National Strategy for Anaemia Prevention and Control in Bangladesh

February 2007

Institute of Public Health Nutrition (IPHN)
Ministry of Health and Family Welfare
Government of the People's Republic of Bangladesh

National Strategy for Anaemia Prevention and Control in Bangladesh

Foreword

بسم الله الرحمن الرحيم

Adviser
Ministry of Health and Family Welfare
Government of the People's Republic of Bangladesh

Anaemia is a pervasive problem among children and women in Bangladesh. Its devastating effects on health and physical and mental productivity affect quality of life, particularly among the poor, and translate into significant economic losses for individuals and for the country. I am pleased that the "National Strategy for the Prevention and Control of Anaemia" has been developed to identify the strategies and comprehensive actions needed to eliminate this serious obstacle to survival, health and development.

I would like to recognize the support and co-operation of all partners and stakeholders who contributed to the development of this important strategy document. IPHN has been instrumental in developing the National Strategy and has ensured that the development process has been both participatory and consultative. The prevention and control of anaemia requires a coordinated response among multiple stakeholders and partners, and I request that they all come forward to support interventions in line with the National Strategy.

Major General Dr. A S M Matiur Rahman (Rtd.)
Advisor
Ministry of Health and Family Welfare,
Ministry of Water Resources
and
Ministry of Religious Affairs
Government of the People's Republic of Bangladesh.

Message

The prevention and control of anaemia is one of the key strategies of the Health, Nutrition and Population Sector Programme for reducing maternal, neonatal and childhood mortality and improving maternal and childhood nutrition. The National Strategy for the Prevention and Control of Anaemia provides a guide for all stakeholders and partners on how policy makers, health professionals, employers, community members and families can take action to prevent and control anaemia.

I congratulate the Institute of Public Health Nutrition for taking the initiative to develop the National Strategy, and for organizing and coordinating all the workshops that led to its development. I acknowledge the valuable contributions by experts from government, NGOs, research institutes and development partners, whose efforts made this National Strategy possible. The challenge before us now is implement the National Strategy in its entirety, and I call upon all stakeholders and partners for their continued support in this respect.

Ehsan Ul-Fattah
Secretary
Ministry of Health and Family Welfare
Government of the People's Republic of Bangladesh.

Message

Anaemia is a widespread public health problem in Bangladesh, affecting the lives of 27 million children, adolescents and women. It poses a major threat to maternal and child survival, contributes to low birth weight, lowered resistance to infection, poor cognitive development and decreased work productivity. The National Strategy for the Prevention and Control of Anaemia lays out the strategies, actions and roles of all stakeholders and partners in addressing this important public health problem.

I extend my congratulations to all stakeholders and partners for their valuable contributions towards the development of the National Strategy. IPHN has played an instrumental role, and brought together experts from government, NGOs, research institutes and UN agencies to contribute to its development. I hope that all stakeholders will extend their support in implementing interventions in line with the strategy.

Dr. Md. Shahjahan Biswas
Director General Health Services
Ministry of Health and Family Welfare

Message

Anaemia is a serious public health problem amongst children and women in Bangladesh, and calls for urgent action among for all concerned. I am confident that if the comprehensive actions identified in National Strategy for the Prevention and Control of Anaemia are fully implemented, children and women in Bangladesh will be better protected from this public health problem.

I acknowledge the contribution of IPHN in the organization and coordination of all efforts to develop this strategy document. I extend my thanks to all stakeholders and partners who contributed their valuable time and expertise to the process. I also acknowledge the support of our development partners, particularly UNICEF. Guided by this document, the government will co-ordinate actions by all stakeholders for the prevention and control of anaemia in Bangladesh.

13/05/07.

Muhammad Abdul Mannan
Director General Family Planning
Ministry of Health and Family Welfare

Acknowledgement

Anaemia affects the lives of millions of children, adolescents and women in Bangladesh today. It poses a major threat to safe motherhood, and contributes to low birth weight, poor growth, impaired immunity, poor learning ability, and low work productivity. These impacts are estimated to cost Bangladesh 7.9% of its gross domestic product. The magnitude of anaemia, together with the associated adverse health, development and economic consequences, highlights the need for intensified action to address this public health problem.

The National Strategy for the Prevention and Control of Anaemia builds on past and continuing achievements in anaemia prevention and control in Bangladesh, and has been developed in the context of existing policies and strategies of the health, nutrition and population sector. It identifies comprehensive strategies and interventions for high risk groups, in particular infants and young children, adolescent girls, newly wed women, and pregnant and breastfeeding women, and for the population as a whole. Priority strategies include micronutrient supplementation, dietary improvement, parasitic diseases control and food fortification. The roles of the critical partners - government, international organizations, non-government organizations, and other concerned parties - are also identified to ensure that collective action contributes to the full attainment of the National Strategy's goal and objectives.

Success in preventing and controlling anaemia will move Bangladesh closer towards the achievement of five of the eight Millennium Development Goals (MDGs), including a reduction in child mortality and improvement in maternal health. I hope that all stakeholders will extend their support in implementing anaemia prevention and control interventions in line with this strategy that is now in place.

Prof. Dr. Fatima Parveen Chowdhury
Director IPHN and Line Director Micronutrients
Ministry of Health and Family Welfare

Contents

Abbreviations

ANC	Antenatal care
BBS	Bangladesh Bureau of Statistics
BCC	Behaviour change communication
BDHS	Bangladesh Demographic and Health Survey
CBO	Community-based organization
CHT	Chittagong Hill Tracts
CNC	Community Nutrition Centre
CNP	Community Nutrition Promoter
CNU	Child Nutrition Unit
DGFP	Directorate General of Family Planning
DGHS	Directorate General of Health Services
EPI	Expanded Programme on Immunization
FWA	Female Welfare Assistant
FWV	Female Welfare Visitor
GMP	Growth monitoring and promotion
HA	Health Assistant
HH	Household
HKI	Helen Keller International
HNPSP	Health, Nutrition and Population Sector Programme
HW	Health worker
IFA	Iron-folic acid
IMCI	Integrated Management of Childhood Illness
IPHN	Institute of Public Health Nutrition
LBW	Low birth weight
MCWC	Maternal and Child Welfare Centre
MDG	Millennium development goal
MMN	Multiple micronutrient
MOHFW	Ministry of Health and Family Welfare
NGO	Non-government organization
NID	National Immunization Day
NMSC	National Micronutrient Steering Committee
NNP	National Nutrition Programme
NPAN	National Plan of Action for Nutrition
NVAC	National Vitamin A Plus Campaign
PNC	Postnatal care
PW	Para Worker
SBA	Skilled Birth Attendant
TBA	Traditional Birth Attendant
TT	Tetanus toxoid
UDC	Urban Development Centre
UHC	Upazilla Health Complex
UHFWC	Union Health and Family Welfare Centre
UNICEF	United Nations Children's Fund
WHO	World Health Organization

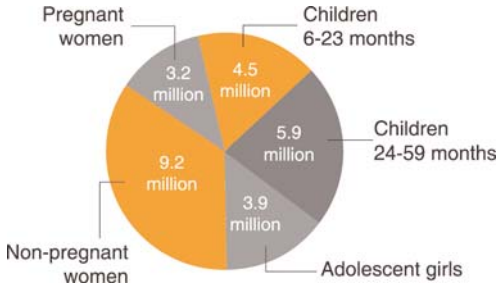
1 Introduction

1.1 Anaemia in Bangladesh

Anaemia is a widespread public health problem in Bangladesh, affecting the lives of 27 million children, adolescents and women (Figure 1). It poses a major threat to maternal and child survival, contributes to low birth weight[1], lowered resistance to infection, poor cognitive development and decreased work productivity. Its devastating effects on health and physical and mental productivity affect quality of life, particularly among the poor, and translate into significant economic losses for individuals and for the country.

