



DISEASE CONTROL
PRIORITIES PROJECT



Regional Burden of Disease Risk Factors, and Cost-Effective Interventions

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INVESTING IN GLOBAL HEALTH "BEST BUYS" AND PRIORITIES FOR ACTION IN DEVELOPING COUNTRIES

Global Burden of Disease (GBD): Goals

- Measure loss of health due to comprehensive set of disease, injury, and risk factor causes in a comparable way
- Decouple epidemiological assessment and advocacy
- Inject non-fatal health outcomes into health policy debate
- Use a common metric for burden of disease assessment with summary measure of population health and cost-effectiveness analysis

Attribution of Disease Burden: Need for Comparative Risk Assessment (CRA)

- ❖ Mortality and morbidity can be attributed to
 - disease or injury outcomes
 - risk factors
- ❖ Focusing on risk factors is key to prevention
- ❖ Comparative risk assessment should be a key input to prioritisation for:
 - health systems faced with many and varied health problems
 - research agenda

Ideal Features of Risk Assessment

- ❖ Well-defined scope
- ❖ Risks assessed irrespective of place in a causal chain
- ❖ Risks defined and studied comprehensively and with comparable counterfactuals
- ❖ “Common currency” outcome measures, with impact assessed in terms of lost healthy life years (example: DALY)
- ❖ Protective as well as hazardous factors
- ❖ Population-wide risks as well as high-risk individuals

Disability-Adjusted Life Years (DALYs)

Burden of Disease on a Defined Population

- ❖ Aggregate of **premature mortality, morbidity, and disability**
- ❖ Adjustments made for
 - **life expectancy**
 - long-term **disability** (weighted)
- ❖ Valid indicator of **population health**
- ❖ Tied to effectiveness of **interventions**

Disability-Adjusted Life Years (DALYs)

$$DALY = YLL + YLD$$

*Time is used as the common metric
for mortality and health status*

YLL Years of life lost due to mortality

YLD Equivalent years of healthy life lost due
to disability



Criteria for Selecting Risks in GBD 2001

- ❖ Risk factors quantified by age, sex, & region selected on the basis of:
 - potential global impact
 - high likelihood of causality
 - potential modifiability
 - neither too specific nor too broad
 - availability of data on risk factor distributions and risk factor-disease relationships

GBD Data Sources

Mortality

⇒ Death registration, sample registration systems, household surveys, surveillance systems, epidemiological studies, population laboratories

Morbidity/disability

⇒ Disease registers, population based studies, longitudinal studies, health facility data (injuries)

Risks Quantified in GBD 2001

Child & maternal under-nutrition

- Childhood and maternal underweight
- Iron deficiency
- Vitamin A deficiency
- Zinc deficiency

Addictive substances

- Smoking and oral tobacco
- Alcohol
- Illicit drugs

Other nutrition-related risks & inactivity

- High blood pressure
- High cholesterol
- Overweight and obesity
- Inadequate fruit and vegetable intake
- Physical inactivity

Sexual and reproductive health risks

- Unsafe sex
- Non-use and ineffective use of contraception



Risks Quantified in GBD 2001

Environmental risks

- Unsafe water, sanitation, and hygiene
- Urban air pollution
- Indoor smoke from solid fuels
- Lead exposure
- Climate change

Other selected risks to health

- Contaminated health care injections
- Child sexual abuse

Occupational risks

- Risk factors for injury
- Carcinogens
- Airborne particulates
- Ergonomic stressors
- Noise

Distributions of risks by poverty



Some Slides on Mortality and Burden of Disease in Sub-Saharan Africa, 2001

Leading Causes of DALYs in Sub-Saharan Africa, 2001

<u>Total DALYs</u>	<u>%</u>
1. HIV/AIDS	17.8
2. Malaria	10.3
3. Lower respiratory infections	8.4
4. Perinatal conditions	6.3
5. Diarrheal diseases	6.1
6. Measles	4.6
7. Tuberculosis	2.4
8. Whooping cough	1.9
9. Road traffic accidents	1.8
10. Protein-energy malnutrition	<u>1.6</u>
Total	61.2

Mathers et al. in Global Burden of Disease and Risk Factors, 2006

Three Leading Causes of Mortality and Burden of Disease: Cape Verde, 2001

Mortality

DALYs

	% total deaths		% total DALYs
Cerebrovascular disease	10.9	Tuberculosis	5.7
Ischaemic heart disease	8.3	Cataracts	5.1
Tuberculosis	7.1	Diarrhoeal diseases	4.5

Source: Mathers, Lopez & Murray, Burden of Disease Volume, 2006.

