

## Recommended protocol for monitoring copper, zinc and selenium:

1. Measure Zn on all patients about to start TPN. If deficiency of trace elements is suspected, Cu and Se should also be determined.
2. Patients who progress to normal diets after TPN for less than 5 days, and whose baseline levels were acceptable require no further trace element monitoring.
3. Patients on TPN for 5 – 10 days only, should be monitored for Cu, Zn and Se at the end of the TPN period.
4. Patients on TPN for more than 10 days should be monitored weekly until levels of trace elements stabilise at acceptable concentrations.
5. Patients on long term TPN (more than 30 days) should be monitored continuously at intervals of 1 – 2 months for these elements, and also for Al, Cr and Mn.
6. If changes in a patient's condition are suspected to be attributable to the prescribed regime, or which might influence trace element status, (e.g diarrhoea, sepsis) the trace element levels should be checked.

## Turnaround

We aim to analyse and report the results within 2 working days from receipt of the specimen.

## Contact Points

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## Plasma / Serum Copper, Zinc and Selenium

Trace Elements Laboratory

## Dept of Clinical Biochemistry



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## Sending Specimens for Analysis

Sample requirements:

### Minimum of 100 µl of serum/plasma

- Trace element free sodium heparin blood collection tubes are recommended for copper, zinc and selenium
- Lithium heparin blood collection tubes may be used but we recommend prior contamination testing for zinc
- Avoid blood collection tubes using gel-separation systems for zinc
- Avoid secondary tubes sealed by rubber o-rings for zinc
- Separate samples within 4 hours of collection.
- Haemolysed samples are unsuitable
- Samples should be stored at 4°C prior to dispatch.
- Send samples by first class post at ambient temperature to the address on the back of this leaflet.

## Analytical Technique

Analysis is performed by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) which permits rapid and accurate determination of all three elements from a single specimen dilution.

## Copper

**Indications** - Deficiency, hepato-biliary dysfunction (including Wilson's Disease), toxicity

**Comment** - raised values are seen in inflammatory states and with steroid hormone therapy. When investigating Wilson's Disease, plasma/serum Cu measurement is only of value as an addition to plasma caeruloplasmin concentration and 24 hour urinary Cu excretion.

### Copper Reference Values:

**Neonate - 4 months:**

1.6-7.9 umol/L

**4-6 months:**

4.7-17 umol/L

**7-12 months:**

7.9-20 umol/L

**Children >12 months and adults:**

11-25 umol/L

**Pregnancy >15/40:**

25-39 umol/L

## Zinc

**Indications** - deficiency

**Comments** - A relatively crude index of zinc status. Exhibits diurnal variation in 'healthy' individuals and is affected by number of factors including acute phase reaction, certain drugs and pregnancy. Concomitant measurement of C-reactive protein may be useful in some

circumstances as an aid to interpreting low Zn concentration.

### Zinc Reference Values:

**Deficiency may be indicated:**

<7.0 umol/L

**May have no clinical significance:**

6.1 - 10.9 umol/L

**Reference range for all ages:**

11-24 umol/L

**Dietary supplement use (or contamination):**

>24 umol/L

## Selenium

**Indications** - deficiency, toxicity

**Comment** - Plasma/serum Se is a good index of recent (months) changes in intake or exposure to the element. However it is an acute-phase reactant and concomitant measurement of C-reactive protein may be useful in some circumstances as an aid to interpreting low Se concentrations.

### Selenium Reference Values:

**<18 months:**

0.4-0.7 umol/L

**18 months-4years:**

0.6-1.1 umol/L

**5-16 years:**

0.7-1.5 umol/L

**Adult (>16 years):**

0.9-1.7 umol/L