|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Performing Urinalysis** | | | | | | | | |
| **Purpose** | This procedure provides instructions for PERFORMING URINALYSIS.  The following dipstick tests can be ordered separately but resulted while performing the Urinalysis procedure; UALB (Albumin), UBL (Blood), UG (Glucose), UKE (Ketones), URPH (pH), USG (Specific Gravity). | | | | | | | |
| **Principle** | Urinalysis includes the physical and chemical analysis of urine as well as the microscopic examination of urinary sediment after concentration. | | | | | | | |
| **Clinical Significance** | Urinalysis test results are used to:   1. Aid in the diagnosis of disease. 2. Screen a population for asymptomatic, congenital/hereditary disease. 3. Monitor the progress of disease. 4. Monitor the effectiveness or complications of therapy. 5. Monitor wellness. | | | | | | | |
| **Policy Statements** | * This procedure applies to all laboratory technologists, section supervisor, and pathologist. | | | | | | | |
| **Materials** | **Equipment** | | | **Reagents** | | | **Supplies** | |
|  | * SIEMENS Clinitek Advantus™ Chemistry Analyzer * Microscope - bright field with 10x and 40x  Nikon E4000 microscope:  1. Analyzer Y-IA inserted in body of microscope 2. Polarizer with lambda-plate (see [Illustration A – Y-IA Analyzer and Polarizer with Lambda Plate](http://khan.childrensmn.org/Manuals/Lab/SOP/UA/Res/200663.pdf)) | | | * SIEMENS Multistix® 10 SG Reagent Strips:  1. No preparation of reagents is required. 2. Each strip is stable and ready to use when removed from the bottle. 3. Initial and date the reagent bottle when opened. 4. The strips are read on the ClinitekAdvantus™ instrument and may also be read visually. 5. Store reagent strips at room temperature (15°-30° c [59°-86° f]) and out of direct sunlight. 6. Do not freeze. 7. Do not remove the desiccant from the bottle. 8. Do not touch the test areas of the reagent strips. 9. To avoid exposure to moisture, close vial immediately after removal of a strip. 10. Strips are stable in the original capped vial until listed expiration date. 11. 25% HCl, 500ml bottle (Ricca Chemical Co. Cat. # 3577-16)  * Use as is, pour off amount needed * Reagent stability is maintained the same as the original bottle  1. 10% NaOH, 500ml bottle (Ricca Chemical Co. Cat. # 7260-16)  * Use as is, pour off amount needed * Reagent stability is maintained the same as the original bottle | | | * Distilled water * 2mL plastic transfer pipettes * Kova Glasstic Slide * Clinitek printer paper * 12 mL plastic centrifuge tubes marked with 12 mL, 10 mL, 2.5 mL, 1 mL and 0.25 mL markings | |
| **Sample** | 1. Acceptable specimens: 2. 10.0 mL of urine in a clean plastic container with screw cap, preferably first morning specimen 3. Label must be placed on the urine container (not lid) 4. Send to lab within 30 minutes 5. If testing is delayed for more than one hour, refrigerate  * Refrigeration provides adequate preservation for most chemical components with the exception of bilirubin and urobilinogen * Refrigeration may cause precipitation of amorphous urates or phosphates which may obscure the microscopic field * Allow the urine specimen to return to room temperature before testing * If the urine needs to be cultured, it should be refrigerated during transit and held refrigerated until cultured.  1. A minimum of 5.0 mL of urine is needed for Multistix® and spun microscopic 2. A minimum of 1.0 mL of urine is needed for Multistix® and unspun microscopic  * Prioritize the tests if the amount of urine is 2.0 ml or less: * Culture first if ordered * Multistix®: do confirmatory tests if volume permits. * Do unspun microscopic using Kova Glasstic® slide and append the appropriate comment * Append “-;MICP” (microscopic on unspun urine) to appearance  1. At physician request samples delayed in arriving at the lab will be tested, attach an appropriate comment  * Append: “-DELA” (specimen delayed in transport)  1. Unacceptable specimens: 2. Unlabeled 3. Labeled incorrectly 4. Specimens collected in a diaper 5. Specimens contaminated with feces 6. Specimens not refrigerated within one hour of collection 7. Notify unit/physician when a specimen is unacceptable; credit test in the computer (OER). | | | | | | | |
