



WATER & RISK

Editorial

Dear Colleagues,

the end of the year is coming soon, and as every year Christmas is arriving sooner than expected. But once again, and although there have been major changes in the staff of the WHOCC (see page 13), we made it: we are happy to present you with the 15th volume of our WHOCC Newsletter and we would again like to give our warmest thanks to the authors for their highly interesting contributions. In the current issue, we focus on water and health problems in some Asian countries.

We invited Professor Abha Lakshmi Singh from the Aligarh Muslim University, India, to give us an insight into the water supply situation of poor urban households in Aligarh City. Water shortage affects one third of the Indian population and thus it is the biggest crisis India is facing today. "For the urban poor life is a living hell", says Ms. Singh. Improvement of the water and sanitation infrastructure for the poor is therefore most urgently needed.

The Pasteur Institute in Lille, France is coordinating a project on the microbiological safety of drinking water in Uzbekistan and the Kyrgyz Republic. Dr. Dilorom Fayzieva from the Uzbek Academy of Sciences explains to us what the project, a follow-up to the French-Kyrgyz-Uzbek Micro Water Initiative, is all about. It is intended to establish ISO/WHO standards in the bacteriological analysis of drinking water.

Dr. Edith Fischnaller, chairwomen of the German NGO Cap Anamur takes us to Afghanistan, where as a consequence of the long-lasting war and the instable security situation the health system has substantial problems relating to the recognition, control and prevention of infectious disease outbreaks.

The issue will be completed by short reports from several conferences which took place in 2009: the biennial symposium of the IWA Health-Related Water Microbiology Group, the Cannes Water Symposium, and the International Symposium on Medical Geography.

We look forward receiving your comments, encourage you to contribute to future "Water & Risk" newsletters and wish you a happy, healthy and successful 2010!

Thomas Kistemann
Head, WHO CC for Health Promoting
Water Management & Risk Communication
IHPH - Institute for Hygiene & Public
Health, University of Bonn, Germany
Email: boxman@ukb.uni-bonn.de



Water for Poor Urban Households: A study of Aligarh City, India.

Introduction

Water shortage is the biggest crisis India is facing in terms of allocation and magnitude, affecting one in three people. One of the reasons for India's growing thirst is the rate at which the population, especially the urban population (285 million, Census of India, 2001), is increasing. By 2020, half of all Indians will be living in cities. Poor people will make up a large part of future urban growth. Much needs to be done if Indian cities are not to crumble further under the weight of teeming millions. By most standards, Indian cities rate among the lowest in the world; environment, infrastructure and quality of life all leave much to be desired (UWSS, 1997). Increasingly however, more attention is being paid by both academics and policy makers to aspects of urban life in India. One such issue concerns access to water in urban Indian households, in particular poor households. Local governments in urban areas across India are generally considered to be in extremely poor financial health, since their revenues are low and as a result investment and expenditure on urban services have suffered (Bajpai, P. and Bhandari, L., 2001). This leads to poor infrastructure and poor services in Indian cities. Water supply is one area where local governments have not been able to keep up with the increase in requirements of the growing population of the cities. Here an attempt has been made to examine how the poor urban households of Aligarh city obtain water for their daily requirements.

Study Area: Aligarh City

Aligarh (27° 53' latitude and 78° 4' longitude) is a medium sized city in North India located in the western part of the fertile Ganges plain. From the 1970s to the present, the city's area has doubled (from 33.45 to 68.97 km²) and its population has tripled (from 253,314 to 767,732). As a result of this, the demand for basic facilities especially housing, water and sanitation has increased tremendously.



The city's water supply

Infrastructure

Aligarh city depends upon ground water as the main source of its water supply. Nearly half of the city receives water from the municipal water supply while the rest obtains water using handpumps and private tube wells or submersible ground water pumps. The whole city has been divided into 17 zones to control the water distribution scheme. About 8 zones are served by the municipal water supply while in 9 zones water is obtained using handpumps and private tube wells. The municipality has installed 54 tube wells which either feed water to storage tanks (18 overhead and 5 underground tanks) for further supply, or supply water directly. Depending upon the capacity of the storage tanks, the water is distributed to only one or two zones (Aligarh Water Works, 2007). Water is likely to become contaminated in these storage tanks as they are not covered properly. Microorganisms like bacteria carried by insects, birds, lizards etc. pollute the water in these tanks.

A major portion of the municipal water is supplied by a 500 km network of water pipes. The pipes are old, prone to leakages and are submerged in sillage. Pores in the pipes serve as entry points for waste that carries germs, bacteria and raw sewage into the distribution network (Fig.1). During non-supply hours, the use of boosters, attached by the consumers directly to the municipality supply lines, creates a vacuum-like condition inside the pipes. This leads to the suction of waste into the pipes. In addition to the municipality's ageing pipes, the consumers' rusted pipes also add to the problem. Pipes should be replaced every 15 years to avoid contamination, but this is not done

Operation

The municipality supplies water twice a day, for about 2 hours in the morning and 2 hours in the evening. During the summer months, when the water level falls and there



Figure 1: Municipal water supply lines

are frequent power failures and also because of leakages in the water distribution system there is generally a water crisis (Fig.2). Consumers complain that they do not receive a sufficient amount of water. The users who are far away from the main pumping stations or storage tanks do not get adequate water pressure so they illegally install booster pumps in their homes to increase water pressure. There is also significant loss of water and pressure in the distribution system as a result of public water taps which are left running or where the public tap is stolen and the water keeps on flowing.



