

# Is the EAT-Lancet commission report alone enough for dietary recommendations?

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Today focus on following aspects of the derivation of the report's Universal Healthy Reference Diet (Reference diet or REF) health projections (Section 1)

- Evidence basis
  - Methodology lacks transparency: e.g. dietary selection process not well documented
  - Not a systematic approach, not following accepted guidelines. Based on expert opinion.
  - No evidence quality assessment
  - Reference diet established based on prevented mortality, afterward adjusted for nutritional content and evaluated *a posteriori* for sustainability
- Modeling methodology
  - Causality assumption
  - Wrong RRs
  - Incorrect and incomplete uncertainty analysis
  - Comparing REF diet with fixed, perfect intake against status-quo diet caloric intake

## The EAT-Lancet Commission's Dietary Composition May Not Prevent Noncommunicable Disease Mortality

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### ABSTRACT

The recently published EAT-Lancet Commission report on dietary impacts on

<https://academic.oup.com/jn/article/150/5/985/5736577>

# EAT-Lancet Methodology

governance. The Commission’s definition of a healthy reference diet was calculated through analysis of food groups, with appropriate ranges proposed for essential daily intake that would lead to **optimal** health and wellbeing and to reducing premature deaths worldwide by 19–23%. The dietary shift that is needed requires a

- Proposed reference diet **based only on “health”**, measured through prevented mortality -> not an optimization
- Reference diet established based on prevented mortality, afterward adjusted for nutritional content and evaluated *a posteriori* for sustainability
- Prevented mortality estimates come from three publications with overlapping co-authors
- **BUT, significantly departs** from other established, health-based diets (e.g. US Dietary Guidelines and UK Eatwell guide)

**WHY?**

	Macronutrient intake grams per day (possible range)	Caloric intake kcal per day
 Whole grains Rice, wheat, corn and other	232	811
 Tubers or starchy vegetables Potatoes and cassava	50 (0–100)	39
 Vegetables All vegetables	300 (200–600)	78
 Fruits All fruits	200 (100–300)	126
 Dairy foods Whole milk or equivalents	250 (0–500)	153
 Protein sources Beef, lamb and pork Chicken and other poultry Eggs Fish	14 (0–28) 29 (0–58) 13 (0–25) 28 (0–100)	30 62 19 40
 Legumes Nuts	75 (0–100) 50 (0–75)	284 291
 Added fats Unsaturated oils Saturated oils	40 (20–80) 11.8 (0–11.8)	354 96
 Added sugars All sugars	31 (0–31)	120

Tables 1 (above) and 2 (below) of the EAT-Lancet Commission report

Approach 1 Comparative Risk	19%	or	11.1 million adult deaths per year
Approach 2 Global Burden of Disease	22.4%	or	10.8 million adult deaths per year
Approach 3 Empirical Disease Risk	23.6%	or	11.6 million adult deaths per year

# Evidence selection

No systematic review approach used, despite Lancet publication requirements

- PRISMA for systematic reviews and meta-analyses
- GATHER for studies involving global health estimates

Systematic approach also advocated by NAS in 2017 “Redesigning the Process for Establishing the Dietary Guidelines for Americans, Chapter 4: Strengthening Analyses and Advancing Methods Used”

Lack of systematic approach **can result in:**

- **biased evidence, particularly for food groups with conflictive literature (e.g. animal proteins)**
- **Ignore other equally optimal diets outside of those evaluated by authors**

Examples:

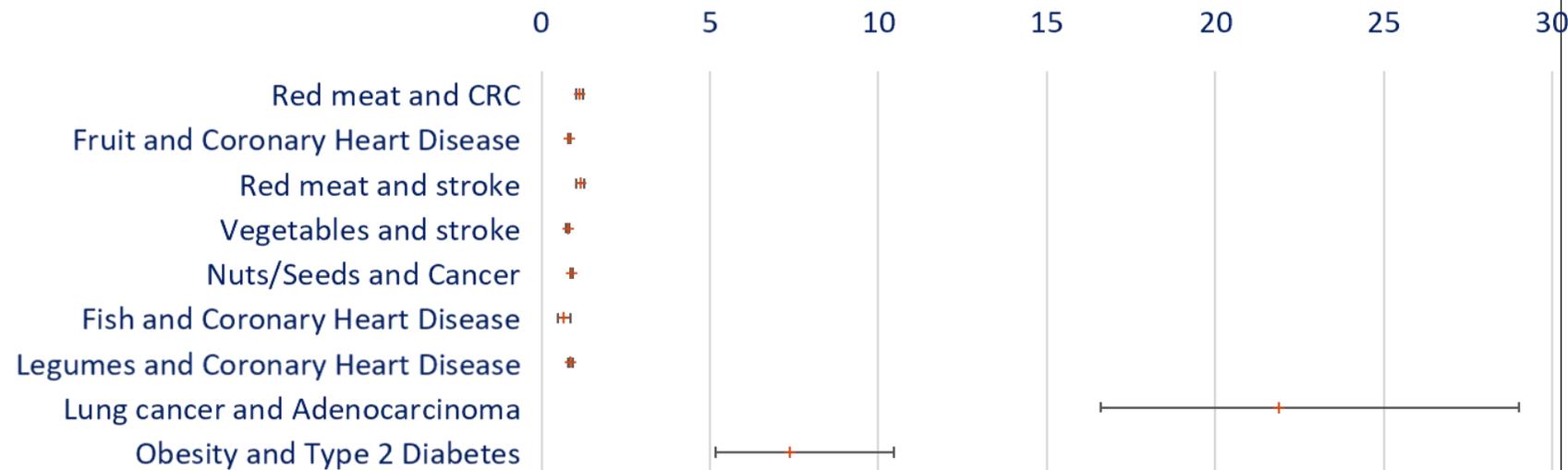
- Some existing SRs were cited, but selection process undefined e.g.
  - why use Chan et al (2011) vs five other newer meta-analysis on CRC and red meat?
  - why include protective effect of nuts against T2DM but not dairy and CRC?
  - Poultry 29(0-58) gr/day. But studies cited in report, even higher amounts not associated with negative health outcomes AND protective effect against CRC and cardiovascular disease
- No article inclusion/exclusion criteria presented, nor database of articles screened

# Strength of evidence and inconsistencies

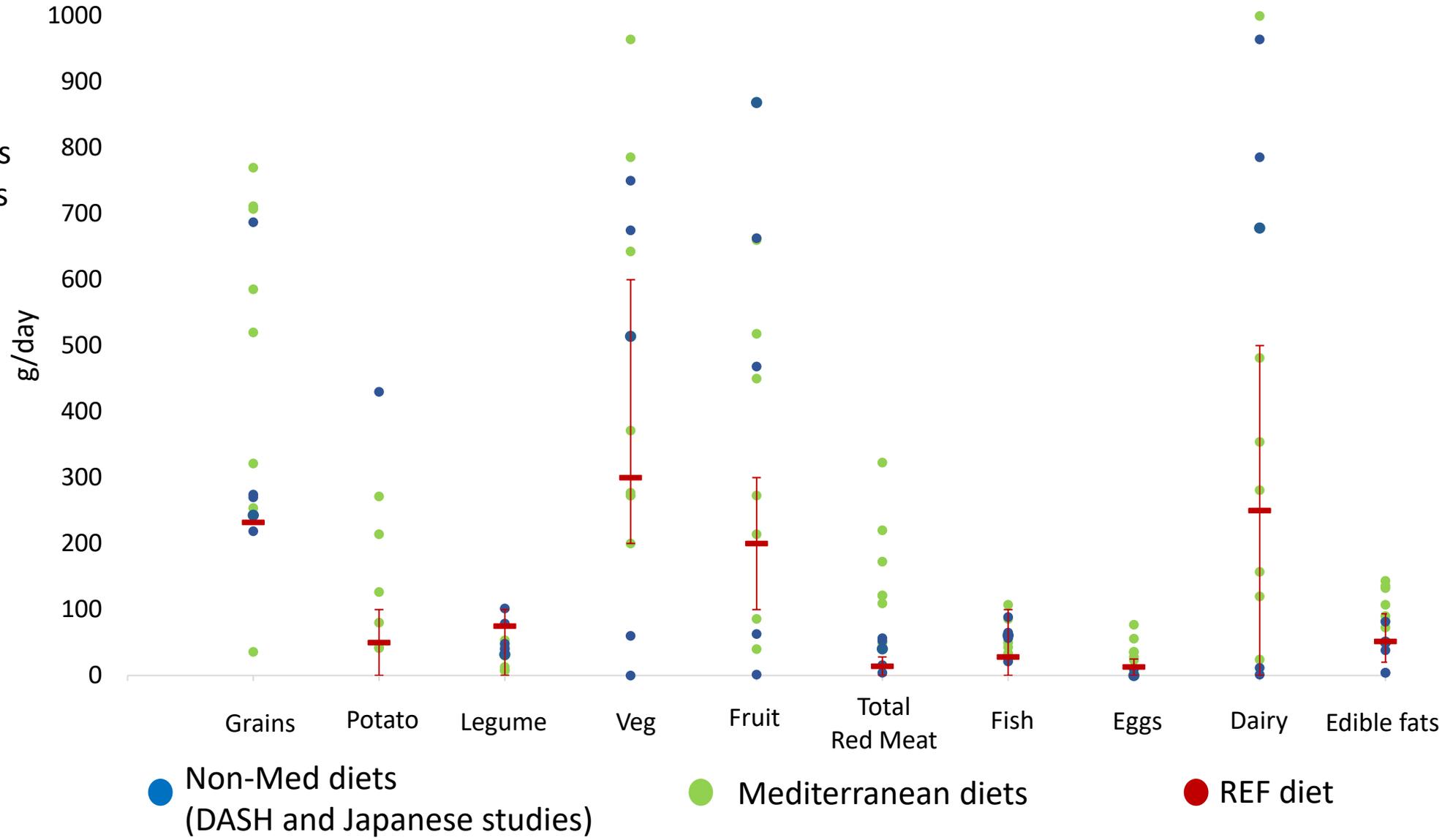
- No evaluation of quality of evidence e.g. GRADE e.g. Johnston et al.(2019) and red meats
- Diet risk factors for health outcomes RRs small and from observational studies assume **causal relationship, and are independent** from each other

