

Chronic Kidney Disease
in Children

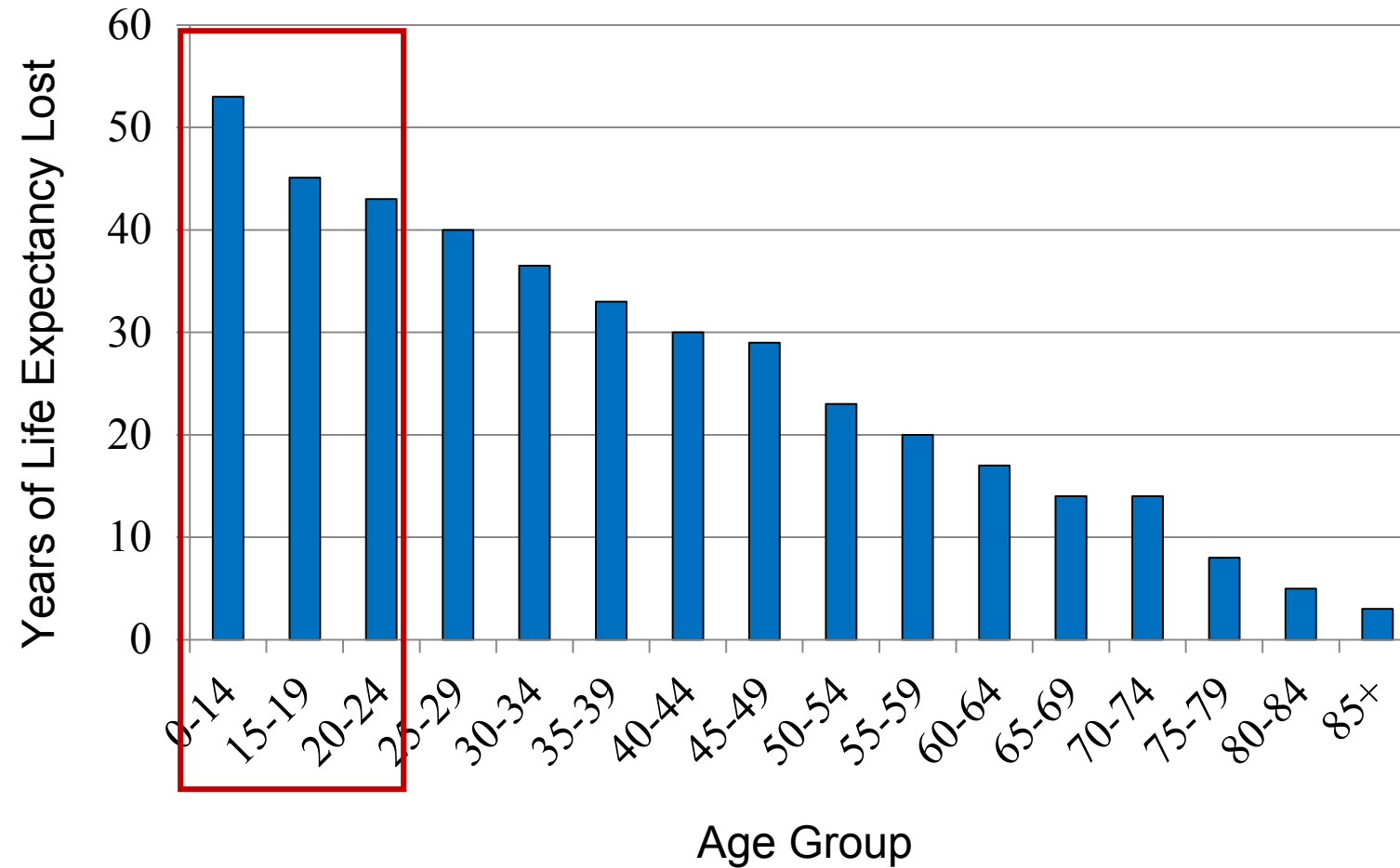
Role of Pulse Wave Velocity in the Assessment of Vascular Stiffness

