

Bibliography of recent literature on poliomyelitis*

Nerve conduction studies and its importance in diagnosis of acute poliomyelitis

Agboatwalla M et al.

Indian Journal of Pediatrics, 1993, 60(2): 265-8

Motor nerve conduction velocity tests were performed on 50 subjects in the paediatric age group. Thirty two patients with acute poliomyelitis and 18 controls. The MNCV was studied in the median nerve in the upper limb and the posterior tibial in the lower limb. The motor nerve conduction velocity in polio patients matched well with the controls, as well as within the accepted standards for normal. The MNCV of the median nerve ranged from 41.8 ± 2.76 m/sec in under 1 year to 44 ± 2.1 m/sec in 3-8 years, in polio patients, while the range in controls varied from 37 to 53 m/sec. Similarly, for the posterior tibial nerve, in polio patients the value of MNCV varied from 38.7 ± 4.9 m/sec to 42.5 ± 3.1 m/sec. In the controls, the MNCV ranged from 38.5 ± 6.3 m/sec to 48.4 ± 3.42 m/sec. Thus, no delay on the motor nerve conduction velocity was seen. Poliomyelitis is a major problem in developing countries like Pakistan and India, where serological diagnosis is a luxury. The determination of motor nerve conduction velocity provides a quick and easy method of distinguishing poliomyelitis from other motor nerve disorders, especially Guillain-Barré syndrome.

Virological and serological studies on poliomyelitis in Karachi, Pakistan. I. Outbreaks in 1990-91

Isomura S et al.

Acta Paediatrica Japan, 1993, 35(5): 382-6

Between October 1989 and September 1991, 124 cases of poliomyelitis visited the Department of Paediatrics, Civil Hospital Karachi, Pakistan. The majority of them were between 6 months and 2 years of age, and the epidemics occurred during the hot seasons. The dominant serotype was poliovirus type 1 during the epidemic season in 1990 and type 2 in 1991. All the polioviruses isolated from the patients were wild-type. Virological studies also disclosed that enteroviruses other than polioviruses were prevalent among healthy children as well as among diarrhoeal and polio patients. A serological survey to elucidate the serological efficacy of oral polio vaccine (OPV) showed that: 1) in 112 unimmunized children, after disappearance of transplacental maternal antibody during early infancy, antibody prevalence increased gradually and more than 80% of the children were seropositive against all three types of polioviruses at 5 years of age; 2) in 201 children immunized with full doses of OPV in their infancy, the decrease in antibody titre during infancy was less and seroprevalence rose sharply afterwards: at 2 years of age, less than 80% of

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them were seropositive against all three types of the virus. The rapid increase of seroprevalence might be the effect of OPV administration. However, the prevalence was lower than that in developed countries.

Disadvantage in physically disabled adults: an assessment of the causation and selection hypotheses

Shaar KH, McCarthy M, Meshefedjian G. *Social Science Medicine*, 1994, 39(3): 407-13

An area survey of West Beirut provided the opportunity to study whether disadvantage among people with physical disabilities is attributed to social class of origin (causation) or is due to the social consequences of disability (selection and drift). Adults who were disabled from poliomyelitis in childhood were compared to West Beirut residents and to age- and sex-matched sibling controls. The typical finding of a substantially greater proportion of disabled people in the lower social class groups was noted. Their fathers were also overrepresented in the lower social classes but to a lesser extent in the skilled manual group. The occupational mobility processes, both intergenerational and intragenerational, pointed to a trend towards skilled labour for disabled groups from all social classes, a finding different from the general population trends. Selection (failure to reach or keep expected position) was noted in the lower social classes while the downward drift (movement from higher to lower social class) for the disabled persons was seen in the upper social classes. Both the causation and the selection-drift hypotheses were supported by the findings.

Unnecessary injections given to children under five years

Ashwath D et al.

Indian Journal of Pediatrics, 1993, 60(3): 451-4

Adults accompanying 64 children attending a hospital out-patient clinic were questioned about treatment and injections given for illnesses in the previous month. Half the children had received injections, almost all given by private doctors: we consider most of these injections to have been unnecessary. Three girls were paralysed by aggravation poliomyelitis after unnecessary injections. Adults approved of injections although they did not know what was injected.

Methods for poliomyelitis eradication: is there a consensus?

Beale AJ.