Discrepancies on total red meat RRs:

- Total red meat RR for stroke Chen et al.19 was 1.15 (1.05-1.25), but Springmann et al used 1.1 (1.05-1.15)
- Total red meat RR for T2DM Feskens et al.18 was 1.13 (95% CI 1.03-1.23) but Springmann et al. used 1.15 (1.07-1.24),
- REF diet uses RR for total red meat, should be only unprocessed (as diet excludes processed red meat) - > T2DM should then be excluded, lower for CRC and stroke

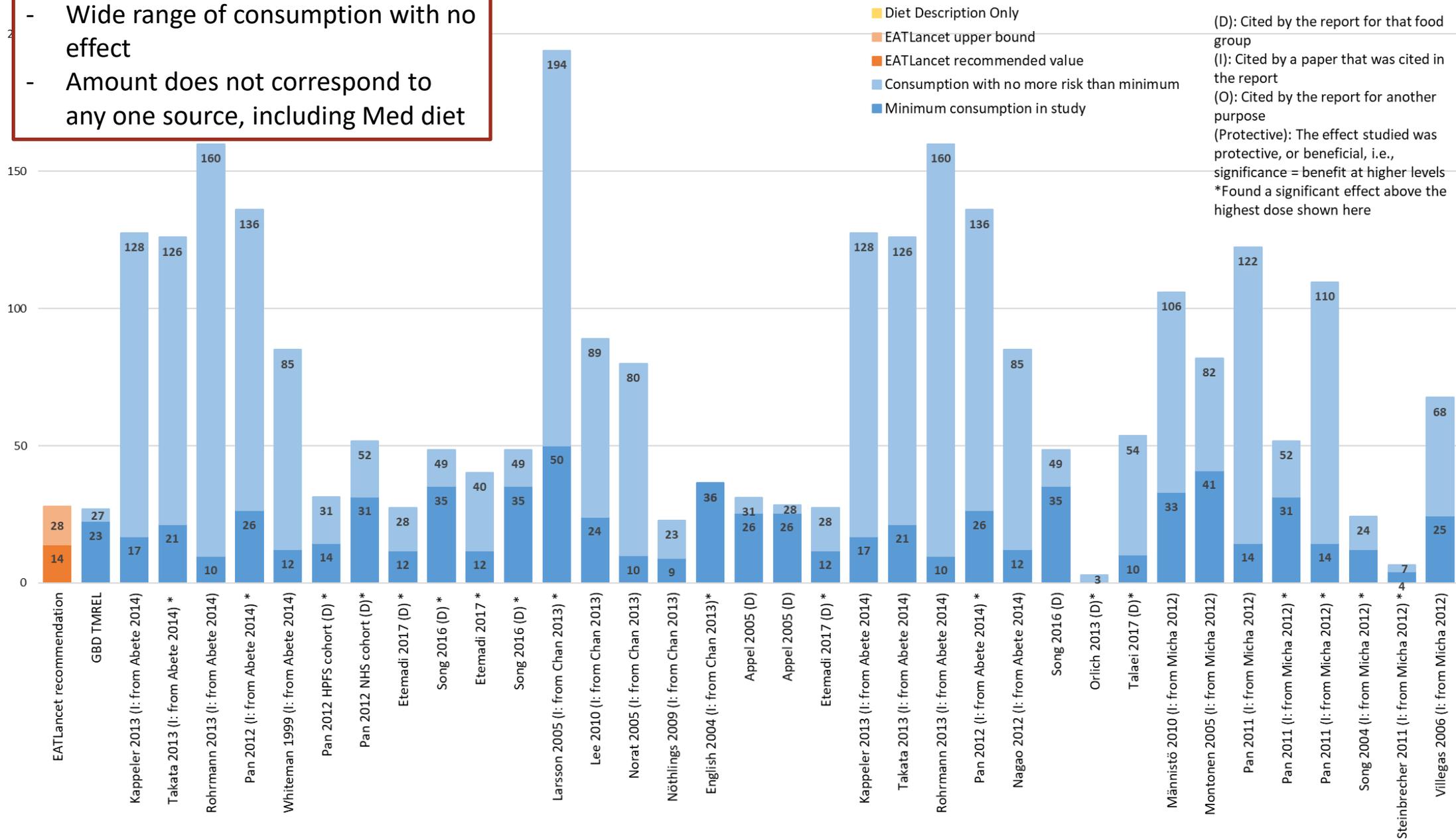


REF diet vs  
references  
cited



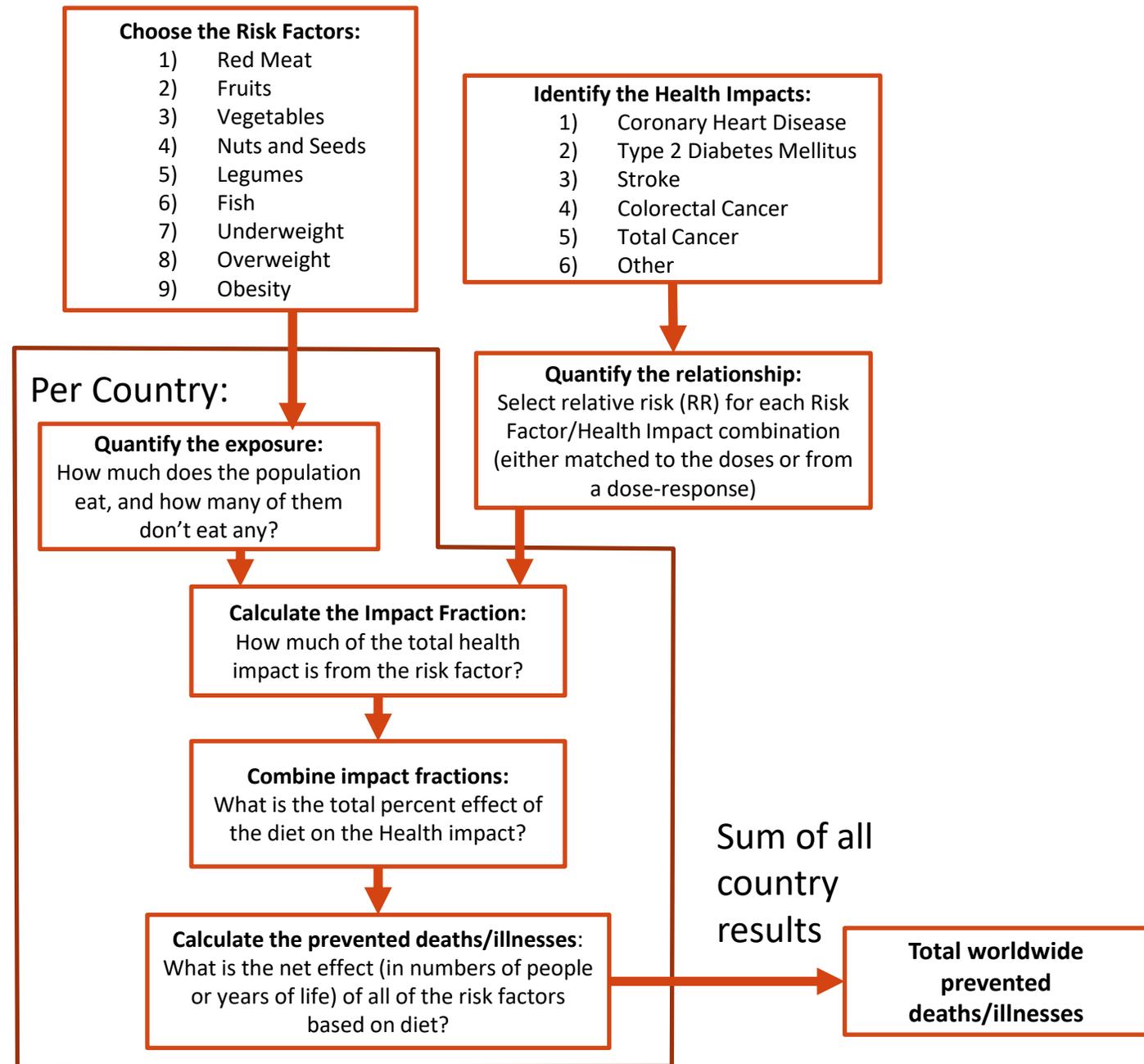
Reference diet red meat recommendation compared with "no additional risk" levels from cited studies, using unprocessed meats only

