Swine Flu: Lessons from a Non-Epidemic

The 1976 swine flu vaccination program, the largest immunization endeavor in history, came to an abrupt and disgraceful end last December. The reasons for its demise were numerous and diverse. Drug companies refused to make the vaccine unless government paid for liability suits if the vaccine proved unsafe. As the feared swine flu epidemic failed to materialize, many Americans did not turn out to get a flu shot. Immunization was suspended temporarily in a few states until it was shown that the deaths of some older persons were not due to the vaccine. Finally, the rare, paralyzing Guillain-Barre syndrome loomed as a risk of swine flu vaccination.

Yet the impact of this costly and controversial preventive medicine effort is far from over, a symposium at the annual meeting of the American Society for Microbiology in New Orleans revealed last week. The symposium, "Swine Influenza Vaccine: An Afterview," included views of government and university scientists.

If there is any one thing the speakers agree on, it is that the program was a "rank political boondoggle." Because so many things went wrong with the program, the American public, and especially the press, became disenchanted with the government officials and scientists who launched it.

The speakers also concur that the Guillain-Barre syndrome was triggered by swine flu vaccination. As Walter R. Dowdle, director of virology at the Center for Disease Control in Atlanta (one of the government agencies responsible for the swine flu program), puts it, being vaccinated posed "a finite but definite risk" of contracting the disease. Epidemiological statistics, he says, showed that 100 cases of the syndrome and 17 deaths from it occurred among 40 million persons vaccinated—risk rates considerably above those for the general American population. Nonetheless, researchers are still not sure whether the swine flu virus itself, or any virus for that matter, can cause the syndrome; vaccination and the syndrome have never been linked before. Rather, the syndrome might have resulted from some abnormal immune reaction to swine flu vaccination or possibly to some other cause. Investigators at the CDC and at the National Institute of Allergy and Infectious Diseases are now trying to see whether swine flu vaccinees who came down with the syndrome share certain characteristics that might have predisposed them to it.

The speakers argue, however, that the swine flu vaccination program was not a scientific failure. It was the largest vaccination attempt in history, surely a scientific feat in itself, asserts Merrill J. Snyder of the University of Maryland School of Medicine in Baltimore. The vaccines were also made in six weeks rather than in the four months it used to take to manufacture flu vaccines, notes Harry Meyer of the Bureau of Biologics of the Food and Drug Administration (another government agency responsible for the swine flu program). During late summer and early fall 1976, he says, two million doses of the vaccine were being produced by drug companies a week—"a stupendous industrial accomplishment." The vaccine, he points out, was also far purer than flu vaccines made in the past (details of which will be published in a summer or fall issue of the JOURNAL OF INFECTIOUS DISEASES). And just because a swine flu epidemic did not occur, Dowdle declares, this does not mean that the vaccination program was a failure. A vaccine against A-Victoria flu virus was made available to Americans at the same time a swine flu vaccine was, and the A-Victoria strain did strike. Thus, if a swine flu epidemic had also occurred, the vaccines might well have saved millions of lives.

Vaccine production: Was it worthwhile?

What's more, the speakers stress, the program has provided valuable scientific information that can be used in future flu vaccine programs. For instance, the NIAID conducted swine flu vaccine clinical trials on some 5,000 adults and 3,500 children before the vaccine was commercially prepared. These trials, concur John La Montagne of the NIAID and Peter Wright of Vanderbilt University School of Medicine, give researchers valuable insights into how much flu virus adults and children require in a vaccine. Adults need only half or even only a fourth the virus previously believed necessary for protection. Children, in contrast, need much more virus than adults because their immune systems are less easily activated by it. Also, two doses of vaccine rather than one appear to be ideal for them. Those children who participated in the trials are now being followed up to see how long antibodies to swine flu virus remain in their blood. The results should give researchers an even better idea of how much flu virus children need for protection.

