Delia Grace Randolph

Health Program ILRI co-lead, Food Safety Flagship A4NH leader

ASF, health, nutrition – latest evidence

Ulaanbaatar, 8th MSP Meeting
11-15 June, 2018

Food and Agriculture Organization of the United Nations

SUSTAINABLE DEVELOPMENT GOALS

17 PARTNERSHIPS FOR THE GOALS

Outline

- Why we need evidence
- Latest evidence on livestock and nutrition and health from ILRI & partners
- How scientists mislead with evidence

Avoiding meat and dairy is 'single biggest way' to reduce your impact on Earth

Biggest analysis to date reveals huge footprint of livestock - it provides just 18% of calories but takes up 83% of farmland

CGIAR

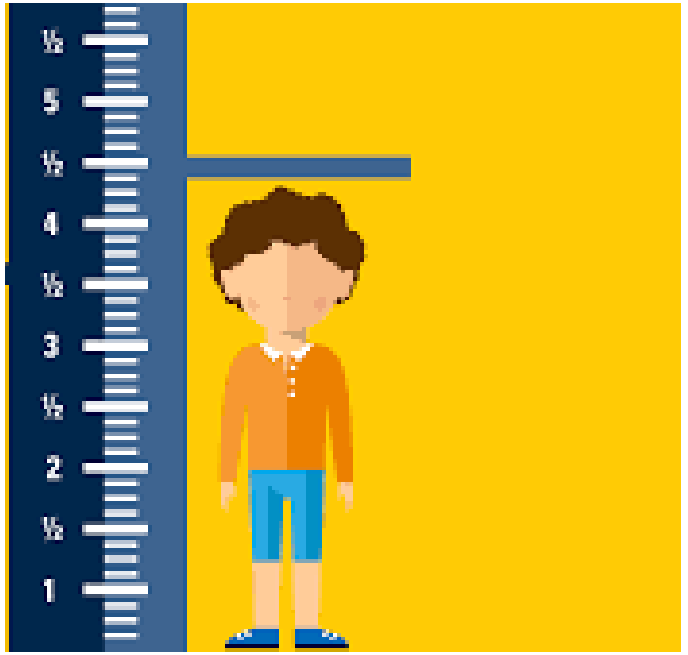
Nyama choma linked to cancer – experts

Oct. 28, 2015, 5:00 am | By JOHN MUCHANGI

If you want tall kids should you feed them milk or meat?

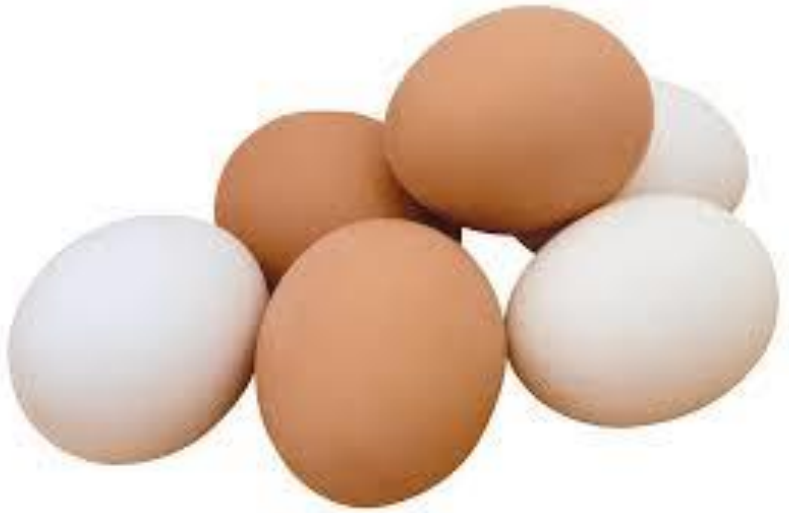
ILRI CGIAR

Do aflatoxins stunt or stimulate growth?

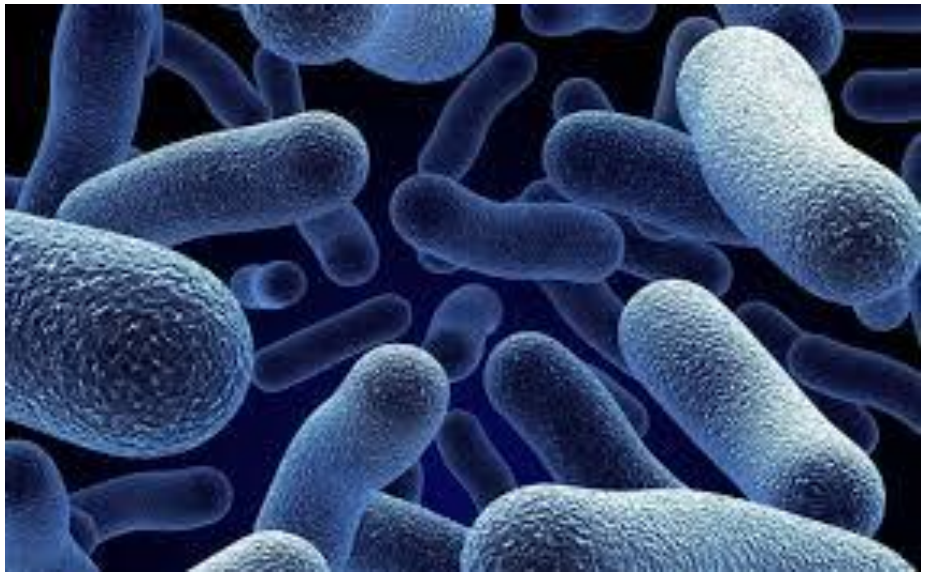


ILRI
CGIAR

If you want smart kids should you feed them cheese or eggs?



Which has a bigger health burden? Chemicals or bacteria in food?



If you want to improve your iron levels
Should you eat spinach or liver?

ILRI CGIAR

WAGENINGEN
UNIVERSITY & RESEARCH

The economics of food safety in India – a rapid assessment

Zuzana Smeets Kristkova (Wageningen Economic Research)
Delia Grace (ILRI)
Marijke Kuiper (Wageningen Economic Research)

