Arsenicosis Case-Detection, Management and Surveillance

Report of a Regional Consultation
New Delhi, India, 5-9 November 2002
1. **INTRODUCTION**

A regional consultation was held in the WHO South-East Asia Regional Office from 5-9 November 2002 to formulate standard protocols for case-detection, surveillance and management of arsenicosis. There were 35 participants in the consultation representing Bangladesh, Bhutan, India Indonesia, Myanmar, Nepal and Thailand in addition to eight members of WHO secretariat (Annex 1). It covers all the related fields including toxicology, dermatology, internal medicine, oncology, epidemiology, nutrition and public health. Dr DN Guha Mazumdar, ex Professor, Department of Gastroenterology, Institute of Postgraduate Medical Education and Research, Kolkata (India), was elected as the Chairperson and Dr Mir Misbahuddin of the Department of Pharmacology, Bangabandhu Sheikh Mujib Medical University, Dhaka (Bangladesh), as Rapporteur.

2. **OBJECTIVES**

The objectives of the consultation were:

(1) To review and endorse uniform case definition and surveillance algorithms for arsenicosis in the Region;

(2) To review and formulate a uniform case management protocol for arsenicosis, and

(3) To formulate a protocol for validating these protocols.

The agenda for the workshop is shown in Annex 2. Dr Caussy said that the goal of the workshop was to review the evidence on case-definition, management and surveillance and reach a consensus on a uniform regional protocol. The format consisted of country presentations, followed by group work. The groups further debated the chosen topics, reviewing all the available evidence, before reaching a consensus. The consensus of each group was further discussed and in the plenary session, they reached an overall consensus. The group also made recommendations for future actions. The members of the working groups are listed in Annex 3.
3. **INAUGURAL SESSION**

The Regional Consultation on Arsenicosis Case-detection, Management and Surveillance was opened by Dr N Kumara Rai, Acting Director, Department of Evidence & Information for Policy, WHO/SEARO. In his address, Dr Kumara Rai pointed out that the WHO Regional Office for South-East Asia had been providing policy and technical support to the governments of affected countries since 1996. Due to the absence of a consistent case definition, an arsenic mitigation initiative was launched in 2002. The highlight of this programme is the setting up of norms and standards, establishing guidelines for risk management, and formulating standard case definition, reporting and management. The Regional Office has already supported experts in the area of toxicology, dermatology, internal medicine, oncology, epidemiology and public health in the formulation of national protocols in Bangladesh, India and Thailand. The role of WHO is to provide technical inputs in the development of “blueprints” for action. The blueprint for case detection, management and surveillance to be formulated during this workshop will be uniformly used in the Region to help in programme implementation by national governments, donor agencies and NGOs.

4. **PRESENTATIONS**

4.1 **Regional Overview**

Dr D Caussy, Regional Epidemiologist, spoke on the role of WHO in mitigating the health impacts of arsenic. He said that the estimates of the number of arsenic exposed people varied both within a country and among the countries: for instance in Bangladesh (25-32 million), West Bengal (5 million), Myanmar (2.5 million) and Thailand (25 000). The prevalence of skin lesion is about 30% of the total affected population, but a variation is seen here also; these variations are partly explained by the lack of a consistent case-definition and the use of unvalidated assays for testing arsenic. To remedy this situation, the Regional Office launched an arsenic mitigation initiative based on the health risk paradigm, consisting of risk assessment and risk mitigation. The purpose of the consultation was to formulate evidence-based protocols for case-detection, surveillance and clinical case management.
4.2 Country Presentations

Dr Mahmuder Rahman (CH), Dr Ranjit Dey and Dr Sk. Akhtar Ahmad of Bangladesh presented the country protocol. High concentration of arsenic is found in 61 out of 64 districts of Bangladesh. About 80 million people are at risk, out of which 10,000 cases are already identified. Dr Rahman emphasized the terminology arsenicosis at the international level. He spoke of the need to establish a centre to facilitate laboratory tests of arsenic.

Dr Dey presented a paper entitled “Arsenic-related health problem in Bangladesh”. He mentioned that underground water was the source of arsenic contaminated drinking water. About 90% of the people were drinking water obtained from shallow tube wells. The first case of arsenicosis was detected in 1994. At present, about 27% of the total number of tube wells were arsenic contaminated. It is estimated that around 400,000 people may develop cancer of different organs. About 2,000 doctors and 15,000 paramedics had already been trained within the last three years. Dr Ahmad presented a paper on “National arsenicosis case diagnosis and management protocol”. He presented the data that was discussed at the International Workshop on Arsenic Mitigation in Bangladesh held at Dhaka from 14-16 January 2002.

