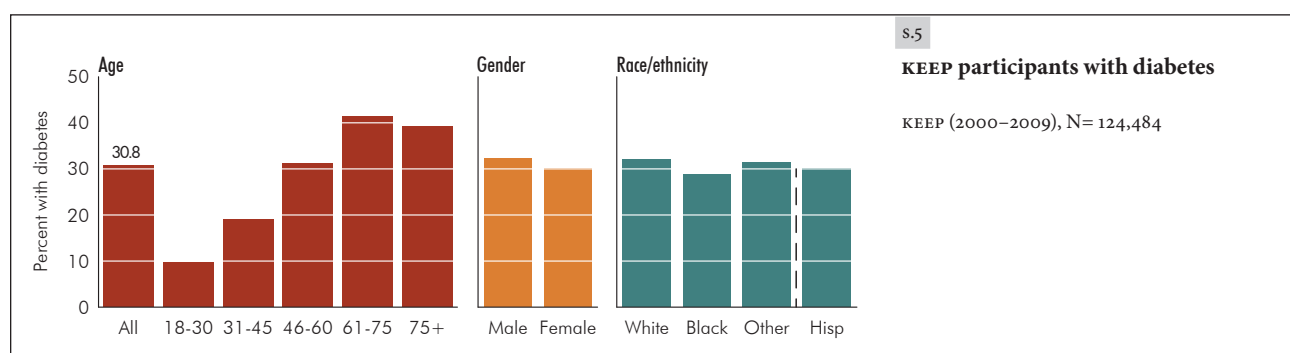
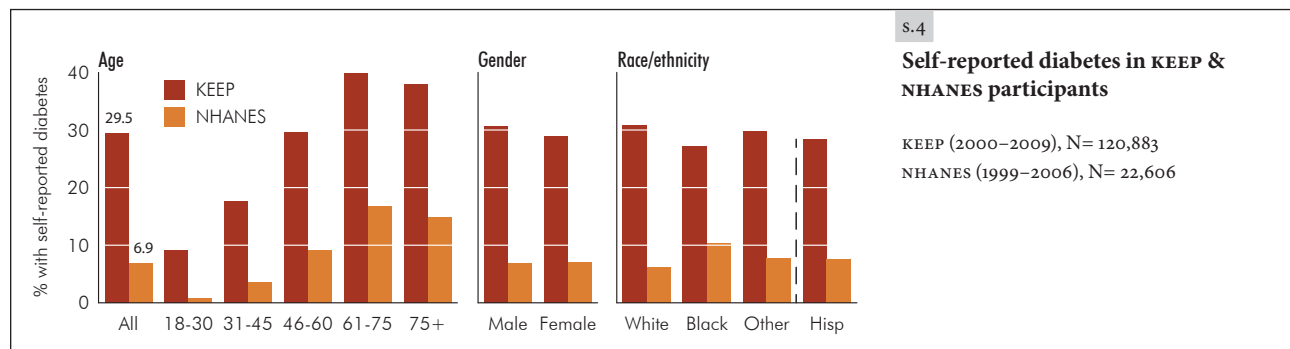
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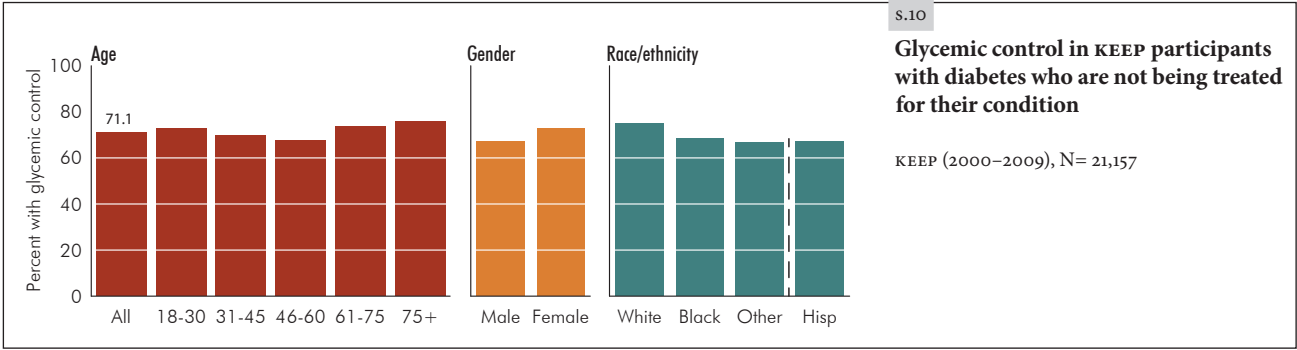
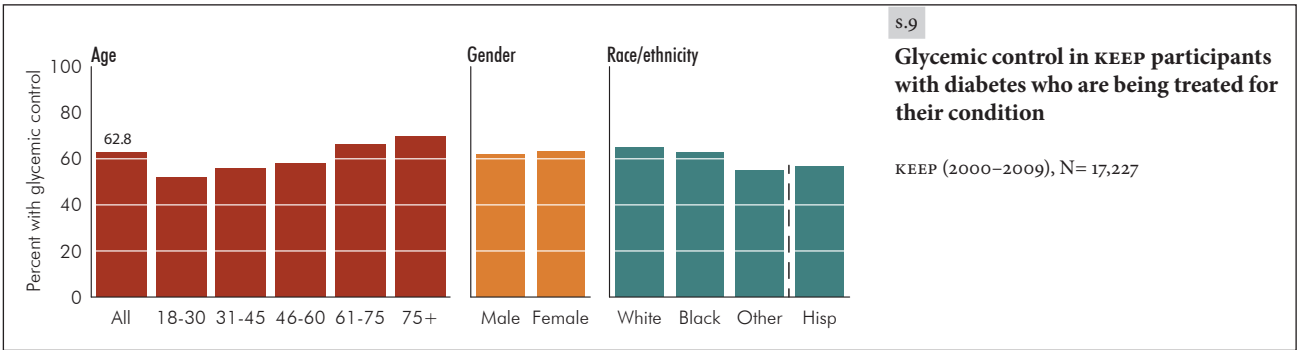
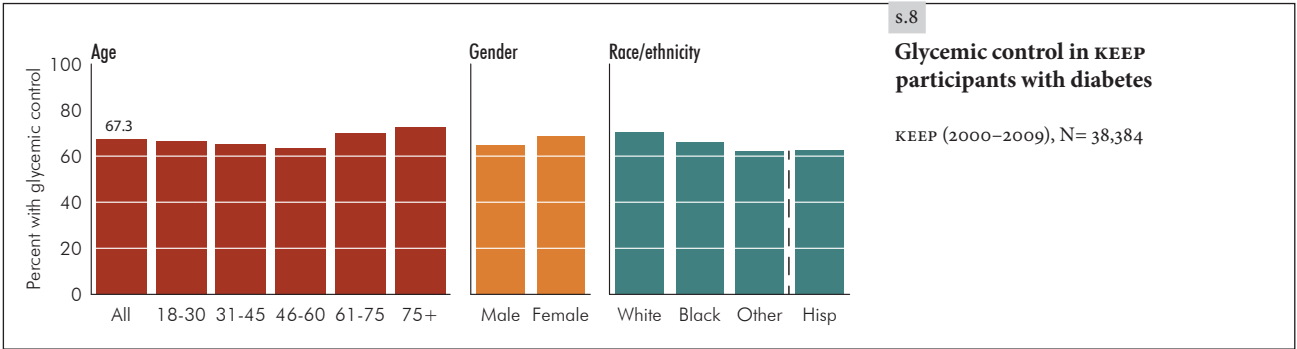
Total eligible KEEP participants, by year

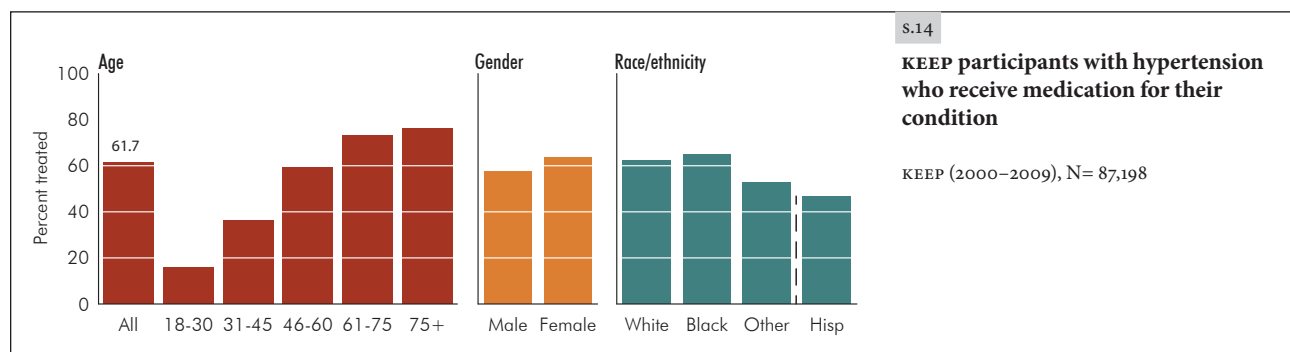
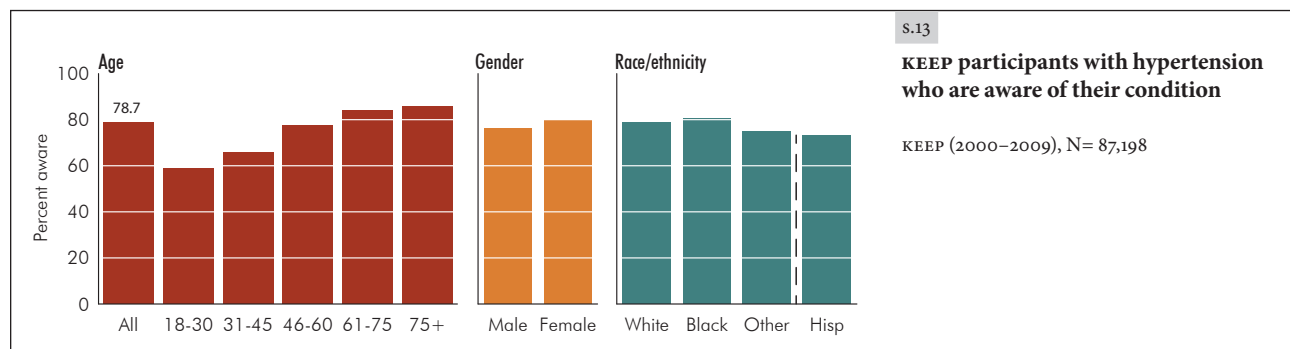
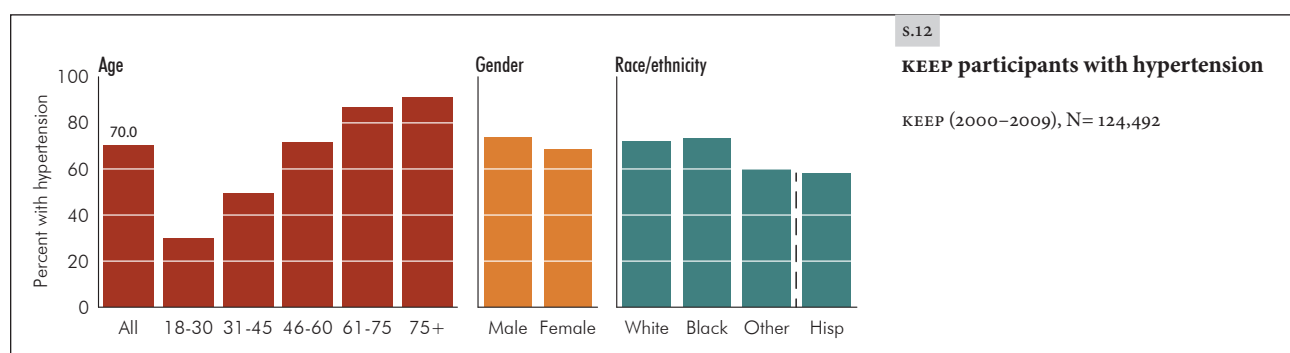
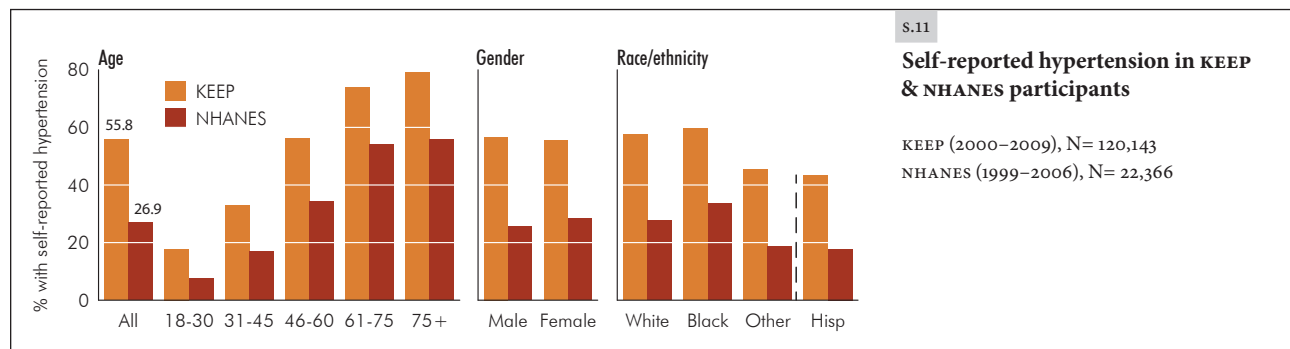
KEEP (2000–2009), N = 124,509