REVIEW DRAFT

FOOD SAFETY CAPACITY BUILDING I

Learning from Experience

to Build the Future

FEED THE FUTURE

White paper

Food safety in developing countries: research gaps and opportunities

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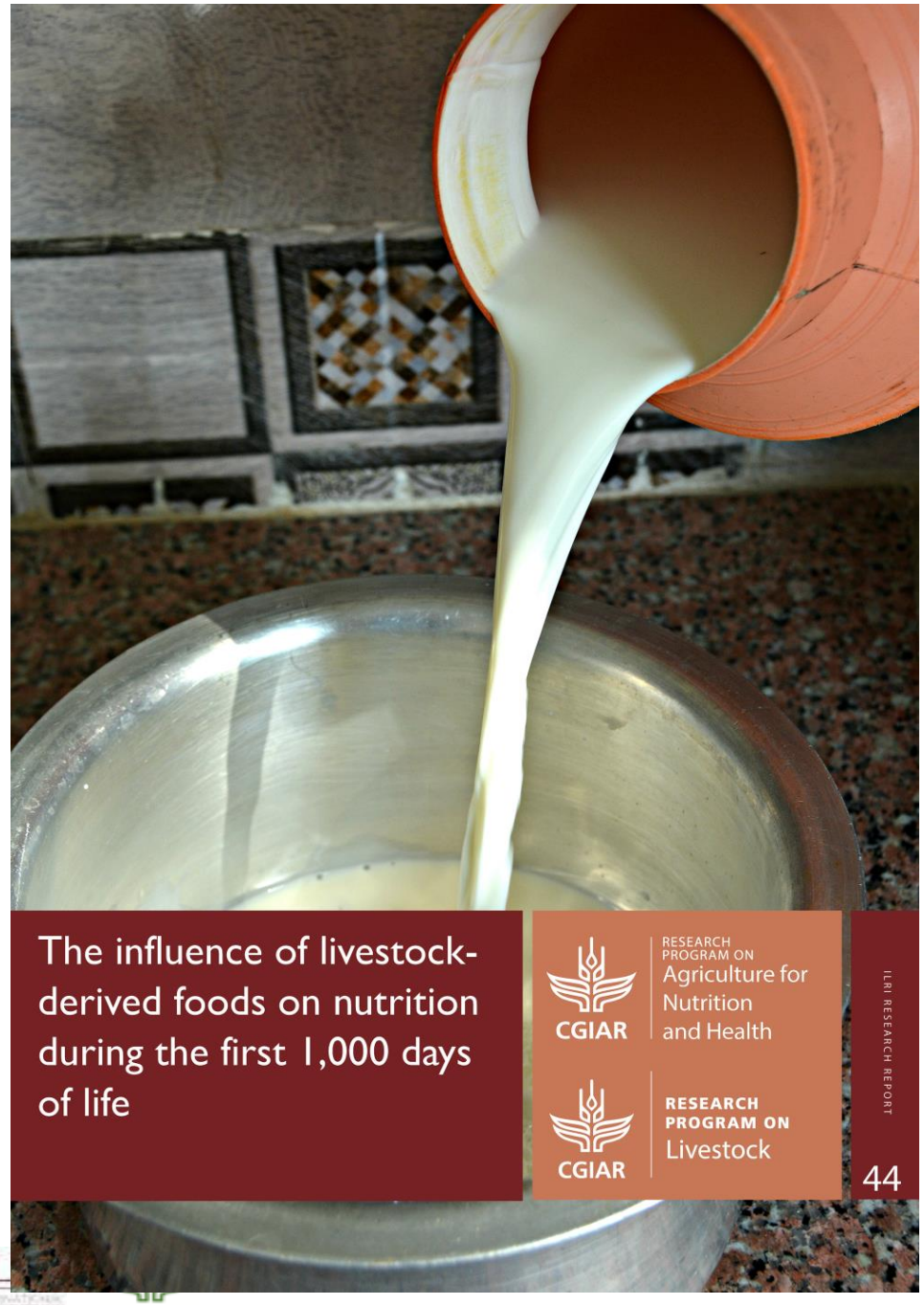


The influence of livestock-derived foods on nutrition during the first 1,000 days of life

