

# 5

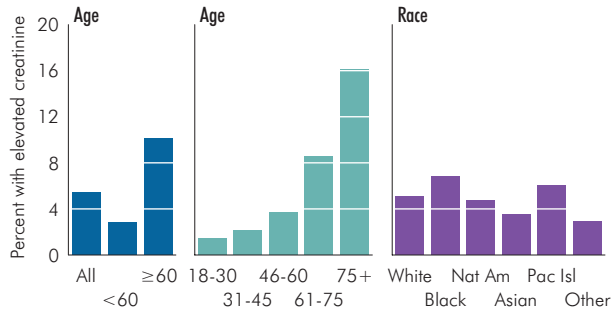
## Chronic kidney disease

“I was found to have proteinuria. My regular doctor sees me every 3 months for my high blood pressure..., but he sent me to a nephrologist who put me on an additional medicine.... My protein went from 200 to 6 on the new medication! He follows me every 6 months and yearly with urine and blood work. I'm glad I got screened! Keep up the good work!”

*KEEP participant: Screening date, November, 2005*

prevalence of CKD  
& family history of  
kidney disease  
hypertension  
diabetes  
obesity  
smoking  
CKD risk factors  
microalbuminuria &  
albumin/creatinine  
ratio  
PTH, calcium, &  
phosphorus

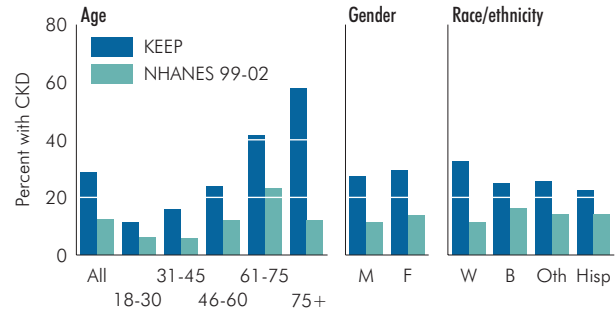
## PREVALENCE OF CKD & FAMILY HISTORY OF KIDNEY DISEASE



5.1

**Elevated serum creatinine levels in KEEP participants, overall & by age, and race**

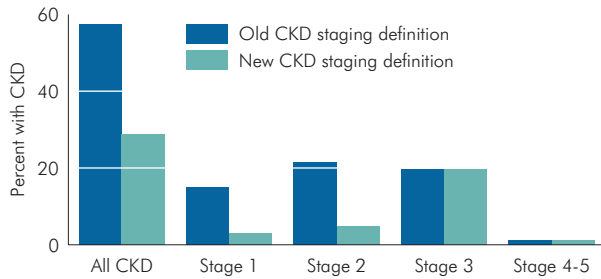
KEEP N = 52,892.



5.2

**CKD in KEEP & NHANES participants, by age, gender, & race ethnicity**

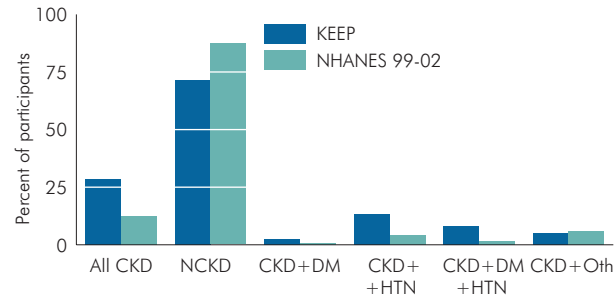
KEEP N = 45,311, age & gender; 44,400, race. NHANES N = 9,718.



5.3

**CKD in KEEP participants, by CKD stage & CKD definition**

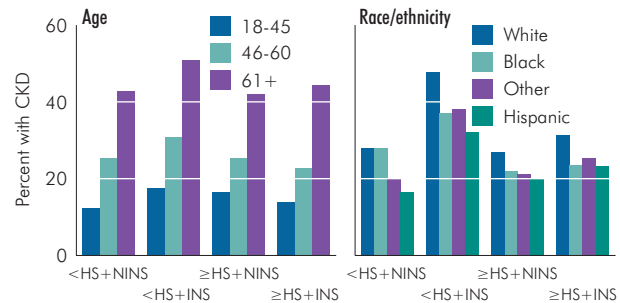
KEEP N = 45,311.



5.4

**Interactions of CKD, diabetes, & hypertension in KEEP & NHANES participants**

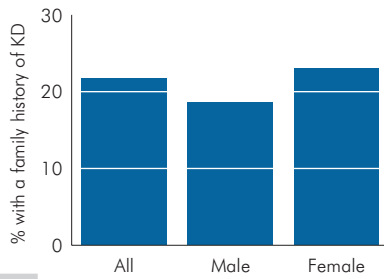
KEEP N = 44,925. NHANES N = 9,599.



5.5

**KEEP participants with CKD, by education & insurance status, age, & race/ethnicity**

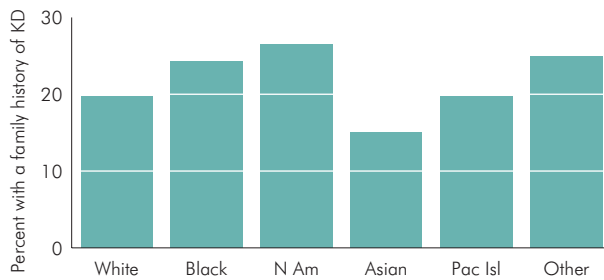
KEEP N = 43,008, age; 42,240, race/ethnicity.



5.6

**Family history of kidney disease in KEEP participants with CKD, overall & by gender**

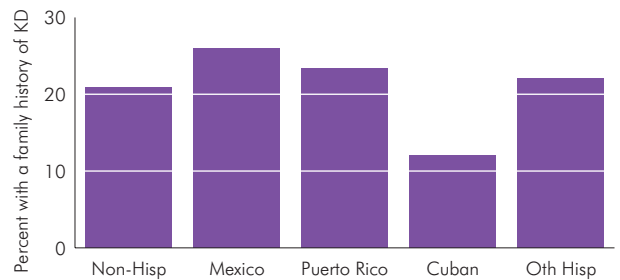
KEEP N = 12,407.



5.7

**Family history of kidney disease in KEEP participants with CKD, by race**

KEEP N = 12,407.



5.8

**Family history of kidney disease in KEEP participants with CKD, by Hispanic ethnicity**

KEEP N = 12,407.

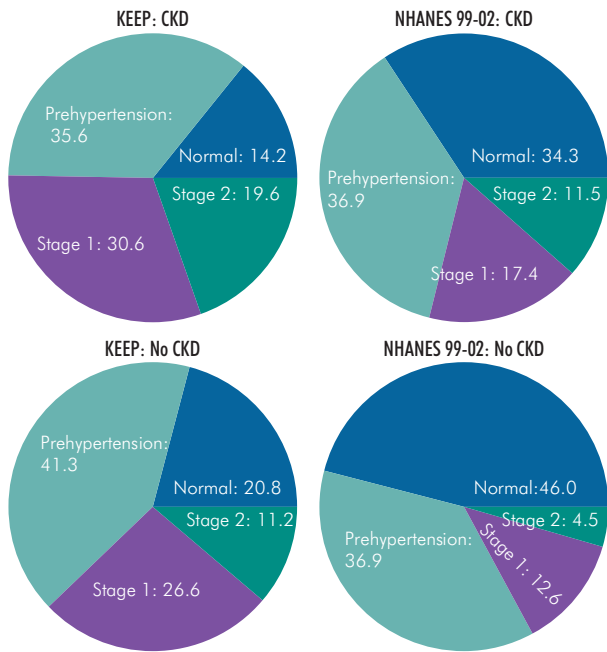
If left untreated, chronic kidney disease (CKD) can lead to end-stage renal disease (ESRD). In 2002, the National Kidney Foundation published guidelines defining the severity of kidney damage through a five-stage classification system based on estimated glomerular filtration rates (eGFRs) and the presence of urine microalbumin. This system defined CKD by an eGFR (K/DOQI MDRD) less than 60 ml/min/1.73 m<sup>2</sup>, or an eGFR (K/DOQI MDRD) ≥60 ml/min/1.73 m<sup>2</sup> in the presence of microalbuminuria. The definition has recently been modified, and for microalbumin substitutes an albumin/creatinine ratio ≥30 mg/g.

Slightly more than 5% of KEEP participants—16 percent of those age 75 and

older—have elevated serum creatinine levels. Using the new CKD definition, 29% percent have CKD compared to 57% when using the old definition.

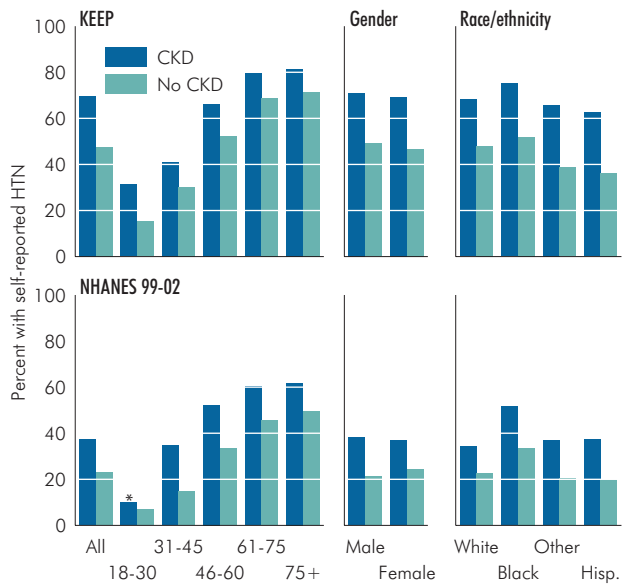
Among KEEP participants, CKD is evenly distributed between males and females, and occurs most frequently in whites. Twenty-two percent of KEEP participants with CKD have a family history of kidney disease—18.6% of males and 23.1% of females. A family history of kidney disease in KEEP participants with CKD is found in 26.5% of Native Americans and 24% of blacks, compared to 15% of Asians. Among Hispanic KEEP participants with CKD, 26 and 23% of those with Mexican or Puerto Rican heritage, respectively, have a family history of kidney disease.