[1] Low birth weight is defined as a birth weight <2500g

Figure 1: Millions of anaemic children, adolescent girls and women in Bangladesh



Prevalence and distribution

Anaemia is the disorder in which the concentration of haemoglobin in the blood is lower than the levels considered normal for a person's age and sex (Box 1). In Bangladesh, anaemia affects 46% of pregnant women, 64% of children aged 6-23 months, 42% of children aged 24-59 months, 30% of adolescent girls and 33% of non-pregnant women (BBS/UNICEF, 2004). According to international criteria, it is a severe public health problem (defined as a prevalence 40%) in preschool children and pregnant women and a moderate public health problem (defined as a prevalence 20-39%) in adolescent girls and non-pregnant women of reproductive age (Figure 1). The prevalence of anaemia is particularly high among children aged 6-23 months and pregnant women because their nutritional requirements for growth and reproduction are relatively high.

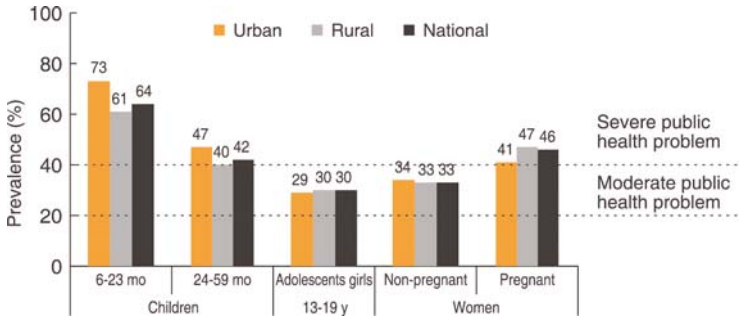
Box 1: Haemoglobin values for defining anaemia in different population groups

Population group	Anaemia measured by haemoglobin (g/L)	
	Anaemia	Severe anaemia
Children 6-59 months	<110	<70
Children 5-11 years	<115	<70
Children 12-14 years	<120	<70
Non pregnant women 15 years	<120	<70
Pregnant women 15 years	<110	<70
Men 15 years	<130	<90

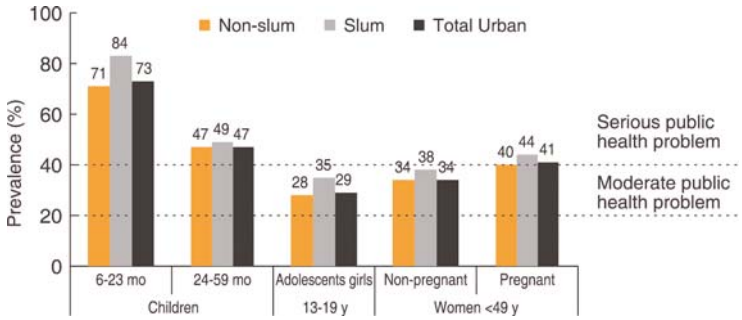
Source: WHO/UNICEF/UNU (2001)

Figure 2: Prevalence of anaemia in Bangladesh, 2001-3

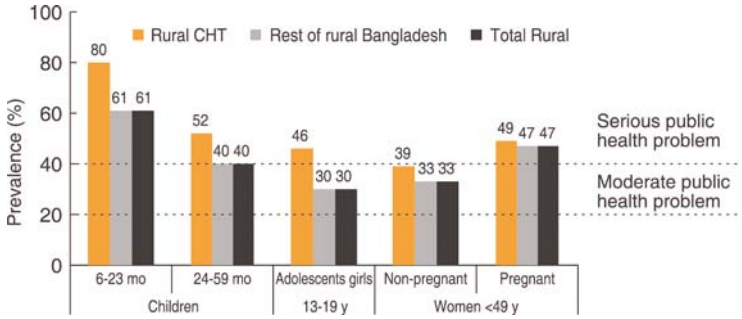
National prevalence by urban and rural areas



Urban prevalence by non-slum and slum areas



Rural prevalence by Chittagong Hill Tracts and the rest of rural areas



Source: BBS/UNICEF (2004) and HKI/IPHN (2002)

Figure 2 shows that there are geographic variations in the prevalence of anaemia. Urban preschool children have a higher anaemia prevalence than their rural counterparts, while the reverse is true for pregnant women. Within urban areas, the anaemia prevalence is higher in slum areas than non-slum areas. Rural areas of the CHT have a higher anaemia prevalence than elsewhere in rural Bangladesh and in the urban areas of the country. The reasons for the geographic variations in prevalence are not known with certainty, but must be explained by variations in the presence and severity of risk factors for anaemia.

Anaemia is more common among the poor, among whom the consequences on health, nutrition and livelihoods are most serious. In the urban areas of Bangladesh, the prevalence of anaemia in preschool children is strongly associated with the education level of his/her mother, an indicator of socio-economic status: 69% of children of illiterate mothers are anaemic compared with only 37% of children of mothers who have a Secondary School Certificate or higher level of education (BBS/UNICEF, 2004).

Causes of anaemia

Anaemia develops when there is poor, insufficient or abnormal haemoglobin or red blood cell production, excessive red blood cell loss, or excessive red blood cell destruction. Each of these conditions has multiple causes, many of which can occur simultaneously in the same individual.

The contribution of each cause of anaemia to the high prevalence in Bangladesh cannot be determined from the data available. However, it is highly likely that iron deficiency is the single most important cause, as observed in most countries of the world (Stoltzfus & Dreyfuss, 1998). Iron is needed to produce haemoglobin in red blood cells, and iron deficiency is most common during periods of life when iron requirements are high due to rapid growth, menstruation and reproduction, such as infancy, early childhood, adolescence and pregnancy. Healthy normal weight newborns usually have adequate iron stores at birth to last them until about six months of life, provided they are exclusively breastfed. However, 36% of infants in Bangladesh are born with low birth weight (BBS/UNICEF, 2005) and with low body iron stores that are quickly exhausted in the first few months of life.

Furthermore, only 42% of Bangladeshi infants are exclusively breastfed for six months (BDHS, 2004) and the quality, quantity and frequency of complementary feeding is inadequate to meet their requirements from six months of age.

There is a lack of knowledge among mothers and household members on dietary practices that can protect family members from iron deficiency. Even where this knowledge is known, few poor households can afford to consume sufficient quantities of animal foods, the best dietary sources of iron, and the absorption of iron from plant and cereal foods is inhibited by the high phytate content of the diet. Poor dietary intake can also contribute to deficiencies in other micronutrients and macronutrients that are needed to enhance the absorption and metabolism of iron and production of haemoglobin and red blood cells, including folic acid, vitamin B12, vitamin C, vitamin A and animal protein. Dietary surveys and studies suggest that a large proportion of children and women do not meet daily requirements for several micronutrients, and have multiple micronutrient deficiencies (Jahan & Hossain, 1998; Lutter & Rivera, 2003; Ahmed et al., 2005). Adequate folic acid nutrition in early pregnancy also protects against neural tube defects, which is why it is important that adolescent girls and women of child-bearing age take folic acid supplements.

Intestinal infections, such as hookworms and diarrhoea, can lead to iron deficiency and anaemia by causing intestinal blood loss, malabsorption of micronutrients, abdominal pain and anorexia. The prevalence of hookworm infection lies in the range 7-25% (WHO 2005, unpublished report), and 8% of children have been reported to have had diarrhoea in the preceding 2 weeks (BDHS, 2004). Malaria may also be an important cause of anaemia among the 14 million people living in the malaria endemic hilly areas of the country. Malaria cases are reported from 13 of the country's 64 districts, but the number of cases in the three CHT districts accounts for nearly 90% of the total caseload in the country.

Haemoglobinopathies such as thalassemia may also contribute anaemia. These genetic disorders are known to occur in specific geographic areas and ethnic groups in Asian countries; however there is limited data for Bangladesh. Haemoglobinopathies may explain the higher prevalence of anaemia among the ethnic groups of the CHT compared with Bengali population living in the same area, but this needs to be confirmed.