RESEARCH PROGRAM ON Agriculture for Nutrition and Health

RESEARCH PROGRAM ON Livestock

ILRI RESEARCH REPORT

44

Food Safety

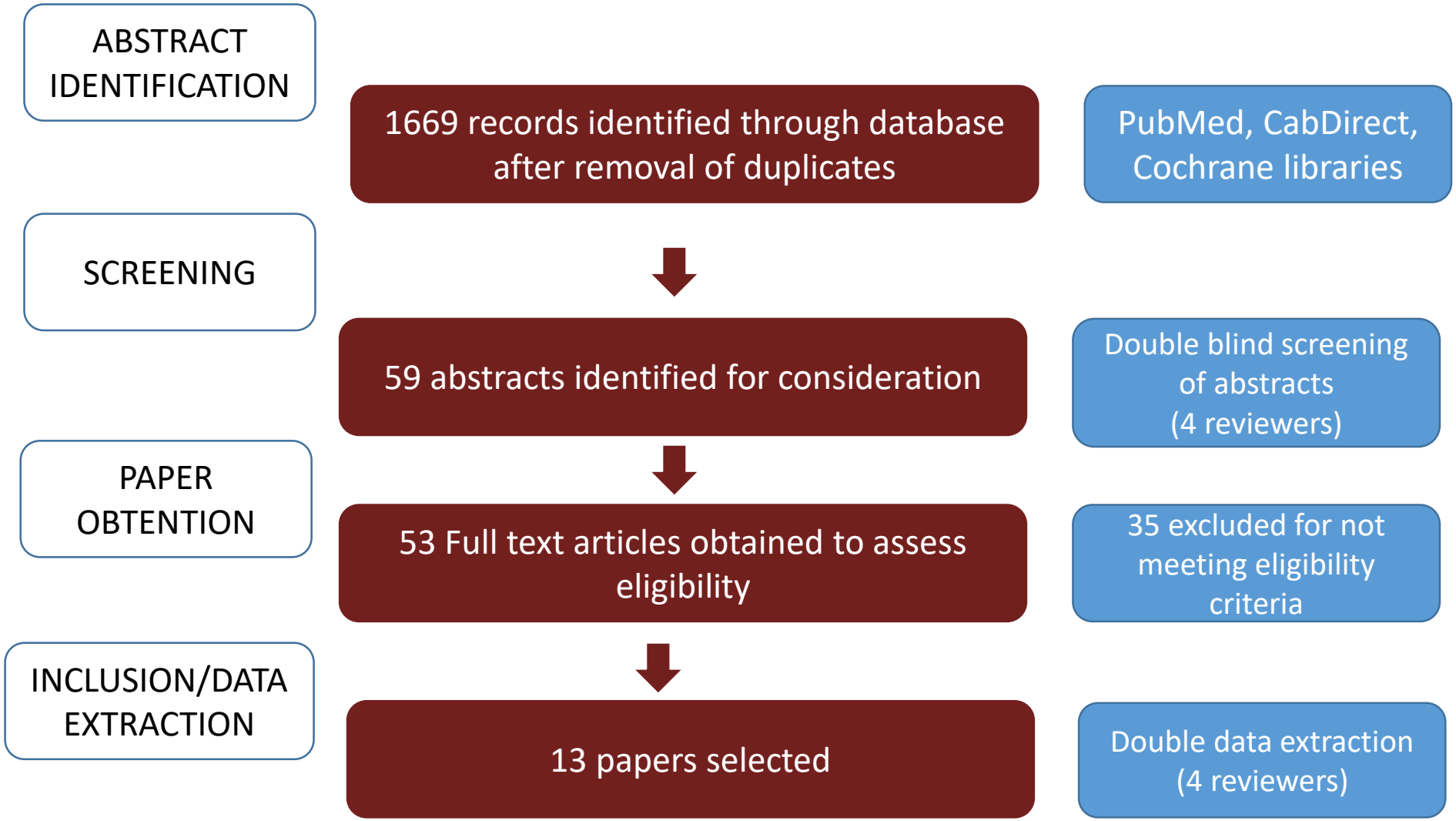
WORKING GROUP: TECHNICAL BRIEF

Food safety metrics relevant to low and middle income countries

ANH Academy

Agriculture, Nutrition & Health Academy

Screening process: PRISMA Flow chart for paper selection



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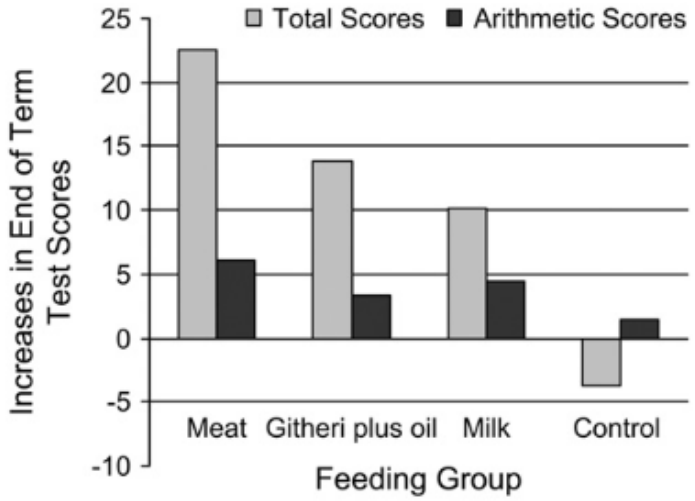
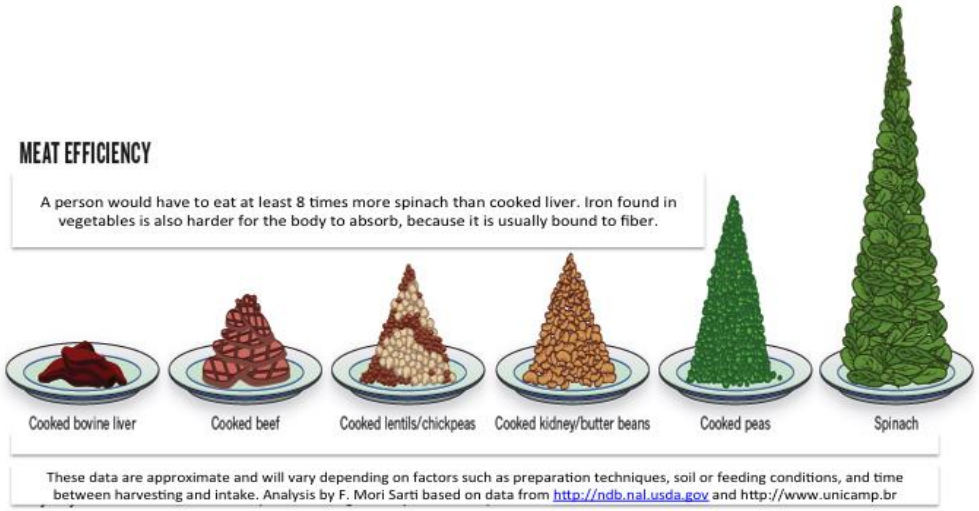
Meat Supplementation Improves Growth, Cognitive, and Behavioral Outcomes in Kenyan Children[1,2]

Charlotte G. Neumann,[3]* Suzanne P. Murphy,[4] Connie Gewa,[5] Monika Grillenberger,[6] and Nimrod O. Bwibo[7]





ELSEVIER

Economics & Human Biology
Volume 10, Issue 3, July 2012, Pages 299-309

Review

Dairy products and physical stature: A systematic review and meta-analysis of controlled trials

Hans de Beer

240ml milk/day = 0.4cm taller/year
(more if stunted or adolescence)

Eggs in Early Complementary Feeding and Child Growth: A Randomized Controlled Trial

Lora L. Iannotti, PhD,[a] Chessa K. Lutter, PhD,[b] Christine P. Stewart, PhD,[c] Carlos Andres Gallegos Riofrío, MA,[d] Carla Malo, BS,[d] Gregory Reinhart, PhD,[e] Ana Palacios, MD, MA,[e] Celia Karp, BS,[d] Melissa Chapnick, RD, MS, MPH,[a] Katherine Cox, BA,[a] William F. Waters, PhD[d]

One egg a day = almost halved stunting

Strong Conclusions

Some consistency :

- Positive role of milk in linear growth and MUAC (not in all) => supported with results from other countries (meta-analysis by de Beer 2011)
- Cognitive skills more promoted by meat than by milk

- Limited role of egg => New evidence on eggs to be incorporated (Iannotti, 2017)
- The more under-nourished, the better the results

Not consistency in:

- Micronutrient results

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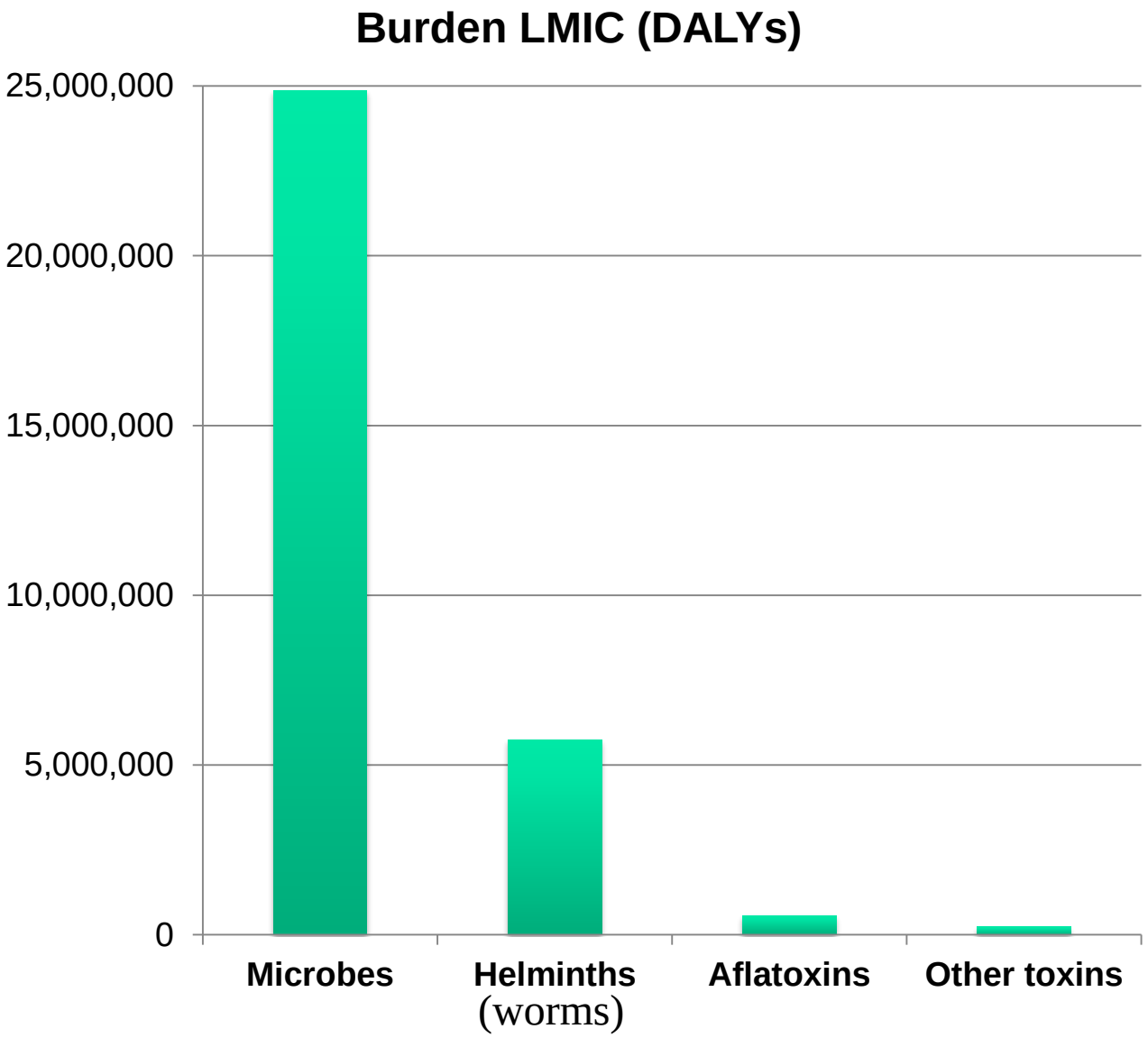
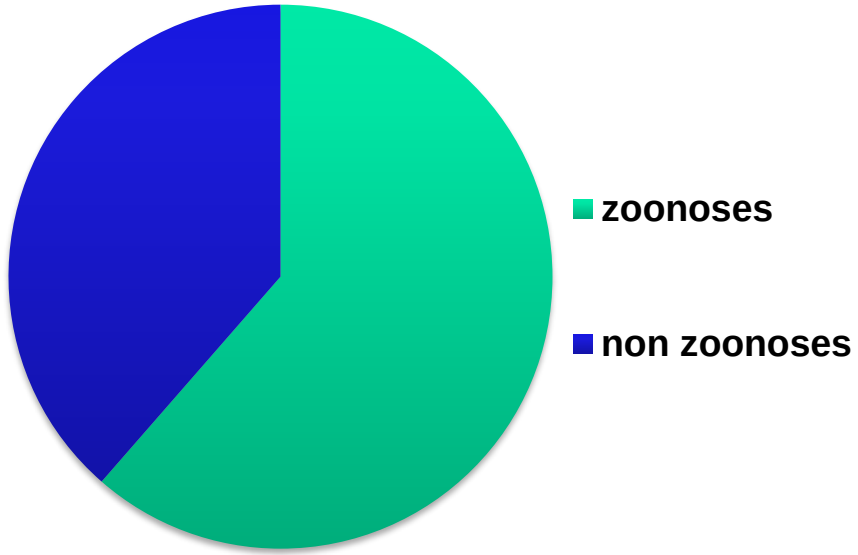
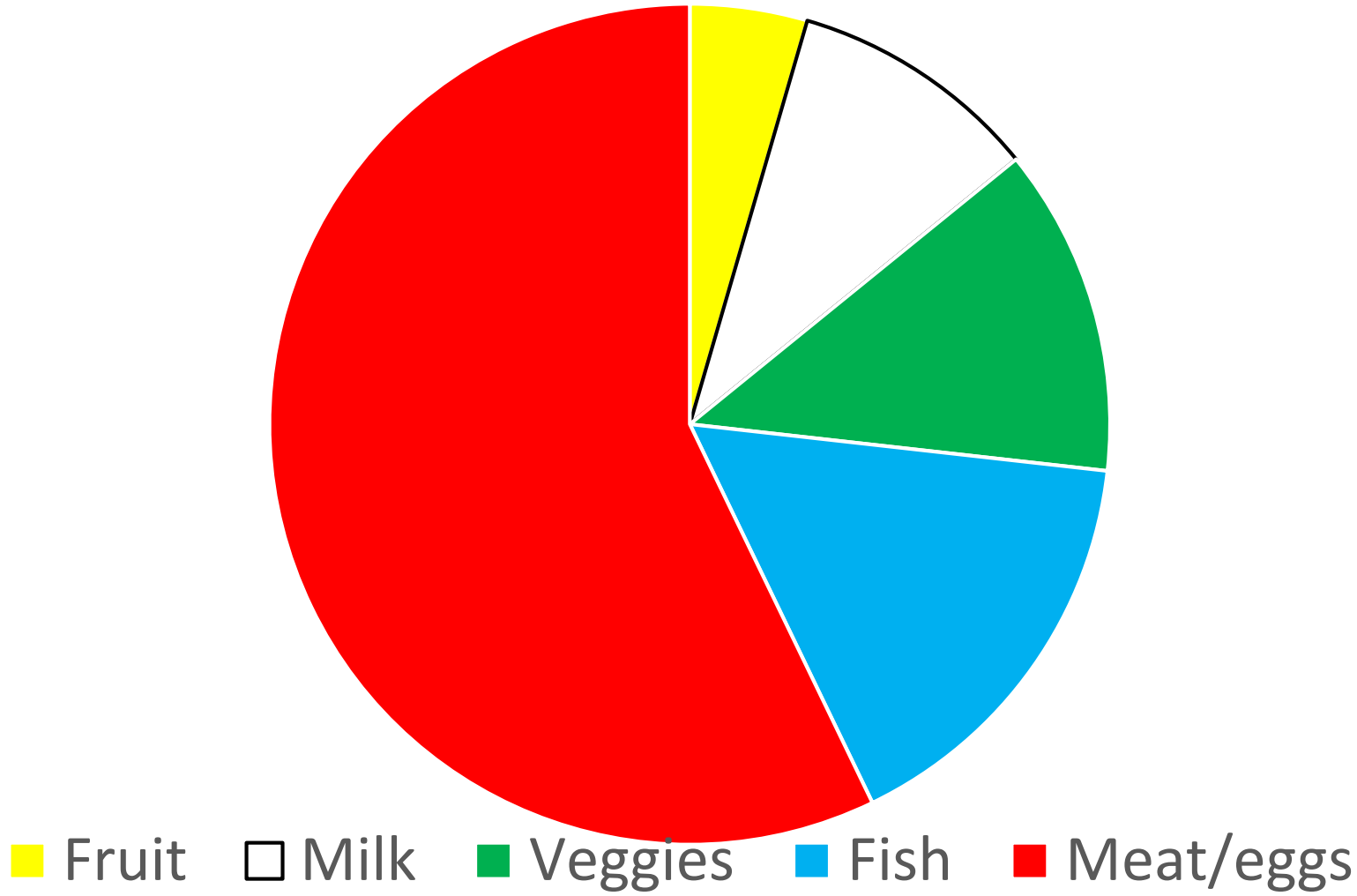
Causes of Food Borne Disease





