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# Diarrhea and Malnutrition

## Research Priorities

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There have been many recent advances in our understanding of the etiology, pathogenesis, mechanisms, and management of acute and chronic diarrheal disease. Many studies have investigated the role of diarrhea in producing or worsening malnutrition. However, the working group identified several areas of diarrhea-malnutrition interactions where current knowledge is incomplete or nonexistent.

A set of general objectives for future research is given in Table I. First, it is desirable to continue investigation of causative and contributory factors, both microbial and epidemiologic, that are important in the occurrence of acute and chronic diarrhea. It is imperative that such studies adopt new technologies, including viral and immunologic diagnostic methods. The investigation of the etiology of diarrheal disease is most relevant in those parts of the world where malnutrition continues to be an important public health problem.

Second, studies should be undertaken to link the severity, duration, and etiology of diarrhea to its nutritional consequences in terms of food

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*Table I. General Objectives for Future Research on Diarrheal Disease*


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To further investigation of etiologic and epidemiologic factors in the genesis of acute and chronic diarrhea
To study the nutritional consequences of the severity and duration of diarrhea of various etiologies
To examine sociocultural, behavioral, and anthropologic factors affecting the occurrence of diarrhea and its management
To apply present and emerging technology for reducing the impact of diarrheal diseases in the most cost-effective manner

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selection and intake, nutrient absorption, loss and diversion of nutrients, and nutritional cost of catabolic-anabolic processes.

Third, the role of socioeconomic and behavioral factors in the production of diarrheal disease is becoming increasingly apparent. The modern tools of anthropologic research should be used to define some of these contributory factors so that one can better define the most practical and effective methods for control and prevention.

Fourth, the most appropriate methods of intervention must be defined. In order to achieve this, there is need for further research into

*Table II. Checklist of Specific Areas of Research in Diarrheal-Malnutrition Interactions*


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Nutritional impact	Functional implications	Interventions <sup>a</sup>
Reduced intake	Physical activity	Epidemiologic
Anorexia	Growth and development	Breast-feeding, causes of decline
Diet selection	Socioeconomic cost	Water (at point of use, change with behavioral alterations)
Reduced absorption	Learning	Physiologic
Increased losses		ORT <sup>b</sup> delivery
Nutrients in urine, stool		Antimicrobial
Metabolic		Pharmacologic
Protein synthesis		Antisecretory
Cell turnover		Antiattachment
Acute phase reactants		Immunologic
Sequestration		Antiviral
		Antitoxic
		Antiattachment
		Dietary
		Child
		Mother

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<sup>a</sup>The most important and feasible form of intervention may vary with culture and stage of development of the region.

<sup>b</sup>ORT = oral rehydration therapy.

*Table III. Some Specific Topics for Future Research on Diarrheal Disease*

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1. Etiopathogenesis and epidemiology

Behavioral, sociocultural, and anthropologic determinants of food and water handling and hygiene in the causation of diarrhea.

Synergism between parasites and accepted agents of diarrheal disease, especially with regard to their combined impact on nutritional status.

Age-related changes in susceptibility to infectious diarrhea (e.g., maturation of local intestinal defense, both antigen-specific and nonspecific, receptors on epithelial cells).

The incidence and nutritional cost of mixed viral-bacterial infections of the intestine.

Investigation of the nature and nutritional implications of environmental enteropathy (tropical sprue, etc.).

Assessment of the magnitude and impact of chronic diarrhea.

Determinants of disease severity with regard to nutritional impact (e.g., extent of mucosal damage, amount of toxin produced).

The role of gut microflora in the causation of diarrhea and its nutritional effects.

Microbial contamination of local foods; how does water contamination contribute to food spoilage?

2. Nutritional impact

What is the nutritional cost of apparently asymptomatic, unrecognized infection with enteric organisms?

What are the catabolic effects of noninvasive microorganisms associated with diarrhea?

How does one distinguish the nutritional effects of diarrhea in terms of the impact of the infection *per se*, and of the secondary complications due to disease (e.g., sugar intolerance) and iatrogenic factors (dietary advice, drugs).

3. Outcome

What is the impact of diarrhea-associated nutritional deficits on growth and development?

What are the effects of the diarrhea-malnutrition complex on physical activity and work performance?

To what extent does nutritional deficiency consequent to diarrheal disease influence learning ability?

*Table III. (continued)*

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**4. Interventions**

The development and evaluation of weaning foods manufactured by village-level and home technology according to regional and cultural patterns.

The promotion and evaluation of the use of colostrum and breast milk in the prevention and management of diarrhea and other infections frequently encountered in infants.

The study of various practical aspects of oral rehydration therapy (e.g., ingredients, including substrates, delivery, local sources of various ingredients such as potassium, evaluation of effectiveness, impact of rehydration on appetite and food intake).

Detailed observational studies of familial attitudes and practices, sociocultural and anthropologic factors, particularly as they may relate to primary prevention and management of secondary spread within households.

Pharmacologic treatment of diarrhea, including indications, dose, and duration of antimicrobial therapy, and side effects of antisymptomatic drugs.

What are the determinants of clinical and physiologic recovery (e.g., mucosal healing, cell turnover)?

Evaluation of traditional folk medicines.

Management of chronic diarrhea.

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the most feasible and practical technology that can be used in the most cost-effective manner to apply current scientific knowledge to reduce the impact of diarrheal disease on individuals and society in terms of nutritional status, growth and development, physical activity, work performance, learning, and other consequences.

Based on these broad general objectives, the working group outlined a few specific areas of research that should receive priority. These are shown in Tables II and III. It is obvious that constraints of various kinds—economic, health, sociocultural, political, etc.—will govern the choice of the particular projects to be undertaken in a given region or institution. But the overall aim is to reduce, in the most expeditious manner, the adverse consequences of diarrheal disease on health and quality of life.