Public Health Review, 1993, 21(1-2): 129-34

I have been a strong advocate, for many years, for the merits of IPV for the control of poliomyelitis, and the ultimate eradication of the disease and of poliovirus from the environment (Beale AJ. Poliovaccines: time for a change in immunization policy? *Lancet*, 1990; 335: 839-842). I have also recognized how fortunate we are in the Public Health field to have such an excellent vaccine as Sabin's OPV. Dr. Foege has argued eloquently and cogently for an approach that uses both vaccines: OPV and IPV. The EPI programme has used three or four doses of OPV, but in a number of developing countries this has proved inadequate to provide satisfactory control. In South America the use of 10 or more doses has been required to bring the disease under control. A combined approach of using killed poliovaccine combined in DTP and three doses of OPV seems to be the pre-

ferred consensus solution. It would cause the minimum and, hopefully, no disruption of the existing programmes of the EPI. It would almost certainly bring forward the day when poliomyelitis will be controlled and the disease at least will be eradicated. It is clear that the sooner this is done the better. It is cheaper to do it now, although it requires more funds in the short term; and it is better for the children of the world—present and future. The extra cost of putting IPV into DTP is probably about US\$ 1 per course, which is probably no more expensive than giving six more doses of OPV, when the total costs of administration are considered.

Albert B. Sabin and the development of oral poliovaccine

Horand F.

Biologicals, 1993, 21(4): 311–6

There are many reasons for the modern interest in viral vaccines, but there is no doubt that the key role played by viral vaccines in public health is the major factor since other prophylactic or therapeutic antiviral products simply do not exist. Viral vaccines have a long history that has been marked by successful events and by tragic accidents. Live viral vaccines are an extraordinary category of biologicals since, despite their reputed efficacy, they were developed by empirical experiments and patient epidemiological observation. From this point of view oral polio vaccine should be considered a "miracle" since it became a major tool for public health in the 20th century, before we were able to understand the molecular basis of polio virus neurovirulence attenuation. The first evidence that polio virus can be attenuated was provided in the early 1940s by Max Theiler, but it was Hilary Koprowsky who demonstrated further in 1952, that a rodent adapted strain was safe and able to immunize a limited

number of volunteers. Koprowsky studies were confirmed later during a mass field trial in Africa. However it is undeniable that the patient and systematic work of Albert B. Sabin was primordial in developing live oral attenuated poliovaccine. The excellence of Sabin's testing of poliovirus neurovirulence in the accurate studies that he developed, enabled him to select, after the cloning of viral populations by plaque assay, the best attenuated variants.

Experience with poliovaccines in the control of poliomyelitis in India

John T.J.

Public Health Review, 1993, 21(1–2): 83–90

OPV was introduced into the National Immunization Programme (NIP) in 1979. The reported number of cases of poliomyelitis was about 20 000 in 1979, 38 000 in 1981; it gradually declined to the pre-immunization level of 20 000 in 1986, but increased to 28 000 in 1987. In 1989, 10 years after NIP, the reported number of cases fell below the pre-immunisation level, and has further declined to 5 669 in 1991. The three-dose OPV coverage during infancy was estimated to be about 80% in 1991. If reporting efficiency is 10%, then about 60 000 cases would have occurred in 1991, for an incidence of disease of about 7 per 100 000 in the total population of 840 million. Three questions arise: 1) Why did it take over 10 years of NIP to reduce the disease burden? 2) Why is the disease occurring at a high incidence level in spite of 80% immunization coverage? 3) Will we be able to eliminate poliomyelitis and eradicate polioviruses by the year 2000 by sustaining the high immunization coverage using 3 doses of OPV? In most countries, the incidence of disease has declined immediately after instituting NIP including OPV. The vaccine efficacy (VE) of three doses of

OPV in India is 70–93%. Hence the lack of decline of incidence during 10 years of NIP was most probably because sufficient proportions of infants were not being immunized. The incidence remains high because the VE and herd effect of three doses of OPV are insufficient. Vaccine failure cases will account for 2–9 cases per 100,000 per year since preimmunization incidence was 30 and VE is 70–93%.

Ghana/JICA/WHO training course in polio diagnostic procedures and vaccine potency testing

Kobayakawa T.

