

Can indicators of child malnutrition be improved - and for what purposes?

Accurate measures of child malnutrition for:

- (i) Growth and weight **references** for child monitoring in all countries (**WHO**)
- (ii) Assessing the **overall prevalence** of child malnutrition in poor countries and gauge trends over time (e.g. the MDG)
- (iii) Identifying children at the highest morbidity/mortality risk in poor countries so as to accomplish **efficient targeting** in intervention programs

Focus here: (ii) and (iii)

Traditional classification of child malnutrition

Since the early 1970s, the **Waterlow 3-tier classification** of anthropometric failure has been the main instrument for assessing children's nutritional status

- **Stunted** (short for age)
- **Underweight** (low weight for age)
- **Wasted** (low weight for height)

Cut-off points: a child's height and weight fall **below 2 standard deviations** of the median in the reference (well nourished) population

Is a new anthropometric classification scheme called for?

Yes, if it can:

*(1) provide a more accurate account of the **total burden** of child malnutrition*

*(2) predict adverse **outcomes** and risks more precisely!*

I will suggest an alternative classification scheme that fulfils these criteria

Start by showing the **actual height and weight **distribution** in a child population from a poor country (Bangladesh)**

Figure 1

Height and weight of children in Bangladesh (Wagstaff 2000)

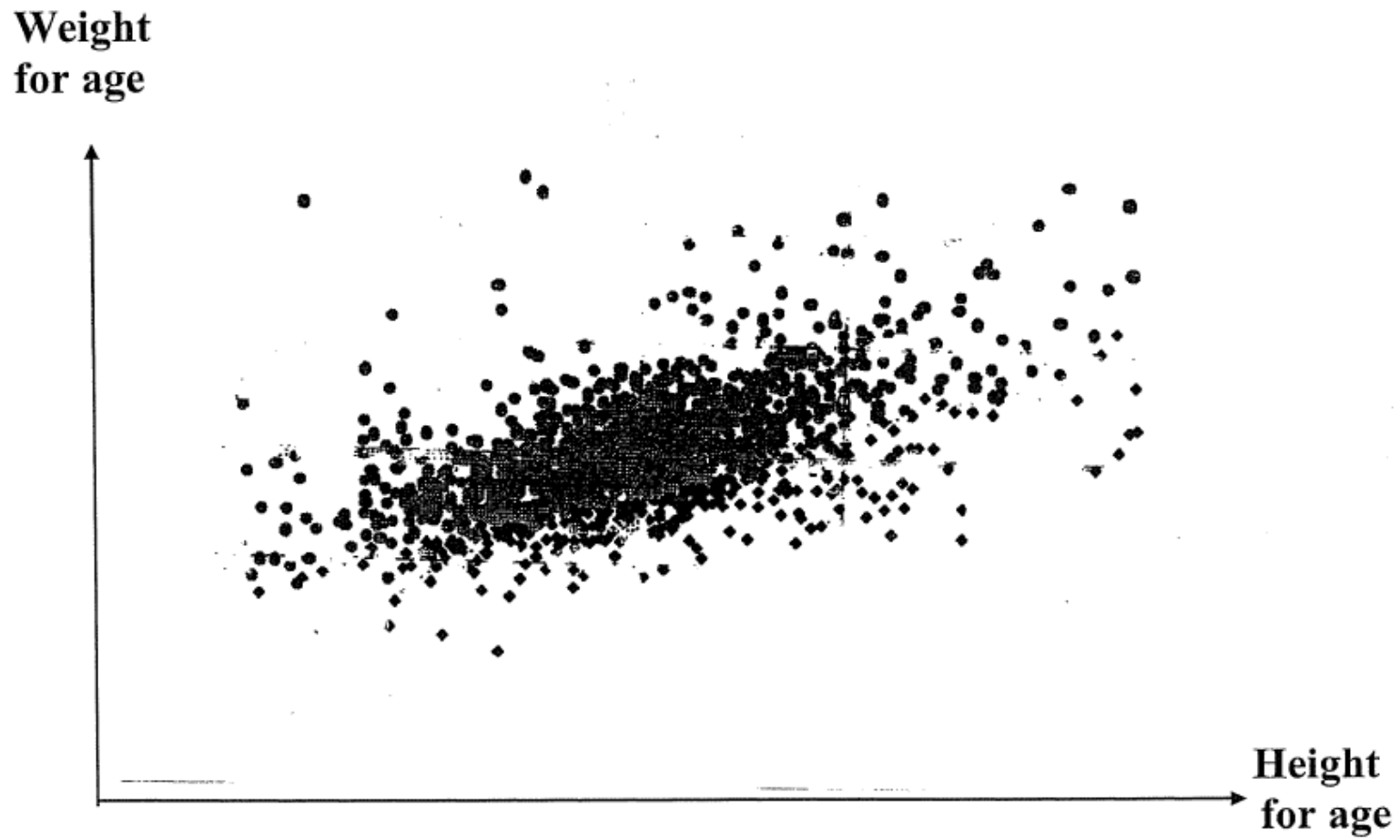


Figure 2

Bangladesh with cut-off points inserted

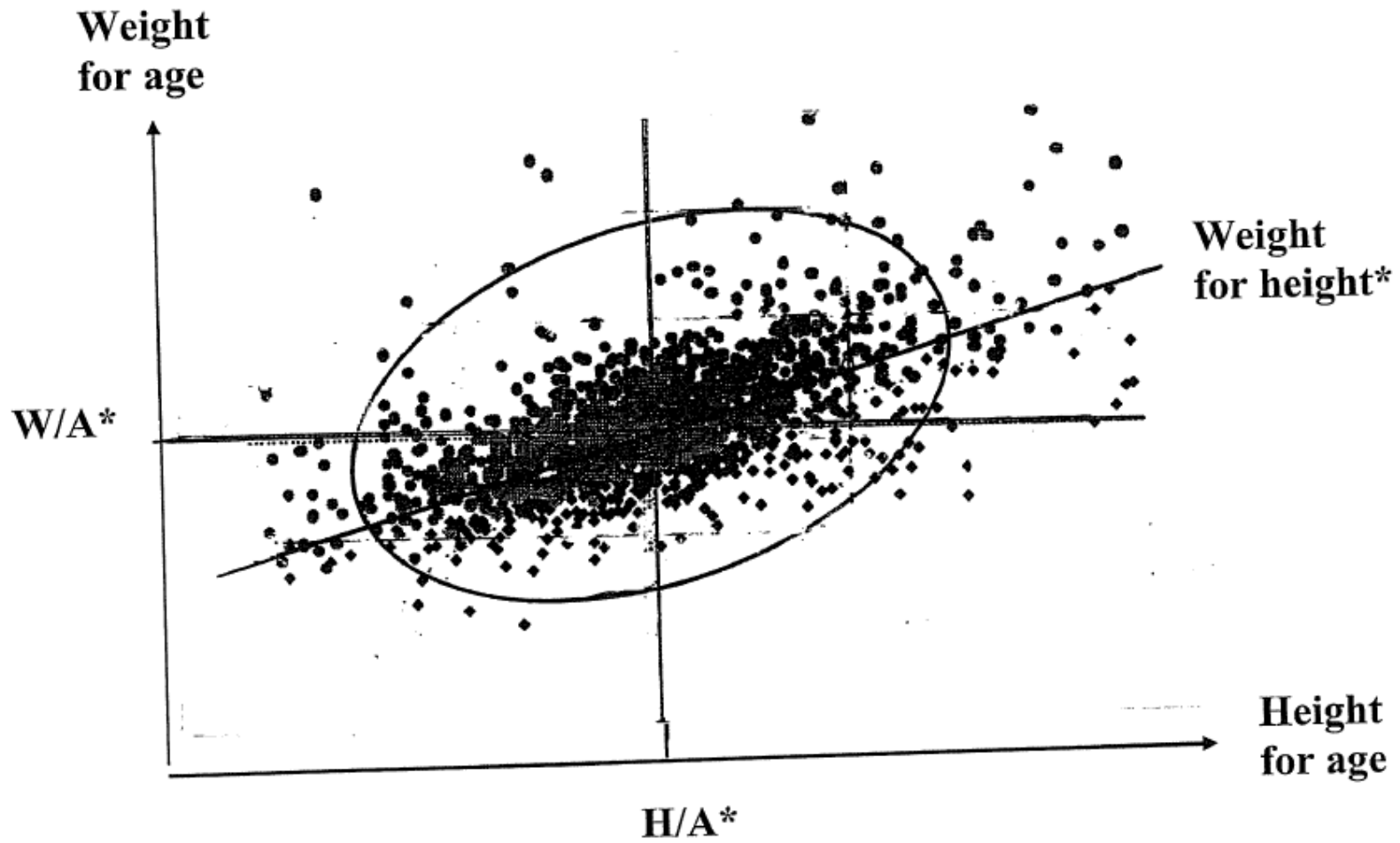


Figure 3 (stylised version of Fig 2)

