

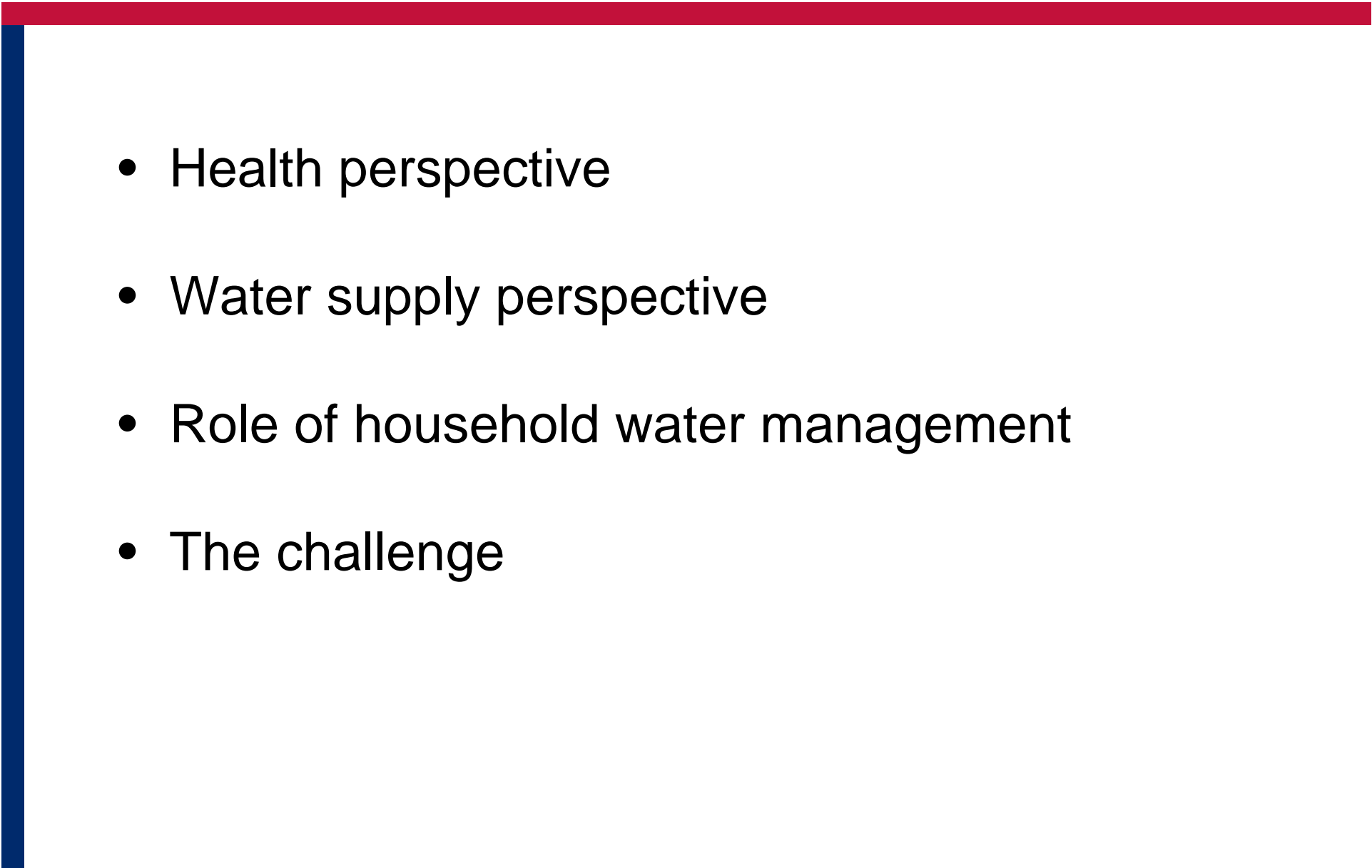


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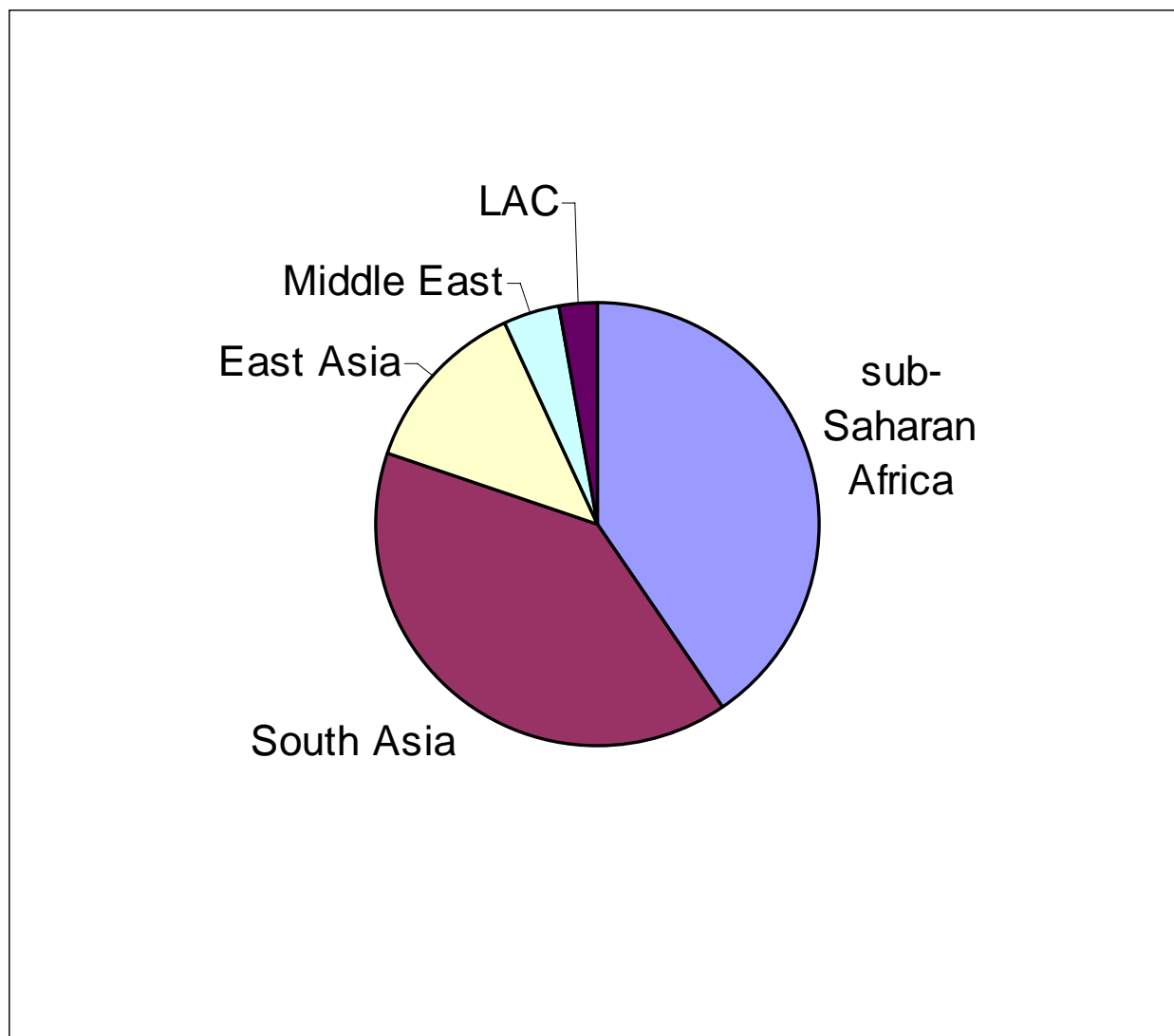
Drinking Water Quality in the Household: The Role of Point-of-Use Water Treatment