Dr Mazumder presented the country report of India entitled, “Case definition of arsenicosis”. He analyzed 25 publications on arsenicosis where he showed 96 per cent of the reported cases were skin lesion (spotty pigmentation and diffuse keratosis). Sixty-four per cent of the reported cases were bronchitis. Forty-four per cent cases had peripheral neuritis. Forty-eight per cent of the reported cases showed the development of cancer. He also discussed the diagnostic criteria of arsenicosis.

Dr Thada Piamphongsana of Thailand presented a paper on “Environmental arsenic poisoning in Ronpiboon district, Thailand”. Arsenicosis cases are also found in Thailand. There is a report of new born baby (1 year) having high level of arsenic in hair. To manage the cases of arsenicosis six things are needed (a) men with knowledge, (b) money, (c) material and method, (d) laboratory (which technique and which specimen), (e) management and (f) continuing medical education. He also graded the duration of exposure into three stages. If the exposure is about six months, then it is in the first stage. If the exposure is 5 to 10 years, it is in the second stage and 10 to 20 years are required for the third stage. He also described
total doses of arsenic administered and the four stages of clinical manifestation. The presentations were followed by open discussion.

4.3 Case Detection
Dr Michael Kosnett of USA presented a paper on the purpose and utility of a case detection. Dr Kosnett gave emphasis to three perspectives – clinical perspective, public health perspective and sub clinical perspective. The development of hyper pigmentation depends on the dose of arsenic intake. If a person ingests more than 0.04 mg/kg body weight/day for six months to three years, then there is a chance to develop hyper pigmentation. On the other hand, if the dose of arsenic is reduced to 0.01 mg/kg body weight/day and ingested by a person for 5 to 15 years, then hyperpigmentation will develop. Peripheral vascular disease, no cirrhotic portal hypertension, respiratory symptoms and peripheral neuropathy develop following ingestion of arsenic for years at a dose of more than 0.01 mg/kg body weight/day. The level of arsenic in hair and toe nail may not be a reliable indicator of long term arsenic exposure.

4.4 Surveillance
Dr Caussy spoke on the surveillance of arsenic disease at the country level. He pointed out that information is needed for a) detection and prevention of arsenic disease outbreak; b) monitoring trends in arsenic diseases. He also defined the data source and also how to decide on data handling. Linkages with the existing health information should be established. Data may be for investigation, prevention and control of the diseases. Effective surveillance requires good motivation, clear case definition and laboratory support.

4.5 Validation of Case Definition
Dr Kosnett of USA presented a paper on the validation of case definition. Two aspects of validation should be considered: (a) accuracy of the definition, (b) feasibility of implementing the case definition in the intended venue (e.g. clinic, public health agency, research).

4.6 Presentation and Adoption of Consensus Protocol
The discussions that ensued were on whether arsenicosis is always accompanied by skin manifestations or there are arsenic-associated cancer
cases that develop without overt skin lesions. It was agreed that the evidence shows skin manifestation as being a sine quanon for diagnosing arsenicosis. The confirmation of arsenic exposure through measurement in skin and hair as a basis for case classification were also debated. It was concluded that in the absence of accurate arsenic exposure, measurement of arsenic in the hair and nails represented a useful adjunct.

The discussions on case surveillance addressed the needs to use minimum data set for reporting arsenicosis cases in the existing HMIS of the country.

The discussions on validation of case definition focused on the needs to validate both the test parameters of sensitivity and specificity as well as the practical feasibility aspects of the protocols.

4.7 Case Management and Validation

Dr Dey gave a lecture on the “Management protocol for arsenicosis cases”. He stressed that the most important step in the management of arsenicosis was to stop the intake of arsenic contaminated drinking water. Other measures include (a) dietary supplementation, (b) application of keratolytic agent, (c) follow up and counselling, (d) cryosurgery, (e) symptomatic treatment, (f) antioxidants and (g) appropriate nutrient supplementation.

