CHEMISTRY CALCULATIONS

☒ St. Joseph Medical Center, Tacoma, WA	☒ St. Anthony Hospital Gig Harbor, WA	☐ Harrison Medical Center, Bremerton, WA
☒ St. Francis Hospital, Federal Way, WA	☒ St. Elizabeth Hospital Enumclaw, WA	☐ Harrison Medical Center, Silverdale, WA
☒ St. Clare Hospital Lakewood, WA	☒ Highline Medical Center Burien, WA	☐ PSC

PURPOSE

To provide instructions for performing chemistry calculations in the event that a calculation either must be performed manually, or entered into LIS manually.

For procedures regarding the individual analytes, see instrument procedure manual for additional information.

1. **ALBUMIN/GLOBULIN RATIO**
2. **AMYLASE URINE TIMED**
3. **AMYLASE/CREATININE CLEARANCE RATIO**
4. **ANION GAP**
5. **BODY SURFACE AREA**
6. **BUN/CREATININE RATIO**
7. **CALCIUM TIMED URINE**
8. **CARDIAC INDEX**
9. **CHOLESTEROL-HIGH DENSITY LIPOPROTEIN RATIO**
10. **CORRECTED CALCIUM (with ALBP)**
11. **CORRECTED CALCIUM (with ALBG)**
12. **CORRECTED CALCIUM X PHOSPOROUS**
13. **CREATININE/CALCIUM RATIO**
14. **CREATININE CLEARANCE**
15. **CREATININE URINE TIMED**
16. **DILUTING WITH PATIENT SAMPLE (LOW CONCENTRATION) for LIPASE, D. BIL AND T. BIL**
17. **ELECTROLYTES URINE TIMED (NA,K,CL)**
18. **GLOBULIN RATIO**
19. **GLOMERULAR FILTRATION RATE**
20. **GLUCOSE, URINE QUANTITATIVE**
21. **GLUCOSE MEAN**
22. **INDIRECT BILIRUBIN(FRACTIONATED BILIRUBIN)**
23. **LOW DENSITY LIPOPROTEIN CHOLESTEROL**
24. **LOW DENSITY LIPOPROTEIN/HIGH DENSITY LIPOPROTEIN RATIO**
25. **MICROALBUMIN CREATININE RATIO**
26. **NEWBORN FRACTIONATED BILIRUBIN**
27. **OSMOLALITY**
28. **PERITONEAL CREATININE CLEARANCE**
29. **PERITONEAL UREA CLEARANCE**
30. **PHOSPHOROUS URINE TIMED**
31. **PROTEIN URINE TIMED**
32. **THYROXINE INDEX**
33. **TOTAL IRON BINDING CAPACITY**
34. **UREA CLEARANCE**
35. **UREA REDUCTION RATE**
36. **UREA URINE TIMED**
37. **URIC ACID URINE TIMED**

1. ALBUMIN / GLOBULIN RATIO

A/G RATIO = $\frac{ALB}{PROT - ALB}$ e.g. $\frac{4.1}{6.2 - 4.1}$ = $\frac{4.1}{2.1}$ = 2.0

Where:	**TEST**
ALB = Albumin in g/dL	**ALB**
PROT = Protein in g/dL	**PROT**

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2. AMYLASE URINE TIMED

AMY UT = $\frac{(AMY\_U)(VOL)}{1000(HR\_COLLEC)}$ e.g. $\frac{(32)(168)}{1000(2)}$ = $\frac{(5376)}{(2000)}$ = 3 U/hr

Where:	**TEST**
AMY UT = Amylase Urine Timed in U/hour	**AMY UT**
AMY_U = Urine Amylase in U/L	**AMY U**
VOL = volume of urine collected in ml	**TOTAL VOLUME**
HR_COLLEC = elapsed time of collection in hours	**HR COLLECTION**

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3. AMYLASE/CREATININE CLEARANCE RATIO

AMY/CREA R (%) = $\frac{(AMY\_U)(CRE\_S)}{(AMY)(CRE\_U)}$ X 100

e.g. $\frac{(32)(1.2)}{(58)(30)}(100)$ = $\frac{(38.4)}{(1740)}(100)$ = (0.022)(100) = 2.2

