About one-third of the global population (over 2 billion persons) are anaemic.

Anaemia is the most common nutritional deficiency disorder in the world.

Prevalence of anaemia is higher in developing countries.

Prevalence of anaemia in India is very high in all groups of the population.

<table>
<thead>
<tr>
<th></th>
<th>Global</th>
<th>Developed</th>
<th>Developing</th>
<th>India Urban</th>
<th>India Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children &lt;5 yrs</td>
<td>43</td>
<td>12</td>
<td>51</td>
<td>60</td>
<td>70</td>
</tr>
<tr>
<td>Children &gt; 5 yrs</td>
<td>37</td>
<td>7</td>
<td>46</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>Men</td>
<td>18</td>
<td>3</td>
<td>26</td>
<td>35</td>
<td>45</td>
</tr>
<tr>
<td>Women</td>
<td>35</td>
<td>11</td>
<td>47</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>Pregnant Women</td>
<td>59</td>
<td>14</td>
<td>51</td>
<td>65</td>
<td>75</td>
</tr>
</tbody>
</table>

Source: WHO
Prevalence of anemia is high in Sub-Saharan Africa and South East Asia – South Asia fares the worst.
PREVALENCE OF ANAEMIA PRESCHOOL CHILDREN
India is world no 1 both in terms of prevalence of anaemia and number anaemic pregnant women
### Prevalence of Anemia in South Asia%

<table>
<thead>
<tr>
<th>Country</th>
<th>Children &lt; 5 years</th>
<th>Women 15-49 years</th>
<th>Pregnant women</th>
<th>Maternal deaths from anemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>65</td>
<td>61</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>55</td>
<td>36</td>
<td>74</td>
<td>2600</td>
</tr>
<tr>
<td>Bhutan</td>
<td>81</td>
<td>55</td>
<td>68</td>
<td>&lt;100</td>
</tr>
<tr>
<td>India</td>
<td>75</td>
<td>51</td>
<td>87</td>
<td>22000</td>
</tr>
<tr>
<td>Nepal</td>
<td>65</td>
<td>62</td>
<td>63</td>
<td>760</td>
</tr>
<tr>
<td>South Asia Region Total</td>
<td></td>
<td></td>
<td></td>
<td>25,560</td>
</tr>
<tr>
<td>World Total</td>
<td></td>
<td></td>
<td></td>
<td>50,000</td>
</tr>
</tbody>
</table>

About half the deaths from anaemia in the world occur in South Asian countries.

India accounts for over 80% of deaths due to anaemia in South Asia.
Majority of the 1.3 billion Indians from all age and physiological groups are anaemic.

Low dietary iron intake and poor bio-availability of iron from Indian vegetarian diets are the major factor responsible for anaemia.

India was the first developing country to initiate national anaemia prevention programme aimed at medicinal supplementation of iron and folic acid to pregnant women and preschool children.

Coverage under the IFA supplementation to pregnant women is improving.

There has been some improvement in coverage under weekly IFA supplementation to children and adolescents.
TIME TRENDS IN PREVALENCE OF ANAEMIA
There have been 8 large scale national surveys since 1990. In 5 of these Hb estimation in pregnant women and under-five children have been undertaken. In 2 of these Hb estimation in adolescent girls from 10-19 yrs of age have been done.

Data from these surveys were tabulated to assess time trends in prevalence of anaemia in pregnant women, under-five children and adolescent girls.
Prevalence of anaemia in pregnancy based on surveys using Haemacue for HB estimation
NFHS 2 was the first national survey to provide state wise data on prevalence of anaemia in pregnant women.

NFHS used the new expensive Haemacue method for Hb estimation.

Data from NFHS 2 showed that:

Pregnant women are not more anaemic than non-pregnant women and prevalence of anaemia in pregnancy was less than 50%.

This was hailed as the impact of India’s successful anaemia control programme for pregnant women.
Obstetricians and nutrition scientists did not think that there was a decline in anaemia in pregnant women.

Several Indian investigators had compared Haemocue and cyan methaemoglobin method for Hb estimation and published their results.