Figure 2: Ageing municipal pipes and consumer's rusted pipes

Water testing

Water samples for physical, chemical and bacteriological examination were collected from 10 sampled wards (the city is divided into 60 wards for convenience) in the city (Table 1). The water tested at these sites was found to be polluted in excess of the maximum permissible limits set by the Bureau of Indian Standards. It contained trace elements such as Fe, Cd, Pb, salts, pesticides and faecal coliforms from sewage. About 74% of the samples were found to be contaminated above the MPL (maximum permissible limit). The municipal water supply and handpump water were analysed for total bacteria and faecal coliform bacteria. The detection of faecal coliforms in water is confirmatory evidence of faecal pollution of human and animal origin. The municipal water supply is badly contaminated with sewage. The handpump water is qualitatively better. The municipal water is seldom chlorinated, although arrangements for chlorination exist. The reasons for contaminated water reaching the consumers tap can be summarized as follows:

- Contamination due to unhygienic storage in the municipal tanks
- Contamination due to leakage in distribution pipes

Aligarh's water has become a cocktail of trace elements, salt, sewage, pesticides, bacterial and faecal coliform – in short, poison.



Constituents	Indian Standard Institution (ISI) (1983)		Concentration in the Sampled Wards of Aligarh City					
	Highest desired level mg/l	Maximum permissible level mg/l	Average concentration in HP water	Minimum	Maximum	Average concentration in MS water	Minimum	Maximum
PH (Values)	6.5 – 8.5	6.5 9.2	7.4	7.12	8.2	7.6	6.97	8.32
Total Hardness	300	600	253	150	391	187.2	110	295
Chloride	25	1000	130.2	47	334	74.3	18	286
Fluoride	1.0	1.5	0.55	0.2	0.9	6.4	0.3	1.5
Copper (CU)	0.05	1.5	0.08	0.07	0.08	-	-	-
So ₄ (Sulphate)			113.5	75	200	85.5	45	160
Chromium (Cr)	0.05	No relaxation	0.15	0.12	0.18	-	-	-
Nickel (Ni)	0.02		0.06	0.05	0.09	-	-	-
Zinc (Zn)	5	15	0.87	0.27	2.1	0.47	0.13	0.92
Sulphate (So ₄)	250	400	113.5	75	130	85.5	45	160
Calcium	750	200 (absence of other sources)	55.3	13	90	43.2	19	72
Magnesium	30	-	187.7	113	294	140.6	83	255

Table 1: Drinking Water Standards and Average Concentration of Major Ions and Trace Elements in Handpump and in Municipal Water Supply from the Sampled wards in Aligarh City. Source: WHO, Guidelines of Drinking Water, 1998.

Water for poor households

Within Indian cities the distribution of resources is highly uneven. For a person living in a poor area, 30 litres of water a day is all one can expect. The sole source of water is either a handpump or a municipal tap shared by at least 50 other families (Fig. 3). The queue for water



Figure 3: Sharing municipal tap water

is a daily affair (Fig. 4). For someone living in an affluent area the daily demand for water is much more than 30 litres. Some residents actually enjoy more than 300 litres a day per person, depending on the area where they live. A filter takes care of drinking water quality by removing harmful bacteria from the precious liquid. There are at least 5 to 15 taps per family.



Figure 4: Queuing for water is a daily affair

There are good reasons to expect poor distribution and poor quality of water in the poorer areas. Environmental problems like bad water, bad sanitation, bad housing, garbage dumps, bad diet, poor health and disease are immediate and visible in the poor households. Water is something we take for granted because we see it everywhere. What we cannot necessarily see is the quality of the water or the hardships faced by the people. For these reasons it was considered worthwhile to examine the water supply conditions and the occurrence of water-borne and water-related diseases in the poor households of Aligarh city.

About 735 poor urban households (income < Rs. 3,000 per month, 1 US \$= Rs 47) were randomly sampled (Singh, A.L and Rahman, A., 2001). A survey on water-related health was conducted during 2006-2007 by administering a questionnaire. Women were mostly chosen as interview partners because fetching water, looking after the household chores, looking after the children and the family is considered to be women's work. Women have a better understanding of the household problems.

Data regarding household water supply and the occurrence of various waterborne and water-related diseases were compiled with the help of a questionnaire in which the following factors were taken into consideration: (i) source of water supply (private/public), (ii) state of water (regular/not regular), (iii) amount of water supply (sufficient/not sufficient), (iv) mode of water storage in the house (in open/closed containers), (v) quality of water (satisfactory/not satisfactory) and (vi) occurrence of various waterborne and water-related diseases like diarrhoea/dysentery, jaundice, typhoid, worms, gastroenteritis, cholera, skin diseases, conjunctivitis and malaria during the previous year (yes/no).