Underlying causes of anaemia in Bangladesh, many of which stem from poverty, include household food insecurity (including a lack of dietary diversification), poor caring practices, inadequate health services and an unhealthy environment. At the beginning of the new millennium, an estimated 40% of the population was affected by income poverty (Poverty Reduction Strategy Paper, 2005). These poor households lack resources to obtain sufficient micronutrient rich-foods, micronutrient supplements, treatment for parasitic disease, shoes, insecticide treated bed-nets, and other preventative commodities or services. They also lack knowledge on how to make their diet more nutritious and on appropriate cooking methods. Key caring practices that contribute to anaemia include poor breastfeeding and complementary feeding practices, inadequate dietary intake of bioavailable iron and other micronutrients, restricted dietary intake during pregnancy, inappropriate home care and care-seeking for illnesses, and a lack of hand-washing and other hygienic behaviours. The common practice of marrying and conceiving at a young age, when the iron demands of pregnancy are combined with the iron demands of growth during adolescence, also increases the risk of anaemia among young mothers and their infants: 68% of girls are married by 18 years of age (BDHS, 2004).

Consequences of anaemia

Anaemia affects the lives of people throughout the life cycle, beginning in utero (Box 2). Anaemia during pregnancy results in poor outcomes for the infants, including preterm delivery, low birth weight, and increased risk of

dying in infancy. Infants who survive are at risk of developing iron deficiency and anaemia in infancy and may have poor growth and psychomotor and cognitive development. Iron deficiency anaemia in infancy can result in learning problems that are irreversible, even if the problem is corrected. Anaemia in childhood leads to poor learning capacity and poor school performance, and may be a factor contributing to the high rate of school drop-outs. Iron deficiency also affects iodine uptake, increasing the risk of iodine deficiency disorders that further impact on a child's intelligence.

Iron deficient and anaemic children of all ages are vulnerable to the harmful effects of anaemia during the period of life when they are both growing and

learning. Anaemia adversely affects immunity, growth, cognitive development and causes apathy, which affects school performance and social development.

Box 2: Consequences of iron deficiency and anaemia throughout the life cycle

All individuals:

- Poor immune function and increased morbidity from infections
- Fatigue and lower physical work capacity
- Poor concentration and impaired cognitive performance
- Poor quality of life

Infant , preschool and school age children

- Poor physical growth, cognitive development and school achievement
- Increased risk of infant and child death
- Increased risk of iodine deficiency
- Low or depleted iron stores for future pregnancies in adolescent girls

Pregnant women and their foetuses

- Increased risk of complications during delivery, including prolonged labour, preterm delivery, LBW and maternal and neonatal death
- Infants of mothers with iron deficiency anaemia are more likely to have low iron stores and to become anaemic in infancy and childhood

Anaemia makes adolescent girls and women weaker during pregnancy and delivery, increasing their risk of prolonged labour and reducing their chances of surviving blood loss during and after child birth. Moderate anaemia increases the risk of maternal death by 1.35 times, and severe anaemia by 3.5 times (Galloway, 2003). Many more women have mild to moderate anaemia than severe anaemia, which underscores the importance of preventing and treating all degrees of anaemia.

Anaemia causes fatigue in men and women, making them less able to engage in social activities and to nurture and care for their families. It lowers work capacity and productivity of household food producers and income earners, lowers opportunities for future household food security due to reduced growth and cognitive development of children, and increases the loss of earnings due to the ill-health or death of household members. The cumulative consequences of anaemia at the individual and household level have grave consequences for social and economic development at the national level by lowering the effectiveness of resources spent on health and education and by lower the gross domestic product due to lives lost, disability and the lower productivity of income earners and food producers. The UN Standing Committee on Nutrition has estimated that the economic costs of anaemia in Bangladesh amount to 7.9% of the country's gross domestic product (UN/SCN, 2004).

Benefits of anaemia prevention and control

The benefits of prevention and controlling anaemia can be considered at three different levels: benefits to the individual, to the household, and to the nation (Box 3). These benefits are very wide ranging because anaemia has diverse consequences and because prevention and control of the factors that cause anaemia lead to concomitant improvements of other conditions associated with these factors. For example, anthelmintic (deworming) treatment can improve growth as well as prevent anaemia.

Benefits to all individuals include increased immunity and lower morbidity from infectious diseases, improved physical work capacity, improved cognitive development and better educational achievement. Pregnant women are less likely to have poor pregnancy outcomes, including perinatal mortality and their infants will be larger at birth and have greater iron stores. If prevention is continued throughout infancy, childhood and adolescence, these children will have improved growth, behavioural and cognitive development, educational achievement and survival, and adolescent girls will have better iron stores for future pregnancies. Benefits to households include increased household food security due to higher work capacity and productivity of household members and lower loss of earnings due to ill-health or death of household members; and improved maternal and child

care due to improved survival, health and nutrition of caregivers. Ultimately, these benefits will improve social and economic development, as reflected by indicators such as mortality, educational achievement and gross national product.

Box 4 explains how success in the prevention and control of anaemia will contribute to the achievement of five of the eight Millennium Development Goals (MDGs), including a reduction in child mortality and improvement in maternal health.

Box 3: Benefits of anaemia prevention and control

BENEFITS TO THE INDIVIDUAL

All individuals:	Pregnant women and foetus:	Infants and children:
■ Increased immunity and lower morbidity from infectious diseases ■ Improved physical work capacity ■ Improved cognition ■ Improved quality of life	■ Decreased risk of complications during delivery, preterm delivery, LBW and maternal and neonatal death ■ Increased iron stores in infants and lower risk of anaemia in infancy and childhood	■ Improved growth ■ Improved psychomotor and cognitive development and educational achievement ■ Decreased risk of iodine deficiency ■ Improved child survival ■ Better iron stores for future pregnancies (adolescent girls)

BENEFITS TO THE HOUSEHOLD

Household food security:	Maternal and child care:	Health services/ environment:
■ Higher work capacity and productivity of household food producers and income earners ■ Lower loss of earnings due to ill-health or death of ousehold members ■ Better opportunities for future household food security due to improved growth and educational achievement of children	■ Improved survival and well-being of caregivers ■ Improved health and nutrition practices of caregivers associated with anaemia prevention and control	■ Increased access to essential drugs and advice for anaemia prevention and control through community-based delivery of health services ■ Improvements in environmental sanitation through complementary parasitic control.

BENEFITS TO THE NATION

Improvements in social and economic development:

- Improved gross domestic product due to improved survival, reduced disability and improved productivity of income earners and food producers
- Greater effectiveness of resources spent on health and education
- Improvements in basic indicators of infant, child and maternal morbidity and mortality

Box 4: How the prevention and control of anaemia will contribute to the achievement of Millennium Development Goals

MDG Goal 1: Eradicate extreme poverty and hunger:
Increased learning ability and intellectual potential of children, and work productivity of all leads to higher earnings.

MDG Goal 2: Achieve Universal Primary Education
Improved cognitive development and intellectual potential of children leads to improved school performance and reduced drop out rates.

MDG Goal 3: Promote gender equality and empower women
Reduced child care burden for women, as a result of healthier children, frees up household resources and allows women more time for income generating work.

MDG Goal 4: Reduce child mortality
Increased child survival reduces child mortality.

MDG Goal 5: Improve maternal health.
Decreased preterm delivery, pregnancy complications (prolonged labour), and perinatal mortality, will improve the health and survival of adolescent girls and women of reproductive age.

1.2 Interventions and programmes in Bangladesh

The commitment of the government to addressing anaemia is seen through the Poverty Reduction Strategy Paper and the Health, Nutrition and Population Sector Program for 2003-10, in which the prevention and control of anaemia is one of the key strategies for reducing maternal, neonatal and childhood mortality and improving maternal and childhood nutrition. Anaemia prevention and control also features in the 1997 National Plan of Action for Nutrition (NPAN) and the National Plan of Action for Children (2004-2009). The Ministry of Health and Family Welfare has overall responsibilities for all activities related to anaemia control in Bangladesh through the Directorate General of Health Services (DGHS), Directorate General of Family Planning (DGHS) and National Nutrition Programme (NNP).

