Guidelines for Specimen Dilutions Technical Procedure 3045

## Purpose

To define minimum volumes of sample and diluent for the first manual dilution for each analyte, subsequent manual dilution ratios and maximum dilution ratios that can be used to obtain analyte results.

## Procedure

When manual dilutions are required to obtain a result, use the following guidelines:

1. Determine which dilution factor to use by looking at the error codes for the analyte in Remisol. Refer to the following manual dilution tables for the dilution factor, minimum sample volume and diluent volume to use for the analyte(s) being diluted. Do not over-dilute or under-dilute. The “raw” diluted value should be in the middle 50% of the AMR (25% - 75% of the AMR). Dilutions should not be run with the ORDAC function. Serial dilutions should be avoided, with the exception of Methotrexate.
2. Program the dilution for the analyte needing a dilution in Remisol. The Remisol barcode printer will print a label after the dilution is programmed.
3. Label a container with the barcode label generated for the programmed dilution.
4. Always confirm the name and sample ID number of the specimen.
5. Take sample for dilution(s) from the primary tube whenever possible.
6. Make appropriate dilution with recommended diluent stated in the analyte procedure.
7. Only use the following calibrated MLA pipettors for making dilutions:

   25 µL

   50 µL

   100 µL

   200 µL

   250 µL

   300 µL

   500 µL

   1000 µL

8. For the maximum dilution (X201) a 5 mL volumetric pipet may be used for the diluent

A few analytes may require an off-line dilution (ex. low phosphorus, low suppressed urine Na, some TDMs). Refer to the specific analyte procedure for recommended dilutions and required calculations.

## Manual Dilution Tables

DxI Immunoassays

| Analyte | Dilution Ratio | Sample Volume | Diluent Volume |
|---|---|---|---|
| Digoxin | X2 | 200 µL | 200 µL |
| E2 (Estradiol) | X2 | 100 µL | 100 µL |
| PTH, PTHIO | X10 | 50 µL | 450 µL |
| TSH | X5 | 100 µL | 400 µL |

Centaur Immunoassays

| Analyte | Dilution Ratio | Sample Volume | Diluent Volume |
|---|---|---|---|
| Ferritin | X21 | 25 µL | 500 µL |
| Ferritin | X41 | 50 µL | 2000 µL |
| Ferritin | X61 | 50 µL | 3000 µL |

DxC Chemistries

| Analyte | Dilution Ratio | Sample Volume | Diluent Volume |
|---|---|---|---|
| MC Chemistries | | | |
| CO2 | X2 | 50 µL | 50 µL |
| CO2 | X3 | 50 µL | 100 µL |
| Calcium | X2 | 50 µL | 50 µL |
| BUN, Glucose | X3 | 50 µL | 100 µL |
| BUN, Glucose | X6 | 50 µL | 250 µL |
| Crea, Phos, ALB, TP | X2 | 50 µL | 50 µL |
| Crea, Phos, ALB, TP | X3 | 50 µL | 100 µL |
| Phos | X4 | 100 µL | 300 µL |
| Enzymes | | | |
| ALP, ALT, AMY, AST, CK, GGT, LD, LIP | X2 | 50 µL | 50 µL |
| ALP, ALT, AMY, AST, CK, GGT, LD, LIP | X3 | 50 µL | 100 µL |
| ALP, ALT, AMY, AST, CK, GGT, LD, LIP | X6 | 50 µL | 250 µL |
| ALP, ALT, AMY, AST, CK, GGT, LD, LIP | X11 | 50 µL | 500 µL |
| ALP, ALT, AMY, AST, CK, GGT, LD, LIP | X21 | 25 µL | 500 µL |
| ALP, ALT, AMY, AST, CK, GGT, LD, LIP | X41 | 50 µL | 2000 µL |
| ALP, ALT, AMY, AST, CK, GGT, LD, LIP | X61 | 50 µL | 3000 µL |
| ALP, ALT, AMY, AST, CK, GGT, LD, LIP | X81 | 50 µL | 4000 µL |
| ALP, ALT, AMY, AST, CK, GGT, LD, LIP | X101 | 50 µL | 5000 µL |
| AMY, CK | X201 | 25 µL | 5000 µL |
| Lipid Tests | | | |
| CHOL, TRIG | X2 | 50 µL | 50 µL |
| CHOL, TRIG | X3 | 50 µL | 100 µL |
| CHOL, TRIG | X6 | 50 µL | 250 µL |
| CHOL, TRIG | X11 | 50 µL | 500 µL |
| CHOL, TRIG | X21 | 25 µL | 500 µL |
| HDLD, LDLD | X2 | 50 µL | 50 µL |
| HDLD, LDLD | X3 | 50 µL | 100 µL |