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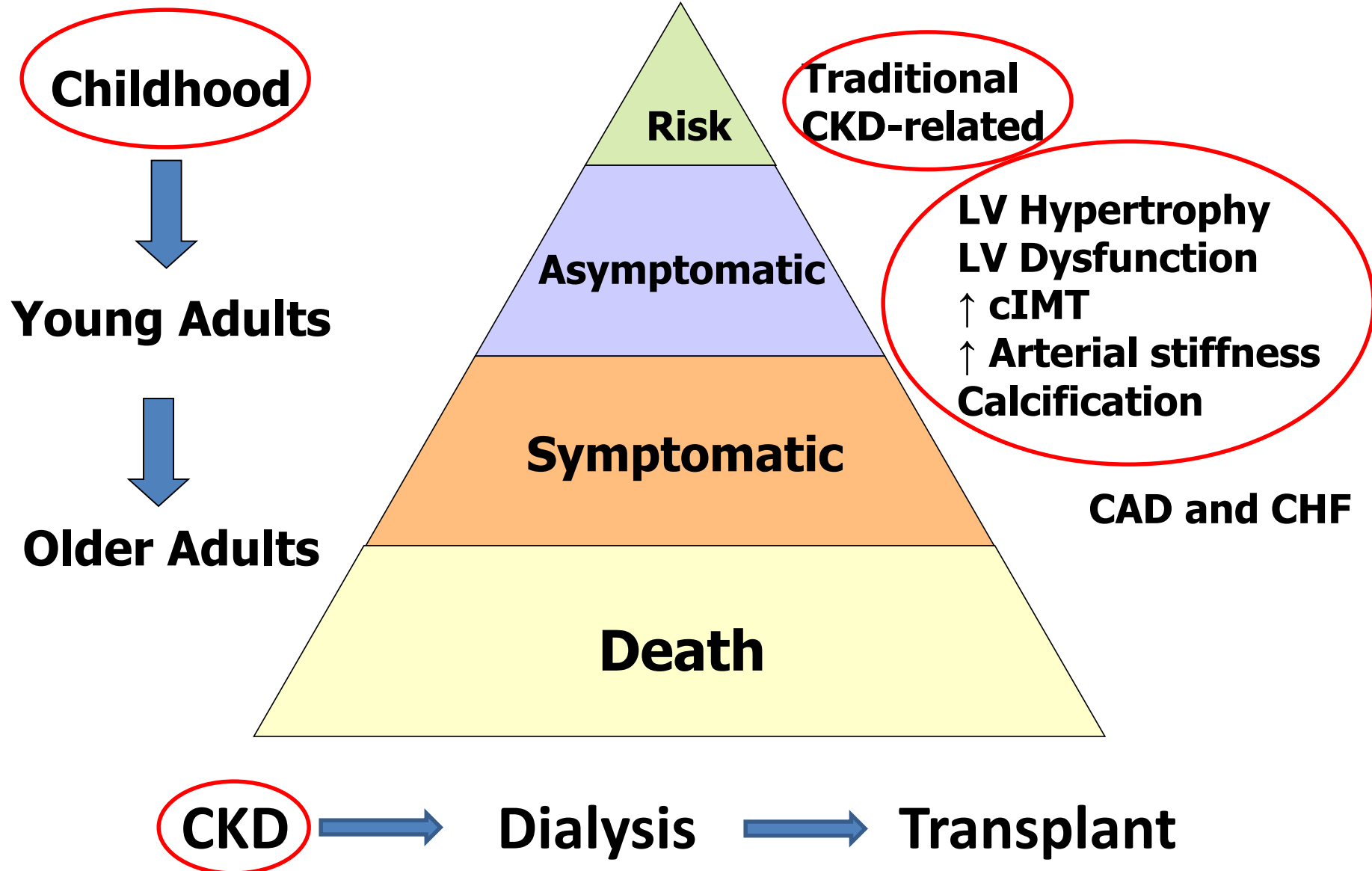
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Difference in Life Expectancy of ESRD vs. General Population