Where:	**TEST**
AMY/CREA R = Amylase/Creatinine ratio as a percent	**AMY/CREA R**
AMY_U = Urine Amylase in U/L	**AMY U**
CRE_S = Serum Creatinine in mg/dL	**CRE S**
AMY = Serum Amylase in U/L	**AMY**
CRE_U = Urine Creatinine in mg/dL	**CRE U**

4. ANION GAP

ANION GAP = Na - (Cl + CO2)

e.g. ANION GAP = 142 – (108 + 25) = 142 – 133 = 9

Where:	**TEST**
Na = Sodium in mmol/L	NA
Cl = Chloride in mmol/L	**CL**
CO2 = Carbon Dioxide in mmol/L	**CO2**

5. BODY SURFACE AREA

The DuBois and DuBois² formula:

BSA (m^2) = 0.007184 x Height(cm)$^{0.725}$ x Weight(kg)$^{0.425}$

e.g. 0.007184 x (70 x 2.54)$^{0.725}$ x $(\frac{185}{2.2})^{0.425}$

= 0.007184 x (177.80)$^{0.725}$ x (84)$^{0.425}$

= 0.007184 x 42.8 x 6.6

= 2.02

1 inch = 2.54 cm **1 kg = 2.2 lb**

Where:	**TEST**
BSA = Body surface area in square m	BSA
Ht = Height in inches	**HT**
Wt = Weight in pounds	**WT**

Alternatively, you may use the BSA chart to arrive at a patient's BSA by connecting patient's height and weight with a ruler, then note where it intersects on the BSA line…

6. BUN/CREATININE RATIO

BUN/CRE R = $\frac{(BUN)}{(CRE)}$ e.g. $\frac{68}{6.1}$ = 11

Where:	**TEST**
BUN = BUN in mg/dL	**BUN**
CRE = Creatinine in mg/dL	**CRE**

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7. CALCIUM TIMED URINE

CA UT = $\frac{(CA\_U)(VOL)}{100}$ e.g. $\frac{(10.8)(1058)}{100} = \frac{(11426.4)}{100}$ = 114

Where:	**TEST**
CA UT = Timed Urine Calcium in mg/24 hr	**CA UT**
CA_U = Urine Calcium in mg/dL	**CA U**
VOL = Urine volume in mL	**TOTAL VOLUME**
HR_COLLEC = elapsed time of collection in hours	**HR COLLECTION**

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8. CARDIAC INDEX

INDEX = $\frac{(CK - MB)}{CK}$ X 100 e.g. $\frac{(94.9)}{567}$ X 100 = 16.7

Where:	**TEST**
CK = Creatine Kinase in Unit/L	**CK**
INDEX = Cardiac Index in %	**INDEX**
CK-MB = Creatine Kinase-MB in ng/mL	**CK-MB**

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9. CHOLESTEROL – HIGH DENSITY LIPOPROTEIN RATIO

$$\text{CHOL – HDL R} = \frac{CHOL}{HDL}$$

e.g. CHOL – HDL R = $\frac{198}{56}$ = 3.5

Where:	**TEST**
CHOL = Cholesterol in mg/dL	**CHOL**
HDL = HDL in mg/dL	**HDL**

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10. CORRECTED CALCIUM (with ALBP)

COR CA = CA + (0.8) (**3.7 - ALBP**)

e.g. COR CA = 9.9 + (0.8)(3.7 – 3.5)

= 9.9 + (0.8)(0.2)

= 9.9 + 0.16

= 10.1

Where:	**TEST**
COR CA = Calcium corrected in mg/dL	**COR CA**
CA = serum or plasma Calcium in mg/dL	**CA**
ALB BCP R = serum or plasma Albumin in g/dL (bromcresol purple method)	**ALB BCP R**

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11. CORRECTED CALCIUM (with ALBG)

COR CA = CA + (0.8) (**4.0 - ALBG**)

e.g. COR CA = 8.8 + (0.8)(4.0 – 3.7)

= 8.8 + (0.8)(0.3)

= 8.8 + (0.24)

