

CALCULATIONS

Adjusted Calcium (mg/dL)	Total Calcium + 0.8 x (4.0-Albumin)
<i>Included In</i>	Adjusted Calcium Phosphorus Product Comprehensive Metabolic Panel Comprehensive Metabolic Panel w/Phosphorus
<i>Note</i>	Calculation provided only when Albumin is <4.0 g/dL

Adjusted Calcium Phosphorus Product (mg²/dL²)	(Total Calcium (mg/dL) + 0.8 x (4.0-Albumin (g/dL))) x Phosphorus
<i>Included In</i>	Adjusted Calcium Phosphorus Product Comprehensive Metabolic Panel w/Phosphorus
<i>Note</i>	Calculation provided only when Albumin is <4.0 g/dL

A/G Ratio	Albumin/Globulin
<i>Included In</i>	Comprehensive Metabolic Panel Comprehensive Metabolic Panel w/Phosphorus

Anion Gap (mEq/L)	Sodium – (Chloride + CO ₂)
<i>Included In</i>	Basic Metabolic Panel Comprehensive Metabolic Panel Comprehensive Metabolic Panel w/ Phosphorus Electrolytes Renal Function Panel

Apolipoprotein B/Apolipoprotein A-1 Ratio	Apolipoprotein B/Apolipoprotein A-1
<i>Note</i>	Calculated when Apolipoprotein B/Apolipoprotein A-1 are ordered

BUN/Creatinine Ratio	BUN/Creatinine
<i>Note</i>	Calculated when BUN and Creatinine are ordered

Calcium Phosphorus Product (mg²/dL²)	Total Calcium x Phosphorus
<i>Included In</i>	Calcium Phosphorus Product Adjusted Calcium Phosphorus Product Comprehensive Metabolic Panel w/Phosphorus

estimated Glomerular Filtration Rate (eGFR) Creatinine (mL/min/1.73 m²)	$142 \times \min(\text{Scr}/K, 1)^{\alpha} \times \max(\text{Scr}/K, 1)^{-1.200} \times 0.9938^{\text{Age}} \times 1.012$ [if female]
estimated Glomerular Filtration Rate (eGFR) Creatinine-Cystatin C (mL/min/1.73 m²)	$135 \times \min(\text{Scr}/K, 1)^{\alpha} \times \max(\text{Scr}/K, 1)^{-0.544} \times \min(\text{Scys}/0.8, 1)^{-0.323} \times \max(\text{Scys}/0.8, 1)^{-0.778} \times 0.9961^{\text{Age}} \times 0.963$ [if female]
<i>Note</i>	Estimated GFR (eGFR) using CKD-EPI 2021 where Scr = standardized creatinine in mg/dL K = 0.7 (females) or 0.9 (males) α = -0.241 (females) or -0.302 (males) min = indicates the minimum of Scr/K or 1 max = indicates the maximum of Scr/K or 1 Scys = standardized Cystatin C in mg/L Age = years

Free Testosterone (pg/mL)	Free Testosterone $\left(\frac{\text{mol}}{\text{L}}\right) = \frac{-b + \sqrt{b^2 - 4a[T]}}{2a}$
<i>Note</i>	Vermeulen equation where, $a = k_{at} + k_t + (k_{at} \times k_t) ([SHBG] + [albumin]) - [T]$ $b = 1 + k_t[SHBG] + k_{at}[albumin] - (k_{at} - k_t)[T]$