Burden of CVD in CKD



Vascular Tests

- Pulse Wave Velocity



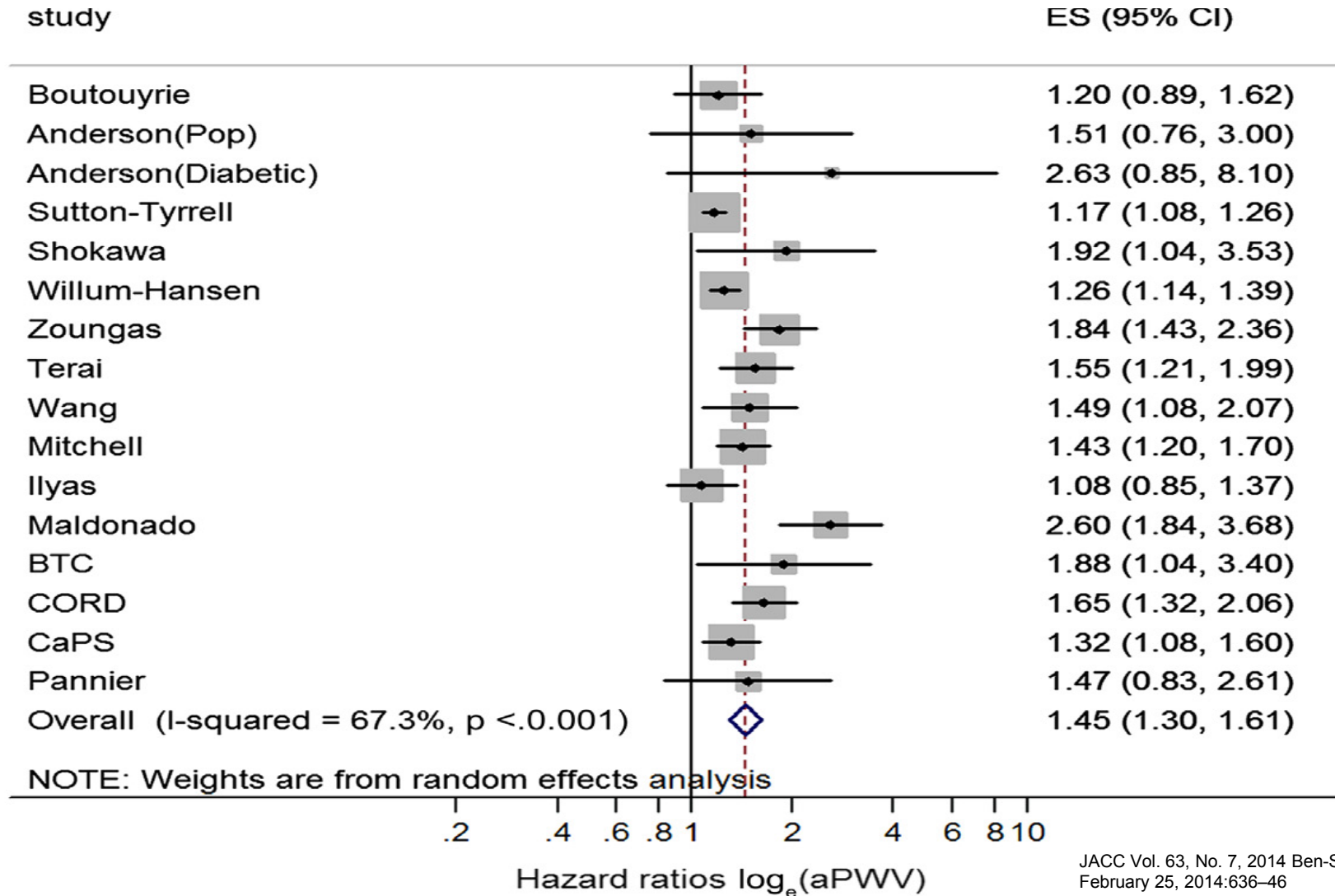
- Pulse Wave Analysis



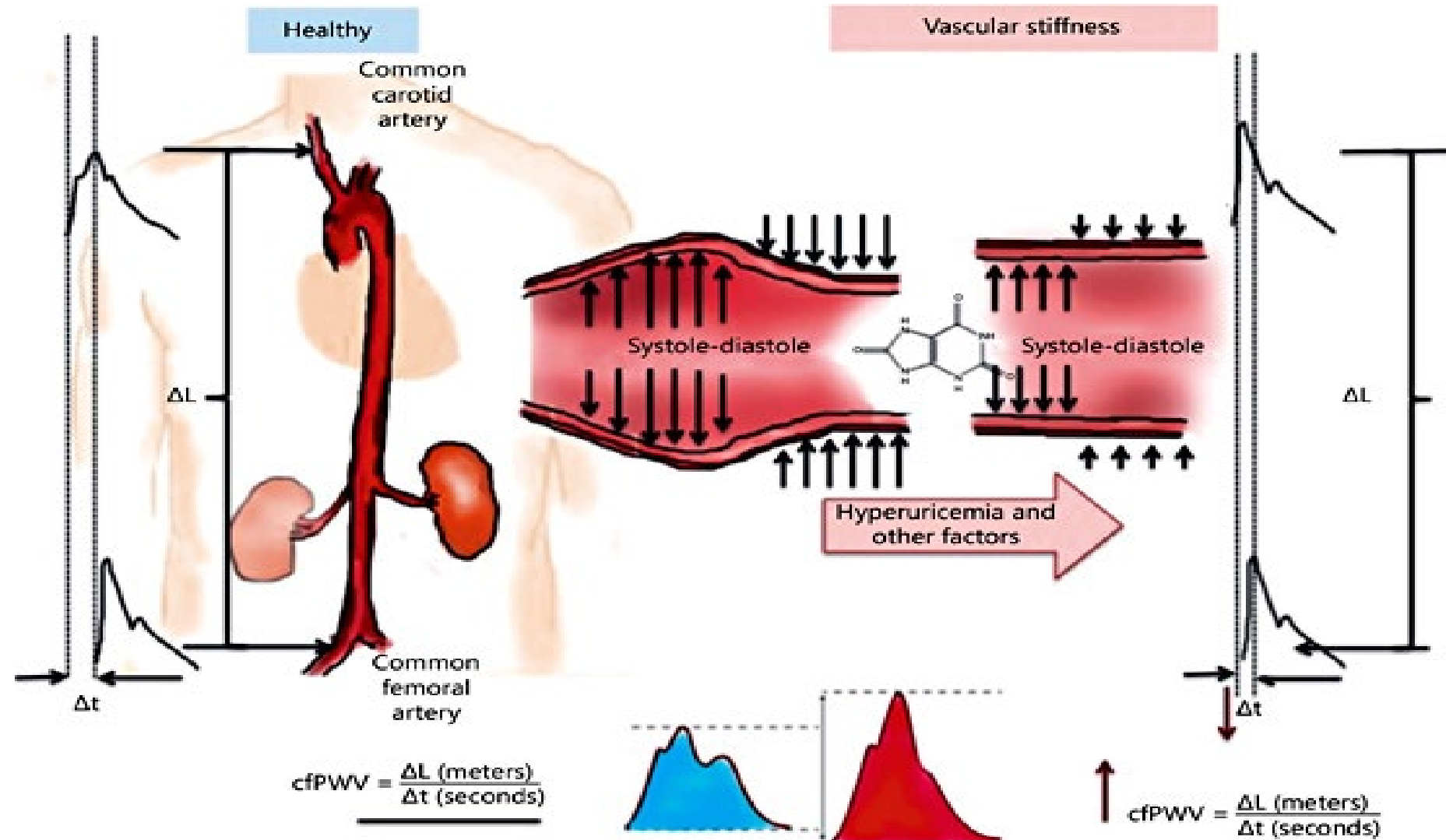
Vascular Tests

- Pulse Wave Velocity (PWV)
 - time for pulse wave to travel from carotid artery to femoral artery (velocity = distance/ time)
 - Higher values = stiffer arteries
- Pulse Wave Analysis (PWA)
 - waveform tracing of radial pulse converted to aortic tracing

Forest Plot for aPWV and Combined Cardiovascular Events