= 9.0

Where:	**TEST**
COR CA = Calcium corrected in mg/dL	**COR CA**
CA = serum or plasma Calcium in mg/dL	**CA**
ALB = serum or plasma Albumin in g/dL **(bromcresol green method)**	**ALB BCG**

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12. CORRECTED CALCIUM X PHOSPHOROUS

COR CA X PHOS

e.g. COR CA X PHOS = 10.1 x 2.2 = 22.2

Where:	**TEST**
COR CA = Calcium corrected in mg/dL	**COR CA**
PHOS = Serum or plasma Phosphorous in mg/dL	**PHOS**

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13. CALCIUM/CREATININE RATIO

CA/CRE RATIO = $\frac{(CA)}{(CRE)}$ OR CA UR/CRE UR RATIO = $\frac{(CAUR)}{(CREUR)}$

Where:	**TEST**
CA UR – Calcium Urine in mg/dL	**CA UR**
CRE_U = Urine Creatinine in mg/dL	**CRE U**

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14. **CREATININE CLEARANCE**

Note: Unable to calculate when total volume is less than 250 mL.

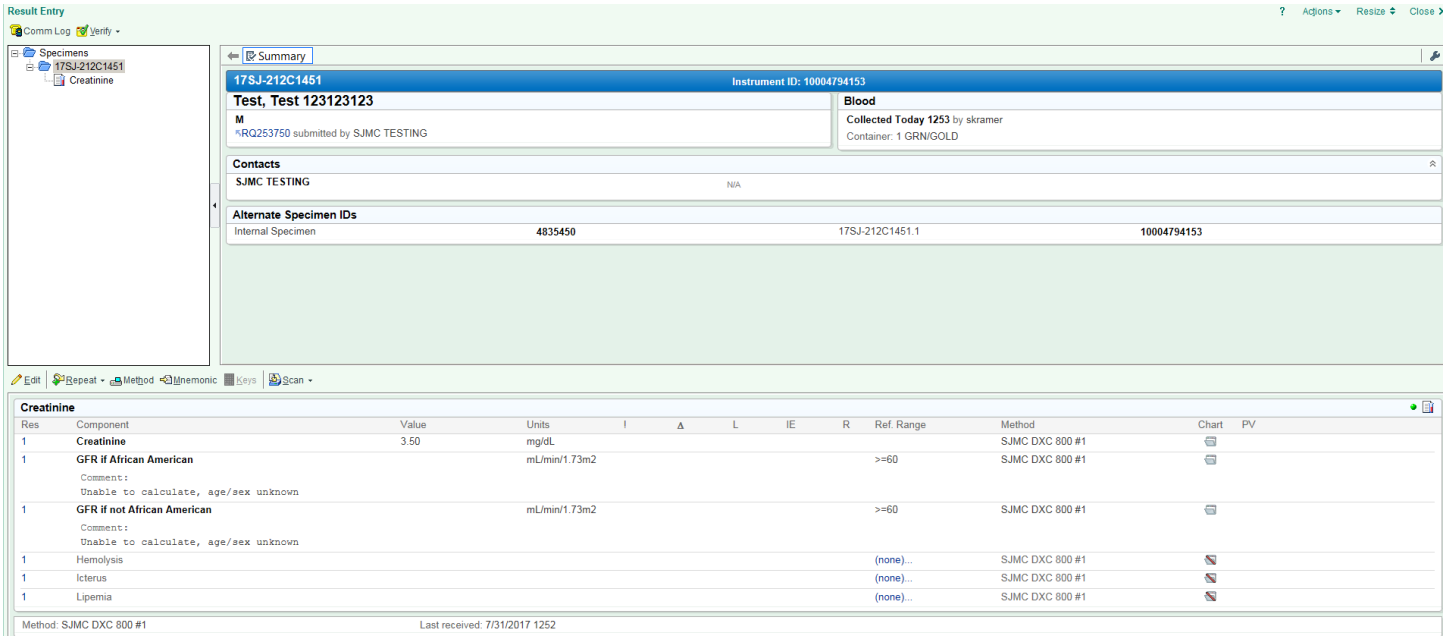
CRE CL = $\frac{(CRE\_U)(VOL)(1.73)}{(CRE\_S)(T(\text{minutes}))(BSA)}$

e.g. $\frac{(115)(2400)(1.73)}{(3.5)(24X60)(2.02)} = \frac{(276000)(1.73)}{(5040)(2.02)} = \frac{(477480)}{(10180.8)} = 46.9 = 47$