CALCULATIONS

	Albumin (g/dL), SHBG (nmol/L) and Testosterone (T in ng/dL) tests converted to mol/L first. Then Free Testosterone (FT in mol/L) converted to pg/mL by multiplying result by 288×10^9
Included in	Testosterone, Free and Total with Albumin, Sex Hormone Binding Globulin (SHBG) and Total Testosterone
Globulin (g/dL)	Total Protein–Albumin
Included In	Comprehensive Metabolic Panel Comprehensive Metabolic Panel w/Phosphorus
Hemoglobin x 3 (g/dL)	Hemoglobin x 3
Included In	Complete Blood Count (CBC) & Differential Complete Blood Count (CBC) & Differential w/Reticulocytes Hemoglobin Hemoglobin & Hematocrit (H&H) Hemogram (Complete Blood Count w/o Differential)
Indirect Bilirubin (mg/dL)	Total Bilirubin – Direct Bilirubin
Note	Calculated when Total and Direct Bilirubin are ordered
Insulin Resistance/HOMA-IR	$(\text{Glucose} \times \text{Insulin}) / 405$
Included in	Insulin Resistance Panel
Iron Status w/Iron & Transferrin or Direct Total Iron Binding Capacity (TIBC)	
TIBC (Calc) (µg/dL)	Transferrin x 1.4
Transferrin Saturation (%)	$(\text{Iron} / (\text{Transferrin} \times 1.4)) \times 100$
Unsaturated Iron Binding Capacity (UIBC) (µg/dL)*	Direct TIBC – Iron
Iron Saturation (%)	$(\text{Iron} / \text{Direct TIBC}) \times 100$
Note*	Calculated when Direct TIBC and Iron are ordered
Lipid Related Calculated tests	
Cholesterol/HDL Ratio	Cholesterol/HDL
HDL/Triglycerides Ratio	HDL/Triglycerides
VLDL/Triglycerides Ratio	$(\text{Cholesterol} - \text{Direct LDL} - \text{HDL}) / \text{Triglycerides}$
Non-HDL (mg/dL)	Cholesterol - HDL
LDL (mg/dL)	Cholesterol – (Very Low Density Lipoprotein + HDL)
VLDL (mg/dL)*	1. Triglycerides/5 2. Cholesterol – Direct LDL – HDL
Note*	1. Only provided if Triglyceride is <400 mg/dL 2. Calculated using measured Direct LDL
% Recirculation	$(\text{Systemic BUN} - \text{Arterial BUN}) / (\text{Systemic BUN} - \text{Venous BUN}) \times 100$
Included In	Recirculation Study
Prothrombin Time (PT) w/ INR	
INR	$(\text{PT Ratio})^{\text{ISI}}$ PT Ratio = $(\text{Patient PT} / \text{Mean Normal PT})^{\text{ISI}}$ Mean Normal PT = Geometric Mean ISI = International Sensitivity Index

CALCULATIONS

HEMODIALYSIS CALCULATIONS	
Kt/V Equilibrated (eqKt/V)	$(0.924 \times \ln \text{Kt/V}) - ((0.395 \times \ln \text{Kt/V}) / (\text{Min} / 60)) + 0.056$
Included In	Kt/V Standard, URR Kt/V Standard, Natural Log, URR
Note	Leypoldt Formula For patient dialyzing 2 or 4-6 times per week For Kt/V Standard calculation purposes only, not reported
Kt/V Jindal	$(0.04 \times ((\text{Pre BUN} - \text{Post BUN}) / \text{Pre BUN} \times 100) - 1.2)$
Note	Jindal Formula (Not KDOQI recommended) The HD Adequacy Work Group feels this formula should not be used to measure delivered dose of Hemodialysis. (K/DOQI Clinical Practice Guidelines for Hemodialysis Adequacy: Update 2000, Guideline 2)
Kt/V Natural Log (lnKt/V)	$(-\ln((\text{Post BUN}/\text{Pre BUN}) - (0.008 \times \text{Treatment Time in mins}/60)) + ((4 - (3.5 \times (\text{Post BUN}/\text{Pre BUN})) \times (\text{Pre WT} - \text{Post WT})/\text{Post WT}))$
Included In	Kt/V Natural Log, URR Kt/V Natural Log, URR, nPNA Kt/V Standard, Natural Log, URR
Note	Daugirdas II Formula The K/DOQI recommendations are: Prescribed dose of hemodialysis: Kt/V of 1.3 Delivered dose of hemodialysis: Kt/V >1.2
Kt/V Standard (stdKt/V)	$(168 \times (1 - \exp(-\text{eqKt/V})) / (\text{Min}/60)) / ((1 - \exp(-\text{eqKt/V})) / \text{eqKt/V} + (168/\text{Number of Treatment}/(\text{Min}/60)) - 1)$
Included In	Kt/V Standard, URR Kt/V Standard, Natural Log, URR
Note	Leypoldt Formula For patient dialyzing 2 or 4-6 times per week
Kt/V Residual	$(\text{Urine Urea Nitrogen}/\text{Blood BUN}) \times (\text{Urine Volume}/\text{Urine Collection Time}) \times (10.08/\text{VSA})$
Included In	Kt/V Natural Log, URR Kt/V Natural Log, URR, nPNA Kt/V Standard, URR Kt/V Standard, Natural Log, URR
Note	Only calculated if urine provided; added to Kt/V Natural Log or Standard up to 90 days
nPNA, Hemodialysis	<ol style="list-style-type: none"> Treatment #1: Beginning of week PNA (PCR) = $\text{Pre BUN} / (36.3 + 5.48 \times \text{Kt/V Natural Log} + 53.5 / \text{Kt/V Natural Log}) + 0.168$ Treatment #2: Midweek PNA (PCR) = $\text{Pre BUN} / (25.8 + 1.15 \times \text{Kt/V Natural Log} + 56.4 / \text{Kt/V Natural Log}) + 0.168$ Treatment #3: End of week PNA (PCR) = $\text{Pre BUN} / (16.3 + 4.3 \times \text{Kt/V Natural Log} + 56.6 / \text{Kt/V Natural Log}) + 0.168$
Included In	Kt/V Natural Log, URR, nPNA
Note	nPNA calculation is only applicable to patients on thrice-weekly dialysis without significant residual function. nPNA calculated from Kt/V without formal kinetic modeling according to Depner T and Daugirdas J: JASN 1996;7:780-785.
Urea Reduction Ratio (%)	$(1 - (\text{Post BUN}/\text{Pre BUN})) \times 100$
Included In	Kt/V Jindal (Not K/DOQI Recommended) Kt/V Natural Log, URR Kt/V Natural Log, URR, nPNA Kt/V Standard, Natural Log, URR Kt/V Standard, URR Urea Reduction Ratio w/Pre and Post BUN
Ultrafiltration Rate (UFR) (mL/kg/hr)	$((\text{pre-weight} - \text{post-weight}) \times 1000) / (\text{delivered time in mins}/60) / \text{post-weight in kg}$
Included In	Kt/V Natural Log, URR Kt/V Natural Log, URR, nPNA Kt/V Standard, Natural Log, URR Kt/V Standard, URR

