CALCULATIONS

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

Adjusted Calcium Phosphorus Product (mg^2/dL^2)	(Total Calcium (mg/dL) + 0.8 x (4.0-Albumin (g/dL)) x Phosphorus
Included In	*Adjusted Calcium Phosphorus Product* *Comprehensive Metabolic Panel w/Phosphorus*
Note	*Calculation provided only when Albumin is <4.0 g/dL*

A/G Ratio	Albumin/Globulin
Included In	*Comprehensive Metabolic Panel* *Comprehensive Metabolic Panel w/Phosphorus*

Anion Gap (mEq/L)	Sodium – (Chloride + CO2)
Included In	*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
Note	*Calculated when* Apolipoprotein B/Apolipoprotein A-1 *are ordered*

BUN/Creatinine Ratio	BUN/Creatinine
Note	*Calculated when BUN and Creatinine are ordered*

Calcium Phosphorus Product (mg^2/dL^2)	Total Calcium x Phosphorus
Included In	*Calcium Phosphorus Product Adjusted* *Calcium Phosphorus Product* *Comprehensive Metabolic Panel w/Phosphorus*

estimated Glomerular Filtration Rate (eGFR) Creatinine (mL/min/1.73 m^2)	$142 \times \min(Scr/K, 1)^{\alpha} \times \max(Scr/K, 1)^{-1.200} \times 0.9938^{Age} \times 1.012$ [if female]
Note	*Estimated GFR (eGFR) using CKD-EPI 2021 where:* *S_{cr} = standardized creatinine in mg/dL* *K = 0.7 (females) or 0.9 (males)* *α = -0.241 (female) or -0.302 (male)* *min = indicates the minimum of S_{cr}/K or 1.0* *max = indicates the maximum of S_{cr}/K or 1.0* *Age = years*
estimated Glomerular Filtration Rate (eGFR) Creatinine-Cystatin C (mL/min/1.73 m^2)	$135 \times \min(Scr/K, 1)^{\alpha} \times \max(Scr/K, 1)^{-0.544} \times \min(Scys/0.8, 1)^{-0.323} \times \max(Scys/0.8, 1)^{-0.778} \times 0.9961^{Age} \times 0.963$ [if female]
Note	*Estimated GFR (eGFR) using CKD-EPI 2021 where:* *S_{cr} = standardized creatinine in mg/dL* *K = 0.7 (females) or 0.9 (males)* *α = -0.219 (female) or -0.144 (male)* *min = indicates the minimum of S_{cr}/K or 1.0* *max = indicates the maximum of S_{cr}/K or 1.0* *S_{cys} = standardized Cystatin C in mg/L* *Age = years*

CALCULATIONS

Free Testosterone (pg/mL)	Free Testosterone $\left(\frac{\text{mol}}{\text{L}}\right) = \frac{-\text{b} + \sqrt{\text{b}^2 - 4\text{a}\,[\text{T}]}}{2\text{a}}$
Note	*Vermeulen equation where,* $a = k_{at} + k_t + (k_{at} \times k_t)\,([SHBG] + [albumin] - [T])$ $b = 1 + k_t[SHBG] + k_{at}[albumin] - (k_{at} - k_t)[T]$ *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 x 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	(Glucose x Insulin) / 405
Included in	*Insulin Resistance Panel*

Iron Status w/Iron & Transferrin or Direct Total Iron Binding Capacity (TIBC)	
Total Iron Binding Capacity (TIBC) (µg/dL)	Transferrin x 1.4
Transferrin Saturation (%)	(Iron/(Transferrin x 1.4)) x 100
Iron Saturation (%)	(Iron/ Direct TIBC) x 100
Unsaturated Iron Binding Capacity (UIBC) (µg/dL)*	Direct TIBC – Iron
*Note**	*Calculated when Direct TIBC and Iron are ordered*