World Health Organisation, 2016

Foods implicated in FBD



World Health Organisation, 2017

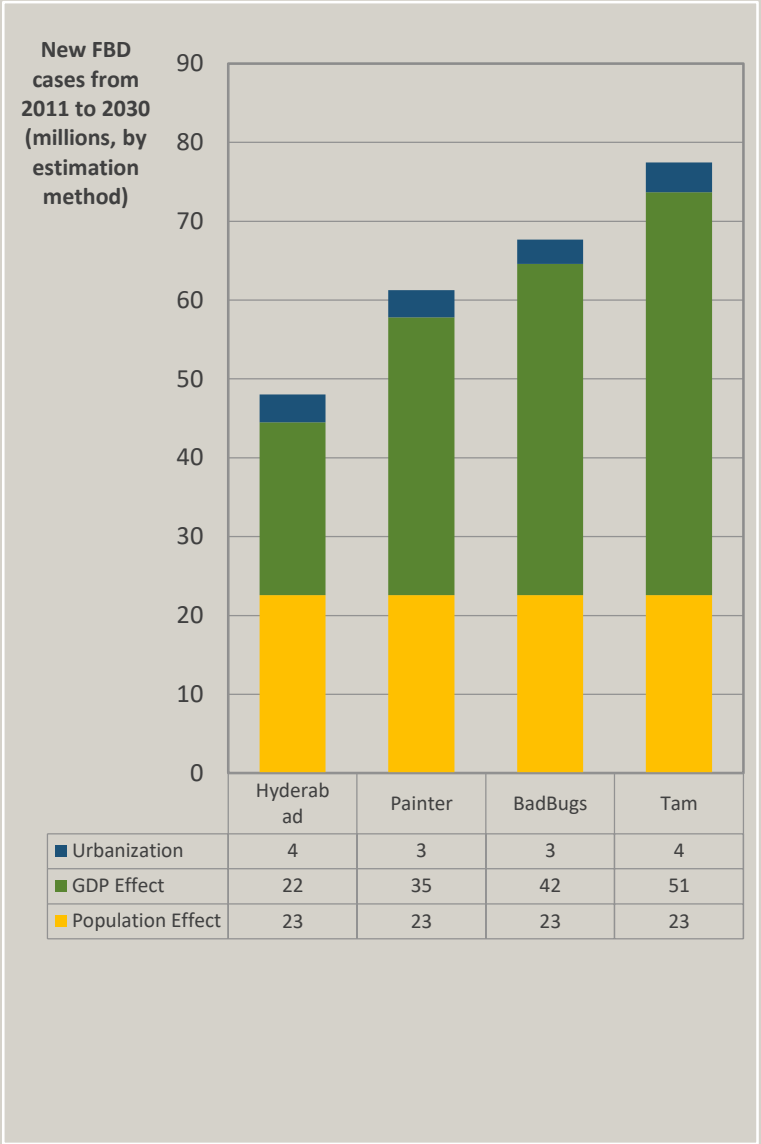
FBD going up, up, up

Best estimates of **current** FBD burden in India – about **100 million cases** per year with and **economic costs** in the range of **USD 12 billion to 55 billion USD**

Applying the human capital approach (foregone output due to premature mortality) the **2010 economic costs** are in range of **USD 12 billion to 55 billion USD**

Expected FBD burden in India to rise from **100 up to 170 million in 2030 – increasing from one out of 12 to one out of 9** people falling sick on average

GDP growth has largest impact on increase in FBD cases from 2011 to 2030, followed by population growth



	Hyderabad	Painter	BadBugs	Tam
Urbanization	4	3	3	4
GDP Effect	22	35	42	51
Population Effect	23	23	23	23

2014 FOOD SAFETY PROGRESS REPORT

Pathogen	Healthy People 2020 target rate	2014 rate*	Change compared with 2006-2008†	
Campylobacter	8.5	13.45	13% increase	
E. coli O157§	0.6	0.92	32% decrease	
Listeria	0.2	0.24	No change	
Salmonella	11.4	15.45	No change	
Vibrio	0.2	0.45	52% increase	
Yersinia	0.3	0.28	22% decrease	

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

*Culture-confirmed infections per 100,000 population

† 2006-2008 were the baseline years used to establish Healthy People 2020 targets

§ Shiga toxin-producing *Escherichia coli* O157

For more information, visit www.cdc.gov/foodnet

SLR: Food safety improvements are feasible, effective, affordable

Most experiments evaluating the effectiveness of technologies were successful

- Irradiation successfully reduced bio-amines in sausages.
- Sealing the anus and throat of cattle during slaughter successfully reduced carcase contamination.
- Spraying carcases with vinegar reduced contamination.
- The biocontrol agent, *Trichoderma harzianum*, reduced *Aspergillus flavus* infection of groundnut in the field and increased yields.

Many training interventions were successful:

- Simple hygiene messages were given to mothers and microbial quality of complementary food improved as evaluated by a RCT.
- School canteens were given hygiene training. After the intervention, staff hygiene knowledge and practice scores, food temperature, aerobic colony count (ACC) and Staphylococcus aureus load in ready to eat (RTE) meal improved significantly compared to baseline.
- Farmers were trained to remove visibly contaminated maize kernels and to wash the remainder. Compared to baseline, mycotoxins in urine significantly decreased.

Interventions around introducing new processes could lead to improvements:

- The introduction of HACCP to an ice-cream making plant resulted in a reduction in microbial contamination of the product.
- Certified green bean farms in Kenya had much better safety performance than non-certified pepper farms in Uganda.
- Detailed abattoir inspection led to a higher detection of tuberculosis infected carcases than routine inspection.

All willingness to pay experiments indicated consumers were WTP for safer food

How scientists lie about evidence

- Weasel words
- Creative causality
- Ignore guidelines

Weasel words

- Depends on
- Significant
- Controls for
- Determines, associated with, linked with, protects

Creative causality

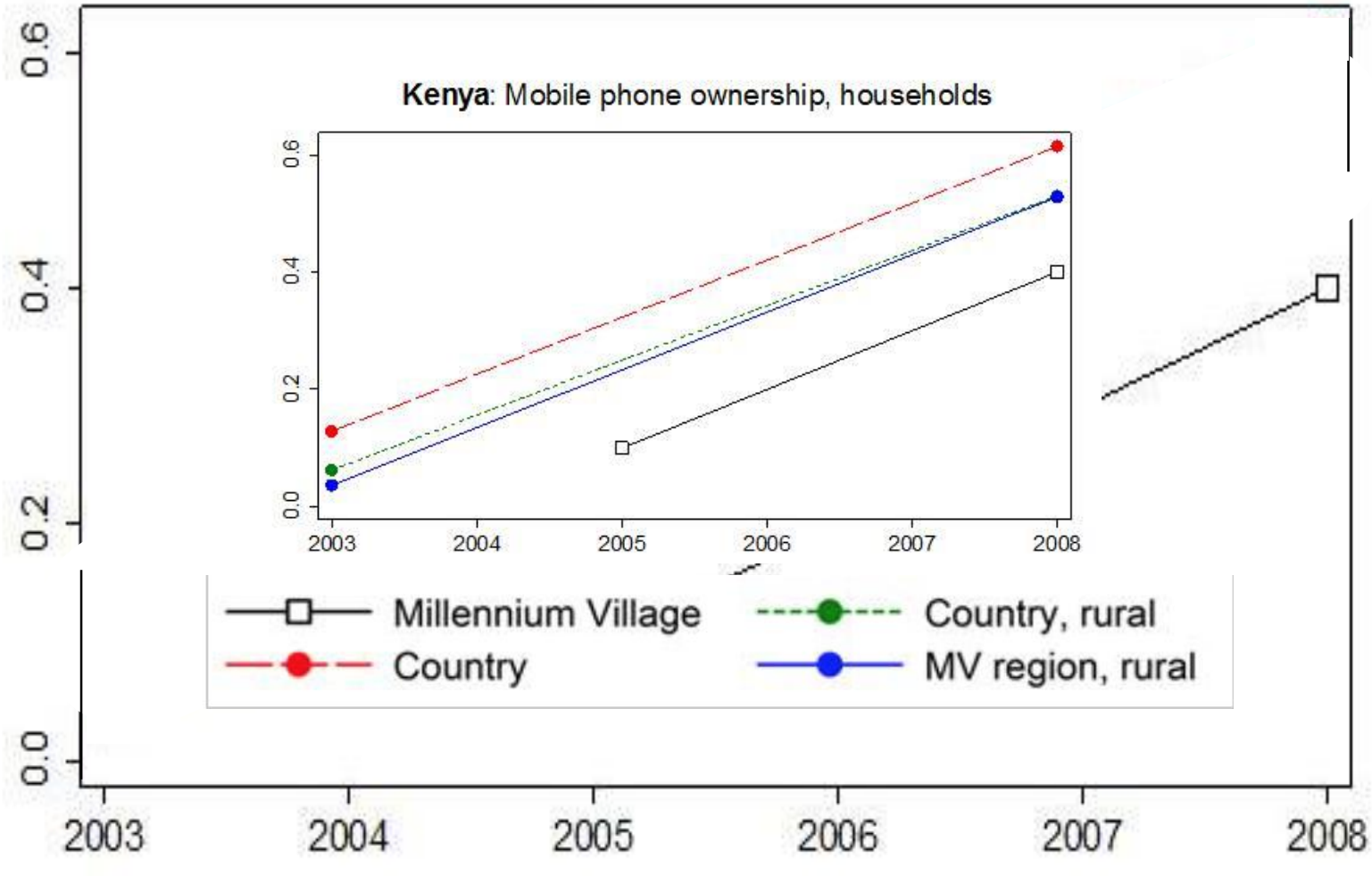
Non experimental designs can only suggest

