

Glimpse

cholera research laboratory NEWSLETTER

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(Compilation)

ICDDR,B ESTABLISHED

The President of the People's Republic of Bangladesh has promulgated an Ordinance to establish the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). The ICDDR,B a new institution derived from the Cholera Research Laboratory.

THE CHOLERA RESEARCH LABORATORY

What has been done?
What has been achieved?
Where is it going?

The three questions in the title are commonly asked about the CRL not only by outsiders but also by those of us in the institution. The questions are particularly pertinent at this time as the CRL is undergoing a transition from a short-term research project to an International Centre for Diarrhoeal Disease Research, Bangladesh. Obviously these questions have been carefully considered for over two years by governments, international agencies, as well as an international Scientific Review Meeting with massive documentation that can hardly be provided here. Further we assume the readers of this paper are active people, not looking for comprehensive reviews but interested in useful information.

Thus we have decided to give you a **GLIMPSE** of the CRL. The dictionary says a "glimpse" is a



Dr. Krishnomurti and Dr. Ilyas, two doctors from Fakultas Kedokteran Universitas, Gadjah Mada, Bagian Mikrobiologi, Yogyakarta, Indonesia are receiving training in Microbiology Branch of CRL (ICDDR,B).

Deputy Director CRL Appointed WHO Regional Representative for Participation WHO Intercountry Consultation in Rangoon, Burma

Dr. M. M. Rahaman, Deputy Director, CRL, has been appointed Temporary Advisor for Participation in the WHO Intercountry Consultation, Rangoon, Burma, to develop a regional programme on Diarrhoeal Diseases, for the World Health Organization. He will be responsible for giving scientific guidance on all regional projects in consultation with other experts.

transient and often imperfect view. This will no doubt be the case here but we hope that through this monthly publication you can get to know who we are, what we do and more particularly, how

we might relate to those of you sharing a common interest and concern with health matters.

What has the CRL done? A rapid overview is obtained by glimpsing at the recent publication "**Index to CRL Publications and Scientific Presentations, 1960-1976**" (available free of cost on request). The 479 papers listed cover not only cholera and diarrhoeal disease but topics ranging from blue-green algae and anthropology to demography and malnutrition. These papers covering 16 years were produced by 216 scientists, 86 (40%) of whom were Bangladesh nationals.

But this is all very academic. So what has been achieved that is significant and useful? All the accomplishments of 18 years cannot

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Special Training at CRL

The members of "Tropical Medicine Society of Kyushu University" at the Medical Department of Kyushu University had a rare and precious opportunity of securing training in the study of diarrhoeal diseases including cholera at CRL from the 18th to the 26th of August, 1978. Japanese medical students had long acquired knowledge of such tropical diseases from their textbooks, and they have had very few chances of studying actual cases of cholera and dysentery. There have long been no cholera cases reported in Japan except the ones brought in from abroad.

Our main activities had been to provide medical services for people in doctorless villages on the isolated islands of Okinawa in the southernmost part of Japan, and to study the medical conditions in Manila while exchanging opinions with the medical students of the Philippines.

We knew that CRL in Dacca was the best place for our activities. The training we received at CRL was in accord with this very purpose. Dacca CRL was indeed a world-centre for field work on such infectious diarrhoeal diseases. We had read and studied all the reports published every year by Dacca-CRL on their excellent research.

I wish to express my deepest thanks to all the members of CRL

for having provided us with the most significant chance.

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the CRL may be providing diarrhoeal services for a population approximating one million.

2. Village-based health and family planning services have been started in a population of 80,000 people. This programme has evolved from a contraceptive distribution project. In addition to family planning, a neonatal tetanus immunization programme and oral rehydration field trial are being implemented. Other health services will be introduced over time.
3. The physical plant at Matlab has been improved with the construction of the first floor above the Government portion of the Rural Health Centre. The CRL portion of the rural health centre now consists of the entire southern wing of the building. Services are provided on the ground floor and research activities are on the first floor.
4. A Rural Treatment Unit for diarrhoeal disease was also

constructed. This building, made of inexpensive materials, is staffed entirely by CRL paramedics. The unit will be utilized as a rural training facility by the Cholera Research Laboratory. At the present time, in all new diarrhoeal patients are screened in the Rural Treatment Unit and many receive treatment there as well.

