# *Are boys eating better than girls?*
## Longitudinal evidence from India

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# *No gender inequalities in U-5 malnutrition*

- Despite sustained economic growth, **malnutrition is still widespread in India**
  - 39% stunted U5 children in 2013/2014 (≈44 mil.) (IFPRI 2014)
- **No sex-based bias** in anthropometric status and anaemia (IIPS 2007, Tarozzi 2012)
- **Mixed evidence** with regards to feeding practices
  - Shorter breastfeeding for infant girls (Jayachandran and Kuziemko 2012; Barcellos et al. 2014, Fledderjohann et al 2015)
  - Inconsistent findings with regards to diets (DasGapta 1987; Booroah 2004; Kehoe et al 2014)
- Contrast with **pro-boy bias** in other dimensions
  - Sex-selective abortion & U5 mortality (Jha et al 2011; Tarozzi 2012)
  - Educational access, outcomes and aspirations (Dercon & Singh 2013; Woodhead et al 2013; Beaman et al 2012)
  - Access to care and vaccinations (Prusty & Kumar 2014; Booroah 2004)

# *How about adults?*

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DATA                                          NEW DELHI, November 13, 2014

*"Official data indicate that anaemia in women is increasing"*

ASIA PACIFIC

## Study Says Pregnant Women in India Are Gravely Underweight

By GARDINER HARRIS   MARCH 2, 2015

**The New York Times**

**Gender disparities** in diets & anaemia in adults (15-49 yrs) from national data (IIPS 2007)

## At what stage of the lifecourse do gender-based disparities in diets emerge?

This paper uses **3 rounds** of data on two **cohorts** of children from the Young Lives study in order to analyse **gender-based disparities as they grow up** in **dietary diversity** in Andhra Pradesh and Telangana, India

# *The data: the YL study*

- **Longitudinal survey (2002-2017)**

- **12,000 children in four countries** – Ethiopia, India (Andhra Pradesh & Telangana), Peru, Vietnam

- **Pro-poor sample**: 20 sentinel sites in each country selected to reflect country diversity, rural-urban, livelihoods, ethnicity

  - In each site households with children of relevant age randomly selected

- **Two parallel cohorts** in each country:

  - **Younger Cohort**: 2,000 children born in 2001-02

  - **Older Cohort**: 1,000 children born in 1994-95

# Data Structure
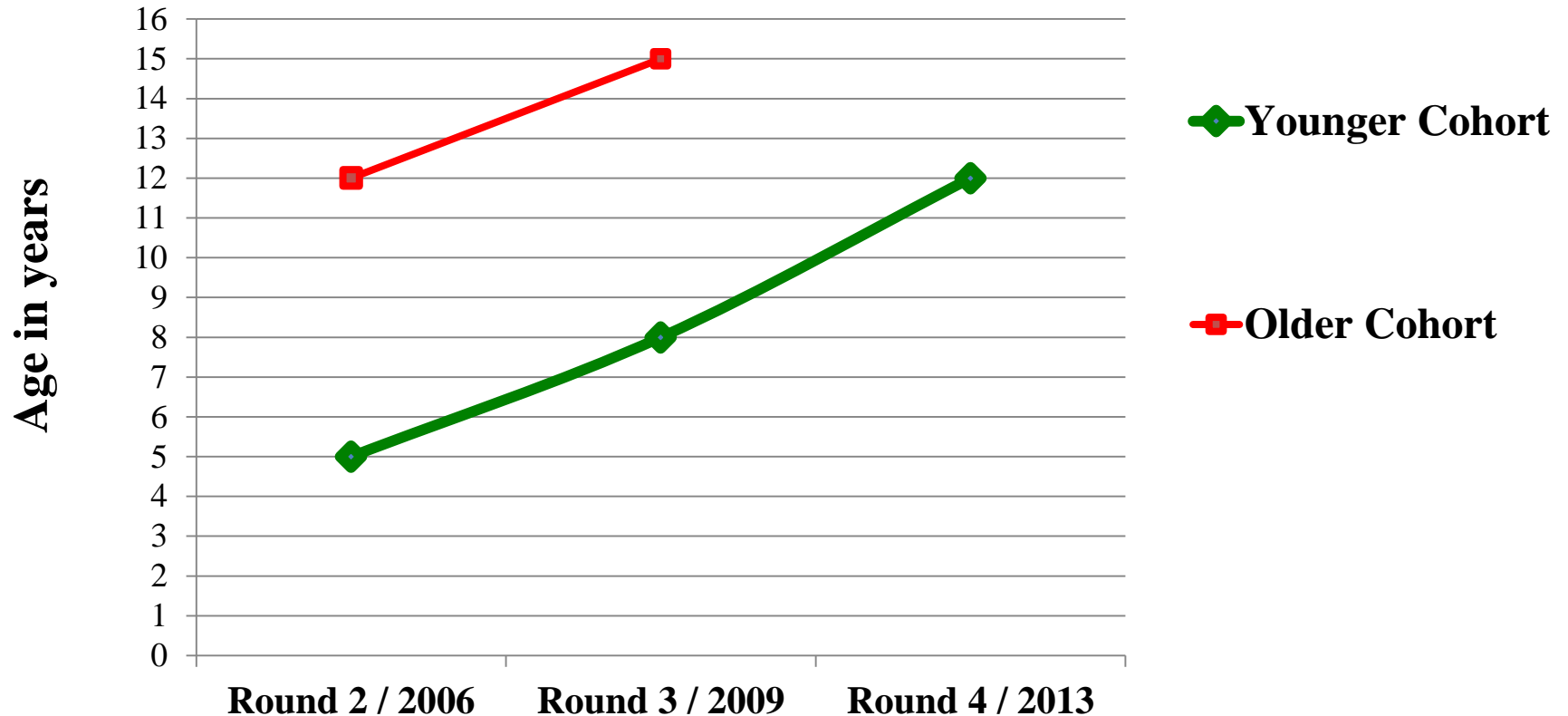


Analytical sample restricted to children that were present in all relevant rounds (n=1915, 95% original sample for the YC and n=976, 97% original sample for the OC)

Empirical results

| | Younger Cohort | | | Older Cohort | |
|---|---|---|---|---|---|
| | **Age 5** | **Age 8** | **Age 12** | **Age 12** | **Age 15** |
| **Dietary diversity** | 4.22 | 4.25 | 4.16 | 4.13 | 4.17 |
| | (0.92) | (0.80) | (0.87) | (0.98) | (0.84) |
| **Cereals** | 0.99 | 0.98 | 0.95 | 0.99 | 0.97 |
| | (0.08) | (0.15) | (0.23) | (0.11) | (0.16) |
| **Roots** | 0.30 | 0.36 | 0.41 | 0.30 | 0.37 |
| | (0.46) | (0.48) | (0.49) | (0.46) | (0.48) |
| **Legumes** | 0.45 | 0.29 | 0.24 | 0.39 | 0.33 |
| | (0.50) | (0.45) | (0.43) | (0.49) | (0.47) |
| **Milk** | 0.65 | 0.83 | 0.74 | 0.64 | 0.78 |
| | (0.48) | (0.38) | (0.44) | (0.48) | (0.41) |
| **Eggs** | 0.18 | 0.20 | 0.24 | 0.19 | 0.19 |
| | (0.38) | (0.40) | (0.43) | (0.39) | (0.39) |
| **Meat** | 0.10 | 0.11 | 0.14 | 0.10 | 0.13 |
| | (0.30) | (0.31) | (0.34) | (0.30) | (0.34) |
| **Fish** | 0.05 | 0.02 | 0.03 | 0.06 | 0.02 |
| | (0.21) | (0.15) | (0.18) | (0.25) | (0.16) |
| **Oil** | 0.96 | 0.94 | 0.97 | 0.92 | 0.90 |
| | (0.20) | (0.23) | (0.18) | (0.27) | (0.31) |
| **Fruit** | 0.42 | 0.31 | 0.44 | 0.41 | 0.34 |
| | (0.49) | (0.46) | (0.50) | (0.49) | (0.47) |
| **Vegetables** | 0.94 | 0.97 | 0.97 | 0.93 | 0.97 |
| | (0.24) | (0.16) | (0.18) | (0.26) | (0.18) |