# HYPERTENSION



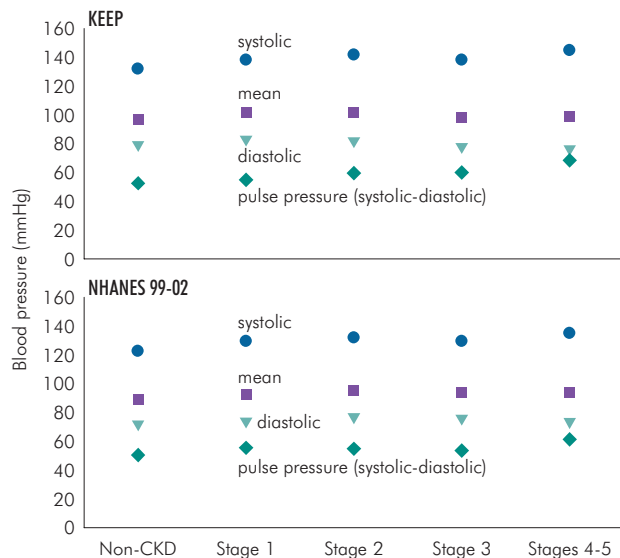
5.9 Percent distribution by hypertension stage (JNC 7) in KEEP & NHANES participants with or without CKD

KEEP N = 44,673. NHANES N = 9,400.



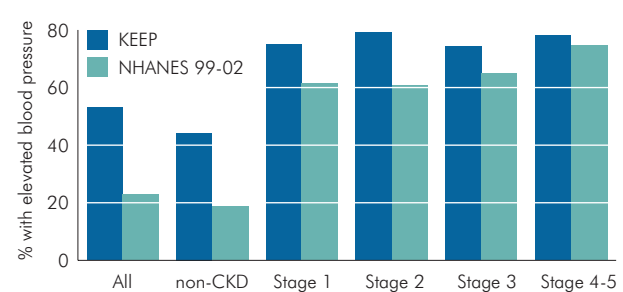
5.10 Self-reported hypertension in KEEP & NHANES participants with or without CKD, by age, gender, & race/ethnicity

KEEP N = 12,573, CKD; 31,284, no CKD. NHANES N = 1,495, CKD; 8,106, no CKD. \*Sample size less than 30 or coefficient of variation not less than 30%.



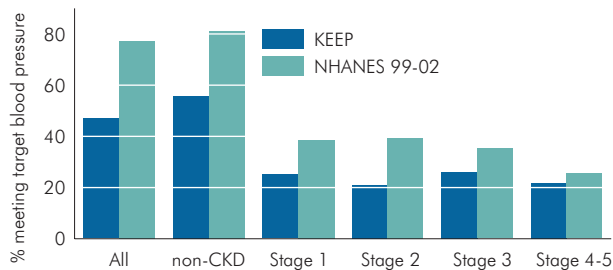
5.11 Blood pressure parameters in KEEP & NHANES participants, by CKD stage

KEEP = 44,673. NHANES N = 9,400.



5.12 Elevated blood pressure (JNC 7) in KEEP & NHANES participants, by CKD stage

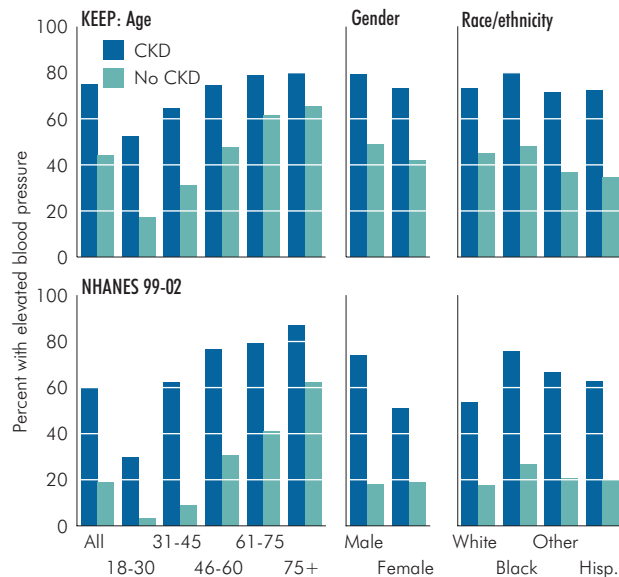
KEEP N = 44,673. NHANES N = 9,423.



5.13

**KEEP & NHANES participants meeting the target blood pressure (JNC 7), by CKD stage**

KEEP N = 44,673. NHANES N = 9,423.



5.14

**Elevated blood pressure (JNC 7) in KEEP & NHANES participants with or without CKD, by age, gender, & race/ethnicity**

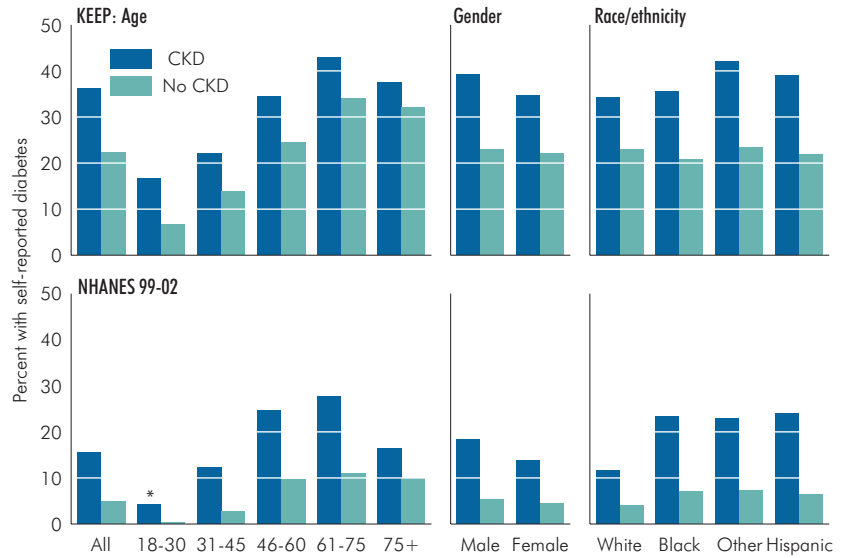
KEEP N = 44,673, age & gender; 43,770, race/ethnicity. NHANES N = 9,157.

**A**mong KEEP participants with or without CKD, 35.6 and 41%, respectively, are prehypertensive, while 36.9% of NHANES participants have this condition. Nearly 70% of KEEP participants with CKD report being hypertensive compared to 47% of those without a CKD diagnosis. In NHANES participants with or without CKD, 37.3 and 23%, respectively, report hypertension.

In the KEEP populations, systolic blood pressure increases from 131.7 mmHg in

those with no CKD to 144.7 mmHg in those classified as having Stage 4–5 CKD. When compared to the NHANES population, more than twice as many KEEP participants have a measured elevated blood pressure.

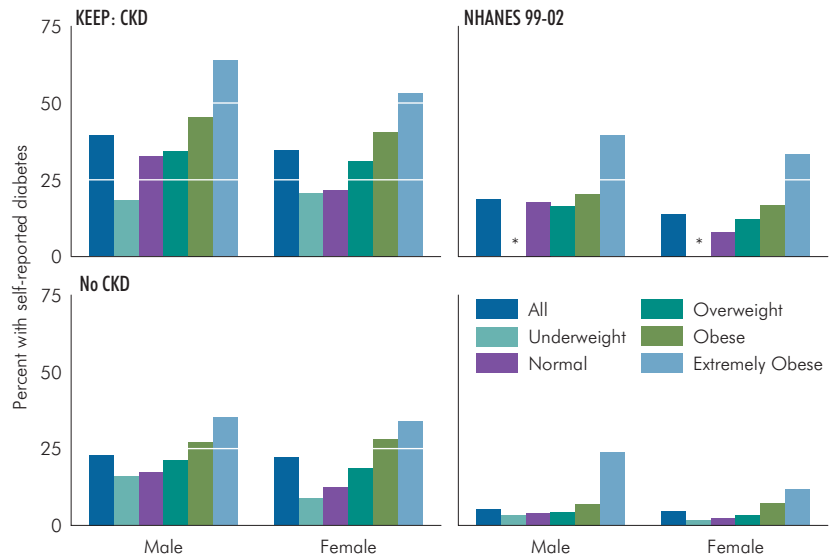
Fewer than half of KEEP participants meet the target blood pressure level, and in KEEP participants with CKD, the percent with an elevated blood pressure increases with age, is higher in men than in women, and is highest in blacks compared to whites and individuals of other races.