Family characteristics showed that most of the respondents had a low educational level (14%) and both the parents and even children worked either as daily wagers or undertook small jobs. More than 3 families, comprising 11 to 15 members and sometimes more than 15 members, were found to be living in 1 multipurpose room where they cook, bathe and sleep. This overcrowding in the home results in a strain on space for sleeping, food, water and sanitation..





Figure 5: Women washing utensils using roadside hand pumps

Nearly 81% of the households sampled fetch water from public sources i.e. either from roadside municipal piped water connections or from roadside handpumps, because they cannot afford to have a municipal piped water connection or handpump inside their houses. Traditionally a woman is supposed to wash clothes and dishes, cook food and look after the children (Fig. 5), all activities where water is essential. Fetching water between 2 to 7 times a day falls mainly on female family members. They typically carry at least 15 litres of water on their heads. This is strenuous, especially in summer. Females reported that they have to walk 1 to 16 km per day to fetch water. Sometimes they have to stand for hours in long queues at the roadside to get water.

The respondents collecting water from the municipal pipelines reported that the supply was irregular; the amount was insufficient and not potable. The water was yellowish in colour, saline in taste, had a particular odour and also sometimes worms also came out of the pipes with the water. Sometimes the residents break the pipes and collect water directly from the underground portion of the pipe and in this procedure dust particles, bacteria and insects are collected with the water (Fig.6).

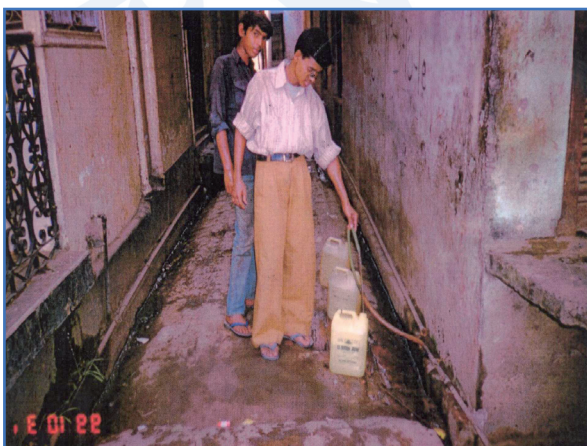


Figure 6: Residents break the municipal pipes to fetch water

The quality of water from the public handpumps was also not satisfactory because these handpumps are drilled only 20 to 30 ft. deep (Fig. 7). The water quality is directly proportional to the depth of drilling. The upper strata of the earth absorb the waste water from sewage tanks and thus contain polluted water. Boiling water for drinking



Figure 7: Roadside hand pumps are another source of water supply in poor areas



Figure 8: Water contamination due to the unhygienic location

purposes was not practiced in these households because of poverty, illiteracy, time scarcity and also because of the common perception that the overall water quality is tolerable. These people are not aware of the health risks involved in using contaminated water (Fig. 8).

Because of the irregular supply and scarcity of water the respondents reported that they had to store water inside their homes. They stored water in open containers such as barrels, cans, pots, buckets of various sizes and drums. These households are again facing risks due to water contamination in the home from open containers and a large number of hazardous dust particles from roads and nearby industries causing various waterborne diseases.

Water contamination in the poor households is caused by:

- Using water from public sources
- Storing water in open containers inside their homes

Occurrence of waterborne / water-related diseases in the poor urban households

Human health is affected by the ingestion of contaminated water either directly or through food and by the use of contaminated water for personal hygiene and recreational purposes. The rich do not suffer because they have





Figure1: UZ-team
Members of Uzbek team Dr. Dildora Makhmudova and Ms. Dilfuza Rakhmedova



Figure2: KGZ-team
Kyrgyz team members Dr. Elena Ten and Dr. Cholpon Mambetalieva during the training

The project is a follow-up of the French-Kyrgyz-Uzbek MicroWater Initiative which began during the visits of Dr. Tristan Simonart from the Pasteur Institute to Central Asia in 2003-2004. The mission in 2003 was focused on the examination of laboratories analyzing microbial drinking quality in the cities of Tashkent, Samarkand, Bukhara, Nukus, Urgench and Andijan and on capacity building aspects. Subsequently several workshops were conducted in different provincial laboratories providing information on the European Drinking Water Directive and similar regulatory documents and quality assurance procedures as well as facilitating an exchange of experiences with the laboratory staff. The second mission to Tashkent, Bishkek and Almaty was a first step towards the cooperation of Central Asian countries to ensure the microbial safety of drinking water.

The project with the working title of NATO Drinking Water Project intends to set up the ISO/WHO standards and requirements for quality assurance procedures in the bacteriological analysis of drinking water. The objectives are:

- a) a comparative study of national drinking water microbiological monitoring regulations with international ISO/WHO standards,
- b) the organization of centralized training courses at the Pasteur Institute for laboratories on microbiological ISO standards for drinking water and ISO 17025 qual-

- ity control accreditation requirements,
- c) the transfer and implementation of international standards in the national reference laboratories,
- d) the evaluation of performance through proficiency testing using inter-laboratory trials between two national reference laboratories in Central Asia and
- e) finally, a comparative study of bacteriological quality of drinking water samples, using both national and ISO standards.