Mortality and Burden of Disease Due to Selected Risk Factors: Cape Verde, 2001

Mortality

DALYs

	% total deaths		% total DALYs
High blood pressure	16.7	Childhood and maternal Underweight	7.6
Childhood and maternal underweight	7.1	High blood pressure	6.0
High cholesterol	3.8	Unsafe water, sanitation, and hygiene	4.0

Source: Mathers, Lopez & Murray, Burden of Disease Volume, 2006.

Three Leading Causes of Mortality and Burden of Disease: Guinea, 2001

Mortality

DALYs

	% total deaths		% total DALYs
Malaria	14.5	Malaria	14.4
Conditions arising during the perinatal period	10.2	Conditions arising during the perinatal period	10.9
Diarrhoeal diseases	9.2	Diarrhoeal diseases	8.7

Source: Mathers, Lopez & Murray, Burden of Disease Volume, 2006.

Mortality and Burden of Disease Due to Selected Risk Factors: Guinea, 2001

Mortality		DALYs	
	% total deaths		% total DALYs
Childhood and maternal underweight	20.5	Childhood and maternal underweight	19.9
Unsafe water, sanitation, and hygiene	8.2	Unsafe water, sanitation, and hygiene	7.7
Unsafe sex	6.9	Unsafe sex	6.0

Source: Mathers, Lopez & Murray, Burden of Disease Volume, 2006.

Three Leading Causes of Mortality and Burden of Disease: Nigeria, 2001

Mortality		DALYs	
	% total deaths		% total DALYs
Malaria	13.2	Malaria	13.2
Lower respiratory infections	11.1	Lower respiratory infections	9.7
HIV/AIDS	9.5	HIV/AIDS	8.3

Source: Mathers, Lopez & Murray, Burden of Disease Volume, 2006.

Mortality and Burden of Disease Due to Selected Risk Factors: Nigeria, 2001

Mortality		DALYs	
	% total deaths		% total DALYs
Childhood and maternal underweight	21.4	Childhood and maternal underweight	21.1
Unsafe sex	10.6	Unsafe sex	9.5
Unsafe water, sanitation, and hygiene	6.0	Unsafe water, sanitation, and hygiene	5.7

Source: Mathers, Lopez & Murray, Burden of Disease Volume, 2006.

Burden of Disease and Risk Factors

Conclusions

- ❖ Role of established risk factors greater than commonly thought
- ❖ Risks are widespread – all risk factors have global impact, and the burden of many occurs almost exclusively in developing countries
- ❖ Large and often unrecognized potential for prevention
 - Full impact of risks often under-measured, and hence under-appreciated
 - Many more at risk:
 - nearly one-third of children and mothers in Guinea would be in better health if they were well nourished
 - nearly one-quarter of adults in Cape Verde would be in better health if they had lower blood pressure
 - nearly one-third of adults in Nigeria would be in better health if they avoided unsafe sex