Acta Paediatrica Japan, 1993, 35(6):

567–70

The Ghana/Japan International Cooperation Agency/WHO training course in polio diagnostic procedures and vaccine potency testing was initiated in 1992 at the Noguchi Memorial Institute for Medical Research in Ghana to run for five consecutive years. The purpose of the course is to create virologists and technicians competent in laboratory methods to support the polio eradication initiative in Africa. The participants are invited mainly from anglophone countries in the region.

Elimination of poliomyelitis in France: epidemiology and vaccine status

Malvy DJ, Drucker J.

Public Health Review, 1993, 21(1–2): 41–

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In France, both inactivated poliovirus vaccine (IPV) and oral poliovirus vaccine (OPV) were used until 1983. By that time a new enhanced-potency IPV (eIPV) had been licensed and recommended by the French Ministry of Health as the vaccine of choice. Ninety-five per cent of infants have received four doses of eIPV by 24 months of age. No cases of vaccine-associated paralysis among either recipients or those in

contact with recipients have been reported since 1983. Only four wild indigenous cases of paralytic poliomyelitis have been reported among unvaccinated children in the past five years and none since 1990. Although paralytic poliomyelitis has been virtually eliminated in France, vaccination programmes as well as active surveillance of the community and environment for poliovirus circulation should be reinforced to reach the goal of wild poliovirus eradication.

Global eradication of poliomyelitis: reinvent the wheel or use existing options effectively?

Ogra PL.

Public Health Review, 1993, 21(1–2):

143–50

The development of serum and nasopharyngeal antibody response, and the magnitude and temporal pattern of faecal shedding of vaccine and revertant polioviruses was examined in infants previously immunized with one or more doses of oral poliovirus vaccine (OPV), enhanced-potency inactivated poliovirus vaccine (eIPV), or both. The faecal samples were collected at different intervals after the last OPV dose. The nucleic acid sequences of the purified RNA obtained from all virus isolates were examined in the 5' noncoding region by dideoxysequencing to determine whether the viruses shed represent revertants (vaccine), nonrevertants, or both. The frequency and duration of vaccine virus-shedding appeared to be similar in both immunization schedules. Revertant virus shedding was not demonstrated 30 days after immunization with OPV alone. However, shedding of revertants was detected for as long as 60 days in some subjects previously immunized with eIPV. The duration of shedding of revertant virus differed with different serotypes and different

immunization regimens. Prior immunization with one or more doses of OPV reduced the length of shedding of revertant virus. Significantly, however, prior immunization with one or more doses of eIPV was not associated with reduced shedding of revertant virus types. The nature of serum immune response as determined by ELISA or neutralizing antibody appeared to be similar after either immunization schedule, although the antibody titres were quantitatively higher after two doses of IPV than observed after a similar schedule with OPV. Highest antibody activity was detected in subjects immunized with a combination of IPV followed by OPV. ELISA antibody activity in the nasopharynx was regularly detected after either form of immunization.

Poliomyelitis in selected African and Asian countries

Patriarca PA.

Public Health Review, 1993, 21(1-2): 91-8

The most common cause for the persistence of poliomyelitis in developing countries has been the failure of routine immunization programmes to provide at least three doses of poliovirus vaccine to a high proportion of infants. However, a more worrisome pattern of disease can be attributed more to vaccine failure than failure to vaccinate, as illustrated by epidemics in selected African and Asian countries during the 1980s. The efficacy of oral poliovirus vaccine (OPV) has been shown in these and other instances to be considerably lower in developing countries than in industrialized countries, indicating that reliance on routine administration of OPV alone will not be sufficient to achieve global eradication of wild poliovirus transmission. Because more aggressive approaches will likely be needed to achieve global eradica-

tion of poliomyelitis, various tactics have evolved over the past decade. The most promising approach has been the use of biannual national vaccination days, which have been used with great success in Latin America. However, these campaigns have certain drawbacks, including enormous OPV requirements and difficult logistics. A second approach, which has been used primarily in the West Bank and Gaza, involves the use of combined schedules of OPV and enhanced-potency inactivated vaccine (IPV). This approach requires far fewer contacts and doses of OPV; allows for more reliable and consistent serum neutralizing antibody responses in both the short- and long-term; and for boosting of secretory antibody responses in both the nasopharynx and gastrointestinal tract.

Surveillance of poliomyelitis in the United Kingdom

Salisbury DM, Begg NT.

