TRAINING FOR IMPROVED PRACTICE:
Public Health and Nutrition in Emergencies

Access to Adequate Food

Quality of Diet: Micronutrients

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Overview

- Risk factors and causes for inadequacy of quality of diets
- Types and causes of MDDs specific to emergencies
- Constraints for assessment
- Strategies for response
- Monitoring mechanisms

Major Risk Factors and Causes

Lack of clean water and inadequate sanitation

Major Risk Factors and Causes

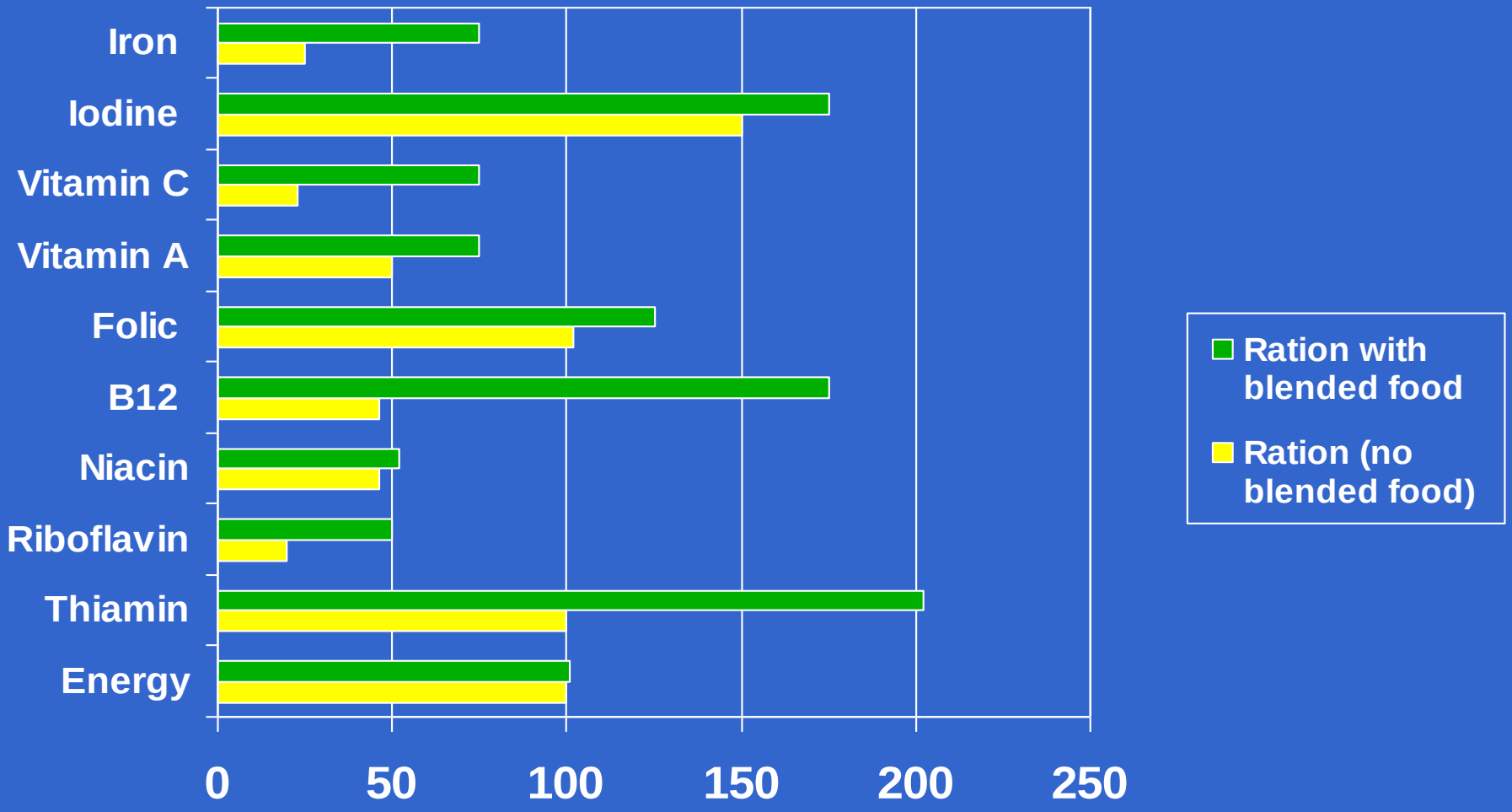
Malnutrition and Disease Increase Requirements – HOW?