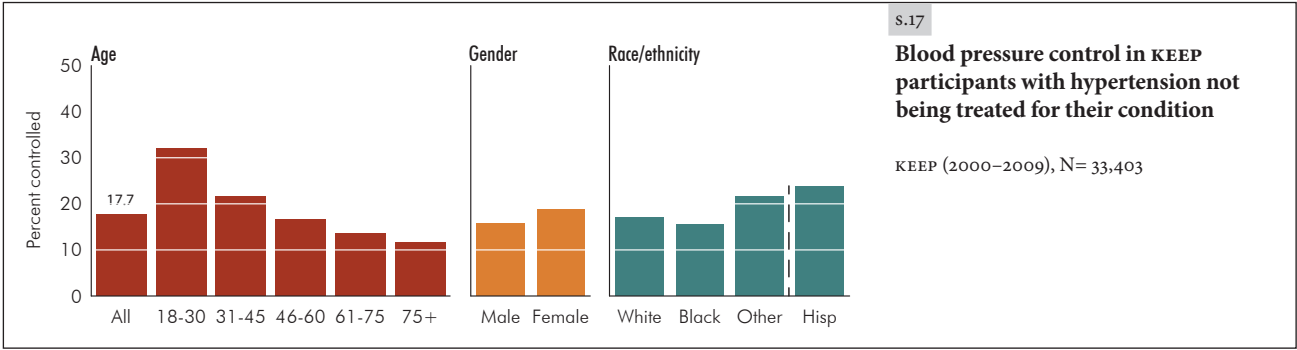
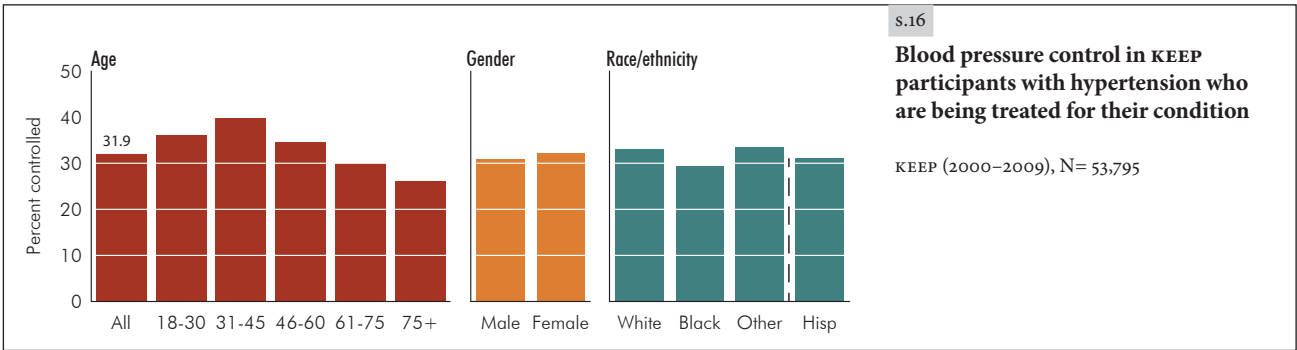
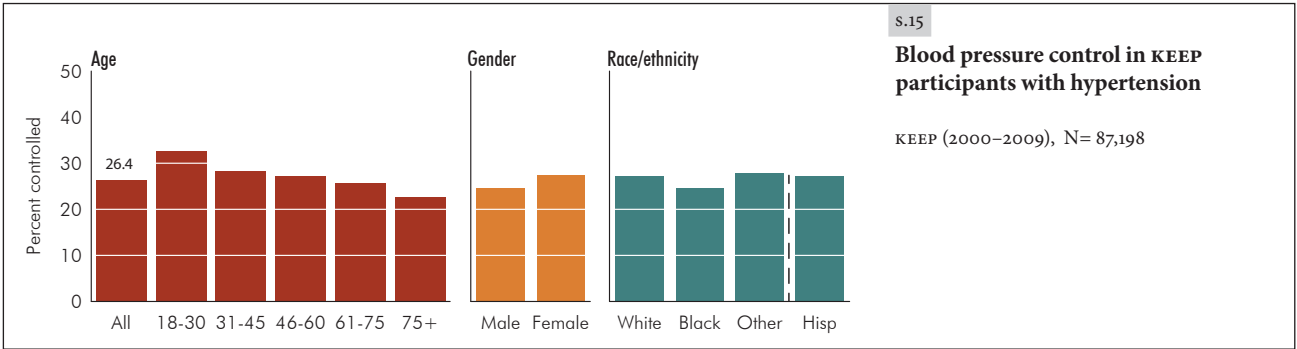
		2000+2001	2002	2003	2004	2005	2006	2007	2008	2009	All	All (%)
Age	18-30	568	644	1,004	1,085	1,391	1,257	989	1,077	1,019	9,034	7.3
	31-45	1,491	1,977	2,393	2,939	3,984	3,685	2,870	3,005	2,698	25,042	20.1
	46-60	2,097	2,651	3,422	4,690	6,438	6,592	5,509	6,113	5,949	43,461	34.9
	61-75	1,502	2,029	2,382	3,328	4,769	5,111	4,968	5,562	5,574	35,225	28.3
	>75	424	743	721	1,076	1,547	1,656	1,683	1,938	1,959	11,747	9.4
	Missing											
Gender	Male	1,959	2,570	2,944	4,142	5,879	5,684	5,207	5,805	5,547	39,737	31.9
	Female	4,123	5,473	6,976	8,975	12,192	12,613	10,808	11,890	11,650	84,700	68.0
	Missing	.	1	2	1	58	4	4	.	2	72	0.1
Race	White	2,284	3,104	4,301	5,793	9,028	9,008	8,131	9,261	8,738	59,648	47.9
	Black	2,652	3,392	3,430	4,274	5,267	5,565	5,041	5,402	5,479	40,502	32.5
	Other	967	1,358	1,851	2,969	3,414	2,942	2,332	2,650	2,910	21,393	17.2
	Unknown/missing	179	190	340	82	420	786	515	382	72	2,966	2.4
Ethnicity	Hispanic	618	712	1,117	1,890	2,416	2,317	2,075	2,164	2,317	15,626	12.6
	Non-Hispanic	5,464	7,332	8,805	11,228	15,713	15,984	13,944	15,531	14,882	108,883	87.4
Education Level	≤ 6 years	362	406	499	814	1,051	1,019	888	884	861	6,784	5.4
	<12 years	586	871	921	1,188	1,779	1,763	1,581	1,570	1,492	11,751	9.4
	12 years	1,585	2,192	2,591	3,491	4,611	4,462	4,190	4,531	4,527	32,180	25.8
	>12 years	1,629	2,155	2,775	3,459	4,675	4,351	3,815	4,504	4,272	31,635	25.4
	16 years	1,143	1,463	1,913	2,530	3,614	3,814	3,228	3,683	3,738	25,126	20.2
	>16 years	688	862	1,132	1,467	2,145	2,453	2,019	2,299	2,117	15,182	12.2
Health Insurance Status	Missing	89	95	91	169	254	439	297	224	192	1,850	1.5
	Yes	4,948	6,428	7,892	10,153	14,056	14,207	12,404	13,632	12,579	96,299	77.3
	No	883	1,234	1,660	2,490	3,251	3,371	3,292	3,525	3,880	23,586	18.9
All	Missing	251	382	370	475	822	723	318	536	740	4,617	3.7
		6,082	8,044	9,922	13,118	18,129	18,301	16,019	17,695	17,199	124,509	100.0