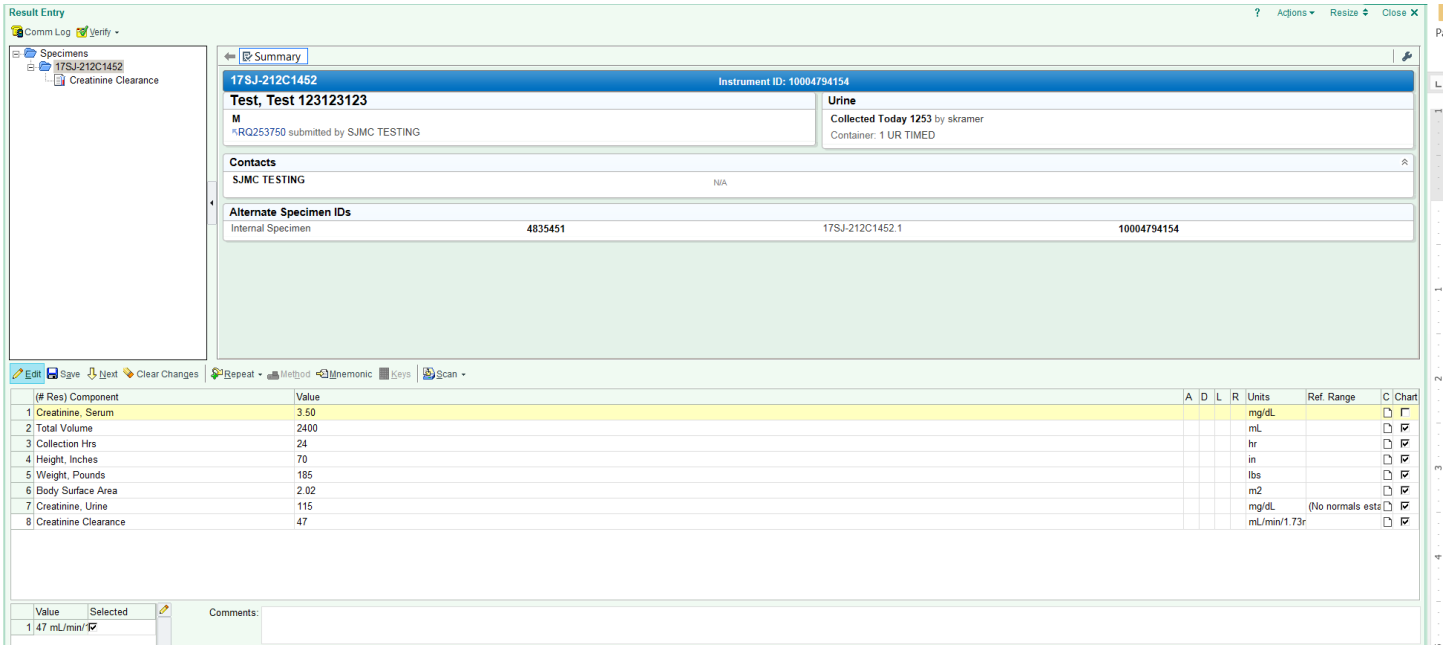
Where:	**TEST**
CRE CL = Creatinine Clearance in mL/min	
CRE_U = Urine Creatinine in mg/dL	**CRE U**
VOL = Total Volume in mL	**TOTAL VOLUME**
1.73 = Standard Body Surface Area in m^2	**---------**
CRE_S = Serum Creatinine in mg/dL	**CRE S**
T = Elapsed time of collection in minutes	**HRS COLLECTION** (enter hrs in LIS)
BSA = patient body surface area in m^2	**BSA**

Result the Serum Creatinine first and verify and the result should populate into the Creatinine Clearance:

If the Urine volume, Weight, and Height was entered it will auto populate into the test.