In 2001, the Institute of Public Health Nutrition developed National Guidelines for the Prevention and Treatment of Iron Deficiency Anaemia, which recommend iron supplementation, dietary improvement, food fortification and helminth control in preschool-aged children, school-aged children, adolescent girls, and women of reproductive age.

In most areas of the country, the only strategy to prevent and control anaemia has been iron-folate supplementation during pregnancy. Pregnant women are provided with supplements by Family Welfare Visitors of the DGFP as part of antenatal care services at Satellite Clinics and Maternal and Child Welfare Centres. In its operational area, the NNP has taken a broader approach to anaemia control by also including adolescent girls, newly wed women and postpartum women in IFA supplementation, and by providing anthelmintic treatment to adolescent girls. Importantly, these interventions are provided at the community level by Community Nutrition Promoters (CNP). The NNP also promotes breastfeeding, complementary feeding and dietary practices among adolescent girls and women through the same CNPs. Deworming of children aged 24-59 months with albendazole is included during the six-monthly National Vitamin A Plus Campaigns (NVAC), implemented by IPHN. Several national and international NGOs and the private sector also provide IFA supplements to pregnant and breastfeeding women, both in rural and urban Bangladesh.

The persistent high prevalence of anaemia in both children and women indicates that there are gaps and challenges in the existing strategies to prevent and control anaemia in Bangladesh. Many of these issues relate to two shortcomings: firstly, the existing strategies do not encompass all of the high-risk target groups and interventions needed for effective prevention and control; and secondly, the coverage of interventions is low due to a number of factors, among which the low awareness and perception of need at all levels and inadequate delivery mechanisms are particularly important. Box 5 summarizes the gaps and challenges at the level of the health system, health service provider and client.

Anaemia prevention and control activities have focused on IFA supplementation, and have not adequately addressed the other causes of anaemia. Children aged less than five years are not routinely given any interventions to prevent and control anaemia, and adolescent girls and non-pregnant women are not included in nationwide efforts. IFA supplementation for pregnant women is more active, but coverage is still low. Recent nutritional surveillance has revealed that only 15% of rural pregnant women take at least 100 IFA tablets during pregnancy, and 46% take none (HKI/IPHN, 2006). The great majority of women are not supplied with adequate IFA supplements through antenatal services because utilization of these services is often late in pregnancy and infrequent: only 27% of women make 3 or more antenatal care visits during pregnancy (BDHS, 2004). This indicates the need to bring interventions for anaemia control to the community, following the example of the NNP. There is also a clear need to improve awareness on anaemia and the need for prevention, as common reasons among women for not taking supplements are that "They are not necessary" (49%), "No-one told me to take them/I did not know I needed them" (15%) and "Side-effects" (13%) (NNP/UNICEF, 2004).

Box 5: Performance gaps in existing interventions to prevent and control anaemia

Health system

- IFA supplementation among pregnant women is often the only approach to anaemia control - inadequate attention given to parasitic disease control, dietary improvement and food fortification.
- Several high risk groups are not covered by anaemia prevention activities, including children under two years throughout the country, and adolescent girls and newly wed women in many areas of the country not covered by the NNP. Medium risk groups, including children aged 2-5 years, primary school children and non-pregnant women are also not included.
- Shortage of IFA supplies at the local level, preventing health workers from providing women with enough supplements to last until the next ANC visit. IFA supplements are uncoated and wrapped in paper, which in humid climates does not protect the tablets from disintegrating.
- Lack of coordination between in IFA distribution between government departments and NGOs affects optimum utilization of resources.

Health service provider

- Health service providers are either not aware or are not applying the 2001 IPHN guidelines for the prevention and control of anaemia.
- Health service providers lack the knowledge, counselling skills, communication materials, time and motivation to counsel mothers on the importance of IFA and other interventions to prevent anaemia and how to manage side-effects, and to monitor compliance with IFA supplementation.

- Low frequency of contact between health service providers and clients
- Irregular haemoglobin examination of children and pregnant and breastfeeding women

Client

- Late and infrequent use of ANC and PNC services by pregnant and breastfeeding women
- Low awareness of the risks of anaemia and perception of the need for taking IFA supplements and other interventions to prevent anaemia.
- Side-effects of supplements, including a fear of having a big baby and difficult delivery.
- Women refuse to take IFA supplements due to the taste and smell of uncoated IFA supplements.

A coordinated and comprehensive approach to anaemia prevention and control is needed in Bangladesh. The interventions required are well understood and cost effective, and the opportunities for delivering them are considerable. For example, the cost-benefit ratio of iron supplementation per pregnant woman alone is 6-14 (Behrman et al., 2004). The government and NGOs in Bangladesh have a vast experience in implementing facility and community-based interventions in both rural and urban areas, and there is a large force of health service providers to deliver services.

1.3 Formulation of the Strategy

The MOHFW and other involved actors recognized the need for preventing and controlling anaemia in Bangladesh, and initiated the development of the National Strategy for the Prevention and Control of Anaemia.

The purpose of the National Strategy is to provide guidance on strategies, interventions and actions for a comprehensive approach to anaemia prevention and control in Bangladesh. It was developed through a series of national consultations convened by the Institute of Public Health Nutrition in 2005-6 with collaboration and support from UNICEF to (i) review the situation of anaemia in Bangladesh and existing approaches and interventions for its prevention and control; (ii) establish objectives and strategies for the prevention and control of anaemia; and (iii) develop a broad plan of action for implementation of the National Strategy.

The national consultations included participants from the Ministry of Health and Family Welfare (Directorate General of Health Services, Directorate General of Family Planning, Institute of Public Health Nutrition and National Nutrition Programme), the Bangladesh National Nutrition Council, Ministry of Local Government and Rural Development, Ministry of Primary and Mass Education, and a broad range of international agencies (UNICEF, World Health Organization, World Food Programme, World Bank, and Micronutrient Initiative), national and international NGOs, professional medical organizations, and research institutes (Dhaka University and the ICDDR,B Centre for Health and Population). The draft strategy was revised based on the feedback from the participants, circulated to technical experts for final comment, and finalized.

The National Strategy was endorsed at a meeting held on 7th September 2006 chaired by the Secretary, Ministry of Health and Family Welfare, and attended by government officials form relevant departments, institutions, and organizations, and representatives from UN agencies, bilateral donors, international organizations and NGOs.

The National Strategy builds on past and continuing achievements in anaemia prevention and control in Bangladesh, and has been developed in the context of existing policies and strategies of the health, nutrition and population sector. It identifies comprehensive strategies and interventions for high risk groups, in particular infants and young children, adolescent girls, newly wed women, and pregnant and breastfeeding women, and for the population as a whole. Priority strategies include micronutrient supplementation, dietary improvement, parasitic diseases control and food fortification. The roles of the critical partners - government, international organizations, non-government organizations, and other concerned parties - are also identified to ensure that collective action contributes to the full attainment of the National Strategy's goal and objectives.

2 National Strategy

2.1 Goal and objectives

The overall goal of the National Strategy is to reduce by one quarter the prevalence of anaemia among high-risk groups in Bangladesh by 2015. The targets for this goal, based on the baseline anaemia prevalence in 2001-3, are given in Figure 3.

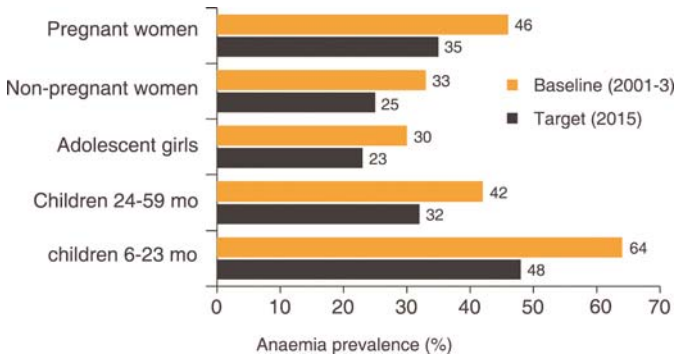
The objectives to be achieved by 2015 are:

- Provide a package of interventions to prevent and control anaemia in 60% of high-risk groups, including micronutrient supplementation, parasitic diseases control, and promotion of key dietary behaviours known to improve micronutrient intake.

