

FORTIFICATION AND NUTRITION SECURITY

A REGIONAL VISION FOR ASIA

Joseph M. Hunt

ADB Health, Nutrition, ECD Advisor

Bangkok Workshop 23 April 02

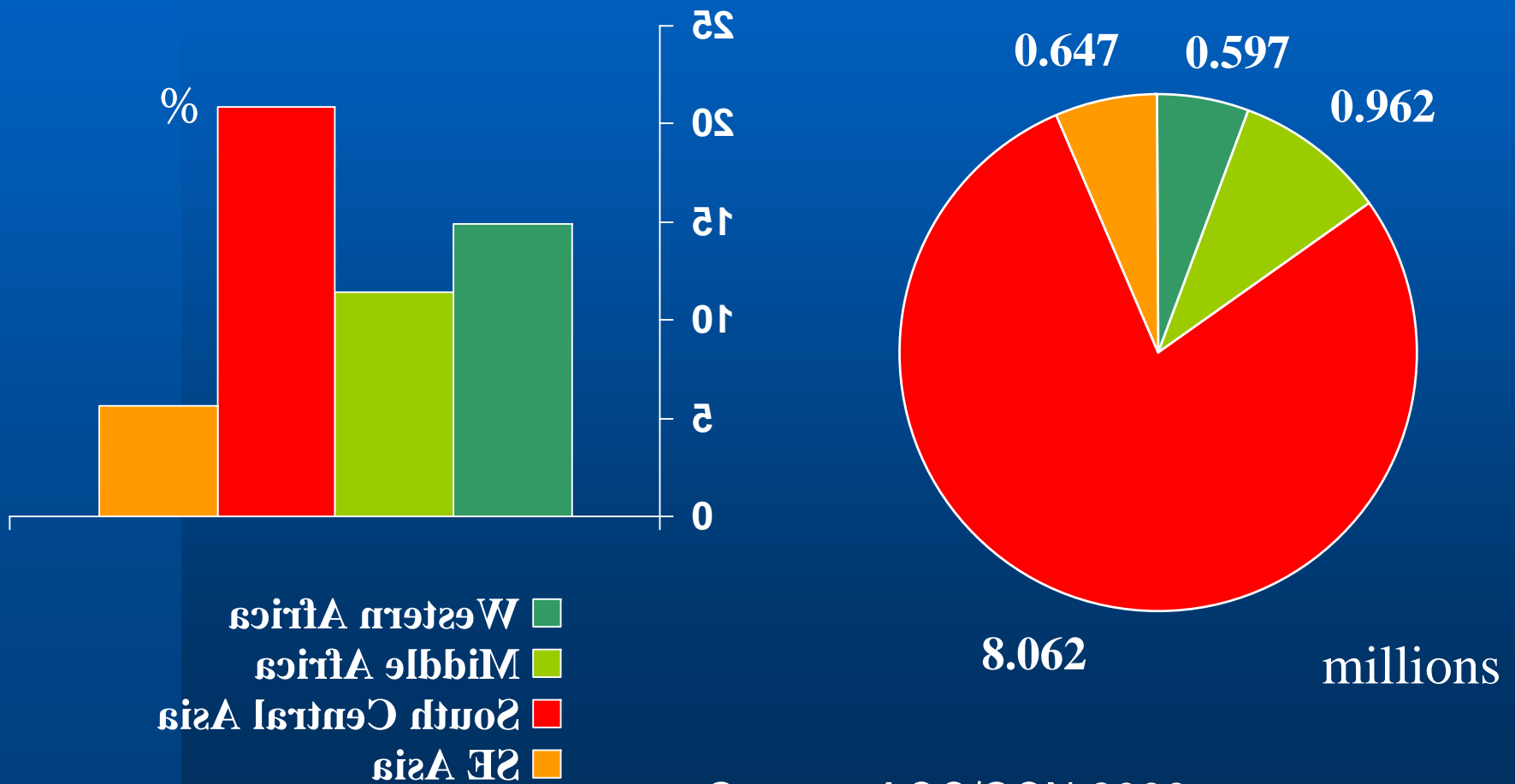
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THE SEVEN **LIVELY** C's

- **CRISIS:** Human/Economic Development
- **CLARION CALL TO ACTION:** MDGs
- **CHILD** Development = Sustainable Development
- **CERTAINTY: SOLUTIONS CLEAR, CHEAP**
- **COMMITMENT** to Partnerships
- **CREDIBILITY:** Mutual Accountability
- **CASH** is not the Problem; Political Will?

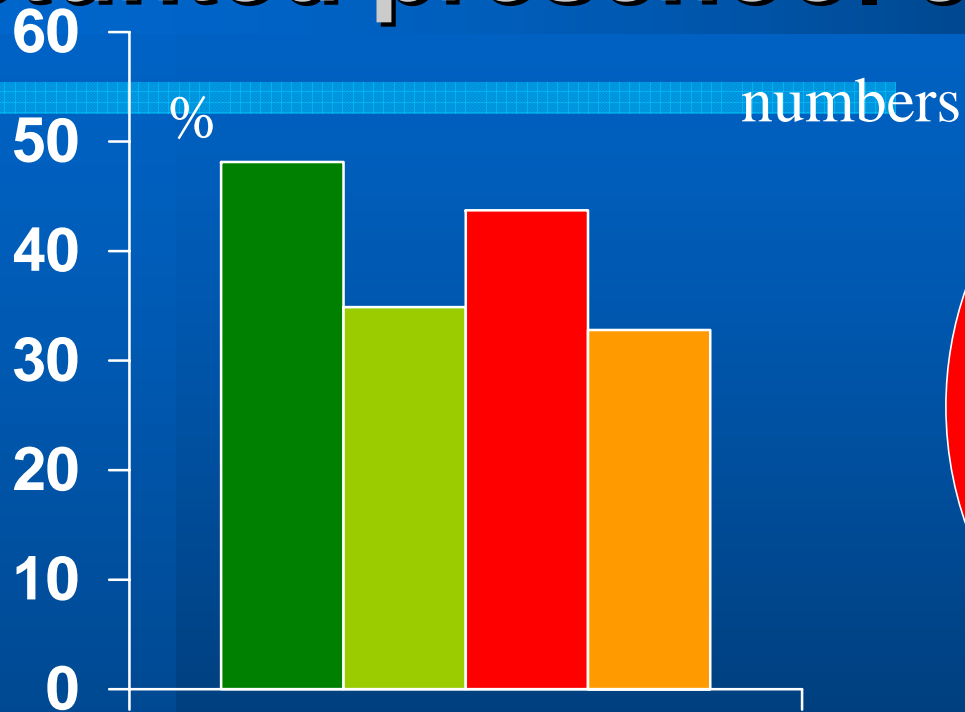
Most global undernutrition is in Asia

Newborns with low birth weight at term

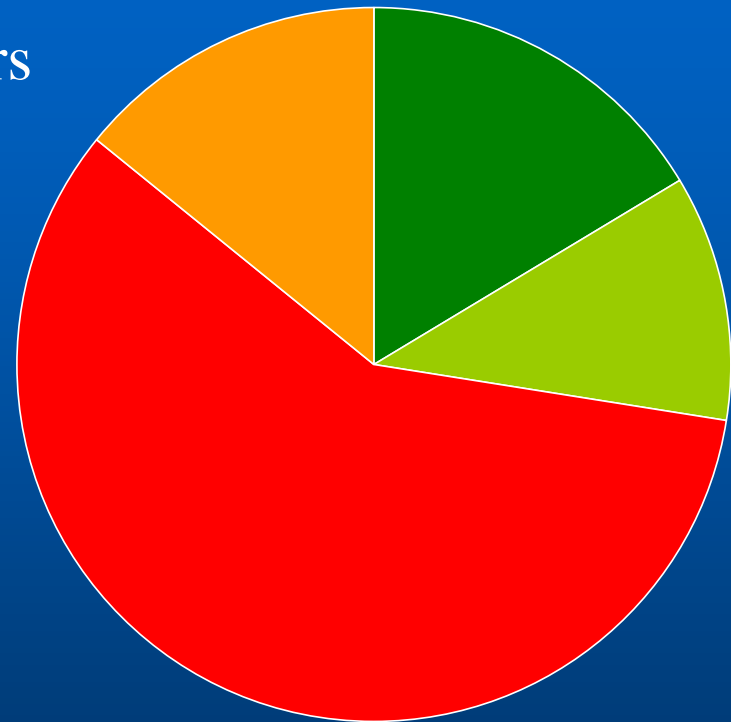


Source: ACC/SCN 2000

Stunted preschool children



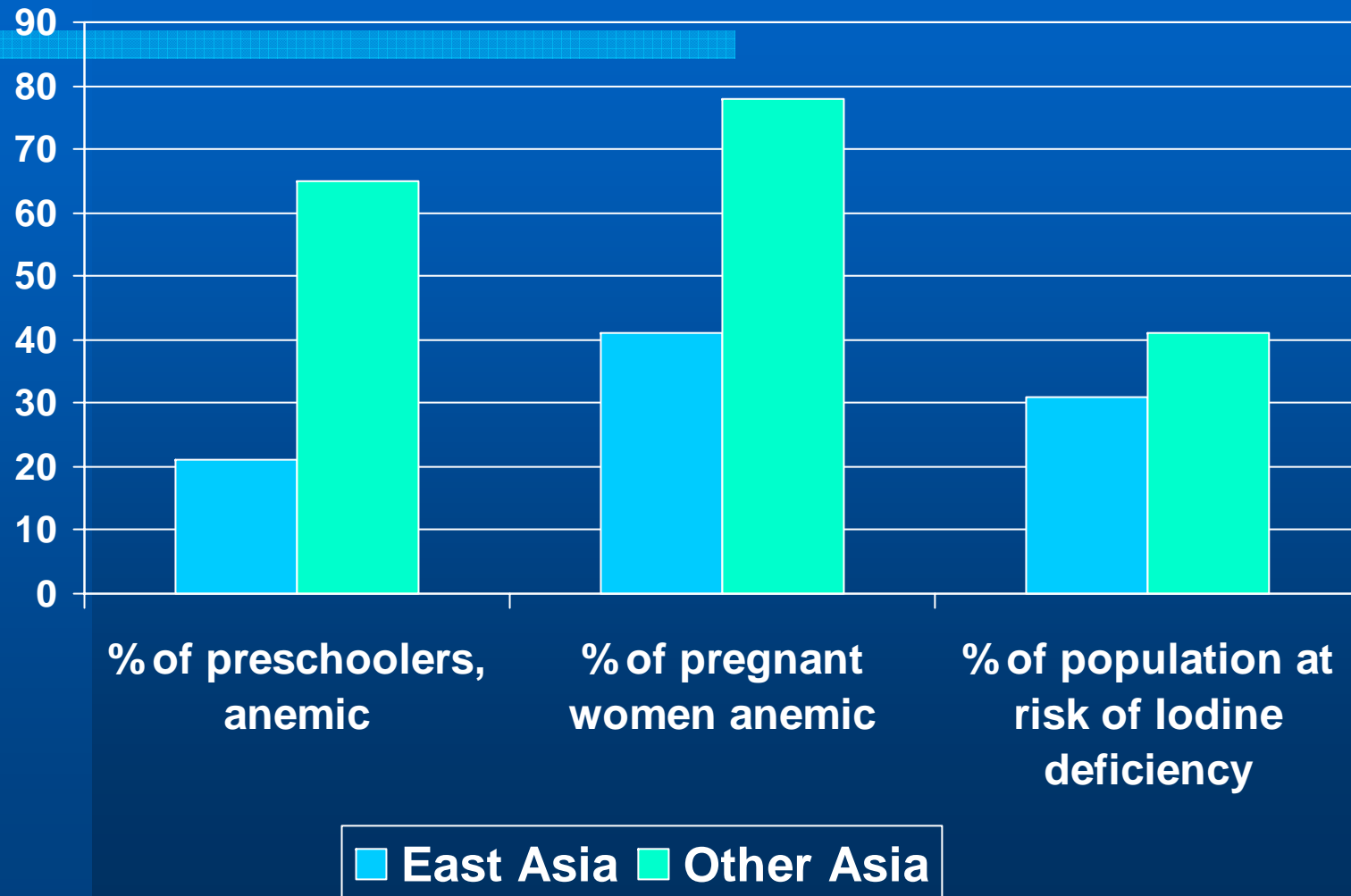
- Eastern Africa
- Western Africa
- South Central Asia
- South-East Asia



- Eastern Africa
- Western Africa
- South Central Asia
- South-East Asia

Source: ACC/SCN 2000

Micronutrient status is very poor in the region



Hidden Hunger

- No visible signs
- Victims not aware



Millenium Development Goals by 2015

- 1) Eliminating most of infant, child, and maternal deaths.
- 2) Reduction of extreme poverty by half.
- 3) Universal primary school enrolment
- 4) Halving severe hunger

Improving Maternal and Child Nutrition is essential for

LIFE and LEARNING

and will attract investment when linked to the MDGs

UNITED NATIONS 8-10 MAY 2002

- GENERAL ASSEMBLY'S SPECIAL SESSION ON CHILDREN
- THE WHOLE WORLD IS WATCHING ASIA
- APPLICATION OF FOOD SCIENCE AND TECHNOLOGY IS ONE KEY
- FORTIFICATION SHIFTS STATE'S ROLE TO QA/REGULATION
- **TOGETHER LET'S SOLVE THIS PROBLEM!!**

Why is it Important to Reduce VAD, IDA and other MN Deficiencies in Asia?