Exercise

Read the two short case-studies on the handout:

What are the main risk factors for micronutrient deficiencies in the reports from Afghanistan and Somalia?

Major Risk Factor and Causes: Nutritional Composition of Food Ration



Summary of Risks and Causes of Inadequacies in Food Quality

- Lack of access to clean water and adequate sanitation
- Increased requirements (infectious disease and malnutrition)
- Malabsorption
- Lack of access to diverse foods and quality of food
- Nutritional composition of food ration

Zinc

Vitamin D

Cobalt

Iodine

Thiamin

Riboflavin

Vitamin B_6

Vitamin E

Magnesium

Manganese

Iron

Seleniu
m

Folate

Vitamin B_{12}

Niacin

Vitamin A

Phosphorus

Vitamin K

Vitamin C

Cobalamin

Chromium

….are common throughout the world including in most emergency-affected populations….

Zinc

Vitamin D

Cobalt

Iodine

Thiamin

Riboflavin

Vitamin B_6

Vitamin E

Magnesium

Manganese

Iron

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Chromium

What do the micronutrients in red have in common?

Consequences: Reported MDDs among Refugees and IDPs

Deficiency	Date	Affected population and location
Thiamine Vitamin B1 deficiency – Beri-beri	1985 1980's 1994-5	Cambodian refugees in Eastern Thailand Liberian refugees in Sierra Leone Bhutanese refugees in Nepal
Vitamin C deficiency – Scurvy	1984 1985 1989 1991 1994 2001/2	Ethiopian refugees in Eastern Sudan Ethiopian refugees in North West Somalia Somalia refugees in Hartisheik, Ethiopia Ethiopian refugees in Kasala, Sudan Drought-affected pastoralists Wajir, Kenya Drought-affected population in Afghanistan
Niacin deficiency – Pellagra	1990/1 1999/00	Mozambican refugees in Malawi Conflict-related IDPs in Angola

Why are these MDDs specific to emergency situations?

Pellagra - niacin deficiency

- populations receiving maize ration without access to legumes - maize is poor source of niacin
- known as 3D's: dematitis, diarrhoea and dementia
- skin irritation around symmetrical sun-exposed areas, especially neck ("Casal's necklace")

Why are these MDDs specific to emergency situations?

Beri-beri - thiamin deficiency

- populations consuming polished rice (non-parboiled rice)
- wet beri-beri (anorexia, oedema, increase in pulse and tenderness); dry beri-beri (muscle weakness, dysfunction of nervous system

Why are these MDDs specific to emergency situations?

Scurvy-
Vitamin C deficiency

- populations with no access to fruit and vegetables or entirely reliant on rations as source of food

- fatigue, swollen and bleeding gums, haemorrhage, slow healing of wounds

Defining the extent and severity of the problem of an inadequate diet?