Dr Mazumdar presented the topic on the “Treatment of chronic arsenic toxicity”. While presenting the treatment of chronic arsenic toxicity, he highlighted the following points: (a) prevention of intake of arsenic contaminated water; (b) supportive treatment; (c) symptomatic treatment (such as lung disease, peripheral neuropathy); (d) chelating agents, and (e) antioxidants. The chelating agents are d-penicillamine, DMSA and DMPS. In his study DMSA was found to be ineffective. DMPS was found to be significantly effective. Etretinate and other retinoids were also effective. The current intervention programme in West Bengal includes: (a) safe water supply; (b) placement of arsenic removal unit, and (c) use of shallow tube well water and other sources. About 60% of the patients continue to pass arsenic in urine even after they stop drinking arsenic contaminated water. Further study is required to evaluate the effectiveness of retinoids, nutrients and selenium.

Dr Thada Piamphonesant of Thailand presented a paper on the “management of arsenicosis” represented with coloured photographs of melanosis as well keratosis. He treated the cases either by BAL at a dose 100
mg/day for 10 days or d-penicillamine at a dose of 100 mg/kg body weight for 2-4 months. He also divided the treatment schedule into stages. Stage 0 or I do not require any treatment. In Stage II, one has to wait and see. In Stage III, he recommended the use of etretinate, liquid nitrogen, excision and curettage. In Stage IV, fluorouracil was advised. Other treatments included physical therapy and supplementation of selenium.

Dr Islam presented a paper on the “Management of Bowen’s diseases”. In 1912, Dr Bowen for the first time described this disease of squamous cell carcinoma-in-situ. Epidemiology, clinical features, histopathological findings, differential diagnosis and treatment of the diseases were described. Management includes topical chemotherapy (5-Fluorouracil), photodynamic therapy, laser ablation, radiation therapy and Moh’s microsurgery.

Dr Sengupta of India gave a lecture on the “management of non-cancerous dermatosis of arsenicosis”. For the management of non-cancerous dermatosis of arsenicosis, the most important thing is to provide arsenic-free drinking water. Antioxidant (Vit.- A, C, and E), DMSA, DMPS can be used for the treatment of keratosis. Retinoid has no role in the treatment of melanosis. Topical therapy is really recommended for melanosis. Salicylic acid, tretinoic acid and 5-fluorouracil may be used for the treatment of keratosis.

4.8 Consensus Protocol

The discussions that followed on case management centered on the use of evidence-based protocol for the management of arsenicosis cases and the need to conduct clinical evaluations before recommending any case-management protocols.

5. RECOMMENDATIONS

The plenary session of the expert panel convened by WHO/SEARO debated on the draft recommendations of these sub-committees and made several key recommendations. The recommendations pertain to case definition, case management and case surveillance including validation of case definition.

5.1 Recommendations of the Sub-committee on Case Definition

The committee noted that the three-tiered case definition that was adopted was based on public health considerations. A working case definition usually
incorporates clinical signs and symptoms and laboratory measurements. It is
generally prudent not to include any clinical information which might not be
uniformly available under conditions of local medical practice (special
laboratory or diagnostic tests, for example). The case criteria should be
appropriate for the diagnostic resources available to the community where
the problem exists. However, this may make the case definition less precise.
Therefore the committee adopted a balance between scientific precision and
field practicality in devising a system whereby a case could be either clinically
confirmed only or clinically and laboratory confirmed depending on
availability of resource or clinical expertise. The following recommendations
were made:

(1) Definition of arsenicosis: Arsenicosis may be defined as a chronic health
condition arising from prolonged ingestion (not less than six months) of
arsenic above a safe dose, usually manifested by characteristics skin
lesions, with or without involvement of internal organs.

(2) The case definition chart should be used in the Region to maintain
uniformity in the detection, surveillance and management of arsenicosis
cases.

(3) The case definition algorithm should be validated and revised after field
testing or development regarding case definition, if any.

(4) A training module including a companion colour atlas should be
developed based on the algorithm.

(5) All trainers and health workers need to be trained as soon as possible
on case detection protocol.

5.2 Recommendations of the Sub-committee on Case Management

Drugs used in the management of arsenicosis should be ideally based on
solid evidence generated through randomized controlled clinical trials.
However, more often than not, recommendations have to be made without
such evidence. In such circumstances, it is a mixture of less than adequate
evidence and the consensus of experts in the area. The management of
arsenicosis falls into this category.

Future studies will inevitably bring major changes in the management.
Management approaches for arsenicosis utilized in the Region to-date have
included the use of many drugs, agents and nutrients. Therefore, therapies
that have not been validated in arsenicosis through randomized double
blinded controlled clinical trials, or have not been part of standard medical treatment, cannot be recommended at this point. The following recommendations were made:

(1) The case management chart adopted in this meeting should be used uniformly throughout the Region.