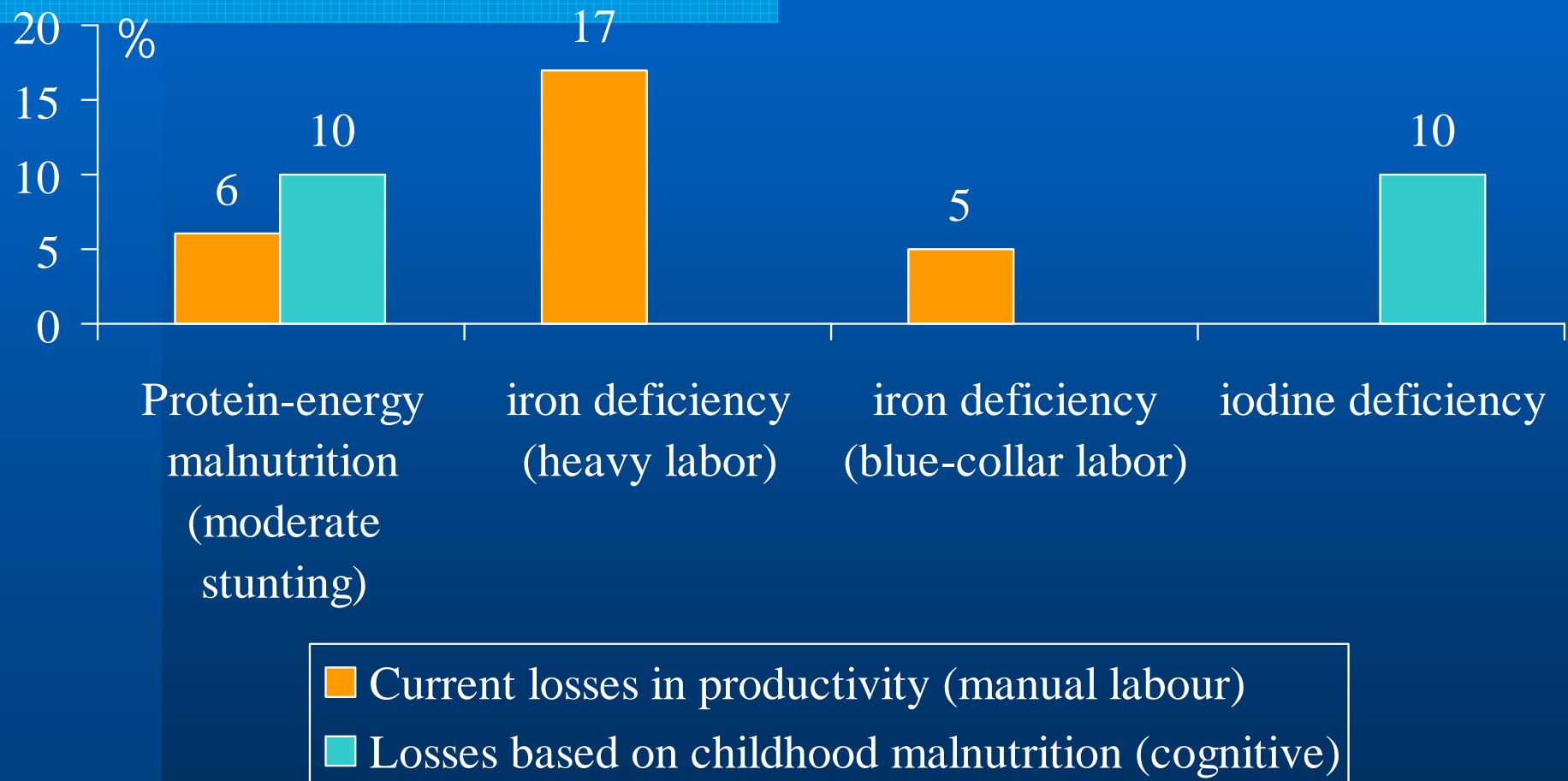
MALNUTRITION DEPRESSES ECONOMIC GROWTH

Disease Burden

GDP

Wages

The economic costs of undernutrition are high: productivity losses



Source: Horton 1999

Estimates of Productivity Costs of Malnutrition in Selected Countries, as Percentage of GDP

Losses of adult productivity

Country	PEM	Iodine Deficiency	Iron Deficiency
India	1.4	0.3	1.25
Pakistan	0.15	3.3	0.6
Viet Nam	0.3	1.0	1.1

Losses including childhood cognitive impairment associated
with iron deficiency

Country	Cognitive Only	Cognitive Plus Loss in Manual Work
Bangladesh	1.1	1.9
India	0.8	0.9
Pakistan	1.1	1.3

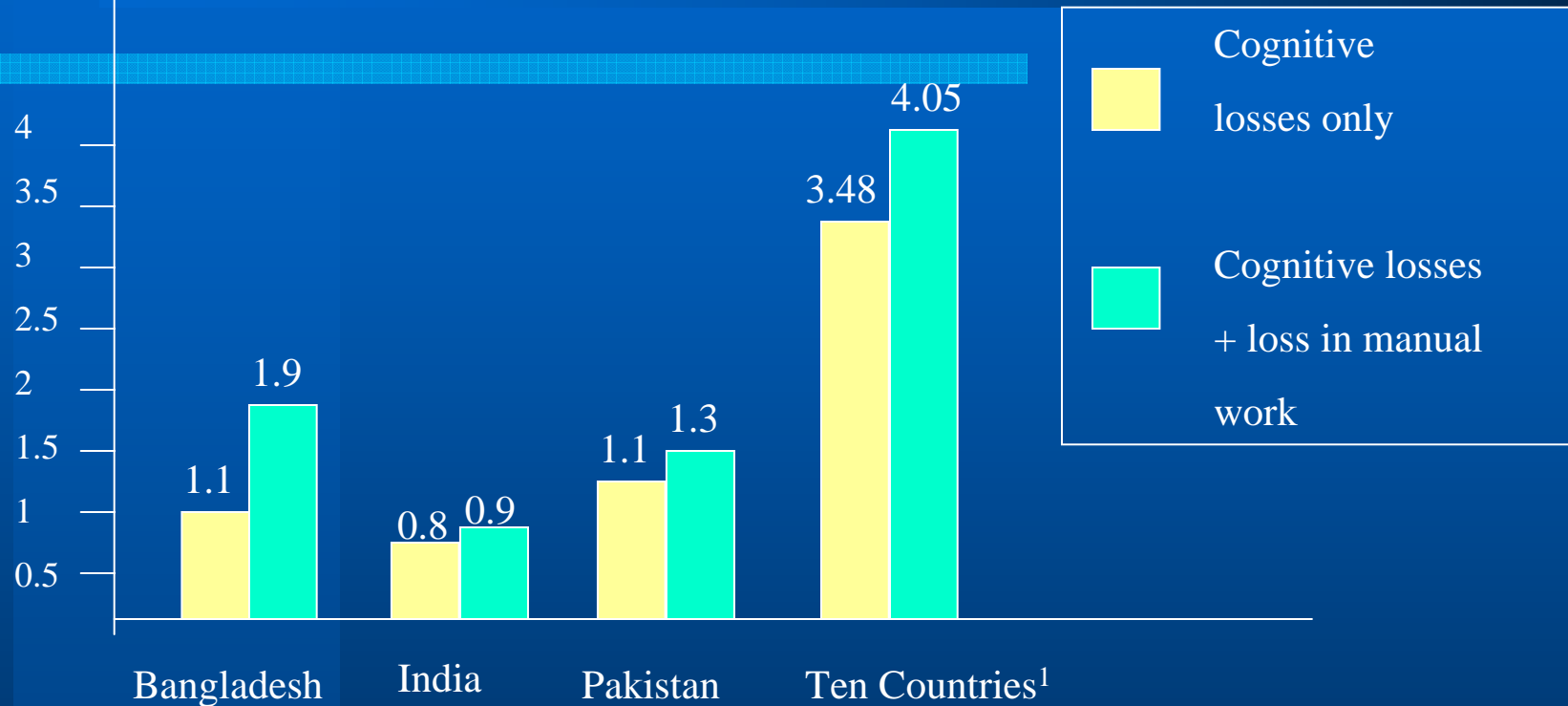
Sources: Calculations for adult productivity from Administrative Staff College (1977), AERC (1997), and Horton (1998), including impairments from Ross and Horton (1998). The data

Economic Consequences of Iron Deficiency

	Future Loss	Current Loss	Total Annual Loss	
	Child Cognition	Adult Labor	Per Cap	'000,000
India	\$3.38	\$0.67	\$4.05	\$3,761
Pakistan	\$3.23	\$0.43	\$3.67	\$500

Ross/Horton, Economic Consequences of Iron Deficiency, MI

Percentage Loss in GDP due to Iron Deficiency



Source: Horton 1999, Horton and Ross 2001

¹ Bangladesh, India, Pakistan, Mali, Tanzania, Egypt, Oman, Bolivia, Honduras, Nicaragua

Approximate Unit Costs of Interventions with Effects on Nutrition

Intervention	Cost/ Beneficiary/Year (US\$)
Education (e.g., breastfeeding)	\$5
Micronutrient supplementation	
- iodine	\$0.50
- iron (per pregnancy)	\$1.70
- vitamin A	\$0.20
Micronutrient Fortification	
- iodine	\$0.05
- iron	\$0.09
- vitamin A	\$0.05-0.15
Feeding Programs (for '000 cal/day)	\$70-100
Community-based Programs (home gardening, growth monitoring)	\$5-10
Source: ADB-UNICEF Regional Study on Reducing Child Malnutrition in Asian Countries	

Annual Cost of Fortification: A Pack of Cigarettes!