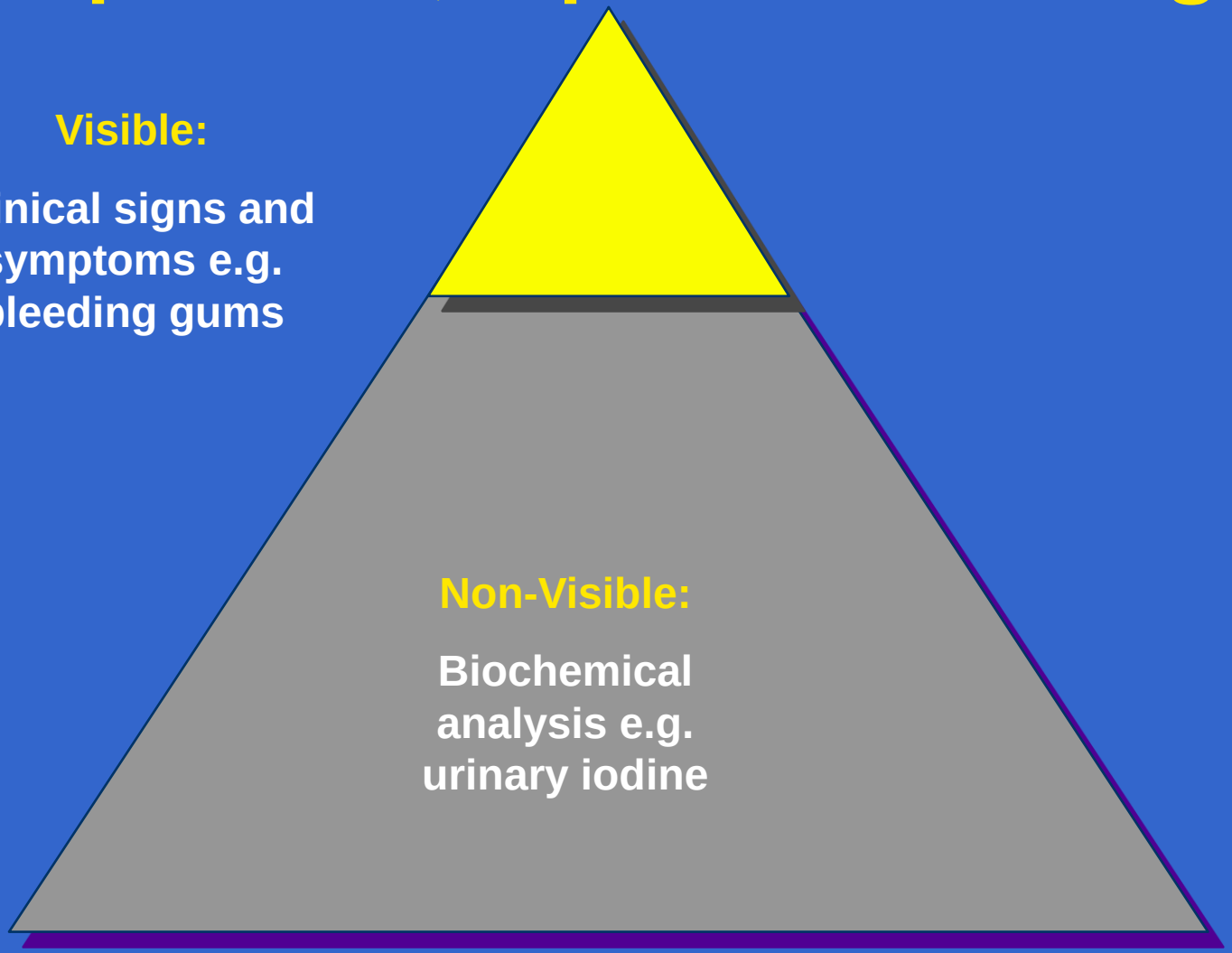
Food consumption surveys

Risk factors

Biochemical studies

Clinical signs and symptoms

Defining the extent and severity of the problem; ‘tip-of-the-iceberg’



NUTRITIONAL RISK FACTORS; loss of livestock, changes in dietary practices

Assessment of Micronutrient Deficiency Diseases

Biochemical Analyses

Laboratory analyses of blood or urine samples

Example: Niacin deficiency (pellagra)

Urinary Niacin Excretion (< 0.5per g creatine)

Ratio of Niacin Metabolites in Urine (< 0.5)

Clinical Diagnosis

Visible signs and symptoms

Example: Thiamine deficiency (beri-beri)

Appetite loss, malaise, Weakness/Paralysis in limbs

Defining the extent and severity of the problem: Non-specific signs

Type I and II Deficiencies

TYPE I:

iron, copper, manganese, iodine, selenium, calcium, thiamine, riboflavin, pyridoxine, folate, nicotinic acid ascorbic acid, retinol, tocopherol (E), vitamin D and K

- Growth continues, anthropometric abnormality late in deficiency
- Specific clinical signs develop
- Body has store
- Specific enzymes affected
- Diagnosed by biochemical tests

TYPE II:

potassium, sodium, magnesium, zinc, phosphorus, protein, fat, oxygen, water

- Growth failure
- No specific clinical signs
- No body store
- Affects metabolism in general
- No specific biochemical abn.
- Diagnosed by anthropometry
- Anorexia response