(2) As there is no known specific treatment for arsenicosis till today, the prudent intervention for arsenicosis is to stop consumption of arsenic contaminated water.

(3) Appropriate counselling for safe water options and health consequences of consuming arsenic contaminated water should be supported through standard Intervention Education and Communication (IEC) strategies. These strategies should include:
   (a) The consumption of microbiologically and chemically safe water
   (b) Implementing programmes for educating patients and other community members about basic public health aspects of arsenicosis and to dispel misconceptions that may lead to stigmatization, family and occupational disruption and other social hardships.
   (c) Symptomatic treatment for patients with melanosis is to stop consumption of arsenic-contaminated water for drinking and cooking.

(4) Symptomatic treatment for patients with keratosis or keratosis and melanosis includes the application of keratolytic agents. Presently 5-10% of salicylic acid and 10-20% of urea based on the most common prevailing practice in the Region and literature review for treatment of keratotic lesions. Higher doses need further evaluation.

(5) The research priority at tertiary level should address testing therapeutic regimens including
   (a) Dose and duration of salicylic acid
   (b) Role of nutritious diet and anti-oxidants such as Spirulina, selenium zinc and vitamins A, C, and E.
   (c) Role of retinoids
   (d) Evaluating chelating agents such as DMPS

(6) All health care workers at the primary care level need to be trained in the recognition and management of dermal and systemic signs and
symptoms of arsenicosis manifestations, including surveillance for cancer.

5.3 Recommendations of the Sub-committee on Case Surveillance

The recommendation of case surveillance focused on the need for tools, guidelines and training for integrating arsenicosis in the existing national surveillance system.

(1) Detection and reporting of cases should be implemented using the endorsed hierarchical case-classification system.

(2) For reporting purposes, a minimum core data set should be used. The data may consist of who is a case (age, sex), what type of case (suspected, probable, clinically confirmed, clinically and laboratory confirmed, unclassified), where is the case (geographical location) how is the case (alive, dead, presence of others major complications). This information may be kept case by case at the primary level and in aggregated forms at the secondary and tertiary levels.

(3) Appropriate tools, guidelines and protocols should be designed for the reporting of cases to allow data flow from the primary to the tertiary level.

(4) Training in the use and implementation of these surveillance tools should be provided to all those involved in the surveillance system

(5) For sustainability, arsenicosis should be included in the routine reporting format that could be grafted into the existing disease surveillance system

(6) Data collected must be used as information for action through analysis (graphs, maps, charts, trends, etc.) and feedback to every level of the health delivery system.

(7) If resources are a constraint, active search for cases should be in phased manner to assess the magnitude of the problem. This should be followed by passive and sentinel surveillance.

5.4 Recommendations of the Sub-committee on Case Validation

Future refinements of the case definition protocol are warranted. Field studies were recommended to address two components of validation: (1) the
precision of the arsenicosis case definition protocol in capturing the burden of arsenic-related disease, and (2) the practical feasibility of implementing the protocol in the context of the clinical settings and the public health surveillance systems of South-East Asia. The findings of these validation studies may suggest useful modifications in the case definition and the case detection protocols.

The traditional approach to validation of a case-definition has been to compare the identified cases by the “definition” to those identified by a “gold standard” that has been determined to accurately establish the truth (presence of the disease) by laboratory or clinical means. The only gold standard that can be used now is the differential clinical diagnosis of expert dermatologists (or a doctor who has been trained by an expert dermatologist) ruling out other arsenicosis-simulating conditions. The exposure history as measured by water or biomarker in hair and nail may provide additional accuracy for diagnosis by clinicians other than dermatologists. Hence the following recommendations were made:

1. The precision of the proposed case-definition should be established by comparing in parallel the clinical diagnosis of a “gold standard” of an expert dermatologist (or a doctor who has been trained by an expert dermatologist) to the clinical diagnosis of general clinicians using both the established clinical criteria and laboratory testing of arsenic exposure. This will enable one to calculate the additional information provided by laboratory testing and the precision of the case-definition to characterize the sensitivity and specificity parameters of the case-definition.

2. The practical feasibility and reliability of applying the case-definition should be performed by comparing the inter-observers agreement of three clinicians examining the same patient and computing the kappa statistics.

