

## **Urinalysis - Urine Testing**

### **Specimen Collection**

- The specimen should be fresh and used within the hour unless refrigerated, where it can be kept for up to four hours but must be at room temperature prior to testing.
- Urine should be in a clean container that is free from bleach or other agents.
- Urine should not be centrifuged before testing but should be "stirred" if left for any time.
- Specimens should be disposed of appropriately

### **Urine Testing Procedure**

- Immerse the reagent strip in the specimen and remove momentarily
- Run the edge of the strip against the specimen container to wipe off excess urine
- Time from dipping and compare the colour changes with the chart at the stated intervals
- Hold the strip horizontally to compare colour changes
- Do not read after two minutes have elapsed - colour changes after this time have no clinical significance
- It is suggested that the test is repeated in the event of a positive result.

### **Storage of Urinalysis Reagent Strips**

- Reagent Strips must be stored in the original bottle and within the expiry dates
- Each strip is single use only
- Do not remove desiccant from the bottle
- Open bottle and secure the lid quickly, extracting a strip as it is required
- Store in dry place between 2 and 30 degrees Celsius
- Do not touch the reagent area of the strips
- Dispose of appropriately as waste

## Parameters and Indicators

Whilst we can't all be clinicians, it would be useful to look at the parameters and what a positive result would indicate. There are many possible causes for each reagent positive being present and so the list will be indicative and not exhaustive.

### Protein

Not normally present in urine in high concentrations and normal urine has a low level of albumin. High concentrations can indicate a range of conditions including hypertension, pre-eclampsia, infection and diabetes

### Blood

Should not be present and can indicate a variety of possible causes including injury, renal failure or infection. False positives caused by menstrual blood or bleach in commodes / containers.

### Ketones

Produced by breakdown of fatty acids indicating uncontrolled diabetes or starvation/anorexia.

### Nitrites

Caused by bacteria breaking down nitrates into nitrites. Indicative of infection (UTI).

### Glucose

Should not be present in urine in detectable amounts. If present indicates diabetes mellitus or renal problem. Test is specific for glucose only and no other sugars.

### Urobilinogen + Bilirubin

Urine normally contains no bilirubin and very little urobilinogen. Conjugated bilirubin only appears in urine in the presence of liver disease or bile duct obstructions.

### Leukocytes

Leukocyte esterase: released from white blood cells secondary to bacterial invasion which causes the release of esterase.

### Specific Gravity

Specific gravity: the density of the urine. This is an indication of the relative proportions of dissolved solid components to the total volume of the specimen and reflects the relative degree of concentration or dilution of the specimen. A normal specific gravity is between 1.003-1.025. This is a direct reflection of the concentration ability of the kidneys and fluid status.

### Microalbumin

Presence of microalbumin indicates the presence of the small protein. This is possibly due to diabetes and/or kidney damage. This would require further investigations.

### PH

PH: a demonstration of how the kidneys regulate excretion of non-volatile acids produced by normal metabolic processes. The kidneys maintain a normal acid-base balance by reabsorbing a variable amount of sodium ions by the tubules and tubular secretion of hydrogen and ammonium ion exchange. The acidity of urine is primarily due to acid phosphates with a minor contribution from organic acids, such as lactic acid, pyruvic acid and citric acid. These are excreted in urine as potassium, sodium, calcium, and ammonium salts. A normal pH is 7. A pH < 7 indicates an acid urine and > 7 indicates an alkaline urine. Normal kidneys can produce widely varying pH levels. An acid urine with a pH < 6 can be seen in patients on a high protein diet, in acidosis, uncontrolled diabetes mellitus, and renal tubular acidosis. An alkaline urine may be found either with urinary tract infections or possible bacterial contamination of an old specimen with urea-splitting organisms.