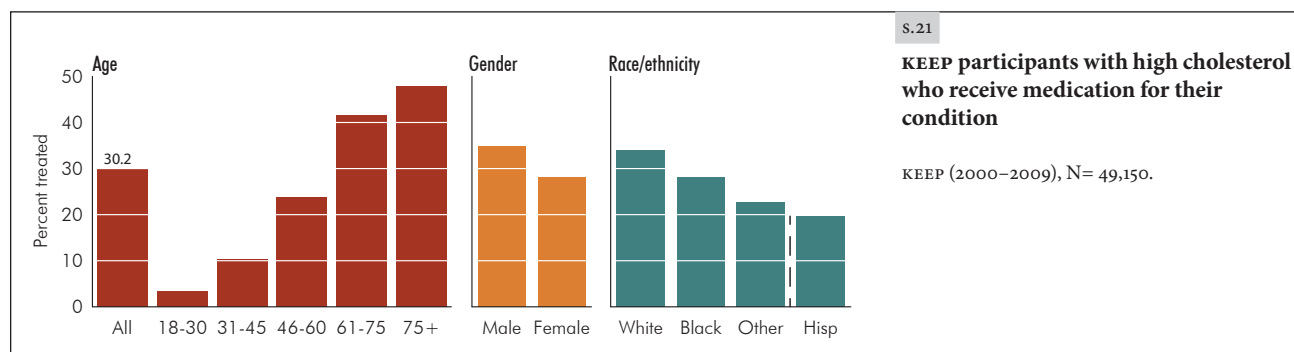
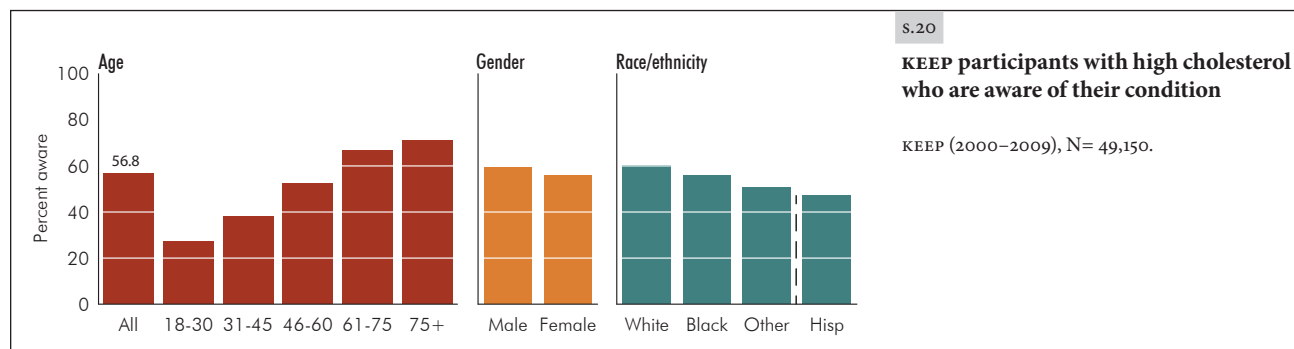
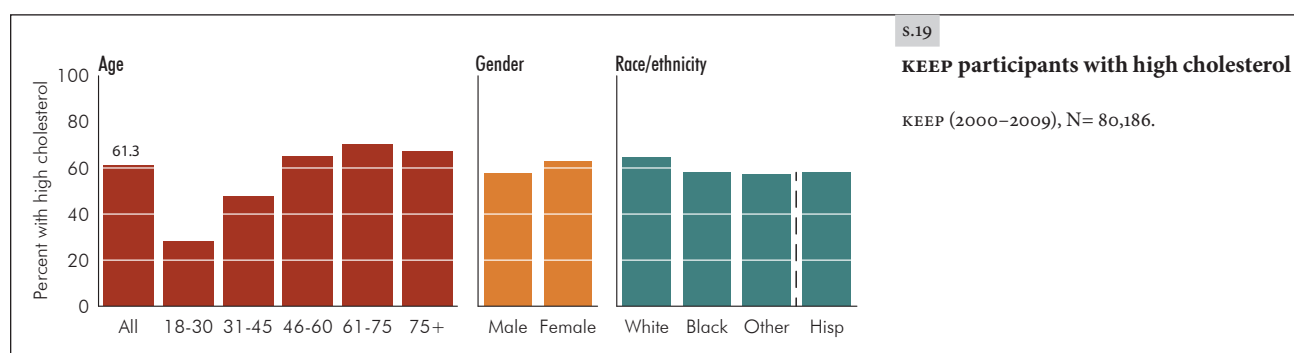
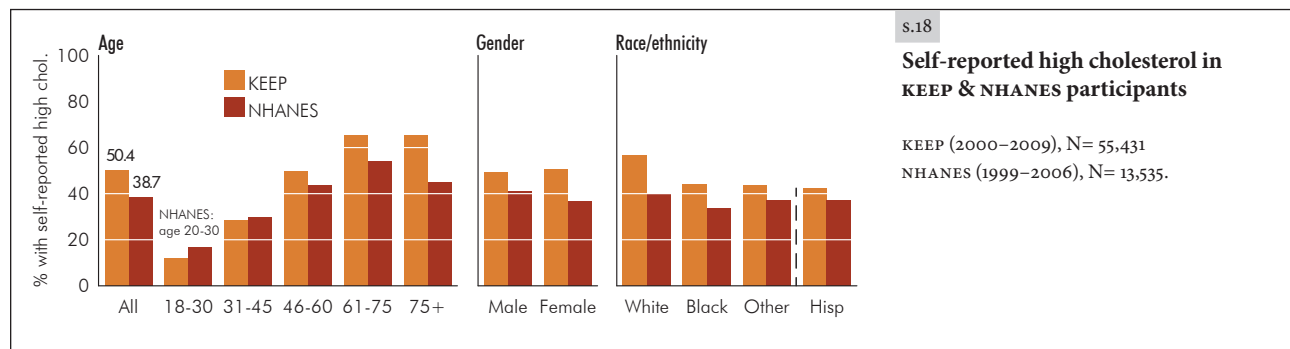
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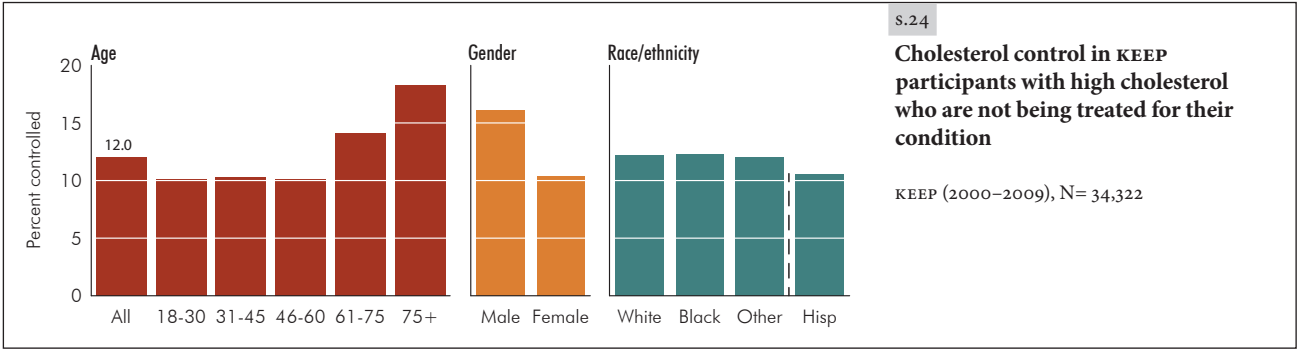
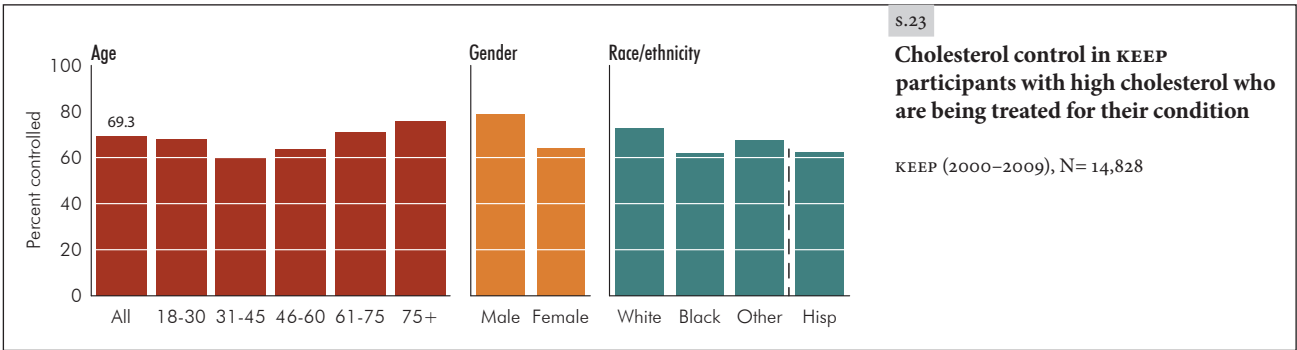
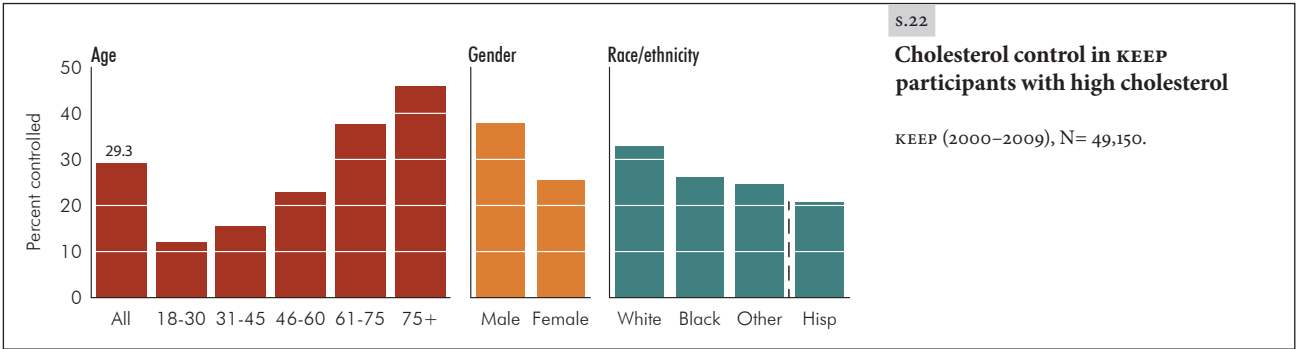


