Preliminary Draft of Letter to Dr. MacLeod

Dear Doctor MacLeod:

I am sending you herewith certain comments about the letter by General Crawford F. Sams, M. C., dated 22 September 1949, and addressed to the Army Epidemiological Board. This letter was referred to our Commission on Virus and Rickettsial Diseases just prior to our annual meeting, and so its contents were discussed by those present,—including: Drs. Hammon and Sabin, and also Dr. Smadel. It falls to my lot to review this discussion and also to give some of my own views.

General Sams has raised a number of important and interesting questions which, obviously are not easy to answer.

1. Primarily it is noted that mosquito control measures were initiated throughout Japan in May 1949, and were considered effective; but inspite of these measures, a late epidemic of Japanese B encephalitis (in which the peak occurred some 5 weeks later than usual) has appeared, with some 2000 cases as of 22 September. Two questions have been raised by General Sams in this connection:

a) Are the previous ideas concerning the transmission of Japanese B encephalitis by mosquitoes correct?

In considering this point, I do not wish to appear didactic, nor do I believe that Japanese encephalitis can only be transmitted by mosquitoes, but it would seem that each year the evidence is growing stronger in favor of transmission of this virus to humans by Culex mosquitoes. Mosquito transmission may not be the only means of transmission—but we face the fact that Japanese B encephalitis seems to fall into the general family of arthropod-borne encephalitides, such as Western Equine encephalomyelitis and St. Louis encephalitis; and that laboratory investigations indicate that mosquitoes can carry the virus, and more recently that we now have the repeated isolation
of the virus from mosquitoes caught during epidemic times in the field. That there may be other insects as yet undiscovered which also enter the picture, few could deny. It seems reasonable at present, therefore, to regard the mosquito vector theory as dominant insofar as man is concerned and it is equally reasonable to recognize that there are gaps in our knowledge of the epidemiology of Japanese B encephalitis and enormous gaps in the technique of controlling this disease.

b) With regard to the second question, as to whether it is justified to continue the expenditure of large sums of money and considerable effort in the attempt to control Japanese B encephalitis through the control of mosquitoes, this would seem to be a question which would depend on local circumstances and its answer would require what one might call local "clinical judgment." From verbal reports received from members of Dr. Hammon's collecting team in Tokyo this summer, it did not seem to those workers that Culex mosquito control in that city in 1949 was as complete as might have been demanded for a "crucial experiment" on mosquito abatement of this type. I am not able to produce figures on these observations, nor have I myself had personal experience but it may be that methods for complete urban and rural control of Culex mosquitoes in Japan have not yet been perfected at least to a point where we might hope them to be truly effective in suppressing encephalitis.

However, insofar as Western equine encephalomyelitis is concerned, we have been informed by Dr. Hammon that in certain endemic areas of the states of California and Washington, intensive mosquito control of certain special types has recently been associated with a great reduction of mosquitoes and also with reduction in the cases of encephalomyelitis.

2. We have been much interested in the maps revealing the distribution of encephalitis and poliomyelitis cases in 1948 which could be interpreted to show that the two diseases were mutually exclusive that year. The epidemiologist in
poliomyelitis has usually felt that one must have an experience longer than one year if we are to base geographical prevalence on it. Ten years would be good. In Sweden the epidemiologists are working on a 20-year study before they are willing to commit themselves as to whether or not certain places can be incriminated of having either a high or a low prevalence of poliomyelitis. In the United States, for instance, poliomyelitis pretty well covers the entire country if one views it from a ten-year or longer aspect. But this point may not be germane to the question you have raised. You state that for 1948, poliomyelitis occurred where Japanese encephalitis did not, and vice versa. We agree with this, but I would not yet attempt to interpret it.

In this connection I reviewed some Japanese B encephalitis maps which Dr. Hammon and I had prepared at the time of our visit to Japan in 1946 (two are enclosed). These are ancient history now; they cover a 25-year period, 1924-1939, but do seem to indicate that Prefectures in the region of the Inland Sea have had a higher endemic or epidemic rate and a more consistent appearance of the disease than has been true elsewhere with a noticeable absence of encephalitis, perhaps, in the southern part of Kyushu and in Hokkido. Thus the 1948 epidemic of encephalitis certainly does not conform to this previous experience, but the disease seems to have moved into new territory, for one year at least. Your 1948 Poliomyelitis map, on the other hand, indicates that the disease seemed to move down into what might be termed endemic encephalitis territory. This type of study should make a most interesting research problem, and I would think that in 5 years one might come up with much interesting and important information and new evidence that an epidemiologist would do well to weigh carefully.

With regard to the comparison of the antibodies in these two diseases, our figures on this are not as extensive as we would like, but results in the age group 0-5 studied by Dr. Sabin have indicated that the presence of
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the Lansing poliomyelitis antibody and the Japanese encephalitis antibodies are different in this age group. In other words, those having Lansing antibodies do not necessarily have antibodies for Japanese B encephalitis and vice versa. We have available sera from Japan on which further determinations of this type might be made and these could perhaps be studied if there seemed to be strong indications for doing so and we could interest the investigators to find time in which to carry out the tests.

Again may I express my appreciation for having had the opportunity to read and discuss this letter. It is obvious that we do not know the answers, but we have done the best we can with the situation at the present.

Sincerely yours,

John R. Paul, M.D.
Director

JRP:mmr
Enclosure

cc: Col. Bauer
    Dr. Haemmon
    Dr. Sabin
    Dr. Smadel