John Borrazzo
Bureau for Global Health
U.S. Agency for International Development

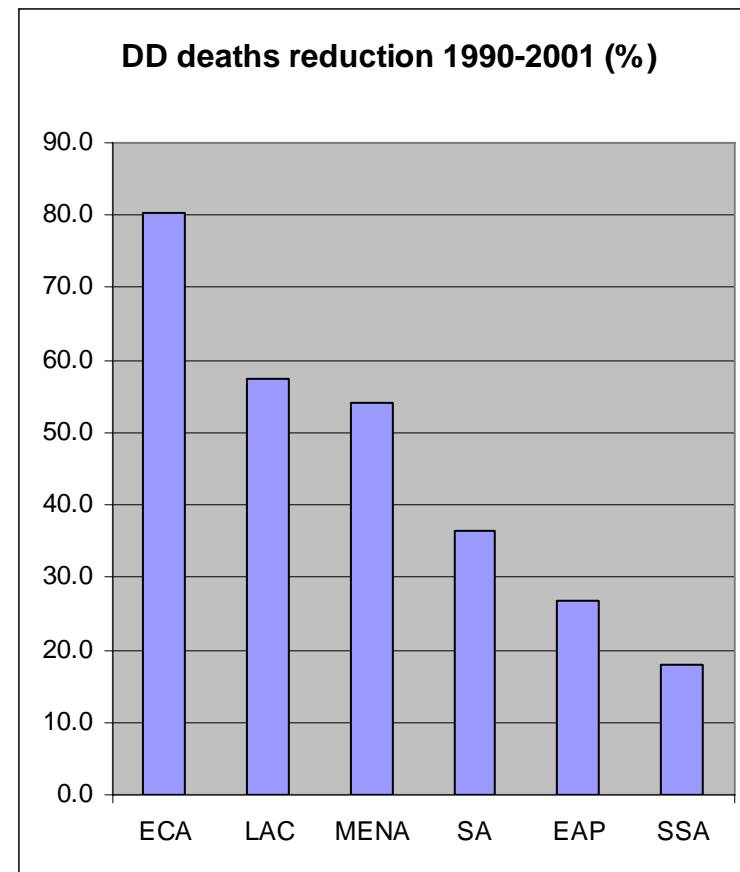
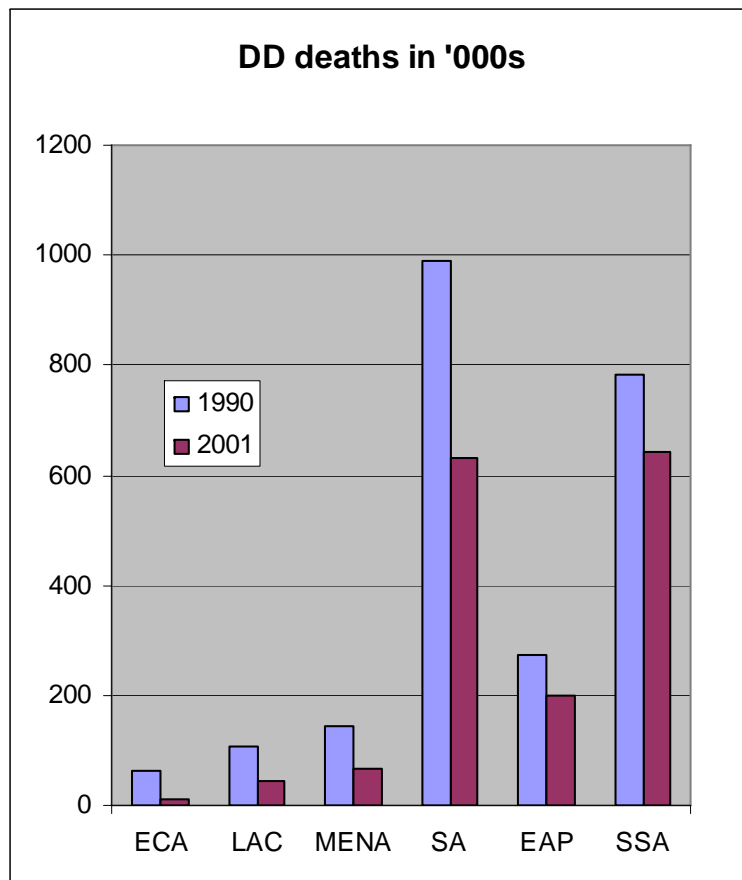
World Bank Water Week
February 28, 2007

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- Health perspective
 - Water supply perspective
 - Role of household water management
 - The challenge

Where do children under 5 die from diarrhea?