Weight and height distribution in a child population of a specific age (4-5y)

Weight for age (kg)

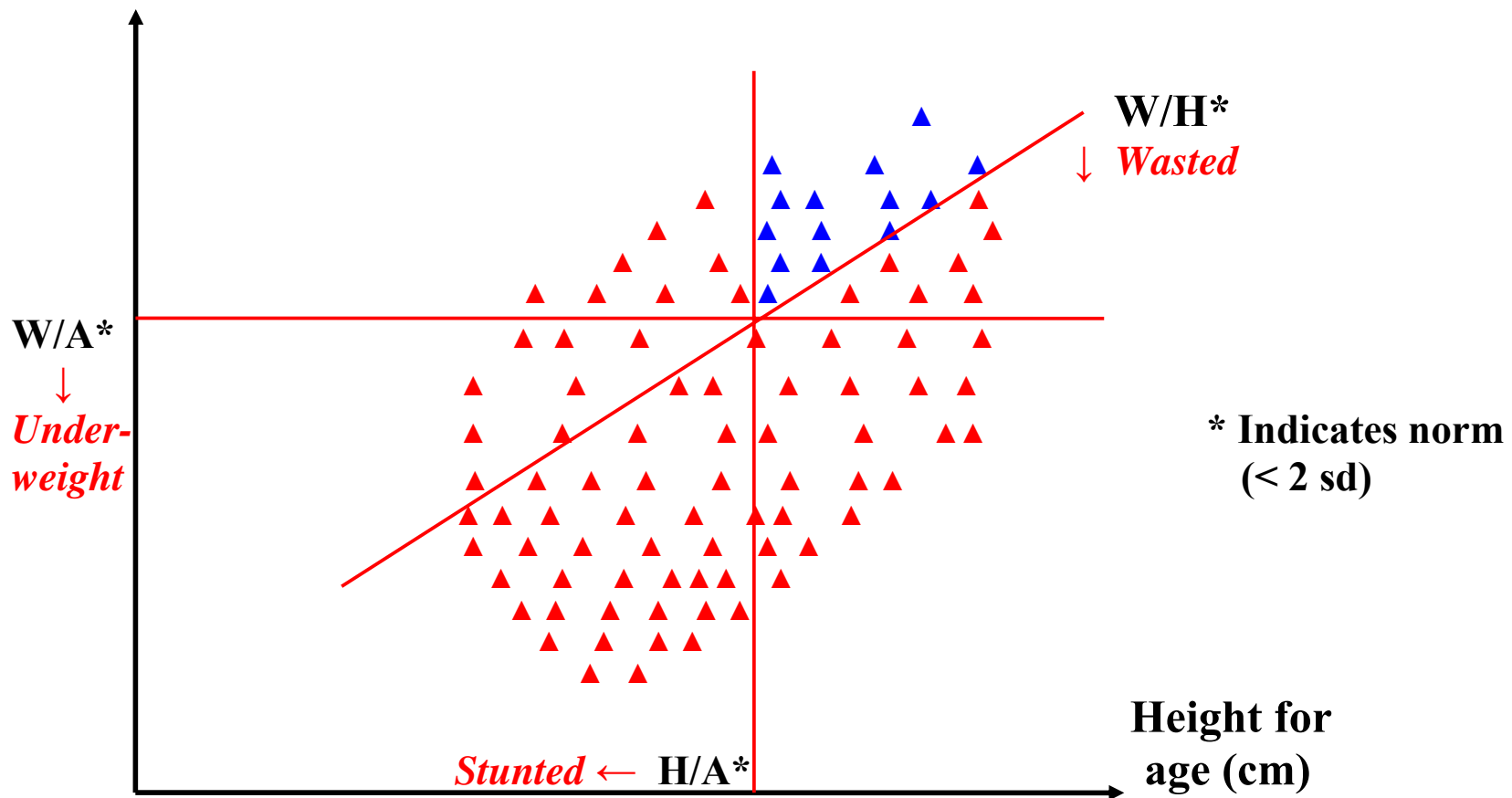
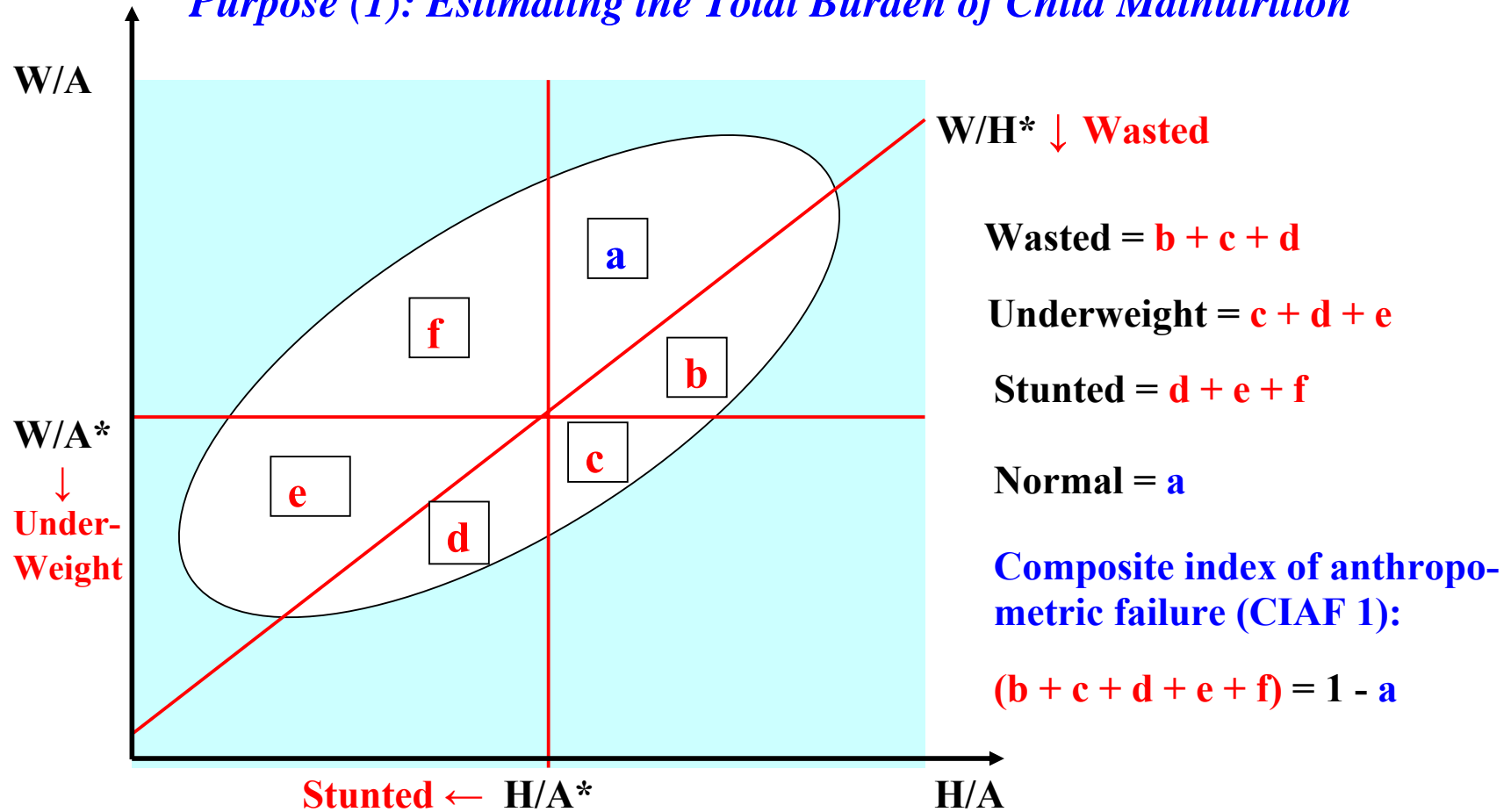


