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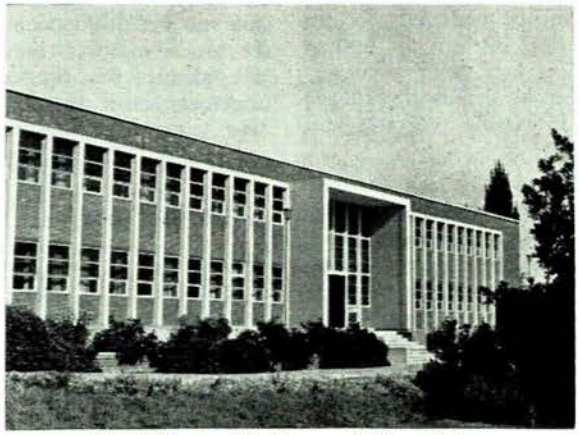
IMMUNIZATION AGAINST POLIOMYELITIS

The successful attack on poliomyelitis on a nation-wide scale in South Africa, some aspects of which are recorded in this issue of the *Journal*, is an event of unusual significance in the field of public health. It demonstrates clearly what an excellent degree of control over a communicable disease can be achieved by an energetic health department in the organization of preventive measures on a country-wide basis, if provided with suitable material for the task. It raises the hope that the substitution of the word 'eradication' for 'control' is well within the limits of possibility with more than one communicable disease.

The oral, Sabin-type poliomyelitis vaccine is probably one of the finest vaccines ever developed and is exceptionally well suited to mass application. The combination of a high degree of efficacy with absence of reaction, extreme simplicity of administration, and low cost of manufacture, is unique among vaccines currently available. In addition it has the unusual property of extending the vaccination process to susceptible individuals in the household unit.



The Poliomyelitis Research Foundation, Johannesburg

The development of effective vaccines against poliomyelitis is an epic of individual research effort, unstinted dissemination of knowledge, and cooperative effort at the national and international level. The break-through in this field came when, in 1948, Enders, Weller and Robbins[1] made the discovery that earned them the Nobel Prize: they found that poliovirus could be grown in cultures of primate tissues. This paved the way for the large-scale production of poliovirus in pure form that is essential for the development of a vaccine.

Dr. Jonas Salk of Pittsburgh, applying his knowledge of influenza virus vaccines, developed a formalin-inactivated poliovirus vaccine. It turned out to be one of the best killed virus vaccines that has been made. However, its administration required a number of spaced injections over a prolonged period.

Among those who did not expect a great deal from an inactivated poliovirus vaccine was Dr. Hilary Koprowski, then of Lederle Laboratories. By combining tissue-culture and animal-passage techniques, he produced an attenuated poliovirus vaccine that was first successfully administered to a human being in 1950. Using similar techniques, Prof. Albert Sabin of Cincinnati developed the strains that are most widely used today.

Until 1958 these strains were used in small groups of volunteers only; in that year they were presented as a gift to the Poliomyelitis Research Foundation in Johannesburg. This enabled the Foundation to prepare its first trial batch of vaccine, amounting to five million doses. A year later, in 1959, limited tests followed in Mauritius, Kenya and Uganda under epidemic conditions, at which time no harm could be done. With the confidence thus gained, in addition to the evidence of small-scale human-volunteer tests, and with the known results of Russian large-scale trials, the State Health Department decided on a national campaign in South Africa: the first of its kind in the Western World. To the members of this Department must go the credit for organizing and carrying to a successful conclusion the unprecedented national poliomyelitis campaign, which began just two years ago this month. The remarkable results achieved indicate that the approximately 80% coverage of the susceptible population was adequate for the near-eradication of the disease.

However, the use of an efficient tool on such a scale and the inevitable interference with the national state of balance which Nature has achieved over the centuries brings with it greater responsibility. The build-up of a susceptible population at the rate of about 300,000 a year can create, in a short period, conditions favourable for epidemics that may surpass in severity those that occurred when Nature alone had charge of affairs.

It is now abundantly clear that the virulent, paralysis-producing virus has not been eliminated from the population. The present spate of cases of poliomyelitis is occurring almost entirely in unimmunized or inadequately immunized individuals. The predominant age group affected is that between one and two years of age. This indicates clearly that too few babies born since the national campaign in 1961 are getting the protection afforded by the easily-available, cost-free, live poliovirus vaccine.

In this respect it is not enough for the medical profession to delegate to the local-authority health services the never-ending and thankless task of persuading parents to have their children immunized in good time. Every practitioner should not only use his persuasive powers on parents, but should also undertake, where necessary, to administer the vaccine himself, as he is entitled to do, in order to render as complete a service as possible to all patients.

The nation-wide campaign in 1961 achieved its object admirably, as the results, recorded elsewhere in this

Journal, show so clearly. It is now our duty as doctors to see to it that these excellent results are not nullified in the future through apathy, mistrust or lack of knowledge on the part of parents. As we said when live poliovaccine was first used in this country, 'unless all children are immunized in infancy against poliomyelitis . . . they will be at great risk if wild strains of poliovirus reappear. It may be necessary to institute compulsory vaccination against poliomyelitis in the future to obviate the possibility of a catastrophe'.[2]

Today we see only too well that young children are still susceptible to poliomyelitis if they have not been fed the oral vaccine. We hope the compulsory vaccination we suggested in 1960 will never prove necessary — that depends on the degree to which we can ensure that all infants receive their immunization. The vaccine is there — it is now up to us to play our part in seeing that it is used to the full advantage of all the people of South Africa.

1. Enders, J. F., Weller, T. H. and Robbins, F. C. (1949): Science, **109**, 85.
2. Editorial (1960): S. Afr. Med. J., **34**, 985.