3. Aside from formal field validation studies involving expert teams, smaller scale, quality assurance audits could be periodically conducted to assess whether the case definition is being implemented in a satisfactory manner. For example, spot checks could be conducted to check the accuracy of demographic, clinical, and exposure data obtained and recorded on randomly selected patients.
5.5 General Recommendations of All Expert Committees

5.5.1 Infrastructure
(1) Multi-disciplinary, autonomous, centers of excellence or Collaborating Centres for arsenic mitigation should be established in the Region.
(2) A multi-disciplinary national task force for identification, monitoring and recommendations for mitigating the health impacts of chronic arsenic toxicity should be established.
(3) Resources should be made available at the local level to provide individual and group counselling to affected individuals.
(4) Rehabilitation programmes for arsenicosis patients with major complications should be established.

5.5.2 Capacity building
(1) Case-detection, surveillance and management of arsenicosis, in clinical and public health contexts should be incorporated in undergraduate and post graduate medical curriculum as well as in the training of paramedics.
(2) National health delivery system should be strengthened to provide services for diagnosis and management of arsenicosis.
(3) Reliable laboratories using Standard Operating Procedures (SOP) should be supported for epidemiological and diagnostics investigation.

6. CONCLUSIONS
The meeting concluded with a summing up address by Dr Than Sein, Director, Evidence & Information for Policy. He expressed the hope that the recommendations of the expert group would be made available to the Regional Director at an early date. This would, in turn, ensure that these recommendations were considered and followed up at the country level in order to achieve the maximum results in an expeditious manner.
Annex 1

LIST OF PARTICIPANTS

Bangladesh
Dr Ranjit Kumar Dey
Director, Planning, Research &
Environmental Health
Directorate-General of Health Services
Mohakhali, Dhaka
Ph. Fax.: 0088-02-9880082, 8819958
E-mail: ranjitkumar@hotmail.com

Dr Mahmuder Rahman
Principal and Professor of Medicine
Dhaka National Medical College & Hospital
Magbazar, Waiken Rail Gali
Dhaka
Ph: 9351190 -91
E-mail: msrahman@bangla.net

Prof. Mahmudur Rahman
Director
National Institute of Preventive &
Social Medicine (NIPSOM)
Dhaka
Ph: 088-02-8821236, 9898798

Prof. Maidul Islam
Professor and Chairman
Department of Dermatology
Bangabandhu Sheikh Mujib Medical University
Dhaka
Ph: 88-02-861030
E-mail: shawrav@bdc.com.com

Dr Salamat Khandker
Medical Officer
DPHE Bhaban, Fourth Floor
Shaheed Capt. Monsur Ali Sarani
Dhaka-1000
Tel: 0088-02-9343372
E-mail: whosani@citechco.net

Dr Md Siddiqui Rahman
Deputy Programme Manager (Arsenic)
Directorate-General of Health Services
Mohakhali
Dhaka
Ph:8819958

Dr Shah Mohammad Keramat Ali
Professor, Clinical Nutrition
Institute of Nutrition and Food Science
University of Dhaka, Dhaka
Ph: 9661900-59/400
Fax: 88028615583
E-mail: lismk@bangla.net

Prof Mir Misbahuddin
Head, Department of Toxicology
Bangabandhu Sheikh Mujib Medical
University
Dhaka

Bhutan
Dr Ugen Dophu
Deputy Medical Superintendent
Jigme Dorji Wangchuck National Referral Hospital
Thimphu
Ph: 00975-2-322496
Fax: 975-2-325384
E-mail: udophy@yahoo.com

India
Dr K C Saha
Ex Professor of Dermatology
Calcutta School of Tropical Medicine
Kolkata
Ph: 337-5090, 241-3023
E-mail: debasaha@yahoo.com

Dr S K Saha
Joint Director of Health Services (PH&CD)
Directorate of Health Services
Government of West Bengal
Writer’s Building
Kolkata
Ph: 214-1107, 214-5600
Dr D N Guha Mazumdar  
Professor of Medicine & Gastro-enterology (Retd)  
Institute of Post Graduate Medical Education & Research  
Kolkata  
Ph: 478 7493  
E-mail: dngm@apexmail.com

Dr D K Raut  
Professor of Public Health  
All India Institute of Hygiene and Public Health  
Kolkata  
Ph: 241-3831/2860  
Fax: 241-8717  
E-mail: drdkraut@vsnl.net