Public Health Review, 1993, 21(1-2): 35-40

Routine surveillance of poliomyelitis is undertaken through statutory notification, laboratory reporting and examination of death certificates where poliomyelitis is mentioned. All health districts report weekly and include zero reporting of poliomyelitis in their returns. UK weekly reports on poliomyelitis are forwarded to WHO Europe. There have been no wild virus cases for over a decade. Since August 1991, there has been active surveillance of acute flaccid paralysis (AFP) in children under 16 years. All consultant paediatricians are contacted monthly through the British Paediatric Surveillance Unit and asked for reports of any cases of AFP. These are then investigated further. The study protocol specifies the investigations that are required for AFP cases, including stool samples for virology. AFP rates from this

surveillance, approximately one per 100 000 children under 16 years, provide a valuable guide for industrialised countries; consideration is being given to extending this scheme into the adult population. In 1992, a 44-year-old man died after sudden onset of AFP. Histology suggested poliomyelitis, and intensive investigations were undertaken to establish a diagnosis. The role of AFP surveillance and investigation of suspected cases are discussed in the light of the need to establish that poliomyelitis has been eliminated.

The pattern of residual muscle paralysis in poliomyelitis

Sharma SC et al.

Int Orthop, 1994, 18(2): 122-5

Rural schoolchildren between the ages of 6 and 18 years were screened for residual paralysis following poliomyelitis; 503 (0.85%) out of a total of 58,592 were victims. Of these, only 16 (3.8%) had received poliomyelitis vaccine, while the remainder had not been immunised. The disease had occurred before the age of 4 years in nearly 90%, the lower limbs being affected (98%) more often than the upper (2%). In the lower limbs, the quadriceps, hip adductors and tibialis anterior were frequently affected. The muscles supplied by the L4 and L5 spinal segments were most commonly involved, while those supplied by L1 and S3 were least. Some order does exist in the apparently irregular distribution of paralysis after poliomyelitis.

Can we agree on a prescription? A view from the perspective of the developing countries

Stoeckel P.

Public Health Review, 1993, 21(1-2): 139-42

There are serious obstacles, particularly on the African continent, to the application

of the official strategy for eradication of poliomyelitis. Outbreaks in countries where a potent OPV was used keep raising the question of its efficacy in routine programmes. Based on the South American strategy, 200 million doses of OPV are needed for the 11 million children born each year. Such quantities of vaccine can hardly be procured for the rest of the world. Organization of vaccination campaigns will be competing with other public health programmes. Studies in Africa and in the Eastern Mediterranean Region have shown the good performance of one or two doses of eIPV combined with DTP. At the current price of the quadruple vaccine DTP-eIPV, its cost-effectiveness not only in money, but in practical terms, especially for the inventory, the cold chain and the delivery, would be extremely attractive.

Paralytic poliomyelitis in Oman: association between regional differences in attack rate and variations in antibody responses to oral poliovirus vaccine

Sutter RW et al.

International Journal of Epidemiology, 1993, 22(5): 936-44

Variation in attack rates of paralytic disease by region during the 1988-1989 epidemic of type 1 poliomyelitis in Oman provided the stimulus to test the hypothesis that these observations were due to regional differences in the response of infants to trivalent oral poliovirus vaccine (OPV). Seroprevalence studies of 394 children born during the outbreak were conducted in six different regions of Oman and in two socioeconomic status (SES) groups in the capital city of Muscat; a seroconversion study was also carried out in 105 infants born after the outbreak. Seroprevalence rates by region after receipt of at least three doses of OPV ranged

from 90% to 100% (median 94%) to poliovirus type 1, and from 86% to 100% (median 97%) to type 2, and from 47% to 79% (median 72%) to type 3, with the lowest rates observed in regions with the highest incidence of type 1 paralytic disease. In Muscat, seroprevalence rates were also significantly lower in low versus high SES groups (type 1: 84% versus 98%, respectively [$p = 0.006$]; type 3: 59% versus 86%, respectively [$p = 0.001$]). In the seroconversion study conducted after the outbreak, 89%, 100% and 50% of infants had detectable antibodies to types 1, 2, and 3, respectively, after four doses of OPV. Low responses to type 3 were also associated with the occurrence of sporadic cases of type 3 poliomyelitis in 1991, in spite of high rates of coverage with at least four doses of OPV (> 96%) throughout the country.