In July 2008, 12 participants from Uzbekistan (7) and Kyrgyzstan (5), representing water bacteriology laboratories at the Republican Center of Sanitary Epidemiological Surveillance (SES) in Tashkent and the Bishkek Center for State Sanitary-Epidemiological Surveillance, as well as research organizations such as the Scientific Production Center for Preventive Medicine of the Health Ministry of the Kyrgyz Republic and the Institute of Water Problems of the Academy of Sciences of the Republic of Uzbekistan were trained at the Pasteur Institute on international standards of drinking water microbiology and on the ISO 17025 guidelines for laboratory accreditation.

The goal of this activity was to increase knowledge and to improve the skills of the laboratory staff in Uzbekistan and Kyrgyzstan to enable them to further implement international approaches and methods (ISO standards and the European Directive on Drinking Water 98/83/EC) for performance of microbiological analysis of drinking water and quality assurance and quality control procedures.

The 10 day training course comprised lectures on the microbiological quality of drinking water covering topics such as: regulations for the quality of water supplied to consumers, quality control procedures, internal quality control, monitoring of the microbiological quality of drinking water and the microbiological analysis of water from different sources. In addition, practical exercises on the process of sampling, media preparation, methods in



Figure3: Training_IPL
French, Kyrgyz and Uzbek teams during the training at the Pasteur Institute in Lille, France



use and the interpretation of results were conducted by microbiologists and laboratory technicians. The training material which was developed by the training staff included schemes for the microbiological analysis of drinking water in accordance with the EC Directive and international regulations and was presented to the participants.

During the training program laboratories with the capacity to analyze sludge and sewage water and for legionella bacteria were visited and information on modern equipment, as well as software for the control of sample registration, media preparation and on maintaining appropriate laboratory conditions was provided. It is expected that this training experience will be implemented in the two national laboratories of the Central Asian Region, inter alia for microbiological analysis of water on the basis of international approaches and ISO 17025.

The future emphasis of the project will seek to enhance knowledge in Kyrgyzstan and Uzbekistan about the quality assurance methodology for microbiological analysis of drinking water adopted in the European Union. Capacity building in this field will be extremely useful for managing and securing the drinking water supply, thereby improving the environmental security and water resource management of the region. Training and workshops conducted during the project will increase the capacity of the laboratory staff of both research institutes and practical public health services of the two republics. Equipping laboratories with mod-

ern analytical equipment will ultimately result in an increase in knowledge and skills and lead to higher quality and validity of the monitoring data. This comprehensive comparative Central Asian-European project creates the technical and scientific background for the implementation of regulations and (ISO) standardization of drinking water practices in Central Asia.

Acknowledgements

The author and the project partners would like to thank the NATO Science for Peace Program for grant no. 982811. Our gratitude is extended to the Department of International Cooperation of the Ministry of Foreign Affairs of France and the Embassy of France in Uzbekistan for assistance and funding of the field missions in 2003 - 2004 and for their support in preparation of project proposal. Furthermore, we would like to thank the Ministry of Health of the Republic of Uzbekistan for arranging meetings and workshops in different provincial laboratories during the visits of experts from the Institute of Pasteur in Lille to Uzbekistan.

Dr. Dilorom Fayzieva,
 Institute of Water Problems,
 Academy of Sciences of the Republic of
 Uzbekistan
 E-mail: dfayzieva@gmail.com



Crimean-Congo haemorrhagic fever – an outbreak in Herat Province, Afghanistan

Background

Crimean -Congo haemorrhagic fever (CCHF) is a viral zoonosis, which occurs in many parts of Asia, Africa and South-Eastern Europe. Multiple outbreaks and individual cases have already been described in medical literature. Sometimes individual nosocomial transmission occurs (1, 2). The latest outbreak report originates from Turkey (3). An earlier CCHF outbreak with 25 infections (4) in Herat Province in Afghanistan was reported by the WHO in 2000.

The virus is usually transferred through bites by Hyalomma ticks . The natural hosts of the virus (RNA virus, Genus: Nairovirus from the family Bunyaviridae) are wild, commercial and also domestic animals, such as sheep, goats and cattle. These animals do not suffer from CCHF, but rather function as an intermediate host. Humans having contact with these animals are at a higher risk of infection. Aside from tick bites, transmission of the virus can take place through blood and also contact with fresh meat/animal products (for example, during the slaughter of animals). Often the illness is mild with only few or no symptoms. Transmission from humans to humans and/or nosocomially is rare, but is however frequently associated

with more severe symptoms and a increased mortality rate, probably caused by a higher level of exposure to the virus (1, 2, 5, 6)



Fig. 1: Hyalomma marginatum marginatum
 Source: PD Dr. Michael Faulde (Federal Armed Forces, Koblenz, Germany)



Outbreak 2008

An outbreak of CCHF occurred between July and September, 2008 in Herat Province (Afghanistan).