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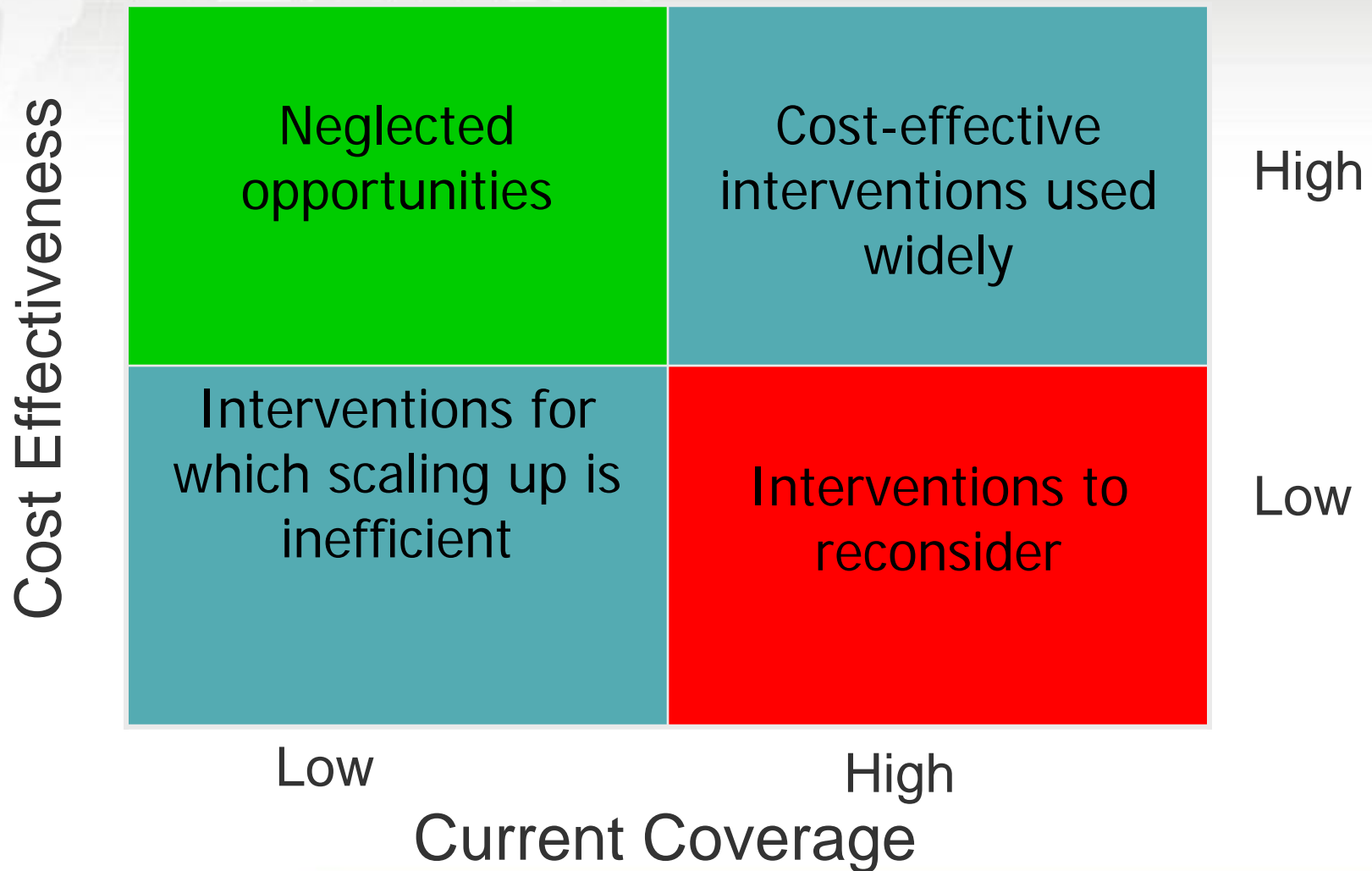
Intervention Cost-Effectiveness Summary of key messages

INVESTING IN GLOBAL HEALTH “BEST BUYS” AND PRIORITIES FOR ACTION IN DEVELOPING COUNTRIES

Objective: Improve Quality of Health Spending

- ❖ Provide information on the “price” of buying health through different interventions
- ❖ Policymakers can combine this information with other considerations to determine how best to improve health

