PUBLIC HEALTH

Polio Protection Progress

New vaccine made with attenuated virus gives promise of being effective and gamma globulin from human blood shows up well on mass trial.

Hope grows that children in the future can be protected against the crippling and killing disease, infantile paralysis. On this and the facing page is the latest budget of good news.

Last week (SNL, Oct. 25) an experiment was reported indicating that a vaccine could be given by mouth to protect against polio.

PUBLIC HEALTH

Gamma Globulin Halves Chances of Paralysis

➤ GAMMA GLOBULIN from human blood can more than cut in half the likelihood of children's getting paralytic polio. The protection it gives lasts at least five weeks and is effective against all three known polio viruses.

These results from trials involving 55,000 children were announced by Dr. William McD. Hammon of the University of Pittsburgh at the meeting of the American Public Health Association in Cleveland, Ohio.

The trials were made in Harris County, Texas, and Woodbury County, Iowa-Dakota County, Nebraska, this past summer and in Provo, Utah, in the summer of 1951.

Of all the children given injections, 90 developed paralytic polio. Of these, 26 were children who got gamma globulin and 64 were children who got a harmless, inactive gelatin injection. This gelatin was given to half the children in the trials, but no one knew until results were tabulated which child got gelatin and which gamma globulin.

The difference between the two groups is "statistically significant" in showing the effectiveness of gamma globulin for protecting against paralytic polio, Dr. Hammon said.

In the first week following the injection, almost as many cases occurred in the gamma globulin group as in the gelatin, or control, group. But the cases in the gamma globulin group were mild and within 30 days half the children had recovered completely. None in the control group had recovered within 30 days.

During the second week the difference was marked. Only three children in the gamma globulin group got paralytic polio compared to 23 in the control group. From the second through the fifth week only six cases occurred in the gamma globulin group, but 38 in the control group.

The gamma globulin was furnished by the American Red Cross. It was prepared from blood collected during World War II from tens of thousands of blood donors all over the country. It is the first material that has been scientifically proved to be effective in preventing human paralytic polio.

The present supply of this material for polio prevention is extremely limited and completely inadequate to meet the expected needs, Dr. Hammon said.

Enough for "reasonable use" will be available, Dr. Hammon believes, if public cooperation in giving blood comes up to the cooperation he found in making the field trials of the material for polio prevention.

These field trials, largest in medical history, were made possible by a grant of $1,000,000 in March of Dimes funds from the National Foundation for Infantile Paralysis.

Questions still to be answered about gamma globulin as a polio preventive are: Is protection good for only five weeks? Can this period be extended by increasing the dose or by a second injection? And, most important of all, does gamma globulin let the child get a harmless, unapparent polio infection that will give him permanent immunity to the disease?

Associated with Dr. Hammon in the trials and report of them were Drs. Lewis F. Coriell of the Camden, N. J., Municipal Hospital, Paul F. Wehrle of the U. S. Public Health Service, Christian R. Klimt, Rockefeller Foundation fellow, and Joseph Stokes, Jr., of the Children's Hospital and University of Pennsylvania, Philadelphia. Local doctors and nurses in the test areas assisted Dr. Hammon's test teams in the trials.

Complete details of the trials appear in a report in the *Journal of the American Medical Association* (Oct. 25).

Science News Letter, November 1, 1952

PUBLIC HEALTH

Vaccination Against Polio Passes Satisfactory Test

➤ A NEW vaccine against poliomyelitis has now had its first trial on children. Results which can be called definitely gratifying were reported by Dr. Howard A. Howe of Johns Hopkins University, Baltimore, at the meeting of the American Public Health Association in Cleveland, Ohio.

The vaccinated children did not get poliomyelitis, but this is not what showed the value or promise of the vaccine. The children were specially picked because there was almost no chance of their being exposed to polio.

They were vaccinated in a test to answer this important question: Do human beings respond in the way chimpanzees and monkeys do to vaccination against polio?

The answer is Yes. As a result, Dr. Howe and associates and the National Foundation for Infantile Paralysis, which helped support the study, are encouraged to go ahead in an effort to make a still better vaccine and to find a way to produce it in large quantities.

There is hope now, however, that this time the dream of vaccination against poliomyelitis, or infantile paralysis, is really coming true. Then it may be possible to give children lasting immunity to the disease instead of the temporary immunity hoped for from current trials of blood's gamma globulin.

Vaccines against polio are not new. In 1935 and 1936 anti-polio vaccines were made and given to children during an epidemic. One of these was made with living polio virus. Some of the vaccinated children got infantile paralysis and it was impossible to say that these cases had not been caused by this vaccine.

The other vaccine was made from polio virus treated with formalin to destroy its power to cause disease. This vaccine seemed safe enough, but no adequate tests of its effectiveness were carried out.

In those days scientists did not have as good ways to measure protection against polio as they have now, and they did not know that there are three different types of polio virus. Vaccine made from one type will not protect against the others, at least in laboratory experiments. Dr. Howe's vaccine is made to protect against all three types, Lansing, Leon and Brunhilde. The viruses in it are treated with formalin so they will not cause infection, though they keep their power to immunize.

Knowing the measure of a vaccine's protective power against polio is not just a

matter of vaccinating a group of children and seeing whether or not they get the disease. Enormous numbers of children are exposed to polio every year, actually become infected, yet never get sick, much less paralyzed. For every person, child or grown-up, paralyzed by polio, there are at least 100 to 1,000 infected with the virus who escape paralysis and even recognizable sickness.