# Key Message #1:

# *Pro-boys gap emerges at 15 years old*

**Regression coefficients for male dummy[1]**
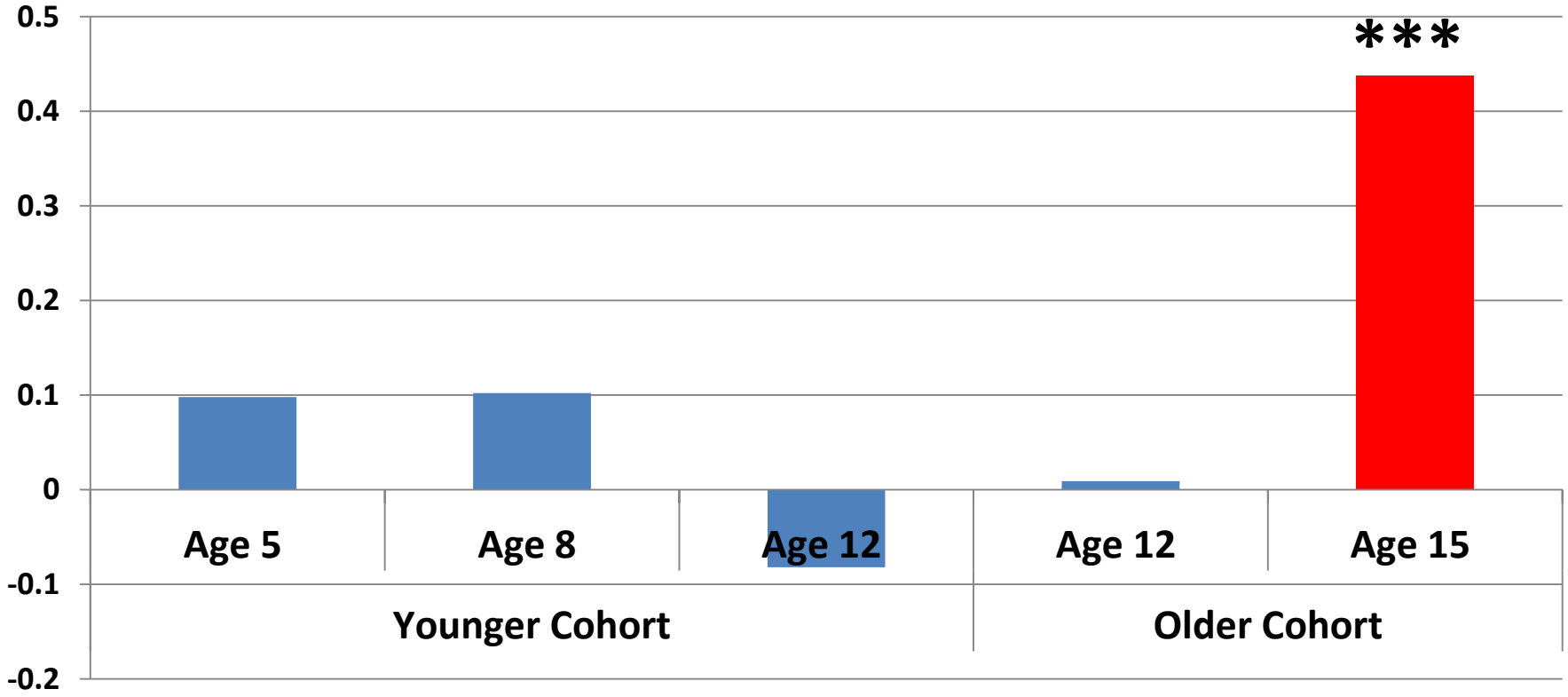


*Cross-sectional estimates , by round and cohort, OLS community-fixed effects*
*** *p<0.01*
[1] *Estimates adjusted for: caste, birth order, older brother in the household, interaction sex\*older brother, maternal education, parental education, sex of head of the household, household size, log household consumption expenditure per capita.*

