Pre-proposal from Harvard Arsenic Project Harvard University

Combatting the Contamination of Water in Bangladesh by Arsenic

BACKGROUND

One of the first recorded discussions of acute arsenic poisoning (and its treatment) was by Ibn Washiya in 905 AD (Hijra 326) Over the years acute arsenic poisoning has disappeared as a major problem but in the 20th century (Hijra 1419) chronic arsenic poisoning is a major international catastrophe.

120 million people live in Bangladesh, of which 90% practice the Muslim faith. According to a recent estimate, 30 million people have been ingesting drinking water with concentrations of arsenic greater than the World Health Organization (WHO) guidelines of 10 parts per billion (ppb). It is estimated that 500,000 people may have visible signs of chronic arsenic poisoning.

The most important task is to provide clean water to the villagers. A second task is to record the details of their suffering for posterity, so that it may never be repeated and a third to carry out an epidemiological study to delineate as reliably as we can the long term effects (cancerous) on health.

The problem is massive, unprecedented and urgent. The size of the program demands a massive response. The urgency of the problem demands that another mechanism be found than the slow process of government. In particular we hope to have the proposed program in place when President Bill Clinton and Mrs Hillary Clinton visit Bangladesh in November 1998.

PROPOSAL

A group of scientists and physicians from Harvard University propose to work with Dhaka Community Hospital to help in each one of these three tasks. The Dhaka Community Hospital Trust provides medical services in many of the villages of Bangladesh and is well equipped to work with the villagers. Dhaka Community Hospital has already begun a "Rapid Action Program" by sending teams into villages to identify, map and measure each well and identify the health status of each villager. We propose to extend this, by repeated visits to these same villages to ascertain which wells stay clean and to follow the health of each and every villager.

This will, we hope enable us to decide whether the existing symptoms are reversible (by better nutrition for example) and which symptoms (probably keratoses) are irreversible. Harvard faculty and students will join these teams and bring technical expertise which will include but not be limited to use of a Global Position System (GPS) to accurately map each well and the use of direct reading arsenic measurement by optical absorption. In addition some students from Dhaka will spend some period at Harvard University to broaden their training. This exchange will enable both groups to learn from the villagers and the suffering patients.

Professor Wilson has already begun with an initial visit to Dhaka and Chandripur where he personally saw 120 villagers with visible signs of chronic arsenic poisoning, hyperpigmentation, hypopigmentation and keratoses. A photograph by Dr Wilson of a typical patient with keratoses is attached. Also Dr. Quamruzzaman, Chairman of the Dhaka Community Hospital Trust has
visited Harvard.
Two websites have already been started - at Harvard and in Dhaka.
http://phys4.harvard.edu/~wilson/arsenic.html
AND
http://wso.net/wei/dch/acic

One important addition to the present teams of the Dhaka Community Hospital will be a field test of various remediation and water purification procedures. Examples of procedures to be included are:

- a filter of iron filings at each well head;
- use of stored rainwater;
- use of micropore filter to purify surface water.

Harvard will also identify promising areas in which a prospective cohort study can be performed.
In addition to the symptoms already seen skin cancers are expected after 15 - 20 years of exposure and bladder and lung cancers after 20 - 30 years.

OUTCOME of WORK

It is anticipated that the Harvard study will be useful to provide reliable information to the major international aid agencies who propose remediation. In addition it should be of inestimable value to those countries (including many parts of Arabia) that use well water for their water resource and inevitably bring up some arsenic.

BUDGET

The massive problem deserves a massive and rapid response. We propose spending $900,000 a year for 5 years; at least half of which will be spent in Bangladesh and the rest by Harvard faculty and students. The actual disbursement organization will be chosen to minimize administrative and overhead costs. Either Harvard University or a special private foundation could be used for this purpose. In either case the same responsible fiscal practices will be pursued.

INITIAL HARVARD ARSENIC PROJECT PERSONNEL

**Harvard University**
Richard Wilson, D Phil, MA
Mallinckrodt Professor of Physics
David C. Christiani MD, MPH, MS
Professor of Occupational Medicine and Epidemiology
John D. Spengler Ph. D.
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**Dhaka Community Hospital**
Dr. Quazi Quamruzzaman, Chairman