Vitamin

1/3 RDA

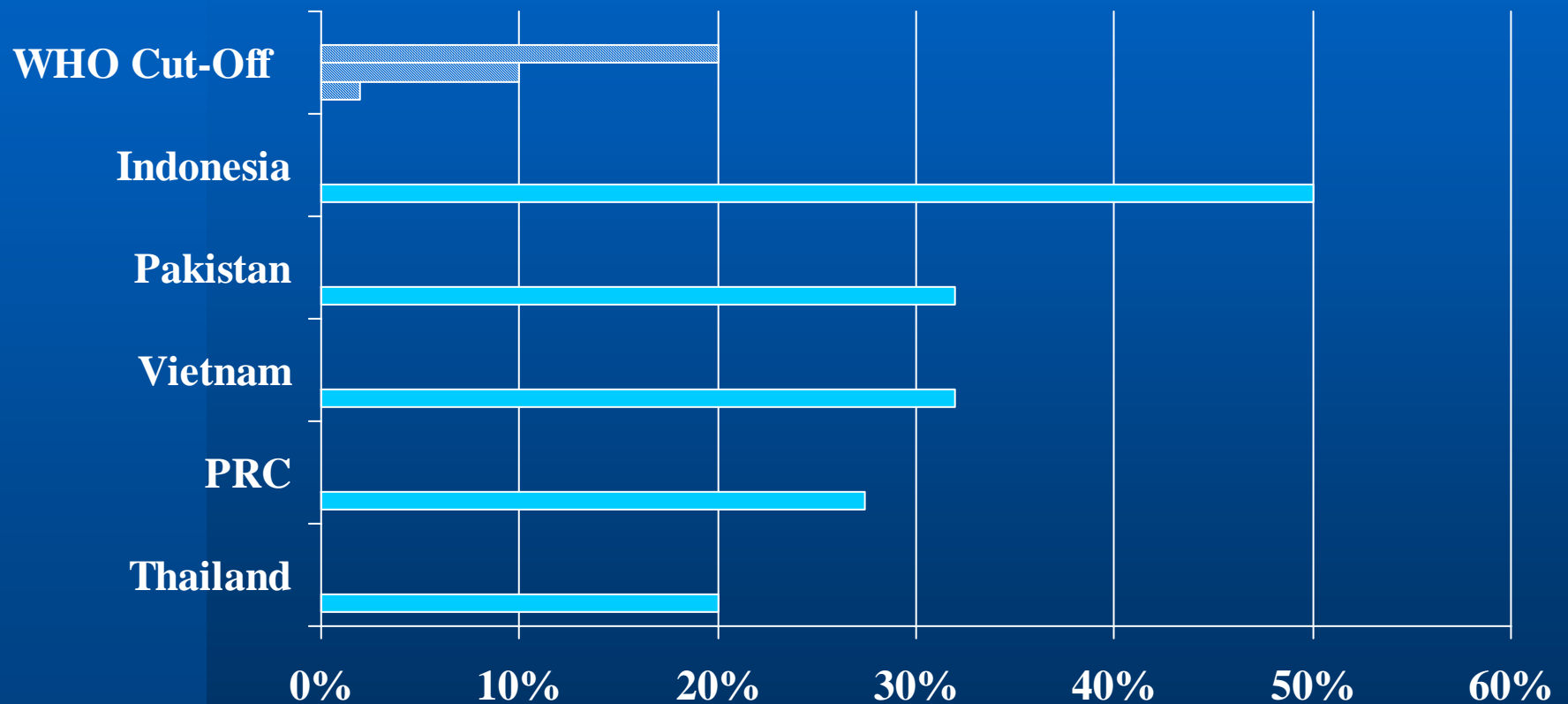
Cost/Person/Year

A (250 CWS)	1111	IU	\$	0.073
D (100 CWS)	133	IU	\$	0.016
E (50% CWS)	5	IU	\$	0.139
B1	0.47	mg	\$	0.004
B2	0.57	mg	\$	0.013
B6	0.73	mg	\$	0.006
Niacin	6.3	mg	\$	0.019
Folic Acid	66.7	mcg	\$	0.001
B12	1	mcg	\$	0.014
C	20	mg	\$	0.055
Fe			\$	0.09
I			\$	0.05
Total			\$	0.48

Why Food Fortification as an Intervention to Reduce MNM?

- **Advantages in Comprehensive Intervention Package**
- **Models of Success in Industrial Countries**
- **Models of Success in Developing Countries**
- **Adapting New Products for Developing Countries**

Prevalence of VAD in Children < 5 years old



*RETA Country Presentations and Mason,
Micronutrient Report, MI*

Why is Vitamin A Important?

- “Improvement of Vitamin A Status in Young Child Populations Leads to Reduction in All-Cause Child Mortality of 23%” **UNICEF, 1993**
- Improved Vitamin A Status Would Be Expected to Prevent Approximately 1.3 - 2.5 Million Deaths Among Children Under 5 Years of Age” **WHO, 1993**

Improving Vitamin A Status in Asia: Saving Lives, Eyesight, and Health Care Costs

	Lives/Yr (thousands)	Blindness/Yr (thousands)	High Care (thousands US\$)	Low Care
Bangladesh	114.2	9.4	9005	6670
Cambodia	6.4	1.1	736	545
China	69.9	71	20058	14857
India	381.8	77.9	70549	52259
Indonesia	47	15.3	2898	2147
Nepal	12.1	2.5	1978	1465
Pakistan	66.1	15.9	10139	7511
Papua New Guinea	1.5	0.4	263	195
Philippines	5	6.7	3408	2525
Sri Lanka	0.4	1.1	741	549
Thailand	2.7	3.4	1552	1150
Viet Nam	7.3	6.7	5119	3792
TOTAL	714.4	211.4	126446	93665

Variables:

no. child deaths 6-9 months

% mortality reduction no. measles and
diarrhea cases seen at clinics/hospitals

% reduction in severe measles and diarrhea
cost per case seen at clinics/hospitals

no cases of childhood blindness

Source:

OMNI/USAID Economic Analysis of
Micronutritional Interventions -

What if Fortification Achieves Only 1/4 of that 23% Impact?

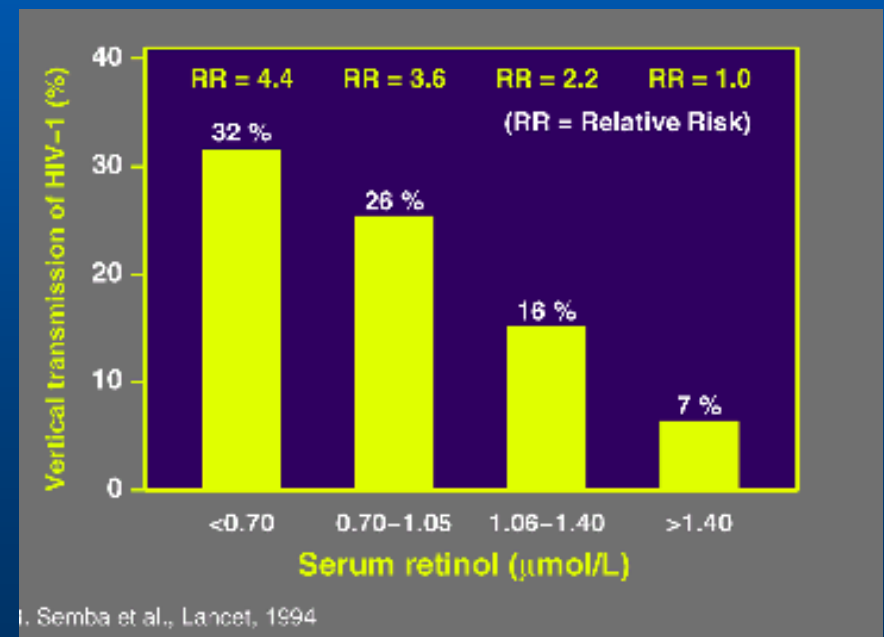
	Under 5 Mortality *	Lives Saved @ 1/4 of 23%
PRC	963,000	55,373
India	2,634,000	151,455
Indonesia	323,000	18,573
Pakistan	714,000	41,055
Thailand	38,000	2,185
Vietnam	84,000	4,830

UNICEF, 2000

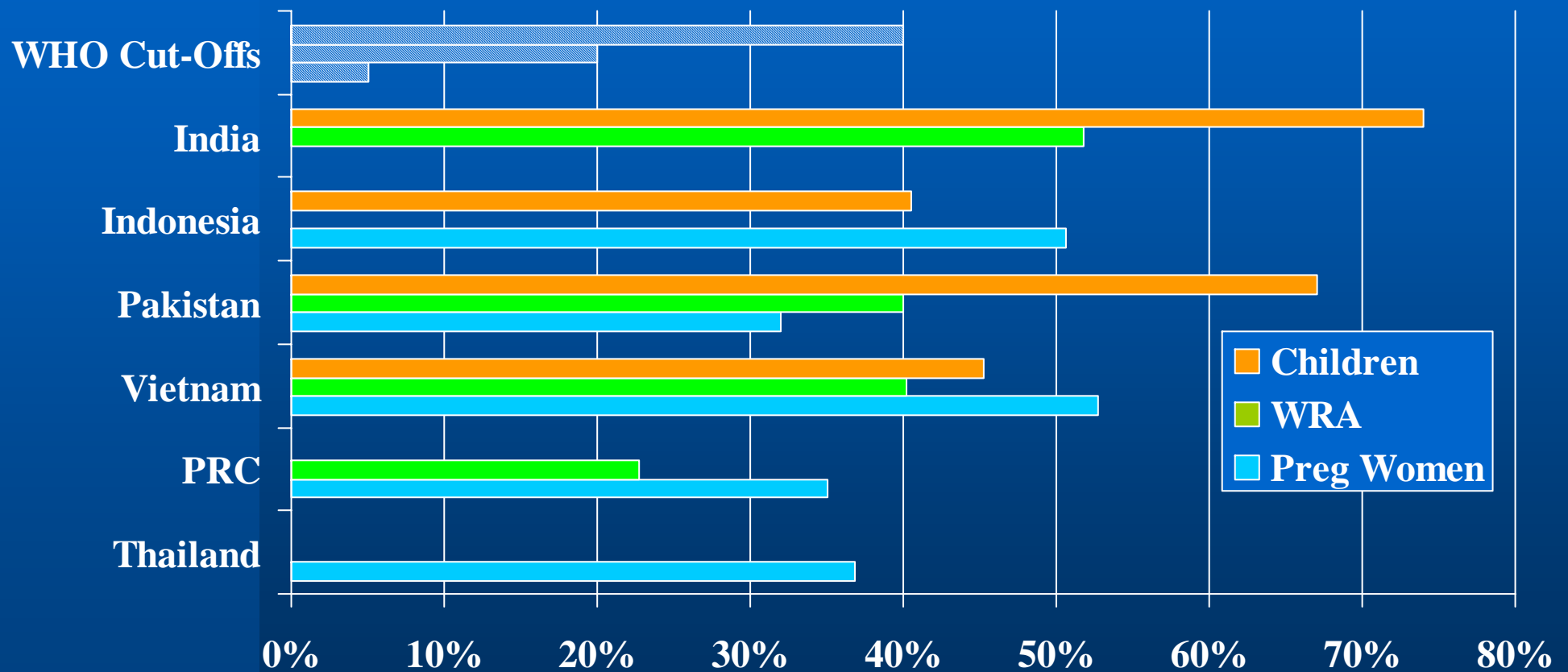
Emerging Knowledge of Vit A: Not For Children Only

- Large Scale Study in Nepal Indicates that Improved Vitamin A Status Can Reduce **Mortality During Pregnancy By Up to 40%**. These are **Currently Being Replicated**.