Identifying the efficiency of current and potential interventions

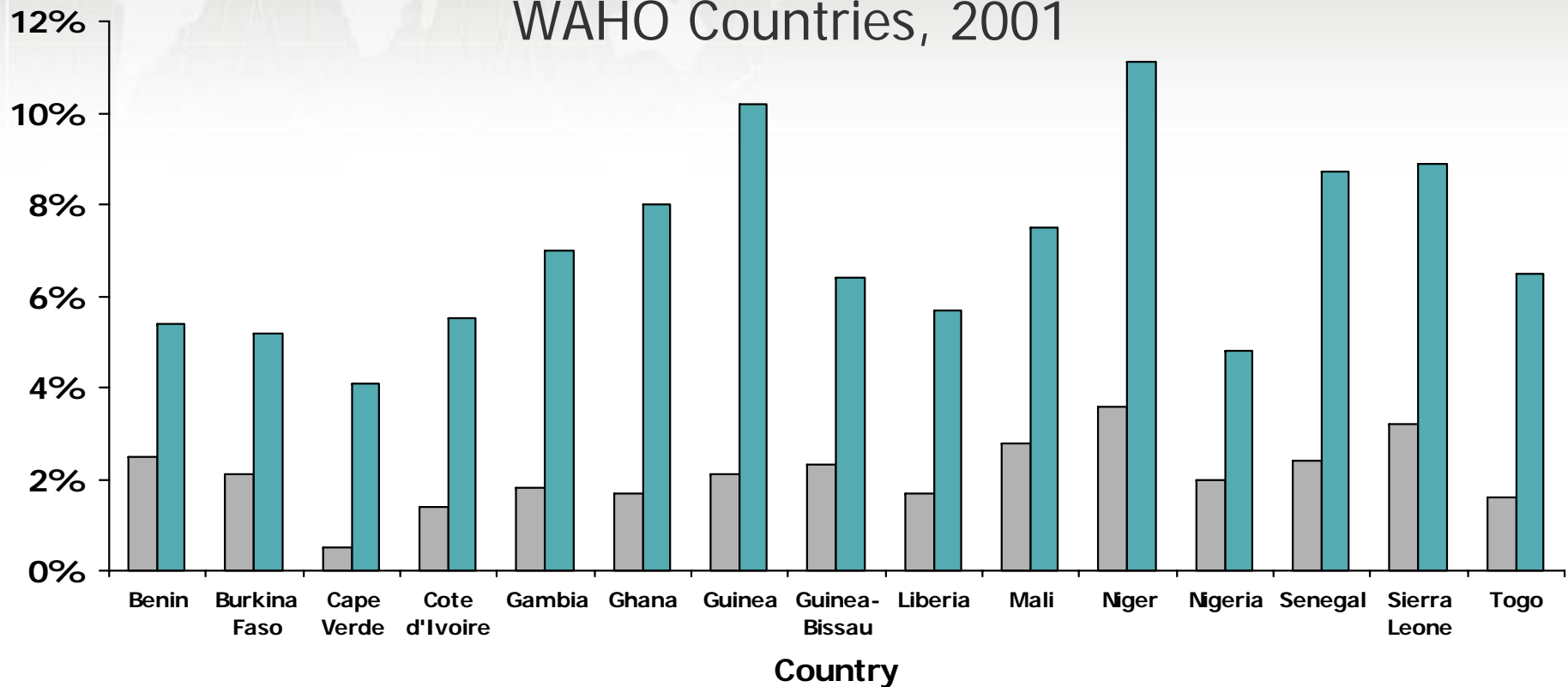


The best health interventions:

- ❖ Target major causes of death, disability and illness in developing countries;
- ❖ Are cost-effective; and
- ❖ Can be scaled up.

Percentage of Deaths Due to Maternal and Perinatal Conditions

WAHO Countries, 2001



■ Maternal Conditions ■ Perinatal Conditions

Maternal Conditions: hemorrhage, sepsis, hypertensive disorders, obstructed labor, abortion, and other maternal conditions
 Perinatal Conditions: low birth weight, birth asphyxia, birth trauma, and other perinatal conditions