- Fortify at least one food vehicle with iron and other micronutrients needed for anaemia prevention

- Increase the availability of affordable micro-nutrient rich foods through household food production, crop diversification, biotechnology and biofortification.

Figure 3: Target anaemia prevalence by the year 2015*



**Source baseline data: BBS/UNICEF (2004)*

2.2 Target groups

Interventions to prevent and control anaemia are prioritized to the three high-risk groups at greatest risk of anaemia and its consequences:

- Low birth weight infants aged 2-5 months and all children aged 6-23 months
- Pregnant women and breastfeeding women up to 3 months postpartum
- Adolescent girls and newly married women

Three additional groups should also be considered for targeting where resources allow:

- Pre-school children aged 24-59 months
- School-aged children aged 5-11 years
- Non-pregnant women of reproductive age

2.3 Strategies

As there are many causes of anaemia, multiple strategies are needed for its prevention and control. These strategies fall into two categories: population-based strategies and targeted strategies for high-risk groups (Box 6). Population-based strategies aim to achieve improvements in the dietary intake and health of the entire population, and are needed for long-term sustainable improvements in haemoglobin levels in a population. Until this ultimate goal is achieved, groups at highest risk of anaemia and its consequences must be targeted with additional strategies to prevent and control anaemia.

As anaemia is a public health problem throughout Bangladesh, national coverage of strategies and interventions is required. However, special attention should be given to the most disadvantages areas of the country, where the prevalence is known to be greatest.

Box 6: Priority strategies for anaemia prevention and control

Targeted strategies for high-risk groups

Strategy 1: Micronutrient supplementation
Strategy 2: Dietary improvement
Strategy 3: Parasitic disease control
Strategy 4: Family planning and safe motherhood

Population-based strategies

Strategy 5: Food fortification
Strategy 6: Production of micronutrient-rich foods through household food production, crop diversification, biotechnology and biofortification

Strategy 1: Micronutrient supplementation

Groups at high risk of anaemia need micronutrient supplements to produce rapid improvements in micronutrient status and prevent anaemia. This is likely to remain the case until significant improvements are made in the diets of the entire population.

The formulation of micronutrient supplements needs careful consideration. Iron or iron-folic acid (IFA) supplements have been widely used to prevent and control anaemia because these two micronutrients are the most common cause of anaemia. However, it is increasingly evident that other micronutrient deficiencies, including vitamin A, vitamin C and vitamin B12, also contribute to anaemia and should also be addressed. Multiple micronutrient (MMN) supplementation provides a means to prevent and control the micronutrient deficiencies that contribute to anaemia, as well as those that impact on other aspects of growth, development and health. A number of countries throughout the world, including Bangladesh, are examining the impact of MMN supplementation on nutrition and health outcomes in adolescent girls and pregnant women. The results of these studies should be used, when available and if indicated, to revise guidelines on micronutrient supplementation in adolescent girls and pregnant women.

Iron drops and syrups have been used in the past for young children, who are unable to swallow tablets, but compliance is often low due to their unpleasant metallic aftertaste and side effects. More appropriate MMN supplements are now available for children aged ≥6 months who are receiving complementary foods and hold great potential for preventing anaemia, including MMN powders and tables that are dispersible, chewable or can be crushed and added to food. The MMN powders and crushable tablets are regarded as "home-based fortificants" because they are mixed with food. For low birth weight infants aged 2-5 months, who should be exclusively breastfed, iron drops and syrups should continue to be used. Normal birth weight children aged less than 6 months should also be exclusively breastfed.

Therapeutic spreads, which combine an energy supplement with a MMN supplement, are also available and help in addressing both anaemia and malnutrition simultaneously.

In emergencies, MMN supplements or therapeutic spreads should be given to all groups at risk of anaemia and micronutrient deficiencies because these emergencies severely affect access to micronutrient rich food (WHO/WFP/UNICEF, 2005).

Interventions

- Provide iron-folate (IFA) or multiple micronutrient (MMN) supplements to low birth weight infants aged 2-5 months and all children aged 6-23 months, pregnant women, and breastfeeding women for the first three months after delivery, adolescent girls and newly wed women in the recommended dose and frequency.
- If resources are available, provide IFA or MMN supplements to other vulnerable groups, such as children aged 24-59 months, school-aged children and non-pregnant women of reproductive age in the recommended dose and frequency.
- Counsel women and caregivers on how to take the IFA/MMN supplements, the importance of taking the full dose, and help them solve any problems they have in complying, such as managing side effects.
- Screen all children, adolescent girls and women for severe anaemia at every contact with a health service provider using the most appropriate and feasible screening method at the health care level. Provide appropriate treatment for anaemia or refer children and women for treatment.
- In emergencies, provide MMN supplements or therapeutic spreads to children aged less than 5 years, pregnant women, and breastfeeding women.

Strategy 2: Dietary improvement

Dietary improvement aims to improve and maintain micronutrient status through changes in behaviour that lead to an increase in the selection of micronutrient-rich foods and a meal pattern favourable to increased bioavailability. Such changes can bring about important sustainable improvements, not only in anaemia and micronutrient status, but for nutrition in general.

In infancy and early childhood, breastfeeding and complementary feeding practices are key to anaemia prevention. Exclusive breastfeeding also helps to prevent anaemia in mothers, because it causes lactational amenorrhea and the iron cost of breastfeeding is less than the iron cost of menstruation.

Animal foods are the best sources of iron and other micronutrients needed to prevent anaemia and should be promoted among all but exclusively breastfeed infants where economically and culturally appropriate. Even when poverty limits the intake of animal foods, small changes in the dietary intake of plant foods can considerably improve the bioavailability of iron and other micronutrients. The bioavailability of iron is strongly influenced by enhancers (e.g. animal foods and vitamin C) and inhibitors (e.g. phytates, tannins and calcium) in the diet. Locally available plant foods that are rich in iron and other micronutrients needed for haemoglobin production and those which enhance the absorption and utilization of these micronutrients should be promoted. Some food processing techniques can improve iron absorption from plant foods, including germination and fermentation, and should be promoted. The consumption of plant foods and beverages that contain inhibitors of iron absorption should be avoided.

Interventions

- Protect, promote and support breastfeeding and complementary feeding practices, including
- Initiation of breastfeeding immediately after delivery (within half an hour)
- Exclusive breastfeeding for the first six months (180 days) of life
- Timely and appropriate introduction of complementary feeding on completion of six months (180 days) of life
- Continued breastfeeding until the child is at least 2 years

- Advise adolescent girls, mothers and caregivers on how to improve the dietary intake for themselves and their young children:
  - Increase intake of meat and fish, where economically and culturally feasible
  - Increase intake of locally available and affordable plant foods that are rich in micronutrients (e.g. green leafy vegetables, pulses, and legumes) and contain vitamin C to enhance iron absorption from plant foods (e.g. citrus fruits and guava)
  - Consume foods and beverages which contain substances that inhibit iron absorption from plant foods at least one hour after meals (e.g. tea, milk and milk products)
  - Use food processing techniques such as germination and fermentation to improve iron absorption from plant foods
  - Using cooking techniques that minimize the loss of micronutrients and increase the bioavailability of micronutrients (e.g. cut vegetables after washing, add small amounts of oil, and minimize cooking times).
- Educate school children about the importance of nutrition and options for improving nutrient intake.
- Promote the consumption of fortified foods, where available and affordable.