- **Can’t control completely with a regression model or propensity score**
  - **Models can only say might**
- **Can’t get causality from a cross sectional (with –without) study**
- **Can’t get causality from a before and after study**

Before and after

- MVP mid-term evaluation report highlights “Proportion of households that own a mobile phone increased fourfold” as one of the project’s “biggest impacts” in Bar-Sauri.

http://blogs.worldbank.org/africacan/the-millennium-villages-project-continues-to-systematically-overstate-its-effects



Observational studies

- **Book "Uncontrolled" (Manzi) summarized: 90% of large RCT replicated**
  - **as compared to only 20% of non-RCT**

- **Young and Carr looked at 52 claims made in medical observational studies**
  - **NONE (zero) of the claims replicated in RCTs,**
  - **5 claims were stat-sig in the opposite direction in the RCT**
  - **Their summary: any claim coming from a non-RCT is most likely to be wrong**

- **Even well-controlled, published non-RCT have been reversed by RCT**

Cross-sectional studies

- Many studies show an association between red and processed meat and increases in total mortality, cancer mortality and CVD mortality even after statistical control

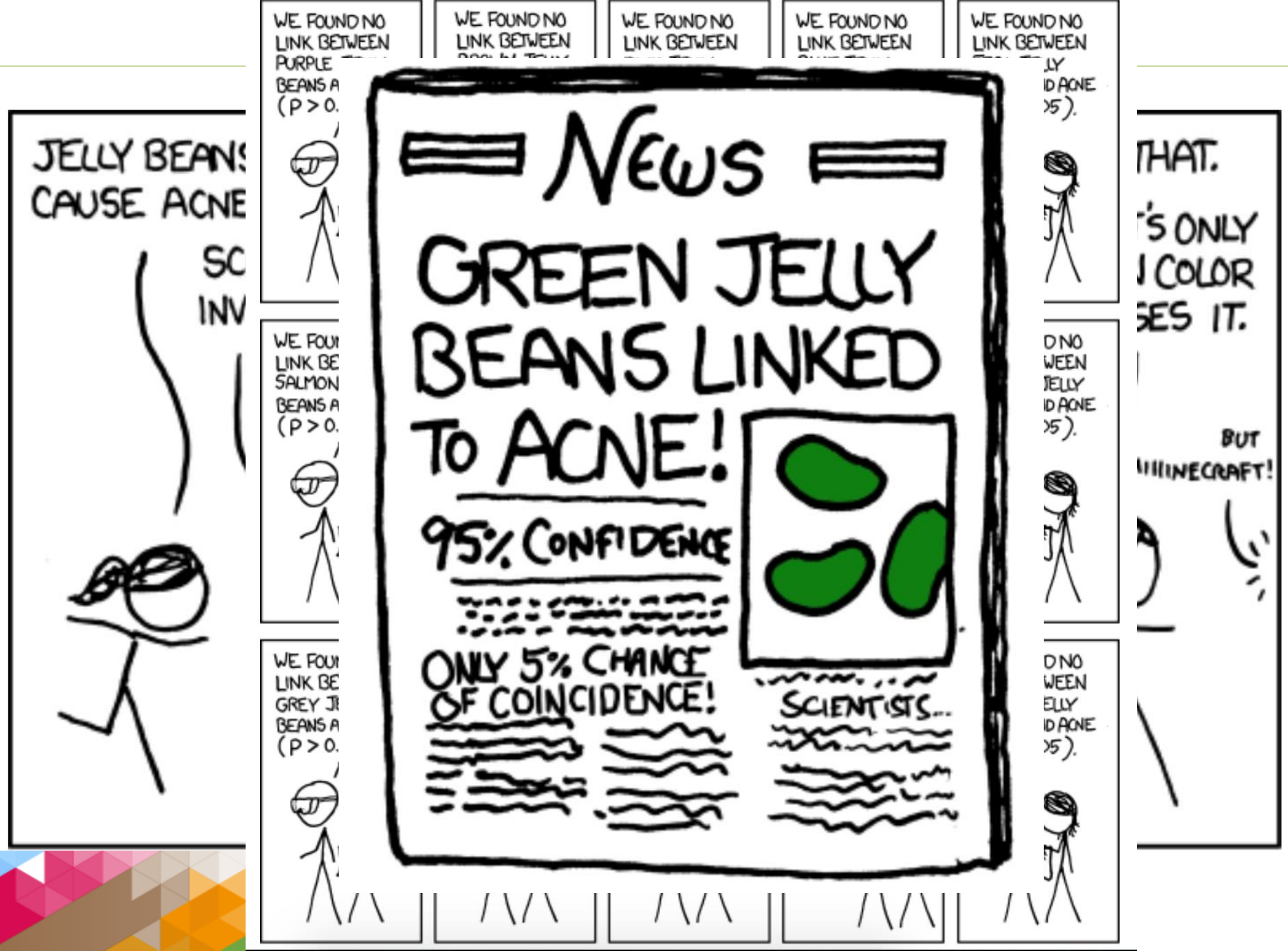
- Recent, large, multi-country study found high CHO intake linked to worse total mortality and CVD outcomes, high fat intake associated with lower risk. Animal protein was associated with lower risk of total mortality, plant protein was not.

- A very large observational study found red meat increased the risk total mortality and white meat decreased it. Is red meat and white meat so different, or are these divergent outcomes a product of who eats red meat vs who eats white meat?

