



## Highlights

- Conducted literature review of dietary adequacy in the Andes;
- Most studies report unrealistically low intakes (Fig 1)
- Inadequate intakes of micronutrients is common (Fig 2)
- Fat intakes are much lower than recommendations (Fig 3)
- Increasing consumption of micronutrient and fat-rich Andean grains could form the basis of a healthy, sustainable diet

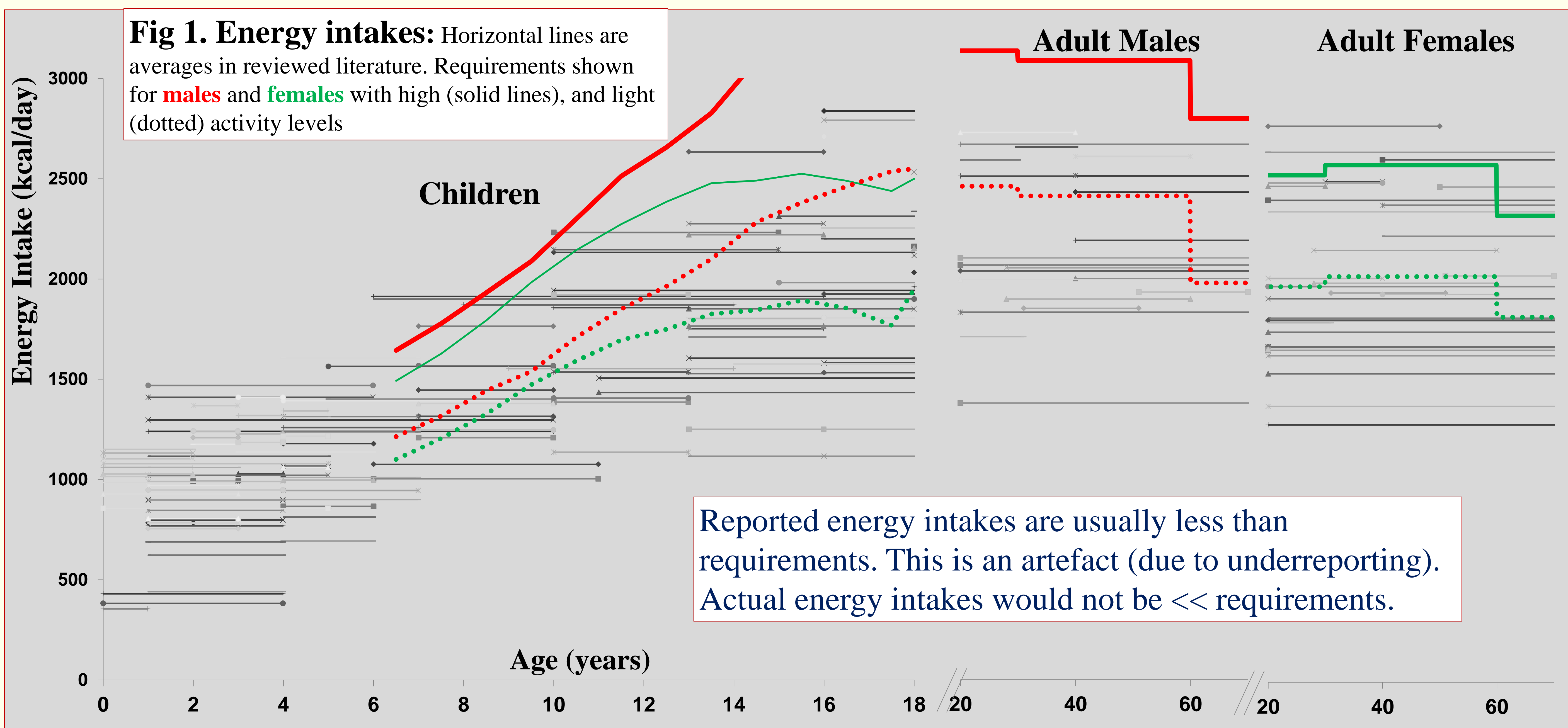
## Objectives

- To review dietary adequacy in the Andes;
- To reveal patterns in food and nutrient intake;
- To highlight food and nutrition priorities in the Andes, and identify opportunities for improvement.

## Methods

- Comprehensive review of published and gray literature 1960 to present
- 33 papers or reports had data suitable for inclusion.
- Extracted data on the mean daily intakes of energy, macro- and micronutrients
- Summarized reports and compared to estimated nutrient requirements