Creatinine value auto populated into Creatinine Clearance:



USE HT-WT TABLE TO OBTAIN PATIENT'S BSA OR CALCULATE IT USING THE DUBOIS FORMULA

NOTE: The blood specimen for CRE S may be unavailable for testing at the time that the urine specimen is received for CRE CL UR testing. Look for any CRE S result less than or equal to 24 hours old in LIS. If there aren't any CRE S, order a Follow up with Client Services, requesting doctor's input. Depending on how patient's CRE S has been running, we may be able to use a CRE S value that is older than 24 hours.

15. CREATININE URINE TIMED

$$\text{CRE UT} = \frac{(CRE\_U)(TOT\_VOLUME)}{100} \quad \text{e.g.} \quad \frac{(115)(1800)}{100} = \frac{(207000)}{100} = 2070$$

Where:	**TEST**
CRE UT = urine creatinine in mg/24 hr	**CRE UT**
CRE_U = urine creatinine in mg/dL	**CRE U**
TOT_VOLUME = volume of urine collected in mL	**TOTAL VOLUME**

NOTE: **CREATININE URINE RANDOM** No calculation involved
CRE UR Random urine sample

Not a timed specimen

No need to order TVOL UT

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16. DILUTION WITH PATIENT SAMPLE- LOW CONCENTRATION

LIPASE, BILIRUBIN DIRECT AND BILIRUBIN TOTAL- Dilution steps

Manufacturer Recommendation is to dilute analyte is with sample a "Known Low Concentration".

Find a patient sample with a known value within reference range see AMR Table.

1. Dilute the analyte with known patient sample (i.e. Lipase 24 U/L).
2. Substract the value of the known ONCE for each part of known used to prepare the dilution.
   - For a 1:2 dilution, you used ONE part of the known so subtract its value ONCE.
   - For a 1:3 dilution you used TWO parts of the known so subtract its value TWICE.

Example: Lipase >400 U/L on initial result.

Note: Upper analytical range is 400 U/L and should be diluted with patient sample with a low lipase (value <30 U/L) to a maximum dilution of X5. Prelim verify the >400 U/L result and proceed with dilution.

A 1:2 dilution is prepared using one part of the unknown and one part of another known low lipase sample (i.e. result known Lipase result of 24 U/L).

The dilution factor of 2 is entered into the analyzer when the testing is programmed for the dilution. The printed result is 512. From that printed result subtract the value of the known low lipase, 24, and the remainder is the final value of the patient concentration = 488.

Edit Prelim result and then, final verify the adjusted Lipase value. NOTE: This example would follow the same process for Bilirubin, Direct and Total.

17. **ELECTROLYTES URINE TIMED (Na, K, Cl)**

$$\text{LYTES UT} = \frac{(ELEC\_U)(TOT\_VOLUME)}{1000}$$

e.g. NA UT = $\frac{(168)(1028)}{1000} = \frac{(172704)}{1000} = 173$

K UT = $\frac{(8)(1028)}{1000} = \frac{(8224)}{1000} = 8$

CL UT = $\frac{(115)(1028)}{1000} = \frac{(118220)}{1000} = 118$

Where:	**TEST**
LYTES UT = Urine Na, K, or CL in mmol/24 hr	**NA U, K U, or CL U**
LYTES U = Urine Na, K, or Cl in mmol/L	**NA U, K U, or CL U**
T VOL = Volume of urine collected in mL	**TOTAL VOLUME**

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18. GLOBULIN RATIO

GLOB R = PROT – ALB

e.g. GLOB R = 6.2 – 4.1 = 2.1

Where:	**TEST**
GLOB R = Globulin ratio in g/dL	**GLOB R**
PROT = Protein in g/dL	**PROT**
ALB = Albumin in g/dL	**ALB**

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19. GLOMERULAR FILTRATION RATE

Due to the complexity of the GFR calculation, we will defer all manual calculations to the technical manager in the event that LIS fails to calculate a patient's GFR.

For more detailed information on how the GFR is utilized in medical treatment, please read the attached article in Appendix A.