Nonetheless, the challenge of flu epidemics to Americans is far from over. Because flu viruses, unlike other viruses, are ever changing, Americans will probably not have ideal protection against them 10 years from now, predicts Meyer. In fact, a swine flu epidemic may still strike since swine flu virus has been found in pigs throughout the United States, yet not in pigs in other countries (see p. 328). And while scientists and government agencies keep a watch for swine flu or other flu epidemics, they will also try to combat skepticism raised by the swine flu program—an attitude that has hurt other kinds of vaccination programs. For instance, the Department of Health, Education and Welfare will now try to step up immunization among American children. Vaccines against numerous childhood diseases are available, yet parents are not taking advantage of them. Such apathy could create new epidemics of old dreaded diseases such as polio or rubella. The latter, while not serious for children, can trigger birth defects in human fetuses.

Educating Americans in prevention is difficult though, Dowdle concedes, whether it is talking them into vaccines, smoke detectors or even national defense. Look at the Surgeon General's attempts to get people to stop smoking, he points out. The Surgeon General's office is now defunct, and Americans keep puffing. □

Fluorocarbons out, new systems in

Time is running out for spray cans using chlorofluorocarbon propellants. But don't despair about losing that fine mist of hair spray or deodorant. Just in the nick of time, new systems for dispensing spray products are being announced.

Three federal agencies—the Food and Drug Administration, Environmental Protection Agency and Consumer Product Safety Commission—last week, in a rare example of cooperation, set Oct. 15, 1978, as the date after which no chemical firm will be allowed to make the propellants for general use. The proposed

schedule permits manufacturers to use existing supplies of the gases until Dec. 15, 1978, but bans sprays with chlorofluorocarbons from interstate commerce after April 15, 1979. The regulations exclude a small number of essential products, such as some drugs and insect sprays, for which no adequate alternative propellant is available. The agencies have not yet proposed restrictions on use of chlorofluorocarbon gases in refrigeration, a more complicated regulatory problem.

The scheduled phase-out of chlorofluorocarbons is in response to mounting evidence that these gases could deplete the earth's protective ozone layer (SN: 9/18/76, p. 180). Scientists estimate this drop in ozone could cause 12,000 to 120,000 additional cases of skin cancer per year in the United States, generate climate changes and produce alterations in plant and animal life that would be detrimental. "Unless we begin now in orderly and deliberate fashion to deal with this issue, then those who come after us may suffer. And the fault would be our own timidity and shortsightedness," Donald Kennedy, FDA commissioner, told a news conference.

The cost of the regulations to industry will be up to $1 billion over a four-year period, estimates EPA Administrator Douglas N. Costle. The manufacturers of fluorocarbons are currently supporting research to resolve some of the remaining uncertainties about the environmental impact of those gases. Richard B. Heckert of E. I. Dupont de Nemours and Co. urged that regulations be flexible in case new evidence lowers estimates of the chlorofluorocarbons' potential effects.

The proposed ban has by no means caught the manufacturers unprepared. They have been exploring alternatives since the first hint that the chlorofluorocarbons might be outlawed. In the long run, the regulations may actually save money, Costle suggests, because alternatives may be cheaper.

Some spray products may soon be dispensed with pump systems and others with a hydrocarbon propellant, according to a spokesman from the Gillette Co. Dow Chemical Co. recently announced that accumulating evidence indicates another chlorofluorocarbon substitute, methylene chloride, will probably be safe to use. Two other, more unusual, systems for creating aerosols have also been revealed. Robert H. Abplanalp, whose Precision Valve Co. is the largest manufacturer of valves for industry, announced last week a totally new type of mechanical valve that uses natural gas derivatives, such as butane or propane, instead of fluorocarbons. In an innovative system developed by the Selvac division of Plant Industries, force against a butyl rubber membrane in a pressurized can expels a mist of product. So, with a variety of replacements, fluorocarbon propellants should be but briefly mourned. The sprays will go on. □

Tri- again: Evidence of heavy leptons

One of the problems of modern particle physics is that the things that experimenters are really looking for are too short-lived to leave a direct record of themselves in the detecting equipment. Their existence has to be deduced from stabler outcoming particles. It seems to be especially true with the so-called heavy leptons. The motto suggested by the most recent report—which suggests the existence of heavy leptons—is: If at two you don't succeed, tri-, tri- again. Muons that is.