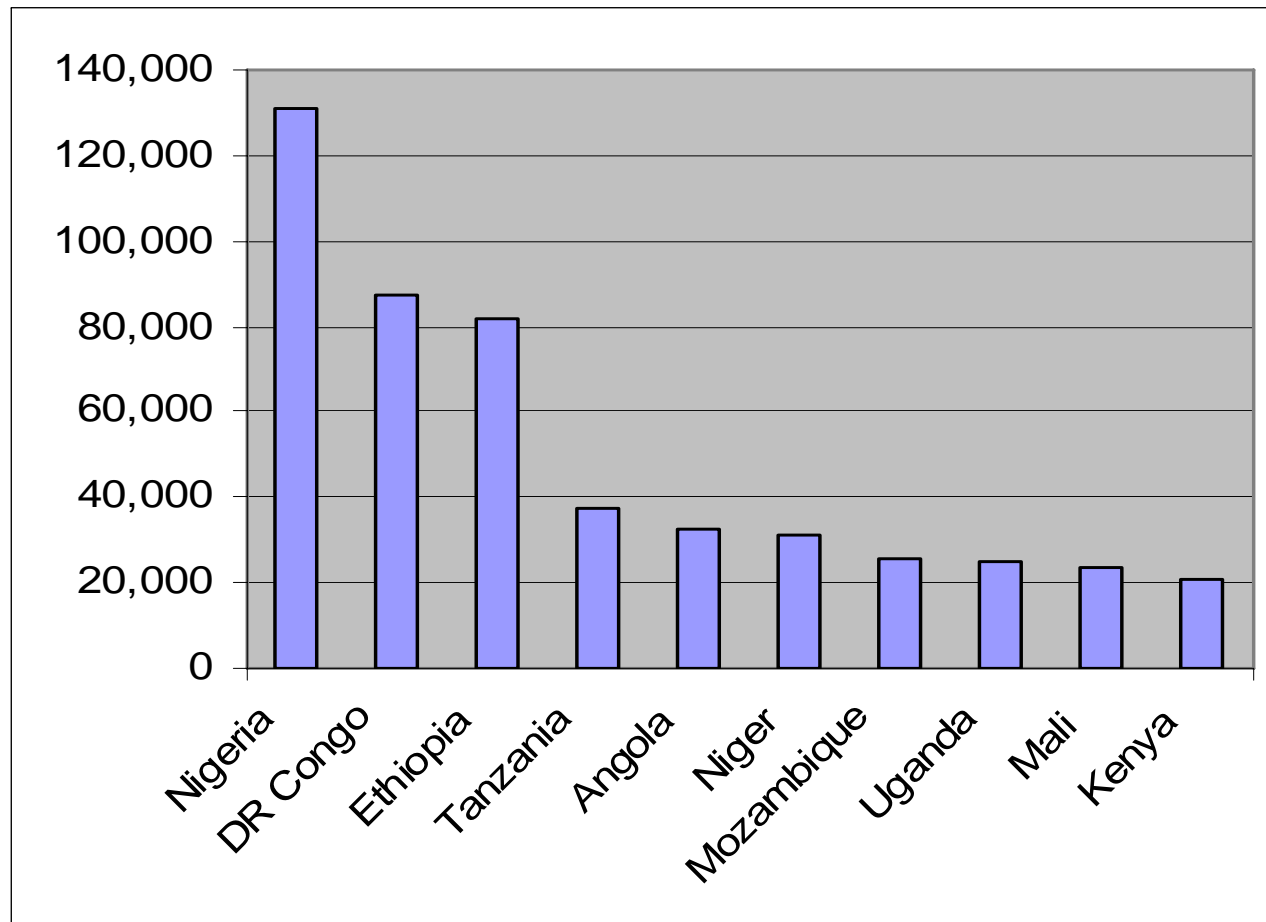


DD deaths have declined everywhere, but are not declining in sub-Saharan Africa as quickly as in other regions



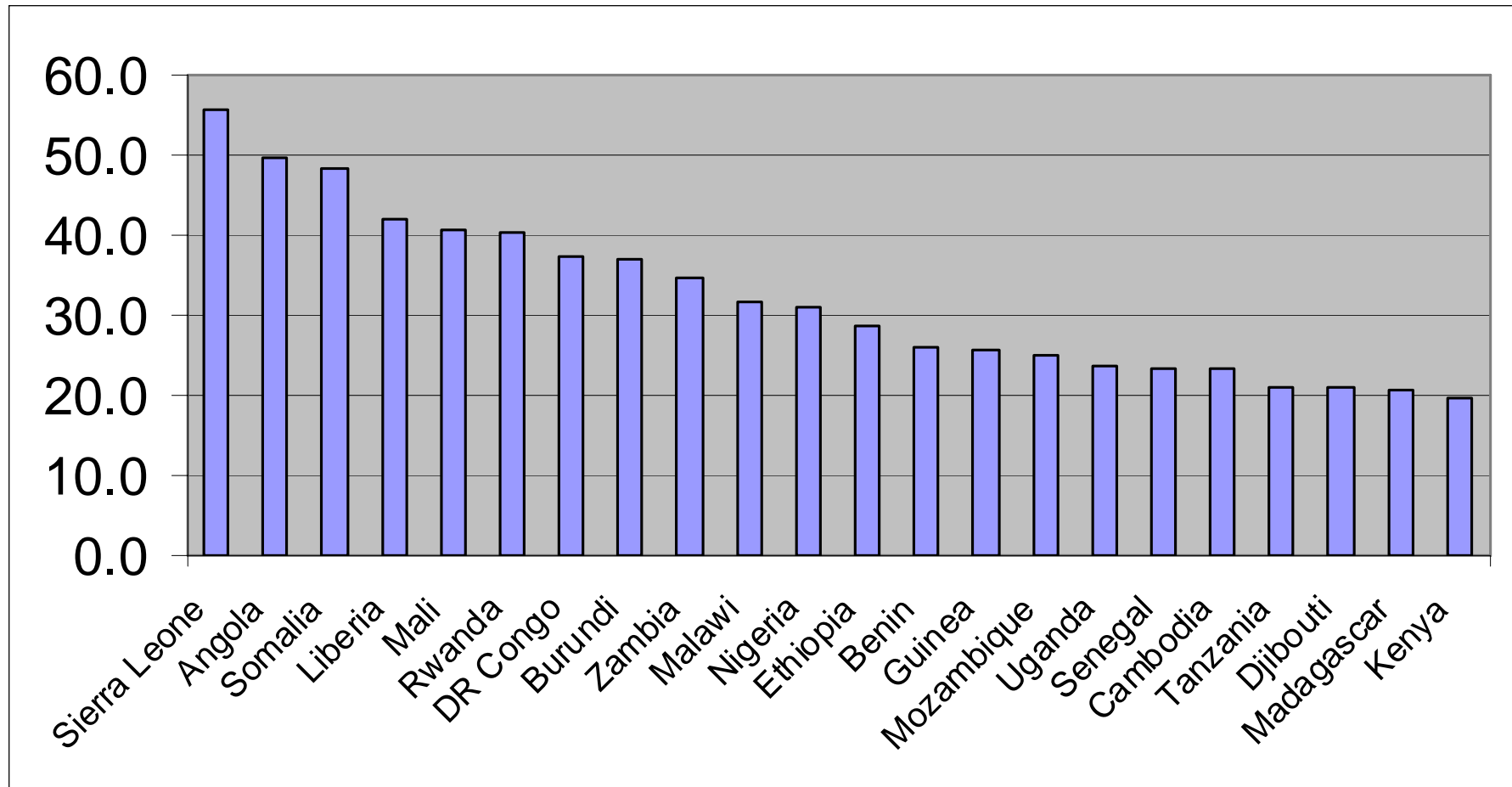
Source: WHO, 2002; ECA=Europe and Central Asia, LAC=Latin America and the Caribbean, MENA=Middle East and North Africa, SA=South Asia, EAP=East Asia and the Pacific, SSA=sub-Saharan Africa