Strategy 3: Parasitic disease control

Soil transmitted helminths, diarrhoeal diseases and malaria are important causes of anaemia in areas where they are endemic. Parasitic disease control involves interventions to prevent infection through proper sanitary and hygiene practices, presumptive treatment of groups at high risk of infection, and therapeutic treatment.

Interventions:

Soil-transmitted helminths and diarrhoea

- Provide presumptive anthelmintic treatment to children aged 24-59 months[2] and adolescent girls once every six months.
- Provide a single dose of presumptive anthelmintic treatment to pregnant women at the earliest opportunity in the second trimester[3]. If the local prevalence of hookworm infections is ≥50%, provide a second dose of anthelmintic treatment at the earliest opportunity after delivery.
- If resources allow, provide anthelmintic treatment to children aged 5-11 years every six months[4].
- Provide information to women and caregivers on home care of diarrhoea (oral rehydration therapy and continued feeding), the danger signs of severe diarrhoea, and when and how to seek medical care.
- Promote good hygiene and sanitary practices to prevent infection, including the use of shoes and latrines, and hand washing after defecation, before food preparation and before eating.

Malaria (areas of malaria transmission only)

- Provide information to women and caregivers on the danger signs of malaria, and when and how to seek treatment.
- Provide rapid malaria treatment to young children and pregnant women with symptoms of fever or malaria in line with national malaria management protocol
- Promote protection measures against malaria (use of insecticide-treated bed-nets, particularly by pregnant women and children aged less than 5 years, and environmental control of mosquitoes)

[2]WHO now recommends that children aged 12-23 months be provided with presumptive anthelmintic treatment. A prevalence survey is planned in Bangladesh for children aged 12-23 months, on the basis of which a decision will be made whether to include these children in presumptive anthelmintic treatment

[3]Anthelmintic treatment should be provided by a health service provider and should not be given in the first trimester of pregnancy

[4]Although the anaemia prevalence is lower than other population groups, the burden of worm infections tends to be highest in this group and they are vulnerable to poor nutritional status and school performance as a result.

Strategy 4: Family planning and safe motherhood

Preventing adolescent pregnancies, reducing the total number of pregnancies and increasing the time between pregnancies will contribute to the control of anaemia because pregnancies create a large demand for iron and other micronutrients. When the iron demands of pregnancy are combined with the iron demands of adolescent growth, girls are at great risk of iron deficiency. When women have two or more years between pregnancies, they are more likely to enter the subsequent pregnancy with adequate iron status.

Obstetric practices can also contribute to control of anaemia in mothers and infants by managing blood loss in mothers and maximizing continued blood flow from the placenta to the infant after delivery without risk of polycythemia (i.e. the baby getting too many blood cells).

Key interventions

- Encourage women to attend ANC services as early as possible in pregnancy, and PNC after delivery.
- Provide micronutrient supplementation (Strategy 1), counseling on dietary improvement (Strategy 2), and interventions to prevent and treat hookworm infection and malaria, where endemic (Strategy 3) to pregnant and breastfeeding women.
- Mitigate and manage blood loss during delivery and in the postpartum period using appropriate methods.
- Intensify efforts with adolescents, families and communities to delay age at marriage and age at first pregnancy.
- Promote family planning methods to delay and space births.

Strategy 5: Food fortification

Fortification of food is a cost-effective and sustainable approach to improving the micronutrient status of a population. Universal fortification of at least one food staple or condiment with iron and other micronutrients for the general

population will improve the micronutrient status and haemoglobin level of almost all people and lay the foundation for a long-term source of micronutrients. Possible examples of food staples or condiments include wheat (atta) and salt.

Infants and young children do not benefit from fortification of food staples/condiments because they do not eat enough of these foods to meet their micronutrient needs. Other strategies are therefore needed including "home fortificants" such as MMN powders the fortification of low-cost and appropriately marketed complementary foods.

In emergency situations, children and women are particularly vulnerable to micronutrient deficiencies. Food aid provided in these situations and to beneficiaries of other food assistance programmes should be fortified with micronutrients to prevent anaemia and other micronutrient deficiency disorders.

Interventions

- Set legislation and regulations for fortification with iron and other micronutrients.
- Develop, produce and market foods fortified with iron and/or other micronutrients (including folic acid, vitamin B-12 and vitamin A) for the general population.
- Develop, produce, and market low cost foods fortified with iron and/or other micronutrients for specific vulnerable groups, particularly infants and young children.
- Fortify food aid products for development and emergency response programmes with iron and other micronutrients, including school-feeding programmes.
- Promote (through social marketing) foods fortified with iron and other micronutrients.

Strategy 6: Production of micronutrient-rich foods

Interventions that increase the production of micronutrient rich foods can improve the availability and affordability of these foods for the general population. These interventions include homestead food production, biotechnology and biofortification, crop diversification and livestock production, which tend to fall within the agriculture and livestock sectors. All opportunities should be made to creating linkages between the health sector and these other sectors, so households understand the full complement of interventions needed to protect household members from anaemia.

Key interventions

- Promote year-round production by households of micronutrient-rich foods or crops in home gardens, fruit tree plantation, small animal husbandry and fisheries.
- Promote the development of new varieties of staples that are rich in micronutrients (biotechnology and biofortification)

2.4 Service delivery channels

Service delivery mechanisms for IFA/MMN supplementation, parasitic disease control and dietary improvement must be carefully selected to optimize coverage and effectiveness. This is particularly true for IFA/MMN supplementation, which requires regular contact between the service provider and target groups.

Table 1 shows the opportunities for delivering interventions to the target groups in at the facility and community level in Bangladesh. To the extent possible, IFA/MMN supplementation should be linked with existing contact opportunities between the health service providers and target groups at both the facility and community level. Because no single delivery channel can ensure high coverage, multiple delivery mechanisms are likely to be needed for each target group. These delivery channels include:

- **Nutrition services (growth monitoring and promotion, weight gain monitoring, and nutrition counselling):** In its operational area, the NNP has monthly contact through its CNPs with pregnant women, breastfeeding women, children aged <2 years and adolescent girls. Several NGOs in rural and urban Bangladesh also provide similar services.

- **Routine immunization:** Health Assistants (HAs) and NGO workers provide vaccinations to children up to at least 9 months of age, and five doses of Tetanus Toxoid to adolescent girls and women of child bearing age, from facilities and EPI outreach sites in the community.

- **National campaign events (National Vitamin A Plus Campaign and National Immunization Days):** At least every six months there is a national campaign event to deliver vitamin A supplements and/or vaccinations to children and/or women through HAs, Family Welfare Assistants (FWAs), NGO workers and volunteers.

- **Integrated management of childhood illnesses (IMCI):** Contacts with children through facility and community IMCI can be utilized to provide IFA/MMN supplements and advice on breastfeeding and complementation feeding.

- **Family planning:** FWA and NGO workers have contacts with non-pregnant women of child-bearing age in the community.

- **Antenatal/delivery/postnatal care:** Family Welfare Visitors have contacts with pregnant and breastfeeding women.

Distribution at the community level is particularly important due to the low utilization of facility-based services. In population groups or geographical areas where health, nutrition and population services have low coverage, alternative delivery mechanisms may need to be considered, including schools (both formal and informal) for adolescent girls, workplace for working women, and community-based distribution through NGOs, CBOs, and volunteers.

The delivery channels listed in Table 1 do not all have national coverage, and so coordination at the district and Upazilla level is essential to ensure that the most appropriate delivery mechanisms are utilized and coverage is maximized. Steps must be taken to avoid duplication of services.

Table 1: Possible delivery channels for IFA/MMN supplementation, parasitic disease control and behaviour change communication.