20. GLUCOSE, URINE QUANTITATIVE

$$\text{GLU UT} = \frac{(GLU\_U)(TOT\_VOL)}{100}$$

e.g. $\frac{(12)(1028)}{100} = \frac{(12336)}{100} = 123$

Where:	**TEST**
GLU UT = Quantitative Glucose in mg/24 hr	**GLU UT**
GLU U = Glucose in mg/dL	**GLU U**
TOT VOL = Total Volume in ml	**TOTAL VOLUME**

21. GLUCOSE MEAN

GLUC MEAN = (35.60)(HB A1C) – 77.3

e.g. (35.60)(6.1) – 77.3 = (217.16) – 77.3 = 140

Where:	**TEST**
GLUC MEAN = Glucose mean in mg/dL	**GLUC MEAN**
HB A1C = Hemoglobin A1C in %	**HBA1C**

22. INDIRECT BILIRUBIN (FRACTIONATED BILIRUBIN)

BIL F = BIL T – BIL D e.g. BIL F = 7.2 – 1.2 = 6.0 mg/dL

Where:	**TEST**
BIL F = Fractionated/ Indirect Bilirubin in mg/dL	**BIL F**
BIL T = Total Bilirubin in mg/dL	**BIL T**
BIL D = Direct Bilirubin in mg/dL	**BIL D**

23. LOW DENSITY LIPOPROTEIN CHOLESTEROL

$$\text{LDL CH} = \text{CHOL} - (\text{HDL} + \frac{(TRIG)}{(5)})$$

e.g. $\text{LDL CH} = 198 - (56 + \frac{(382)}{(5)}) = 198 - (56 + 76.4) = 198 - (132.4) = 66$

Where:	**TEST**
LDL CH = Low density lipoprotein in mg/dL	**LDL CH**
CHOL = Cholesterol in mg/dL	**CHOL**
HDL = High density lipoprotein in mg/dL	**HDL**
TRIG = Triglycerides in mg/dL	**TRIG**

NOTE:

If the patient's TRIG is 400 or greater, report the LDL CH with Comment added with the phrase code, "LDL". (LIS will auto populated the phrase). Result LDL-HDL R with an "N/A".

24. LOW DENSITY LIPOPROTEIN / HIGH DENSITY LIPOPROTEIN RATIO

$$\text{LDL / HDL R} = \frac{(LDL\_CH)}{(HDL)} \quad \text{e.g.} \quad \frac{(66)}{(56)} = 1.2$$

Where:	**TEST**
LDL = LDL in mg/dL	**LDL**
HDL = HDL in mg/dL	**HDL**

25. MICROALBUMIN CREATININE RATIO

MALB/CRE R = $\frac{(MALB\_U)}{(CRE\_U)}$ X 1000

e.g. $\frac{(MALB\_U)}{(CRE\_U)}$ X 1000 = $\frac{(0.9)}{(138)}$ X 1000 = 0.00652 X 1000 = 7

Where:	**TEST**
MALB/CRE R = Microalbumin creatinine ratio	**MALB/CRE R**
MALB U = Urine microalbumin in mg/dL	**MALB U**
CRE U = Urine creatinine in mg/dL	**CRE U**

NOTE : If MALB U is <0.1, report MALB/CRE with "unable to calculate" (automatically done by LIS)

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26. NEWBORN FRACTIONATED BILIRUBIN

NB BILF = BIL T NB - BIL D e.g. 6.3 – 0.4 = 5.

Where :	**TEST**
NB BILF = Newborn Indirect Bilirubin in mg/dL	**NB BILF**
BIL D = Direct Bilirubin in mg/dL	**BIL D**

NOTE: To compute patient's age in hours, enter patient's date of birth and birth time. For inpatients, look for the birth time and the birthdate in Result Entry (or call Nursery to verify in case of discrepancy). For outpatients, the birth time should already be resulted during the ordering process, otherwise check with client services. Look for the specimen's collection time by looking in the Collection Update section.

If you get "DL" for the direct bilirubin (Bil D) result, it is a value below the instrument's linear range. Report the indirect bilirubin (Bil I NB) with a comment use a phrase code, "calc". "Calc" reads "Unable to calculate due to non-numeric result".