5. Many exciting reasearch findings have assisted Matlab over the past year. Perhaps the most interesting is the finding that rotavirus—a virus which has been shown to cause disease in animals as well as among children in developed countries appears to account for a major portion of the diarrhoea of children between the ages of 6 and 24 months. This discovery will aid in the study of diarrhoea transmission and may promote the development of methods to prevent such infections. Other research findings include the usefulness of bactrim in the treatment of dysentery, the use of oral rehydration for rotavirus diarrhoea, the relationship between water use patterns and diarrhoea, patterns of fertility and mortality, and the importance of diarrhoea in causing malnutrition.



Nepalese Scientist Visits Cholera Research Laboratory

Dr. L. Poudayl, Chief Officer, Central Health Laboratory, Bir Hospital, Kathmandu, Nepal, visited the Cholera Research Laboratory from November 1 to November 3, 1978. Dr. Poudayl had discussions with various Scientists in CRL and visited CRL's field-area at Matlab on November 2, 1978. As a result of discussions between Dr. Poudayl and the Scientific Directors of CRL, it has been decided that trainees will be accepted from the Central Health Laboratory in Nepal in the near future.

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be summarized here. However, since the cholera season is now upon us it is worth reviewing what CRL has learned about measures for prevention and treatment—those which are useless as well as useful.

In terms of epidemic control the CRL has firmly established that currently available cholera vaccines are useless. Indeed an injection of cholera vaccine does increase somewhat an individual's resistance to cholera for a few months but it by no means guarantees protection if there is sufficient exposure to contaminated water. The only way to break the cycle of spread of the cholera germ is to prevent the infected stool of a case or carrier from entering water sources that will be used by people for any purpose. In rural riverine areas this is virtually impossible at this time since people traditionally defecate on the banks of canals, rivers or tanks and the latter are used for washing purposes. Thus the discharge of cholera germs into the water and their subsequent

spread is virtually guaranteed.

The most widespread misconception about cholera prevention is that the use of contaminated surface water from rivers, canals or tanks is harmless as long as one drinks protected tubewell water. The CRL has conclusively demonstrated that in this type of situation tubewell water gives essentially no protection from cholera. Tubewell water drinkers who use contaminated surface water for washing, bathing and other purposes inevitably will get some of this water—perhaps only a few drops in their mouths and will have the risk of contracting cholera as if they did not use tubewells at all.

The most important achievement of the CRL has been the development of a simplified method of cholera treatment which an intelligent person with a little training can implement and save lives over 99% of the cases. This was accomplished initially by the development of a single intravenous fluid—the Dacca Solution. This fluid is now produced and distributed nationally by the Government of Bangladesh. The real innovation however was the development of oral rehydration as a simple inexpensive measure to replace the salt and water losses in diarrhoea by mouth. Because oral rehydration treatment is useful for all types of diarrhoea its use has spread rapidly across the world. The significance of this development has been recently highlighted in an editorial in the international journal, "The Lancet" (August 5th, 1978) which states:

"The discovery that sodium transport and glucose transport are coupled in the small intestine, so that glucose accelerates absorption of solute and water, was potentially the most impor-

News and Views of Readers

Appropriate remarks, news or views by the readers will be considered for publication in this newsletter. However these remarks if intended for publication in this newsletter should not exceed 200 words.

tant medical advance this century. It opened the way to oral hydration treatment for severe diarrhoea the main cause of infant death in the developing world."

With reference to the future, there remain many unanswered questions about diarrhoeal diseases, particularly as we are now discovering the importance of new bacterial and viral agents in Bangladesh enterotoxigenic *E. coli* and rotavirus. More will be said about these in later issues. The greatest challenge now is taking the knowledge we already have about simple and effective treatment and working with agencies and institutions throughout Bangladesh. So this may be implemented nationwide. With this, deaths from cholera and other dehydrating diarrhoeas will become a thing of the past.

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The people of CRL have made major contributions to the basic understanding of diarrhoeal illnesses and have also translated this knowledge into methods of care and prevention that have benefitted thousands of people in Bangladesh. In the coming years, we look forward to continued leadership by the people of this institution in all areas of work related to diarrhoea.