| **Limitations** | Multistix® 10 SG Limitations:  NOTE: Substances that cause abnormal urine color, such as drugs containing azo dyes (e.g. Pyridium, Azo Gantrisin, Azo Gantanol) nitrofurantoin (Macrodantin, Furadantin) riboflavin, and grossly bloody samples may affect the readability of reagent areas on urinalysis reagent strips. The color development on the reagent pad may be masked, or a color reaction may be produced on the pad that could be interpreted as a false positive.   1. Glucose:  * Ascorbic acid concentration of 50 mg/dL or greater may cause false negatives in specimens containing small amounts of glucose (75-125 mg/dl). * Ketone bodies reduce the sensitivity of the test; moderately high ketone levels (40 mg/dl) may cause false negatives for specimens containing small amounts of glucose (75-125 mg/dl) but the combination of such ketone levels and low glucose levels is metabolically improbable in screening. * The reactivity of the glucose test decreases as the specific gravity of the urine increases. * Reactivity may also vary with temperature.  1. Bilirubin:  * Indican (Indoxyl sulfate) can produce a yellow-orange to red color response that may interfere with the interpretation of a negative or a positive bilirubin reading. * Metabolites of Lodine (Etodalac) may cause false positive or atypical results. * Ascorbic acid concentrations of 25 mg/dL or greater may cause false negatives.  1. Ketones:  * False positive results (Trace or less) may occur with highly pigmented urine specimens or those containing large amounts of levodopa metabolites. * Compounds such as mesna (2-mercaptoethane sulfonic acid) that contain sulfhydryl groups may cause false positive results or an atypical color reaction.  1. Specific Gravity:  * The chemical nature of the Bayer SG test may cause slightly different results from those obtained with other specific gravity methods when elevated amounts of certain urine constituents are present. * Highly buffered alkaline urines may cause low readings relative to other methods. * Elevated specific gravity readings may be obtained in the presence of moderate quantities (100-750 mg/dL) of protein.  1. Blood:  * Elevated specific gravity may reduce the reactivity of the blood test. * Capoten (captopril) may also cause decreased reactivity. * Certain oxidizing contaminants, such as hypochlorite, may produce false positive results. * Microbial peroxidase associated with urinary tract infection may cause a false positive reaction. * Levels of ascorbic acid normally found in urine do not interfere with this test.  1. pH:  * If proper procedure is not followed and excess urine remains on the strip, a phenomenon known as "runover" may occur, in which the acid buffer from the protein reagent will run onto the pH area, causing a false lowering of the pH result. | | | | | | | |
|  | 1. Protein:  * False positive results may be obtained with highly buffered or alkaline urines. * Contamination of the urine specimen with quaternary ammonium compounds (e.g., from some antiseptics and detergents) or with skin cleansers containing chlorhexidine may also produce false positive results.  1. Urobilinogen:  * The reagent area may react with substances known to interfere with Ehrlich's reagent, such as p-aminobenzoic acid. * False negative results may be obtained if formalin is present. * Strip reactivity increases with temperature; the optimum temperature is 22-25°C. * The test is not a reliable method for the detection of porphobilinogen. * The absence of urobilinogen cannot be determined with this test.  1. Nitrite:  * Pink spots or pink edges should not be interpreted as a positive result. * Any degree of uniform pink color development should be interpreted as a positive nitrite test suggesting the presence of 105 or more organisms per ml, but color development is not proportional to the number of bacteria present. * A negative result does not in itself prove that there is no significant bacteriuria. * Negative results may occur when urinary tract infections are caused by organisms that do not contain reductase to convert nitrate to nitrite; when urine has not been retained in the bladder long enough (four hours or more) for reduction of nitrate to nitrite to occur; or when dietary nitrate is absent, even if organisms containing reductase are present and bladder incubation is ample. * Sensitivity of the nitrite test is reduced for urines with high specific gravity. * Ascorbic acid concentrations of 25 mg/dl or greater may cause false negative results with specimens containing small amounts of nitrite ion (0.06 mg/dL or less).  