Maternal HIV Transmission & Vitamin A Status



Prevalence of Anemia in Pregnant, WRA & children



*RETA Country Presentations and Mason,
Micronutrient Report, MI*

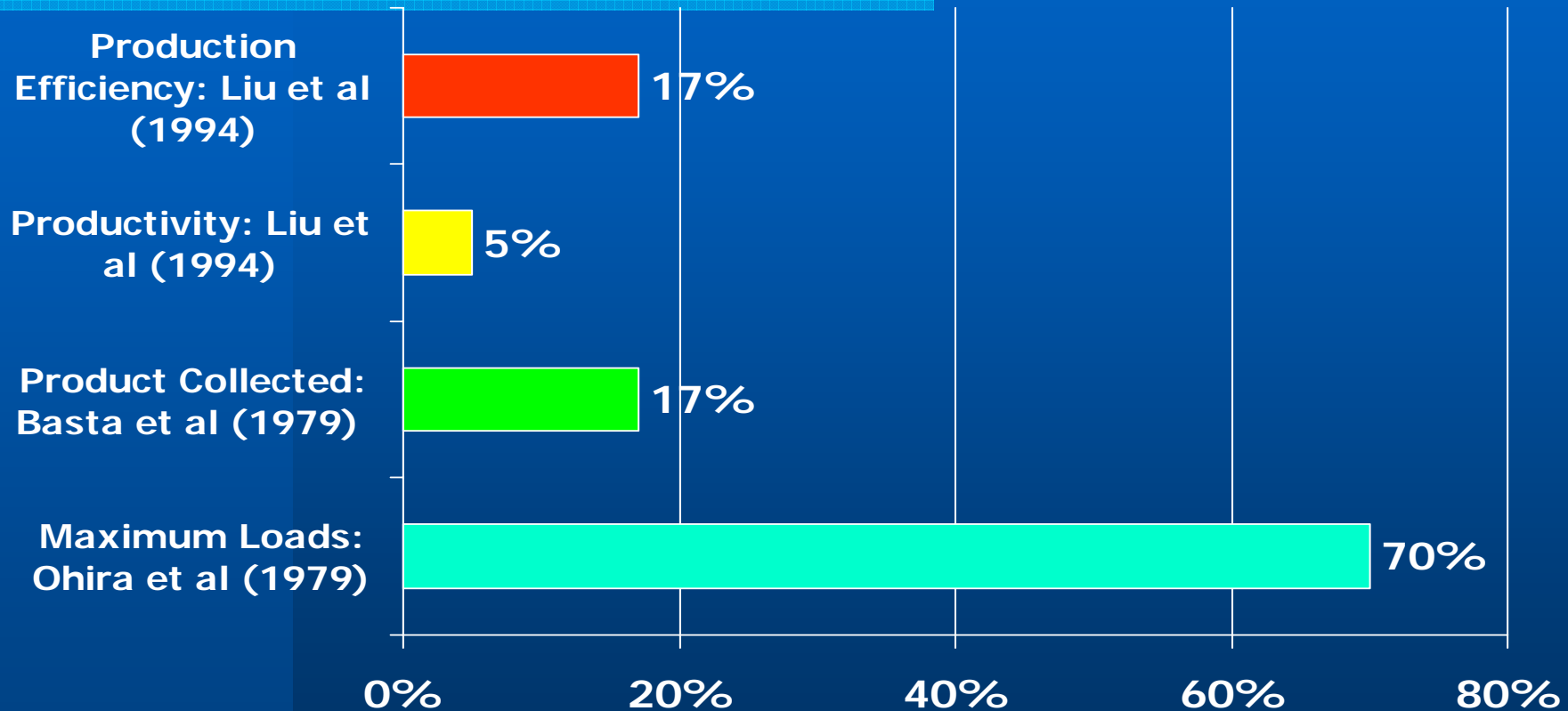
Impact on Adults

- Women risk death in childbirth
- All suffer physical weakness & fatigue
- Lower individual work output
- Lower individual productivity
- Depressed National Economic Growth

Maternal Deaths Attributable to Anemia

	Maternal Deaths	Due to Anemia
Cambodia	33,000	7,600
PRC	19,600	4,500
India	139,300	32,000
Nepal	17,100	3,900
Pakistan	17,100	3,900
Vietnam	33,000	7,600

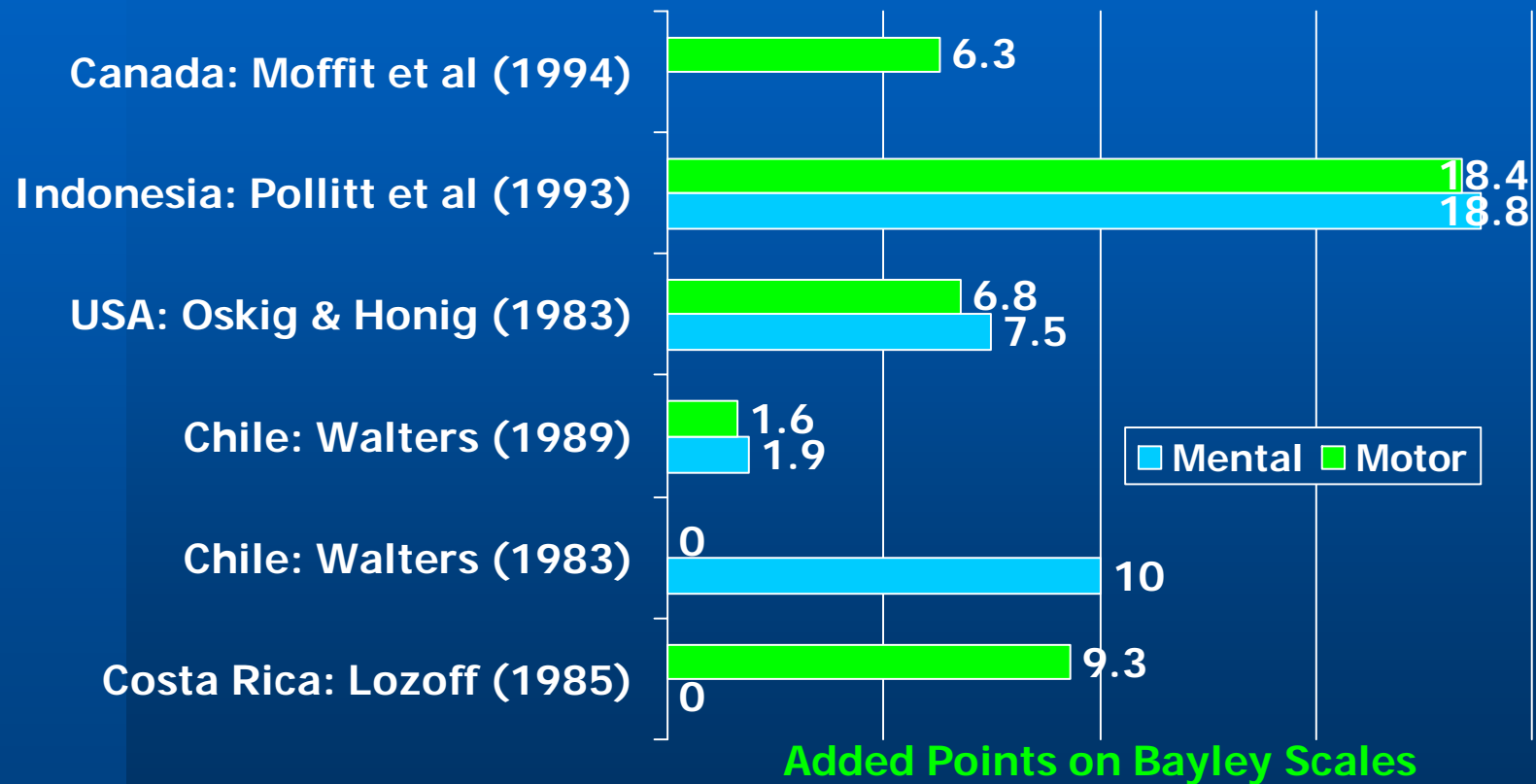
Productivity Increase Associated with Improved Iron Status



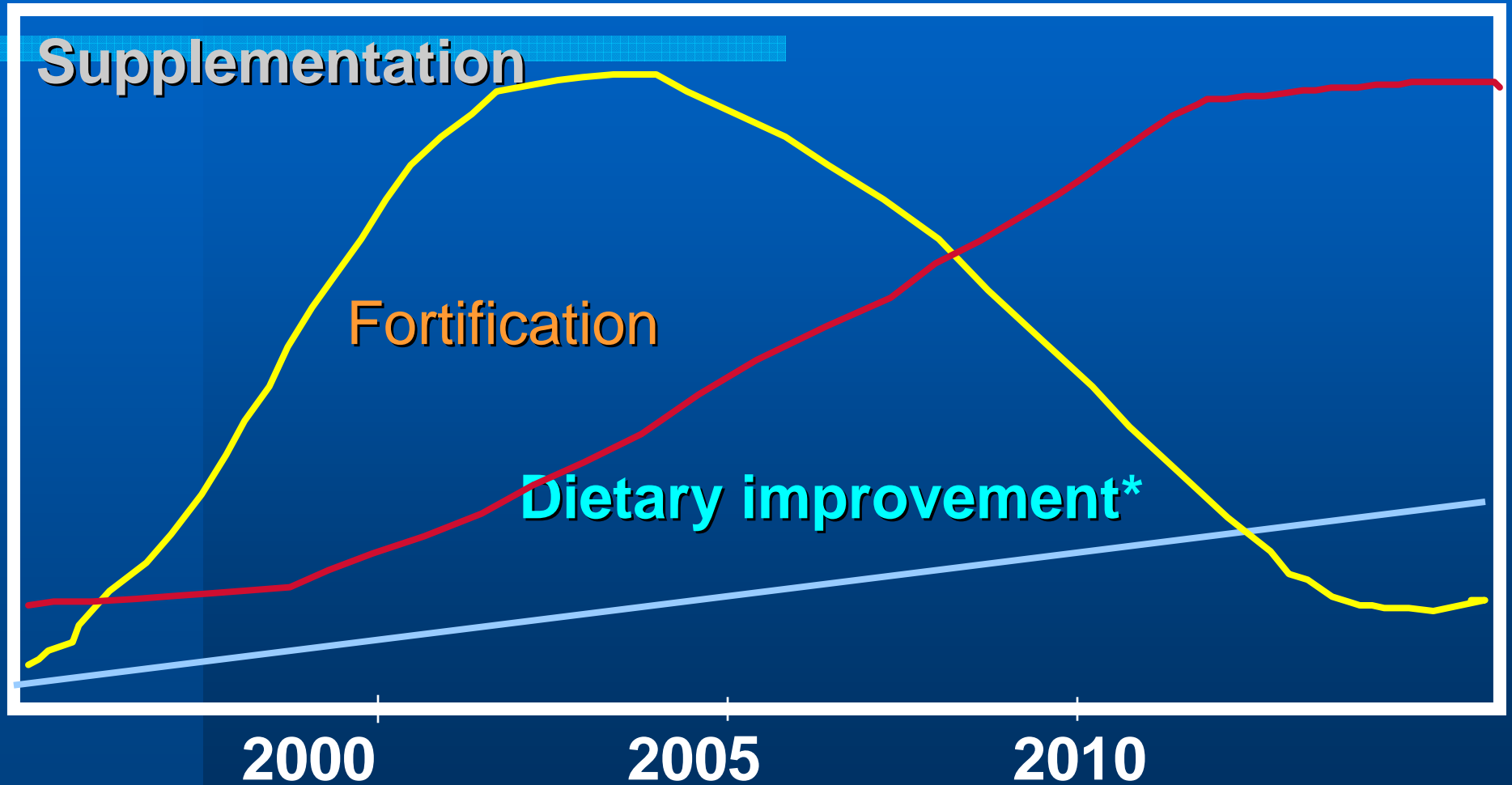
Impact on Children

- Often have low birth weight
- Prone to infections and death
- Lower Intelligence Quotient 5-10 points
- School performance is below normal
- Future productivity is lower

Behavioral & Cognitive Impact



COMPLEMENTARY INTERVENTIONS



* Includes education, dietary diversification, food modification and new plant varieties.