5.15

**Self-reported diabetes in KEEP & NHANES participants with or without CKD, by age, gender, & race/ethnicity**

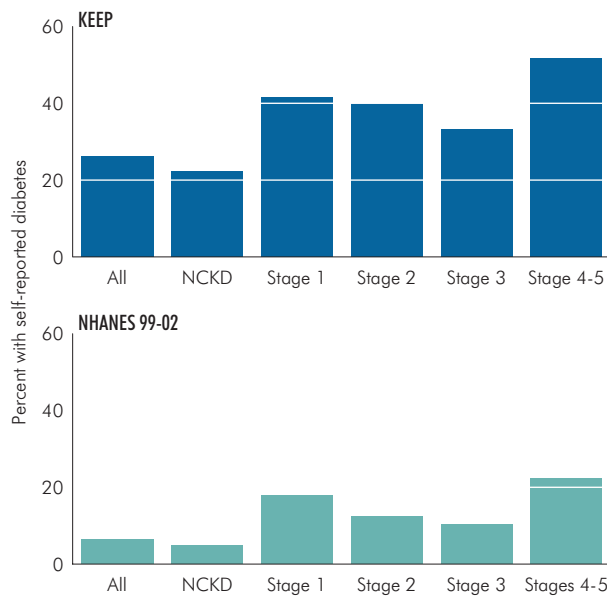
KEEP N = 44,925 age & gender; 44,041, race/ethnicity. NHANES N = 9,714.  
 \*Sample size less than 30 or coefficient of variation not less than 30%.



5.16

**Self-reported diabetes in KEEP & NHANES participants with or without CKD, by BMI category & gender**

KEEP N = 44,339. NHANES N = 9,714. \*Sample size less than 30 or coefficient of variation not less than 30%.



5.17

**Self-reported diabetes in KEEP & NHANES participants, by CKD stage**

KEEP N = 44,925. NHANES N = 11,432.

In both the KEEP and NHANES populations, self-reported diabetes is most prominent in participants with CKD—at 36.1 and 15.7%, respectively—compared to 22 and 4.8% of those without the diagnosis.

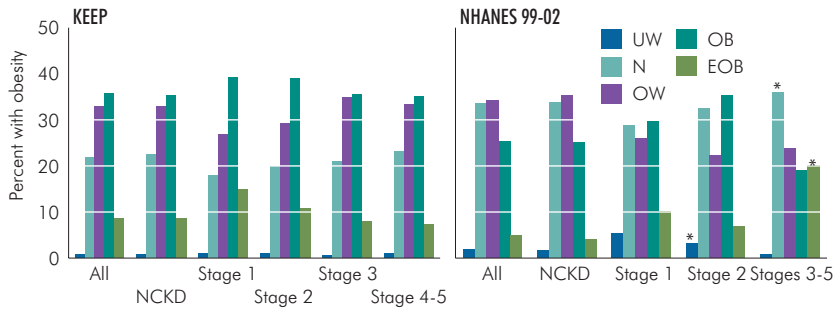
By gender, diabetes is 12–17% more common in male and female participants with CKD compared to those without the diagnosis. Thirty-four and 36% of white and black KEEP participants with CKD, respectively, report having diabetes compared to 23 and 21% of those without the diagnosis. The highest rates of diabetes occur in participants of other races and

Hispanics, at 42 and 39%, respectively.

Overall, the percent of KEEP participants with self-reported diabetes increases with BMI regardless of CKD status. Among participants with CKD, sixty-four percent of men are classified as extremely obese compared to 53.1% of women. In the non-CKD KEEP population, 34–35% are classified as extremely obese.

Nearly 52% of KEEP participants with Stage 4–5 CKD report having diabetes, compared to 22.4% in the NHANES population. Diabetes is evident in 42, 40, and 33%, of Stage 1, 2 and 3 participants, respectively.

# OBESITY

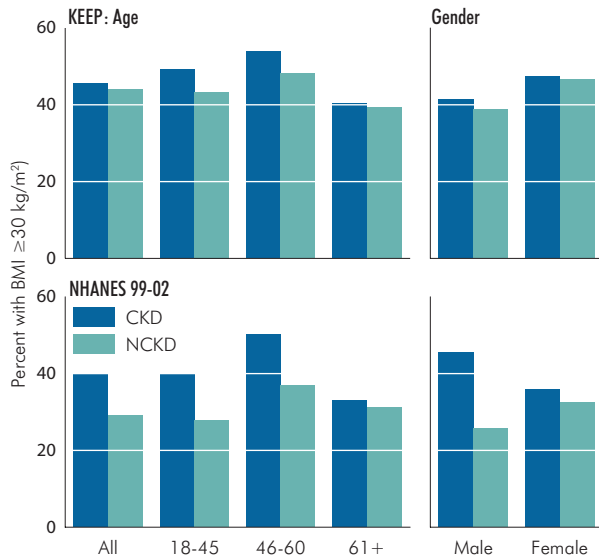


5.18

## BMI in KEEP & NHANES participants, by CKD stage

KEEP N = 44,711, NHANES N = 10,132.

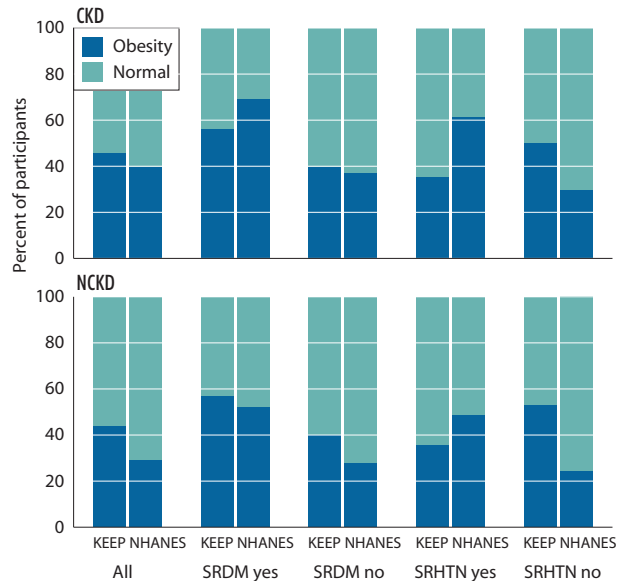
\*Sample size less than 30 or coefficient of variation not less than 30%.



5.19

## BMI $\geq 30$ kg/m<sup>2</sup> in KEEP & NHANES participants with or without CKD, by age

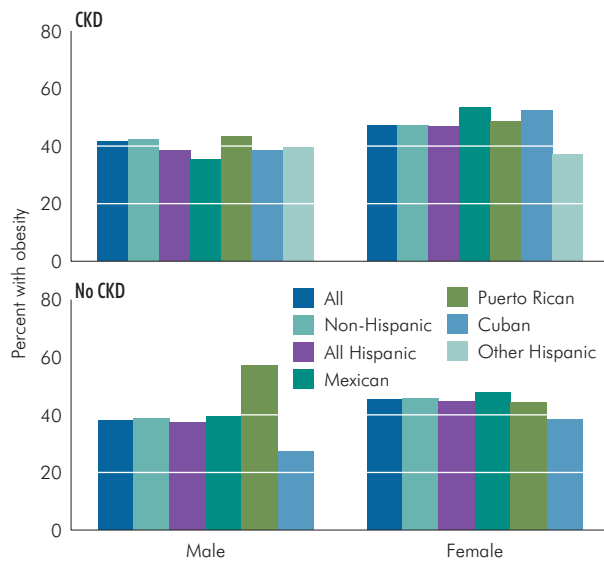
KEEP N = 44,711. NHANES N = 9,459.



5.20

## BMI in KEEP & NHANES participants with or without CKD, by self-reported diabetes or hypertension

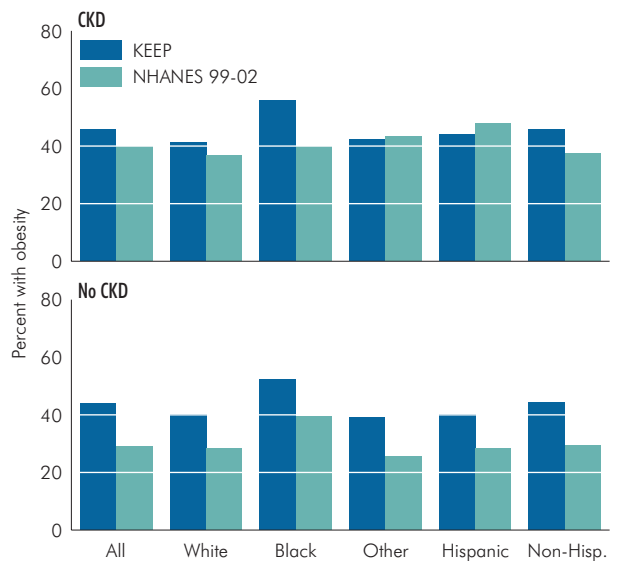
KEEP N = 43,832. NHANES N = 9,459, all; 9,455, diabetes; 9,344 hypertension.



5.21

**Obesity (BMI ≥ 30 kg/m<sup>2</sup>) in KEEP participants with or without CKD, by gender & Hispanic ethnicity**

KEEP N = 34,021, all, 5,427, Hispanic ethnicity.



5.22

**Obesity (BMI ≥ 30 kg/m<sup>2</sup>) in KEEP & NHANES participants with or without CKD, by race/ethnicity**

KEEP N = 43,824, race; 44,711, ethnicity. NHANES N = 9,459.



In the KEEP and NHANES populations overall, 32.9 and 34.2%, respectively, are classified as overweight; 35.7 and 25.3% are classified as obese. The greatest proportions of KEEP participants who are either overweight or obese occur in those who are classified as having Stage 1 or Stage 2 CKD.