1. Leukocytes:  * Elevated glucose concentrations (3 g/dl) or high specific gravity may cause decreased test results. * The presence of Cephalexin (Keflex) Cephalothin (Keflin) or high concentrations of oxalic acid may also cause decreased reactivity, and high levels of the drug may cause a false negative reaction. | | | | | | | |
| **Quality Control** | 1. Quantify Control System manufactured by Bio-Rad Vendor Item # BR 975 (Cardinal Health): 2. Two levels, positive and negative 3. Data is recorded on the quality control sheet, daily 4. Expected values are highlighted on the QC sheet 5. Bulk control vials are stored in refrigerator, stable until date on label 6. Open vials stored at room temperature in the dark are stable for 31 days. 7. Label opened vials with date and initials 8. Controls should be room temperature before running 9. Controls are to be run under the following conditions: 10. Once every 24 hours 11. When a fresh container of reagent strips is opened 12. Once in parallel with each lot number change, document in QC log book 13. Whenever test results are questionable   **The Clinitek Advantus™ will not operate if acceptable QC values are not obtained every 24 hours. If 24 hours has passed since QC was last run the user will be prompted to run QC again.**   1. Handle control in same manner as patient sample: 2. From ready/run screen, select menu key. 3. Then touch the control key. 4. Enter lot # of control as ID #. 5. Apply control solution to Multistix strip, making sure all reagent pads are wet. 6. Press the enter symbol. 7. With the pushbar to the right, place the reagent strip on the loading station, to the right of the arrow and against the rear wall of the platform. 8. Reagent strip will automatically advance and results will then print. 9. Record results on QC sheets. 10. If controls fall outside stated values, the following sources of error may have occurred: 11. Improper technique or instrument setup:  * Be sure that the reagent strip you are using corresponds to the reagent strip name on the touch screen. * Carefully repeat the test. * Check procedure as described above.  1. Deterioration of the reagent strip test areas due to exposure or light, ambient moisture or heat:  * Obtain a fresh bottle of reagent strips, repeat. * If fresh reagent strips fail to give results within the expected values, proceed to sub-step C (below).  1. Deterioration of the control solution:  * Open a fresh control bottle, repeat test. * If fresh solution fails to give results within the expected values, proceed to sub-step D (below).  1. ClinitekAdvantus™ instrument malfunction:  * Perform an initial instrument check procedure * If the initial instrument check or the instrument/reagent strip performance check procedures cannot be successfully completed and an instrument malfunction or reagent strip problem is suspected, see TROUBLESHOOTING section, or contact the Customer Service Department for assistance  1. Do not report patient results if the QC fails and cannot be brought into range. | | | | | | | |
| **Calibration** | Calibration is automatically performed each time a reagent strip is analyzed on the Clinitek Advantus™. | | | | | | | |
| **Special Safety Precautions** | **Warning re: SIEMENS Multistix® 10 SG Reagent Strips:**  Warning – Toxic. Contains one or more of the following chemicals: Phenol, diazonium salt, nitroferricyanide. Avoid contact with skin and mucous membranes. Flush affected areas with copious amounts of water. Get immediate medical attention for eyes or if ingested.  **Warning re: 25% HCL (hydrochloric acid):**  Warning: Strong acid. Avoid contact with skin and mucous membranes. Wear skin and eye protection. Flush affected areas with copious amounts of water. Get immediate medical attention for eyes or if ingested. DO NOT induce vomiting.  **Warning re: 10% NaOH (sodium hydroxide):**  Warning Caustic. Avoid contact with skin and mucous membranes. Wear skin and eye protection. Flush affected areas with copious amounts of water. Get immediate medical attention for eyes or if ingested. DO NOT induce vomiting. | | | | | | | |
