# Hope for major advance in fighting world killer disease

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University of Leicester scientists are heading a worldwide research project which could revolutionise the diagnosis and treatment of diarrhoea in children in developing countries.

The four-year project, the results of which are now being piloted in four hospitals in India, will offer a means of identifying the two most deadly forms of the disease quickly, cheaply and with little training necessary for practitioners.

The implications for improving children's health could be enormous. Diarrhoea is a major killer in developing countries. World Health Organisation statistics indicate that more than 2 million people die each year from the effects of diarrhoea, most of them children under five years old.

Diarrhoea is caused by a range of bacterial, viral and parasitic organisms, and is usually spread by contaminated water and poor sanitation. Two particular bacteria , enteropathogenic E.coli (EPEC), which causes a persistent infection lasting more than 14 days, and Shigella, the cause of dysentery - are the most deadly in terms of killing children. They cause only 20% of cases of diarrhoea but result in 60% of deaths. It is these two killers - EPEC and Shigella - that the Leicester-led project is targeting.

Peter Williams, Professor of Microbiology in the Department of Genetics, and Leicester colleagues Uta Praekelt and Marie Singer, are

working with scientists at the Robert Koch Institute in Germany and Anna University in Chennai India, and with doctors at the Christian Medical College in Vellore, India, and at Gadjah Mada University in Yogyakarta, Indonesia.

Their project, called the European-Asian Challenge to Childhood Diarrhoea, or EACh-ChilD (because each child is precious!) currently receives funding of €1m from the European Union, but in its earlier stages it was supported by an Academic Links Scheme funded by the British Council and the Indian University Grants Commission.

Professor Williams commented: "All cases of diarrhoea look the same to start with, and children are usually given oral rehydration therapy, which is cheap and puts back fluids lost by diarrhoea. But disease caused by EPEC and Shigella does not usually respond to oral rehydration therapy. They are much more severe forms of the disease and even if they don't kill they can often inflict irreversible damage that interferes with the child's growth and development.

"Current practice in most Indian clinics is only to test for E. coli and Shigella if the child's symptoms have not responded to oral rehydration therapy by three days. The usual tests then take a further three days, by which time the disease may have progressed to a very serious stage. Our project has been to design a rapid method to identify these two types of the disease so that doctors can focus treatment immediately on those children who need it, before the damage is done.

"It's often said that, if a medical intervention costs more than US$½ it's not going to be viable in developing countries. Our test is quick, robust and cheap. At a workshop we held recently at Anna University, more than 30 people, ranging from technicians and students to clinical professors, had the opportunity to perform the tests with their own hands and see the results with their own eyes. They were very impressed!"

In the developing world it is not possible on cost grounds to give antibiotics to every child with diarrhoea, and in any case antibiotics would not work in every case. The Leicester test includes the facility to determine antibiotic resistance profiles quickly so that the correct antibiotics can be used.

With basic equipment donated by the EACh-ChilD project, the test is now being piloted in four hospitals in south India, one of which, the Government Children's Hospital in Chennai, is the biggest children's hospital in Asia. Once any further improvements are made following these trials, then Professor Williams expects the technique to spread round other clinicians in the region and elsewhere. His team has already received enquiries from the Gambia in Africa.

A commercial testing kit is currently being developed.

Source: University of Leicester