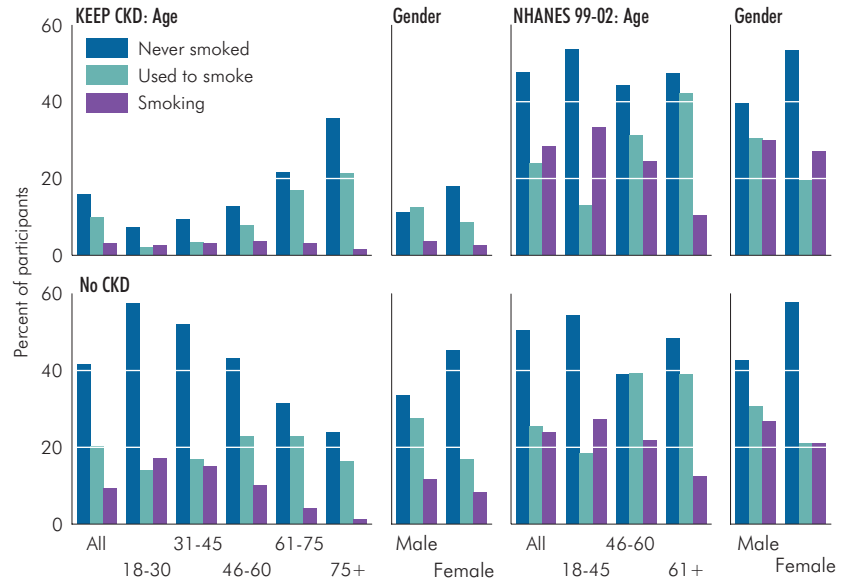
Obesity is most prominent in KEEP and NHANES participants age 46–60, regardless of CKD status. Except for male NHANES participants with CKD, obesity is more prominent in females.

In KEEP participants with CKD, 56.4% of those who report having diabetes are classified as obese, while 43.6% are classified as having a normal BMI; in those

with CKD who report having hypertension, 35.4% are classified as obese and 64.6% are classified as normal.

With the exception of male KEEP participants with Puerto Rican heritage and without a diagnosis of CKD, the proportions of participants who are classified as obese is generally distributed equally among all Hispanic ethnicities.

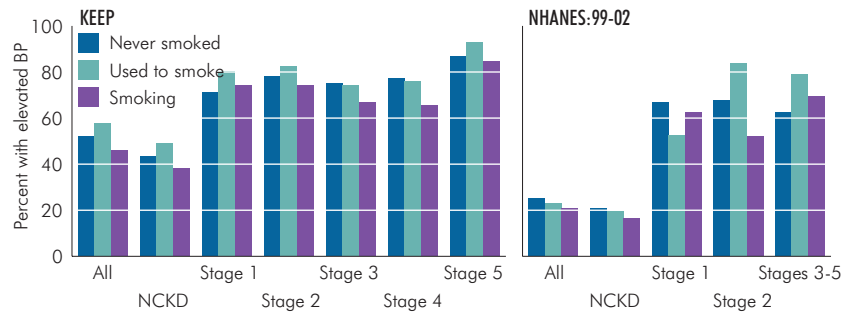
Black KEEP participants with or without a diagnosis of CKD are the most likely to have a BMI ≥30 kg/m<sup>2</sup>—56 and 52%, respectively—followed by whites at 41 and 40%, and individuals of other races at 42 and 39%. Non-Hispanics are slightly more likely to have a BMI equal to or exceeding 30 kg/m<sup>2</sup> regardless of CKD status.



5.23

**Smoking status in KEEP & NHANES participants with or without CKD, by age & gender**

KEEP N = 42,571. NHANES N = 8,700; participants age 20 and older.



5.24

**Elevated blood pressure (JNC 7) in KEEP & NHANES participants, by CKD stage & smoking status**

KEEP N = 42,027. NHANES N = 8,406, all; 8,182, CKD; participants age 20 and older.



5.25

**Smoking status in KEEP & NHANES participants with or without CKD, by race/ethnicity**

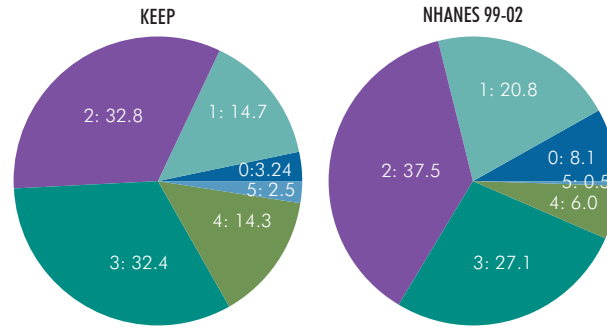
KEEP N = 41,746. NHANES N = 8,700, participants age 20 and older.

**A**mong KEEP participants, a far greater proportion of those without a CKD diagnosis report never having smoked compared to those with the diagnosis. The proportion of KEEP participants who report never having smoked decreases with age in individuals with no CKD, and, in contrast, increases with age in those with CKD. In the NHANES population, 47.7% of those with CKD report never smoking, compared to 50.5% without CKD. In both the KEEP and NHANES populations, more females than males report not smoking regardless of CKD status.

The percentage of KEEP participants with elevated blood pressure varies little through Stage 4 of CKD and is highest in those with Stage 5 CKD. Ironically, participants who used to smoke or have never smoked are more likely to have an elevated blood pressure.

By race/ethnicity, in both the KEEP and NHANES populations, little variation is noted by smoking category, regardless of CKD status.

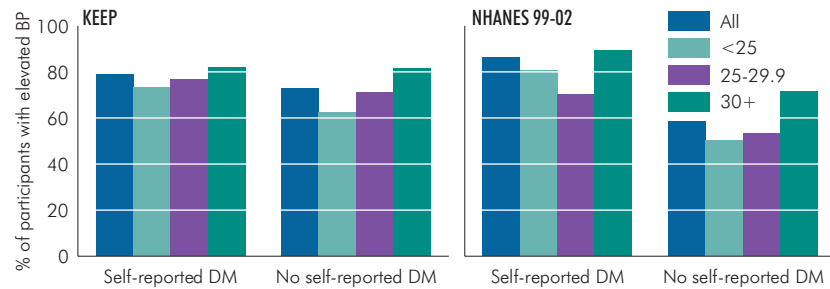
## CKD RISK FACTORS



5.26

### Percent distribution of KEEP & NHANES participants with CKD, by number of risk factors for CKD

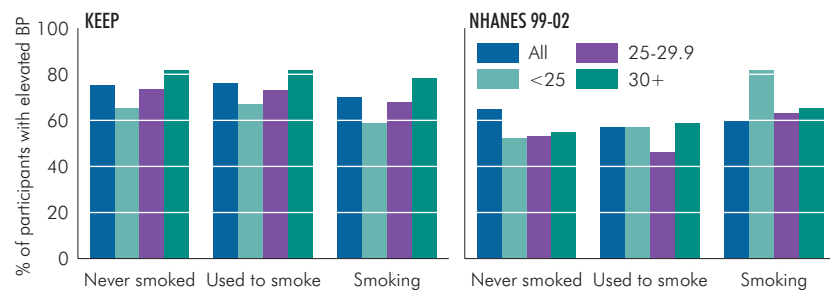
KEEP N = 12,994. NHANES N = 1,129, participants age 20 and older.



5.27

### Elevated blood pressure (JNC 7) in KEEP & NHANES participants with CKD, by BMI category & self-reported diabetic status

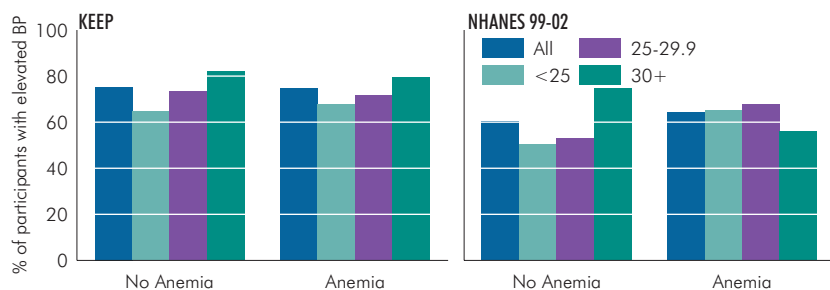
KEEP N = 12,689. NHANES N = 1,265.



5.28

### Elevated blood pressure (JNC 7) in KEEP & NHANES participants with CKD, by BMI & smoking status

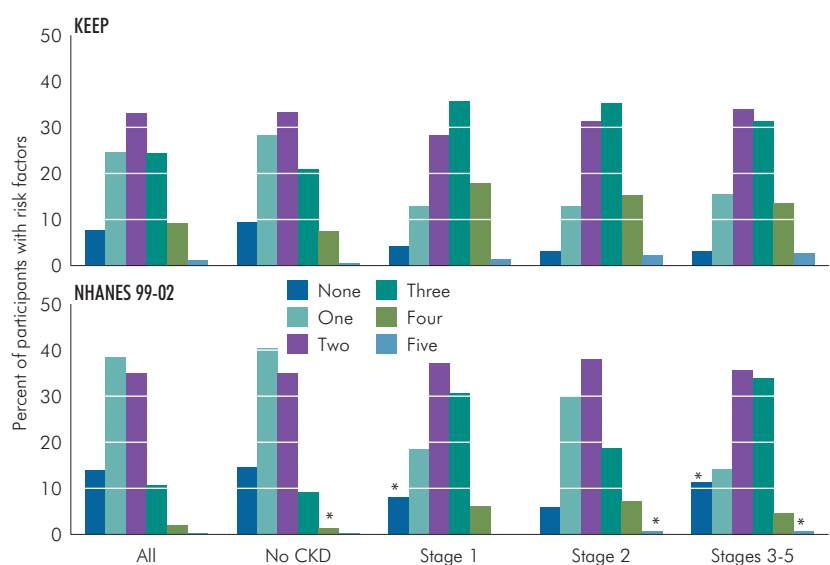
KEEP N = 12,023. NHANES N = 1,208, all; 1,130, BMI, participants age 20 and older.