| **Procedure** | Follow the activities in the table below for PERFORMING URINALYSIS. | | | | | | | |
|  | **Part One: Macroscopic Procedure** | | | | | | | |
|  | **Step** | **Action** | | | | | | **Related Document** |
|  | 1.1 | Inspect platform and push bar position; check for cleanliness. If either appears dirty, clean. | | | | | |  |
|  | 1.2 | Interaction between the Clinitek Advantus™ and the operator is through a touch screen. Do not use anything hard or pointed on the touch screen. If screen saver is displayed, touch screen to access the ready/run screen. | | | | | |  |
|  | 1.3 | With the handheld scanner, scan patient barcode from specimen label. This will automatically enter patient ID# and accession number. | | | | | |  |
|  | 1.4 | Pour 10 mL of patient specimen into a conical tube. | | | | | |  |
|  | 1.5 | Note color of specimen and scan the appropriate barcode into the Clinitek Advantus™ with the handheld scanner. | | | | | |  |
|  | 1.6 | Note clarity of well-mixed specimen through an optically clear tube in front of a light source and scan the appropriate barcode into the Clinitek Advantus™. See [Table D – Clarity Definitions](http://khan.childrensmn.org/Manuals/Lab/SOP/UA/Res/200667.pdf). | | | | | |  |
|  | 1.7 | Immerse all reagent areas of a Multistix® 10 SG Reagent Strip in fresh, well-mixed, uncentrifuged urine. | | | | | |  |
|  | 1.8 | Remove the strip immediately. Run the edge of the strip against the side of the urine container to remove excess urine. DO NOT blot the edge of the strip against a paper towel. | | | | | |  |
|  | 1.9 | Press the Enter symbol. The push bar will move to the left. | | | | | |  |
|  | 1.10 | Place the reagent strip with reagent areas facing up onto the supports of the loading station, just to the right of the embossed arrow. The end of the reagent strip should be against the rear wall the platform. | | | | | |  |
|  | 1.11 | The instrument will detect the strip, which will activate the timing and movement functions. The strip is moved along the platform, analyzed, and moved into the waste bin. | | | | | |  |
|  | 1.12 | The results will print out and will crossover into Sunquest. | | | | | |  |
|  | **Part Two: Microscopic Procedure** | | | | | | | |
|  | 2.1 | If any of the following criteria are met, a microscopic examination of the urine is required:   1. Appearance: any turbidity 2. Blood: positive 3. Nitrite: positive 4. Leukocyte esterase positive 5. Albumin/protein: positive 6. Specific request from an attending physician | | | | | |  |
|  | 2.2 | Pour 10.0 mL, well mixed urine into a Kova-type centrifuge tube. Centrifuge 5 minutes at 2,200 rpm. | | | | | |  |
|  | 2.3 | Remove 9.0 mL of the supernatant. | | | | | |  |
|  | 2.4 | With a disposable plastic transfer pipette or Kovapette, mix supernatant with cell button thoroughly. | | | | | |  |
|  | 2.5 | With a plastic transfer pipette or Kovapette, add a small amount of urine to one of the wells on a Glasstic® slide; avoid bubbles. | | | | | |  |
|  | 2.6 | Place on microscope stage; focus under 10x. | | | | | |  |
|  | 2.7 | Under low power, examine at least ten fields, look for casts and crystals:   1. Quantitate casts and crystals under low power 2. Identify and quantitate epithelial cells, yeast and WBC clumps | | | | | |  |
|  | 2.8 | Under high power, examine at least ten fields, look for RBCs and WBCs:   1. Quantitate RBCs and WBCs 2. Report the lowest number of cells observed to the highest number of cells observed (example 0 – 3, 0 - 5, 5 - 10, 10 – 25, 25 – 50, 50 - 100) 3. Identify casts and crystals 4. Quantitate bacteria and mucous | | | | | |  |
|  | 2.9 | Report crystals, epithelial cells (squamous, transitional or renal), bacteria, mucus, yeast, and WBC clumps as rare, few, moderate or many. | | | | | |  |