IMMUNISASIE TEEN POLIOMIËLITIS

'n Gebeurtenis van buitengewone belang op die gebied van staatsgesondheidsleer was die geslaagde landswye aanval op poliomiëlitis in Suid-Afrika, sekere aspekte waarvan in hierdie uitgawe van die *Tydskrif* beskrywe word.

Dit het duidelik bewys welke uitstekende beheer oor 'n oordraagbare siekte deur 'n ywerige gesondheidsdepartement met die organiseer van voorbehoedmaatreëls op landswye skaal verkry kan word mits dit van die nodige materiaal voorsien word. Die hoop kan tereg gekoester word dat, op die gebied van meer as een oordraagbare siekte, ‚beheer' deur die woord ‚uitwissing' vervang kan word.

Die Sabin-tipe slukentstof is waarskynlik een van die beste entstowwe wat tot nog toe ontwikkel is en dit is by uitstek geskik vir massa-toediening. Die kombinasie van 'n hoë mate van doeltreffendheid, afwesigheid van nadelige reaksies, uiterste eenvoud van toediening, en lae vervaardigingskoste is uniek onder die entstowwe wat tans beskikbaar is. Om alles te kroon, besit dit die buitengewone eienskap dat dit die ent-proses aan vatbare lede van die huiskring oordra.

Die ontwikkeling van doeltreffende entstowwe teen poliomiëlitis is 'n epos van individuele navorsing, geredelike verspreiding van kennis, en samewerking op nasionale en internasionale vlak. Binne die bestek van 'n dekade is die middel wat die eeu-oue en gevreesde siekte onder die knie kan bring, daargestel.

Die deurbraak op dié gebied het gevolg op die ontdekking wat Enders, Weller en Robbins[1] in 1948 gemaak het en waarvoor die Nobelprys aan hul toegeken is: hulle het bevind dat die poliovirus in primaatweefsel-kultuur gekweek kon word. Dit het die weg gebaan vir die grootskaalse produksie van poliovirus in 'n suiwer vorm — 'n vereiste wat vir die ontwikkeling van 'n entstof onontbeerlik is.

Dr. Jonas Salk van Pittsburgh het, deur die toepassing van sy kennis van die griepvirus-entstof, 'n formaliengeïnaktiveerde poliovirus-entstof ontwikkel. Dit is een van die mees geslaagde ‚dooie' virus-entstowwe maar dit vereis egter 'n aantal inspuitings wat met tussenposes oor 'n lang tydperk toegedien moet word.

Dr. Hilary Koprowski, van die Lederle Laboratoriums, was een van die wetenskaplikes wat nie op 'n geïnaktiveerde entstof te veel peil getrek het nie. Deur weefselkultuur- en dierinenting-tegnieke te kombineer, het hy 'n verswakte poliovirus-entstof vervaardig wat in 1950 met goeie gevolge aan 'n mens toegedien is. Prof. Albert Sabin van Cincinnati het van dergelike metodes gebruik gemaak en die rassoorte ontwikkel wat vandag alom gebruik word.

Vireers is hierdie rassoorte net op klein groepies vrywilligers getoets maar in 1958 is die rassoorte aan die Poliomiëlitis Navorsingstigting te Johannesburg geskenk. Dit het die Navorsingstigting in staat gestel om proefentstof van vyf miljoen dosisse voor te berei. 'n Jaar later is dit tot 'n mate in Mauritius, Kenia en Uganda tydens 'n epidemie—toe dit geen nadelige gevolge kon hê nie—uitgetoets.

Versterk deur hierdie ondervinding, en die resultate van toetse op die klein groepies vrywilligers en van die grootskaalse proewe in Rusland, het die Staatsgesondheidsdepartement besluit om 'n landswye veldtog in Suid-Afrika te loods—die eerste van sy soort in die Westerse Wêreld. Aan die personeel van hierdie departement kom die eer toe vir die suksesvolle uitvoering van hierdie ongeëwenaarde landswye veldtog. Die merkwaardige resultate wat verkry is, het getoon dat die dekking van bykans 80% van die vatbare bevolking voldoende is om die siekte byna uit te wis.

Die gebruik van so 'n doeltreffende middel op so 'n skaal en die onvermydelike ingryping in die ewewig van die Natuur ontsluit egter groter verantwoordelikhede. Die vermeerdering van die vatbare bevolking teen ongeveer 300,000 per jaar kan binne 'n kort tydsbestek toestande skep wat die uitbreek van epidemies kan begunstig wat self strawwer mag wees as toe die Natuur alleen in beheer was.

Dit is onteenseglik bewys dat die kwaadaardige virus wat verlamming veroorsaak *nie* uitgeroei is nie. Die huidige stroom van poliomiëlitisgevalle kom feitlik uitsluitlik voor onder individue wat onvoldoende of glad nie entstof ontvang het nie. Die ouderdomsgroep een tot twee jaar word veral aangetas. Hiervan kan afgelei word dat te klein 'n getal van babas, wat ná die 1961 landswye veldtog gebore is, die beskerming van die kostelose, maklik bekombare, lewende poliovirus-entstof ontvang.

Die mediese professie durf nie aan plaaslike gesondheidsdienste die nimmereindigende, ondankbare taak alleen oorlaat nie om ouers te oortuig om hul kinders betyds te laat immuniseer. Elke praktisyn behoort nie slegs die ouers te probeer oorreed nie, maar dit is hul plig en voorreg om, indien nodig, die entstof self toe te dien. Sodoende kan hul die besmoontlike diens aan alle pasiënte lewer.

1. Enders, J. F., Weller, T. H. en Robbins, F. C. (1949): Science, **109**, 85.