Aortic stiffness is highly prevalent in CKD and predicts CVD events



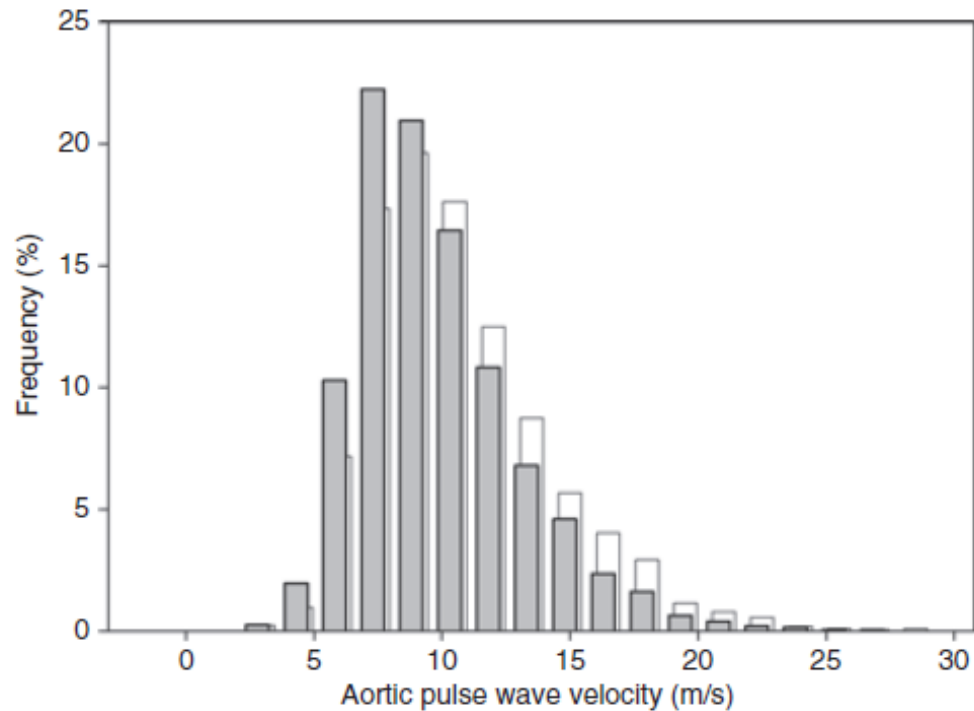


Figure 1 | Histogram depicting frequency of adjusted (for waist circumference) aortic pulse wave velocity (PWV) in shaded bars (foreground) grouped in units of 1.5 m/s in the chronic kidney disease population of the Chronic Renal Insufficiency Cohort study. The distribution of the unadjusted aortic PWV is shown in open bars (background) for reference.