|  | 2.10 | When you have completed the urinalysis, dispose of the sample down the drain of a “dirty” sink. | | | | | |  |
|  | **Part Three: Crystal Identification (Nikon E4000 Microscope)** | | | | | | | |
|  | 3.1 | Prepare the microscope:   1. Push the insertion/removal knob towards the microscope. 2. Place the polarizer with lambda-plate over the filter holder of the field lens unit on the base of the microscope so that the Nikon mark on the polarizer can be read upright. 3. Swing the polarizer’s lambda-plate out of the optical path. 4. Remove an eyepiece from the eyepiece tube.   ~AUT0004   1. Look through the open eyepiece tube:  * Turn the polarizer on the filter holder until a dark cross image appears on the exit pupil of the objective, * Fix the polarizer in position by tightening the polarizer clamp screw.  1. Return the eyepiece and the lambda-plate back to their original positions.    * Confirm that the view field turns a reddish-purple when the lambda-plate rotation lever is turned as far as it will go to the left and then to the right. | | | | | |  |
|  | 3.2 | Standard:   1. Cystine crystals are used to exhibit birefringence. Cystine crystals appear blue or yellow under the retardation plate depending on the crystal orientation. 2. A positive cystine control slide is stored with the polarizer with lambda plate. | | | | | |  |
|  | 3.3 | Procedure:   1. Clean slide/coverslip with methanol, air dry. 2. Prepare wet mount by placing one drop of urine on the slide, coverslip**.** NOTE: Fluid should just fill in under the coverslip, not float it. 3. Swing the polarizer’s lambda plate out of the optical path. The viewfinder turns dark. 4. Place wet mount on microscope stage. 5. Focus wet mount so that WBCs can be clearly seen. The specimen will appear as a bright image in the dark view field. 6. Turn up intensity of light source for better contrast. 7. Crystals appear white against black background. 8. If crystals are observed, swing the lambda plate into the optical path. 9. Identify the crystals using polarizing characteristics and reference books. | | | | | |  |
| **Procedure Notes** | 1. Because the pH of freshly excreted urine does not reach a pH of 9 in normal or abnormal conditions, a pH of 9.0 is associated with an improperly preserved specimen and indicates that a fresh specimen should be obtained to ensure the validity of the results.   The following code will be appended to results as a comment that suggests collecting a fresh sample;   * 1. QPH – Specimen quality questionable due to high pH, suggest recollect.  1. Do not concentrate quantities of less than 5.0 mL. 2. Straw is the same as pale yellow. 3. The directions must be followed exactly.  * Accurate timing is essential to obtain optimal results. * The ClinitekAdvantus™ instrument will read the test strips at the appropriate time intervals. * If excessive liquid is left on the ID band portion of the dipstick or in instances where a dark or pigmented urine is being analyzed an error message may be generated. Repeat testing with a new dipstick, taking care not to get any urine on the ID band portion of the dipstick.  1. Cloudy urines can be placed in warm tap water to dissolve possible urate crystals that form on cooling of the urine. 2. Amorphous urates dissolve in 10% NaOH: 3. Add one drop of NaOH to one drop of sediment 4. Watch for clearing of sediment. 5. Amorphous phosphates dissolve in 25% HCl 6. Add one drop of HCl to one drop of sediment 7. Watch for clearing of sediment. 8. Cystine crystals appear as colorless, six-sided (hexagonal) plates. 9. Sides are not always even and may be laminated or layered. 10. The crystals tend to clump. 11. Present primarily in acid urine. 12. They are clinically significant and indicate disease. 13. In consultation with the physician advisory group, Children’s laboratory does not routinely perform testing for reducing substances other than glucose. It has been determined that testing for reducing substances is more appropriately performed as part of a metabolic screen. 14. If urine is grossly bloody, do the following 15. Run urine on the ClinitekAdvantus™, **remember to add an extra number or notation to the** **accession number so it will not autofile.