CALCULATIONS

PD ADEQUACY CALCULATIONS	
Weekly Total Kt/V	Weekly Residual Kt/V + Weekly Dialysate Kt/V
Weekly Residual Kt/V	$((\text{Urine Urea Nitrogen/BUN}) \times (\text{Urine Volume (mL)}/\text{Urine Collection Time (min)}) \times 10.08) / \text{VSA}$
Note	Calculated if urine sample provided
Weekly Dialysate Kt/V	$((\text{Dialysate Urea Nitrogen/BUN}) \times (24 \text{ Hour Dialysate Drain Volume (mL)}/1000) \times 7) / \text{VSA}$
Weekly Total CrCl (L/wk/1.73 m ²)	Weekly Residual GFR + Weekly Dialysate Creatinine Clearance
Weekly Residual GFR (L/wk/1.73 m ²)	Arithmetic Mean of Weekly Urea Clearance and Weekly Creatinine Clearance $((\text{Urine Urea Nitrogen/BUN}) \times (\text{Urine Volume (mL)}/\text{Urine Collection Time (min)}) \times 10.08) + (\text{Urine Creatinine/Plasma Creatinine} \times \text{Urine Volume (mL)}/\text{Urine Collection Time (min)} \times 10.08)) / 2 \times 1.73 / \text{BSA}$
Weekly Dialysate CrCl (L/wk/1.73 m ²)	$(\text{Dialysate Corrected Creatinine/Plasma Creatinine}) \times (24 \text{ Hour Dialysate Drain Volume (mL)}/1000) \times 7 \times 1.73 / \text{BSA}$
Weekly Residual CrCl (L/wk/1.73 m ²)	$(\text{Urine Creatinine/Blood Creatinine}) \times (\text{Urine Volume (mL)}/\text{Urine Collection Time (min)}) \times (1.73 / \text{BSA}) \times 10.08$
Creatinine Clearance (mL/min/1.73m ²)	$(\text{Urine Creatinine/Blood Creatinine}) \times (\text{Urine Volume (mL)}/\text{Urine Collection Time (min)}) \times (1.73 / \text{BSA})$
Corrected Creatinine, 24 Hour (mg/dL)	Creatinine at 24 Hour Dwell – (Glucose at 24 Hour Dwell x 0.00010386)
nPNA, Peritoneal Dialysis (g/kg/day)	$(10.76 \times ((0.69 \times \text{UNA}) + 1.46)) / (\text{VSA}/0.58)$
Protein Nitrogen Appearance (PNA) (g/day)	$10.76 \times ((0.69 \times \text{UNA}) + 1.46)$
UNA (g/day)	$(24 \text{ Hour Drain Volume (mL)} \times 24 \text{ Hour Urea Dialysate})/100000 + (\text{Urine Volume (mL)} \times \text{Urine Urea Nitrogen})/100000 \times (1440/\text{Total Urine Collection Time (min)})$
Note	UNA used for PNA calculation purposes only, not reported
Body Surface Area (BSA) (m ²)	Adult (≥16 years) uses DuBois and DuBois formula $\text{BSA (m}^2\text{)} = 0.007184 \times \text{Wt}^{0.425} \times \text{Ht}^{0.725}$ Pediatric (< 16 years) uses Haycock formula $\text{BSA (m}^2\text{)} = 0.024265 \times \text{Wt}^{0.5378} \times \text{Ht}^{0.3964}$ where weight (Wt) is in kilograms and height (Ht) is in centimeters
Volume from Surface Area (VSA) (Liters)	Adult (≥16 years) uses Hume and Weyers formula Male: $V = -14.012934 + 0.296785 \times \text{Wt} + 0.194786 \times \text{Ht}$ Female: $V = -35.270121 + 0.183809 \times \text{Wt} + 0.344547 \times \text{Ht}$ Pediatric (<16 years) uses Friis-Hansen formula $V = 0.135 \times \text{Wt}^{0.666} \times \text{Ht}^{0.535}$ where weight (Wt) is in kilograms and height (Ht) is in centimeters