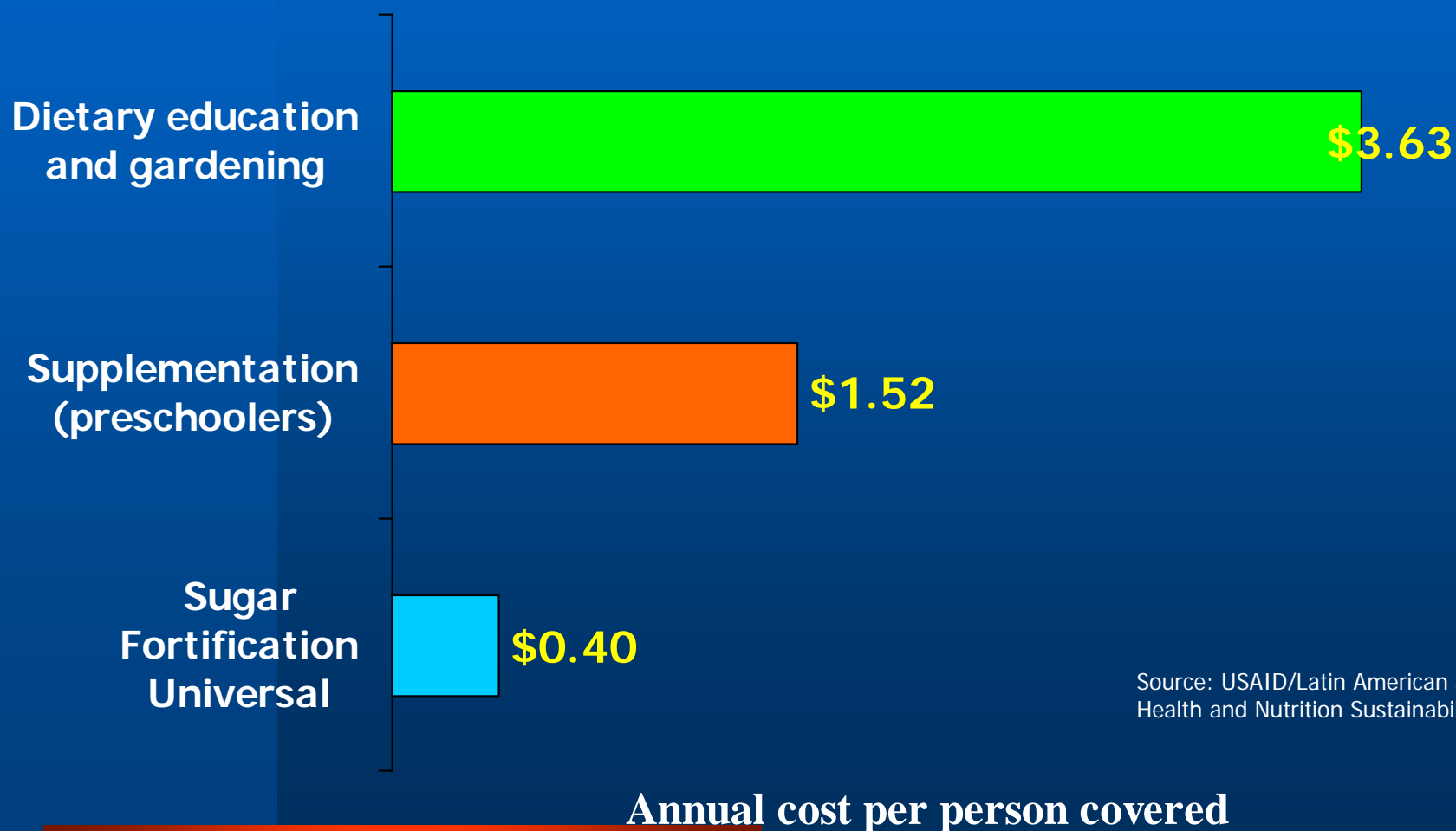
Both Supplementation and Fortification Make Economic Sense

- **Population level impact maximized by fortification**
- **Saving lives at least cost:** targeted suppl for pregnant women (Fe), under fives (Vit A)
- **Raise productivity of programs = lower clinical prevalence at least cost:**
 - --> FF 3x suppl Vit A (<5s), Fe (moms)
 - --> FF 4x iodine suppl (gen), 2x repro-age
- **INSTITUTE OF MEDICINE 1998**

Strategic Advantages in Comprehensive Package

- Population-wide Intervention
- Transfers Costs of Protecting Health to Sectors otherwise not involved
- Enhances Health & Nutrition Strategies
- Consistent Delivery Maximizes Benefit
- Safety in Low Daily Doses
- Minimal Behavior Change
- Cost Effective

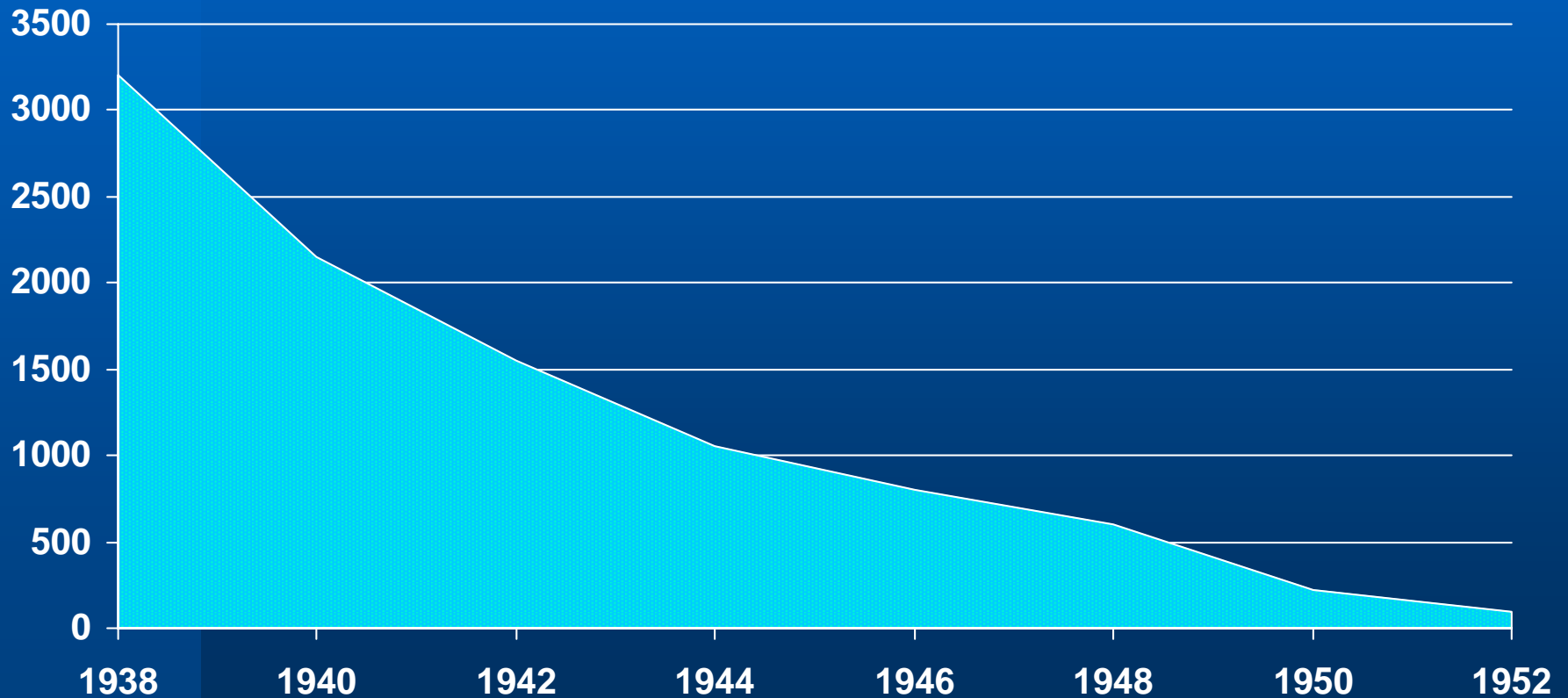
Cost-Effectiveness Analysis: Vitamin A Interventions Guatemala



Source: USAID/Latin American and Caribbean Health and Nutrition Sustainability Project, 1991

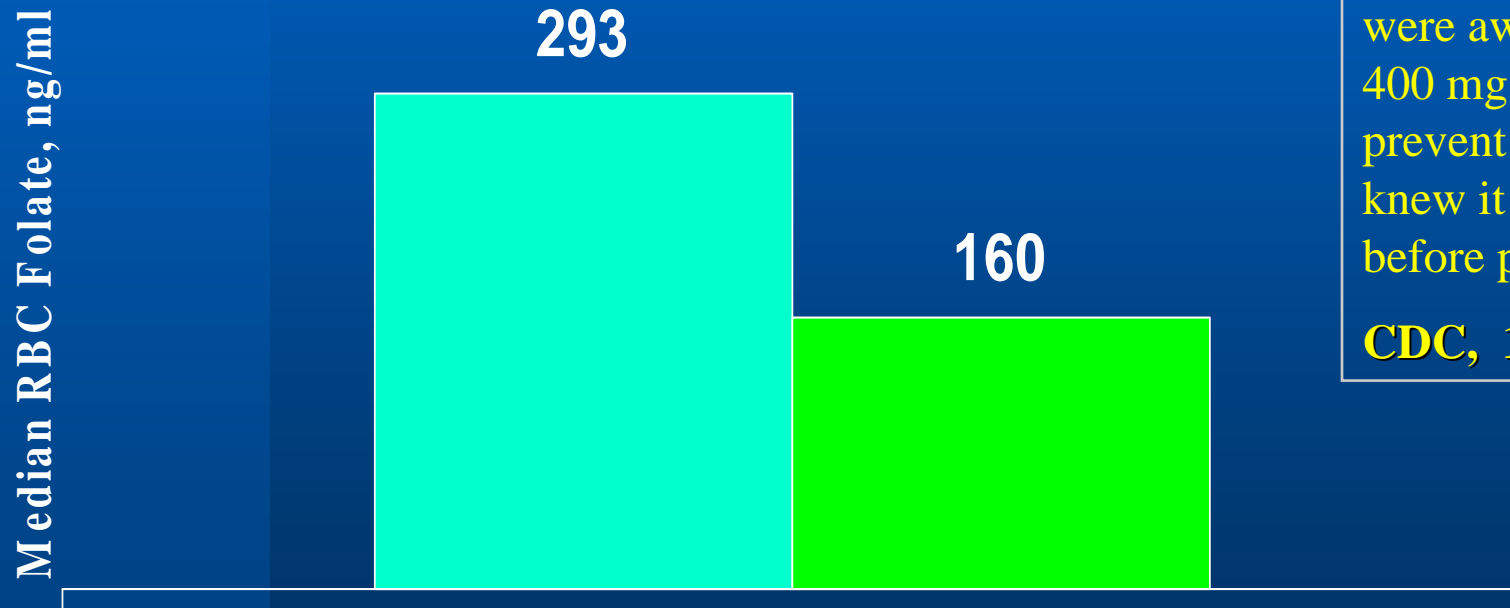
Industrial Country Impact: Flour Fortification In USA