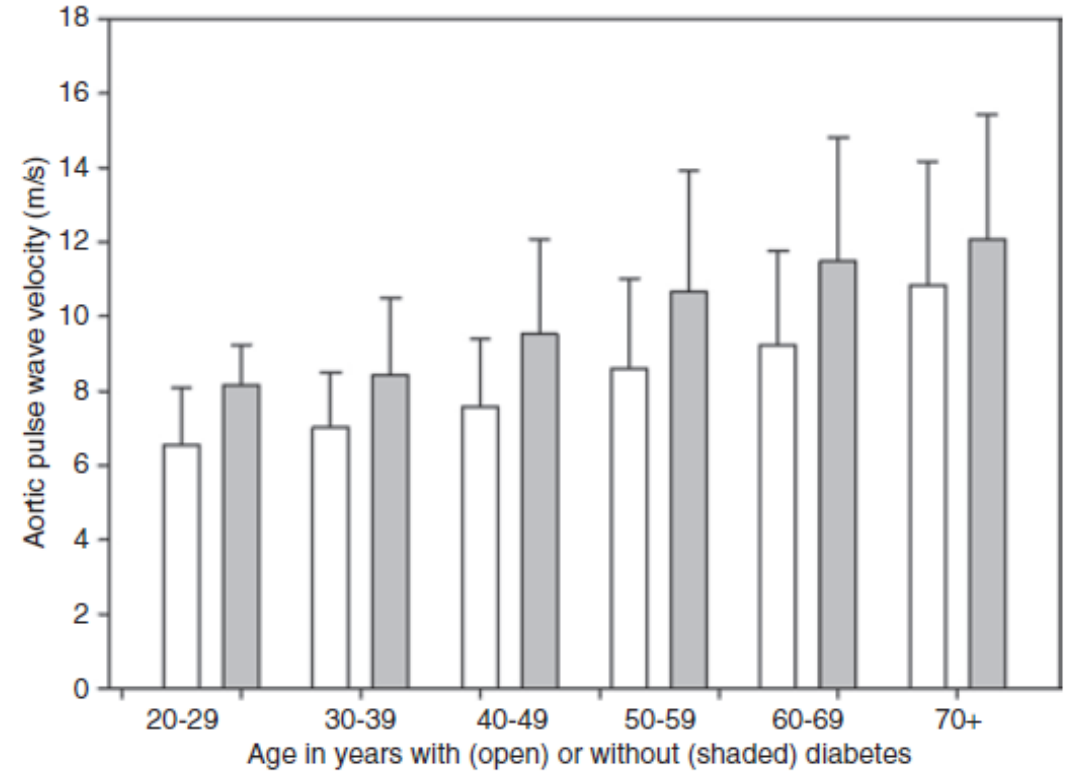


Figure 3 | Mean \pm s.d. aortic pulse wave velocity plotted against age in 10 year increments separated within each 10 year interval by the absence (open bar) or presence (shaded bar) of diabetes.

Table 3 | Multivariable linear regressions for selected variables and aortic PWV

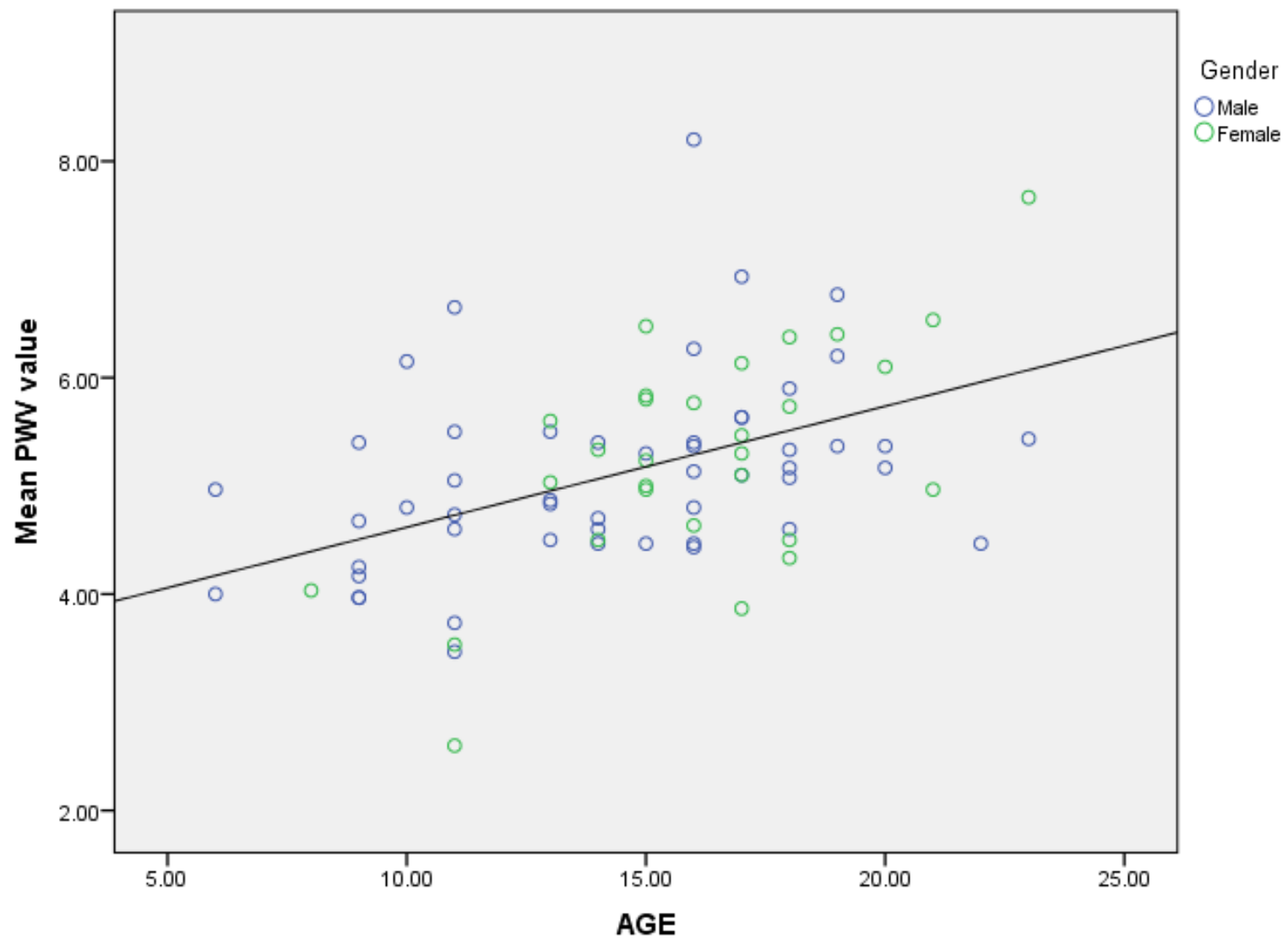
Variable	Regression 1		Regression 2	
	As measured PWV estimate (s.e.)	<i>P</i> value	Adjusted PWV estimate (s.e.)	<i>P</i> value
Age (per 10 year interval)	1.09 (0.06)	<0.0001	0.95 (0.05)	<0.0001
eGFR (per 10 ml/min/1.73m ²)	-0.27 (0.04)	<0.0001	-0.23 (0.04)	<0.0001
Glucose (per 10 mg/dl)	0.04 (0.01)	0.0020	0.04 (0.01)	0.0017
Race black vs. white	0.41 (0.14)	0.0026	0.39 (0.12)	0.0016
Race other vs. white	0.32 (0.25)	0.2040	0.16 (0.23)	0.4749
MAP (per 1 mm Hg)	0.05 (0.00)	<0.0001	0.04 (0.00)	<0.0001
Waist circumference (per 1 cm)	0.03 (0.00)	<0.0001	-0.01 (0.00)	0.0007
Diabetes (yes vs. no)	1.67 (0.14)	<0.0001	1.51 (0.13)	<0.0001
Female (vs. male)	-0.04 (0.12)	0.7534	-0.31 (0.11)	0.0054