CALCULATIONS

FLUID CALCULATIONS	
Peritoneal Equilibration Test (PET) Fast	
Corrected Creatinine, 4 Hour (mg/dL)	Creatinine at 4 Hour Dwell – (Glucose at 4 Hour Dwell x 0.00010386)
Corrected Creatinine D/P, 4 Hour	Corrected Creatinine at 4 Hour Dwell/Plasma Creatinine
Peritoneal Equilibration Test (PET) Standard	
Corrected Creatinine, 0 Hour, 2 Hour, 4 Hour (mg/dL)	Creatinine at 0 or 2 or 4 Hour Dwell – (Glucose at 0 or 2 or 4 Hour Dwell x 0.00010386)
Corrected Creatinine D/P, 0 Hour	Corrected Creatinine at 0 Hour Dwell/Plasma Creatinine
Corrected Creatinine D/P, 2 Hour	Corrected Creatinine at 2 Hour Dwell/Plasma Creatinine
Corrected Creatinine D/P, 4 Hour	Corrected Creatinine at 4 Hour Dwell/Plasma Creatinine
Glucose D/D0, 2 Hour	Glucose at 2 Hour Dwell/Glucose at 0 Hour Dwell
Glucose D/D0, 4 Hour	Glucose at 4 Hour Dwell/Glucose at 0 Hour Dwell
Urea D/P, 0 Hour	Urea at 0 Hour Dwell/Plasma Urea
Urea D/P, 2 Hour	Urea at 2 Hour Dwell/Plasma Urea
Urea D/P, 4 Hour	Urea at 4 Hour Dwell/Plasma Urea
Peritoneal Equilibration Test (PET) Modified	
Corrected Creatinine, 0 Hour, 1 Hour, 2 Hour, 4 Hour (mg/dL)	Creatinine at 0 or 1 or 2 or 4 Hour Dwell – (Glucose at 0 or 1 or 2 or 4 Hour Dwell x 0.00010386)
Corrected Creatinine D/P, 4 Hour	Corrected Creatinine at 4 Hour Dwell/Plasma Creatinine
Sodium D/P, 0 Hour	Sodium at 0 Hour Dwell / Plasma Sodium
Sodium D/P, 1 Hour	Sodium at 1 Hour Dwell / Plasma Sodium
Sodium D/P, 2 Hour	Sodium at 2 Hour Dwell / Plasma Sodium
Sodium D/P, 4 Hour	Sodium at 4 Hour Dwell / Plasma Sodium
Fluid, 24-Hour Dwell	
Corrected Creatinine, 24 Hour (mg/dL)	Creatinine at 24 Hour Dwell – (Glucose at 24 Hour Dwell x 0.00010386)
Fluid, Overnight Dwell	
Corrected Creatinine, Overnight (mg/dL)	Creatinine Overnight Dwell – (Glucose Overnight Dwell x 0.00010386)
Gotch PD QA	
Corrected Creatinine, PD QA (mg/dL)	(Corrected Creatinine, PD QA – Glucose PD QA x 0.00010386)
Total Protein, PD QA (g/dL)	Total Protein, PD QA / 1000
Gotch PD Exchange 1	
Corrected Creatinine, PD Exchange 1 (mg/dL)	(Corrected Creatinine, PD Exchange 1 – Glucose PD Exchange 1 x 0.00010386)
Total Protein, PD Exchange 1 (g/dL)	Total Protein, PD Exchange 1 / 1000
Gotch PD Exchange 2	
Corrected Creatinine, PD Exchange 2 (mg/dL)	(Corrected Creatinine, PD Exchange 2 – Glucose PD Exchange 2 x 0.00010386)
Total Protein, PD Exchange 2 (g/dL)	Total Protein, PD Exchange 2 / 1000
Gotch PD Exchange 3	
Corrected Creatinine, PD Exchange 3 (mg/dL)	(Corrected Creatinine, PD Exchange 3 – Glucose PD Exchange 3 x 0.00010386)
Total Protein, PD Exchange 3 (g/dL)	Total Protein, PD Exchange 3 / 1000
Gotch PD Exchange 4	
Corrected Creatinine, PD Exchange 4 (mg/dL)	(Corrected Creatinine, PD Exchange 4 – Glucose PD Exchange 4 x 0.00010386)
Total Protein, PD Exchange 4 (g/dL)	Total Protein, PD Exchange 4 / 1000
Gotch PD Exchange 5	
Corrected Creatinine, PD Exchange 5 (mg/dL)	(Corrected Creatinine, PD Exchange 5 – Glucose PD Exchange 5 x 0.00010386)
Total Protein, PD Exchange 5 (g/dL)	Total Protein, PD Exchange 5 / 1000