The reason for this is that a little of the virus, when it gets into the body, mobilizes the body's defensive forces. Some of the defenders are substances called antibodies. A large amount of virus may overwhelm the body's defensive forces, and in such a case, the person attacked gets sick with infantile paralysis.

Antibodies cannot be seen. To tell whether you have any polio antibodies in your blood, scientists would mix some of your blood serum with live polio virus and inject this into a mouse. If the mouse did not get polio, though the same amount of polio virus alone gave the disease to its sister mouse, it would show you had polio antibodies in your blood.

Fifteen years ago, this test could only be made on monkeys, which are expensive animals compared to mice. Now the neutralization test, as it is called, can be made on mice for one of the three polio viruses, the Lansing strain. The neutralization test can also now be carried out with all three virus types in test tube cultures of monkey testes and kidney.

Besides telling whether you have polio antibodies, the test can be made to tell how much antibody, thus giving an idea of the ability of your blood serum to neutralize the virus and thus protect you from the disease. This is done by seeing how much your serum can be diluted and still neutralize a given amount of polio virus. Scientists call this the titer of antibodies in your blood.

Fifteen years ago, when scientists were working on polio vaccines, they did not have such good methods for measuring the titer of polio antibodies. So, as Dr. Howe explained, the whole problem had to be studied over again.

For the trials in humans, six little boys and girls between the ages of two and five were chosen. These six and five others who were not vaccinated were inmates of Rosewood Training School, at Owings Mills, Md., near Baltimore. The children were low grade idiots or imbeciles who never left their beds, never played with other children, not even their ward mates, and almost never had any visitors. They were chosen for the study because it was thought they were least likely to have any contacts through which they might develop antibodies by natural exposure to polio virus other than the inactivated virus in the vaccine. And they were vaccinated in 1951, when there was very little polio in the region outside Rosewood. In Baltimore City and County from June through December of that year there were only 26 cases of infantile paralysis with paralysis, the lowest number in eight years.

At about the same time that the children were vaccinated, five chimpanzees were given the same vaccine. Both children and chimps showed a rise of about the same degree in antibody level following the vaccination. Although the vaccine was made from all three types of polio virus, the antibody levels to the different strains were tested. For the Brunhilde strain, the response was not as good as for the Leon and Lansing. Dr. Howe hopes the vaccine can be improved in this respect.

Although the titers were low in the vaccinated children, it is impossible, Dr. Howe says, to state that they are too low to protect against paralysis. The same levels are enough to protect monkeys against paralysis, and much lower levels can be found in as much as a fourth of the adult population. Yet all of the latter are members of a group which is statistically immune, since on the average only two out of every 100,000 adults get the paralytic form of the disease in a whole year's time.

Some other chimps in the study got the vaccine mixed with an adjuvant oil. Within recent years scientists have found that virus vaccines can be made more effective by addition of such oils. The polio vaccine made with an adjuvant was more effective in raising the antibody titer in the chimps. Dr. Howe plans further study of this with the hope of being able to increase the vaccine's efficiency for humans through the use of an adjuvant.

Meanwhile, it is now known that vaccine trials on chimpanzees can be used as a guide to production of a vaccine that will be effective for protecting humans and in tests to determine how long it will protect, what dosage must be used, whether "booster" shots should be given and when, and for answering all the other questions doctors must have answered before trying a new preventive method for children on a large scale.

Science News Letter, November 1, 1952

NUTRITION

Proper Cooking Retains Nutritive Values of Meat

➤ MORE BEEF is coming on the market and housewives will be buying and using more of this meat. Even so, the thrifty ones will want to buy and cook it so as to make the most of its nourishing values. Beef and other meats are an important source of proteins, the essential body components used for building and repairing body tissue. The lean of beef is also a valuable source of B vitamins and of the minerals, phosphorus and iron. Beef fat contains a small amount of vitamin A.

Cooking, other processing and home and commercial storage bring about nutritive losses in meat, U. S. Department of Agriculture experts point out. In a new bulletin on beef (USDA-A1B84, Govt. Printing Office, 15 cents) the Department's Bureau of Human Nutrition and Home Economics gives the following information:

Meat shrinks when cooked; it loses water through evaporation, and some of the fat, mineral matter, B vitamins, and protein in the drippings. Heat causes some destruction of vitamins, mainly thiamine. More thiamine is destroyed by long cooking, such as braising, than by shorter cooking methods. When cooked beef is kept warm for serving, there is further loss of this vitamin.

Under usual conditions, losses of nutritive value are not great enough to be a cause for concern, although it is advisable to keep them to a minimum.

Freezing does not alter nutritive values, but losses result if drip from thawed meat is not used.

A 3-ounce serving of cooked beef chuck (bone out) provides a little less than one-third of the protein and almost one-fourth of the iron and niacin recommended by the National Research Council as the daily allowance for a physically active man.

Liver, kidney, and heart contain as much protein as the muscle meats and are rich in the B vitamins and iron. Liver is an excellent source of vitamin A and a good source of ascorbic acid. It is important as a blood builder because of its iron and copper content.

Science News Letter, November 1, 1952

Symptoms of diseases such as high blood pressure, diabetes and arteriosclerosis show up in the veins, arteries and capillaries of the eye's *retina* long before more obvious symptoms appear.