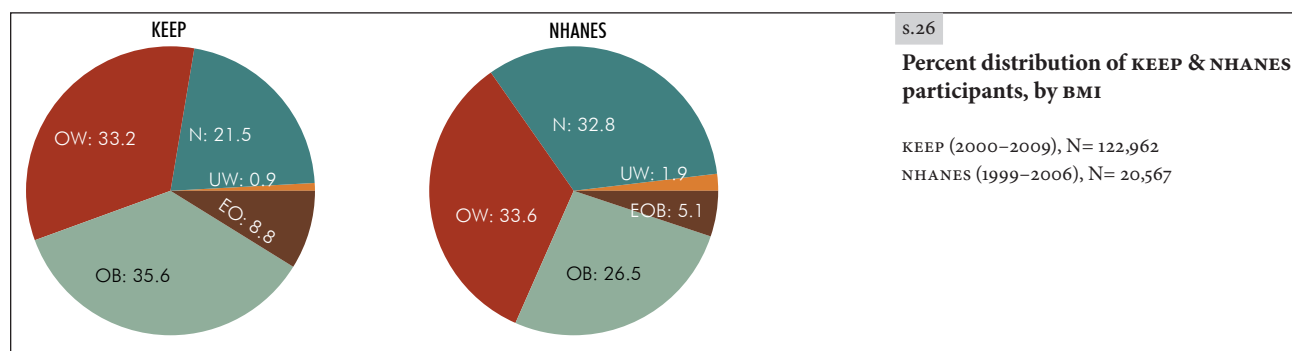
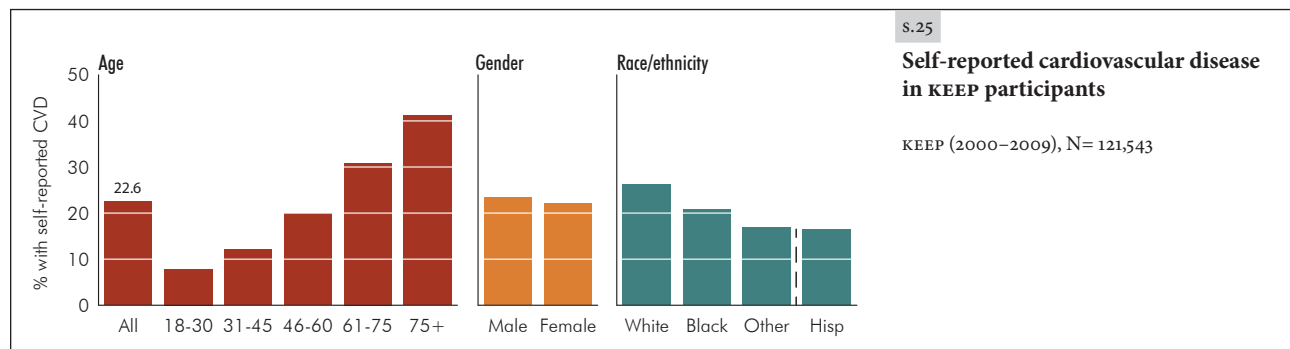


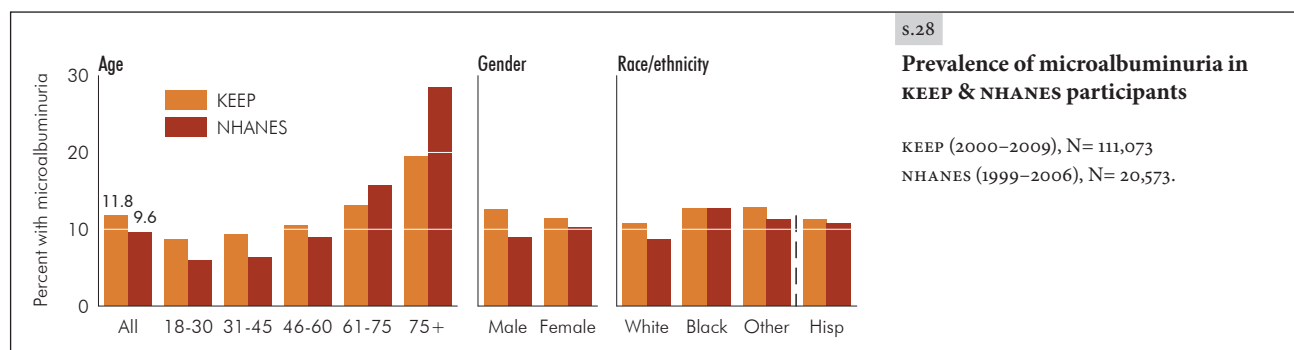
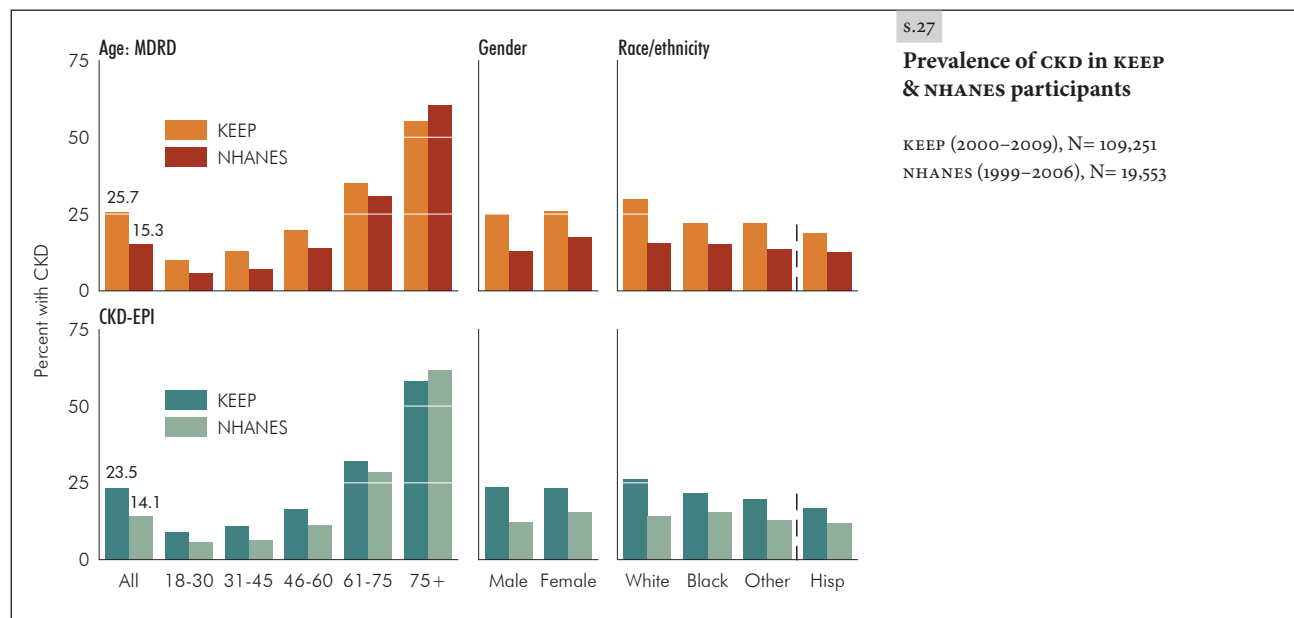












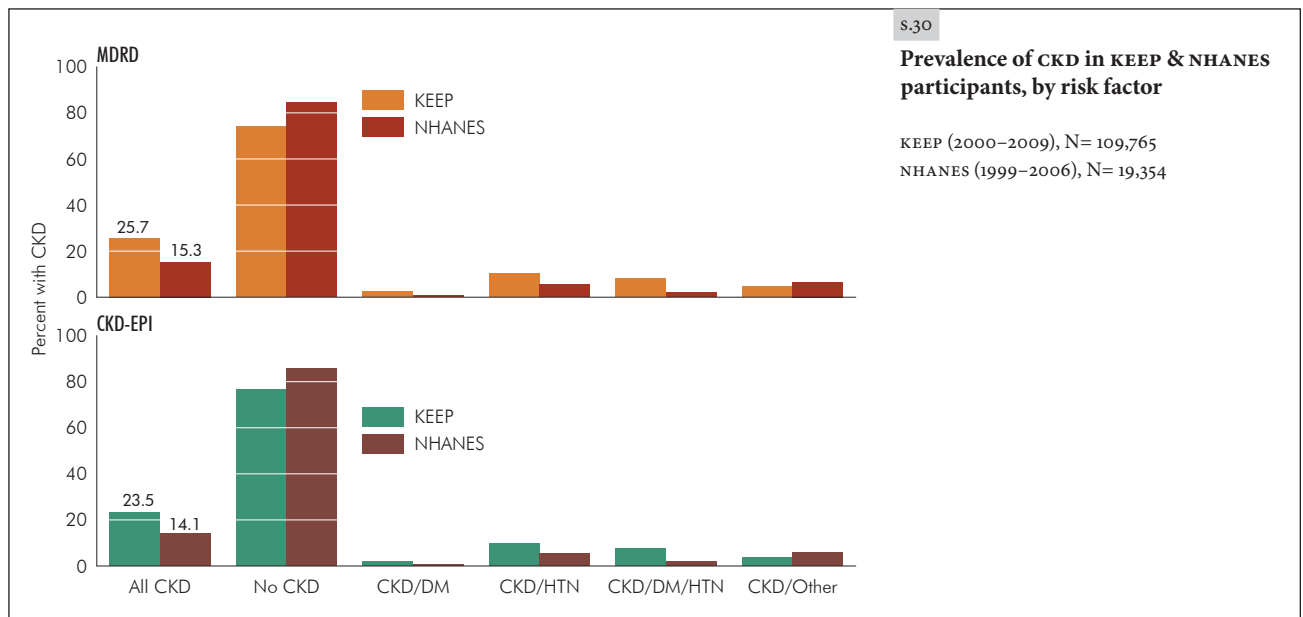
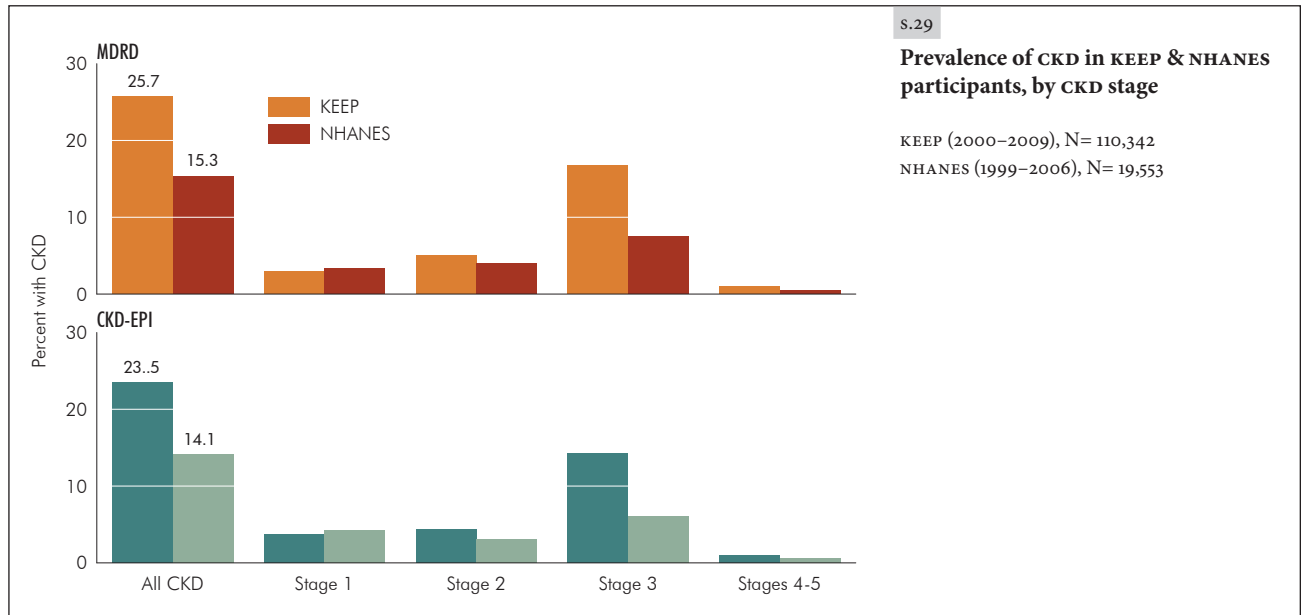
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Total eligible KEEP participants with CKD, by CKD stage: MDRD equation