Deaths from Niacin Deficiency



Industrial Country Impact: Flour Fortification In USA

Median Folate Levels Increase 83%

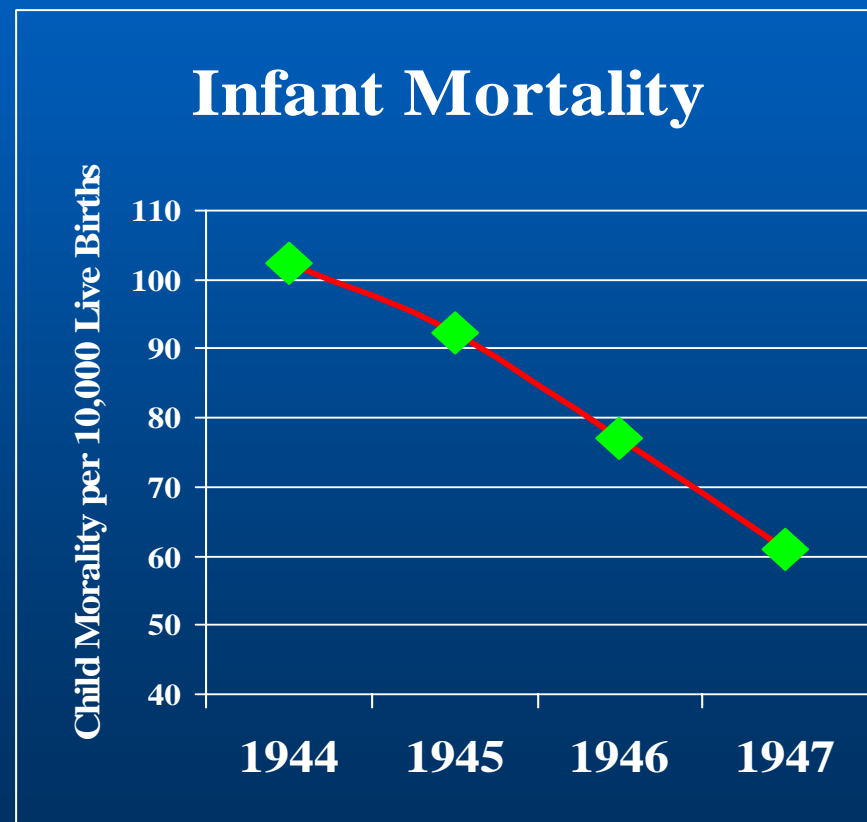
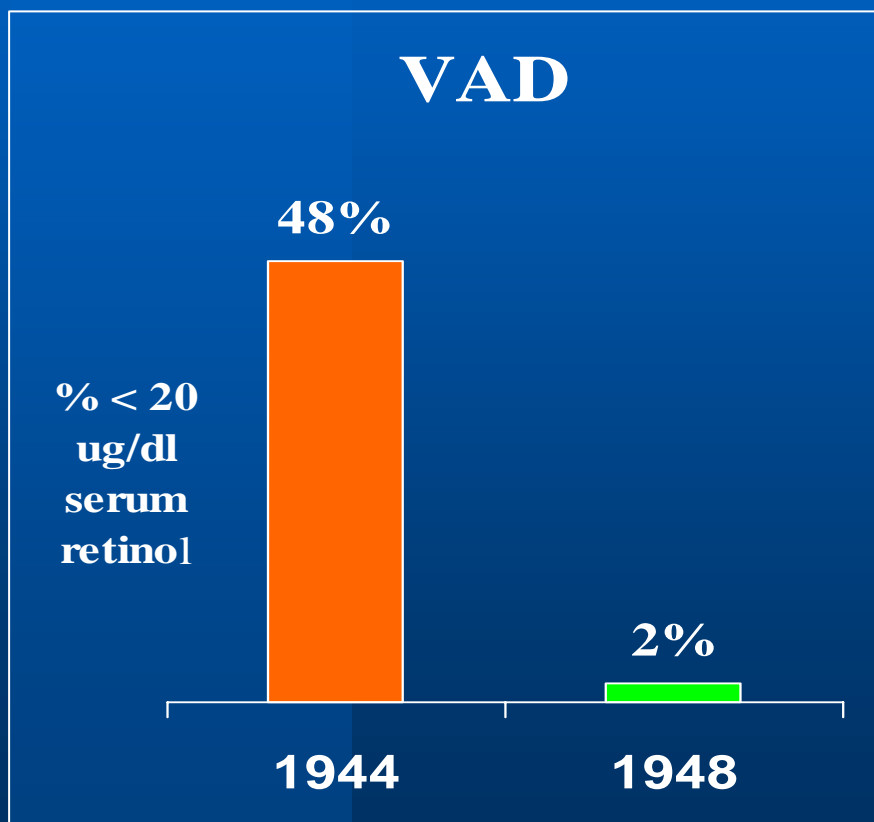


Fortification Begins mid-1997

“Only 13% of Women... were aware that taking 400 mg folic acid can help prevent NTDs. Only 7% knew it should be taken before pregnancy”