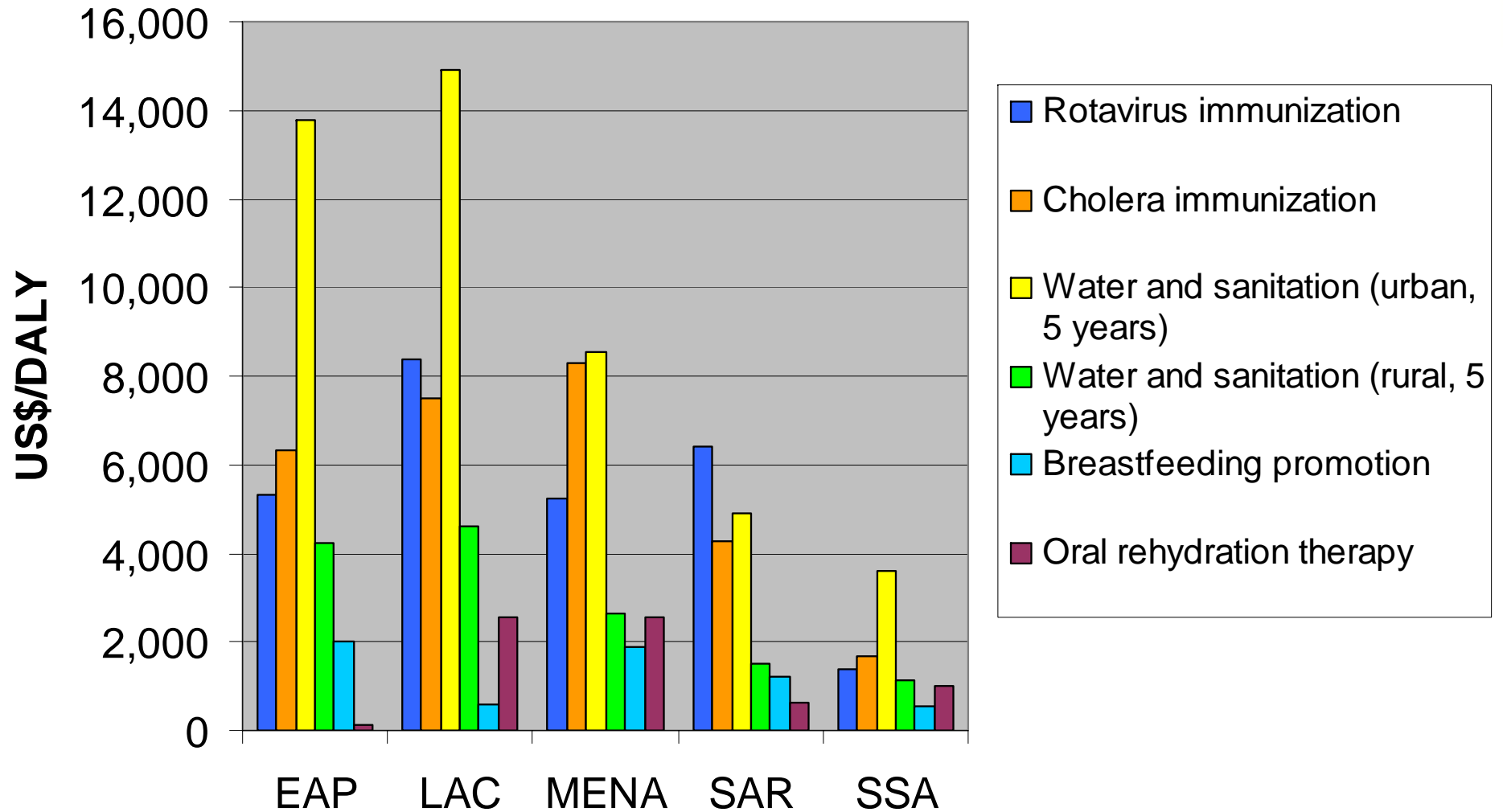
Source: WHO World Health Statistics, 2001