5.29

**Elevated blood pressure (JNC 7) in KEEP & NHANES participants with CKD, by BMI category & anemia (WHO definition) status**

KEEP N = 12,620. NHANES N = 1,264, all; 1,186, BMI.



5.30

**Number of risk factors for cardiovascular disease in KEEP & NHANES participants, by CKD stage**

KEEP N = 45,311. NHANES N = 8,044, all; 7,989, CKD, participants age 20 and older. \*Sample size less than 30 or coefficient of variation not less than 30%.



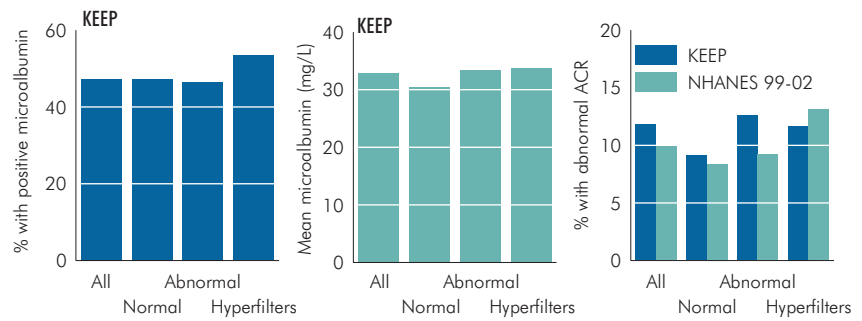
In the KEEP and NHANES populations 32.8 and 37.5%, respectively have two risk factors, while 32.4 and 27.1%, respectively have three risk factors.

KEEP and NHANES participants with a BMI  $\geq 30$  kg/m<sup>2</sup> are generally the most likely to have an elevated blood pressure, regardless of diabetic status or smoking status.

Anemia does not appear to influence the likelihood of having an elevated blood pressure in KEEP participants; in the NHANES population, elevated blood pressure is most evident in participants with no anemia and a BMI of  $\geq 30$  kg/m<sup>2</sup>.

The percent of KEEP participants with two risk factors increases as the severity of CKD increases, ranging from 28–34%.

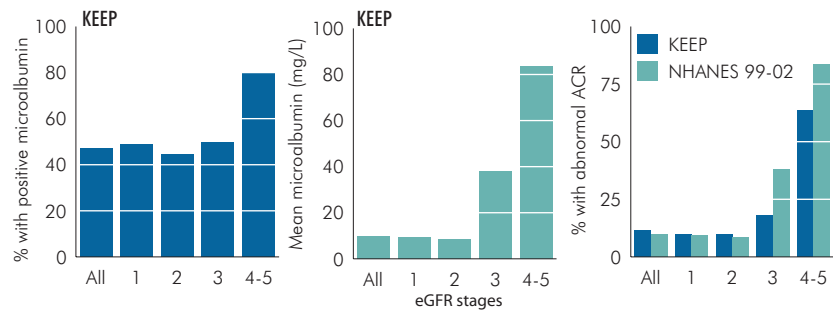
## MICROALBUMINURIA & ALBUMIN/CREATININE RATIO



5.31

### Microalbuminuria & albumin/creatinine ratio in KEEP & NHANES participants, by creatinine clearance level (KEEP MDRD)

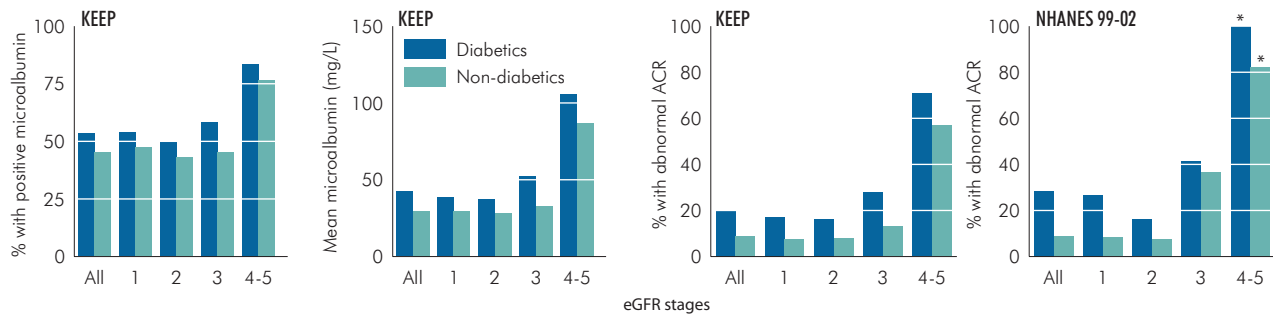
KEEP N = 48,014. NHANES N = 10,254 all; 9,670, creatinine clearance level. Positive microalbumin, >20mg/L



5.32

### Microalbuminuria & albumin/creatinine ratio in KEEP & NHANES participants, by eGFR stage (MDRD)

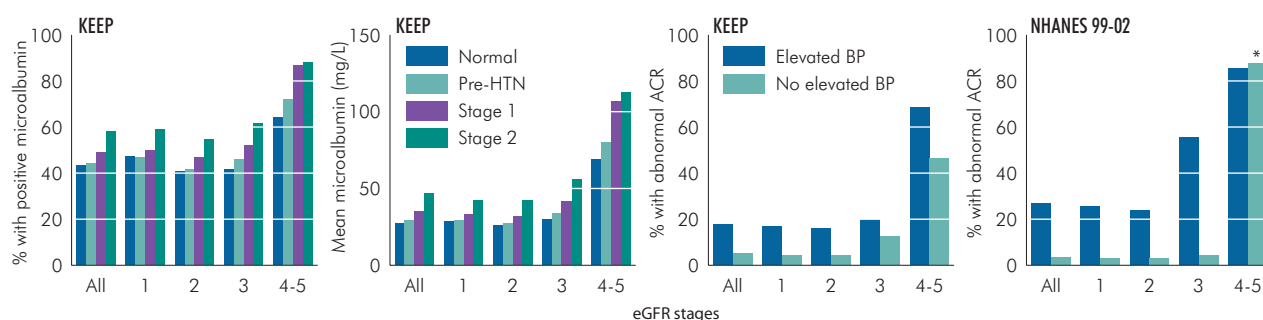
KEEP N = 48,014, microalbuminuria; 43,657. ACR. NHANES N = 10,254, all; 9,670, eGFR. Positive microalbumin, >20mg/L



5.33

### Microalbuminuria & albumin/creatinine ratio in KEEP & NHANES participants, by eGFR stage & diabetic status

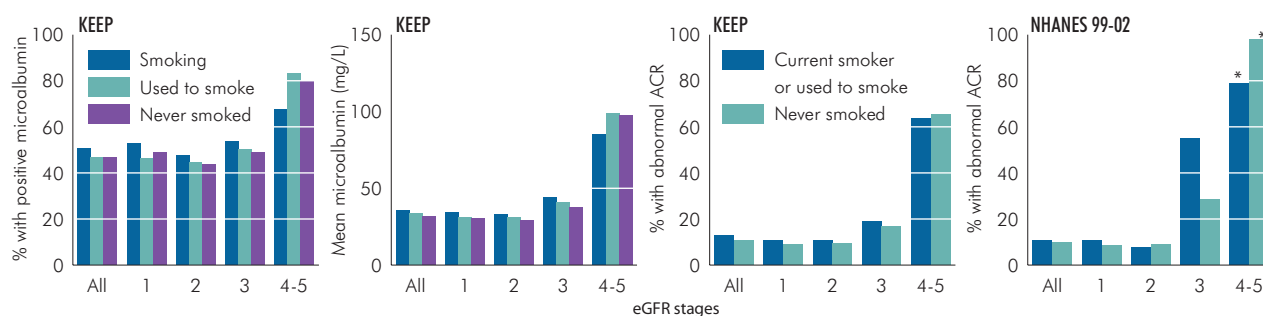
KEEP N = 47,602, microalbuminuria; 43,296. ACR. NHANES N = 10,249, all; 9,666, eGFR. \*Sample size less than 30 or coefficient of variation not less than 30%. Positive microalbumin, >20mg/L



5-34

**Microalbuminuria & albumin/creatinine ratio in KEEP & NHANES participants, by eGFR stage & JNC 7 blood pressure stage**

KEEP N = 47,353, microalbuminuria; 43,046, ACR. NHANES N = 9,329, all; 9,121, eGFR. \*Sample size less than 30 or coefficient of variation not less than 30%. Positive microalbumin, >20mg/L



5-35

**Microalbuminuria & albumin/creatinine ratio in KEEP & NHANES participants, by eGFR stage and smoking history**

KEEP N = 41,008. NHANES N = 9,178, all; 8,652, eGFR; participants age 20 and older. \*Sample size less than 30 or coefficient of variation not less than 30%. Positive microalbumin, >20mg/L

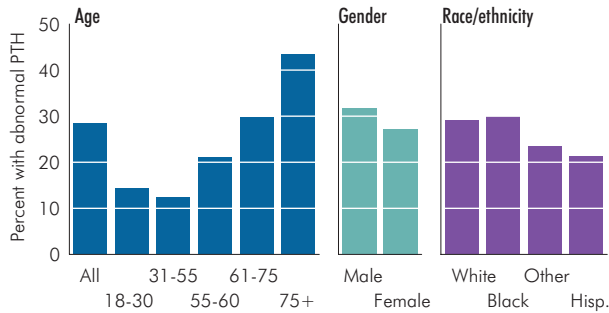
**A** positive urinary albumin (>20mg/L) is most likely in KEEP participants classified as “hyperfiltrators,” while mean microalbumin levels are similar across creatinine clearance levels.