The numbers and outbreak dynamics are based on information provided by the Af-ghan Ministry of Health, Herat Province and the DEWS Surveillance Department (Dr. Akbarian) on 9 September, 2008. The data were given to the German NGO Cap Anamur (chairwomen: Dr Edith Fischnaller). Cap Anamur operates in Herat Province and was asked by the health authorities of Herat for support.

At the time the report was issued the outbreak comprised 19 confirmed cases. The first person with a laboratory-confirmed illness was an in-patient in the Herat hospital on 11 July, 2008. The 33-year old housewife from the Zandajan district worked on a private animal farm and was stung by a tick. The first symptoms appeared on 3 July, but positive confirmation of CCHF occurred only after her death on 12 July.

Up until 9 September a total of 19 cases were isolated with confirmed infections or on suspicion of CCHF in the Shaidayee children's hospital. Prior to the outbreak the children's hospital was still under construction and not yet operational.

6 cases were laboratory-confirmed (IgM ELISA) and

13 cases were high-grade suspected cases in accordance with the WHO definition. They were also provided with Ribavirin therapy due to nature of their symptoms. For the 13 suspected cases the laboratory results had not been delivered at this stage. Two cases of the illness were probably a result of person-to-person transmission. It is highly probable that a nurse caring for a patient with suspected CCHF at the hospital in Herat was infected through nosocomial transmission. A second person, a relative who had intensive contact with an infected patient in the hospital, also suffered mild symptoms (head-aches) and was subsequently tested positive and treated with Ribavirin.. All other patients were either bitten by ticks (3 cases) or had contact with animals during slaughtering (9 cases) and so direct contact with blood and/or meat of infected animals. In 8 cases the transmission route was unknown. Due to the severity of their symptoms the 22 infected people were all treated with Ribavirin.

Five patients died during the outbreak, seven recovered and were released from hospital, three were released from hospital on their own request and at the time of reporting seven were still receiving treatment. Of these latter ten, the outcome of the illness is not known.

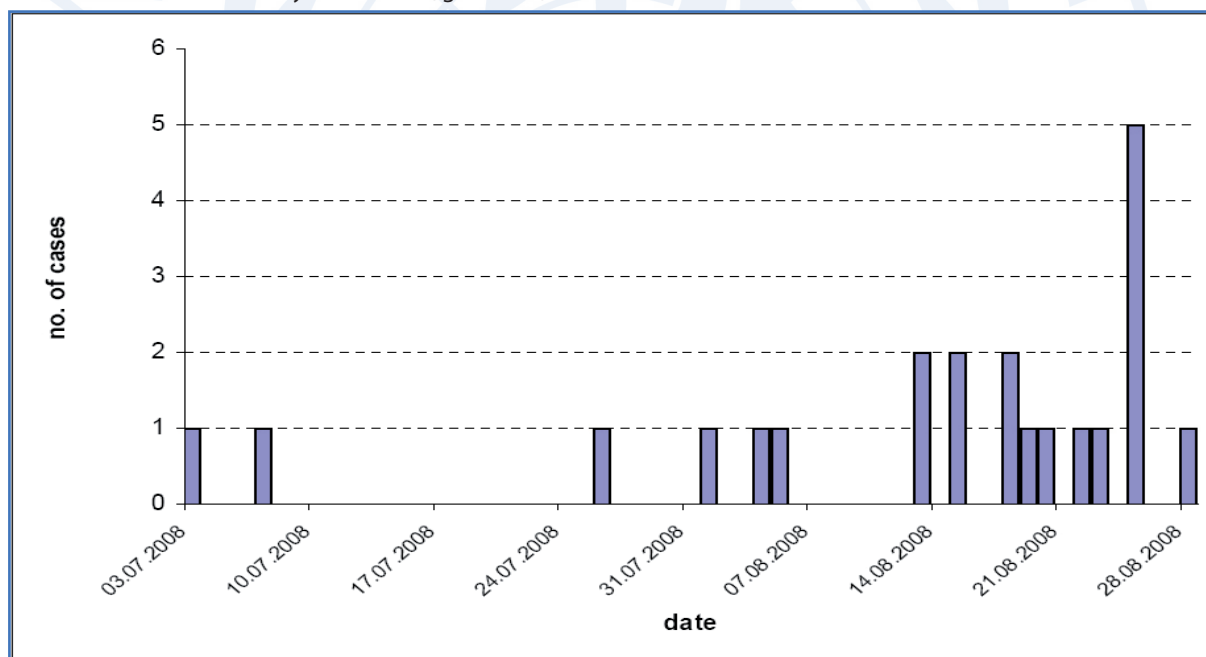


Fig. 2: Number of patients infected during the outbreak in 2008

Source: Ministry of Health, Herat Department, 2008

Outbreak management of the local authorities

During the outbreak the local outbreak management team of the Ministry of Health in conjunction with NGOs co-ordinated tasks and developed a plan of action comprising:

- surveillance, registration and identification of contacts
- passing of information to the Ministry of Health in Kabul and to the WHO (according to International Health Regulations) (7)
- laboratory tests and forwarding of samples for additional diagnostics

- training and briefing of medical personal (government hospitals and private hospitals)
- training of local butchers and slaughtermen in the hygienic handling of meat and the use of protective gloves and clothing
- opening and equipping of an isolation facility in the as yet unopened Shai-dayee hospital. (The hospital was built by the Italian government and army (Italian Co-operation) outside the city and is quite far from the government hospital)
- transfer of necessary medical and other personal from the government hospital to support the patients in isolation in the Shaidayee hospital
- provision of Ribavirin by NGOs



- supply of 332,000 doses of Evermethrin, by the FAO (Food and Agriculture Organisation of the United Nations) for the prevention and treatment of animals with ticks and application by the veterinary centre. The results of this action are under discussion.