Presented are regressions of predictor variables from **Table 2** on PWV using two models. In regression 1 the outcome is PWV as it was originally measured. In regression 2 the outcome is PWV adjusted for waist circumference.

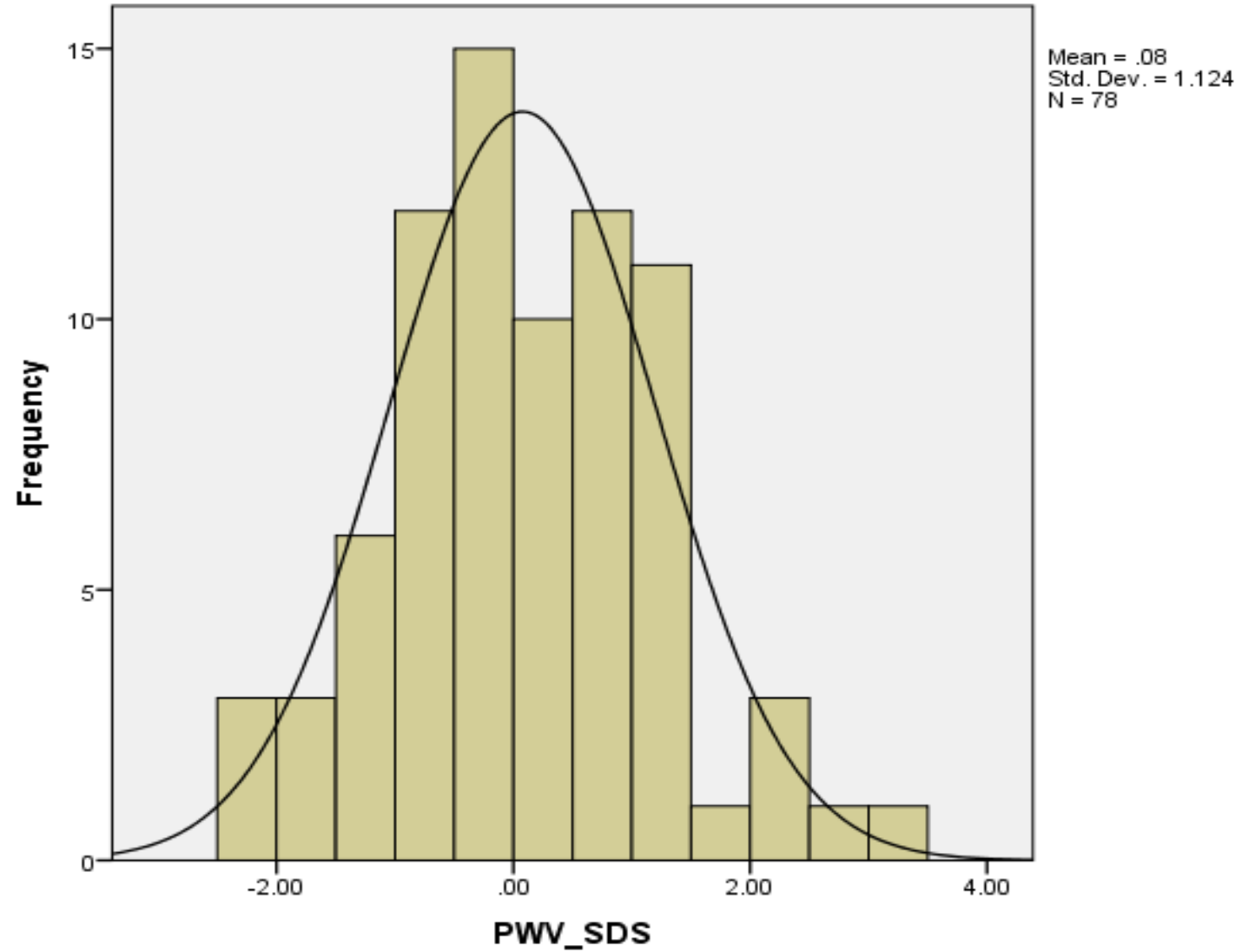
eGFR, estimated glomerular filtration rate; MAP, mean arterial pressure; PWV, pulse wave velocity.

