

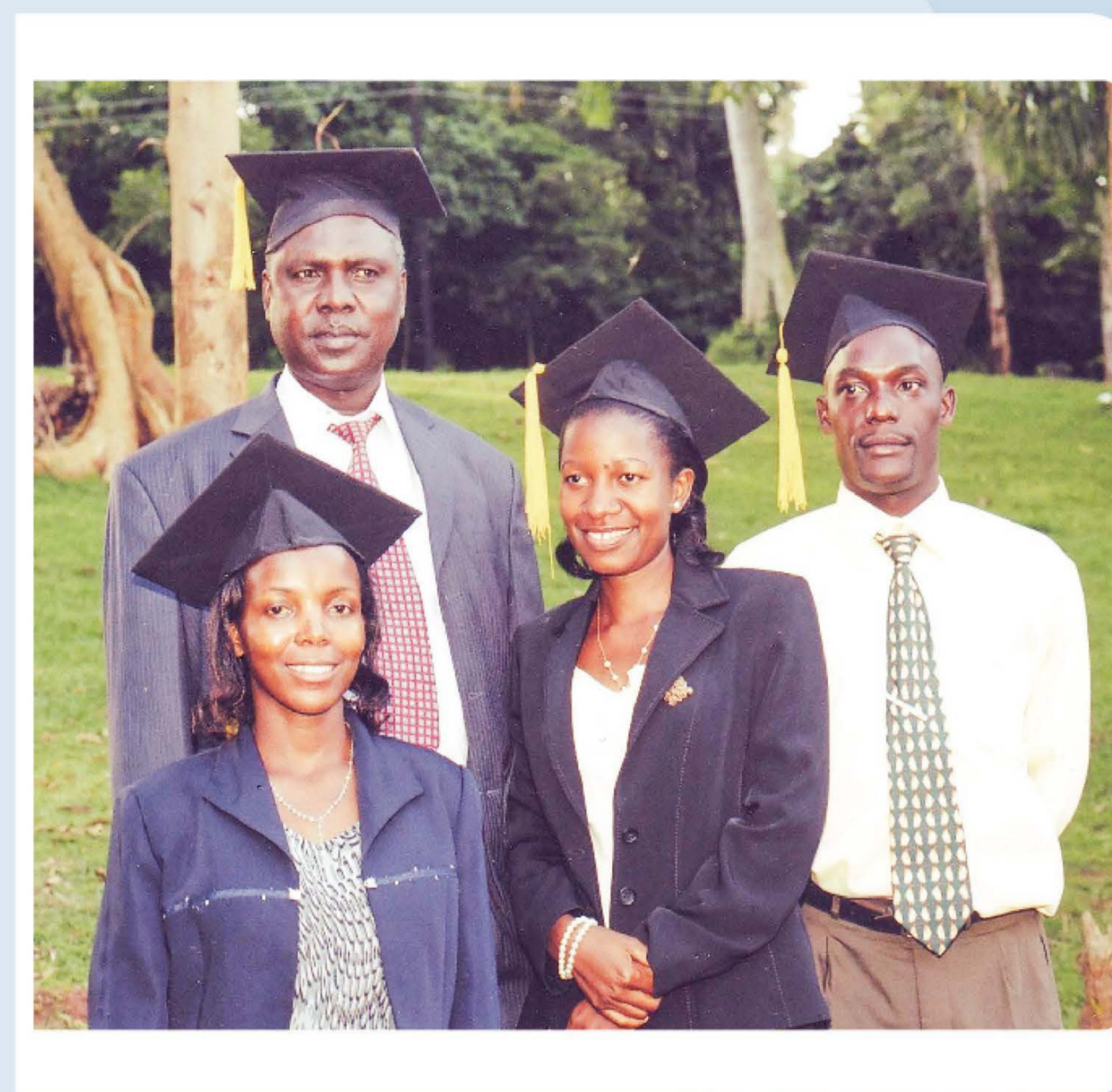


Capacity building

EMaBS has supported training for the research team. The projects had supported members for award of diploma, Bachelor's, Master's and PhD degrees

Appreciation:

Thanks to the participants' commitment and the tireless efforts of the study clerk and field team.



Funders

EMaBS has been funded mainly by grants from the Wellcome Trust and UKRI's Medical Research Council (MRC).

Major partners in Uganda include:-

- Entebbe Hospital
- The Division of Vector Borne Diseases at the Ministry of Health
- The MRC/UVRI and LSHTM Uganda Research Unit



The Entebbe Mother and Baby Study

The Entebbe Mother and Baby Study (EMaBS): the impact of helminths on the response to immunization and on the incidence of infection and disease in childhood in Uganda. A study that has cared for mothers and their babies for 20 years (2003 - 2023).



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Who

Pregnant mothers who visited Entebbe Hospital for antenatal care. 2507 mothers were enrolled into the EMaBS between 2003 and 2005 and 2345 live-born babies were born between April 2003 and April 2006. Many participants have remained dedicated to the work - 1622 (69%) participated at five years, 1214 individuals were seen at age 9 for assessment of allergy-related outcomes at school age. 1119 participated in the study on blood pressure at either 10 or 11 years of age and various groups of participants have taken part in new studies as teenagers, for example on vaccines and COVID-19.

Where

The research clinic is housed at grade A hospital where participants come for their treatment and routine follow-up



What

The Entebbe Mother and Baby Study (EMaBS): the impact of helminths on the response to immunization and on the incidence of infection and disease in childhood in Uganda. A study that has cared for mothers and their babies for 20 years (2003 – 2023).