Dr A K Harit  
Chief Medical Officer  
National Institute of Communicable Diseases  
22 Sham Nath Marg  
New Delhi  
Ph: 3928720, 3971272  
Fax: 3928700, 3922677  
E-mail: skj397@yahoo.co.in

Dr Sujit Ranjan Sengupta  
Professor  
Institute of Post Graduate Medical Education & Research  
Kolkata  
Ph: 033-2239692  
E-mail: drsujit1@rediffmail.com

Indonesia  
Dr H Firdaus Adam  
Chief of Section of Data Analysis & Dissemination  
Directorate General, CDC&EH, Ministry of Health, Jakarta  
Ph: 62 21 426 5974  
Fax: 62.21. 4266919

Myanmar  
Dr Soe Tint  
Assistant Director, Occupational Health  
Department of Health  
Ministry of Health  
Yangon  
Ph: 223824

Nepal  
Dr Kokila Devi Shrestha  
Chief of Epidemiology  
Department of Health Services, Epidemiology & Disease control division  
Ministry of Public Health  
Kathmandu  
Ph: 255796, 262268  
Fax: 262268

Dr Keshar Man Malla  
Dermatologist  
Bhaktapur Hospital  
Ph: 610676

Dr Manen P Gorkhali  
Physician and Neurologist  
Bir Hospital  
Kathmandu  
Ph: 00977-1-221988  
E-mail: mgorkhaly@yahoo.com

Thailand  
Dr Siriluk Thaicharoen  
Director of Leprosy Unit - Dermatologist  
Department of disease control Region II  
Nakorn Si Thammarat Province  
Ph: 075-344895, 341155  
Fax: 075-342328  
E-mail: sirilukslp1205@yahoo.com
Dr Thada Piamphongsant  
Senior Consultant  
Institute of Dermatology  
Department of Medical Services, Ministry of Public Health  
Nonthaburi  
Ph: 662-246-1280  
Fax: 662-433-7922  
E-mail: thadapiam@hotmail.com  

Dr Kamjad Ramakul  
Director  
Bureau of Occupational and Environmental Disease  
Department of Health  
Ministry of Public Health  
Nonthaburi  
Ph: 00662-5904381  
Fax: 00662-5904388  
E-mail: put@loxinfo.co.th  

Dr Wilaiwan Puttapruk  
Academic of Public Health  
Ropinboon Hospital  
Nakorn Si Thammarat Province  
Ph: 066(075) 449120  
Fax: 066(075) 449123  
Email: yooyayee_put@hotmail.com  

Dr Peera Kongthong  
Director  
Ropniboon Hospital  
Nakorn Si Thammarat Province  
Ph: 066(075) 449441  
Fax: 066 (075) 449123  
Email: peeraruse@yahoo.com  

Dr Anchalee Siripitayakunkit  
Disease Control Officer  
Bureau of Epidemiology  
Department of Disease Control  
Ministry of Public Health  
Nonthaburi  
Ph: 662-5901885  
Fax: 662-590 1784  
Email: sunchale@health.moph.go.th  

Other Agencies  
Dr Michael J Kosnett  
Diplomate, American Boards of Internal Medicine  
Preventive Medicine (Occupational Medicine) and Medical Toxicology  
1630 Welton Street, Suite 300 Denver, CO 80202, USA  
Tel: (303)571-5778  
Fax: (303) 892-5628  
E-mail: Michael.Kosnett@UCHSC.edu  

Dr Rachel Kaufmann  
Sr. Public Health Specialist  
World Bank Liaison for Environmental Health  
MSN MC11-1108, 1818 H Street Washington DC 20433, USA  
Ph: 202-458-5048  
Fax: 202-522-1664  
E-mail: rkaufmann@worldbank.org  

Dr Saima Khan  
Assistant Project Officer  
Arsenic Health and Nutrition Section  
United Nations Children’s Fund  
GPO Box 58 Dhaka  
Ph: 9336701-10  
Fax: 880-2-9335641-42  
E-mail: saikhan@unicef.org  

Dr Sundar Rajan S Gopalan  
Senior HNP Specialist  
South Asia Human Development Department  
Bangladesh Country Office  
World Bank  
Dhaka, Bangladesh  