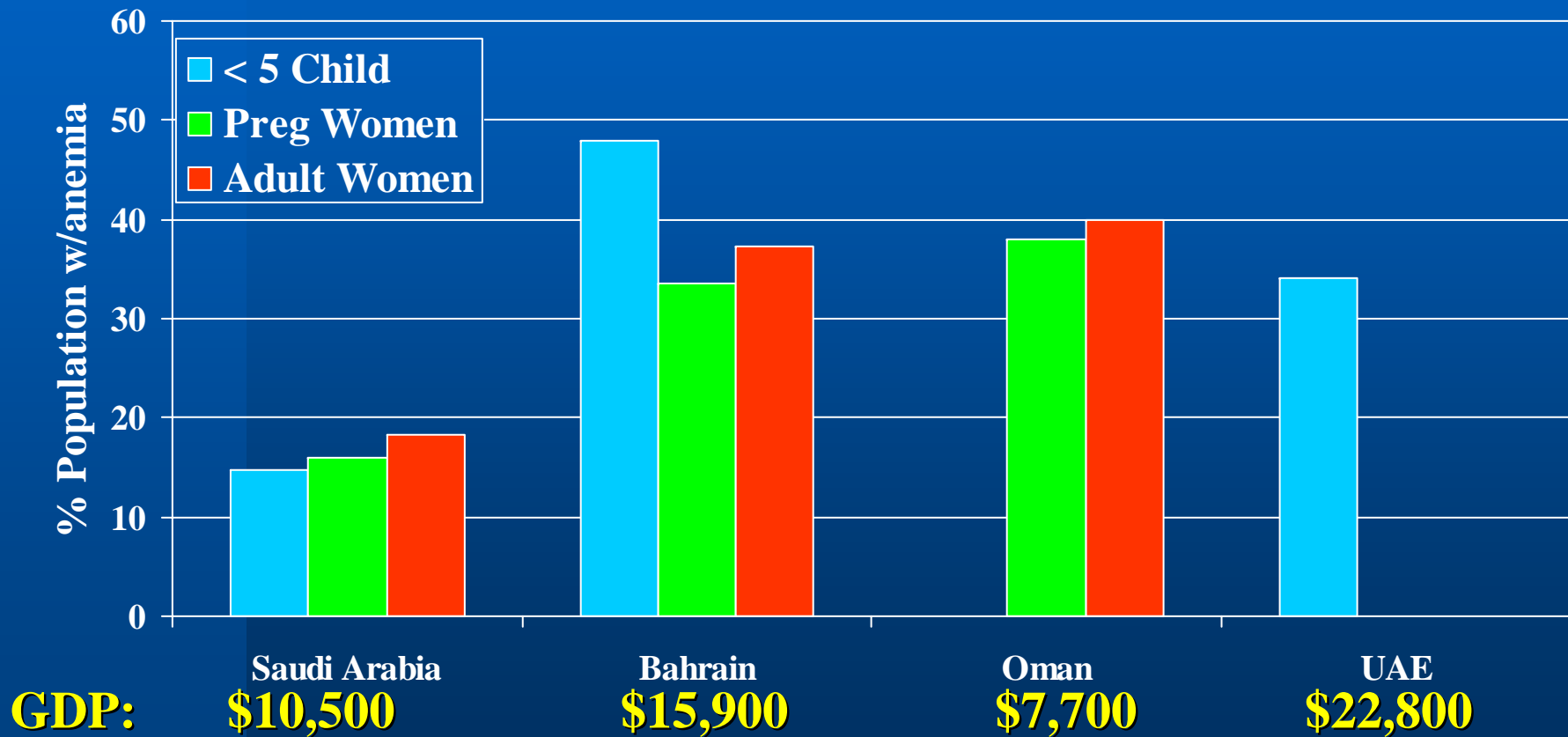
CDC, 1999

Industrial Country Impact: Canada Margarine Fortification



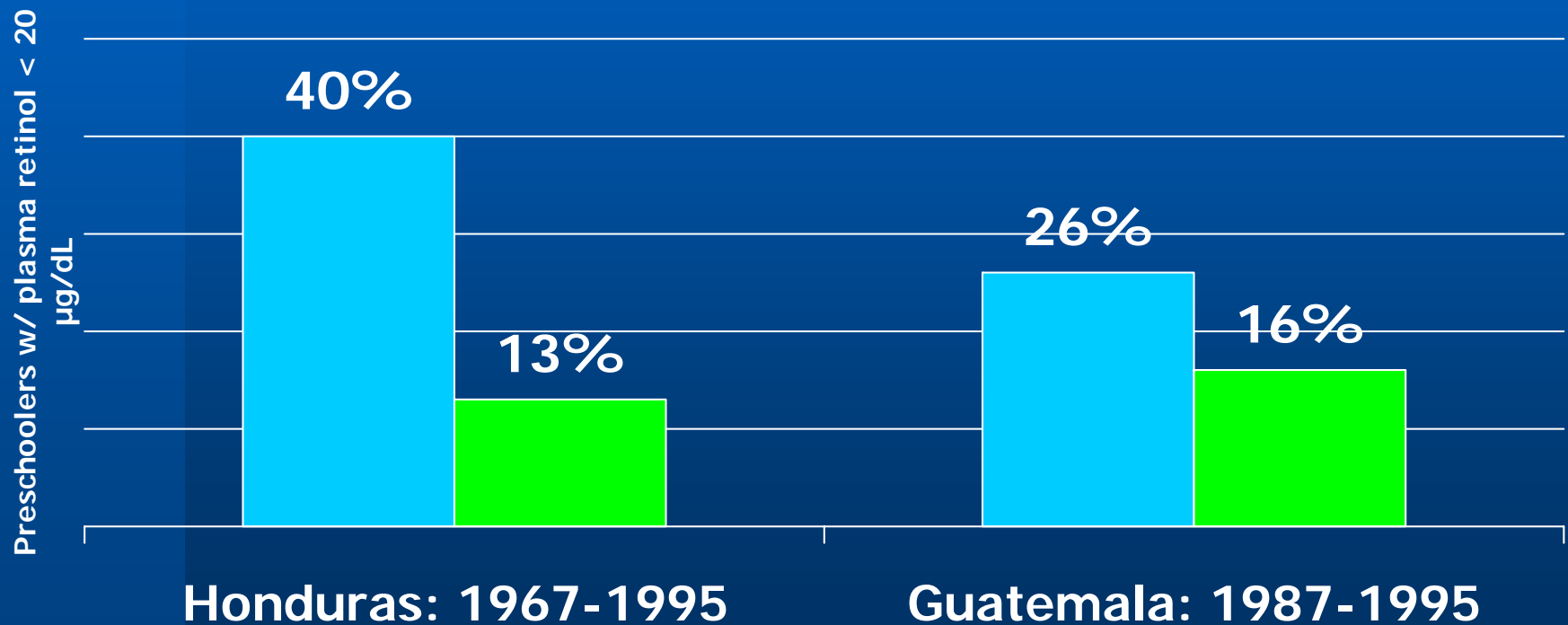
Fortification Begins 1944

Developing Country Impact: Gulf States Anemia Rates



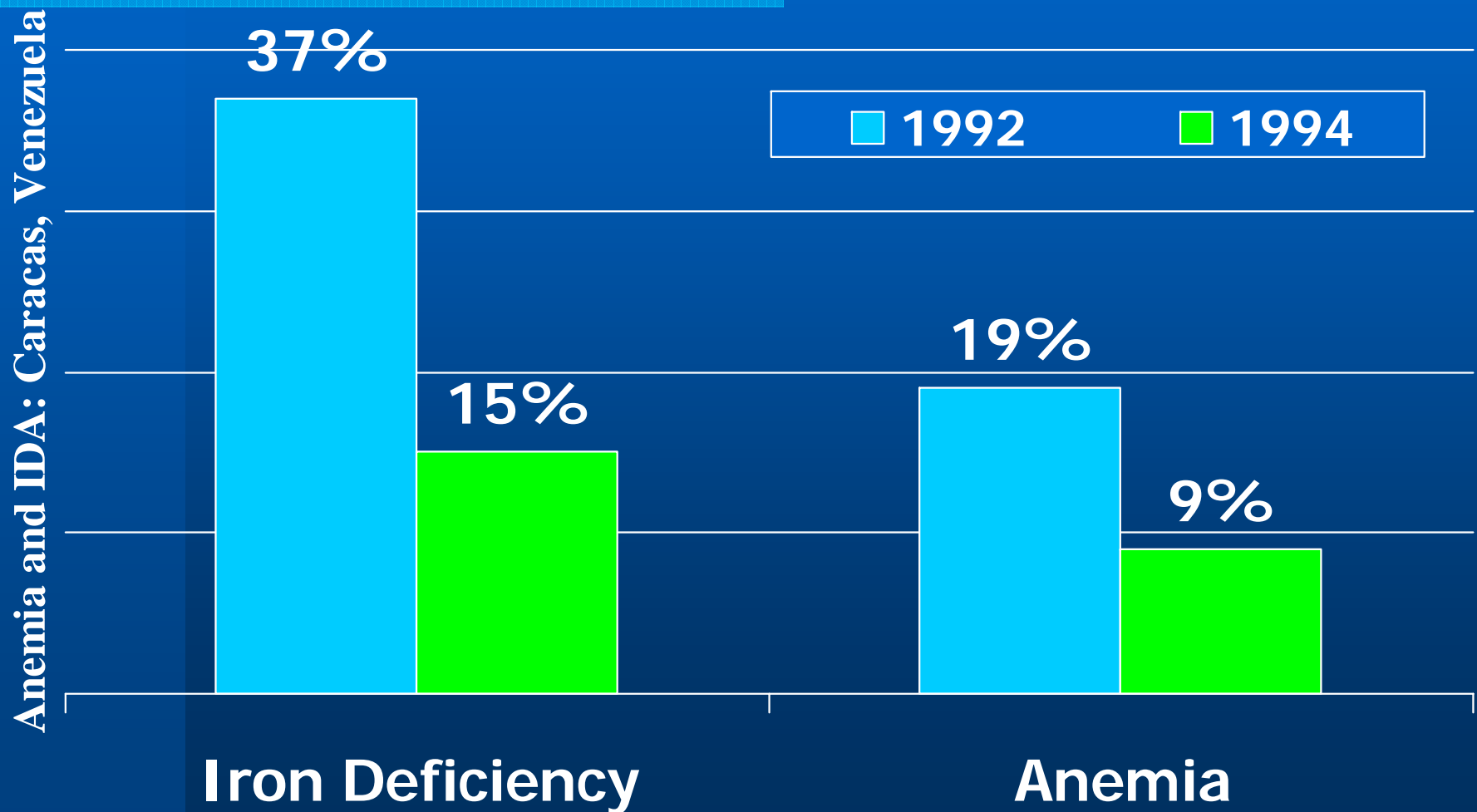
Developing Country Impact Sugar Fortification Cent. America

VAD in Preschoolers



Developing Country Impact

Venezuela Flour Fortification



Benefit: Estimating Economic Impact in Venezuela

Improvement in Anemia:

- 10% previously anemic children (and assume women) are no longer anemic

Per Cap Benefits:

- Future Earnings from Improved Cognitive Growth & Development: **\$5.89 per/cap**
- Current Increases in Blue Collar and Heavy Manual Labor in Adults: **\$1.58 per/cap**

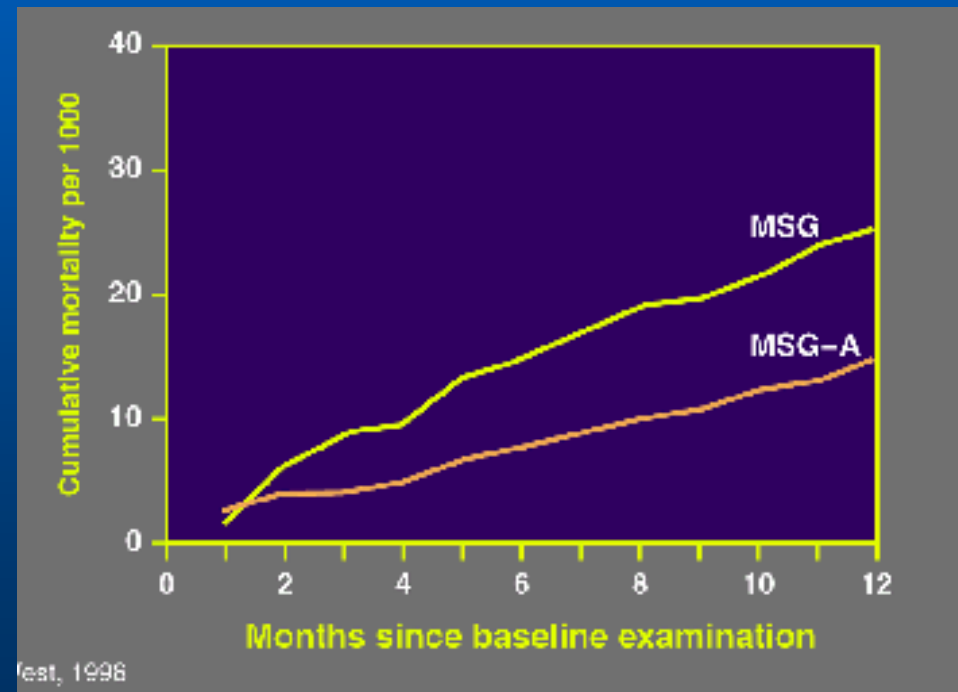
National Population-Wide Gain: **\$177,000,000**

Mortality Reduction Indonesia: Vitamin A Fortified MSG

Trial Parameters

- **Subjects:** 11,000 Subjects in Intervention & Control
- **Level:** 810 ug/.23 g MSG
- **Deliver:** 30% RDA
- **Market Conditions:** 80% Coverage

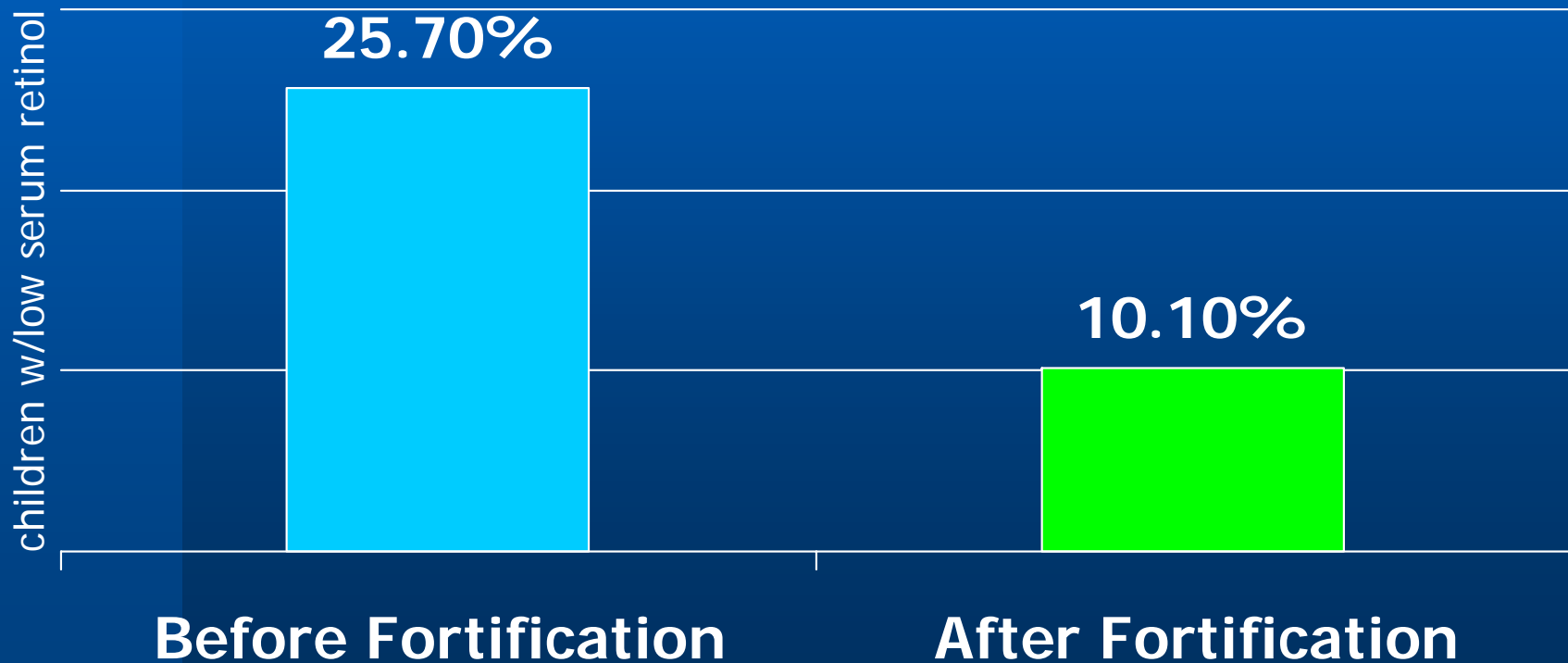
Mortality Reduced: 45%



Adapting New Products

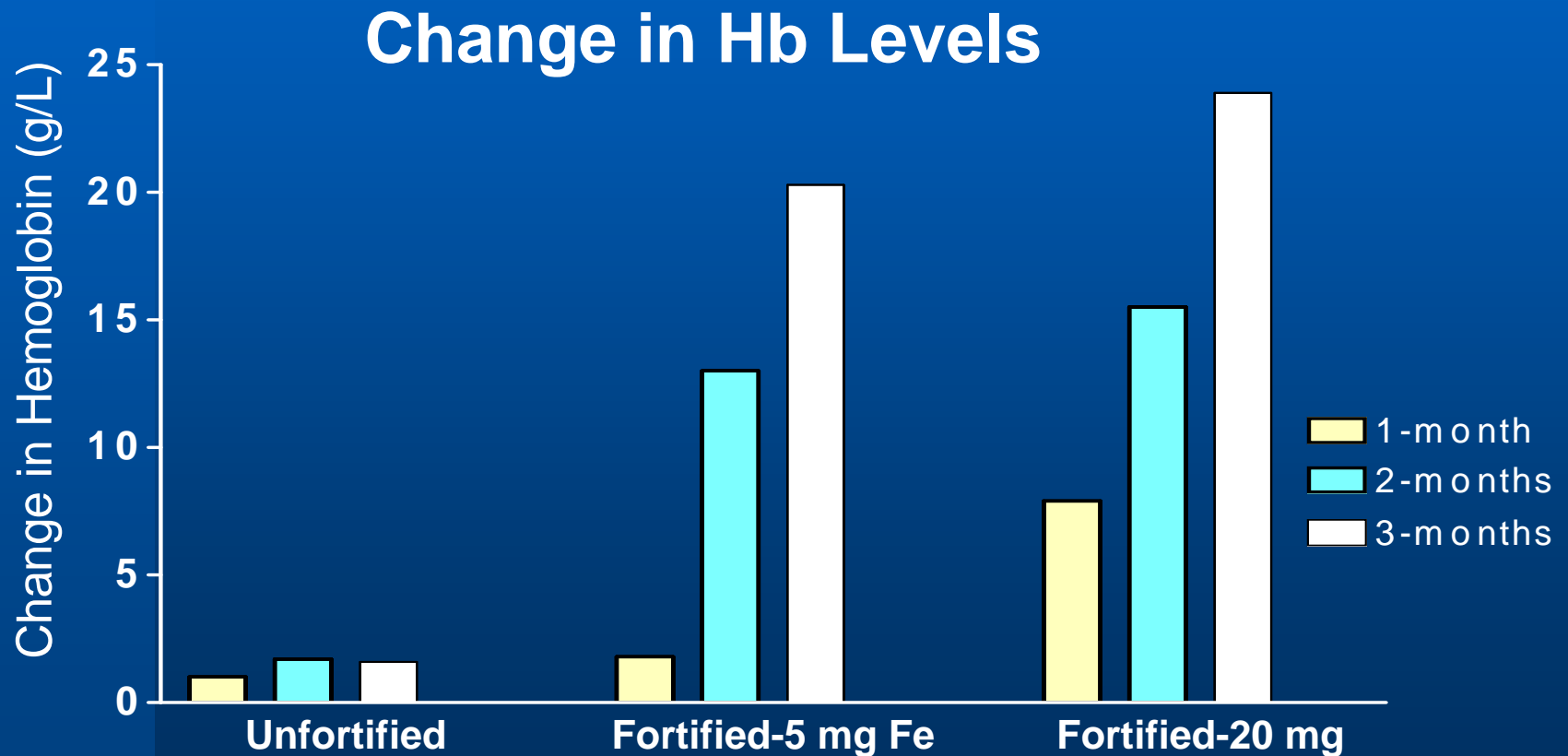
Philippines: Shelf Stable Margarine

VAD in Children



Adapting New Products

China: Iron Fortified Soy Sauce



Fortified Flour in the Market

Indonesia National Wheat Flour Standard

Micronutrient	Level in PPM
Iron	60
Zinc	30
Thiamine	2.5
Riboflavin	4
Folic Acid	2