Creative causality

RCT can be done wrong too

- **Must be controlled, controls must be random**
- **Must follow best practice guidelines**
- **Comparisons require corrections**
- **Can’t infer causality from a secondary outcome**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Doing it wrong

- **Failure to evaluate large scale investments**
- **Interventions without measuring outcomes – yet some interventions make things worse**
- **Near-term, easy, un-important outcomes e.g. changes in knowledge**
- **Reliance on self-reporting (e.g. diarrhea)**
- **Short-term follow ups – no attention to sustainability**
- **Limited information on economic aspects – many likely unaffordable**
- **Lack of attention to incentives**
- **Limited cover of un-intended consequences especially gender and nutrition**

Composite study on nutrition sensitive agricultural interventions

- **Agricultural intervention in villages to improve nutrition of children**
- **Provided seeds, poultry, training, BCC**

- **Cluster randomised controlled trial**
- **Outcomes: HAZ, WHZ, wasting, stunting, Hb, anaemia, diarrhoea, cognitive performance.**

- **No significant effect on HAZ, WHZ**
- **Marginally significant on Hb – p=0.06**
- **No change anaemia, significant improvement cognition**
- **Significant effect on diarrhoea**
- **Girls between 6 months and 12 had significantly reduced stunting**

Doing it right

- **Do a RCT if you want to make claims about cause/ impact**
- **Clearly specify a single primary outcome of the study or include few primary outcomes along with a strategy to account for multiplicity,**
- **Specify a limited number of secondary outcomes, along with a justification**
- **Published protocol in a recognized trial registry prior to the start of trial analysis,**
- **Ensure that the discussion of outcomes is consistent in the protocol, abstract, methods, results and tables, and,**
- **Use principled approaches to account for multiple outcomes to help minimize the chance of spurious results due to multiplicity and help to ensure maximal gain of evidence-based knowledge accrues from these important and expensive trials.**

Reporting guidelines for main study types

Randomised trials	CONSORT	Extensions
Observational studies	STROBE	Extensions
Systematic reviews	PRISMA	Extensions
Case reports	CARE	Extensions
Qualitative research	SRQR	COREQ
Diagnostic / prognostic studies	STARD	TRIPOD
Quality improvement studies	SQUIRE	
Economic evaluations	CHEERS	
Animal pre-clinical studies	ARRIVE	
Study protocols	SPIRIT	PRISMA-P
Clinical practice guidelines	AGREE	RIGHT

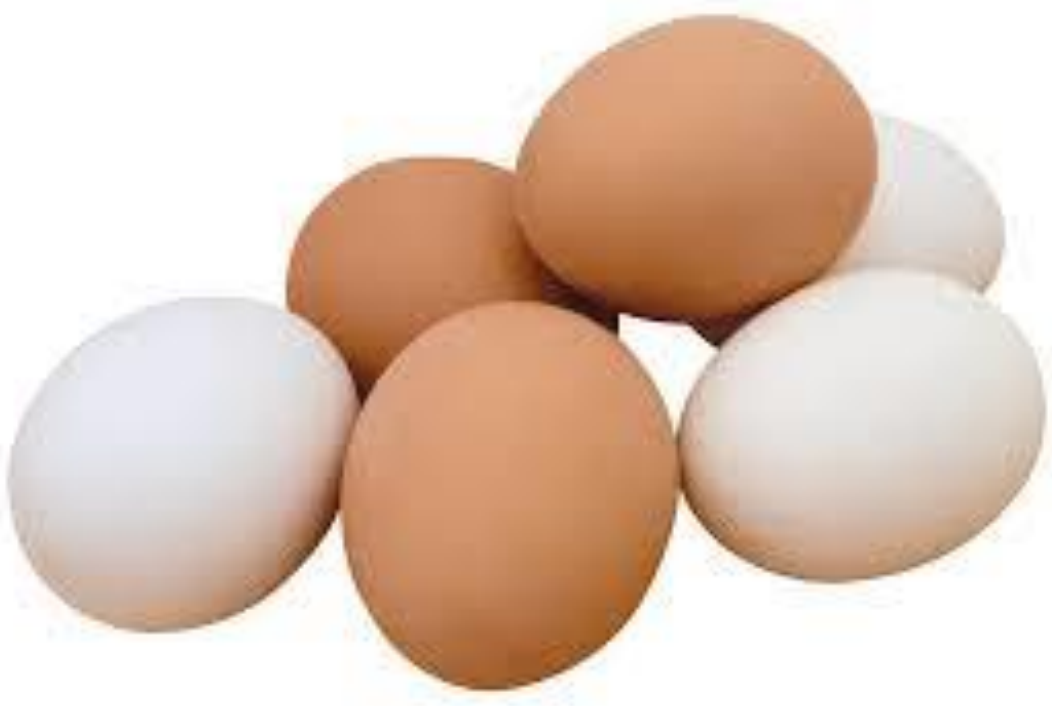
Equator.net

Qualitative research review guidelines – RATS

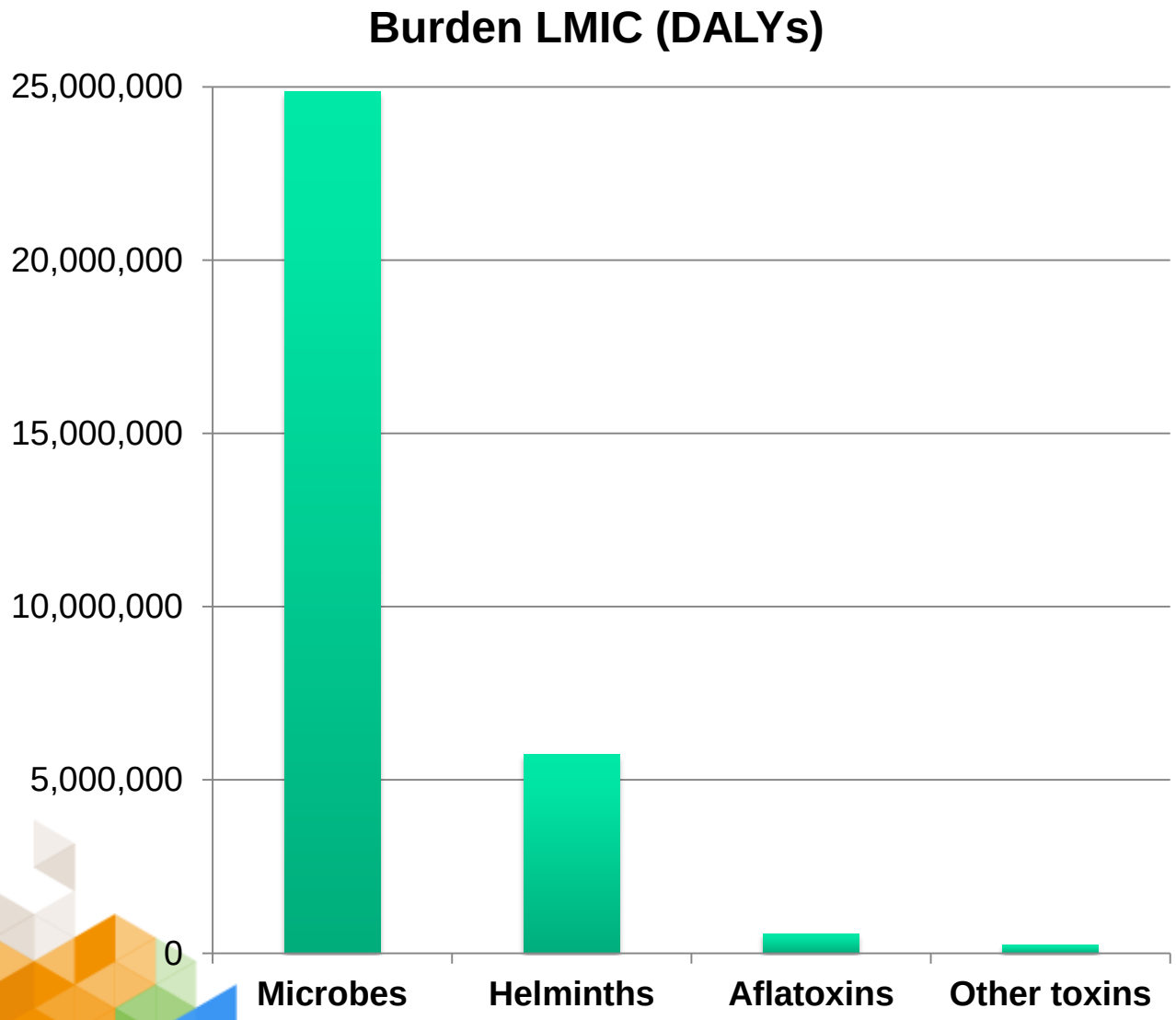
Reporting guideline provided for? (i.e. exactly what the authors state in the paper)	Qualitative research reviews
Full bibliographic reference	The RATS guidelines modified for BioMed Central are copyright Jocalyn Clark, BMJ. They can be found in Clark JP: *How to peer review a qualitative manuscript*. In *Peer Review in Health Sciences*. Second edition. Edited by Godlee F, Jefferson T. London: BMJ Books; 2003:219-235.
Language	English
Relevant URLs (full-text if available)	The RATS reporting guideline checklist is available at: http://old.biomedcentral.com/authors/rats
Reporting guideline	RATS