Mr Iijima Daisuke  
Assistant Resident Representative  
JICA India Office  
2nd Floor, DLF Centre, Sansad Marg (Parliament Street) New Delhi – 110001, India  
Ph: 331-1990  
Fax:331-1996  
E-mail: Lijima.Daisuke@jica.go.jp
Mr Takashi Matsumoto  
Assistant Resident Representative  
JICA India Office  
2nd Floor, DLF Centre,  
Sansad Marg (Parliament Street)  
New Delhi – 110001  
Ph: 331-1990  
Fax:331-1996  
E-mail: matsumoto.takashi@jica.go.jp

Dr Sean Dooolan  
Environment Adviser  
Department for International Development (DFID)  
British High Commission  
B-28, Tara Crescent  
Qutab Institutional Area  
New Delhi – 110016, India  
Ph: 652-9123 (Xtn.3315)  
Fax:652-9296  
E-mail: s-doolan@dfid.gov.uk

Dr Shinjiro Okuzawa  
Project Formulation Adviser (Environment)  
Japan International Cooperation Agency (JICA)  
2nd Floor, DLF Centre,  
Sansad Marg (Parliament Street)  
New Delhi – 110001, India  
Ph: 331-1990  
Fax:331-1996  
E-mail: jicaid@jica.go.jp

Dr Takaku Keiichi  
Arsenic Mitigation Advisor  
Japan International Cooperation Agency  
Department of Public Health Engineering)  
14, Shaheed Captain Monsur Alis Sharani  
Kakrail  
Dhaka – 1000, Bangladesh  
E-mail: takaku@citechco.net

WHO Secretariat  
Dr U Than Sein, EIP/SEARO  
Dr Abdul Sattar Yoosuf, SD E/SEARO  
Dr N Kumara Rai, CDS/SEARO  
Dr Cherian Varghese, WHO/India  
Dr Anton Fric, WHO/Nepal  
Dr Krisantha Weerasuriya, EDM/SEARO  
Dr P T Jayawickramarajah, SHS/SEARO  
Dr Deoraj Caussy, O EH/SEARO
Annex 2

PROGRAMME

Tuesday, 5 November 2002

Inauguration and Country Presentations

0830-0900 hours  Registration

0900-0920 hours  
- Formal Opening and Regional Director’s remarks - Dr N Kumara Rai
- Introduction of Participants - Dr Anton Fric
- Nomination of Rapporteur/Chairman - Dr N Kumara Rai

1000-1030 hours  Inaugural Lecture: An Overview of Arsenic mitigation in SEAR - Dr Harry D Caussy

1030-1100 hours  Format, Objectives and Expected Outputs of the Consultation - Dr Harry D Caussy

1100-1130 hours  Country Presentation: Bangladesh Case- Definition Protocols - Dr Ranjit Kumar Dey

1130-1200 hours  Discussions on Bangladesh Case Definition Protocol

1200-1230 hours  Country Presentation: India Case-Definition Protocols - Dr Guha Mazumder

1330-1400 hours  Discussions on India Case Definition Protocol

1400-1430 hours  Country Presentation: Thailand Protocols on Case Definition - Dr Thada Piamphongsant

1430-1500 hours  Discussions on Thailand Case Definition Protocol

1500-1530 hours  Presentation on the generic protocol for case detection - Dr Michael Kosnett

1600-1630 hrs  Discussions on Generic protocol

Wednesday, 6 November 2002

0830-0900 hours  Introduction to Group Discussions - Dr Michael Kosnett
0900-1000 hours  Group work on case definition
1100-1130 hours  Group work on case definition
1130-1200 hours  Presentations of recommendations of Case-Definition Group Work
1200-1230 hours  Discussions on recommendations
1330-1400 hours  Surveillance of arsenic diseases - Dr Harry D Caussy
1400-1430 hours  Validation of case-definition - Dr Michael Kosnett
1430-1530 hours  Group work on surveillance and validation (Concurrent Sessions)
1600-1630 hours  Report from Case surveillance Group - Group Discussion
1630-1730 hours  Discussions on Case Surveillance

Thursday, 7 November 2002

Case Management

0830-0900 hours  Report from Case validation Group
0900-0930 hours  Discussion case validation protocols
0930-1000 hours  Presentation of Case Management Protocol from Bangladesh - Dr Ranjit Kumar Dey
1000-1030 hours  Presentation of Case Management Protocol from India - Dr Guha Mazumder
1100-1130 hours  Presentation of Case Management Protocol from Thailand - Dr Thada Piamphongsant
1130-1200 hours  Management of Bowens’s disease - Dr Maidul Islam
1200-1230 hours  Management of pre-cancerous arsenic associated skin lesion - Dr Sengupta
1330-1400 hours  Discussions on all case management protocols
1400-1530 hours  Group work on Case Management
1600-1630 hours  Group Work on Case Management