# Gap at 15 years old driven by highly nutritious foods

**Regression coefficient for male*15 years old interaction[1]**
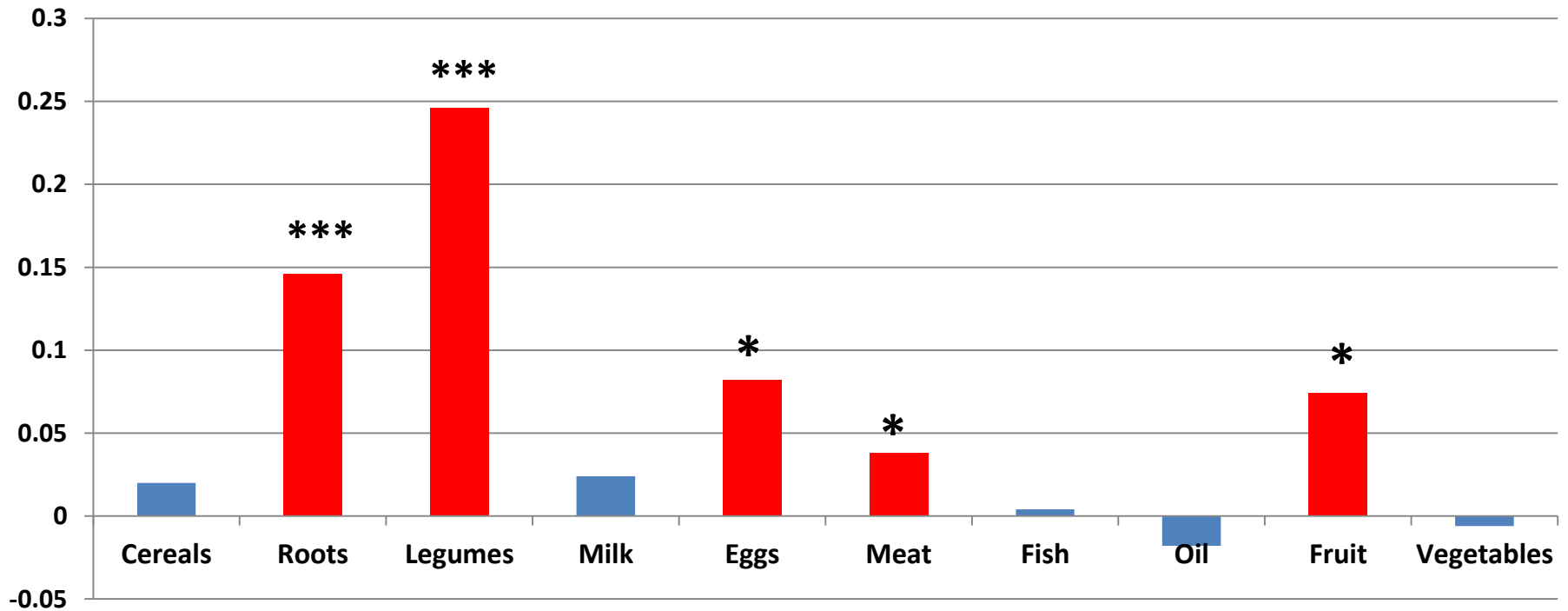


*Pooled sample* estimates, Linear Probability Model cluster fixed effects
*** p<0.01, * p<0.1
[1] Estimates adjusted for: caste, birth order, interaction sex*older brother, maternal education, parental education, sex of head of the household, household size, log household consumption expenditure per capita, male*age interactions, Cohort dummy

# Gap is robust to differences between adolescents in timing of puberty, time use and dietary behaviours

Dietary diversity and dietary behaviours among 15-year-olds (OLS estimates, main results)

| | (1) Dietary diversity (baseline) | (2) Dietary diversity (puberty) | (3) Dietary diversity (time use) | (4) Number of meals | (5) Physical activity |
|---|---|---|---|---|---|
| Male | 0.436*** | 0.374*** | 0.407*** | 0.129 | −0.656 |
| | (0.099) | (0.103) | (0.105) | (0.111) | (0.527) |
| Difference in height (cm) | | 0.009 | | | |
| | | (0.006) | | | |
| Hours spent at school or studying | | | 0.006 | | |
| | | | (0.017) | | |
| Hours spent on leisure activities | | | 0.000 | | |
| | | | (0.021) | | |
| Hours spent on household care/chores activities | | | −0.014 | | |
| | | | (0.026) | | |
| Hours spent on family farm or business | | | 0.017 | | |
| | | | (0.017) | | |
| Hours spent on work for pay | | | 0.004 | | |
| | | | (0.018) | | |
| Constant | 2.923*** | 3.021*** | 2.903*** | 2.828*** | 4.395*** |
| | (0.383) | (0.421) | (0.514) | (0.574) | (1.030) |
| Observations | 939 | 895 | 939 | 940 | 939 |
| Child and household covariates? | YES | YES | YES | YES | YES |
| Community fixed effects? | YES | YES | YES | YES | YES |
| F-test | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Chow test (equality male coefficients from baseline and augmented models, p-value) | | 0.24 | 0.34 | | |
| Adj. R-squared | 0.07 | 0.07 | 0.07 | 0.05 | 0.02 |