Nigeria, DR Congo, and Ethiopia collectively account for nearly one-fifth of global child deaths from diarrhea...



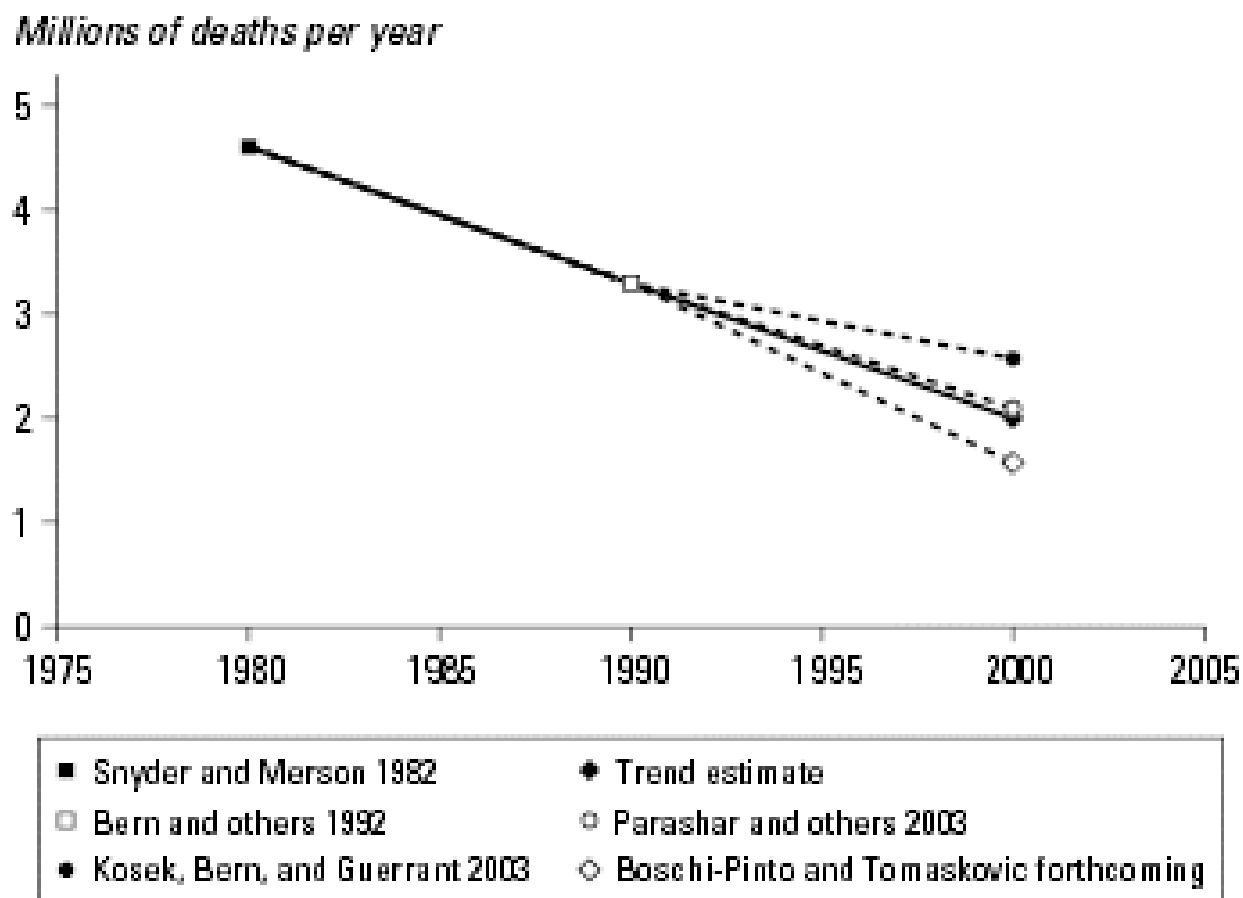
Source: *The Lancet* Child Survival Series, 2003