- Wide range of consumption with no effect
- Amount does not correspond to any one source, including Med diet



# EAT-Lancet/Springmann Mortality Methodology

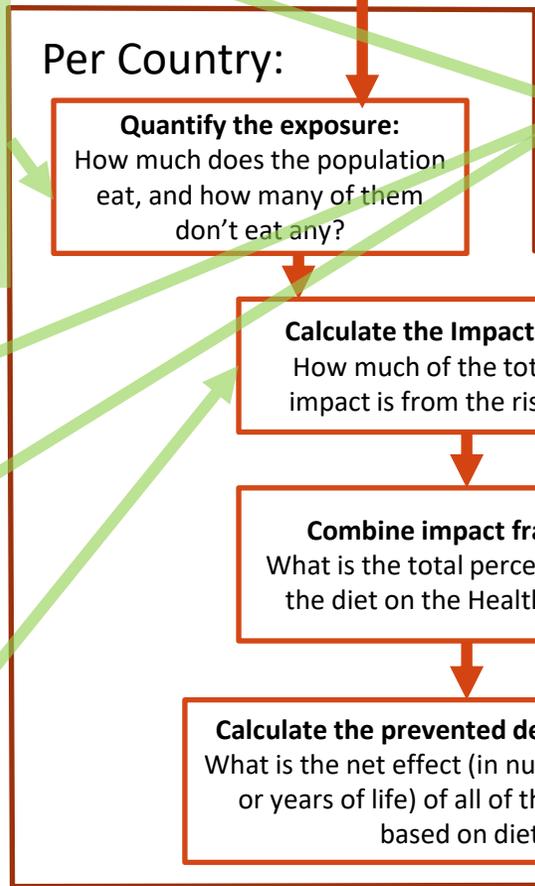
- The **Population Impact Fraction (PIF)** general approach used for many other disease-risk factor relationships outside of diet
  - Requires causality assumption
  - Model additive only when risk factors are independent (diet risk factors are not)
- Linear dose response for all health impacts of red meat and legume consumption, but non-linear for protective effects of other dietary components
  - Based on observational studies at highest consumption, but extrapolated down when no effect observed



# Potential Corrections to the analysis

- Choose the Risk Factors:**
- 1) Red Meat
  - 2) Fruits
  - 3) Vegetables
  - 4) Nuts and Seeds
  - 5) Legumes
  - 6) Fish
  - 7) Underweight
  - 8) Overweight
  - 9) Obesity

- Identify the Health Impacts:**
- 1) Coronary Heart Disease
  - 2) Type 2 Diabetes Mellitus
  - 3) Stroke
  - 4) Colorectal Cancer
  - 5) Total Cancer
  - 6) Other



**Quantify the relationship:**  
 Select a RR for each Risk Factor/Health Impact combination (either matched to the doses or from a dose-response)

Inconsistent meta-analysis sources for RRs

Used total stroke and red meat RR when red meat is only significantly associated with ischemic stroke

No uncertainty in:

- amount of food consumed
- prevalence of consumers
- mortality rates
- prevalence underweight, overweight, and obesity

Incorrect RRs red meats

Ref diet contains no processed meat, but the total red meat RR was used (should be only unprocessed)

Assumes disease cases prevented = deaths prevented)

Sum of all country results

**Total worldwide prevented deaths/illnesses**

# Calories vs diet vs weight

Reduction of **weight-related risk factors alone** impacts mortality

Diet maintaining recommended calorie intake (i.e. perfect adherence resulting in no underweight, and no overweight/obese) will prevent mortality

We separated the weight-related risk factors from the overall mortality estimation (weight + dietary components) to answer:

Is there **additional** reduction in mortalities from the change in dietary components alone after we adjust for weight-related deaths?