** This will provide results on blood, leukocytes, nitrite and protein. 16. Spin urine for five minutes at 2200 RPM. 17. Pour supernatant into another urine tube. 18. Perform any confirmatory tests that are necessary. 19. Dip a Multistix10SG into the supernatant and place on ClinitekAdvantus™, **again remember to** **modify the accession number so it will not autofile.** 20. This will provide results on specific gravity, glucose, bilirubin, ketone, pH and urobilinogen without any interference’s from red cells. 21. Label each printout as "spun" or "unspun" and tape both to urine logsheet. 22. For details on reporting in Sunquest see [Document Z - Resulting Grossly Bloody Urines in OEM](http://khan.childrensmn.org/Manuals/Lab/SOP/UA/Res/208420.pdf) 23. Report blood, leukocyte esterase, nitrites, and protein results from unspun tape manually. 24. Report specific gravity, pH, glucose, ketones, bilirubin and urobilinogen results from the “spun” tape manually. 25. Perform microscopic. | | | | | | | |
|  | 1. Specific gravity: Do not test on refractometer.  * Report <05 or >30 in box for results for results which are <1.005 or >1.030.  1. Fluorescent or Contrast dye can be present in urine and may interfere with dipstick results. Chemical results on the dipstick should correlate with microscopic findings. If there are discrepancies please append dipstick results with one of the following codes:  * DYE - contrast dye may be present, may interfere with testing. * INT - ? interfering substance * INTU – due to the presence of an interfering substance, the specimen is unacceptable and cannot be assayed.  1. Expected Results:   NOTE: Expected values for the typical "normal" healthy population and the abnormal population are listed below for each reagent. Exact agreement between visual results and instrumental results might not be found because of the inherent differences between the perception of the human eye and the optical system of the instruments.   1. Glucose:  * The kidney normally excretes small amounts of glucose. * Amounts are usually below the sensitivity of this strip, however, on occasion may produce a color between the negative and the 100 mg/dl color blocks that is interpreted by the instrument as a positive. * Results at the first positive level may be significantly abnormal if found consistently.  1. Bilirubin:  * Normally no bilirubin is detectable in urine by even the most sensitive methods. * Trace amounts of bilirubin are sufficiently abnormal to require further investigation. * Atypical colors (colors that are unlike the negative or positive color blocks shown on the color chart) may indicate that bilirubin-derived bile pigments are present in the urine sample and may be masking the bilirubin reaction.  1. Ketone:  * Normal urine specimens usually yield negative results with this reagent. * Detectable levels of ketone may occur in urine during physiological stress conditions such as fasting, pregnancy and frequent strenuous exercise. * In ketoacidosis, starvation or with other abnormalities of carbohydrate or lipid metabolism, ketones may appear in urine in large amounts before serum ketone is elevated.  1. Specific Gravity:  * Random urines may vary in specific gravity from 1.001 to >/= 1.030. * Twenty-four hour urines from normal adults with normal diets and normal fluid intake will have a specific gravity of 1.016 - 1.022.  1. Blood:  * The significance of the trace reaction will vary among patients, and clinical judgment is required for assessment in an individual case. * Development of green spots (intact erythrocytes) or green color (free hemoglobin/myoglobin) on the reagent area within 60 seconds indicates the need for further investigation. * Blood is often, but not always, found in the urine of menstruating females. * This test is highly sensitive to hemoglobin and thus complements the microscopic examination  1. pH: Both the normal and abnormal urinary pH range is from 5 to 9. | | | | | | | |