Findings: Hemocue overestimates Hb & underestimates anaemia.

The relationship between Hemocue and cyanmethHb values is non-linear; So correction factor cannot be used to correct the over estimation of Hb by Hemocue.

The conclusion: Do not use Hemocue if accurate estimation of Hb is required.
NFHS 3 continued to use expensive Hemocue method for estimation of Hb because:

- other DHS use the method;
- it can be done in the field by the survey personnel with no pipetting skills;
- results are immediately available and can be given to the surveyed person.

There was an increase in prevalence of anaemia in pregnant, lactating and non-pregnant women between NFHS 2 & 3; this was viewed with concern.

Several Labs and some clinicians started to use Haemacue to estimate Hb in pregnant women because of the ease of doing Hb estimation.
Data on prevalence of anaemia from NFHS 2, 3 & 4 where available are shown in the figure.

There are no substantial differences in the prevalence of anaemia between good performing and poor performing states between NHFS 2, 3 and 4. There has not been consistent or substantial reduction in the prevalence of anaemia in pregnant women between the three surveys done 15 years apart.
Prevalence of severe anaemia was below 5% in all the states both in NFHS 2 and 3.

Prevalence of mild anaemia was relatively low as compared to moderate anaemia. This might be due to the low range of Hb for mild anaemia – only 1 g/dL while that for moderate anaemia was 3 g /dL.

Differences in prevalence of anaemia between states were of a greater magnitude than the differences between NFHS 2 & 3 in the same state.
Prevalence of anaemia in pregnancy based on surveys using cyanmethaemoglobin method for HB estimation
Prevalence of anaemia in all EAG states was very high in 2002.

Comparison of data on state wise prevalence of anaemia in DLHS 2 (2002-04) with AHS CAB (2013-14) showed that all states except Uttarakhand showed significant reduction of between 10 and 35%.
Prevalence of anaemia in better performing states was high in 2002 but not as high as the EAG states. There was significant reduction in prevalence of anaemia in all states ranging from 15% in West Bengal to over 50% in Kerala & Himachal. In Kerala & Himachal over 60% of pregnant women were not anaemic!
Prevalence of different grades of anemia is computed using Indian cut-off points from DLHS 2 and DLHS 4. 
There was a shift to the right in prevalence of different grades of anaemia in all states. 
In better performing states, severe anaemia in pregnancy was rare. In most states moderate anaemia was seen in only about 10%!
Changes in different grades of anaemia

Prevalence of different grades of anemia is computed using Indian cut-off points from DLHS 2 and DLHS 4.

There was a shift to the right in prevalence of different grades of anaemia in all states.

In better performing states, severe anaemia in pregnancy was rare.
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CHANGES IN GRADES OF ANAEMIA IN PREGNANCY
**HOW DO WE GRADE ANAEMIA IN PREGNANCY**

In 1972 WHO defined cut off points for anaemia and requested countries to define grades depending upon functional de-compensation.

- India defined mild anaemia as 8-11 g/dL: (easy fatigability, poor work capacity) – treated by oral iron folic acid
- Moderate anaemia 5-7.9 g/dL: (impaired immune function, increased morbidity due to infections, higher preterm and low birth weight rates and IMR) treated with IM iron therapy
- Severe anaemia <5g/dl (High perinatal morbidity and mortality High maternal morbidity and mortality) hospitalisation and intensive care.

In the 1990s WHO defined grades of anaemia in pregnancy as

- Mild 10.0 to 10.9 g/dL
- Moderate 7.0 to 9.9 g/dL
- Severe < 7.0 g/dL

Iron plus guidelines have used the WHO grading for reporting prevalence of anemia and the existing Indian cut-off for treatment of anaemia. This is a source of confusion.
Prevalence of different grades of anaemia is computed using Indian cut-off points.

There has been substantial reduction in severe and moderate anaemia even in poorly performing states.

Mild anaemia is now the most common grade of anaemia.
There was a shift to the right in prevalence of different grades of anaemia in all states.
In better performing states severe anaemia in pregnancy was rare. In most states moderate anaemia was seen in only about 10%!
PREVALENCE OF ANEMIA IN UNDER FIVE CHILDREN
Prevalence of anaemia in preschool children was higher than prevalence of anaemia in pregnant women in NFHS 2,3 and 4.