KEEP (2000–2009), N= 124,509

	Non-CKD	Stage 1 & Abnormal ACR	Stage 2 & Abnormal ACR	Stage 3	Stages 4-5	Missing	All
Age							
18-30	6,871	431	185	132	15	1,400	9,034
31-45	18,615	895	861	1,066	58	3,547	25,042
46-60	30,810	1,272	1,815	4,455	213	4,896	43,461
61-75	20,787	555	1,915	8,376	424	3,168	35,225
>75	4,869	99	738	4,817	380	844	11,747
Gender							
Male	26,417	957	1,893	5,557	406	4,507	39,737
Female	55,535	2,295	3,621	13,289	684	9,276	84,700
Missing	.	.	.	.	.	72	72
Race							
White	38,592	966	2,566	12,315	630	4,579	59,648
Black	27,344	1,466	1,876	4,106	268	5,442	40,502
Other	15,117	775	1,019	2,334	189	1,959	21,393
Unknown/missing	899	45	53	91	3	1,875	2,966
Ethnicity							
Hispanic	10,679	537	587	1,280	82	2,461	15,626
Non-Hispanic	71,273	2,715	4,927	17,566	1,008	11,394	108,883
U.S. Census Region							
Northeast	19,202	743	1,316	4,387	241	2,981	28,870
Midwest	11,859	491	822	2,908	170	1,907	18,157
South	39,440	1,597	2,609	8,493	484	7,325	59,948
West	11,432	421	767	3,052	195	1,631	17,498
Missing	19	.	.	6	.	11	36
U.S. Census Division							
New England	6,544	222	453	1,744	81	1,644	10,688
Middle Atlantic	12,658	521	863	2,643	160	1,337	18,182
East North Central	7,665	342	542	1,695	100	933	11,277
West North Central	4,194	149	280	1,213	70	974	6,880
South Atlantic	19,980	780	1,301	4,396	233	4,221	30,911
East South Central	10,938	397	739	2,447	123	1,339	15,983
West South Central	8,522	420	569	1,650	128	1,765	13,054
Mountain	6,845	236	433	2,126	108	908	10,656
Pacific	4,587	185	334	926	87	723	6,842
Missing	19	.	.	6	.	11	36
Smoking							
Yes	30,846	1,361	2,358	7,726	496	5,444	48,231
No	48,281	1,759	2,971	10,447	555	7,551	71,564
Missing	2,825	132	185	673	39	860	4,714
Education Level							
≤ 6 years	3,994	230	362	1,187	100	911	6,784
<12 years	7,071	378	610	2,073	145	1,474	11,751
12 years	20,364	893	1,511	5,568	344	3,500	32,180
>12 years	21,171	845	1,345	4,462	255	3,557	31,635
16 years	17,788	598	1,000	3,045	139	2,556	25,126
>16 years	10,512	264	585	2,239	93	1,489	15,182
Missing	1,051	44	101	272	14	368	1,850
Health Insurance Status							
Yes	62,370	2,176	4,268	16,054	914	10,517	96,299
No	16,840	944	1,045	1,974	126	2,657	23,586
Missing	2,735	132	201	818	50	681	4,617
Doctor Status							
Yes	69,820	2,680	4,901	17,581	1,012	11,481	107,475
No	10,567	495	506	911	50	1,902	14,431
Missing	1,565	77	107	354	28	472	2,603
All	81,952	3,252	5,514	18,846	1,090	13,855	124,509

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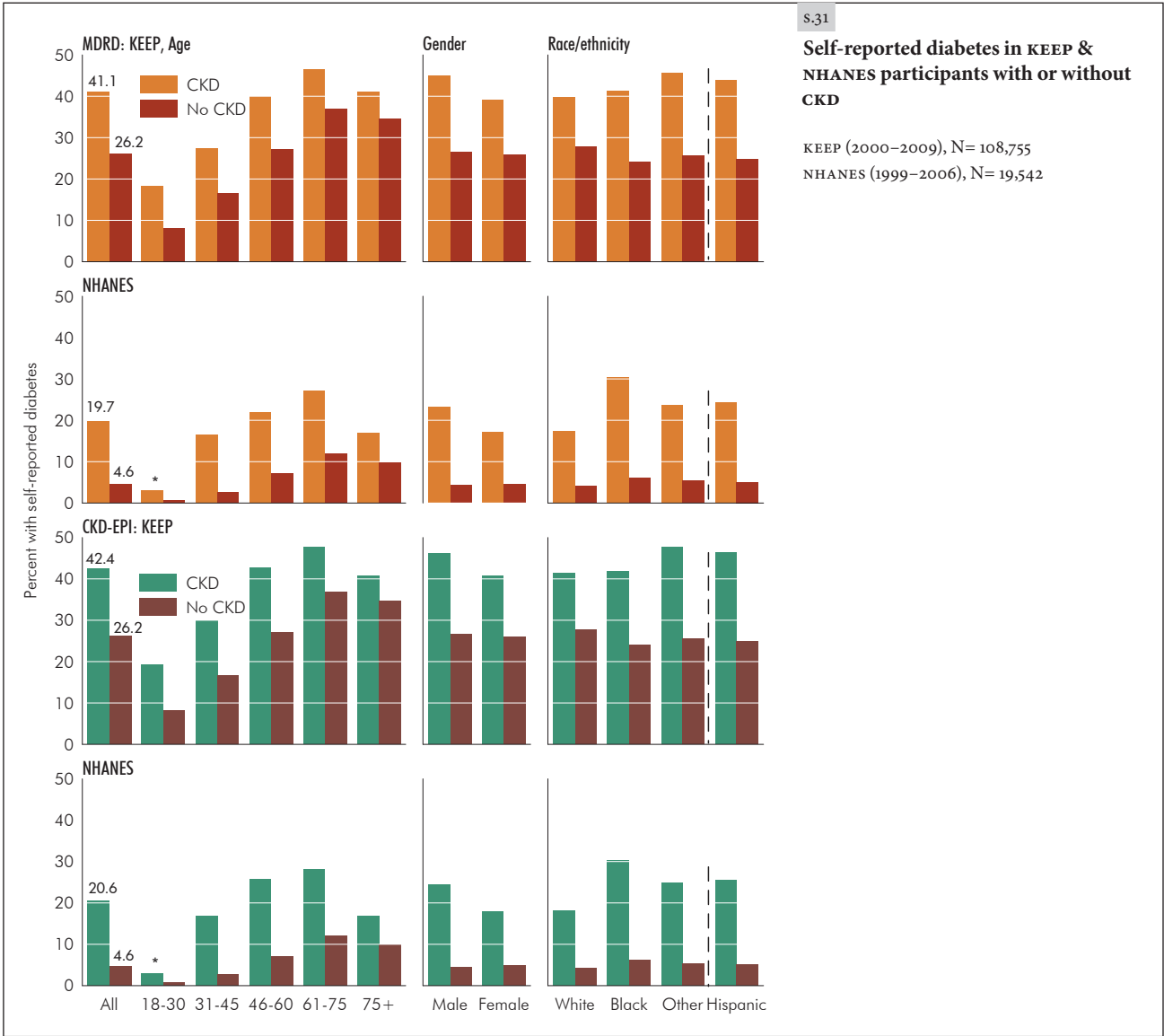
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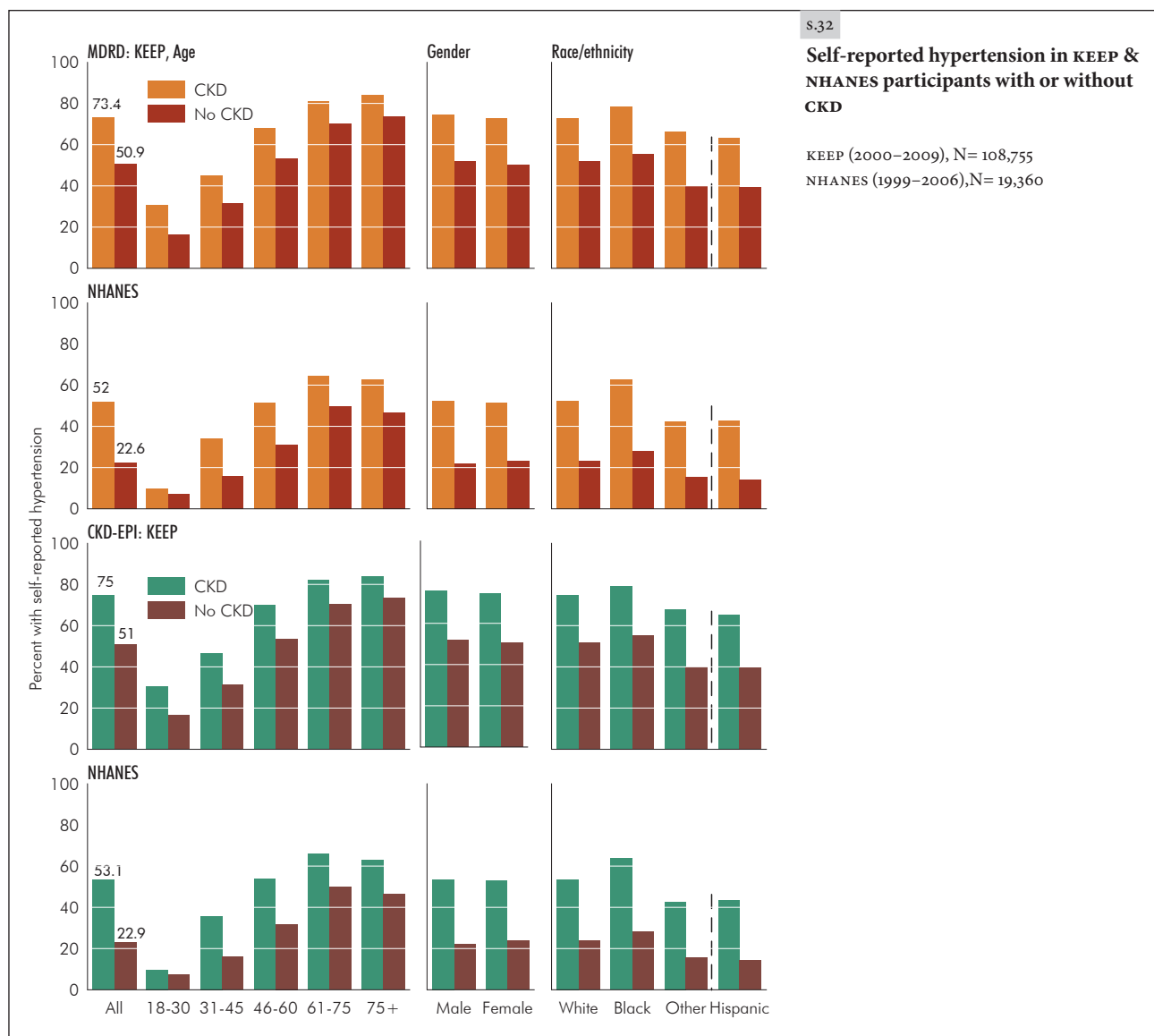
Total eligible KEEP participants with CKD, by CKD stage: CKD-EPI equation