During the outbreak the local health authorities identified the following difficulties in outbreak management:

- lack of isolation facilities for barrier nursing in all hospitals throughout the country
- lack of trained and qualified medical personnel, in particular for illnesses requiring isolation
- lack of medical equipment
- lack of guaranteed supplies of appropriate medicines, particularly Ribavirin
- lack of intensive-care facilities
- inadequate supply of drinking water and correct and safe sanitation in the Shaidayee hospital, throughout the entire province and in other hospitals
- lack of laboratory equipment and laboratory personnel to perform local analysis
- insufficient networking of the local public health services
- reduced security situation for the health workers, patients and their relatives.

Conclusion

The outbreak characteristics and its consequences for international health are manifold. In the outbreak described, the mortality rate was about 26% which is within the range of 10-50% as described in medical literature (2).

The Afghan health system has substantial problems relating to the recognition, treatment and prevention of such outbreaks due to the instable security situation in the country. For many years the health system has been unable to provide adequate health care across the country as a whole. As the outbreak presented here, together with the response of the local authorities shows, response procedures do exist. However the implementation of these is often difficult due to the personnel, structural and hygiene infrastructure, as well as to the generally difficult supply situation which exists in Afghanistan with regard to materials, medicines etc. The International Health regulations (http://www.who.int/csr/ihr/IHR_2005_en.pdf) are followed in Afghanistan; even though there are problems in their practical implementation.

The risks for international health are evident. Adequate treatment and isolation facilities are not available all over the country. It is recommended, in the context of development assistance in Afghanistan, that hospital design should include isolation capabilities, as well as human capacity building comprising training on hygiene, including infection prevention. For security reasons only very few foreign NGOs are able to work in Afghanistan in the medical field even though the International Security Assistance Force (ISAF) is present in the provincial towns.

Recommendations for the self-protection of travellers

Knowledge of local infection risks is critical in order to make adequate preparation possible for travellers and members of international missions to Afghanistan. The following preventative measures must be considered:

- wearing impregnated clothing and substantial footwear and avoiding exposed skin (particularly on the legs) when going into the field
- use of insect repellents
- routine examinations for ticks and their correct removal (not with unprotected hand, not by crushing)
- procurement of information over the epidemiological outbreak situation and the endemic occurrence in the region (increased occurrence of ticks in the spring and autumn)
- when possible, avoidance of direct handling of animals where increased risk exists. Where this can not be avoided, then only with appropriate preventive measures
- no handling of blood or fresh meat. If unavoidable, appropriate protection and disinfection measures
- medical travel precautions according to the local infection risks
- obtaining guarantee from employers of medical evacuation possibilities, including those when the patient is in isolation.

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Dr. med. Edith Fischnaller
Institute for Hygiene and Public Health
University of Bonn
edith.fischnaller@ukb.uni-bonn.de



15 th International Symposium of the Health-Related Water Microbiology Group, 31 May - 5 June 2009 , Naxos, Greece

In spring 2009, the small island of Naxos, Greece was captured by a few hundred water microbiology scientists. Venue for the conference was the restored 17th century Ursuline school (converted into a modern conference centre). Nowadays, this school serves as a modern conference centre, which is located within the walls of the medieval Venetian castle of Naxos old town.

From May 31st to June 5th 2009 researcher working on water technology or hygiene from over 40 countries around the world took the opportunity to present their projects and inventions during the 15th HRWM specialist group symposium. Main topics were:

- Water pollution and diseases,
- Microbial behaviour in the water environment,
- Detection, identification, and source tracking of microbial contaminants
- Water/wastewater treatment and disinfection,
- Epidemiology of waterborne diseases,
- Biofilm studies,
- Microbial risk assessment and management,
- Recreational water, tourism and health,
- Climate change and water quality,
- Water quality in locations with water shortage,
- Solar disinfection and
- Waterborne nosocomial infections.

Beside the approx. 90 lectures, expert discussions were inspired by about 240 poster presentations. The Institute of Hygiene and Public Health from the University of Bonn was represented by a lecture about "Practical experiences with the treatment of black and grey water

within a modular treatment plant to produce microbiologically safe reusable water" by Andrea Rechenburg and two poster focussing on antibiotic resistances of bacteria in aquatic environments (Christiane Franke) and pathogens in septage in Vietnam (Vo Thi Yen-Phi). Aside from scientific work, the greek organiser took care that the participants got the chance to explore the Greek way of life. The conference started with a welcome reception under the temple of Apollon at sunset and at the end of the week the gala dinner in a traditional tavern was a great finale. During the week excursions were offered to explore Naxos town, the island and its surrounding.