Constraints of Assessment Tools for MDDS

- Lack of user friendly tools
- Non-specific clinical signs
- Lack of expertise
- Invasive
- Expensive
- Lack of laboratory facilities for analysis
- Context-specific risk factors; difficult to quantify

Response: Intervention Strategies

- Fortification
- Distribution of food rich in micronutrients
- Treatment
- Increasing size of ration
- Food security based approaches; improved access to land, trade & exchange
- Advocacy (based on surveys or surveillance)
- Supplementation

Supplements: Vitamin A distribution

- Deficiency associated with increased morbidity and mortality, especially from measles
- Routine supplementation recommended for children under five years every 3-6 months

Supplementation Doses:

Children >1 year < 6 years:	**200,000 IU orally**
Infants 6 - 12 months:	**100,000 IU orally**
Lactating mothers:	**200,000 IU once at delivery or during next 2 months**

Food Fortification

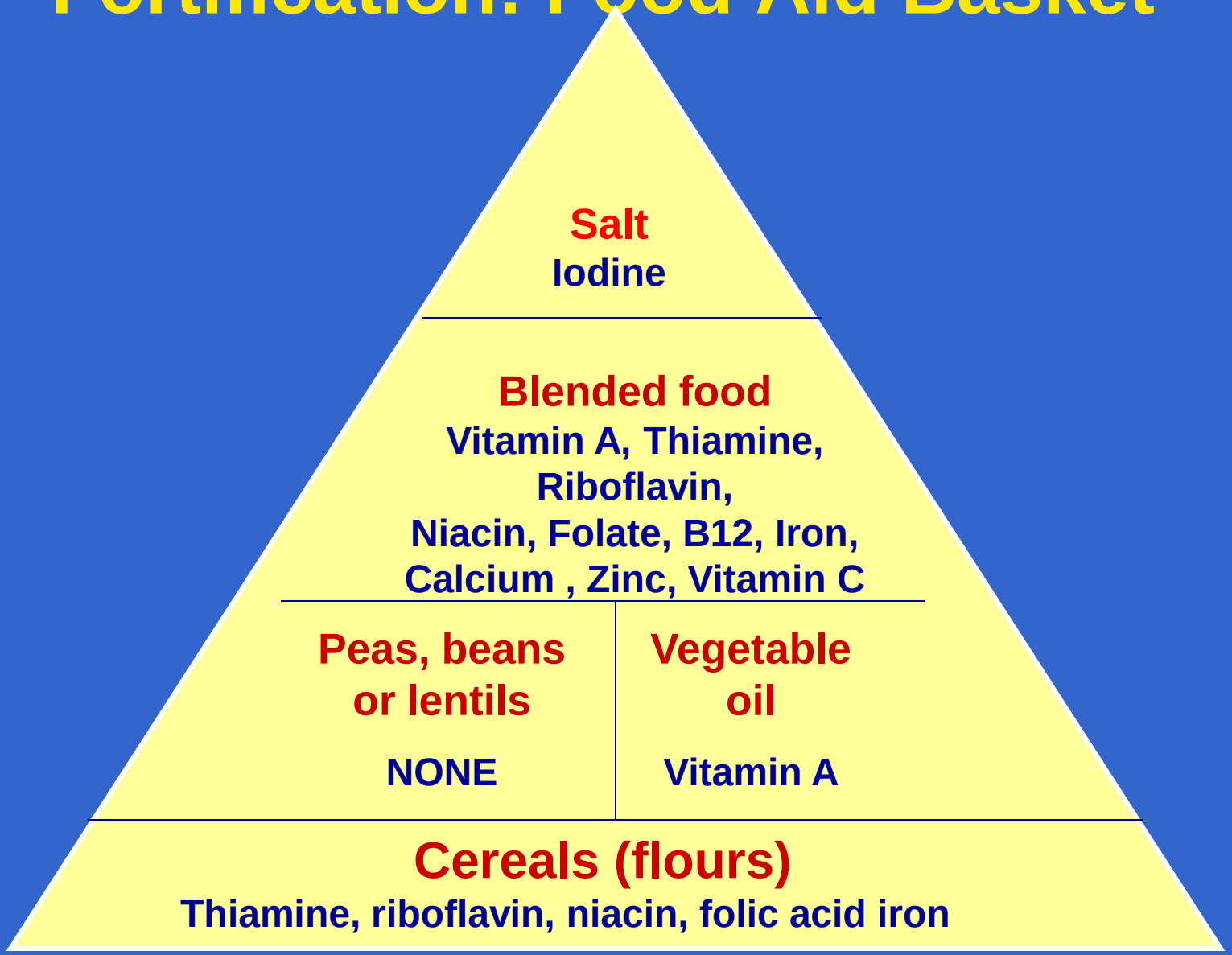
- Replace selected nutrients which are lost during processing of foods … also known as "enrichment" (e.g. iron fortified wheat flour)
- Addition of larger quantities of nutrients than are naturally present in selected foods (e.g. blended food)
- Add nutrient to food which is not "natural carrier" for the nutrient, but is consumed by large proportions of the population (e.g. iodized salt)