	Target groups					Delivery channels	
	Children 2-23 mo	Adolescent girls	Newly wed women	Pregnant women	Breastfeeding women	Facility	Community
Nutrition services (GMP, weight gain monitoring, nutrition counselling)	X	X	X	X	X	UHFWC (FWV) NGO clinic (NGO worker)	CNC (CNO,CNP) CNU Para Centre (Para Worker) UDC (HW)
Routine immunization (measles/TT)	X	X	X	X	X	Dist. Hospital (HA) UHC (HA) MCWC (HA) UHFWC (HA) NGO clinic (NGO worker)	EPI outreach sites (HA) Community Clinic (HA) CNC (HA) Satellite Clinics (HA) UDC (NGO worker) Para Centre (HA)
NIDS/NVAC	X	X	X	X	X	UHC/MCWC/UHFWC/NGO clinic (HA/FWA/ NGO worker/volunteers)	NID/NVAC distribution sites (HA/FWA/NGO worker/volunteers)
IMCI	X					Dist. Hospital (Doctors) UHC (doctors) MCWC (MO) UHFWC (MO/SACMO/MA) NGO/Urban clinic (Doctor)	EPI outreach sites (HA) Satellite clinic (FWV/FWA) CC (FWA, HA) CNC (CNO, CNP) NGO outreach sites (NGO worker)
Family planning			X		X	UHC (MO/FWV) MCWC (MO/FWV) NGO/Urban clinic (Doctor/NGO worker)	EPI outreach sites (FWA) Satellite clinic (FWV/FWA) CC (FWA) HH visits (FWA) NGO Satellite clinics (NGO workers)

Antenatal care				X		Medical College hospitals (Doctor, nurse) District hospital (Doctor, nurse) UHC (MO/FWV) MCWC (MO/FWV) NGO/Urban clinics (Doctor/NGO worker)	Satellite clinics (FWV) UDC (NGO worker)
Delivery care					X	Medical College hospitals (Doctor, nurse) District hospital (Doctor, nurse) UHC (Doctor, nurse) MCWC (MO/FWV) UHFWC (MO/FWV) NGO/Urban clinics	HH visits (SBA, TBA)
Postnatal care					X	Medical College hospitals District hospital (Doctors, nurse) UHC (MO/FWV) MCWC (MO/FWV) NGO/Urban clinics (Doctor/NGO worker)	Satellite clinics (FWV) UDC (UDC HW) HH visits (SBA, TBA)
Educational institutes		X				Schools (teachers)	Non-formal schools (teachers)
Community-based groups/forums/ distribution	X	X	X	X	X	UHC (MO/FWV) MCWC (MO/FWV) NGO/Urban clinic (Doctor/NGO worker)	Women/adolescent groups (UDC HW, CNO, CNP, PW, NGO workers)
Workplace		X	X	X	X		Factories (employers) Tea plantations (employers)

CNC	Community Nutrition Centre
CNP	Community Nutrition Promoter
CNO	Community Nutrition Organizer
CNU	Child Nutrition Unit
EPI	Expanded Programme on Immunization
FWA	Female Welfare Assistant
FWV	Female Welfare Visitor
GMP	Growth monitoring and promotion
HA	Health Assistant
HH	Household
HW	Health Worker
IMCI	Integrated Management of Childhood Illness
MA	Medical Assistant
MO	Medical Officer
MCWC	Maternal and Child Welfare Centre
PW	Para Worker
SACMO	Sub-Asstt. Community Medical Officer
SBA	Skilled Birth Attendant
TBA	Traditional Birth Attendant
TT	Tetanus Toxoid
UDC	Urban Development Centre
UHC	Upazilla Health Complex
UHFWC	Union Health and Family Welfare Centre

2.5 Advocacy and behaviour change communication

An advocacy and behaviour change communication (BCC) component is needed to raise awareness of anaemia; ensure that anaemia is acknowledged as a serious public health problem and is established on the development agenda; encourage urgent action to be taken against anaemia; and to promote the behaviour change among the public. Advocacy and communication efforts should target stakeholders at all levels, including policy makers, programme managers, commercial food and pharmaceutical sectors, health service providers, opinion leaders, civil society, community-based organizations, NGOs, caregivers, adolescents and women of childbearing age, family members and the wider public.

Key interventions

- Raise awareness of the serious implications of anaemia for health, survival, and social and economic development to create commitment, demand, and resources for anaemia prevention at all levels.
- Develop the capacity of health service provides to counsel women, caregivers and family members on the changes in behaviour needed to prevent and treat anaemia.
- Promote specific changes in behaviours aimed at preventing anaemia including
- Breastfeeding, complementary feeding and dietary practices
- Compliance with IFA/MMN supplementation regimens
- Treatment of parasitic infections, including hookworm, diarrhoea and malaria
- Sanitary and hygiene behaviours
- Utilization of preventative and curative health services

These responsibilities are primarily assigned to women but are heavily influenced by other family members who must also be targeted by communication interventions.

2.6 Monitoring, evaluation and research

Actions in support of anaemia prevention and control must be monitored and evaluated to test and assess program effectiveness, justify the continuation or modification of interventions and provide feedback at all levels. Monitoring of an ongoing program is continuous and aims to provide the management and other stakeholders with early indications of progress (or lack thereof) in the achievement of results and objectives. Evaluation is a periodic exercise that attempts to systematically and objectively assess progress towards and the achievement of a program's objectives or goals. Because progress in anaemia prevention and control depends on the achievement of behavioural aims and objectives, monitoring and evaluation of behavioural indicators should be given special attention.

A monitoring and evaluation plan should be developed to provide a standardized framework on how needed information will be collected, processed, analysed, interpreted, shared and used. All organizations working in the field of anaemia prevention and control should follow the same monitoring and evaluation plan to ensure comparability. It is particularly important to ensure the consistent use of indicators for monitoring and evaluating trends in anaemia prevention and control. Where possible, monitoring indicators should be incorporated into existing health information systems. Outcome and impact indicators can be included in surveys such as the Bangladesh Health and Demographic Survey, Child Nutrition Survey, and Multiple Indicator Cluster Survey.

Research, including operations research, is needed to determine the factors that contribute to anaemia and to identify cost-effective approaches to its prevention and control for evidence-based advocacy and programme implementation.

The results for monitoring, evaluation and research should be regularly reviewed and used to revise strategies and interventions for preventing and controlling anaemia.

2.7 Stakeholders and their responsibilities

Governments and other concerned parties share responsibility for successful implementation of the National Strategy. Making the necessary changes from the community to national level demands many actions, including increased political will, public investment, awareness among health workers, involvement of families and communities, and collaboration between governments, international organizations and other concerned parties. Each partner should acknowledge and embrace its responsibilities, laid out in Box 7, for preventing and controlling anaemia and for mobilizing required resources.

Box 7: Stakeholders and their responsibilities

Government of Bangladesh	
Stakeholders:	Ministry of Health and Family Welfare: Directorate General of Health Services Directorate General of Family Planning National Nutrition Program Bangladesh National Nutrition Council Bangladesh Standards and Testing Institute (BSTI) Ministry of Local Government, Rural Development and Cooperatives Ministry of Agriculture Ministry of Fisheries and Livestock
Responsibilities:	Formulate, implement, monitor and evaluate policies and strategies for the prevention and control of anaemia Identify and allocate human, financial and organizational resources for implementation of the National Strategy
Health professional bodies and research institutions	
Stakeholders:	Medical colleges, university and institutes Bangladesh Medical Association Bangladesh Paediatric Association Bangladesh Perinatal Society Obstetricians and Gynaecologists Society of Bangladesh Bangladesh Nursing Association Institute for Child and Mother Health Neonatal Forum ICDDR,B Centre for Health and Population Research
Responsibilities:	Education and training in anaemia prevention control for all health service providers Integration of anaemia prevention and control into antenatal, postnatal, reproductive health, child health and nutrition services.
Non-governmental organizations and community based organizations	
Stakeholders:	National and international NGOs CBOs, religious organizations and women's groups.
Responsibilities:	Provide members with accurate, up-to-date information

	about anaemia prevention and control Incorporate anaemia prevention and control interventions in community-based interventions and ensure effective linkages with the health care system.
Education authorities	
Stakeholders:	Education authorities
Responsibilities:	Provide accurate information through schools and other education channels to children and adolescents to promote greater awareness of anaemia and its prevention and control.
Commercial Sector	
Stakeholders:	Food and pharmaceutical manufacturers, marketers and distributors.
Responsibilities:	Develop, produce and market goods fortified with micronutrients. Develop, produce and market IFA and other micronutrient supplements that address all nutritional causes of anaemia
International organizations	
Stakeholders:	UN agencies, international NGOs.
Responsibilities:	Advocate for increased human, financial and institutional resources for implementation of the National Strategy. Support development of norms and standards Support policy development and promotion. Support national capacity-building.