Characteristics	N = 90
Age (years)	14.9 (3.8)
Gender (male)	50 (56%)
Diagnosis (glomerular)	44 (49%)
GFR	
>90	9 (10%)
60 – 90	39 (43%)
45 – 60	18 (20%)
30 – 45	16 (18%)
<30	7 (8%)
PWV (m/s) (n=80)	5.17 (0.9)
Height %ile	
BP %ile	
# BP meds	

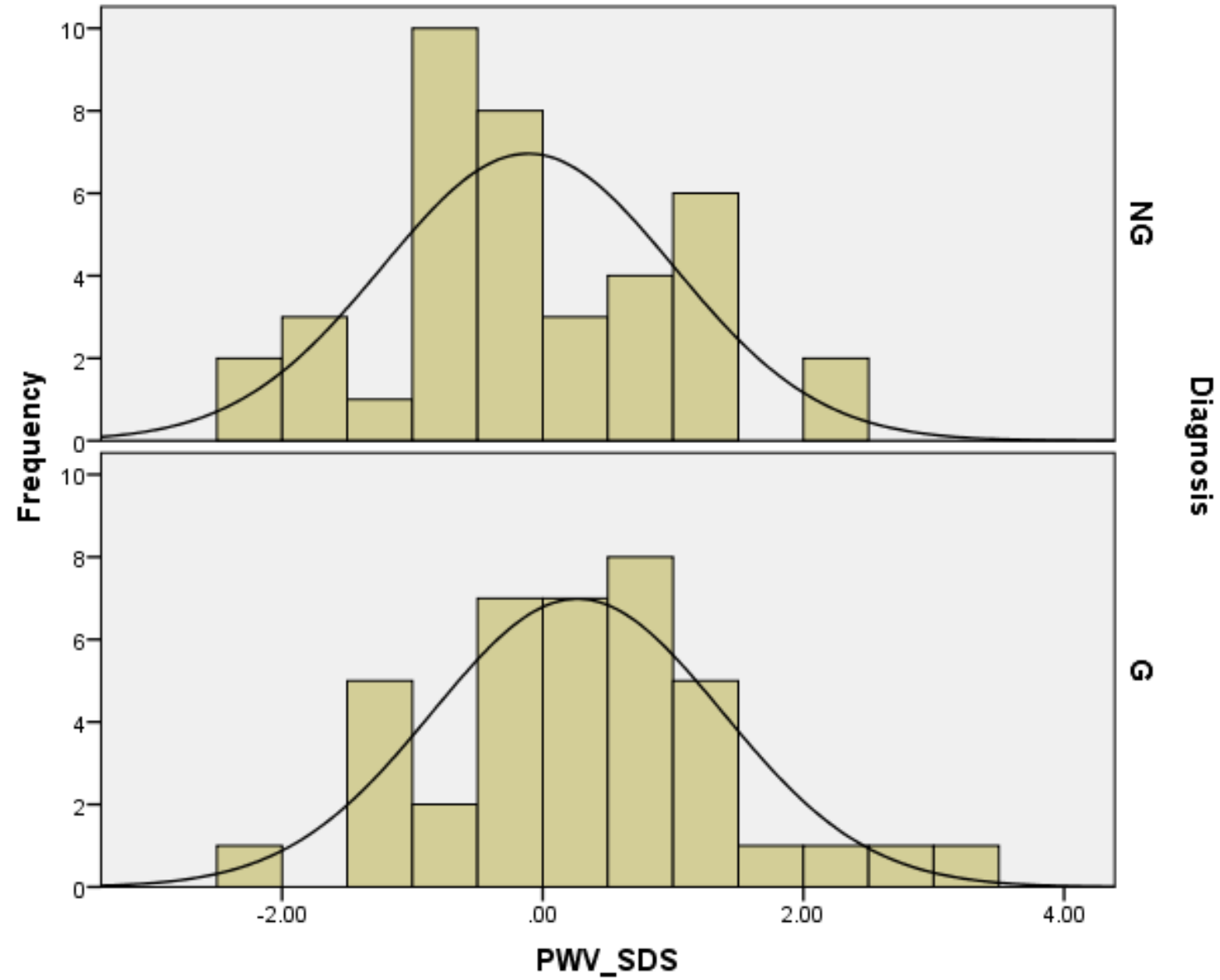
PWV x Age and Gender



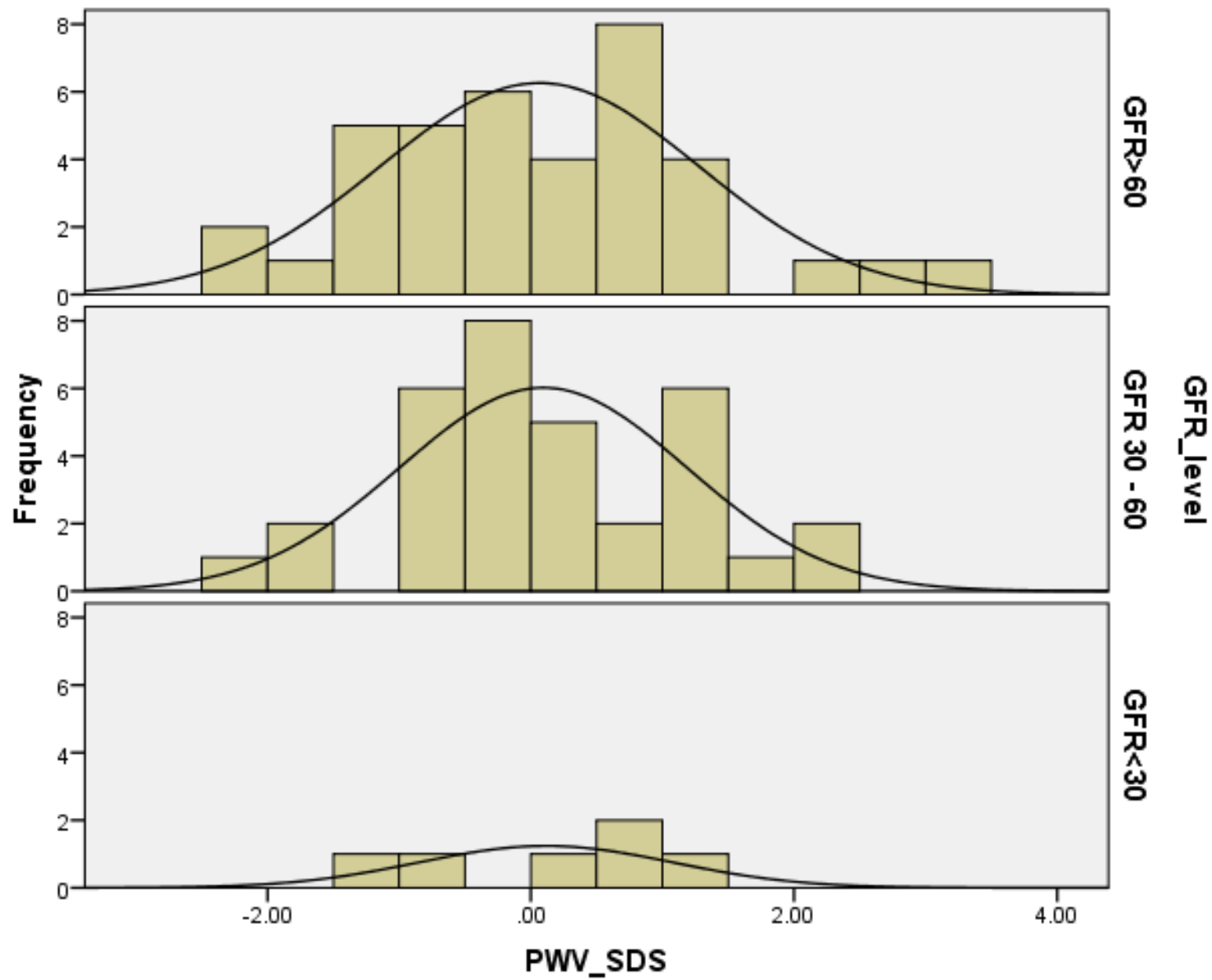
PWV Z-score (adjusted by age and sex)



PWV Z-score by Diagnosis



PWV Z-score by GFR Level



PWV Z-score by Urine P:C