One of the least costly ways of combating MDDs

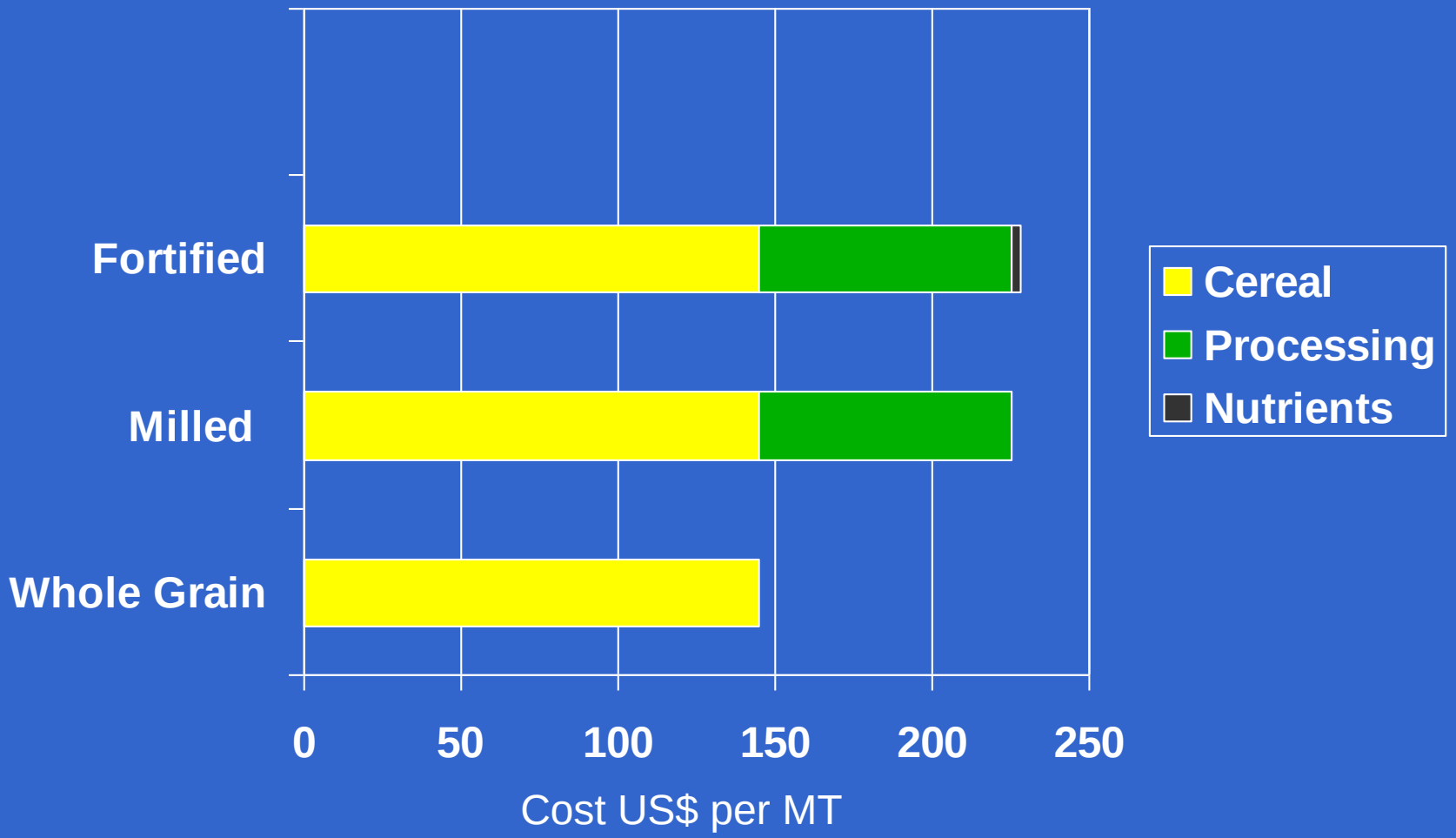
Food Fortification: constraints

- Food vehicle should be consumed by all members of target group
- Stability and shelf-life of micronutrients
- Levels of fortification
  - Technical constraints
  - Lack of international guidelines
  - Lack of quality control

Fortification: Food Aid Basket



Fortification: cost



"The very real issue in costing the fortification approach is not the cost of nutrient addition but the cost of milling the cereal"