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Advances in Diarrhoeal Research : The CRL in Historical Perspective

In November of 1962 when the first patient was admitted to the Cholera Research Laboratory (CRL), the then Pakistan-SEATO Cholera Research Laboratory, there were many misconceptions about cholera and little idea that there were many related illnesses. These errors were being propagated in the most distinguished textbooks and publications and had resulted in cholera patients dying at a rate of 20-30% of those affected even when they came under medical care. Furthermore, there was no insight into the larger groups of illness afflicting millions of people the world over with watery diarrhoeas, some equal in severity to cholera itself. In the short space of 16 years most misconceptions about how cholera is caused have been dispelled. Furthermore, from the research that has been done we know that many other episodes of diarrhoea are caused by bacteria which produce toxins (poisons) similar to the one secreted by the cholera vibrio.

Many people have asked what the use of this knowledge may be other than satisfying the curiosity of some scientists. The answers to this are quite simple. The first result of the application of modern scientific thoughts and measurements to the problem of cholera was to change the composition of the intravenous replacement fluid given to cholera patients so it matches that of the fluids lost. Secondly, since it was found that there was no damage to the intestine and no loss of blood products, then there was no need of transfusion, plasma, or elaborate drugs (all of which are expensive and often not available). The third result was to show that with a solution of proper composition given to match losses treatment could be provided by individuals with very little formal training. Deaths were reduced to near zero by these three steps which were applied at CRL by early in 1963. Next the importance of antibiotics in

shortening diarrhoea due to cholera was proven and this reduced the amount of intravenous fluids needed. Such treatment was successful but still expensive.

Based on a series of basic studies on the way the cholera vibrio causes diarrhoea a simple oral rehydration was developed that has revolutionized the treatment of diarrhoea all over the world. By mixing 8 teaspoons of sugar (or 4 of glucose) with one level teaspoon of salt (*labon*) and one of sodium bicarbonate (*khabsoda*) in one *seer* (liter) of water a solution that is highly effective in replacing fluid losses from diarrhoea may be prepared. If taken according to thirst and in sufficient quantity to sustain a good flow of urine, patients will have no complications of cholera and related diarrhoeas. In the ideal mixture potassium chloride is also present but by use of banana (*kala*), green coconut (*Dab*) or other fruits, potassium that is lost, can be replaced.

In the past several years new causes of diarrhoea has been discovered—rotavirus and a germ, **E. coli** which produces diarrhoea-causing toxins. Through continued research other germs which cause diarrhoea will be found. The importance of such research is to provide the basis for preparing effective vaccines. Both in cholera and other diarrhoeal diseases we expect effective vaccines will be found during the next decade.

Finally studies of the way people catch the germs which cause diarrhoea from their surroundings will lead us to find the best ways to take precautions against the spread of disease-causing germs. A prerequisite for practical measures of control is carefully gathered knowledge of how each kind of diarrhoea is transmitted.

Fundamental to prevention of diarrhoea is knowledge of how people can be kept in the best general health and nutrition to defend against diseases. Knowledge regarding nutrition and how general health affects the susceptibility to diarrhoea is most important.

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MATLAB FIELD STATION

Over the past year there have been many developments and changes in the CRL Matlab field station. The CRL programme, begun in 1963, covers 233 villages with a population of 280,000 people (1974). Research, training, and service activity are undertaken by a staff of over 400—most of whom are local residents.

The Matlab field station had been organized around three administrative branches: Field Surveillance, Hospital and Administration. To meet the needs of the changing scientific and service programme, these branches were consolidated in April 1978 and organized around programmes. Two of these programmes, Health Service, and Demographic Surveillance are considered core programmes, i.e., these involve basic activities essential for all research, training, and service functions of the field station. The Health Services Programme, (headed by Dr. Yunus as Physician-in-Charge and Mr. Chakraborty as Supervisor) operates the diarrhoea treatment hospital and family planning services in Matlab along with a village-based MCH-family planning programme covering a population of 80,000 people. The Demographic Surveillance Activities (headed by Mr. A. Sarder) involve the registration of all births, deaths, marriages and migrations in the study population.

The two other programmes are Special Studies (headed by Mr. M. R. Khan) and Administration (headed by Mr. Bejoy R. Saha). These four programmes undertake the implementation of a variety of research protocols, in addition to their service activities. Among the more outstanding activities that have taken place in Matlab over the past year are the following:

1. Over 20,000 patients have received diarrhoeal health services. Less than half of these came from the Matlab study population. The remainder came from thanas throughout Chandpur Sub-division. It is estimated that

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