Figure 4

Purpose (1): Estimating the Total Burden of Child Malnutrition

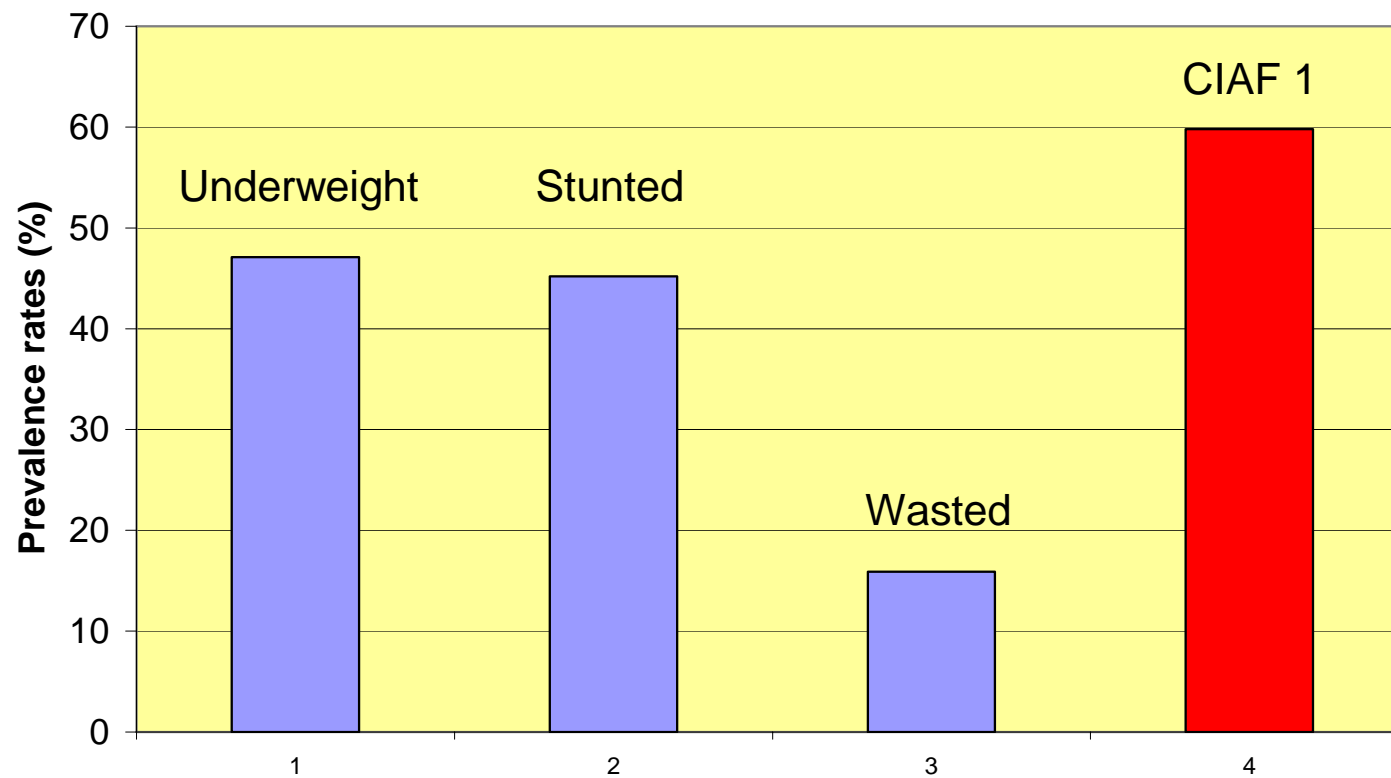


No previous index captures the share of all children with at least one anthropometric failure

New classification scheme hence implies higher overall prevalence of child malnutrition

(Figure 5)

Figure 5
Comparison of estimated child malnutrition according to CIAF 1
and traditional indicators in India 1998-99



Purpose (2): Improving child malnutrition indicators as risk predictors of child mortality (or ill health)

Several studies have assessed the efficiency of the **traditional indicators** for predicting these risks

Method:

- (i) Measure and classify children as **stunted, underweight** and **wasted**;**
- (ii) follow up by assessing which children have **later died** (or fallen ill)**

Main finding: traditional indicators are blunt predictors of child mortality (or morbidity) risk

- Most children below the norms survive (error of inclusion)**
- Many children above the norms die (error of exclusion)**