(Dr. G. Beaton, April 1999)

Fortification: local milling initiatives

- UNICEF/MI in Zambia explored the possibility of fortifying maize in small hammer mills
- WVC funded MICAH projects focuses on iron and iodine deficiencies in Malawi
- Joint WFP/Oxfam/NRI piloting ‘containerized’ milling unit at refugee level

Management?

Technical?

Acceptability?

Quality Control

Target Group and Intervention

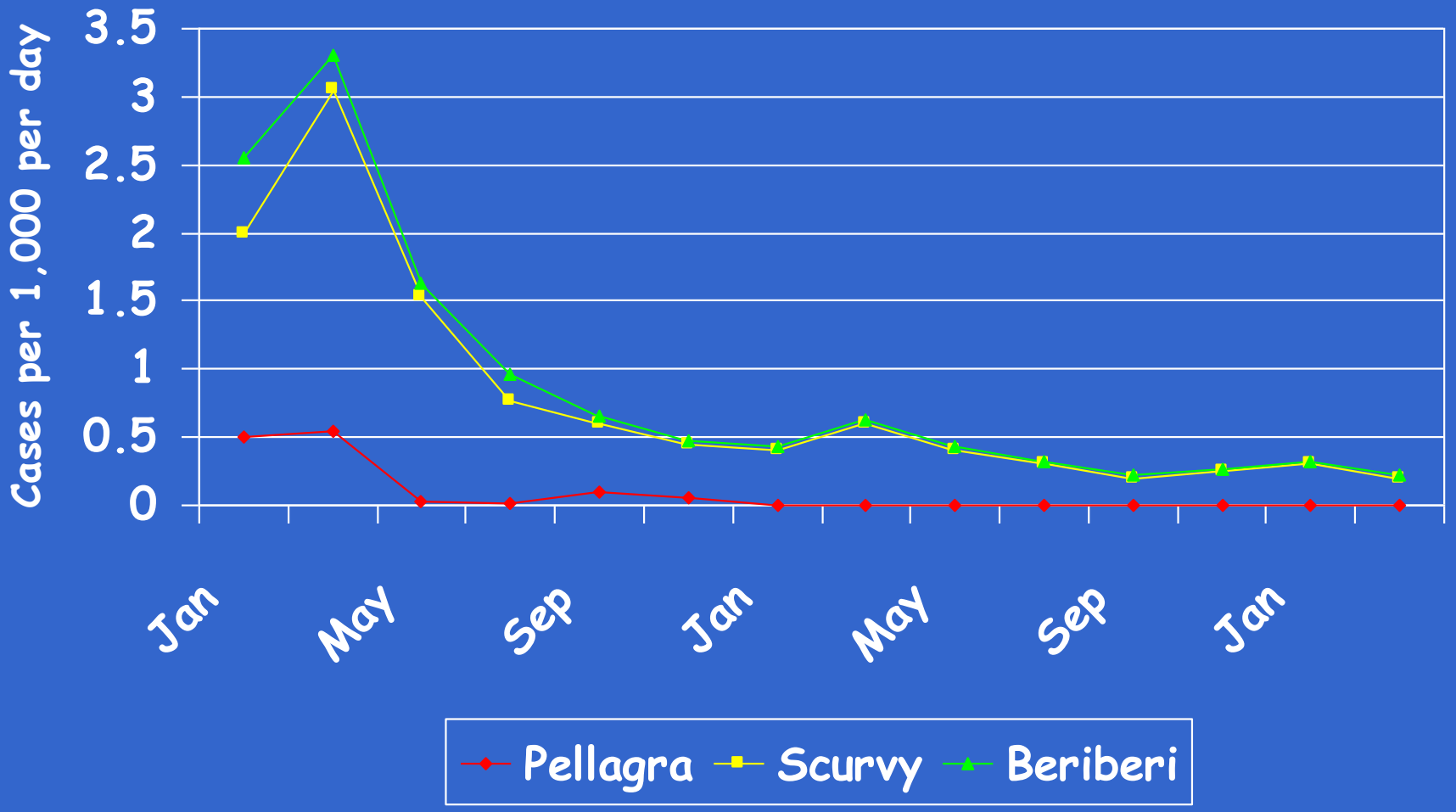
Control and prevention of Vitamin C deficiency: the challenges