Lipid Related Calculated tests	
Cholesterol/HDL Ratio	Cholesterol/HDL
HDL/Triglycerides Ratio	HDL/Triglycerides
Non-HDL (mg/dL)	Cholesterol - HDL
LDL (mg/dL)*	Cholesterol – (Very Low Density Lipoprotein + HDL)*
VLDL (mg/dL)[1,2]	1. Triglycerides/5* 2. Cholesterol – Direct LDL – HDL
VLDL/Triglycerides Ratio	(Cholesterol – Direct LDL – HDL) / Triglycerides
Note	*1. Only provided if Triglyceride is ≤400 mg/dL* *2. Calculated using measured Direct LDL* * *Friedewald equation*

% Recirculation	(Systemic BUN – Arterial BUN)/(Systemic BUN – Venous BUN) x 100
Included In	Recirculation Study

Prothrombin Time (PT) w/ INR	
INR	$(\text{PT Ratio})^{ISI}$ PT Ratio = $(\text{Patient PT/Mean Normal PT})^{ISI}$ Mean Normal PT = Geometric Mean ISI = International Sensitivity Index

CALCULATIONS

HEMODIALYSIS CALCULATIONS	
Kt/V Equilibrated (eqKt/V)	(0.924 x lnKt/V) – ((0.395 x lnKt/V) / (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 x ((Pre BUN – Post BUN) / Pre BUN x 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((Post BUN/Pre BUN) - (0.008 x Treatment Time in mins/60)) + ((4-(3.5 x (Post BUN/Pre BUN)) x (Pre WT-Post WT)/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 x (1-exp(-eqKt/V)) / (Min/60)) / ((1-exp(-eqKt/V)) / eqKt/V + (168/Number of Treatment/(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	(Urine Urea Nitrogen/Blood BUN) x (Urine Volume/Urine Collection Time) x (10.08/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	1. Treatment #1: Beginning of week PNA (PCR) = Pre BUN / (36.3 + 5.48 x Kt/V Natural Log + 53.5/ Kt/V Natural Log) + 0.168 2. Treatment #2: Midweek PNA (PCR) = Pre BUN / (25.8 + 1.15 x Kt/V Natural Log + 56.4/ Kt/V Natural Log) + 0.168 3. Treatment #3: End of week PNA (PCR) = Pre BUN / (16.3 + 4.3 x Kt/V Natural Log + 56.6/ 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 – (Post BUN/Pre BUN)) x 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)	((pre-weight – post-weight) x 1000)/ (delivered time in mins/60)/ 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	((Urine Urea Nitrogen/BUN) x (Urine Volume (mL)/Urine Collection Time (min)) x 10.08) / VSA
Note	*Calculated if urine sample provided*

Weekly Dialysate Kt/V	((Dialysate Urea Nitrogen/BUN) x (24 Hour Dialysate Drain Volume (mL)/1000) x 7) / VSA

Weekly Total CrCl (L/wk/1.73 m²)	Weekly Residual GFR + Weekly Dialysate Creatinine Clearance

Weekly Residual GFR (L/wk/1.73 m²)	Arithmetic Mean of Weekly Urea Clearance and Weekly Creatinine Clearance ((Urine Urea Nitrogen/BUN) x (Urine Volume (mL)/Urine Collection Time (min) x 10.08) + (Urine Creatinine/Plasma Creatinine x Urine Volume (mL)/Urine Collection Time (min) x 10.08))/2 x 1.73/BSA

Weekly Dialysate CrCl (L/wk/1.73 m²)	(Dialysate Corrected Creatinine/Plasma Creatinine) x (24 Hour Dialysate Drain Volume (mL)/1000) x 7 x 1.73/BSA

Weekly Residual CrCl (L/wk/1.73 m²)	(Urine Creatinine/Blood Creatinine) x (Urine Volume (mL)/Urine Collection Time (min)) x (1.73/BSA) x 10.08