How

The studies were designed as clinical trials. Half the mothers were treated with albendazole for roundworms, (especially hookworm) during pregnancy and half waited till after delivery.

Also, half the mothers were treated with praziquantel (for schistosomiasis [Bilharzia]) during pregnancy and half waited until after delivery.

Then half of the children were treated every quarter with albendazole (for worms like hookworm, roundworm and whipworm) between age 15 months and five years and half were just treated when worms were found in stool samples. The trial components were completed when children reached five years of age. Follow up of the cohort has continued from 2003 to 2023 – twenty years!

This has presented many additional opportunities to understand the impact of infection exposure on health outcomes.



Why

The EMaBS study aimed at establishing whether treating worm infections during pregnancy and early childhood improved the health of mothers and children.

We were especially interested in whether these treatments would help the babies respond better to the vaccines they are given between birth and one year of age.

Later on we also became interested in other effects of worms and their treatment, for example effects on allergy and on child development.



What we found

About treating worms in pregnancy

1. TREATING WORMS IN PREGNANCY SAFE.

The EMaBS study was the first time that using praziquantel in pregnancy had been properly tested and it was found to be safe. It can be given to pregnant and breastfeeding women. They can be included in mass drug administration campaigns for schistosomiasis

2. TREATING WORMS DURING PREGNANCY CAN HELP TO PREVENT ANAEMIA (LOW BLOOD COUNTS) IN THE MOTHERS.

In EMaBS we found this to be useful in mothers with heavy hookworm infections.

3. TREATING WORMS IN PREGNANCY AND EARLY CHILDHOOD HAD NO IMPORTANT EFFECT ON THE BABY'S RESPONSES OR INFECTIOUS DISEASES.

Earlier studies had suggested that infants of mothers with worms responded differently to vaccines and, even in EMaBS, children of mothers with hookworm seemed more likely to get malaria.

About Infections and cancer

INFECTIONS IN EARLY LIFE AND EXPOSURE TO MALARIA INCREASE REPLICATION OF KAPOSI'S SARCOMA HERPES VIRUS (KSHV).

KSHV is a virus which is very common in Uganda – almost everyone is infected when they are very young. The virus is transmitted in saliva. For most people this does not cause any problem, but for a few, especially people with untreated HIV infection, it can cause a type of cancer called Kaposi's Sarcoma (KS). We studied age of infection and markers of virus activity in EMaBS and found that earlier age of infection and exposure to other infections, including malaria, can increase the activity of the virus. This information may help researchers to find out more about preventing KS cancer.

About blood pressure in children

EARLY LIFE AND CHILDHOOD EXPERIENCES CAN INFLUENCE BLOOD PRESSURE IN LATER LIFE.

When they were 10 or 11 years old, over 1000 EMaBS children took part in a study about blood pressure. We found that raised blood pressure in children was more common in those.

- Whose mothers were heavier when pregnant.
- Whose family members had a history of high blood pressure.
- Who were born with low birth weight but grew rapidly after birth.
- Who had fewer whipworm, but more malaria, infections as children
- Who themselves were heavier for their height as children
- Who ate fewer vegetables and fruits

About vaccination in teenagers

1. BOOSTER VACCINATIONS FOR TB MAY BE USEFUL FOR TEENAGERS.

With the exception of COVID-19, tuberculosis kills more adults than any other infection, but we do not have a good vaccine to boost responses in teenagers. 66 EMaBS teenagers and 6 of their parents took part in a study to test a new TB vaccine booster combination for the first time in Uganda. This was the TB042 study.

2. UGANGAN CHILDREN FROM URBAN AREAS RESPOND BETTER TO VACCINES THAN CHILDREN FROM RURAL AREAS.

300 EMaBS teenagers took part in the POVAC C trial. POVAC stands for "population differences in vaccine responses." In this study EMaBS teenagers received vaccines against Yellow Fever, Typhoid, and Human Papilloma Virus, as well as boosters for Tetanus and Diphtheria. Half of the children received BCG before the other vaccines. EMaBS children responded more strongly to Yellow Fever, Typhoid, Tetanus and Diphtheria vaccines than children from rural Koome islands and rural Jinja district.

About COVID-19 in teenagers

EMaBS has been treating participants for various illnesses from birth until now, so during the COVID-19 pandemic we thought we would test participants for SARS-CoV-2 if they came when they were sick. Very few came to the clinic with COVID-19 symptoms and those that did tested negative. 500 participants, as well as the POVAC participants, have given samples to test whether they had SARS-CoV-2 infection at any time. Sample testing is incomplete but of those tested so far none was positive before the pandemic, but all were positive by December 2022.

Genetic studies in EMaBS

In about 2014, EMaBS participants and their parents agreed for genetic studies to be undertaken using stored samples. This has enabled analyses to be done combining EMaBS results with information from several other studies from different countries in Africa and also in other continents. So far this has shown

1. THAT MALARIA CAN CAUSE IRON DEFICIENCY. Previously it was known that there was an association between malaria and iron deficiency (low levels of iron in the body, a cause of anaemia or low blood levels). Genetic markers were used to prove that malaria causes iron deficiency by showing that genes that protect against malaria also protect against iron deficiency, but only in countries where malaria is common.

2. In work that we hope to publish very soon we found that some genes are very influential in how people respond to some vaccines. Understanding these genes can also help us to understand how we are protected against infectious diseases