Intervention	Constraints
Distribution of fresh vegetables	Expensive, logistical feasibility (quantities, perishable)
Distribution of supplements	Need to be distributed every 7-14 days, non-compliance, short-term
Increase size of ration for exchange	Availability of vitamin C rich foods, may decrease overall energy intakes
Fortification	Shelf-life, vitamin C lost during cooking processes
Promotion of vegetable gardens	Access to land, water etc, longer-term, must be vitamin rich foods
Distribution of vitamin-C rich foods e.g. tomato paste, orange juice	Culturally acceptability of food, expensive, vitamin C lost

Strategies: Monitoring and Evaluation

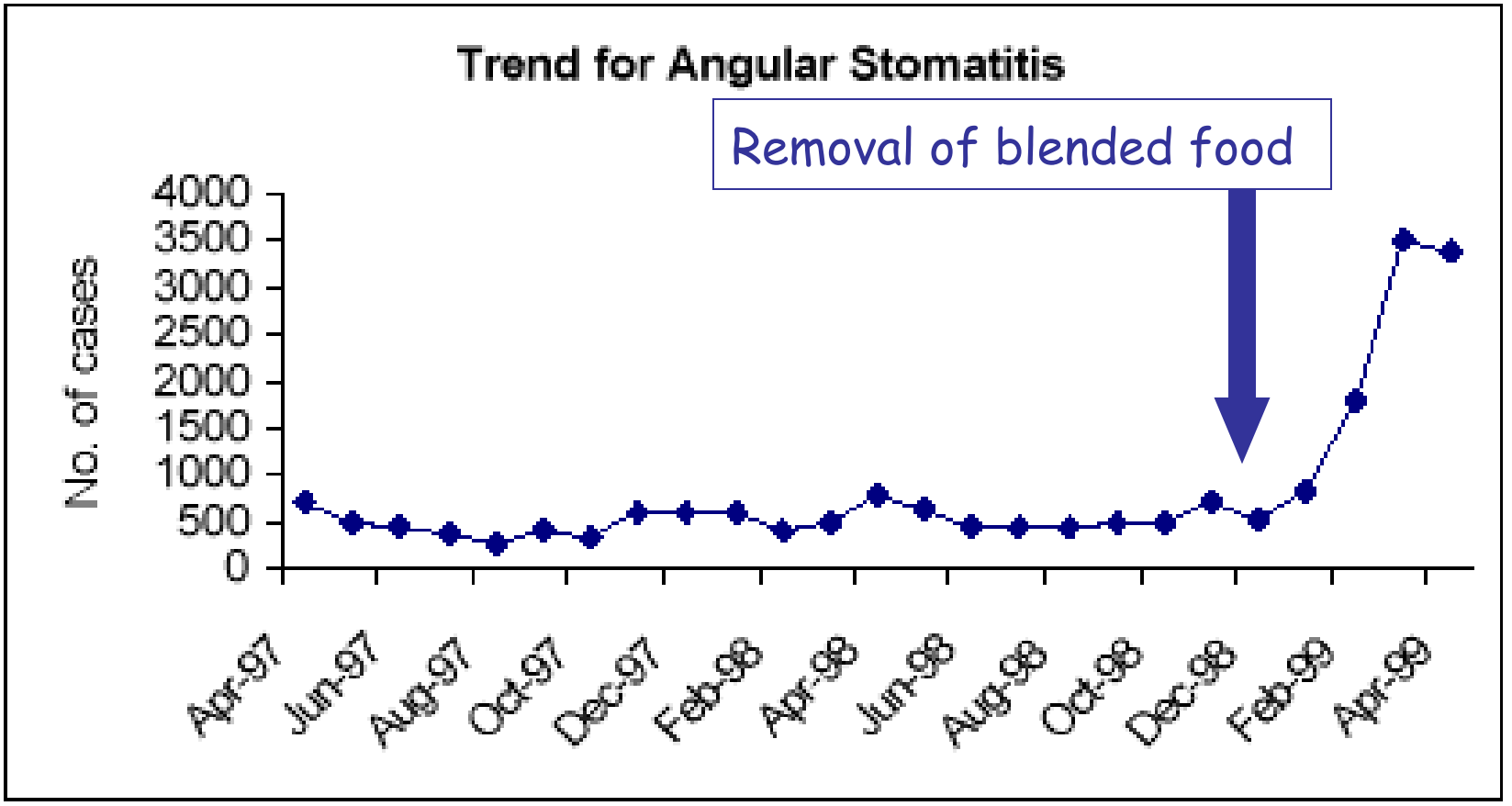
- Quality control; fortification
- Coverage of intervention
- Acceptability: food use, intra-household distribution
- Compliance
- Surveillance; admissions, active
- Prevalence of MDDs; surveys (clinical and biochemical)