As the HRWM group is quite active, there is a HRWM newsletter about the conference available (http://www.iwa-microbiology.org/uploads/hrwm_newsletter_july_2009_special_issue_001.pdf) and

the conference website (www.watermicro2009.gr) is still online.

We enjoyed to meet colleagues and friends, got new ideas for our work, loved the food, got sunburned, exhausted, but happy, after an exciting week and look forward to Roturoa.



Christiane Schreiber
Institute for Hygiene and Public Health
University of Bonn
Email: Christiane.Franke@ukb.uni-bonn.de

Cannes Water Symposium Workshop 30 June - 2 July 2009, Cannes, France

During the "11th Cannes Water Symposium 2009" a workshop was organized at the the invitation of Mr. Villerot (Suez Environment). It gave PhD students from

different countries the opportunity to present their PhD theses and discuss them with professors and students from other universities. 16 theses from 10 universities in



Fig.1 Participants of the Cannes Water Symposium Workshop.

France, Germany, Great Britain, Switzerland and Spain were presented. The main focuses were on microbiology, chemistry, toxicology and epidemiology related to the environment and drinking water. The presentations were spread over two days and four presentations with high relevance were chosen to be presented in an opensession during the Cannes Water Symposium.

Six presentations from Germany represented the research project: "Biofilms in household installations", which is financed by the German Federal Ministry



of Education and Research. Previous investigations by the research facilities involved showed that contamination of drinking water was often caused by biofilms in household distribution systems. The Institute for Hygiene and Public Health of the University of Bonn is engaged in two different sections of this project. The first section aims to determine the health risks from drinking water contamination for the consumer. This includes the analysis of drinking water quality data from German buildings which have been collected by local health authorities. The second section seeks to verify the efficacy of drinking water disinfectants and the development of behavioural guidelines in cases where there is damage to distribution systems.

Some presentations focused on the detection and elimination of healthcare relevant bacteria such as *Helicobacter pylori*, *Cryptosporidium* spp. or viruses (Adenovirus). Others considered the role of chemicals such as perfluorated compounds (PFOA, PFOS) or chloramines in water in the environment and their relevance to human health when they occur in drinking water.

The most significant message to come out of the workshop was that the handling of drinking water was different for country to country in Europe. This workshop should be used to improve and extend interfaces between the countries' approaches with regard to drinking water. A periodic exchange of experiences and opinions between the participating universities can lead to a consistent exchange of knowledge related to drinking water. One target for a follow-up workshop should be to invite participants from other countries to gain a view on the approach in these areas.

It is planned that some presentations will be published

in the "International Journal of Hygiene and Environmental Health".

It remains to say that very productive discussions were enjoyed by the participants in the workshop. The beautiful location facilitated informal discussions and networking in a very conducive atmosphere. The group of PhD students was heterogeneous and they were also able to profit from being at different stages in their theses.

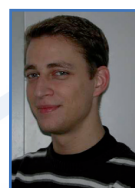
Johannes Lenz

Institute for Hygiene and Public Health; Bonn,
Disinfectant testing Department
E-mail: Johannes.Lenz@ukb.uni-bonn.de



Stefan Linke

Institute for Hygiene and Public Health; Bonn,
Disinfectant testing Department
E-mail: Stefan.Linke@ukb.uni-bonn.de



Sebastian Völker

Institute for Hygiene and Public Health; Bonn,
Medical Geography and Public Health
E-mail: Sebastian.Voelker@ukb.uni-bonn.de



The 13th International Symposium on Medical Geography (IMGS), McMaster University, 12-17 July 2009, Ontario, Canada

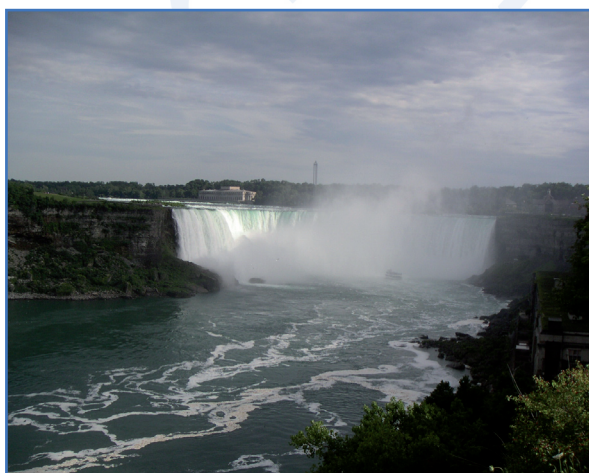


Fig.1 Canadian Falls

'Changing Environments, Changing Health' was the theme of this symposium, in which 170 papers on recently completed and ongoing research on a wide range of issues pertaining to environment and health were presented. The scientific sessions covered topics relating to environmental influences on health, risk perceptions, health inequalities, health of minority and special groups, rural health, urban health and behaviour patterns influencing health.