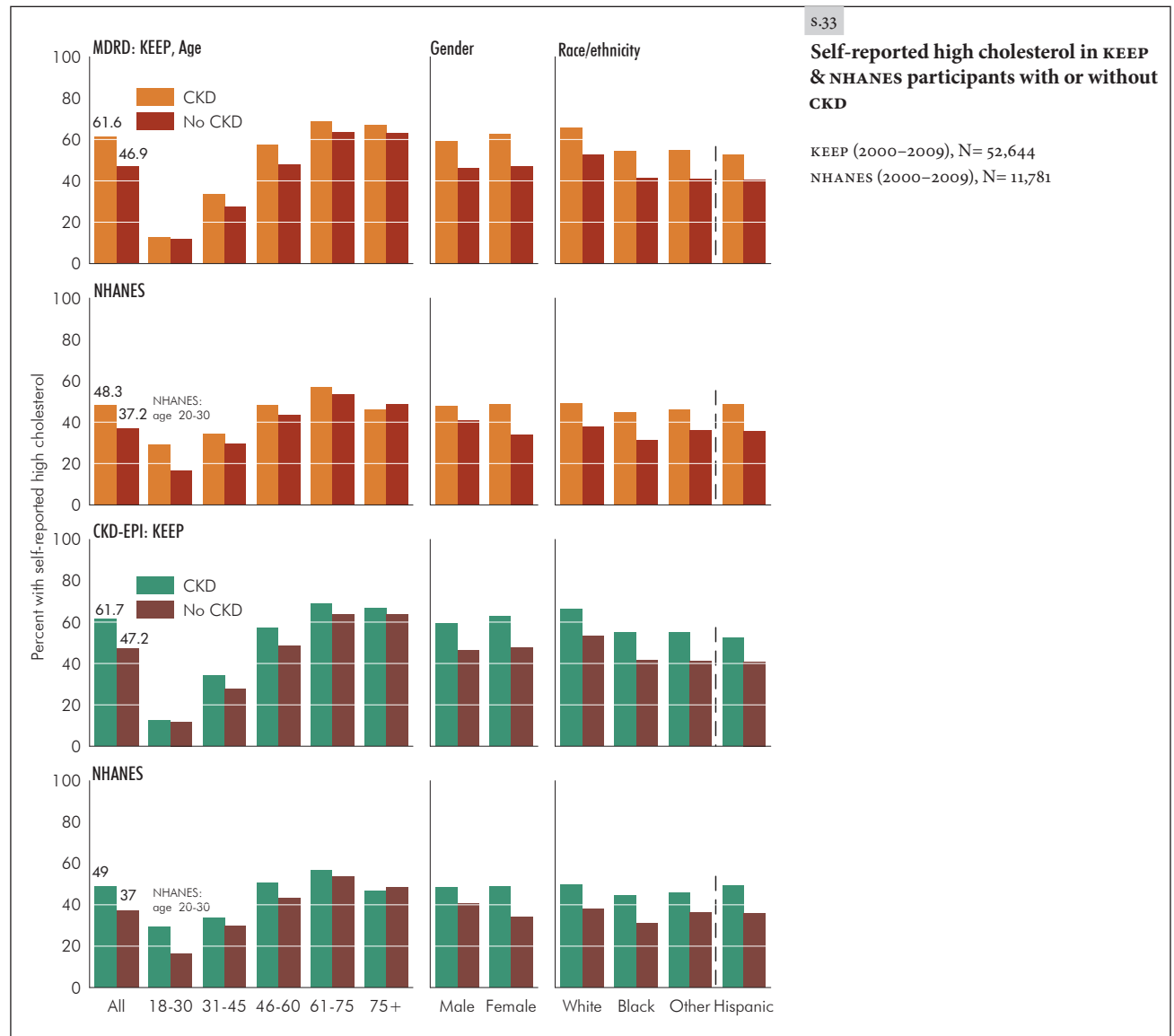
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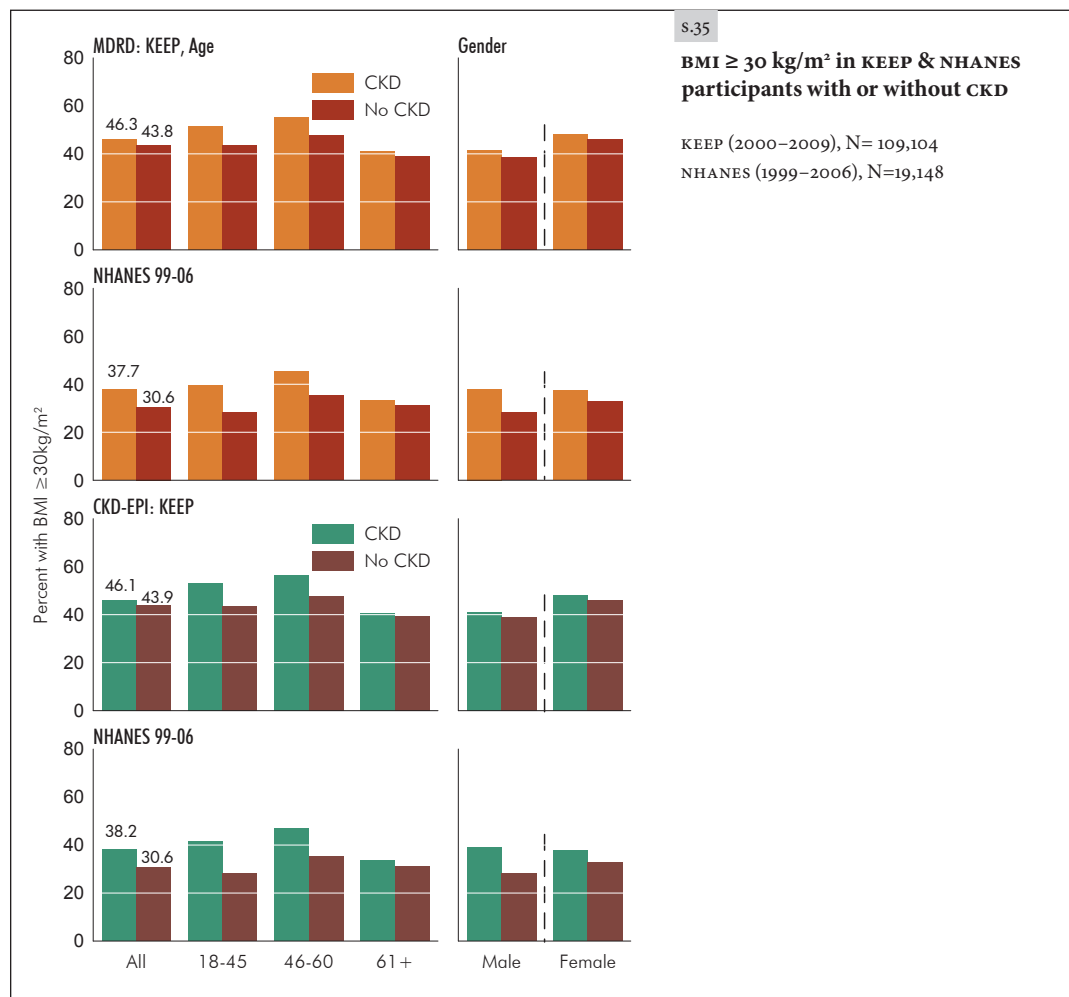
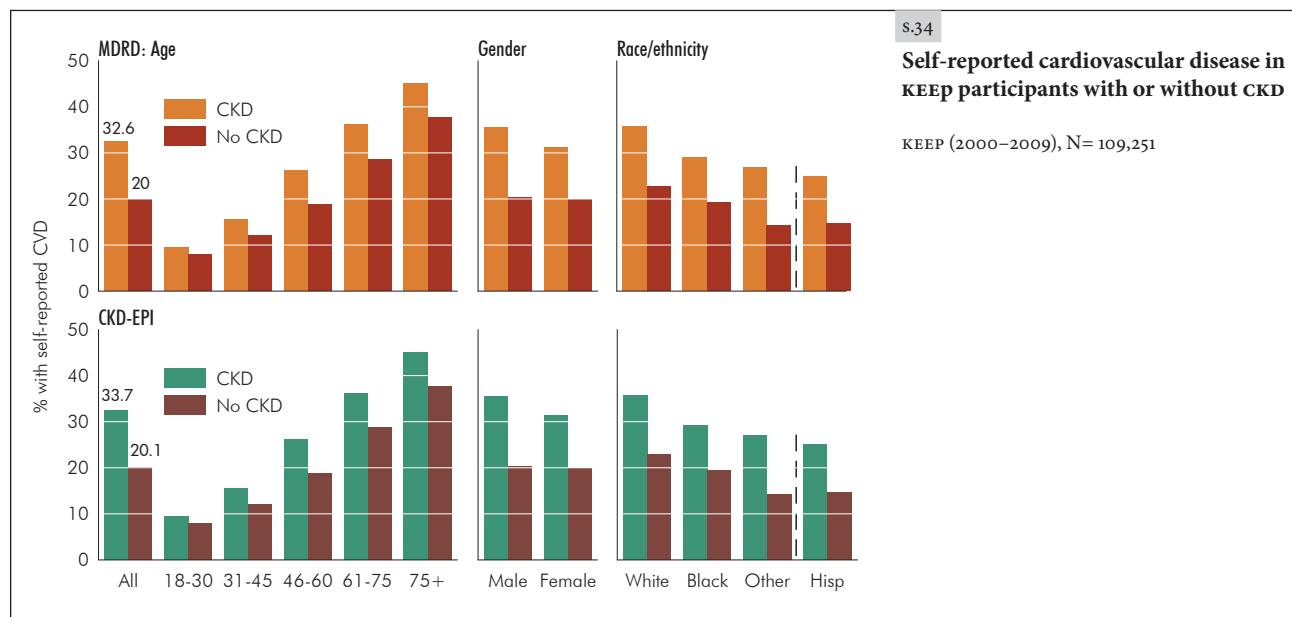
	Non-CKD	Stage 1 & Abnormal ACR	Stage 2 & Abnormal ACR	Stage 3	Stages 4-5	Missing	All
Age							
18-30	6,922	540	85	65	13	1,409	9,034
31-45	19,078	1,303	523	460	56	3,622	25,042
46-60	32,108	1,645	1,615	2,880	186	5,027	43,461
61-75	21,718	663	1,918	7,245	431	3,250	35,225
>75	4,562	38	740	5,132	474	801	11,747
Gender							
Male	26,856	1,180	1,725	4,981	449	4,546	39,737
Female	57,532	3,009	3,156	10,801	711	9,491	84,700
Missing	.	.	.	.	.	72	72
Race							
White	40,452	1,360	2,350	10,056	663	4,767	59,648
Black	27,467	1,752	1,616	3,914	310	5,443	40,502
Other	15,548	1,025	863	1,749	184	2,024	21,393
Unknown/missing	921	52	52	63	3	1,875	2,966
Ethnicity							
Hispanic	10,955	684	495	914	78	2,500	15,626
Non-Hispanic	73,433	3,505	4,386	14,868	1,082	11,609	108,883
U.S. Census Region							
Northeast	19,754	955	1,180	3,681	253	3,047	28,870
Midwest	12,235	627	731	2,462	184	1,918	18,157
South	40,482	2,036	2,289	7,155	525	7,461	59,948
West	11,898	571	681	2,478	198	1,672	17,498
Missing	19	.	.	6	.	11	36
U.S. Census Division							
New England	6,827	290	416	1,385	84	1,686	10,688
Middle Atlantic	12,927	665	764	2,296	169	1,361	18,182
East North Central	7,878	429	486	1,436	108	940	11,277
West North Central	4,357	198	245	1,026	76	978	6,880
South Atlantic	20,492	998	1,143	3,722	248	4,308	30,911
East South Central	11,255	519	649	2,065	143	1,352	15,983
West South Central	8,735	519	497	1,368	134	1,801	13,054
Mountain	7,185	317	391	1,733	112	918	10,656
Pacific	4,713	254	290	745	86	754	6,842
Missing	19	.	.	6	.	11	36
Smoking							
Yes	31,771	1,742	2,096	6,539	533	5,550	48,231
No	49,717	2,291	2,613	8,662	586	7,695	71,564
Missing	2,900	156	172	581	41	864	4,714
Education Level							
≤ 6 years	4,053	253	344	1,096	116	922	6,784
<12 years	7,216	455	564	1,858	166	1,492	11,751
12 years	21,004	1,108	1,387	4,743	371	3,567	32,180
>12 years	21,831	1,117	1,165	3,659	255	3,608	31,635
16 years	18,354	839	814	2,357	140	2,622	25,126
>16 years	10,854	356	518	1,832	96	1,526	15,182
Missing	1,075	61	89	237	16	372	1,850
Health Insurance Status							
Yes	64,292	2,808	3,846	13,646	987	10,720	96,299
No	17,288	1,228	849	1,404	119	2,698	23,586
Missing	2,801	153	186	732	54	691	4,617
Doctor Status							
Yes	71,966	3,461	4,370	14,887	1,085	11,706	107,475
No	10,813	642	400	604	48	1,924	14,431
Missing	1,609	86	111	291	27	479	2,603
All	84,388	4,189	4,881	15,782	1,160	14,109	124,509