2.8 Coordination

The national Micronutrient Working Group, comprised of technical representatives from all relevant departments of the government, UN agencies, development partners and NGOs will provide technical support to strategize and plan, coordinate implementation, and monitor and evaluate interventions for the prevention and control of micronutrient deficiencies, including anaemia at the national level. The following broad tasks will be performed by this working group:

- Recommend new/changes to policies and strategies for micronutrient prevention and control to the NSC for approval
- Develop technical guidelines on micronutrient prevention and control
- Develop a 5-year and annual plan of action for micronutrient prevention and control.
- Monitor the implementation of the plan of action and progress towards the objectives and targets of the National Strategy.
- Provide any other technical assistance required for effective implementation

Anaemia prevention and control activities will be coordinated and monitored at district level through the District Health Coordination Meetings, and at upazilla level through the Upazilla Health Coordination Meetings. In operational areas of the NNP, the Upazilla Nutrition Technical Committee will also be utilized

3 Broad Plan of Action

This broad plan of action describes the actions required to implement the strategy. It is intended as the basis for the formulation of a detailed five year and annual Plan of Action.

3.1 Policy and guidelines for anaemia prevention and control

3.1.1 Periodically review and update existing guidelines for the prevention and treatment of anaemia. Determine if IFA doses conform to latest international recommendations, and consider adding other micronutrients to supplements for children and women.

3.1.2 Incorporate anaemia prevention control in other relevant guidelines, including guidelines for emergency response in nutrition.

3.1.3 Disseminate all guidelines, and any revisions, to public, private and NGO health facilities and health service providers.

3.1.4 Incorporate anaemia prevention and control interventions into national development policies and plans, major health initiatives and other projects to advocate for its importance and mobilize resources

3.2 Advocacy and behaviour change communication

3.2.1 Conduct formative research on

- Attitudes and behaviours related to anaemia at all levels (including policy and programme managers, health service providers, community members, family members and clients)
- Barriers to, and facilitators of, interventions for anaemia prevention and treatment at all levels
- Acceptability and feasibility of alternative supply channels for interventions, including community-based providers
- Consumer preferences for the characteristics and packaging of supplements.

3.2.2 Develop an advocacy and communication strategy, based on the formative research, to support all interventions to prevent and control anaemia

3.2.3 Develop advocacy and communication messages, tools and materials for all audiences/stakeholders to raise awareness of anaemia, encourage appropriate action to be taken, and promote behaviour change, including:

- Advocacy messages/tools for decision makers at all levels to highlight the serious implications of anaemia for health, survival, and social and economic development to create commitment, demand, and resources for anaemia prevention
- Counselling messages/tools and job aids/kits to assist service providers in motivating adolescent girls, women and caregivers take IFA/MMN supplements and deworming tablets (or give to their children), improve dietary intake of micronutrients, and to prevent parasitic diseases.
- Communication materials to promote increased household production and consumption of locally available micronutrient rich foods, and consumption of fortified foods when available.
- Incorporation of information about anaemia, and the importance of good hygiene and sanitation, insecticide treated bed-nets and adequate diet into the school curriculum.

3.2.4 Monitor the effectiveness of the advocacy and communication interventions, and adjust strategy if required

3.3 Supplies and delivery channels

3.3.1 Modify, within affordable limits, the characteristics (colour, coating and size) and packaging of IFA/MMN supplements to improve protection from humidity, acceptability and compliance by children and women

3.3.2 Estimate the quantities of IFA/MMN supplements and deworming tablets needed for all target groups in the country.

3.3.3 Identify the most appropriate delivery channels(s) within the public sector (health, nutrition and population sub-sectors and education sector) for delivery of anaemia prevention interventions to children and women. Identify and pilot alternative delivery mechanisms to improve coverage of key interventions, particularly IFA/MMN supplementation, including community-based delivery, NGOs and the private sector.

3.3.4 Promote consistency of approaches across all programmes/projects implementing interventions to prevent and control anaemia, including the use of uniform guidelines, training materials, and job aids.

3.3.5 Formulate and disseminate the job functions of health service providers and community-based workers with respect to the delivery of anaemia prevention and control interventions.

3.4 Knowledge and skills of health service providers and community-based workers

3.4.1 Assess levels of skills and knowledge, needs for improvement, and training needs of health service providers and community-based workers.

3.4.2 Revise the curricula, training materials and job aids for pre-service and in-service training of health service providers at all levels to include appropriate content on anaemia prevention and control.

3.4.3 Develop a training package, including training materials and job aids, for community-based workers on anaemia prevention and control.

3.4.4 Develop a pool of core trainers in anaemia prevention and control for training of health service providers and community-based workers.

3.4.5 Conduct in-service training for health service providers and community-based workers.

3.4.6 Improve follow-up and supportive supervision of health workers to sustain their knowledge and skills and the quality of counselling.

3.5 Food fortification

3.5.1 Select the most appropriate food to fortify and specifications for the fortificant (formulation, particle size, colour, potency, acceptable amount).

3.5.2 Study industrial capacity for food fortification, including the industry's commitment and capacity to fortify foods, including foods that target high risk groups (complementary foods for children aged =6 months and pregnant and breastfeeding women), in terms of technology, equipment, laboratory availability and qualified personnel.

3.5.3 Conduct pilot fortification studies to assess biological effectiveness, acceptability and costs.

3.5.4 Establish national guidance for fortifying food with micronutrients and regulating food fortification, including legislation, regulations and standards.

3.5.5 Establish a quality control/assurance system at critical control points, such as shipping, industrial processing, storage, retailing and household.

3.5.6 Motivate and educate consumers and health and food professions about consuming fortified foods.

3.5.7 Monitor consumption of the fortified foods by different vulnerable groups.

3.6 Monitoring, evaluation and research

3.6.1 Develop a monitoring and evaluation framework/plan to monitor and evaluate the effectiveness of anaemia prevention and control interventions:

- Select a standard set of input, process, output and impact indicators, including behavioural indicators
- For each indicator, identify criteria and targets; trigger points for remedial action; data collection methodology, and types and sources of data.

3.6.2 Incorporate indicators into existing health information systems by modifying monitoring and reporting formats and training health service providers to collect monitoring data as part of their routine activities.

3.6.3 Review the monitoring data at the sub-district, district and national level, and provide constant feedback to stakeholders for appropriate action.

3.6.4 Conduct periodic evaluations of the anaemia prevention and control interventions every 2-3 years, including impact indicators (haemoglobin measurements).

3.6.5 Identify priority research gaps to improve the design of interventions and programmes, and institutions which can help, technically and/or financially, to conduct and/or support the needed research.

3.6.6 Conduct assessments, operations research and evaluations of interventions for the prevention and control of anaemia.

3.6.7 Examine the possible role of haemoglobinopathies as a determinant of anaemia in Bangladesh, particularly among the different ethnic groups in the CHT.

3.6.8 Disseminate results of research, and revise strategies, interventions and guidelines in response to new knowledge and programme experiences and outcomes.

3.7 Coordination

3.7.1 Establish the National Micronutrient Working Group, with defined Terms of References and membership.

3.7.2 Appoint a focal point within the MOHFW for overall responsibility for anaemia prevention and control.

3.7.3 Develop a 5-year and annual detailed Plan of Action for anaemia prevention and control.

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Developed by:

Institute of Public Health Nutrition (IPHN)
Directorate General of Health Services
Mohakhali, Dhaka-1212

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