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27. OSMOLALITY

$$\text{OSMO CALC} = 1.86(NA) + \frac{GLUCOSE}{18} + \frac{BUN}{2.8} + 9$$

$$\text{e.g. } + \frac{165}{18} + \frac{68}{2.8} + 9 = 264.12 + 9.17 + 24.28 + 9 = 307$$

Where:	**TEST**
OSMO CALC = Calculated Osmolality in mOsm/K	**OSMO CALC**
NA = Serum or plasma sodium in mmol/L	**NA**
GLUCOSE = Serum or plasma glucose in mmol/L	**GLUCOSE**
BUN = Serum or plasma urea in mmol/L	**BUN**

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28. PERITONEAL CREATININE CLEARANCE

Note: Result the Serum Creatinine first and verify result. Serum Creatinine will be populated into the Peritoneal Creatinine Clearance.

$$\text{CRE CL PT} = \frac{(CRE\_PT)(TOT\_VOL)(1.73)}{(CRE\_S)(T(\text{minutes}))(BSA)}$$

$$\text{e.g. CRE CL PT} = \frac{(150.2)(1858)(1.73)}{(2.2)(1440)(2.12)} = \frac{(279071.6)(1.73)}{(3168)(2.12)} = \frac{(482793.86)}{(6716.16)} = 72$$

Where:	**TEST**
CRE CL PT = Peritoneal creatinine clearance in ml/min	**CRE CL PT**
CRE PT = Peritoneal creatinine in mg/dL	**CRE PT**
CRE S = Serum creatinine in mg/dL	**CRE S**
VOL = Total Volume in mL	T**OTAL VOLUME**
1.73 = Standard Body Surface Area in m^2	--------
T = Elapsed time of collection in minutes	**Hours Collection**(enter hours)

BSA = patient body surface area in m^2	**BSA**

NOTE: The blood specimen for CRE S may be unavailable for testing at the time that the urine specimen is received for CRE CL testing. Look for any CRE S result less than or equal to 24hours old in LIS. If there aren't any CRE S order a follow up for Client Services requesting doctor's input. Depending on how patient's CRE S has been running, we may be able to use a CRE S value that is older than 24 hours.

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29. PERITONEAL UREA CLEARANCE

Note: Result the Serum BUN first and verify result. Serum BUN will be populated into the Peritoneal Creatinine Clearance.

$$\text{UR CL PT} = \frac{(UREA\_PT)(TOT\_VOL)(1.73)}{(BUN\_S)(T(\text{minutes}))(BSA)}$$

$$\text{e.g. } \frac{(80)(1858)(1.73)}{(28)(1440)(2.06)} = \frac{(148640)(1.73)}{(40320)(2.06)} = \frac{(257147.2)}{(83059.2)} = 3.10$$

Where:	**TEST**
UR CL PT = Peritoneal creatinine clearance in ml/min	**UR CL PT**
UREA PT = Peritoneal creatinine in mg/dL	**UREA PT**
BUN S = Serum BUN in mg/dL	**BUN Serum**
VOL = Total Volume in mL	**TOTAL VOLUME**
1.73 = Standard Body Surface Area in m^2	--------
T = Elapsed time of collection in minutes	**Hours Collection** (enter hours)
BSA = patient body surface area in m^2	**BSA**

HELPFUL HINT: Program all UR CL PT manually on the DXC as "serum". The test will run automatically as "urine" if barcode is read by the DXC.

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30. PHOSPHOROUS URINE TIMED

$$\text{PHOS UT} = \frac{(PHOS\_U)(TOT\_VOLUME)}{100}$$

e.g. $\frac{(28)(1860)}{100} = \frac{(52080)}{100} = 521$

Where:	**TEST**
PHOS UT = Urine Phosphorous in mg/24 hr	**PHOS UT**
PHOS_U = Urine Phosphorous in mg/dL	**PHOS U**
TOTAL_VOLUME = volume of urine collected in mL	**TOTAL VOLUME**

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31. PROTEIN URINE TIMED

$$\text{PROT UT} = \frac{(PROT\_U)(VOL)}{100{,}000} = \frac{(18)(1850)}{100{,}000} = \frac{(33300)}{100{,}000} = 0.333$$

Where:	**TEST**
PROT UT = Urine Protein in g/24 hr	**PROT UT**
PROT_U = Urine Protein in mg/dL	**PROT U**
VOL = Urine Total Volume in mL	**TOTAL VOLUME**

NOTE: When the DXC turns out a "Suppressed LO" mTP value, report it as PROT U <6 in LIS. Enter a comment, under PRT UC with phrase, "calc," which reads "unable to calculate due to non-numeric value".