Allows us to know if changing from status-quo to the reference diet prevents deaths, or mortality reduction could be achieved with any diet that keeps everyone at a healthy weight

Roughly 50% prevention due to calorie control

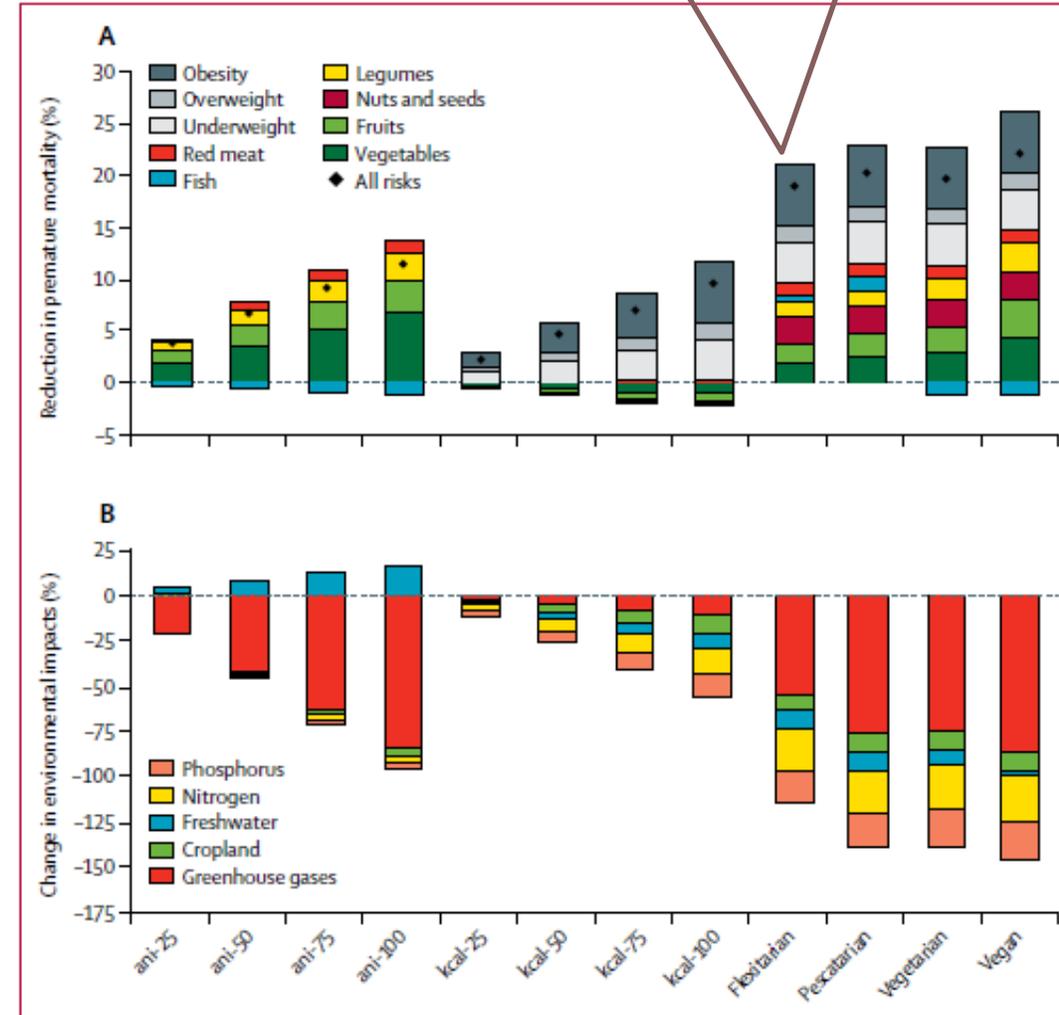
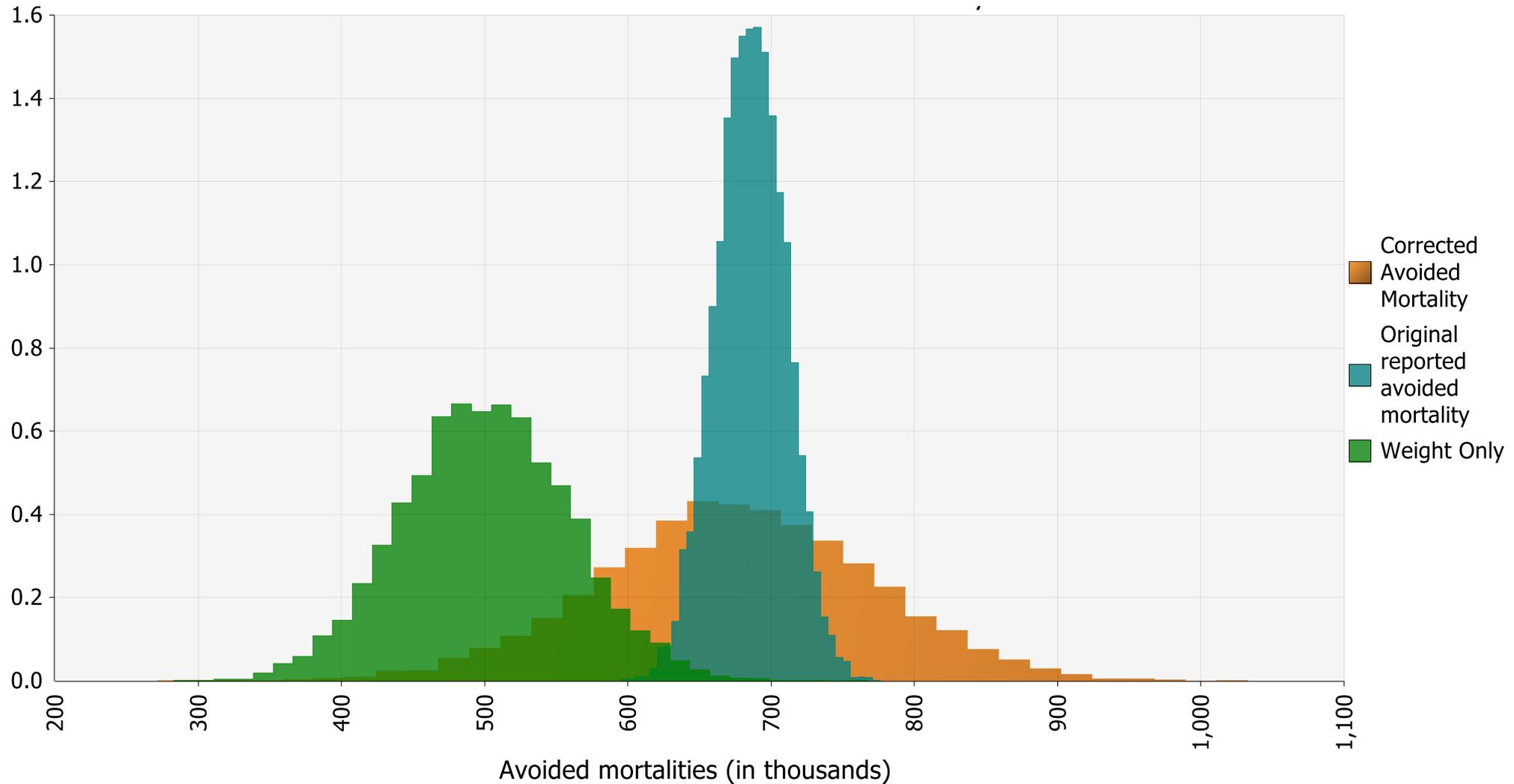