Creatinine Clearance (mL/min/1.73m2)	(Urine Creatinine/Blood Creatinine) x (Urine Volume (mL)/Urine Collection Time (min)) x (1.73/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 x ((0.69 x UNA) + 1.46)) / (VSA/0.58)

Protein Nitrogen Appearance (PNA) (g/day)	10.76 x ((0.69x UNA) + 1.46)

UNA (g/day)	(24 Hour Drain Volume (mL) x 24 Hour Urea Dialysate)/100000 + (Urine Volume (mL) x Urine Urea Nitrogen)/100000) x (1440/Total Urine Collection Time (min))
Note	*UNA used for PNA calculation purposes only, not reported*

Body Surface Area (BSA) (m²)	Adult (≥16 years) uses DuBois and DuBois formula BSA (m²) = 0.007184 x Wt^$^{0.425}$ x Ht^$^{0.725}$ Pediatric (< 16 years) uses Haycock formula BSA (m²) = 0.024265 x Wt^$^{0.5378}$ x 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 x Wt + 0.194786 x Ht Female: V = -35.270121 + 0.183809 x Wt + 0.344547 x Ht Pediatric (<16 years) uses Friis-Hansen formula V = 0.135 x Wt^$^{0.666}$ x 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/1.73m2)	(Urine Creatinine/Blood Creatinine) x (Urine Volume (mL)/Urine Collection Time (min)) x (1.73/BSA)
Body Surface Area (BSA)	Adult (≥16 years) uses DuBois and DuBois formula BSA (m^2) = 0.007184 x Wt^$^{0.425}$ x Ht^$^{0.725}$ Pediatric (< 16 years) uses Haycock formula BSA (m^2) = 0.024265 x Wt^$^{0.5378}$ x 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)	(Urine Urea Nitrogen x Urine Volume (mL)) / (Blood BUN x 0.9 x Total Urine Collection Time (min))
Kt/V Residual	(Urine Urea Nitrogen/Blood BUN) x (Urine Volume (mL)/ Urine Collection Time (min)) x (10.08/VSA)
Volume from Surface Area (VSA) (Liters)	Adult (≥16 years) uses Hume and Weyers formula Male: V= -14.012934 + 0.296785 x Wt + 0.194786 x Ht Female: V = -35.270121 + 0.183809 x Wt + 0.344547 x Ht Pediatric (<16 years) uses Friis-Hansen formula V = 0.135 x Wt^$^{0.666}$ x 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)	((Urine Creatinine in mg/dL x Urine Volume in mL)/100) x (1440 / Total Urine Collection Time in min)

24 Hour Urine Urea Nitrogen	
Urine Urea Nitrogen, 24 Hour (g/24 hr)	((Urine Urea Nitrogen in mg/dL/100) x (Urine Volume in mL/(Total Urine Collection Time in mins/1440)))/1000

24 Hour Urine Total Protein with Creatinine	
Urine Protein, 24 Hour (mg/24 hr)	(Urine Total Protein/100) x ((Urine Volume in mL)/(Total Urine Collection Time in mins/1440))
Urine Total Protein/ Creatinine Ratio, 24 Hour (mg/g creat)	((Urine Total Protein/100) x ((Urine Volume in mL)/(Total Urine Collection Time in mins/1440)))/(((Urine Creatinine/100) x (Urine Volume in mL/(Total Urine Collection Time in mins /1440)))/1000)
Urine Creatinine, 24 Hour (g/24 hr)	((Urine Creatinine/100) x (Urine Volume in mL/(Total Urine Collection Time in mins/1440)))/1000

Albumin, Random Urine with Creatinine	
Urine Albumin/Creatinine Ratio (mg/g)	(Albumin, Random Urine/Creatinine, Random Urine) x 100

Total Protein, Random Urine with Creatinine	
Urine Total Protein/Creatinine Ratio (mg/g creat)	(Total Protein, Random Urine/Creatinine, Random Urine) x 1000