The papers presented on the environment highlighted the visual qualities of landscape and the role of beauty and our fascination with the environment on health. Neighbourhoods and micro-ecological factors underlying areas of higher health risks were underscored. Health inequalities at local and international levels were highlighted throughout the symposium. At the international level, people from rich nations move



to poorer countries for expensive operations, while the rich from poor countries move to the richer nations for medical care. The neglect of environmental hazards affecting poor countries was also stressed. At the local level, healthier people move out of deprived areas, leaving the less healthy in the lower quartiles who continue to be marginalised in health provision. Participatory development, strengthening communities and working beyond research were seen as the key factors needed to address these inequalities.

The de-institutionalisation of health care from the hospital was presented as a factor contributing to changing geographies of health care in developed countries. Consequently, the private space of the home becomes a place of institutionalised health care, as medical personnel continue to attend patients at home and medical equipment may also be installed in homes. Family members become "professional" care givers. Income benefits for family care givers become necessary, in particular when the carer has to leave their job to take care of a terminally ill patient.

Methodologically, a high level of skill in combining quantitative, qualitative and spatial tools was apparent. The use of GIS techniques in designing, collecting, analysing and presenting qualitative and quantitative research was evident even in studies of a descriptive nature. The presentation of papers applying GIS techniques in participatory studies involving communities and children was an indication of the penetration of spatial methods into qualitative research.

The cultural programme involved a full day field trip to Niagara Falls, appealing to the geographers' love for nature. Stopping at the Jackson Triggs winery along the way, participants enjoyed the scenery of some of the most beautiful vineyards in the world. The climax of the tour was a boat ride on the "Maid of the Mist" around the falls, which proved to be a spectacular and unforgettable experience!

The 13th IMGS saw some major landmarks in the history of medical geography, with the first formal annual general meeting and presentation of awards for the best Master's and PhD student presentations. The symposium left participants looking forward to the next symposium at Durham University in the United Kingdom in 2011. As a take-home message, presenters raised the challenge of moving research findings into actions. Perhaps one way of doing this is to communicate research findings in a way that can influence public opinion, a powerful tool to drive political will and change.

Sophia Githinji
Institute for Hygiene and Public Health
University of Bonn
Email: Sophia.Githinji@ukb.uni-bonn.de



Events on Water, Health and Risk Communication:

January 2010

15. Session of the Commission for Climatology (WMO Branch: Climate Prediction and Adaptation)
20-29 January 2010 (dates tentative)
Turkey
http://www.wmo.int/pages/meetings/index_en.html

March 2010

2nd International Conference on Integrated Water Resources Management and Challenges of Sustainable Development (GIRE3D)
24-26 March 2010
Agadir, Morocco
<http://www.fsa.ac.ma/gire3d/index.php?lng=en>

Joint SAC/SEPA Biennial Conference 2010: Climate, Water & Soil: Science, Policy & Practice
31 March - 1 April 2010
Edinburgh, UK
www.sac.ac.uk/sacsepaconf

September 2010

IWA World Water Congress and Exhibition
19-24 September 2010
Montréal, Canada
<http://www.iwa2010montreal.org>

October 2010

CCGW 2010 : „International Conference on Climate Change and Global Warming“
Venice, Italy
27-29 October 2010
<http://www.waset.org/wcset10/venice/ccgw/>

2011

July 2011
34th Biennial Congress of the International Association of Hydraulic Engineering and Research (IAHR)
26 June-1 July 2011
Brisbane, Australia
<http://www.iahr2011.org/>

August 2011

WaterMicro 2011 (HRWM specialist group of IWA)
September or October 2011 in Rotorua, New Zealand
http://www.iwa-microbiology.org/uploads/hrwm_newsletter_july_2009_special_issue_001.pdf



The WHO CC Bonn thanks all readers and contributors for their commitment in 2009 and sends Season's Greetings and best wishes for 2010!



Christoph Höser, Ina Wienand, Thomas Kistemann, Andrea Rechenburg, Christian Timm (left to right)

In the course of 2009, the team of the WHOCC office experienced major changes. After five extremely successful years, Dr. Susanne Herbst left the position as WHOCC's executive manager. Also Oksana Krämling, Yvonne Walz and Miriam Zeh resigned. We are very grateful for their important contributions to the office's work within the past years.

Dr. Andrea Rechenburg took over the management during September 2009. Christoph Höser joined the team as a senior researcher in October 2009, whereas Christian Timm started to work as student assistant already in February 2009.

Imprint:

Publisher:

WHO Collaborating Centre for Health Promoting
Water Management and Risk Communication
IHPH - Institute for Hygiene and Public Health
University of Bonn
Sigmund-Freud-Str. 25
53105 Bonn, Germany
Phone: +49 (0)228 - 287 19515
Fax: +49 (0)228 - 287 19516
Web: <http://www.whocc-bonn.de>

Editors: Dr. Susanne Herbst, Dr. Andrea Rechenburg, Prof. Dr. Thomas Kistemann, Prof. Dr. Martin Exner

English copy editor:

Helen Hanimann-Robinson, Forch, CH

Layout:

Yvonne Walz, Christian Timm

Contact:

whocc@ukb.uni-bonn.de

Contributions reflect the opinion of the authors and are not necessarily in correspondence with the position of the WHOCC

