its to the doctor. Among the approaches being pursued are the following:

- microencapsulation, in which injectable biodegradable "microcapsules" slowly release antigen in a way that mimics repeated injections (the first animal tests of this approach were begun in 1991); and
- live vaccine carriers, in which a live viral or bacterial vaccine serves as a carrier for a second vaccine when the genes that code for the protective component of the second vaccine are inserted into the genome of the currently available one.

The immediate goals of the Children's Vaccine Initiative are to develop a single-dose tetanus vaccine to improve coverage and eliminate neonatal tetanus; an improved measles vaccine suitable for administration early in life; and a thermostable oral poliovirus vaccine that will not need the "cold chain" now required to keep the current fragile vaccines effective during transport. At the meeting, Rotary International, as part of its PolioPlus Program, presented a US$250,000 grant to WHO to help underwrite a two-year collaborative research project to develop a thermostable poliomyelitis vaccine.

The Children's Vaccine Initiative will also facilitate improvement of the quality of vaccines produced in developing countries and, together with the Expanded Program on Immunization, will ensure that vaccines are utilized effectively and efficiently in order to reach all children.

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**Two Research Projects Seek to Improve Immunization Practices**

PAHO is collaborating in two research projects directed toward improving immunization practices. The projects, both in their initial stages, focus on two diseases targeted for eradication/elimination, poliomyelitis and neonatal tetanus, and will be carried out in Cuba and Bolivia, respectively.

The study in Cuba will determine the seroprevalence of polio neutralizing antibodies (types 1, 2, and 3) in children under five years of age. All children in Cuba under five receive two doses of oral polio vaccine (OPV) each year, administered in February and April by national mass campaigns. Thus, children under one year old to four years of age will have received none (if born after the April campaign), two, four, six, or eight doses of OPV, allowing researchers to estimate seroconversion rates of polio neutralizing antibodies for each number of doses.

The study has important ramifications for the global effort to eradicate polio. Little is known about seroconversion rates of polio neutralizing antibodies to greater than five doses of OPV. However, it is believed that administration of three to four doses of OPV by routine services may not be adequate to eradicate polio globally. The results of this study may help refine vaccine delivery strategies worldwide.

In addition to financial support, PAHO and WHO, through the Expanded Program on Immunization, will provide such materials as standardized international sera, standardized controls, cell cultures,
and the necessary reagents to ensure that all laboratory procedures used in the study are carried out according to WHO recommendations, thus allowing comparisons of results with those from other laboratories.

The second project seeks to increase tetanus toxoid vaccine coverage of pregnant women in underserved areas while reducing the risk of infections, such as hepatitis B and HIV, that may be transmitted by improperly sterilized syringes and needles. To this end, a nonreusable injection device (Uniject\(^1\)) has been developed by the Program for Appropriate Technology in Health (PATH), under a cooperative agreement with USAID, and is now ready for field testing. Uniject is prefilled with a single dose, which eliminates errors that might result from inaccurate filling. A one-way valve allows vaccine to be injected but closes off the fluid path if an attempt is made to refill the device through the needle.

\(^1\)Uniject is a trademark of the Program for Appropriate Technology in Health.

A field trial of Uniject is to be carried out by the Bolivian Ministry of Health in collaboration with PAHO and PATH. In both a rural and an urban area of Bolivia, traditional birth attendants (parteras) who have already received training in tetanus toxoid delivery will be instructed in the use of this new injection device. The study’s objectives are to develop a training program with appropriate materials and record keeping forms for use by parteras, evaluate the acceptability of the device to birth attendants and mothers, and evaluate the field performance, design, and ease of use of Uniject. As part of the evaluation process, a serologic survey will be carried out on 40 women immunized with Uniject and 40 immunized with vaccine from the same batch but administered in a standard syringe and needle. The survey will determine whether the two methods of vaccine administration produce a comparable rise in antibody titer.

The project is to be carried out over a 10-month period and will be cofunded by PAHO and PATH.