..and the problem of child deaths from DD is severe elsewhere in sub-Saharan Africa, albeit smaller in overall magnitude



Source: *The Lancet* Child Survival Series, 2003

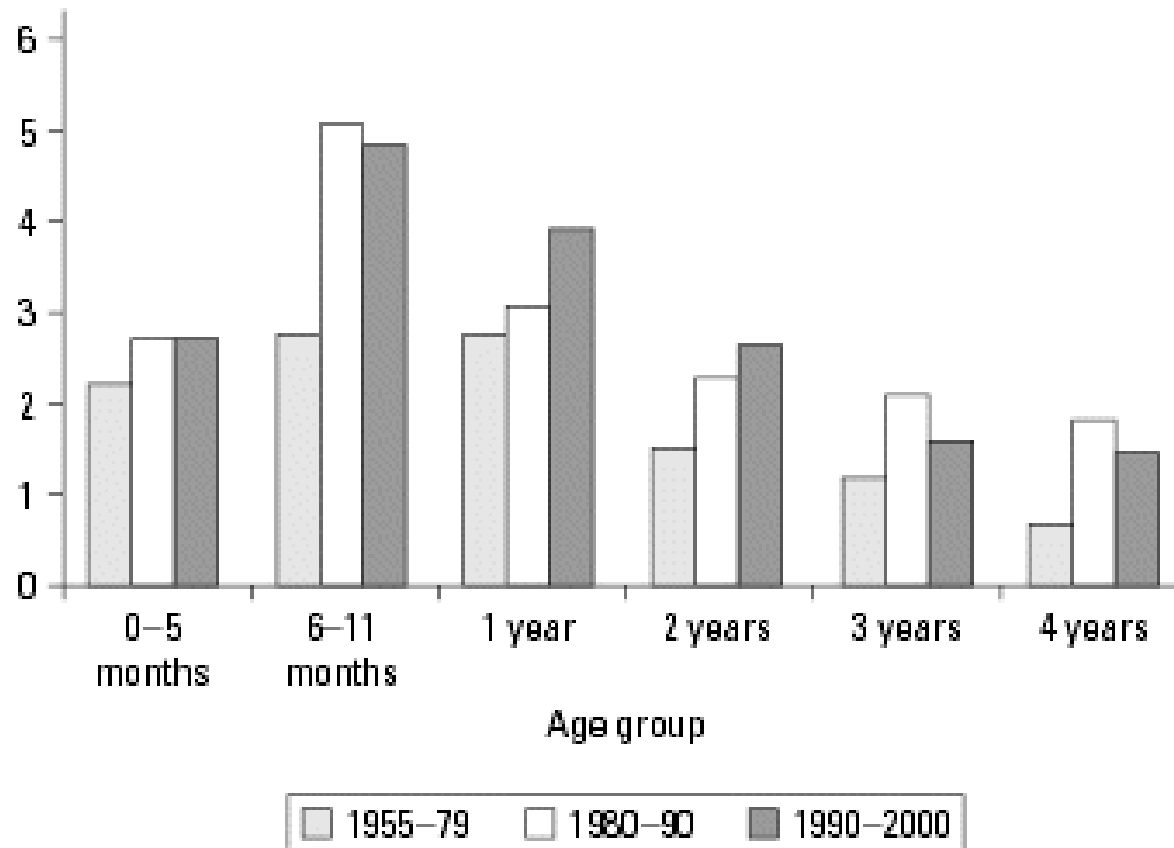
Global Estimates of Diarrhea Mortality, 1975-2000



Source: Disease Control Priorities in Developing Countries, Second Edition; 2006

Median Age-specific Incidences for Diarrheal Episodes per Child per Year from Three Reviews of Prospective Studies in Developing Areas, 1955-2000

Number of episodes per person per year



Source: Disease Control Priorities in Developing Countries, Second Edition; 2006

DCPDP “Diarrheal Diseases” Chapter...