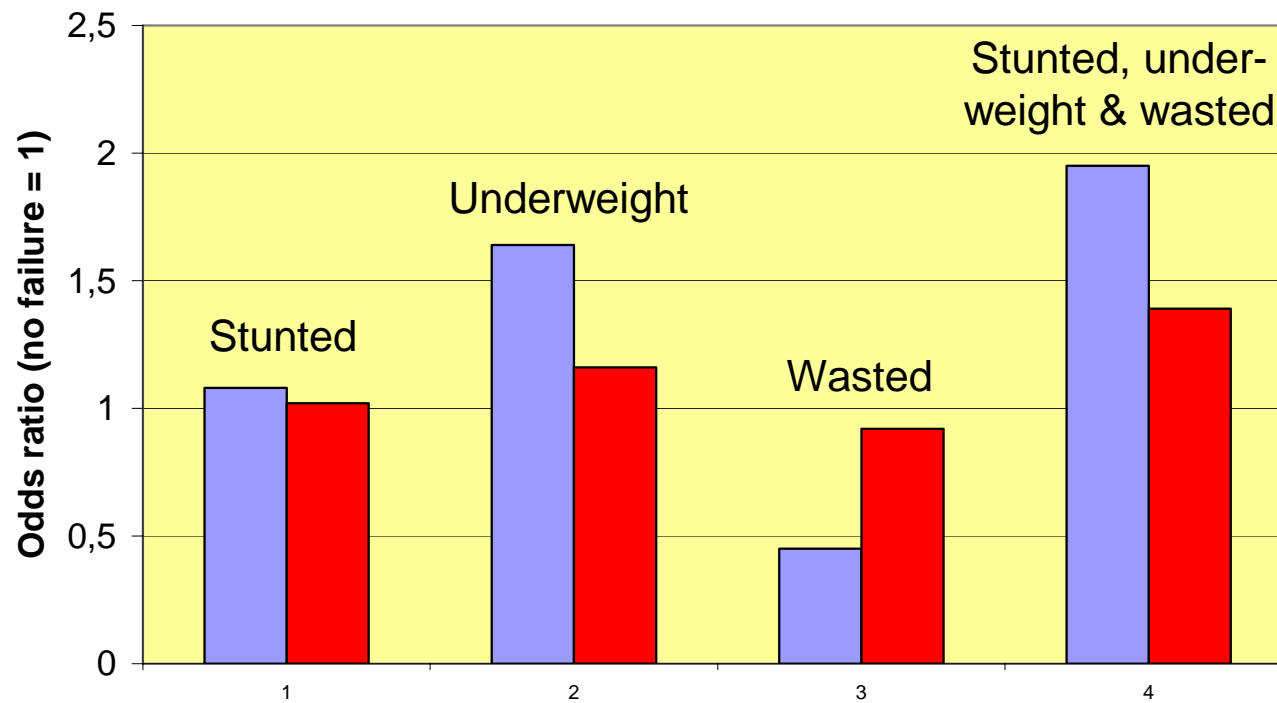
Recently, a few attempts have been made to test whether my **6-tier** classification scheme identifies children at risk more accurately than the earlier **3-tier** scheme

I will show **results** from a study by Nandy et al (WHO Bulletin 2005)

They examined the incidence of **severe diarrhoea** and **ARI** in child groups with different forms of anthropometric failure and combinations thereof

Diarrhoea and **ARI** account for **57%** of post-neonatal **child mortality** in developing countries (< 5 years)

Figure 6
Odds ratio for children with severe diarrhoea and acute respiratory infections according to anthropometric status in India 1998-99



Nandy et al further found:

- 1) The incidence of severe diarrhoea and ARI is **not** higher among **stunted** and **wasted** children than among “normal” children**