## Results



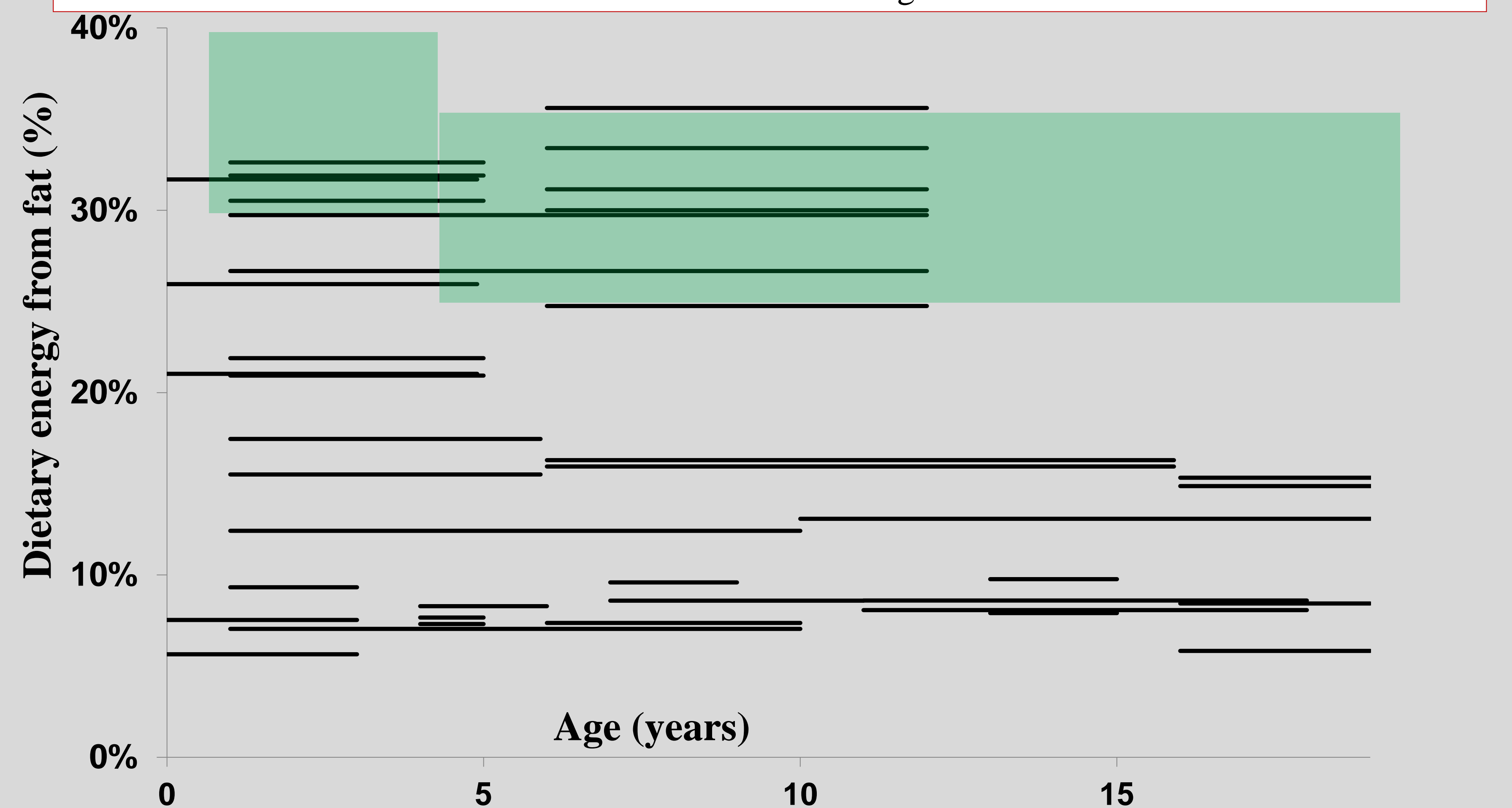
**Fig 2. Micronutrient adequacy of diet:** Average reported intake vs estimated average requirement (EAR). If intake  $\approx$  EAR then  $\sim$ 50% of population will have inadequate intakes.

Age (years)	0	2	4	6	8	9-11	12-15	16-19	20+
<b>MALES</b>									
Thiamin	Green								
Riboflavin	Yellow			Green		Orange		Red	
Vitamin A	Yellow			Green		Orange		Red	
Folate	Red			Yellow		Green		Red	
Calcium	Green		Yellow		Green		Red		Red
Zinc	Green		Yellow		Green		Red		Red
Iron	Green								
<b>FEMALES</b>									
Thiamin	Green								
Riboflavin	Yellow			Orange		Yellow		Red	
Vitamin A	Yellow			Orange		Yellow		Red	
Folate	Red			Yellow		Green		Red	
Calcium	Green		Yellow		Green		Red		Red
Zinc	Green		Yellow		Green		Red		Red
Iron	Green								

In >> EAR   In > EAR   In  $\approx$  EAR   In < EAR   In << EAR

Due to the underreporting, real intakes may be >30% higher than reported, and nutrient inadequacies much less common

**Fig 3. Contribution of fat to energy intake:** Horizontal lines are averages in reviewed literature. Recommended fat intake shown with green boxes.



Fat intakes are remarkably low. In adults (not shown) most studies report averages <20% energy from fat. The fat that is consumed is usually low quality, hydrogenated vegetable oils.

## Conclusions

- The rural Andean diet is characterized by inadequate intakes of some micronutrients and extremely low intakes of fat.
- The health consequences of low fat intake are far reaching, with impaired child growth, impaired neurocognitive development, increased obesity, and heart disease

## Diet of the Future?

- The Andean diet needs to improve micronutrient and, most critically, fat intakes, in order to continue to reduce child mortality and illness, while not exacerbating the increasing rate of diet-related NCDs
- Improvements may be found in a reevaluation of fat and micronutrient-rich Andean grains, such as lupine bean, and quinoa, and the increase of animal-source foods.