“...improving the supply of safe water and the ability to safely dispose of fecal waste are the best ways to reduce the burden of morbidity and mortality...Local low-tech solutions can be useful, and enhanced efforts to find ways to improve water cleanliness at the point of use and to build simple latrines that will be used consistently are needed.”

Safe Water...

- **Water that does not cause morbidity and/or mortality**
 - ** Especially in children under 5 and other vulnerable population groups (e.g. people living with HIV/AIDS)**
- **Meets measured water quality indicators**
 - **Fecal coliform**
 - **Total coliform**
 - **Chemical contaminants (e.g. arsenic)**









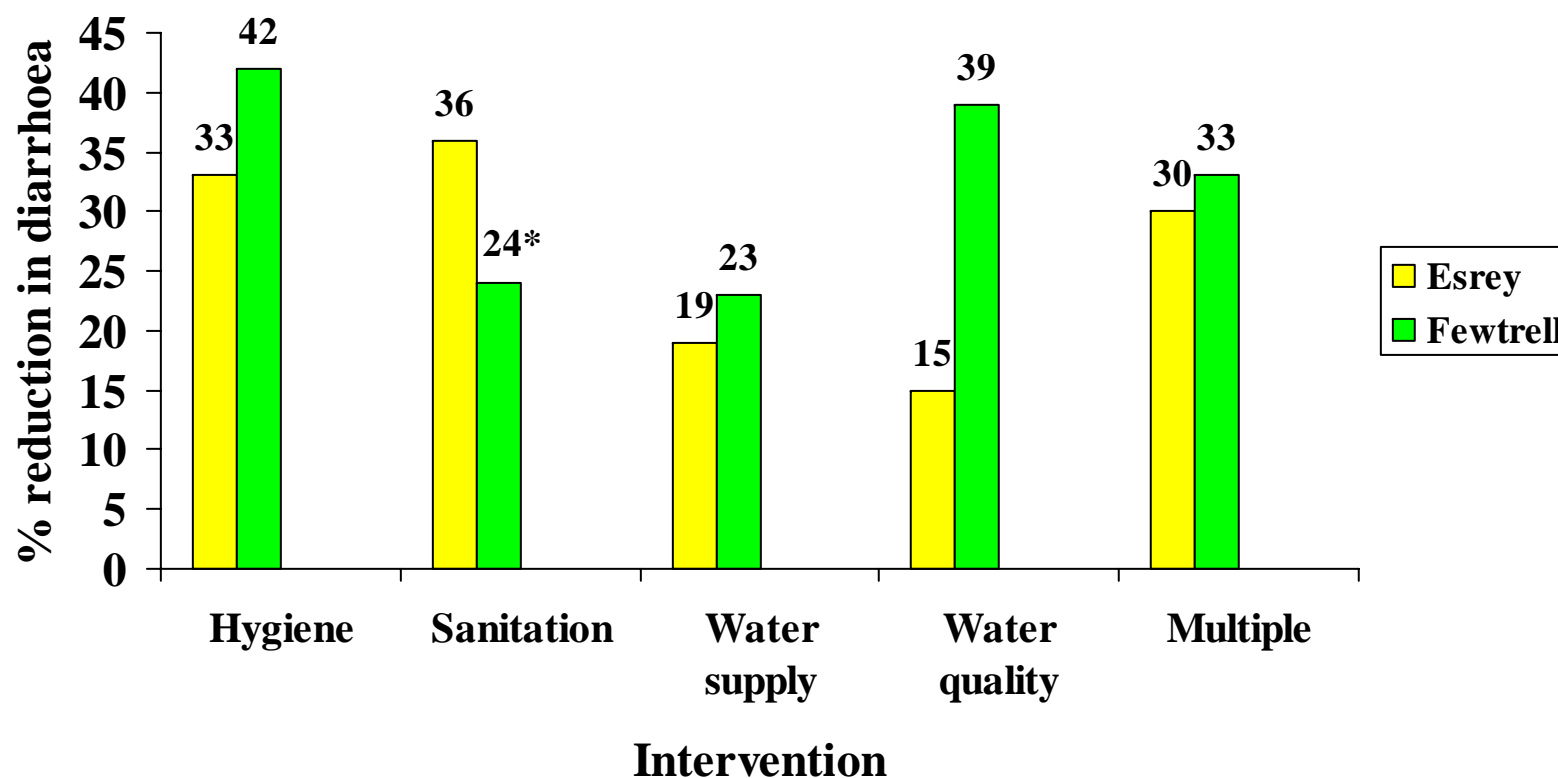


The assumption that “improved water supply” is safe is often false...