- 2) **Underweight** children are significantly **more** frequently ill**

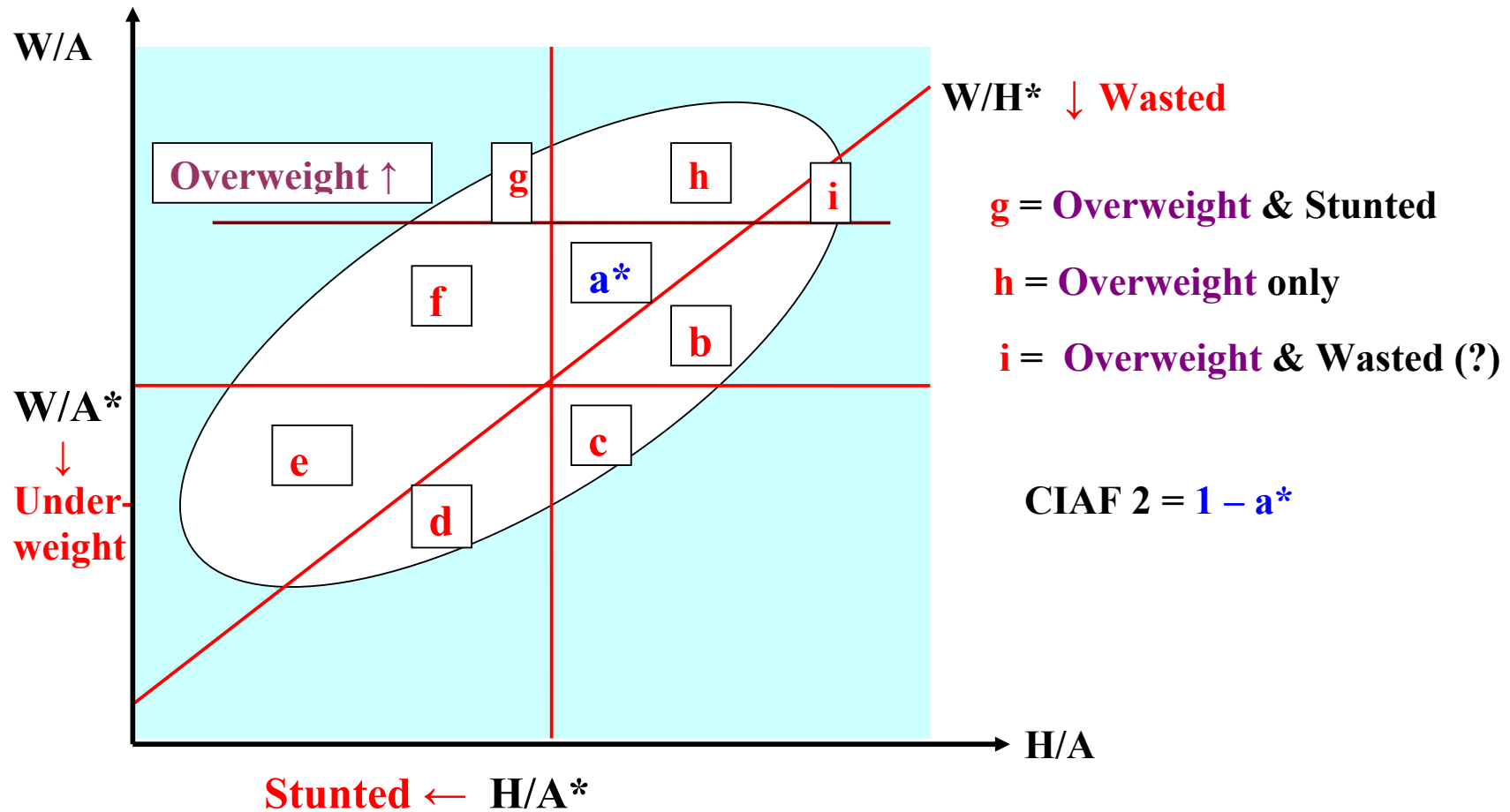
- 3) Children with **2 or 3 forms of anthropometric failure** are significantly more frequently ill than children with **one** failure only – and are hence at higher **mortality risk****

I have recently extended the **6-tier scheme** to include also child malnutrition in the form of **overweight** and obesity

Figure 7

Figure 7

Total prevalence of child anthropometric failure (2). Including overweight and obesity



Rationales for extension

- Child overweight is on the increase in **many poor** countries**
- According to the new WHO norms, **12.5%** of Chinese children were **overweight or obese** in 2002 and **40%** had a weight 1 standard deviation above the median in the reference population – **alarming sign!****
- A recent study from rural Mexico found **5-10%** of children to suffer from stunting **and** concurrent overweight or obesity – a “**double-burden**” form of malnutrition not observed before, but included in my extended scheme (**g**)**

--- **Extended classification schemes implies higher overall child malnutrition**

--- **I know of no study that has estimated the mortality/morbidity risk associated with child **overweight** in a **poor country** (adverse effects are **long term**)**

--- **Several **negative health consequences** of child overweight **later in life** have been documented in high-income countries by Barker and others**

Summary remarks

- The composite index of anthropometric failure provides a more comprehensive measure of the **overall burden of child malnutrition**
- A more detailed anthropometric classification scheme seems to provide more **accurate predictions** of child morbidity (and mortality?)

Xièxie

(A short summary of the presentation is available in the “bag”)

References

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- Fernald LC, Neufeld LM (2007). Overweight with concurrent stunting in very young children from rural Mexico. Europ J Clin Nut 61: 623-32.**
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