Friday, 8 November 2002
Presentation of Working Sub-Groups

0830-0930 hrs  Presentation of Group Discussion on Case Management
0930-1030 hrs  Discussions on Case Management
1100-1230 hrs  Presentation of Case Definition Sub-group
1330-1400 hrs  Discussions and modification of case definition protocol
1400-1430 hrs  Presentation of Case-Validation Subgroup
1430-1500 hrs  Discussions and modification of Case Validation Sub-group
1500-1530 hrs  Presentation of Case Surveillance Sub-group
1600-1630 hrs  Discussion and modification of Case Surveillance Protocol
1630-1700 hrs  Presentation of Case Management and Validation Subgroup

Saturday, 9 November 2002

Endorsement of all Protocols

0930-1000 hrs  Discussions and modifications of case management protocol
1030-1200 hrs  Recommendations from this workshop
1300-1500 hrs  Presentations and Final endorsement of all protocols - Dr Michael Kosnett and Rapporteur of all sub-groups
1530 hrs  Closing of workshop
Annex 3
MEMBERS OF WORKING GROUPS

Members of the Expert Sub-committees

<table>
<thead>
<tr>
<th>Sub-committee</th>
<th>Chairperson</th>
<th>Secretary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case-Definition</td>
<td>Dr Akhtar Ahmed</td>
<td>Dr D N Guha Mazumder</td>
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<tr>
<td>Validation of Case Definition</td>
<td>Dr Tada Piamphongsant</td>
<td>Dr Anton Fric</td>
</tr>
<tr>
<td>Case Surveillance</td>
<td>Dr D N Guha Mazumder</td>
<td>Dr AK Harit</td>
</tr>
<tr>
<td>Case Management</td>
<td>Dr R Kauffman</td>
<td>Dr K Weerasuriya</td>
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</table>

Members of Different Sub-Groups and Committees

<table>
<thead>
<tr>
<th>1Case-Definition</th>
<th>2Case-Validation</th>
<th>3Case Surveillance</th>
<th>4Case-Management</th>
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</thead>
<tbody>
<tr>
<td>Dr Akhtar Ahmed</td>
<td>Dr D N Guha Mazumder</td>
<td>Dr R K Dey</td>
<td>Dr K C Saha</td>
</tr>
<tr>
<td>Dr Tada Piamphongsant</td>
<td>Dr Anton Fric</td>
<td>Dr A K Harit</td>
<td>Dr Maidul Islam</td>
</tr>
<tr>
<td>Dr D N Guha Mazumder</td>
<td>Dr AK Harit</td>
<td>Dr KD Shrestha</td>
<td>Prof. Mahmudur Rahman (NIPSO M)</td>
</tr>
<tr>
<td>Dr R Kauffman</td>
<td>Dr Saima Khan</td>
<td>Dr Anchalee Sripitayakunkit</td>
<td>Dr Mesban Uddin</td>
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<td>Dr Saima Khan</td>
<td>Dr Saima Khan</td>
<td>Dr Firdaus Adam</td>
<td>Dr S K Saha</td>
</tr>
<tr>
<td>Dr Myint Myint Gyi</td>
<td>Dr Soe Tint</td>
<td>Dr S K Saha</td>
<td>Prof. Mahmudur Rahman (DCH)</td>
</tr>
<tr>
<td>Dr Peera Kongthong</td>
<td>Dr Sabai Nyi</td>
<td>Dr Ranjit Kumar Dey</td>
<td>Dr Cherian Varghese</td>
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<tr>
<td>Dr Siriluck Thacharoen</td>
<td>Dr Firdevs Adam</td>
<td>Dr Kamjat Ramakul</td>
<td>Dr Ranjan Sengupta</td>
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<tr>
<td>Dr Sididur Rahman</td>
<td>Dr Ugen Dophu</td>
<td>Dr Kokila Devi Shrestha</td>
<td>Dr Salamat Khandekar</td>
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<tr>
<td>Dr Maidul Islam</td>
<td>Pro Mir Misbahuddin</td>
<td>Dr Ullawon Puttapruk</td>
<td>Dr Shah Mohamad Keramat Ali</td>
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