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

# Key Message #4:

## Gender gaps vary by parental attitudes towards children's education

Coefficient on male dummy and interaction of dietary diversity among 15-year-olds with key variables (OLS estimates, main results)

| | (1) Dietary diversity (Maternal education) | (2) Dietary diversity (Poverty) | (3) Dietary diversity (Rural/urban location) | (4) Dietary diversity (Caregiver aspirations) | (5) Dietary diversity (Caregiver aspirations + school enrolment) |
|---|---|---|---|---|---|
| Male | 0.468*** | 0.491*** | 0.376*** | 0.202* | 0.201* |
| | (0.093) | (0.102) | (0.121) | (0.115) | (0.115) |
| Male* Mother is illiterate | −0.053 | | | | |
| | (0.128) | | | | |
| Male* Poorest tercile | | −0.224 | | | |
| | | (0.141) | | | |
| Male * Urban | | | 0.216 | | |
| | | | (0.187) | | |
| Male * High caregiver aspirations | | | | 0.300*** | 0.302*** |
| | | | | (0.104) | (0.103) |
| Currently enrolled | | | | | 0.014 |
| | | | | | (0.064) |
| Constant | 2.824*** | 3.219*** | 2.971*** | 3.012*** | 3.006*** |
| | (0.359) | (0.495) | (0.389) | (0.396) | (0.400) |
| Observations | 939 | 939 | 939 | 939 | 938 |
| Child and household covariates? | YES | YES | YES | YES | YES |
| Community fixed effects? | YES | YES | YES | YES | YES |
| F test | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Chow test (equality male coefficients from baseline and augmented models, p-value) | 0.69 | 0.14 | 0.37 | 0.002 | 0.002 |
| Adj. R-squared | 0.07 | 0.07 | 0.07 | 0.08 | 0.08 |

Robust standard errors in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$

# Similar insights from anthropological & demographic literatures

- Adolescence stage of the lifecourse in which gender norms become more pronounced (Pells 2012, Gittelhson 1991)
  - E.g. increased household domestic responsabilities like food preparation
- These norms seem to have repercussions in terms of (Gittelsohn 1991, DasGupta 1987, 1997; Harriss 1995)
  - Reduced portion sizes
  - Changes in serving order
  - Channeling / substitution of foods towards some family members

# *Conclusions - and why should we care?*

- **It's not only about gender**… other factors like age matter!
  - New lit on age-gender inequalities in India (Milazzo 2014; Coffey et al 2013)
- Evidence on gender-age disparities **critical to improve the targeting** of policies
- By focusing only on young children **we may miss out important information and windows of opportunities**
- Biggest youth population globally: Adolescent health key policy priority (National Youth Policy 2014)
- Almost half on Indian women before their first pregnancy are malnourished (as opposed to 18% in SSA) (Coffey 2015)
- Highest global burden of U5 malnutrition: Investing in improving adolescent girls nutrition
  - *Policy objective per se*
  - *Break the malnutrition cycle*

# Thank you!

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## Boys get to eat a wider variety of foods than girls: Study

TNN | May 3, 2016, 05.02 PM IST

The University of Oxford and Imperial College London conducted a study on diets of
collected
013.
ontinue

# Teenage boys eat variety of food than girls in AP & Telangana

Press Trust of India | London
April 27, 2016 Last Updated at 18:07 IST

# *Statistical analysis*

1. **Cross-sectional specification** (OLS community fixed effects)

$$y_{ij,t} = \beta_0 + \beta_1 M_{ij} + \beta_2 X_{ij,t} + \gamma_j + \varepsilon_{ij,t}$$

*$X_{ij}$, t includes: child caste, religion, vegetarianism, and birth order; maternal and parental years of schooling; gender of the head of the household; household's size and logarithm of consumption per capita in rupees. Further, it includes a dummy for older brother living in the household and an interaction term between being a girl and having an older brother.*

2. **Pooled sample** estimates with age-gender interactions

$$y_{ij,t} = \beta_0 + \beta_1 M_{ij} + \beta_2 X_{ij,t} + \beta_3 M_{ij} * Age_{ij,t} + \beta_4 Cohort_{ij} + \beta_5 Age_{ij,t} + \gamma_j + \varepsilon_{ij,t}$$

3. **Robustness checks**: is the gap explained by the inclusion of additional covariates?

4. **Moderation analysis**: does the gap vary by maternal education, poverty, place of residence or education aspirations?

# *Dietary diversity: why, what, how?*

- A **balanced diet** is fundamental for the proper physical and cognitive development of children and adolescents (Steyn et al 2006).

- Number of food groups consumed in the previous day (Ruel 2002)
  - Data allowed for a seven food groups measure

- **Good proxy for nutritional adequacy amongst young children, women and adolescents** (Steyn et al 2006, FAO and FHI 360 2016, Mirmiran et al 2004)

- Easy to collect and relatively unexpensive indicator