|  | 1. Protein:  * Normally no protein is detectable in urine, although the normal kidney excretes a minute amount. * A color matching any block greater than trace indicates significant proteinuria. * For urine of high specific gravity, the test area may closely match the trace color block even though only normal concentrations of protein are present. * Clinical judgment is needed to evaluate the significance of trace results.  1. Urobilinogen:  * The normal urobilinogen range obtained with this test is 0.2 to 1.0 mg/dl (1 mg/dl is approximately equal to 1 Ehrlich Unit/dl). * A result of 2.0 mg/dl represents the transition from normal to abnormal, and the patient and/or urine specimen should be evaluated further.  1. Nitrite:  * Normally no nitrite is detectable in urine. * The proportion of positive nitrite tests in cases of significant infection depends on how long the urine specimens were retained in the bladder prior to collection. * Identification of known positive cases with the nitrite test ranges from as low as 40%, when little bladder incubation occurred, to as high as approximately 80%, when a minimum of four hours of bladder incubation occurred.  1. Leukocytes:  * Normal urine specimens generally yield negative results; positive results (small or greater) are clinically significant. * Individually observed trace results may be of questionable clinical significance; however, trace results observed repeatedly may be clinically significant. * Positive and repeated trace results indicate the need for further testing of the patient and/or urine specimen, according to medically accepted procedures for pyuria. * Positive results may occasionally be found with random specimens from females due to contamination of the specimen by vaginal discharge.  1. Some elements are more easily observed/identified with the aid of polarized light, i.e., crystals, fat, etc. 2. For quantity modifiers, see [Table Y – Quantity Modifier Definitions](http://khan.childrensmn.org/Manuals/Lab/SOP/UA/Res/200668.pdf). 3. For numeric codes for WBCs/RBCs, see [Table Z – Numeric Codes for WBCs and RBCs](http://khan.childrensmn.org/Manuals/Lab/SOP/UA/Res/200669.pdf). 4. DO NOT report RBCs and/or WBCs as "packed”, report >100 (RRG1). 5. Casts have a tendency to locate near the edges, therefore, low power scanning of the edges is recommended. 6. When using bright-field microscopy, care must be taken to reduce the amount of light, because many sediment constituents have a refractive index similar to urine and will not be seen under bright light. 7. When a microscopic is performed on an unspun urine append the appropriate comment:  * “MICP” (microscopic on uncentrifuged urine)  1. If a microscopic is requested by a physician and no elements are present, append:  * Result “-MPNO” (Microscopic performed, no cellular elements present) | | | | | | | |
| **Interpretation/**  **Results/Alert Values** | Color Light yellow to amber  Clarity Clear to slightly cloudy  Specific Gravity Infants 1.002 to 1.006  Adults 1.001 to 1.030  pH: 5.0 to 8.0  Protein Negative  Glucose Negative  Ketone Negative  Blood Negative  Bilirubin Negative  Urobilinogen 0.2 to 1.0 EU/dl  Leukocyte esterase Negative  Nitrites Negative  RBCs 0 - 3/hpf  WBCs 0 - 5/hpf  Epithelial Cells Few ( squamous only )  Casts 0 - 2 hyaline casts/lpf  Crystals few calcium oxalate, few amorphous urates or phosphates  Mucus slight  Bacteria few/hpf  Yeast negative  Microscopic results should be correlated with the physical and chemical findings to ensure the accuracy of the report. To do this, please consult [Table AA – Urine Micro Results Compared to Physical, Chemical, and Other Factors](http://khan.childrensmn.org/Manuals/Lab/SOP/UA/Res/200664.pdf).  **NOTE:** Specimens in which results do not correlate must be rechecked for both technical and clerical errors; however, the amount of formed elements or chemicals must also be taken into consideration, as must the possibility of interference with chemical tests and the age of the specimen. | | | | | | | |