Bhutanese Refugees in Nepal:
Surveillance (Jan '94 - Mar '96)



Source: ENN, Issue 5; 1998

Bhutanese refugees in Nepal: impact of removal of blended food



Case-Study (1) : Pellagra outbreak in Kuito, Angola (1999-2000)

Read the case-study carefully:

- Define a strategy of intervention for the pellagra outbreak

Case-Study (1): Pellagra outbreak in Kuito, Angola (1999-2000)

- Ongoing war
- Rural population displaced to Kuito city
- Largely reliant on food ration, fragile as a result of insecurity and small air-strip
- Relatively high prevalence of acute (12% >-2 z-score)
- Epidemic of pellagra described as:
  - July 1999, the first cases diagnosed
  - Between Aug ‘99 and Jan 2000, 898 clinical cases seen
  - 83% of cases female and 85% of cases persons older than15 years
  - 66% of the cases from the displaced populations
  - attack rate 2.6 per 1,000 habitants

Case-Study(1): Pellagra outbreak in Kuito, Angola (1999-2000)

- Case definition
- Active surveillance system including training
- Inclusion of blended food or niacin-rich food
- Supplementation of Vitamin B complex
- Determine levels of niacin in ration
- Treatment of maize with lime
- Increased access to land
- Providing additional ration for exchange
- Fortification; local mechanism or fortified cereal

Case-Study (2) : Control and Prevention of Scurvy (2001-2003)

Read the case-study carefully:

- What strategy is required to prevent predicted outbreak in the winter months of 2002/3?

Case-Study (2) : Control and Prevention of Scurvy (2001-2003)

- Erosion of livelihoods masked by low wasting
- High level of scurvy “sialengia”
- High levels of mortality and disease prevalence
  - April 2001 - Scurvy caused 6% of the deaths in Kohistan district (SCF-US/CDC)
  - Action Contre La Faim, 6.3% attack and 7% case fatality rate (Ghor province, March 2002)
  - 3.1% prevalence in Badghis province (UNICEF-CDC), April 2002 .
  - 4.5% prevalence in Maslakh IDP Camp (UNICEF - CDC), April 2002.

Review

- Quality of diet and access to diverse range of foods is almost always compromised among emergency affected populations
- MDDs associated with emergency affected populations are primarily but not exclusively; pellagra, beri-beri, scurvy
- Defining the extent and severity of the problem is fraught with constraints
- Intervention; need to describe all options and prioritize on the basis of feasible, reaching the target group, cost, short-term as well as long-term benefits
- MDDs should be addressed with a range of strategies rather than a single one
- In populations at high risk, it is advisable to design a surveillance system