Failure to detect and treat IRON DEFICIENCY ANAEMIA, which is extremely common in the first two years of life, leads to AVOIDABLE global DEVELOPMENTAL DELAY

Lower limits of normal for age
Anaemia is defined as a haemoglobin level below the lower limit of normal for age.

<table>
<thead>
<tr>
<th>Age</th>
<th>Hb (g/dl)</th>
<th>MCV (fl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth</td>
<td>13.5</td>
<td>100</td>
</tr>
<tr>
<td>6 weeks</td>
<td>9.5</td>
<td>80</td>
</tr>
<tr>
<td>3 months</td>
<td>10.0</td>
<td>72</td>
</tr>
<tr>
<td>6 - 12 months</td>
<td>10.5</td>
<td>70</td>
</tr>
<tr>
<td>1 - 1.5 years</td>
<td>10.5</td>
<td>70</td>
</tr>
<tr>
<td>1.5 - 4 years</td>
<td>11.0</td>
<td>74</td>
</tr>
<tr>
<td>4 - 7 years</td>
<td>11.0</td>
<td>76</td>
</tr>
<tr>
<td>7 - 12 years</td>
<td>11.5</td>
<td>78</td>
</tr>
<tr>
<td>Post-pubertal:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>14.0</td>
<td>80</td>
</tr>
<tr>
<td>Girls</td>
<td>12.0</td>
<td>80</td>
</tr>
</tbody>
</table>

(For the upper limit of the MCV add 15 to the lower limit)

Diagnostic approach

- **Low Hb for Age**
  - WBC and platelets normal
  - **Simple anaemia**
    - **MCV**
      - ↓ (microcytosis)
        - Iron deficiency
        - Thalassemia
        - Chronic disease
      - ↑ (macrocytosis)
        - Folate deficiency
        - Liver disease
        - Anticonvulsants
        - B12 deficiency (rare)
  - Reticulocyte count
    - ↓
      - Chronic disease
    - ↑
      - Blood loss
      - Haemolysis
  - WBC &/or platelets abnormal
  - **Complex anaemia**
    - Leukaemia
    - Marrow aplasia
Microcytic Anaemia

Clinical
History: worms, diet, blood loss, milk intake (type and quantity)
Examination: co-incidental in MOST cases

Management
Treat for iron deficiency unless liver, spleen or lymph nodes are enlarged, and/or MCV < 60
1) **ELEMENTAL** IRON 3mg/kg/day in 1-2 doses
2) CHECK THE HAEMOGLOBIN in 1 month. Expect a rise of 2-3g/dl in 1 month. A response to iron confirms iron deficiency. Check monthly until normal
3) Once normal, CONTINUE TREATMENT FOR 8 WEEKS, to replenish body stores
4) Antiparasitics (give at time of diagnosis and repeat at first follow up visit)
   - MEBENDAZOLE (Vermox) 5ml or 1 tablet, 12H for 3 days or
   - ALBENDAZOLE (Zentel: very expensive) 20ml or 2 tablets stat (in children older than two years)
5) Ensure cow’s milk intake is not excessive

If there is no response to iron therapy consider:
1) “non-compliance” (check for dark stools)
2) ongoing blood loss
3) another diagnosis – thalassaemia
4) chronic infection e.g. TB, HIV
5) Then...

Investigations (when clinically applicable):
1) Serum ferritin: (iron stores)
2) Stool:
   - occult blood (ongoing blood loss)
   - trichuris ova (cause of blood loss)
   - colour change (confirm taking iron)
3) Hb electrophoresis: (confirm thalasaemia)
4) Chest X-ray
5) Tuberculin skin test
6) ESR

Management
Manage according to clinical condition.
When adherence to therapy is in doubt, consider parenteral iron (observing the special precautions in the package insert)

Refer If:
1) White cells and/or platelets also abnormal
2) Purpura, petechiae etc
3) Enlarged liver, spleen or lymph nodes
4) Rapidly dropping haemoglobin
5) Jaundice
6) No response to iron therapy
7) Heart failure (related to severe anaemia)
8) Observed frank bleeding

Information to parents on iron deficiency anaemia
1) Explain the nature of the condition
   "The blood is 'weak' because of a shortage of iron in the body."
2) Advise on diet
   - sources: liver, meat, egg yolk, green vegetables, whole grains, legumes
   - iron in meat is better absorbed than that in vegetables and cereals
   - avoid tea and very high fibre diets
   - Consider reducing or eliminating cow’s milk intake
3) Take iron for as long as prescribed, even if the child is feeling well
   - take iron with food (ideally with orange juice)
   - the colour of the stools may change to grey, or even black
   - keep the medicine well away from young children

**REMEMBER**: as few as 4 iron tablets can kill a toddler