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32. FREE THYROXINE INDEX (FTI)

$$\text{FTI} = T4\frac{(Tuptake)}{40.0}$$

$= 8.5 \text{ X } \frac{27.6}{40.0} = 8.5 \text{ X } 0.69 = 5.9$

Where:	**TEST**
FTI = Free Thyroxine Index in g/24 hr	**FTI**
T4 = Thyroxine	**T4**
TU = T Uptake	**T Uptake**

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33. TOTAL IRON BINDING CAPACITY

TIBC = TRAN IBC * 1.4

e.g. 70 * 1.4 = 98L

FE %SAT = $\frac{(IRON)}{(TIBC)}$ X 100 e.g. FE % SAT = $\frac{(238)}{(98)}$ X 100 = 243

Where:	**TEST**
TIBC = Total Iron Binding Capacity in mcg/dL	**TIBC**
IRON = Total Iron in mcg/dL	**IRON**
FE % SAT = Percent Iron Saturation	**% FE SAT**

Note:
If, TRAN is <70, TIBC and FE %SAT should have no result and comment added by LIS, “unable to calculate”.

If, IRON is <5 mcg/dL, TIBC and FE %SAT should have no result and comment added by LIS, “unable to calculate”.

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34. UREA CLEARANCE

UREA CL = $\frac{(UREA\_U)(VOL)(1.73)}{(BUN)(T)((BSA)}$

e.g. $\frac{(45)(2050)(1.73)}{(15)(1440)((2.02)} = \frac{(159592.5)}{(43632)} = 3.66$

Where:	**TEST**
UREA CL = Urea Clearance in ml/min	**UR CL CALC**
UREA_U = Urine Urea in mg/dL	**UREA U**
VOL = Total Volume in mL	**TOTAL VOLUME**
1.73 = Standard Body Surface Area in m^2	**------**
BUN = Serum Urea (BUN) in mg/dL	**BUN**
T = Elapsed time of collection in minutes	**HOUR COLLECTION** (enter hrs in LIS)
BSA = patient body surface area in m^2	**BSA**

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35. UREA REDUCTION RATIO

Note: BUN PRE should be resulted first for calculation to work correctly.

URR = $\frac{(BUN\_PRE) - (BUN\_POST)}{BUN\_PRE}$ x 100

e.g. $\frac{(78) - (15)}{78}$ x 100 = $\frac{(63)}{78}$ x 100 = 0.81 x 100 = 81

Where:	**TEST**
URR = Urea Reduction Ratio in %	**UREA RR**
BUN_PRE = Pre-dialysis BUN in mg/dL	**BUN PRE**
BUN_POST = Post-dialysis BUN in mg/dL	**BUN POST**

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36. UREA URINE TIMED

$$\text{UREA UT} = \frac{(UREA\_U)(VOL)}{100{,}000}$$

$$\text{e.g. } \frac{(480)(2580)}{100{,}000} = \frac{(1238400)}{100{,}000} = 12$$

Where:	**TEST**
UREA UT = Urine Urea in g/24 hr	**UREA UT**
UREA_U = Urine Urea in mg/dL	**UREA U**
VOL = Urine Total Volume in mLs	**TOTAL VOLUME**

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37. URIC ACID URINE TIMED

$$\text{URC UT} = \frac{(URIC\_U)(TOT\_VOLUME)}{100}$$

$$\text{e.g. } \frac{(20.2)(1880)}{100} = \frac{(37976)}{100} = 380$$

Where:	**TEST**
URC UT = Urine Uric Acid in mg/24 hr	**URC UT**
URIC_U = Urine Uric Acid in mg/dL	**URIC U**
TOT_VOLUME = volume of urine collected in mL	**TOTAL VOLUME**
