Alert | Multiple forms of calcium exist with varying amounts of elemental calcium expressed in varying units. Therefore careful attention is required in prescription and administration of calcium to avoid over- or under-dosing. Conversion factor for elemental Ca: 1 mg = 0.02 mmol = 0.05 mEq. Do not mix with any medication that contains phosphates, carbonates, sulfates or tartrates. Separate doses of the following by at least 2 hours: Phosphate, iron, thyroxine and phenytoin.

Indication | Oral calcium supplement to prevent/treat calcium deficiency.

Action | Calcium is essential for the functional integrity of the nervous, muscular, skeletal and cardiac systems and for clotting function.

Drug Type | Mineral.

Trade Name | CalSource Ca1000 effervescent tablets (Novartis).
If required:
Calcium Gluconate Injection (Phebra) (calcium 0.22 mmol/mL).
Calcium Chloride Injection (Phebra) 10% (calcium 0.68 mmol/mL).

Maximum Dose | Oral – 5.5 mmol/kg

Presentation | Calcium carbonate, calcium lactate gluconate (CalSource Ca1000) effervescent tablets contain calcium carbonate 1.8 g, calcium lactate gluconate 2.3 g (equivalent to 1 g or 25 mmol of elemental calcium) and sodium 136.9 mg (5.95 mmol).
If required:
Calcium gluconate 10% 10 mL vial contains 0.22 mmol/mL of elemental calcium.
Calcium chloride 10% 10 mL vial contains 0.68 mmol/mL of elemental calcium.

Dosage/Interval | Dose can vary.
Estimate the calcium intake from all sources before prescribing oral calcium.
Recommended total daily intake of elemental calcium from all sources: 120–200 mg/kg/day (3–5 mmol/kg/day).
Usual starting oral calcium dose: 20 mg/kg/day. Can increase up to 80 mg/kg/day. Divide the daily dose into 2-4 doses mixed with feeds (Do not mix with Phosphate – See Drug Interactions).

Route | Oral

Preparation/Dilution | Calcium – oral
Dissolve one calcium 1000 mg effervescent tablet in 10 mL of sterile water to make a 2.5 mmol/mL solution.

Administration | Calcium – oral
Administer with feeds.
If required, calcium IV vials may be given orally (must be diluted at least 1:4 with sterile water).

Monitoring | Monitor calcium, phosphate and magnesium. Measurement of ionised calcium preferred over total calcium.
Correct hypomagnesaemia if present.

Contraindications | Caution in patients with renal or cardiac impairment

Precautions | Do not mix with any medication that contains phosphates, carbonates, sulfates or tartrates.

Drug Interactions | Do not mix with any medication that contains phosphates, carbonates, sulfates or tartrates.
Separate doses of the following by at least 2 hours: Phosphate, iron, thyroxine and phenytoin.
Digoxin (serious risk of arrhythmia and cardiovascular collapse), thiazide diuretics (increased risk of hypercalcaemia), ketoconazole (decreased ketoconazole effect).

Adverse Reactions | Nephrolithiasis with long term use.
Gastric irritation, diarrhoea and NEC have occurred during oral therapy with hyperosmolar preparations (must dilute with water)

Compatibility | Do not mix with any medication that contains phosphates, carbonates, sulfates or tartrates.

Stability | Oral solution: Discard remaining after use.
Calcium gluconate is a supersaturated solution and may precipitate in the vial at room temperature. Inspect the vial before use.

Storage |
Calcium – ORAL
Newborn Use Only

**Special Comments**

Calcium salt equivalents of elemental calcium

<table>
<thead>
<tr>
<th>Salt</th>
<th>Elemental Ca</th>
<th>Measured Calcium (mmol/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium acetate 1 g</td>
<td>253 mg</td>
<td>6.30 mmol</td>
</tr>
<tr>
<td>Calcium carbonate 1 g</td>
<td>400 mg</td>
<td>9.96 mmol</td>
</tr>
<tr>
<td>Calcium citrate 1 g</td>
<td>211 mg</td>
<td>5.26 mmol</td>
</tr>
<tr>
<td>Calcium chloride 1 g</td>
<td>273 mg</td>
<td>6.80 mmol</td>
</tr>
<tr>
<td>Calcium gluconate 1 g</td>
<td>66 mg</td>
<td>1.64 mmol</td>
</tr>
<tr>
<td>Calcium gluceptate 1 g</td>
<td>82 mg</td>
<td>2.04 mmol</td>
</tr>
<tr>
<td>Calcium gluconate 1 g</td>
<td>93 mg</td>
<td>2.32 mmol</td>
</tr>
<tr>
<td>Calcium chloride 10% 1 mL</td>
<td>27.3 mg</td>
<td>0.68 mmol</td>
</tr>
<tr>
<td>Calcium gluconate 10% 1 mL</td>
<td>9.3 mg</td>
<td>0.23 mmol</td>
</tr>
</tbody>
</table>

**Evidence summary**

Blood gas machines measure ionised calcium directly and are more accurate than the main pathology laboratory which calculates the ionised calcium from a complex formula. Corrected calcium is calculated (when albumin < 40 or > 45) by the formula:

\[
\text{Measured Ca (mmol/L) + (40 – albumin (g/L) x 0.025)}
\]

Calcium concentrations decrease transiently after birth. Of preterm infants, 30-57% will have calcium < 1.75 mmol/L or ionised Ca < 0.9 mmol/L in the first few days. This is typically asymptomatic and typically recovers in 7–10 days. No short- or long-term benefit of early calcium treatment has been demonstrated other than acute rise in calcium concentration.\(^5\)\(^7\)\(^9\)

Recommended enteral intake of calcium in newborns is 3 to 3.5 mmol/kg/day.\(^1\)\(^1\)\(^2\)

**References**

2. MHRA Public Assessment Report. Calcium gluconate injection 10% in 10 ml glass containers: risk of aluminium exposure. September 2010