If you want tall kids give them milk

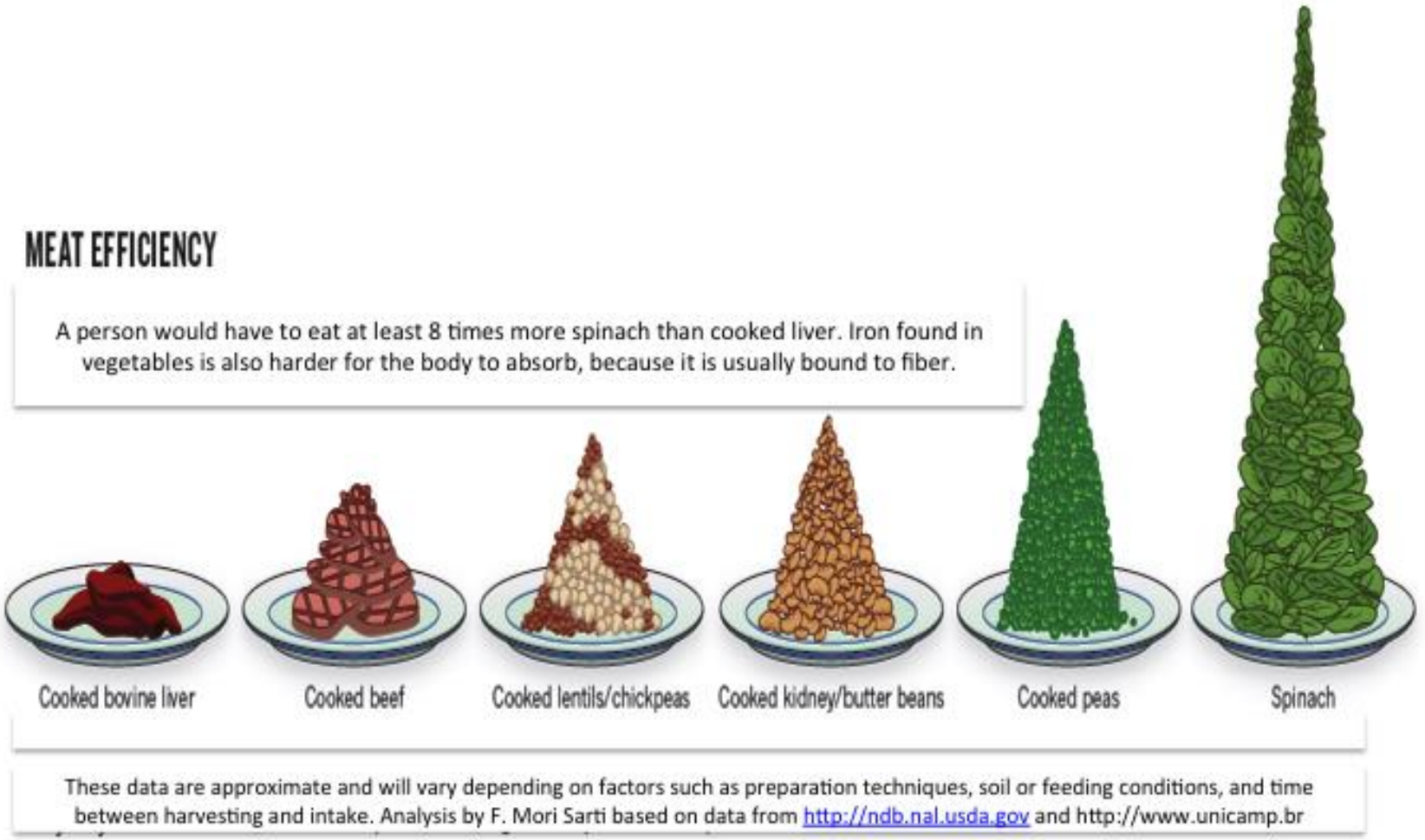
If you want smart kids feed them eggs



Bugs have much larger impacts than chemicals



If you want to improve your iron eat liver



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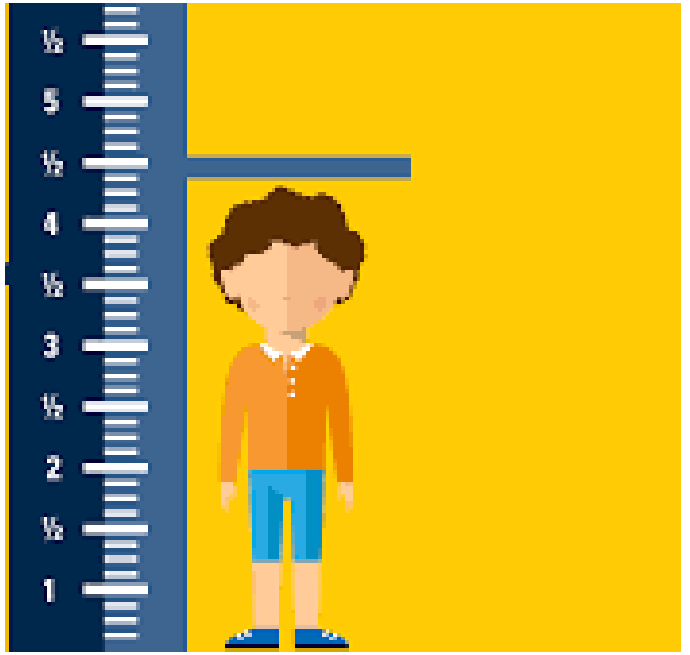

www.livestockdialogue.org

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#LivestockAgenda

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