NEW WORLD

Rashness that may Pay Off

by our Washington Correspondent

JUST as the rubella vaccination campaign in the United States is reaching its full momentum, critics are repeating their earlier fears that the programme is based on a shaky strategy and could even do more harm than good. The root of the controversy is the classical dilemma of whether to act on the basis of incomplete knowledge to try to forestall a certain tragedy. In this instance the decision has been to act now in the hope of preventing the rubella epidemic that is expected to break out this winter. But although no qualitatively new evidence has come to light since the decision to proceed was taken a year ago, the doubts about the basic strategy of the campaign have been accumulating. Meanwhile the Department of Health, Education and Welfare's Center for Disease Control in Atlanta, Georgia, continues undeflected in its aim of vaccinating between 40 and 60 million children before the next epidemic begins.

Rubella, or German measles, is a harmless enough disease in people, but the virus can cause death or malformity in the foetus if contracted by the mother at a certain stage of pregnancy. In the last rubella epidemic in the United States, in 1964, there were some 30,000 foetal deaths and 20,000 children born with congenital abnormalities. So far some $41 million has been allocated to the present vaccination campaign, which has already reached 16 million children between the age of one year and puberty, or about a quarter of the total target population.

The campaign is modelled on the successful vaccination programmes conducted against polio and measles but it differs in the indirectness of its approach; the immediate beneficiaries are not the children who are vaccinated but the susceptible women in the community for whom the children are the commonest source of infection in an epidemic. With the live attenuated virus that is the basis of the present vaccines, the risks of vaccinating susceptible women directly seemed unacceptable—some of the vaccinees might unknowingly be pregnant and the effects of the attenuated virus on the foetus are unknown. Instead, it was decided to try and immunize enough of the children in the population to prevent an epidemic from starting.

This so called "barrier" strategy has been successful with measles and with polio, but several surveys of which the most recent was reported this month by Hörstmann and colleagues at the Yale University School of Medicine*, have shown that at least in the special conditions of military camps the virus can still reach all the susceptible victims even though more than 8 men out of 10 have a natural resistance to the disease. Unless the vaccination programme can reach more than the 80 to 85 per cent of the population which is naturally resistant to rubella, some critics argue, the barrier it throws up will not be sufficient to halt the epidemic.

Another criticism is that the present vaccines provide a smaller degree of immunity to rubella than does natural infection, with the result that vaccinees are often reinfected when exposed to the wild virus. (In the survey reported by Horstmann and her colleagues, for example, 80 per cent of the vaccinated soldiers became reinfected during the epidemic.) Even though the infection in these cases is almost always clinically inapparent, being detectable only through a rise in the circulating antibodies, there is the possibility that the reinfected vaccinees may transmit the virus to others. The Public Health Service Advisory Committee on Immunization Practices said in a report in August that the probability of such spread is "exceedingly low". Others are not so sure. The epidemiologists at Yale University, for example, conclude that the question is far from settled although they agree that risk of contagion from reinfected persons is greatly reduced.

Another source of uncertainty is the duration of the immunity conferred by vaccination. Will a girl vaccinated against rubella at the age of 6 still be immune to the virus by the time she starts to bear children? The Advisory Committee on Immunization Practices bases its view that long term protection is likely, on the evidence that antibody levels have declined very little during the four years of observation of the children who were the first to be vaccinated. But others believe that a substantial proportion of vaccinees may lose their immunity after ten years or more.

A different question is whether a mother who has been vaccinated but is reinfected runs the same risk as a susceptible woman of bearing a rubella baby. Malformations are known to occur even when a susceptible mother has suffered from rubella in a clinically inapparent form; the clinically inapparent form of the disease with which vaccinees become reinfected could in theory also be teratogenic. However, although this possibility cannot yet be ruled out, no one has yet detected the virus in the bloodstream of reinfected vaccinees, which suggests that it is unlikely to cross the placenta in these cases.

A more theoretical worry concerns the quality of immunity to rubella in subsequent generations, should the wild virus be eliminated by the vaccination programme. Since the vaccine provokes a smaller degree of immunity than does exposure to the wild virus, it could be that generations which have to rely on vaccination for their immunity will be less strongly protected against the virus.

Defenders of the vaccination programme reply that none of these criticisms is new, and all were fully considered before the programme was started. It is true there are uncertainties in the knowledge of how the vaccine will work, but to wait for more complete knowledge whilst suffering the toll of the rubella babies born in the approaching and later epidemics would be absurd, especially when a viable rubella vaccine is in existence. The two crucial questions are whether a reinfected vaccinee can participate in the chain of transmission and whether, if pregnant, she can transmit the virus to her foetus. While these possibilities cannot be ruled out, they seemed at the time, and still seem, sufficiently small to justify the present use of the vaccine. Defenders of the programme argue that the spread of the virus in a military camp, as reported by

* *New England Journal of Medicine* (**283**, 771; 1970).