DxC Chemistries - continued

| Analyte | Dilution Ratio | Sample Volume | Diluent Volume |
|---|---|---|---|
| Miscellaneous CC Tests | | | |
| DBIL, FE, ETOH, LACT, MG, TBIL, SALY | X2 | 50 µL | 50 µL |
| DBIL, FE,ETOH, LACT, MG, TBIL, SALY | X3 | 50 µL | 100 µL |
| DBIL, ETOH, LACT, MG, TBIL, SALY | X6 | 50 µL | 250 µL |
| AMMONIA, TRANSF | X2 | 50 µL | 50 µL |
| URIC | X2 | 50 µL | 50 µL |
| URIC | X3 | 50 µL | 100 µL |
| URIC | X6 | 50 µL | 250 µL |
| Therapeutic Drugs | | | |
| ACTM, CAR, PHE, TOB, VPA, GEN | X2 | 50 µL | 50 µL |
| CAR, PHE, TOB, VPA, GEN | X3 | 50 µL | 100 µL |
| CAR, PHE, TOB, VPA, GEN | X6 | 50 µL | 250 µL |
| CAR, PHE, VPA, GEN | X11 | 50 µL | 500 µL |
| Immunology Tests | | | |
| C3, C4, HPT, IgA, IgG, IgM, PAB | X2 | 50 µL | 50 µL |
| C3, C4, PAB | X3 | 50 µL | 100 µL |
| C3, C4, PAB | X6 | 50 µL | 250 µL |
| C3, C4, PAB | X11 | 50 µL | 500 µL |
| Urine Chemistries | | | |
| Urine - Ca, Phos, M-TP, MA, UN, Uric | X2 | 50 µL | 50 µL |
| Urine - Ca, Phos, M-TP, MA, UN, Uric | X3 | 50 µL | 100 µL |
| Urine - Ca, Phos, M-TP, MA, UN, Uric | X6 | 50 µL | 250 µL |
| Urine - Ca, Phos, M-TP, MA, UN, Uric | X11 | 50 µL | 500 µL |
| Urine - Ca, Phos, M-TP, MA, UN, Uric | X21 | 25 µL | 500 µL |
| Urine - M-TP | X41 | 50 µL | 2000 µL |
| Urine - M-TP | X61 | 50 µL | 3000 µL |
| Urine - Crea | X2 | 50 µL | 50 µL |
| Urine - Crea | X3 | 50 µL | 100 µL |
| Urine - Crea | X6 | 50 µL | 250 µL |
| CSF Chemistries | | | |
| CSF Glucose | X2 | 50 µL | 50 µL |
| CSF Glucose | X3 | 50 µL | 100 µL |
| CSF Glucose | X6 | 50 µL | 250 µL |
| CSF Protein | X2 | 50 µL | 50 µL |
| CSF Protein | X3 | 50 µL | 100 µL |
| CSF Protein | X6 | 50 µL | 250 µL |
| CSF Protein | X11 | 50 µL | 500 µL |
| CSF Protein | X21 | 25 µL | 500 µL |

Methotrexate Serial Dilutions

| Dilution Ratio | Volume 1 | Diluent Volume |
|---|---|---|
| X10 | 50 µL sample | 450 µL saline |
| X100 | 50 µL x10 dilution* | 450 µL saline |
| X1000 | 50 µL x100 dilution* | 450 µL saline |

* Dilutions should be well-mixed with a transfer pipette prior to using the diluted sample for the next dilution. Refer to the Methotrexate Technical Procedure 3146 for further information.

| Prepared By | Date Adopted | Supersedes Procedure # |
|---|---|---|
| Michael Inn | 12/03/2012 | New |

| Revision Date | Type of Revision | Revised by | Review/Annual Review Date | Reviewed By |
|---|---|---|---|---|
| | | | 12/04/2012 | G. Kost |
| | | | 11/20/2013 | G. Kost |
| 07/10/2014 | update | | 07/23/2014 | L. Howell |
| | | | 08/28/2015 | J. Gregg |
| 12/15/2016 | Added MTX serial dilutions, minor update | kdagang | 12/22/2016 | N. Tran |
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