Fortified Oil Products In the Market

Vitamin A Standards for Fortified Oil Products

Country	Product	IU/gr
India	Vanspati	25
India	Table Margarine	30
Indonesia	Margarine	25-35
Malaysia	Table Margarine	25-35
Pakistan	Ghuee, Butter Oil	33
Philippines	Margaine	33
Singapore	Margarine	28.3
Food Aid	Veg-Oil	60

Making the Case for Investment in Food Fortification

Food Fortification Helps End Micronutrient Malnutrition

- **Fortification:**
 - Financially responsible
 - Politically popular
 - Technically simple
 - Well established

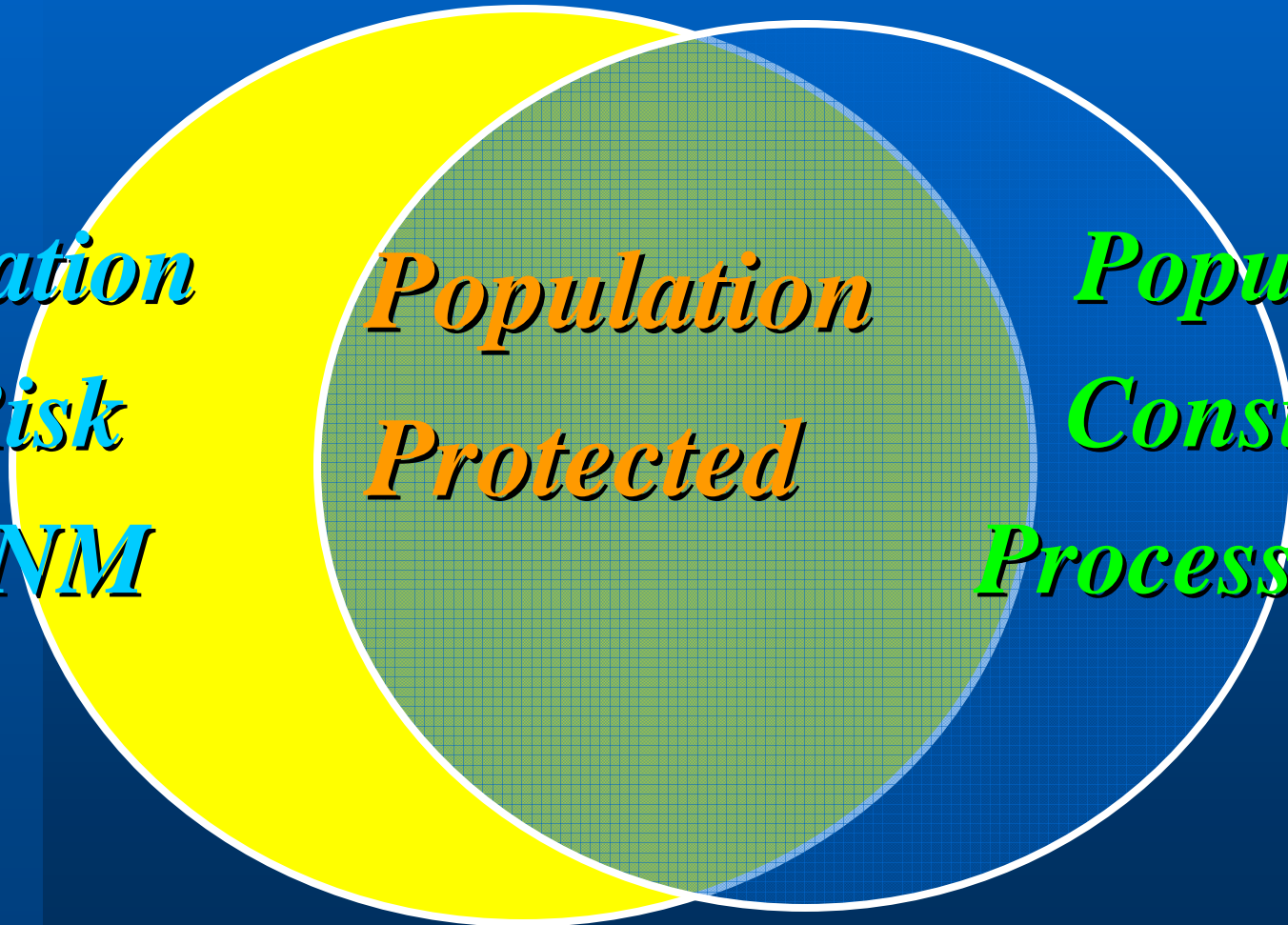
Basic Data Challenge

Overlap of Vehicle & At-Risk

*Population
At-Risk
of MNM*

*Population
Protected*

*Population
Consuming
Processed Food*



Fortification Success Factors

- Data to Demonstrate Need
- Product & Solution
- Analysis, Advocacy & Marketing Case
- Enabling Policy & Investment Environment
- Financing for Capital Investment
- Commercial Viability: Recurring Costs
- Consumer Demand & Awareness

Expanding Practicality: Developmental Investment

Technology & Production

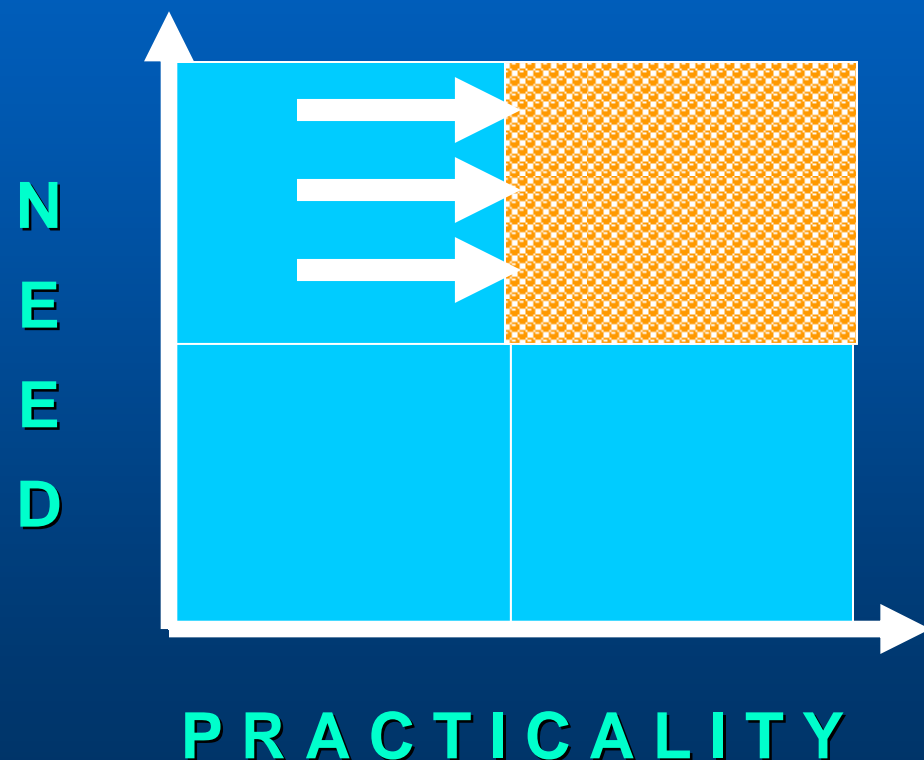
- Upgrade Processing & Distribution
- More Stable/Bioavailable Fortificants
- New Food Products & Vehicles
- Small Scale Tech & Business Model

Awareness & Demand

- Professional & Public Education

Public Policy & Capacity

- Commitment, Mandate & Investment
- Food Control Infrastructure
- Monitoring Safety & Benefit
- Target Programs for At-Risk



Capitalizing on Opportunity

Expanding Practicality

That's Why We're Here

- Define Remaining Data Issues
- Address Industrial Feasibility
- Build Marketing & Investment Case
- Identify Policy Barriers
- Quantify Capital Needs
- Define Beneficiaries & Investors

COMMITMENT - PARTNERSHIPS

- Expanding the Space to include public, private and civic cultures
- Reaching out for technical and economic support for empowerment, not dependence
- Raising capacity
- Regional consensus for concerted national action
- ODA as catalyst, not substitute

COUNTRY TEAM MEMBERS FOR ROUNDTABLE AND STEERING COM at Minister/Deputy level

- Public: Health (chair), education, agriculture /food processing, industry/trade/customs, finance/investment
- Chair: salt producers/flour millers/bakers
- Women's federation, consumers' union
- Nutrition scientist/communications expert
- Social policy parliament; exec office Pres
- All country team institutions eligible for funds

Regional Initiative
on Salt and Flour Fortification for
Improving Women and Children's
Nutrition in Central Asia and Caucasus
2001-3

ASIAN DEVELOPMENT BANK
UNITED NATIONS CHILDREN'S FUND
KAZAKH ACADEMY OF NUTRITION

Eliminating Brain Drain in Central Asia from Iodine and Iron Deficiencies

- Salt and Flour Fortification Project co-sponsored by ADB and UNICEF
- Partnerships for Poor Mothers and Children
- Reverse Trend toward Mental Retardation
- Support Human and Economic Development
- Regional Cooperation is the Key

OBJECTIVES

- Fortify salt with potassium iodate and flour with iron-based premix
- Substantially reduce IDD and IDA
- Improve mental development, reduce poverty
- Build CARK-CAUC Partnership: Reform
>production, regulation, surveillance, customs, trade
- Strengthen capacity to sustain
- Mobilize resources for final solution

CREDIBILITY

- Consensus Building w/ all Stakeholders
- Reallocation of Own Resources
- Political Mobilization for CIP
- Social Mobilization to ensure Civil Society Buy-in and Response to Needs of the Poor
- CIP reflects National Governance
- ODA reflects MDG realization

SETTING THE STAGE FOR NEW INVESTMENT

- Intersectoral Planning and Creating ...
- → Consensus, Capacity, Strategies
- → Public Goods
- → Local governance
- → Community Partnerships
- → People's Empowerment

Positioning the CIP for Resource Mobilization

- Use existing PERs to estimate additional needs
- Stress economic/health losses of inaction
- Present cost-effectiveness arguments
- Emphasize public and Private savings from new investment
- Link I to life cycle learning and earning
- Slice I Gap three ways: Pu/Pr; C/L; Nat/ODA
- Structure of accountability for leadership
- Regional capacity building in parallel

CASH FOR KIDS AND THOSE WHO LOVE THEM

- ADB: Japan Fund for Poverty Reduction
- : Bilateral Trust Funds
- UN Nutrition Forum: UN agencies and Bilaterals : Asia Child Development Trust Fund?
- Philanthropies: GAIN, others
- Building the Investment Coalition in parallel to CIP review and adoption
- Convergence of MOFs and DPs to co-finance CIPs at Investors' Roundtable IV 2002 : **\$40M**