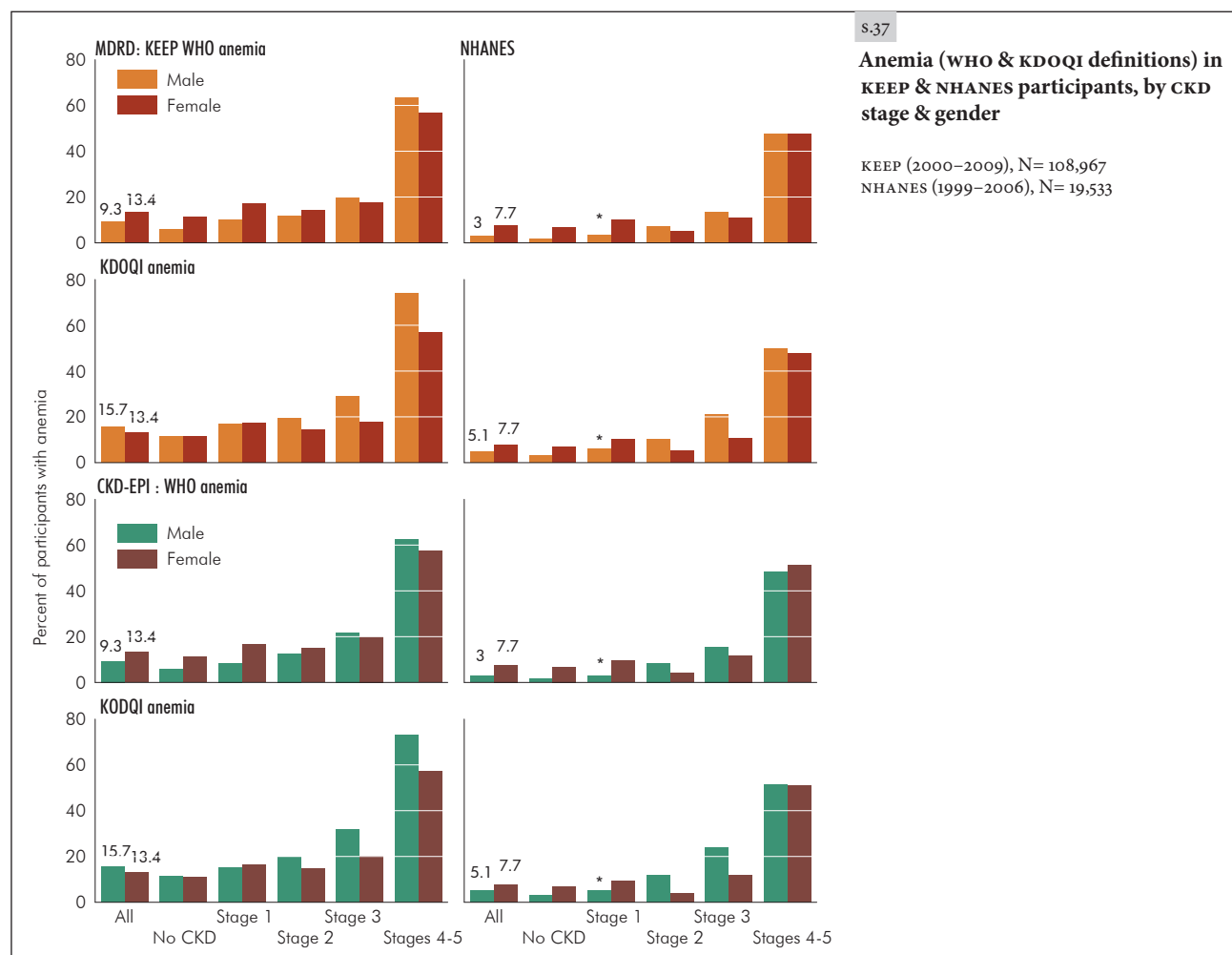
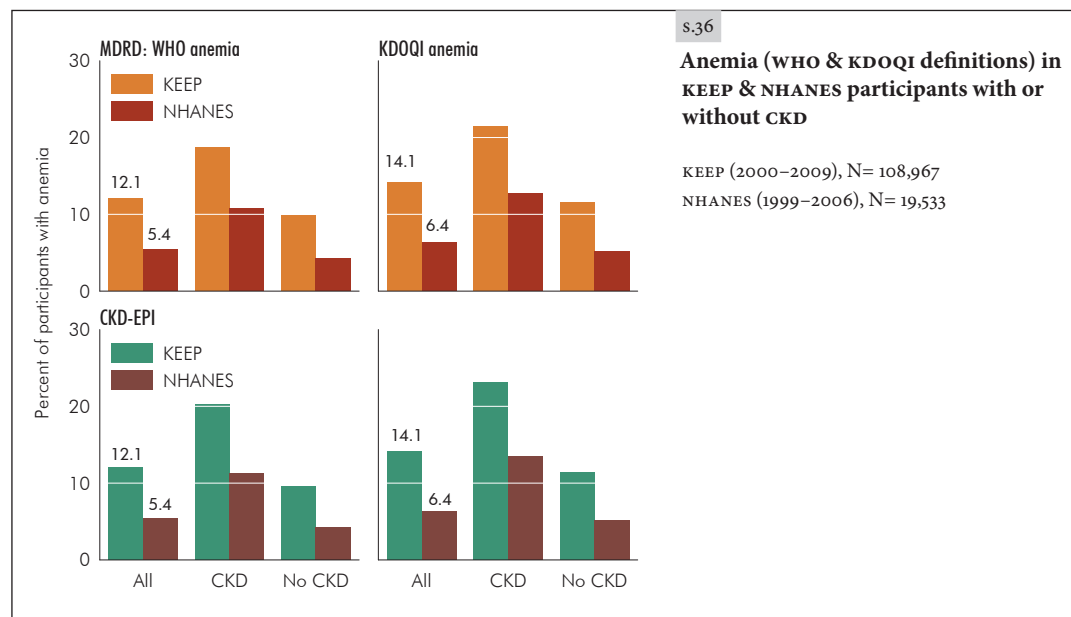
". " Zero values in this cell