Nearly 30% more KEEP participants with Stage 4–5 eGFR have a positive urine microalbumin test compared to those at an earlier eGFR stage. KEEP participants who report having diabetes are more prone to microalbuminuria, have higher microalbumin levels, and are more likely to have an abnormal ACR.

KEEP participants with advanced stages of hypertension are the most likely to have a positive urine test for microalbumin regardless of eGFR stage, and abnormal albumin/creatinine ratios are more common in those with elevated blood pressures.

Approximately 12–15% more KEEP participants with Stage 4–and 5 eGFR who used to smoke or never smoked have a positive test for microalbumin, while proportions of KEEP participants with an abnormal ACR are similar within each stage of eGFR regardless of smoking status.

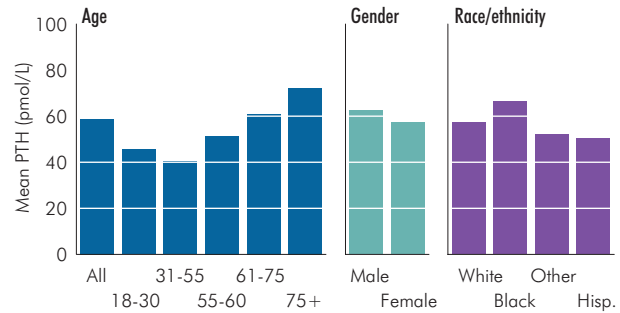
## PARATHYROID HORMONE



5.36

### PTH in KEEP participants, by age, gender, & race/ethnicity

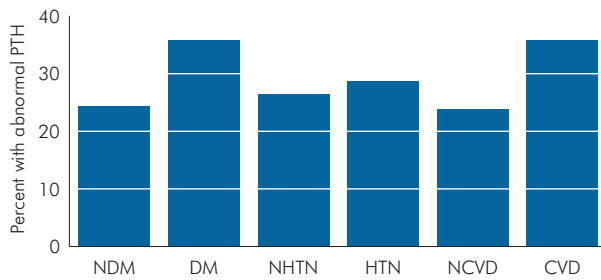
KEEP N = 1,998, includes participants with eGFR 15–<60, intact PTH only.



5.37

### Mean PTH in KEEP participants, by age, gender, & race/ethnicity

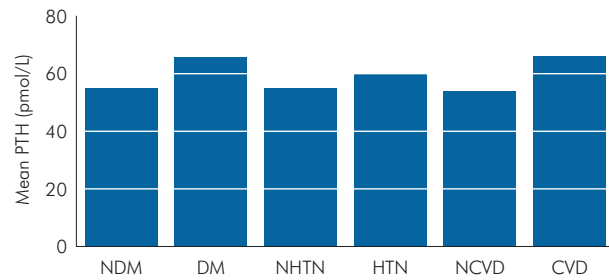
KEEP N = 1,998, includes participants with eGFR 15–<60, intact PTH only.



5.38

### PTH levels in KEEP participants, by self-reported diabetic & hypertensive status, & cardiovascular disease status

KEEP N = 1,998, eGFR 15–<60, intact PTH only.



5.39

### Mean PTH in KEEP participants, by self-reported diabetic & hypertensive status, & cardiovascular disease status

KEEP N = 1,998, includes participants with eGFR 15–<60, intact PTH only.

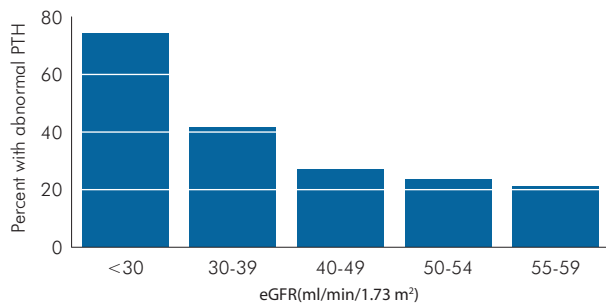
Seventy-eight percent of KEEP participants have an abnormal PTH. The percent of KEEP participants with an abnormal value increases with age, reaching 43% in those age 75 and older. Abnormal values are more evident in males than in females, and are similar in whites and blacks, at 29.1 and 29.8%, respectively. Mean PTH levels also increase as age increases and are highest in male and black participants.

Approximately 36% of participants diagnosed with diabetes or cardiovascular disease have abnormal PTH levels. And mean PTH levels are more likely in participants who have a comorbid conditions compared to those with no comorbidity.

Seventy-four percent of KEEP participants with an eGFR of <30 ml/min/1.73 m<sup>2</sup> have an abnormal PTH compared to 21.1% of those with an eGFR of 55–59. Mean PTH levels reach 155 pmol/L in these individuals, more than three times the level found in those with an eGFR of 55–59 ml/min/1.73m<sup>2</sup>.

Compared to participants with Stage 3 CKD, nearly three times as many KEEP participants with Stage 4 CKD have abnormal PTH levels. And mean PTH levels in participants with abnormal hemoglobins are 26 pmol/L higher than levels found in those with normal hemoglobins.

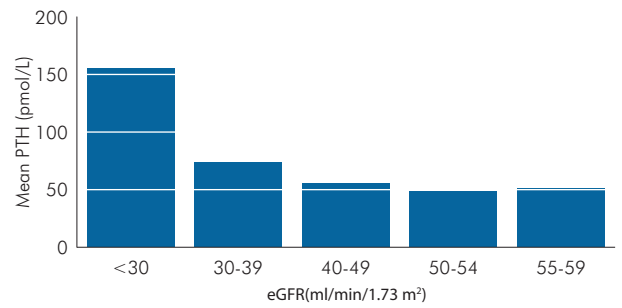
KEEP participants with a BMI ≥25 kg/m<sup>2</sup> have a mean PTH level of 60 pmol/L, compared to 52.3 in those with a BMI under 25 kg/m<sup>2</sup>.



5.40

**PTH in KEEP participants, by eGFR**

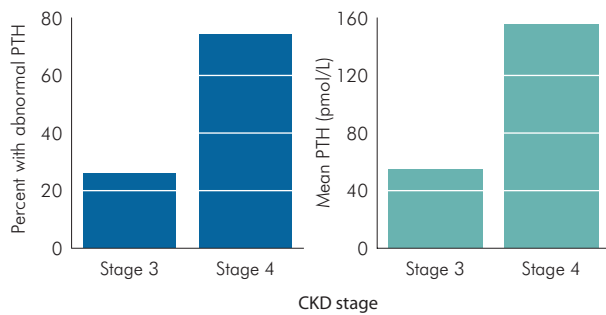
KEEP N = 1,998, includes participants with eGFR 15-60, intact PTH only.



5.41

**Mean PTH level in KEEP participants, by eGFR**

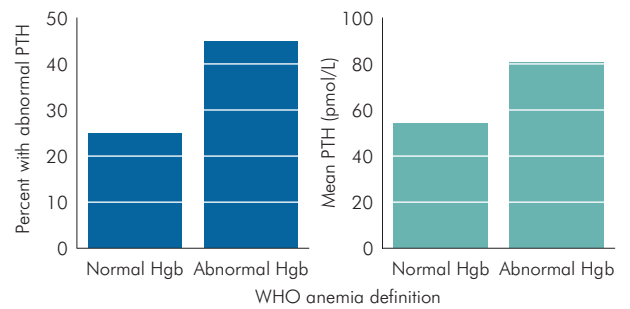
KEEP N = 1,998, includes participants with eGFR 15-60, intact PTH only.



5.42

**PTH in KEEP participants, by CKD stage**

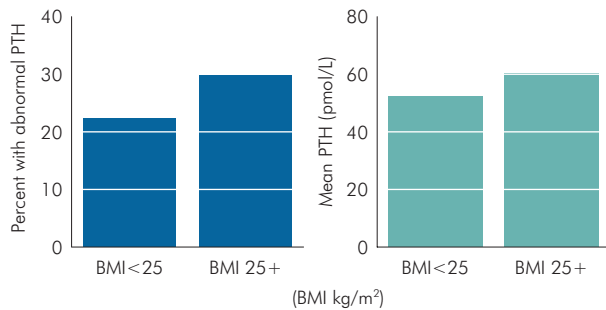
KEEP N = 1,998, eGFR 15-60, intact PTH only.



5.43

**PTH levels in KEEP participants, by WHO anemia status**

KEEP N = 1,998, participants with eGFR 15-60, intact PTH only.

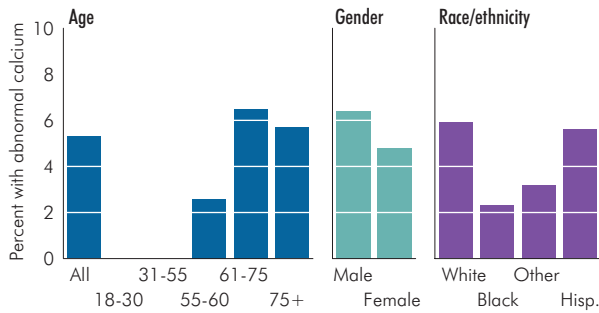


5.44

**PTH in KEEP participants, by BMI**

KEEP N = 1,998, eGFR 15-60, intact PTH only.