Horstmann, should not be construed as evidence that the barrier strategy is mistaken, since for several diseases the progress of transmission in these conditions is known to be quite different from that among the civilian population.

The severer critics of the present campaign believe that the Division of Biologics Standards of the National Institutes of Health, which is responsible for recommending licences for the vaccine, should have allowed more research data to accumulate before giving the programme its blessing. As it happens the attenuated virus strain on which two of the three vaccines are based was developed by two scientists in the Division of Biologics Standards, Drs H. M. Meyer and Dr P. D. Parkman. In deciding to recommend licences for the rubella vaccines the director of the CAP D division, Dr Roderick Murray, took advice from all people concerned, not excluding Drs Meyer and Parkman. But to avoid any conflict of interest Dr Murray specifically requested that no member of the Biologics Standards Division should also have a voting position on the board responsible for developing the rubella vaccines, the Vaccine Development Committee of the National Institute of Allergy and Infectious Diseases. Dr Meyer was one of the non-voting liaison members of this committee but, with his exception, no member of the Division of Biologics Standards sat on this or either of the two other committees involved, the Surgeon General's Advisory Committee on Immunization Practices and the Immunization Committee of the American Academy of Pediatrics. The latter two committees issued a joint statement at the time the rubella vaccines were licensed recommending their routine use on children.

A more moderate view of the vaccination programme is taken by the Nobel laureate Dr John Enders of the Boston Children's Hospital. In a judiciously balanced editorial article in the *New England Journal of Medicine* he said that the "accumulating doubts" about the long term effectiveness of the programme "should not for the present be allowed to interfere with its continuation. But in the meantime they may usefully encourage a reconsideration of other, more direct procedures, such as the vaccination of susceptible parturient women or of adolescent girls".

Though it is far too early to assess how the vaccination is working, those involved with the programme have the impression that in areas where there has been heavy vaccination there is less rubella around than usual. Even should the campaign not succeed, there are many who will say it was worth the gamble.

AIR POLLUTION

Academy to Take on Detroit Oil Men

by our Washington Correspondent

THE National Academy of Sciences is a rarity among learned societies in that it is required by charter to tender practical advice, when requested by government, on the issues of the day. Unlike the British Royal Society, for example, whose only purpose in life is self-perpetuation, the National Academy dares to put the talents of its members to practical use, though with the ever present risk of offending powerful interest groups or agencies of government. The academy now seems likely to be charged with a task as awesome politically as any that it has yet faced, that of monitoring progress in meeting Senator Muskie's clean air bill which states, among other things, that all cars manufactured after January 1, 1975, will emit 90 per cent less pollutants than present models. The academy may thus be brought into conflict with the automobile manufacturers, if it finds them dragging their feet, and maybe with the producers of gasoline as well, or with the Congress should it find the legislated standards technologically impossible to meet.

The standards demanded by the Senate for 1975 model cars have not yet reached the statute book but have every chance of doing so now that they have been agreed to at a meeting this month between Senate and House conferees. What the House and Senate have yet to agree upon is the precise role to be played by the National Academy in seeing that the legislation is fulfilled. It appears that the academy will not be asked, as at one time seemed likely, to say at this moment whether the 1975 deadline for reduced emissions is technologically feasible. At the meeting between Senate and House conferees on October 8, it was agreed that the academy should prepare reports at six-monthly intervals, the first being due next July, on the progress made by the manufacturers towards meeting the deadline. But the academy may also be required to comment in its six-monthly reports on the progress made in light of what is technologically feasible at the time—in other words, on whether the car-makers are trying hard enough. In assessing what is technologically feasible the academy will not be asked to consider price as a factor.

One point at which the academy's advice will clearly be crucial is in deciding the option, allowed for in the bill, of postponing the deadline by one year should the manufacturers be able to prove to a federal court that it is too harsh. The precise description of the Academy's role will be decided when the conferees from the Senate and House meet again next month. The Academy is said to have refused government requests for advice only half a dozen times in its existence and is unlikely to pass up this one, however great the temptation.

ANTARCTICA

NSF declared Sole Heir

by our Washington Correspondent

THE National Science Foundation will become the most puissant power in Antarctica, following President Nixon's decision last week that the foundation should be the sole channel for funding United States work in the continent. The budget of the NSF will be increased by $25 million when the transfer of programmes from the Department of Defense and the Coast Guard is complete. But the changeover will not necessarily mean more money for Antarctic research, since the programmes to be transferred are concerned almost wholly with providing logistical support to existing research efforts.

This year the foundation is spending $7·5 million on all forms of Antarctic research, which at the height of the season, during the austral summer, brings some 200 scientists and technicians to the four year-round bases the United States maintains at Byrd, McMurdo, Palmer and the Amundsen-Scott South Pole station. The eleven major projects being supported this year include a balloon study of cosmic rays under J. Barcus at the University of Denver, continued exploration by