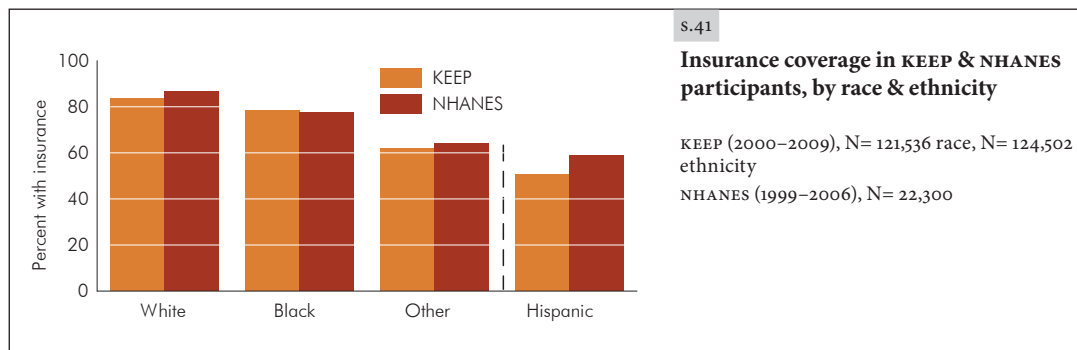
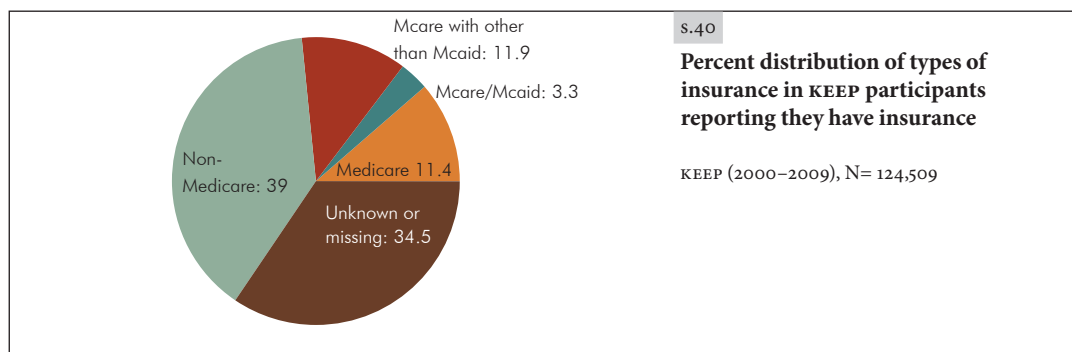
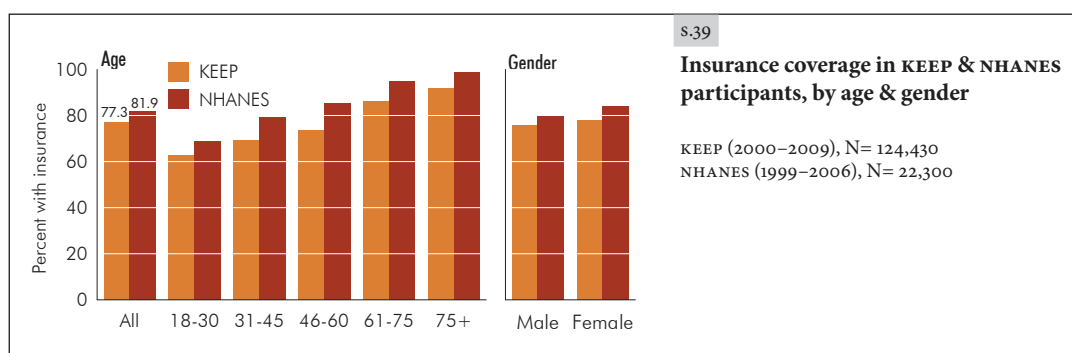
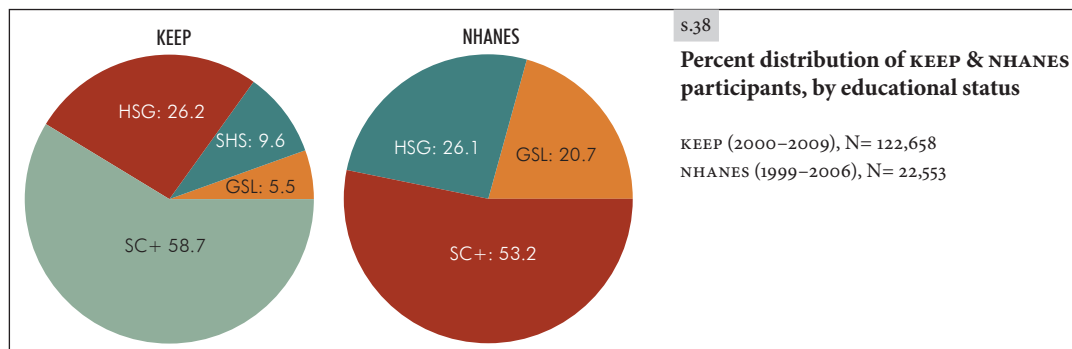






s.d

Odds ratio (OR) of CKD, by risk factor				
KEEP (2000–2009), N= 49,662				
MDRD equation				
	OR	Low	Upper	P-value
Age				
18 - 45	0.76	0.71	0.82	<.0001
46 - 60	1.00			
61 - 75	1.84	1.74	1.94	<.0001
75+	4.31	4.01	4.64	<.0001
Male	0.94	0.89	0.98	0.0061
Race				
White	1.00			
Black	0.65	0.62	0.68	<.0001
Other	0.95	0.88	1.02	0.1330
Hispanic	0.74	0.68	0.81	<.0001
Self-reported diabetes	1.41	1.35	1.48	<.0001
Self-reported hypertension	1.75	1.66	1.85	<.0001
Self-reported high cholesterol	1.09	1.04	1.14	0.0003
Cardiovascular disease	1.25	1.20	1.32	<.0001
BMI ≥30 kg/m ²	1.18	1.12	1.23	<.0001
Anemia (WHO definition)	2.10	1.97	2.23	<.0001
Insurance	0.95	0.89	1.01	0.0908
CKD-EPI equation				
	OR	Low	Upper	P-value
Age				
18 - 45	0.86	0.80	0.93	0.0002
46 - 60	1.00			
61 - 75	2.07	1.95	2.19	<.0001
75+	6.22	5.77	6.70	<.0001
Male	1.03	0.98	1.08	0.2713
Race				
White	1.00			
Black	0.80	0.76	0.85	<.0001
Other	1.00	0.93	1.08	0.9159
Hispanic	0.79	0.72	0.86	<.0001
Self-reported diabetes	1.49	1.42	1.56	<.0001
Self-reported hypertension	1.78	1.69	1.88	<.0001
Self-reported high cholesterol	1.08	1.03	1.14	0.0023
Cardiovascular disease	1.27	1.21	1.34	<.0001
BMI ≥30 kg/m ²	1.18	1.13	1.24	<.0001
Anemia (WHO definition)	2.22	2.09	2.37	<.0001
Insurance	0.93	0.87	0.99	0.0326



s.e

Hazard ratio of RRT, controlled by risk factors

KEEP (2000–2009), N= 96,309

	Estimate	SE	P-value	Hazard ratio
Age				
18 - 45	0.19	0.17	0.2688	1.21
46 - 60	1.00			
61 - 75	-0.48	0.13	0.0002	0.62
75+	-0.90	0.18	<.0001	0.41
Male	0.55	0.11	<.0001	1.74
Race				
White	1.00			
Black	0.45	0.13	0.0003	1.57
Other	0.50	0.15	0.0006	1.65
Hispanic	-0.43	0.21	0.0371	0.65
Self-reported diabetes	0.43	0.12	0.0003	1.54
Self-reported hypertension	0.55	0.19	0.0038	1.74
Cardiovascular disease	0.01	0.11	0.9357	1.01
BMI ≥ 30 kg/m ²	0.04	0.11	0.7463	1.04
Anemia (WHO definition)	0.89	0.12	<.0001	2.44
Insurance	-0.28	0.14	0.0459	0.75
eGFR(continuous)	-0.09	0.00	<.0001	0.91
ACR ≥ 30 mg/g	2.25	0.16	<.0001	9.52

s.f

Hazard ratio of death, controlled by risk factors

KEEP (2000–2009), N= 101,417

MDRD Study Equation

	Estimate	SE	P-value	Hazard ratio
Age				
18 - 45	-0.95	0.10	<.0001	0.39
46 - 60	1.00			
61 - 75	0.86	0.06	<.0001	2.36
75+	1.76	0.06	<.0001	5.84
Male	0.49	0.04	<.0001	1.64
Race				
White	1.00			
Black	-0.10	0.05	0.0369	0.91
Other	-0.05	0.06	0.3847	0.95
Hispanic	-0.33	0.09	0.0003	0.72
Self-reported diabetes	0.41	0.04	<.0001	1.50
Self-reported hypertension	0.16	0.05	0.0011	1.17
Cardiovascular disease	0.49	0.04	<.0001	1.64
BMI ≥ 30 kg/m ²	-0.05	0.04	0.2060	0.95
Anemia (WHO definition)	0.61	0.05	<.0001	1.83
Insurance	-0.20	0.07	0.0017	0.82
CKD by MDRD				
non-CKD	1.00			
stage 1	0.75	0.11	<.0001	2.12
stage 2	0.65	0.07	<.0001	1.92
stage 3-5	0.63	0.04	<.0001	1.89

CKD-EPI Equation

	Estimate	SE	P-value	Hazard ratio
Age				
18 - 45	-0.95	0.10	<.0001	0.39
46 - 60	1.00			
61 - 75	0.84	0.06	<.0001	2.31
75+	1.69	0.06	<.0001	5.44
Male	0.48	0.04	<.0001	1.62
Race				
White	1.00			
Black	-0.12	0.05	0.0097	0.89
Other	-0.06	0.06	0.3508	0.95
Hispanic	-0.33	0.09	0.0004	0.72
Self-reported diabetes	0.40	0.04	<.0001	1.50
Self-reported hypertension	0.15	0.05	0.0018	1.16
Cardiovascular disease	0.49	0.04	<.0001	1.64
BMI ≥ 30 kg/m ²	-0.05	0.04	0.1922	0.95
Anemia (WHO definition)	0.59	0.05	<.0001	1.81
Insurance	-0.21	0.07	0.0014	0.81
CKD by CKD-EPI				
non-CKD	1.00			
stage 1	0.74	0.11	<.0001	2.09
stage 2	0.67	0.07	<.0001	1.96
stage 3-5	0.69	0.05	<.0001	2.00