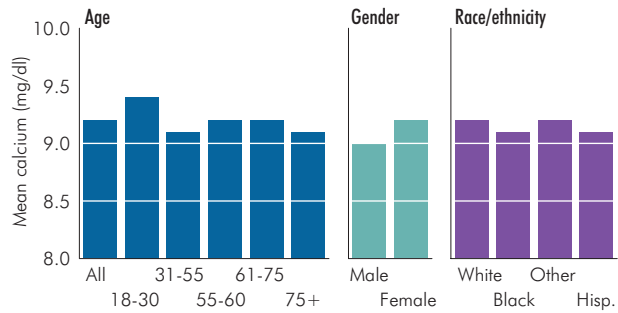
## CALCIUM



5.45

### Calcium in KEEP participants, by age, gender, & race/ethnicity

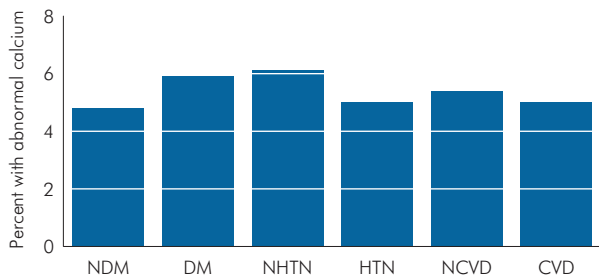
KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



5.46

### Mean calcium levels in KEEP participants, by age, gender, & race/ethnicity

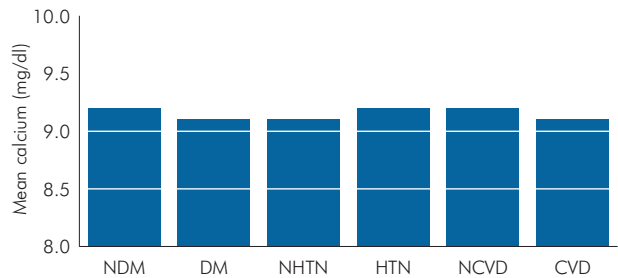
KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



5.47

### Calcium levels in KEEP participants, by self-reported diabetic & hypertensive status, & cardiovascular disease status

KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



5.48

### Mean calcium level in KEEP participants, by self-reported diabetic & hypertensive status, & cardiovascular disease status

KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



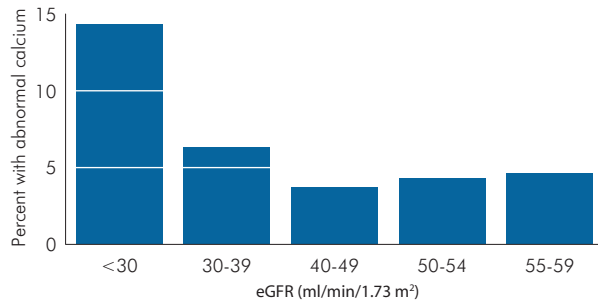
White and Hispanic KEEP participants are the most likely to have an abnormal calcium level. Mean levels are generally similar in KEEP participants across all age, gender, and race/ethnicity categories, ranging from a maximum of 9.4 mg/dl in participants age 18–30 to a minimum of 9.1 in those age 75 and older, 9.0–9.2 in males versus females, and 9.1–9.2 in all racial and ethnic categories.

Six percent of KEEP participants who have diabetes have an abnormal calcium level, compare to 5% in those with hypertension or cardiovascular disease; comorbidity, however, does not appear to impact calcium levels.

Slightly over 14% of KEEP participants with an eGFR of less than 30 ml/min/1.73 m<sup>2</sup> have an abnormal calcium level, compared to 4.6% of those with a eGFR of 55–59.

Fourteen percent of KEEP participants classified as having Stage 4 CKD have an abnormal calcium level, compared to 4.5% of those with Stage 3 CKD. Mean calcium levels are similar in KEEP participants with normal or abnormal hemoglobins.

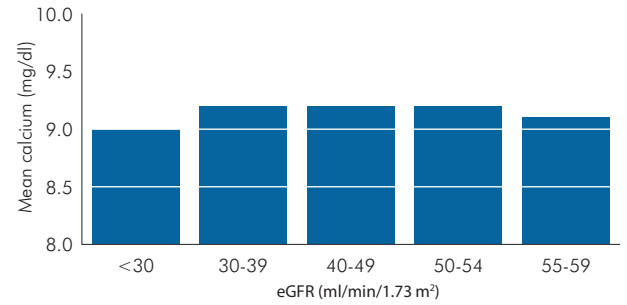
Seven percent of KEEP participants with a BMI under 25 kg/m<sup>2</sup> have an abnormal calcium, compared to 4.9% of those whose BMI reaches 25 kg/m<sup>2</sup> or greater.



5.49

### Calcium in KEEP participants, by eGFR

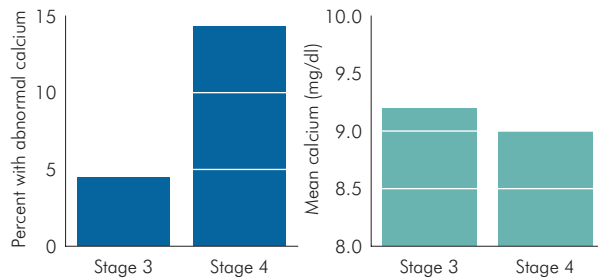
KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



5.50

### Mean calcium level in KEEP participants, by eGFR

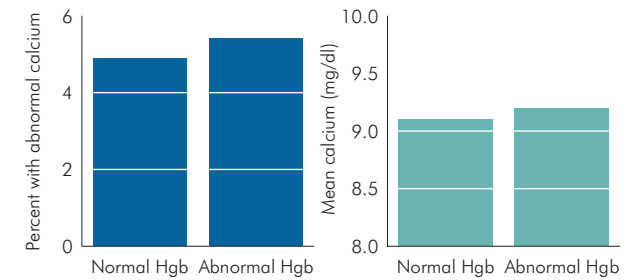
KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



5.51

### Calcium levels in KEEP participants, by CKD stage

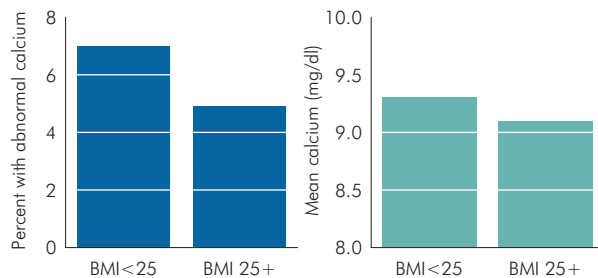
KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



5.52

### Calcium in KEEP participants, by WHO anemia

KEEP N = 459, includes participants with eGFR 15–<60 CLS only.

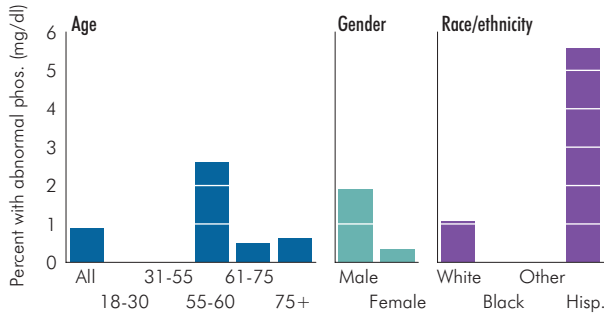


5.53

### Calcium in KEEP participants, by BMI

KEEP N = 459, includes participants with eGFR 15–<60 CLS only.

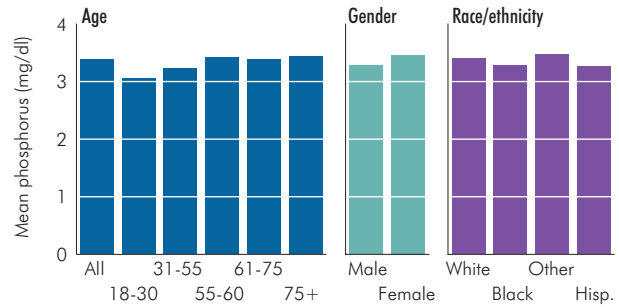
# PHOSPHORUS



5-54

## Phosphorus in KEEP participants, by age, gender, & race/ethnicity

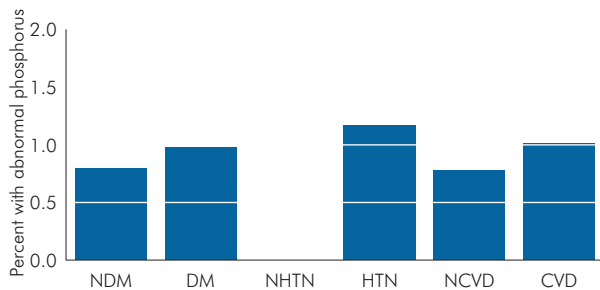
KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



5-55

## Mean phosphorus level in KEEP participants, by age, gender, & race/ethnicity

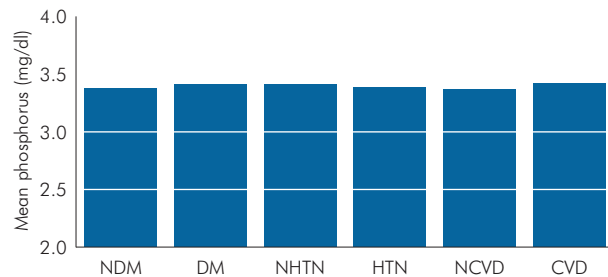
KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



5-56

## Phosphorus in KEEP participants, by self-reported diabetic & hypertensive status, & cardiovascular disease status

KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



5-57

## Mean phosphorus in KEEP participants, by self-reported diabetic & hypertensive status, & cardiovascular disease status

KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



early 1% of KEEP participants have an abnormal phosphorus level. By age, levels are highest in participants age 55–60, at 2.6 mg/dl, in males at 1.9 versus 0.34 in females, and in Hispanics at 5.6 compared to 1.1 in whites.