Prevalence of anaemia in children varied between states.

There was no substantial or consistent reduction in prevalence of anaemia in children between NFHS 2,3 and 4.
Prevalence of different grades of anaemia in U5 – NFHS 2 and 3

In all states moderate anaemia was the commonest grade of anaemia.
There were substantial inter-state differences in the prevalence of different grades of anaemia in under-five children.
There was no consistent or substantial reduction in different grades of anaemia in under-five children between NFHS 2 and 3.
Prevalence of anaemia in all EAG states was very high in 2002.

Comparison of data on state-wise prevalence of anaemia in DLHS II (2002-04) with AHS CAB (2013-14) showed that all states except Uttarakhand showed significant reduction of between 5 – 20%.
Prevalence of anaemia in better performing states was high in 2002 but not as high as the EAG states. There was significant reduction in prevalence of anaemia in all states ranging from 11% in West Bengal to over 30% in Kerala. In Kerala nearly half the children are not anaemic!
There has been substantial reduction in severe and moderate anaemia even in poorly performing states. Mild anaemia is now the most common grade of anaemia in children.
As can be seen in all states there has been a clear shift to the right and in good performing states like Kerala, moderate and severe anaemia is <10%.

Even in EAG states there has been substantial improvement for eg in Chhattisgarh, moderate and severe anaemia account for <25%.
ADOLESCENT GIRLS
Prevalence of anaemia in all EAG states was very high in 2002. Comparison of data on state wise prevalence of anaemia in DLHS II (2002-04) with AHS CAB (2013-14) showed that all states except Uttarakhand showed significant reduction of between 5 and 20%.
Time trends in prevalence of anaemia in adolescent girls
DLHS II (2002-4) to DLHS 4 (2013-14)

Prevalence of anaemia in better performing states was high in 2002 but not as high as the EAG states.
There was significant reduction in prevalence of anaemia in all states ranging from 8% in West Bengal to over 30% in Kerala.
In Kerala nearly 50% of adolescent girls were not anaemic!
Time trends in prevalence of grades of anaemia in adolescent girls
DLHS II-AHS 2002-4 to 2013-14

Prevalence of different grades of anemia is computed using Indian cut-off points from DLHS 2 and AHS.
There has been substantial reduction in severe and moderate anaemia even in poorly performing states.
Prevalence of different grades of anaemia is computed using Indian cut-off points from DLHS 2 and DLHS 4
There was a shift to the right in prevalence of different grades of anaemia in all states
In better performing states, severe anaemia in adolescent girls is rare. In most states moderate anaemia was seen in only about 10-30%!
TO SUM UP
Has there been a reduction in prevalence and severity of anaemia?
Clearly yes
In all states except Uttarakhand there has been a reduction in overall prevalence of anaemia in the last ten years in all three groups pregnant women preschool children and adolescent girls. Severe anaemia in all three groups is now rare especially in better performing states
Mild anaemia is by far the commonest grade of anaemia in all states
Programme implications

Antenatal care aims at universal screening for accurate early diagnosis and effective treatment of obstetric problems.

Anaemia is the most common obstetric problem in India.

Accurate diagnosis of anaemia using cyanmethHb estimation in all pregnant women is possible in India without major additional inputs. The clinicians and people will see that they get accurate results at affordable opportunity cost.

Clinicians will respond by following the treatment protocols and make treatment of anemia effective.

Pregnant women will respond by adhering to treatment and follow-up schedules and benefit.
Programme implications

The two pronged strategy of increasing iron intake (dietary diversification and use of DFS) will provide a sustainable method to improve iron folate intake.

WIFS may also improve the intake.

Detecting and treating children and adolescents with mild and moderate anaemia can deliver good results in terms of reduction in anaemia and its adverse health consequences.

COUNTRY WILL BE HAPPY
LOSING GLOBAL NO 1 STATUS IN ANAEMIA BY 2025
Thank You