Ensure healthier mothers and children

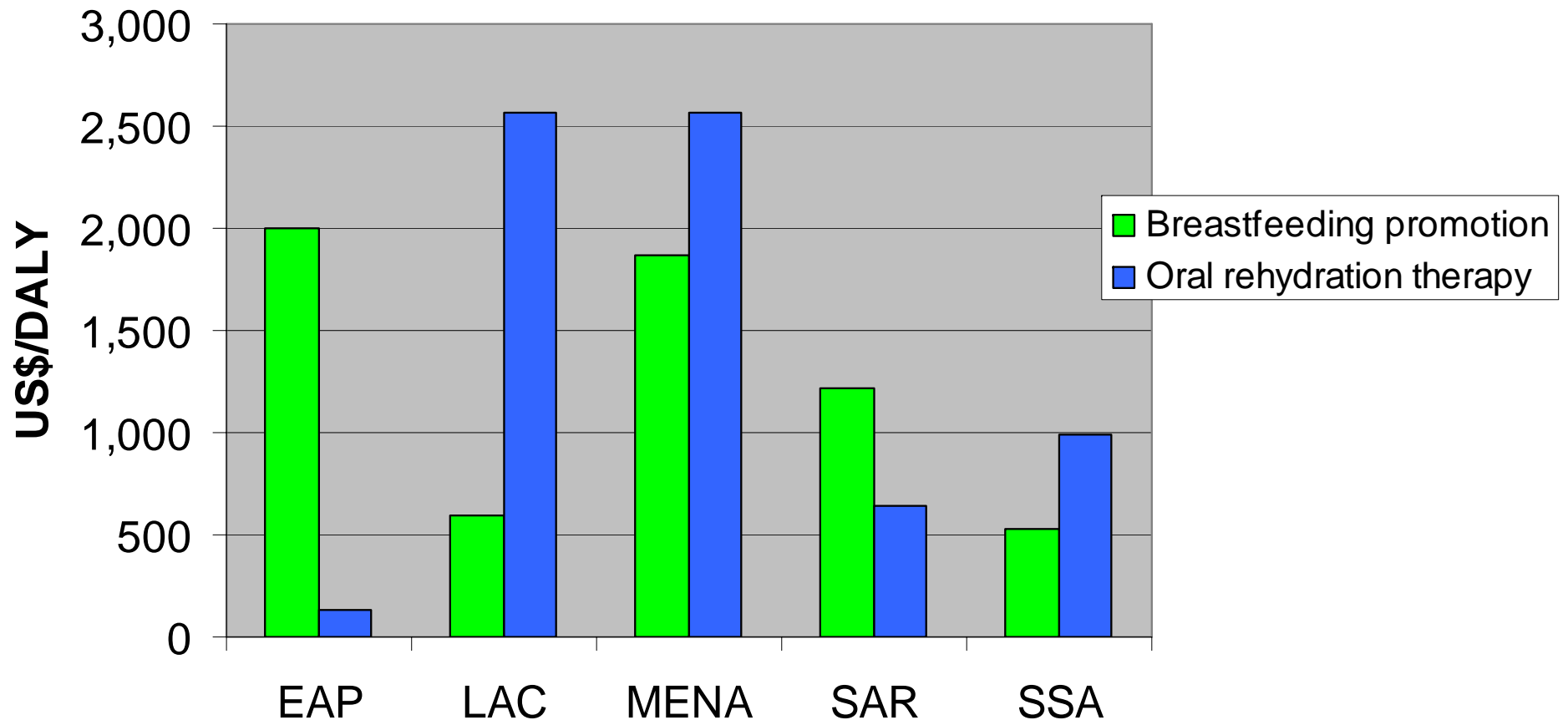
*One-half of all child deaths occur
in the first 28 days after birth.*

- Ensure access to emergency obstetric care.
- Keep newborns dry, warm, and clean.
- Vaccinate children against major childhood killers.
- Monitor children's health to prevent and treat childhood pneumonia, diarrhea, and malaria.

Diarrheal Disease



Diarrheal Disease: CEA for Breastfeeding and Oral Rehydration Therapy Interventions



Promote good nutrition

Poor nutrition contributes to up to 40 percent of the disease burden worldwide.

- Provide children and pregnant women essential nutrients.
- Promote at least six months of exclusive breastfeeding for infants.
- Lower trans fats in processed foods through legislation/regulation.

Support family planning

Average Cost per Benefit of Family Planning in Sub-Saharan Africa

Cost per Birth Averted	\$131
Cost per Infant Death Averted	\$1,367
Cost per Maternal Death Averted	\$10,231
Cost per DALY Saved	\$34
Cost per Year of Life Lost Averted	\$37
Source: DCP2, Chapter 57	

Control malaria

Malaria claims the lives of 1 million children yearly, and it threatens nearly one-half of the world's population.

- Provide universal access to insecticide-treated nets in areas where malaria is endemic.
- Expand intermittent preventive treatment for pregnant women.
- Subsidize artemisinin combination therapy to ensure effective treatment.

Ensure equal access to high-quality health care

In many countries, women, rural residents, and the poor have less access to quality health care.

- Train health workers to perform basic surgical procedures and treat common medical conditions.
- Help providers choose the most cost-effective interventions.

None of these improvements will be sustainable unless we strengthen health systems.

- ❖ Stewardship and regulation
- ❖ Organizational structures
- ❖ Human resources
- ❖ Target resources

Closing thoughts

- ❖ DCPP provides tools for priority setting
- ❖ Policymakers can vastly improve quality of health spending
- ❖ Improving quality of health spending should be complemented by increased spending