Mean phosphorus levels in KEEP participants are similar across all age, gender, and race/ethnicity categories, at 3.4 mg/dl overall.

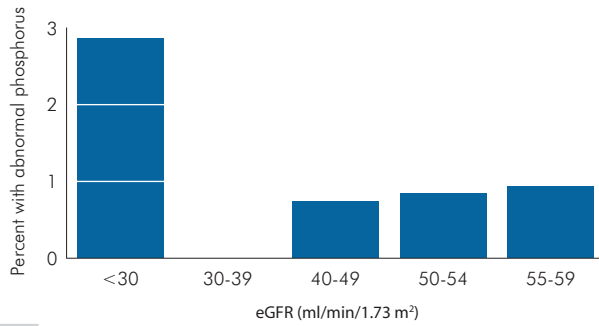
Percentages of KEEP participants with an abnormal phosphorus level are similar regardless of comorbidity status, but are slightly higher in participants with hypertension. Mean phosphorus levels average 3.4 mg/dl in KEEP participants with or without comorbid conditions.

Nearly 3% of KEEP participants with an eGFR less than 30 ml/min/1.73 m<sup>2</sup> have an abnormal phosphorus compared to 1% of those with an eGFR of 55–59.

Mean phosphorus levels are highest in KEEP participants with an eGFR less than 30 ml/min/1.73 m<sup>2</sup>.

The percent of KEEP participants with an abnormal phosphorus is highest in those classified as having Stage 4 CKD; approximately 2% of KEEP participants with a normal hemoglobin have an abnormal phosphorus.

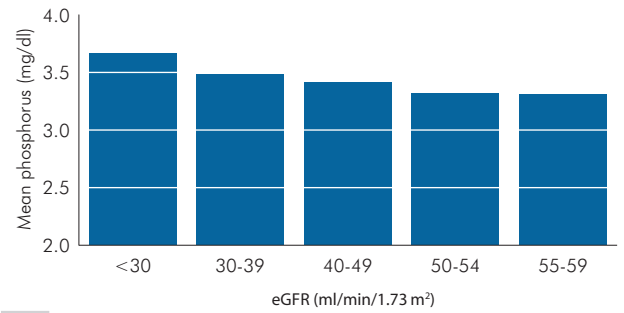
Mean phosphorus levels are slightly higher in KEEP participants with a BMI less than 25 kg/m<sup>2</sup> compared to those with a BMI ≥25 kg/m<sup>2</sup>.



5.58

### Phosphorus levels in KEEP participants, by eGFR

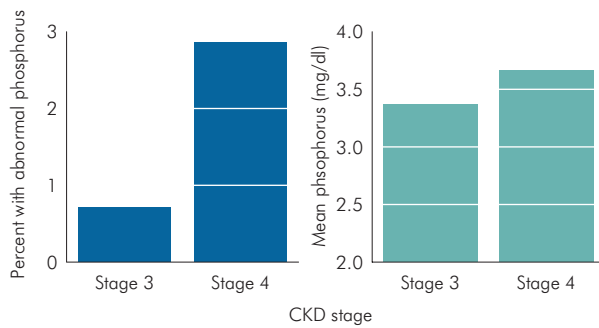
KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



5.59

### Mean phosphorus in KEEP participants, by eGFR

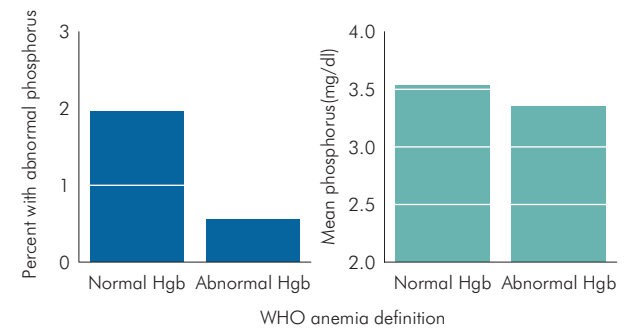
KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



5.60

### Phosphorus levels in KEEP participants, by CKD stage

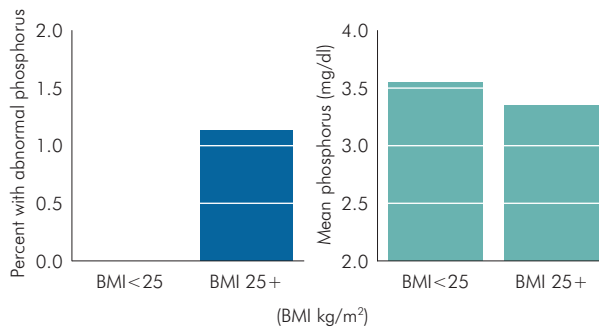
KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



5.61

### Phosphorus levels in KEEP participants, by WHO anemia

KEEP N = 459, includes participants with eGFR 15–<60 CLS only.



5.62

### Phosphorus levels in KEEP participants, by BMI

KEEP N = 459, includes participants with eGFR 15–<60 CLS only.

## CHAPTER HIGHLIGHTS

### Figure 5.3

Using the new CKD definition, 29% percent have CKD compared to 57% under the old definition.

### Figure 5.12

When compared to the NHANES population, more than twice as many KEEP participants have a measured elevated blood pressure.

### Figure 5.15

In both the KEEP and NHANES populations, self-reported diabetes is most prominent in participants with CKD—at 36.1 and 15.7%, respectively—compared to 22 and 4.8% of those without the diagnosis.

### Figure 5.18

In the KEEP and NHANES populations overall, 32.9 and 34.2%, respectively, are classified as overweight; 35.7 and 25.3% are classified as obese.

### Figure 5.26

In the KEEP and NHANES populations the percentage of participants with 2–3 risk factors ranges from 27.1 to 37.5%.

### Figure 5.32

Nearly 30% more KEEP participants with Stage 4–5 eGFR have a positive urine microalbumin test compared to those at an earlier eGFR stage.

### Figure 5.36

Twenty-eight percent of KEEP participants have an abnormal PTH. The percent of KEEP participants with an abnormal value increases with age, reaching 43% in those age 75 and older.

### Figure 5.45

White and Hispanic KEEP participants are the most likely to have an abnormal calcium level.

#### DIABETES

Self-reported diabetes  
Elevated blood sugar

#### JNC 7 HYPERTENSION

**Normal**  
systolic <120 mmHg & diastolic <80 mmHg

**Prehypertension**  
systolic 120–139 mmHg or diastolic 80–89 mmHg

**Stage 1**  
systolic 140–159 mmHg or diastolic 90–99 mmHg

**Stage 2**  
systolic  $\geq$ 160 mmHg or diastolic  $\geq$ 100 mmHg

#### ELEVATED BLOOD PRESSURE (EBP) (JNC 7)

**DM or CKD:**  
systolic:  $\geq$ 130 mmHg or diastolic:  $\geq$ 80 mmHg

**No DM or CKD:**  
systolic:  $\geq$ 140 mmHg or  
diastolic:  $\geq$ 90 mmHg

#### MEAN BLOOD PRESSURE

(Systolic-Diastolic)/3 + Diastolic

#### CKD DEFINITION

If eGFR by K/DOQI MDRD <60 ml/min/1.73 m<sup>2</sup> or eGFR  $\geq$ 60 ml/min/1.73 m<sup>2</sup> and abnormal albumin/creatinine ratio (ACR  $\geq$ 30mg/g)

#### CKD STAGES

Stage 1: eGFR  $\geq$ 90, ACR  $\geq$ 30 mg/g  
Stage 2: eGFR 60–89, ACR  $\geq$ 30 mg/g  
Stage 3: eGFR 30–59  
Stage 4: eGFR 15–29  
Stage 5: eGFR <15 or dialysis

#### 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  $\geq$ 40

#### RISK FACTORS FOR CARDIOVASCULAR DISEASE

Diabetes  
BMI  $\geq$ 30 kg/m<sup>2</sup>  
Smoking history  
Anemia (WHO definition)  
Elevated blood pressure

#### WHO ANEMIA DEFINITION

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

#### CREATININE CLEARANCE LEVEL (KEEP MDRD)

Normal: male, 100–125, female 90–110  
Abnormal: male, <100, female, <90  
Hyperfiltration: male, >125, females, >110

#### ABNORMAL ALBUMIN/CREATININE RATIO (ACR)

ACR  $\geq$ 30 mg/g

#### POSITIVE MICROALBUMIN

>20 mg/L

#### eGFR STAGES

Stage 1: eGFR  $\geq$ 90  
Stage 2: eGFR 60–89  
Stage 3: eGFR 30–59  
Stage 4: eGFR 15–29  
Stage 5: eGFR <15

#### PTH NORMAL LEVELS

##### K/DOQI

Stage 3 CKD: 35–70  
Stage 4 CKD: 75–110  
(PTH test administered after May 1, 2005, for participants with eGFR <60 ml/min/1.73 m<sup>2</sup>.)

#### CALCIUM NORMAL LEVELS

8.4–10.2 mg/dl  
(Calcium test administered after May 1, 2005, for participants with eGFR <60 ml/min/1.73 m<sup>2</sup>.)

#### PHOSPHORUS NORMAL LEVELS

2.3–4.7 mg/dl  
(Phosphorus test administered after May 1, 2005, for participants with eGFR <60 ml/min/1.73 m<sup>2</sup>.)