CALCULATIONS

URINE CALCULATIONS	
24 Hour Urine Creatinine Clearance (Residual Renal Creatinine Clearance)	
Creatinine Clearance (mL/min/1.73m ²)	$(\text{Urine Creatinine/Blood Creatinine}) \times (\text{Urine Volume (mL)}/\text{Urine Collection Time (min)}) \times (1.73/\text{BSA})$
Body Surface Area (BSA)	Adult (≥ 16 years) uses DuBois and DuBois formula $\text{BSA (m}^2\text{)} = 0.007184 \times \text{Wt}^{0.425} \times \text{Ht}^{0.725}$ Pediatric (< 16 years) uses Haycock formula $\text{BSA (m}^2\text{)} = 0.024265 \times \text{Wt}^{0.5378} \times \text{Ht}^{0.3964}$ where weight (Wt) is in kilograms and height (Ht) is in centimeters

Residual Urea Clearance, KrU – for Hemodialysis only	
KrU (mL/min)	$(\text{Urine Urea Nitrogen} \times \text{Urine Volume (mL)}) / (\text{Blood BUN} \times 0.9 \times \text{Total Urine Collection Time (min)})$
Kt/V Residual	$(\text{Urine Urea Nitrogen/Blood BUN}) \times (\text{Urine Volume (mL)}/\text{Urine Collection Time (min)}) \times (10.08/\text{VSA})$
Volume from Surface Area (VSA) (Liters)	Adult (≥ 16 years) uses Hume and Weyers formula Male: $V = -14.012934 + 0.296785 \times \text{Wt} + 0.194786 \times \text{Ht}$ Female: $V = -35.270121 + 0.183809 \times \text{Wt} + 0.344547 \times \text{Ht}$ Pediatric (<16 years) uses Friis-Hansen formula $V = 0.135 \times \text{Wt}^{0.666} \times \text{Ht}^{0.535}$ where weight (Wt) is in kilograms and height (Ht) is in centimeters

24 Hour Urine Creatinine	
Urine Creatinine, 24 Hour (mg/24 hr)	$((\text{Urine Creatinine in mg/dL} \times \text{Urine Volume in mL})/100) \times (1440 / \text{Total Urine Collection Time in min})$

24 Hour Urine Urea Nitrogen	
Urine Urea Nitrogen, 24 Hour (g/24 hr)	$((\text{Urine Urea Nitrogen in mg/dL}/100) \times (\text{Urine Volume in mL}/(\text{Total Urine Collection Time in mins}/1440)))/1000$

24 Hour Urine Total Protein with Creatinine	
Urine Protein, 24 Hour (mg/24 hr)	$(\text{Urine Total Protein}/100) \times ((\text{Urine Volume in mL})/(\text{Total Urine Collection Time in mins}/1440))$
Urine Total Protein/ Creatinine Ratio, 24 Hour (mg/g creat)	$((\text{Urine Total Protein}/100) \times ((\text{Urine Volume in mL})/(\text{Total Urine Collection Time in mins}/1440)))/(((\text{Urine Creatinine}/100) \times (\text{Urine Volume in mL}/(\text{Total Urine Collection Time in mins}/1440))))/1000$
Urine Creatinine, 24 Hour (g/24 hr)	$((\text{Urine Creatinine}/100) \times (\text{Urine Volume in mL}/(\text{Total Urine Collection Time in mins}/1440)))/1000$

Albumin, Random Urine with Creatinine	
Urine Albumin/Creatinine Ratio (mg/g)	$(\text{Albumin, Random Urine}/\text{Creatinine, Random Urine}) \times 100$

Total Protein, Random Urine with Creatinine	
Urine Total Protein/Creatinine Ratio (mg/g creat)	$(\text{Total Protein, Random Urine}/\text{Creatinine, Random Urine}) \times 1000$