**Examination** 17186

**Phosphate (urine)**

### Purpose of test

The main reason for requesting a urine phosphate
- urinary phosphate analysis is useful in the differential
diagnosis of hyper and hypophosphatemia
- as part of a stone profile

The calculation of the renal tubular reabsorption of
phosphate (TmP/GFR) can be useful in identifying a need
for replacement, monitor recovery of tubules following
damage, monitoring response to growth hormone
replacement, oncogenic osteomalacia and help diagnosis
of some rare tubular diseases ie X-linked
hypophosphatemia rickets

### Sample

Urine

### Sample Tube/Container

**Adults** - preferred sample 24 hour collection bottle (acid
preservative)

**Paediatrics** - 1st morning or random sample

Contact CAH ext 59297 for bottle

Please note that for use in the calculation of TmP/GFR a
paired 24 hour urine and serum for phosphate and
creatinine is required

### Sample Volume

24 hour collection

### Special Precautions

Please note container contains hydrochloric acid
preservative which is corrosive, AVOID CONTACT WITH
SKIN, EYES AND MOUTH

### Biological reference range

<table>
<thead>
<tr>
<th>Sample</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st morning urine</td>
<td>10 - 33 mmol/L</td>
</tr>
<tr>
<td>24 - hour urine</td>
<td>15 - 50 mmol/24h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TmP/GFR</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>0.8 - 1.35mmol/L</td>
</tr>
<tr>
<td>2 - 15yrs</td>
<td>1.15 - 2.44mmol/L</td>
</tr>
<tr>
<td>6 months</td>
<td>1.15 - 2.60mmol/L</td>
</tr>
<tr>
<td>3 months</td>
<td>1.48 - 3.30mmol/L</td>
</tr>
<tr>
<td>Neonate</td>
<td>1.43 - 3.43mmol/L</td>
</tr>
</tbody>
</table>

### Clinical decision values

Contact laboratory for access to publication by Payne.
Renal tubular reabsorption of phosphate (TmP/GFR)
indication and interpretation Ann Clin Biochem 1998 35:
201

### Factors affecting performance

No specific requirements

### Turnaround times:

The Laboratory aims to report 90% of requests within the
stated time from receipt

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*Note: Printed documents are not controlled*
Patient preparation
No specific requirements

Instructions for patient collected sample
See 24 hour urine collection instruction sheet available from laboratory on request and issued with every 24 hour collection bottle

Sample transportation
No specific requirements

Special handling needs
No specific requirements

Patient consent required
Implied consent

Specific rejection criteria
Generic rejection applies

Additional information
Minimum Retest Intervals- not available

Calculation of TmP/GFR
The fractional tubular reabsorption of phosphate (TRP) is required for the calculation of the renal tubular reabsorption of phosphate (TmP/GFR)

TRP is calculated by entering the fasting urine and plasma concentrations, in the same concentration units, into the following equation

\[
TRP = 1 - ((\text{Urine phosphate/Plasma phosphate}) \times (\text{Plasma creatinine/Urine creatinine}))
\]

If TRP is less than or equal to 0.86 then the patient's values lie on the linear part of a curve and the following algorithm can be applied

\[
\text{TmP/GFR} = TRP \times \text{Plasma phosphate}
\]

However, if TRP is greater than 0.86 the patient's values lie on the non-linear 'splay' part of a curve

\[
\alpha = 0.3 \times \frac{TRP}{1-0.8 \times TRP}
\]

Then

\[
\text{TmP/GFR} = \alpha \times \text{Plasma phosphate}
\]

A TmP/GFR calculator is available at http://baspath.co.uk/calculations/renal_tubular_reabsorption_of_ph.htm

Please note this calculator has not been validated by the southern trust pathology department
Lab Tests Online-UK is a useful source of information to help patients understand the many clinical laboratory tests that are used in diagnosis, monitoring and treatment of disease. http://labtestsonline.org.uk/

References
- Lab Tests Online
- Roche insert 2011-01, V 5 English
- WHO use of anticoagulants in diagnostic laboratory investigations
- National Minimum Re-testing Interval Project: A final report detailing consensus recommendations for minimum re-testing intervals for use in Clinical Biochemistry 2012
- ACB Phosphate monograph Susan Troup 2013
- R B Payne Renal Tubular Reabsorption of Phosphate (TmP/GFR): Indications and Interpretation Ann Clin Biochem 1998 35: 201