| **Result Reporting** | In Sunquest:    Urinalysis results will autofile in function OEM, device C500M (Mpls.), C500S (St.Paul) if none of the results listed previously in **2.1** **Microscopic Procedure** are met. If the urine is grossly bloody refer to Procedure Notes #10 (h.-j.) above. If any of these results are present on the dipstick a UMIC will be ordered by Sunquest and a Microscopic exam will be performed and resulted by the technologist (see below).   1. Double click the Desktop’s FlexiLab icon 2. Log into Sunquest 3. Click Urinalysis keyboard 4. Click OK if the boxed information is correct (keyboard = URCT) 5. Fill in the sample accession number in the yellow box <CR> 6. Click the OK button in the Loaded Previously Filed Data box 7. Data from the Clinitek Advantus™ appears  * Five results are required USG (specific gravity), URPH (pH), UCOL (color) and UCLA (clarity)  1. Click the QA Review tab  * Sunquest, in the background, reviews the results against rules to:   + - Perform billing UAO     - OR return to the Resulting tab for microscopic results     - UWBC & URBC are required results     - After required results plus other microscopic results are entered     - Click QA Review tab, UAM is billed  1. Click the Save button 2. Enter the next accession number or close the urinalysis keyboard when finished. 3. If it is necessary to credit a urinalysis test take the following steps;   ● If the urine **HAS NOT** been resulted it can be canceled in function OER.  ● If the urine **HAS** been resulted it should be credited in function CRW. For a sample that did not have a microscopic exam performed the test code UAO should be credited. If the urine had a microscopic exam performed the test code UAM should be credited. | | | | | | | |
| **References** | 1. Bayer Multistix® 10 SG Reagent Strips package insert, revised 4/99, Bayer Corporation, Elkhart, IN 46515. 2. Bayer Multistix® 10 SG package insert #1022AD, 1992 Miles Inc., revised 7/93. 3. Chek-Stix Reagent Strips package insert, revised 12/90. Miles Inc., Diagnostics Division, Elkhart, IN 46515. 4. Clinitek® 500 Operating Manual, Second Edition, revised 5/01 Bayer Corporation Inc., Elkhart, IN 46515. 5. Henry, J.B., Clinical Diagnosis and Management by Laboratory Methods, 18th edition, W.B. Saunders Co., Philadelphia, 1991, pp. 419 - 431. 6. Howanitz, P.J., et al., Timeliness of Urinalysis, Arch Path Lab Med, Vol 121:1977, 667-671. 7. Lippman, R., MD, Urine and the Urinary Sediment, Second Edition, 1971. 8. National Committee for Clinical Laboratory Standards. Routine Urinalysis; Proposed Guideline. NCCLS Document GP16-P (ISBN 1-56238-125-3). NCCLS, 771 East Lancaster Avenue, Villanova, PA 19085, 1991. 9. NCCLS Document GP16-T Vol., 12 No. 26, December 1992. 10. Ross, D.L. and Neely, A.E., Textbook of Urinalysis and Body Fluids, Appleton-Century Crofts, Norwalk, Connecticut 1983. 11. Strasinger, S., Urinalysis and Body Fluids, Second Edition, F.A. Davis Co., Philadelphia, 1989, pp. 88 - 103. 12. SIEMENS Clinitek Advantus™ Operators Guide V.1.0 REF 06635228 (133898) Rev. D. 13. [Innovative Urinalysis Test Strips with ID Bands](http://usa.healthcare.siemens.com/point-of-care/poc-overview/innovative-urinalysis-test-strips-id-bands) | | | | | | | |
| **Historical Record** | **Version** | | **Written/Revised by:** | | **Effective Date:** | **Summary of Revisions** | | |
| 1 | | Author unknown | | Unknown | Initial Version | | |
| 2 | | Mpls: Laura Carmack | | 1/1994 | Revised | | |
| 2 | | St. Paul: Mary Ellen Eckhoff | | 1/1993 | Revised | | |
| 3 | | Mpls: Laura Carmack | | 1/1994 | Added microscopic portion | | |
| 3 | | St. Paul: Laura Carmack | | 12/1995 | Updated microscopic to include correlation | | |
|  | 4 | | St. Paul: Tami Haux | | 10/1996 | Updated | | |
|  | 5 | | Jim Berger | | 11/1999 | Merged and revised | | |
|  | 6 | | Laura Rachford | | 5/2001 | Updated for STP conversion to Mysis | | |
|  | 7 | | Merodie Warren | | 1/2003 | Updated for Clinitek 500 and LIS interface | | |
|  | 8 | | Laura Rachford | | 3/2004 | Include crystal identification procedure | | |
|  | 9 | | Al Quigley | | 12/01/10 | Clinitek Advantus Application | | |
|  | 10 | | Al Quigley | | 06/01/11 | Revised, reformatted | | |
|  | 11 | | Al Quigley | | 08/19/14 | Retired confirmatory testing, Eliminated Glucose >1000 being performed microscopically, allowed the autofiling of results. | | |
|  | 12 | | Al Quigley | | 9/23/15 | Reference ranges adjusted to match LIS report. | | |
|  | 13 | | Al Quigley | | 03/07/19 | Specimens with Ph >/= 9.0 will now autofile with QPH comment.  (Procedure notes #1) | | |