Heavy leptons would be heavier and highly unstable relatives of the electron. Existence of heavy leptons is predicted by the newly developed unified field theories, which have physicists excited because they promise a comprehensive treatment of particle physics. Therefore experimenters are busily looking for evidence of heavy leptons.

The way to try to make heavy leptons is to take beams of high-energy neutrinos and hit them against atomic nuclei. What comes out at the other end of such an experiment is one or more of the known leptons (electrons or muons). The inference is that a large part of the energy carried by the neutrino was materialized into something rather massive and short-lived. That something then decayed to produce the outcoming particles. From the nature, momenta and paths of the outcoming particles the experimenters try to deduce what the short-lived something was.

A number of neutrino experiments of this sort have recorded dilepton events (two outcoming leptons) but most of these have been explained as the creation of charmed particles, interesting in themselves, but not heavy leptons. The present report, from the experiment at the Fermi National Accelerator Laboratory known as the Fermilab-Harvard-Pennsylvania-Rutgers-Wisconsin collaboration (A. A. Benvenuti and 15 others in the May 16 PHYSICAL REVIEW LETTERS) records six trimuon events. With three outcoming muons they can argue away other possibilities and settle on heavy leptons. They suggest that in some of these events, the incoming neutrino makes a heavy lepton. This decays into a lighter but still new kind of lepton and a muon. The second new lepton then turns into two more muons, giving the final result. □

Major European satellite: Low but going

Geos, formerly intended by the European Space Agency to become the first purely scientific geostationary satellite, is alive and well—but it will never achieve its goal. Launched for ESA by the National Aeronautics and Space Administration on April 20, the probe was carried aloft by a Delta rocket that malfunctioned and let it off at barely a third of the altitude necessary to station it over a fixed point on the earth. As a result, Geos (not to be confused with the U.S. GEOS series of geodetic satellites) is now in an elongated orbit that varies from about 2,100 kilometers above the earth to more than 38,000, with its apogee (high point) at 35°E longitude.

The probe's problems are doubly distressing because it has been scheduled to play a major role in the International Magnetospheric Study. This project, which began last year and is to continue into 1979, involves more than 40 nations (SN: 1/3/76, p. 6). The launching of Geos had been delayed 8 months due to late component deliveries and other factors, but at least, in its less-than-optimum orbit, all of its instruments are working. According to ESA, "The seven Geos experiments have, between them, detected electron and proton spectra, relatively heavy ions, and have provided magnetic field data down to 3.5 earth radii." The satellite is expected to provide data on a variety of magnetic-field and plasma phenomena, particularly as it crosses magnetic field lines that are aligned with tracking stations and sounding-rocket facilities in Scandinavia.

Even if Geos had ended up in the ocean, all would not have been lost for the International Magnetospheric Study. The multiyear effort may involve as many as four dozen other satellites. □

New Apollo asteroids

The little catalog of "Apollo" asteroids—those whose orbits take them inside the orbit of the earth—continues to grow apace. California Institute of Technology student S. J. Bus discovered what is known as fast-moving object 1977 HA in a photographic plate taken on April 17 by Caltech astronomer Eleanor Helin using the 18-inch Schmidt telescope at Palomar Mountain. The tiny object, which passed within 4.8 million kilometers of the earth on April 1, follows a course that ranges from the asteroid belt almost in to the orbit of Venus.

Another probable Apollo asteroid, 1977 HB, was discovered by astronomer Charles Kowal in a plate made on April 24 with Palomar's 48-inch Schmidt instrument. Calculations of the object's orbit have been awaiting additional observations, but the total number of Apollo asteroids has now reached 24 (subject to one or two uncertain observations) since the first one was spotted in 1932. □