Figure 2: Premature mortality and environmental impacts of diet scenarios in 2030 (A) Diamonds show reductions in premature mortality due to diet patterns and bars show proportion contributions of individual risk factors to the reduction. Total percentage contributions can exceed 100% because individual risks are attenuated when combined and can be compensated by opposing risk factors. (B) Percentage change in environmental impacts.

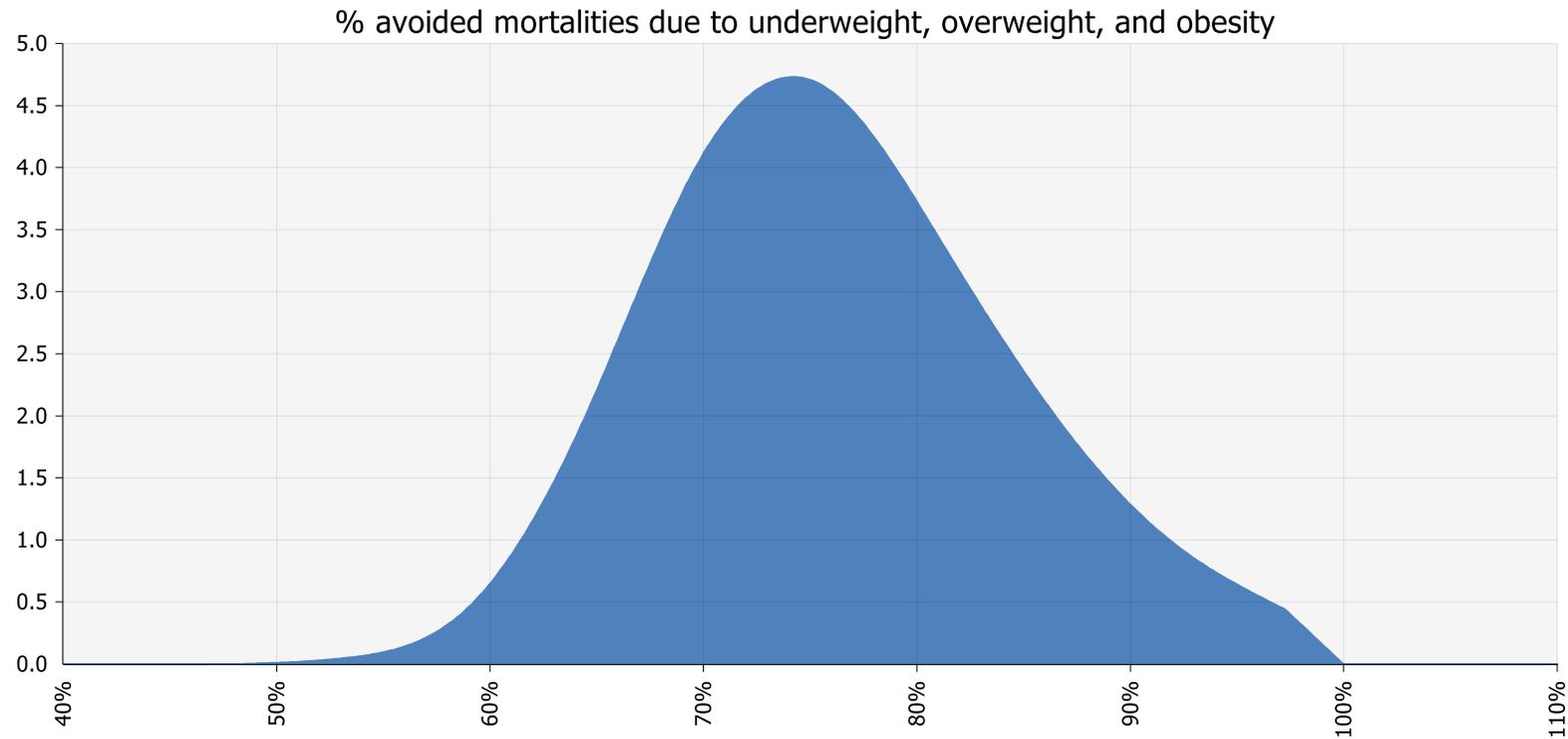
# Avoided mortality after adjustments – United States



# % reference diet projected avoided mortalities due weight factors -USA

REF diet calorie intake assumed fixed -> underweight, overweight, and obesity eliminated in the US population. This assumption is responsible for **75% (63-94%)** of the predicted total mortalities avoided in the USA.

“After adjusting for the omitted uncertainty and RR errors, and beyond the impact of changing energy consumption to a fixed and ideal level with the REF diet, there may not be statistically significant changes in deaths from switching from the current diet composition to the REF one.”



# Conclusions

The EAT-Lancet Universal Healthy Reference Diet is **NOT**:

- A health-optimal diet
- Systematically derived, or using standard reporting guidelines
- Based on causal evidence
- Consistent with several other guidelines or studies

But even accepting all of the above, reference diet mortality prevention NOT statistically different from status-quo diet, after adjusting for ideal caloric intake adherence (for the US)

So although the principle has merits, the methodology must be **independently replicated**, tested and potentially improved by others before it's accepted as sound evidence for policy decisions.

# Thank you!

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