- Need for storage – often unsafe or unhygienic
- Improper handling during transport and use



Comparison of Esrey (1991) with Fewtrell and Colford (2004) shows similar results except for water quality interventions



Cochrane Review of Water Quality Intervention Comparisons (Clasen et al, 2006)

- 38 comparisons from 30 independent studies suggest that household interventions are more effective in preventing diarrhoea than interventions at the water source.
- Effectiveness was positively associated with compliance.
- Effectiveness was not conditioned on the presence of improved water supplies or sanitation in the study setting.
- Significant heterogeneity suggests that the actual level of effectiveness may depend on a variety of conditions that research to date cannot fully explain.

DCPDP “Water Supply, Sanitation, and Hygiene Promotion” Chapter...

“It is important for the water engineer to know whether scarce funding should be spent on improved water treatment and measures to protect water quality or instead on providing a limitless supply of water at a high level of access and convenience and encouraging its use for improved hygiene practices.”

“...domestic hygiene — particularly food and hand hygiene — is the principal determinant of endemic diarrheal disease rates and not drinking water quality.”

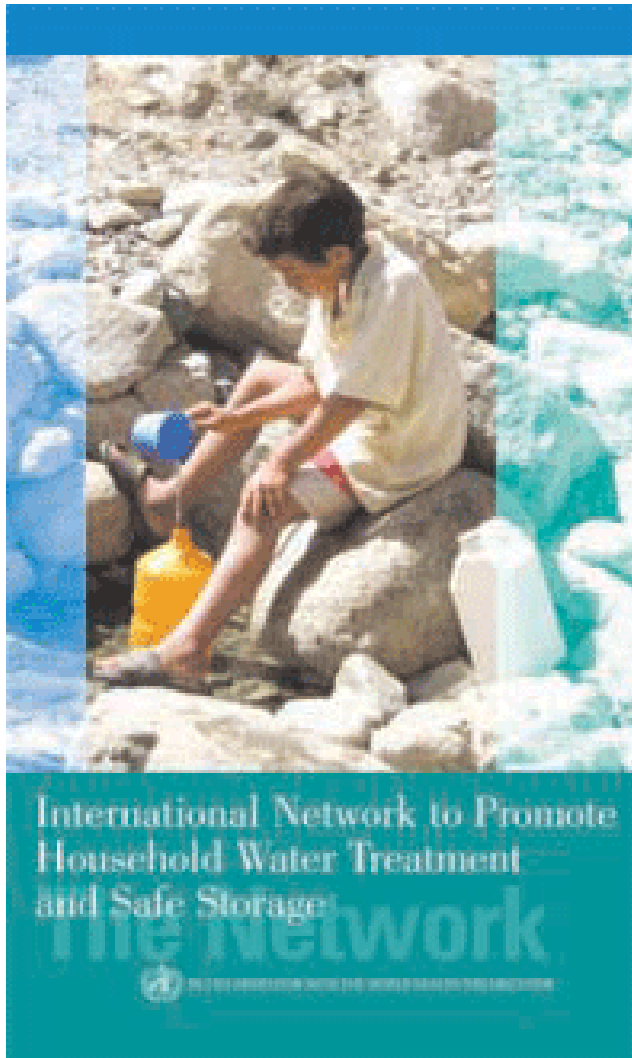
Recall: DCPDP “Diarrheal Diseases” Chapter...

“...improving the supply of safe water and the ability to safely dispose of fecal waste are the best ways to reduce the burden of morbidity and mortality...Local low-tech solutions can be useful, and enhanced efforts to find ways to improve water cleanliness at the point of use and to build simple latrines that will be used consistently are needed.”

Point-of-use Water Treatment and Safe Storage is a Proven Intervention

- Proven technology (efficacy) – chlorine, combined flocculent-chlorine, solar disinfection, ceramic filters
- Proven benefit in field settings under conditions of actual use (effective) – range of outcomes is 20-80% reduction in diarrheal disease with typical reductions of 30-50%
- Proven program strategy (sustainable, scaleable, affordable, cost-effective) – social marketing, community-based communication and sales

International Network to Promote Household Water Treatment and Safe Storage





WaterGuard™ 



Tumia kidonge kimoja kwenye dumu la lita ishirini za maji ya bomba na vidonge viwili kwa maji ya ziwa, mito na kisima. Kama maji yana tope au vumbi chuja kwanza kwa kutumia kitambaa kabla ya kuyatibu. Funga dumu lako na Subiri kwa dakika 30 kabla ya kuyanywa. Usimeze kidonge.



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With partners, USAID is supporting POU water treatment as part of its child health, HIV/AIDS, and emergency response programs

Current country programs include:

- Zambia
- Madagascar
- Kenya
- Malawi
- Rwanda
- Nigeria
- Ethiopia
- Haiti

The Challenge....

- Does POU water treatment have the potential to become a standard part of water supply activities – i.e. focusing on increasing water quantities supplied and used while at the same insuring that a minimum quantity (2 liters per capita per day) is assured to meet drinking water standards?