Basic conditions for the eradication of poliomyelitis—indications for a common prescription

Swartz TA.

Public Health Review, 1993, 21(1-2): 157-60

The efforts of the last decade to achieve the world eradication of poliomyelitis have resulted in several problems of methodology and field implementation of the polio control programme. 1) The concept of eradication. Its present definition refers to the complete absence of activity of the wild poliovirus. It is the result of the decision to recommend the use of OPV for the world control of polio and leaves unanswered the problem of the paralytic disease associated with OPV. 2) Besides a successful vaccination policy the control of polio implies a satisfactory environment. Risk factors in the environment mean persistence of endemicity and reoccurrence of disease, even after several years of absence of po-

lio activity. 3) Concerning the limitations of the two available vaccines, problems of immunogenicity, safety and thermostability are associated with OPV. Use of eIPV requires high coverage of all the ages at risk of infection, and gut immunity is lower than that induced by OPV. On the other hand, several observations point to the limitation of OPV to prevent the spread of the wild virus into the vaccinated community, as claimed for eIPV. Limitations of OPV are mainly vaccine associated paralytic disease in the developed countries, and wild virus associated disease in "vaccinated" individuals in the developing countries. Disease associated with eIPV programmes is observed practically only in nonvaccinated individuals. eIPV, particularly if associated with OPV, offers a clear advantage over OPV alone, in terms of immunogenicity, safety, and protective efficacy. 4) Total elimination of paralytic poliomyelitis can hardly be conceived of without the use of the eIPV.

Direct detection of wild poliovirus circulation by stool surveys of healthy children and analysis of community wastewater

Tambini G et al.

Journal of Infectious Diseases, 1993, 168(6): 1510-4

Cartagena, Colombia, was one of the last cities in the Americas known to have endemic poliomyelitis. After three cases were identified in 1991, two approaches for detecting continued silent transmission of wild polioviruses within a high-risk community were used: stool surveys of healthy children and virologic analysis of community sewage. Wild type 1 polioviruses were isolated from 8% of the children studied and from 21% of sewage samples. The proportions of wild polioviruses, vaccine-related polioviruses, and nonpolio enteric

viruses were similar for both approaches. Wild poliovirus sequences were also amplified directly from processed sewage samples by the polymerase chain reaction using primer pairs specific for the indigenous type 1 genotype. The last reported cases associated with wild polioviruses in the Americas occurred in Colombia (8 April 1991) and Peru (23 August 1991). Direct sampling for wild polioviruses in high-risk communities can provide further evidence that eradication of the indigenous wild polioviruses has been achieved in the Americas.

Coping with the late effects: differences between depressed and nondepressed polio survivors

Tate D et al.

American Journal of Physical Medicine and Rehabilitation, 1994, 73(1): 27-35

This study examined differences between depressed and nondepressed individuals with a history of paralytic poliomyelitis in terms of demographics, health status and coping strategies. The prevalence of distress and depression in this group of 116 polio survivors was determined. Subjects completed the Brief Symptom Inventory, the Coping with Disability Inventory and a questionnaire concerning their polio histories and self-perceptions of health. Medical assessments were performed by physicians. Only 15.8% of the sample had scores indicating depression and elevated distress. Depressed/distressed polio survivors were more likely to: be living alone, be experiencing further health status deterioration, seek professional help, view their health as poor, report greater pain, be less satisfied with their occupational status and their lives in general and exhibit poorer coping outcome behaviours in relation to their disability. Three factors in coping with the late effects of polio were identified

through a factor analysis of the Coping with Disability Inventory: positive self-acceptance, information seeking/sharing about the disability and social activism. Differences between depressed/distressed and other polio survivors were found across these three factors, with depressed/distressed subjects having significantly lower coping scores. These and other results are discussed.

The WHO-EPI Initiative for the global eradication of poliomyelitis

Ward NA et al.

Biologicals, 1993, 21(4): 327-33

Since the development of attenuated oral polio vaccine, Dr Albert Sabin consistently maintained that the global eradication of wild poliovirus was possible, but that to achieve polio eradication in developing countries would require the mass administration of the oral vaccine. Experience in Cuba and Czechoslovakia proved the effectiveness of this technique, but it was only with its deployment in Brazil in 1980 that its role in eradicating the virus from a broad geographical area started to be realized. With the declaration in 1985 of a target of regional polio eradication, extension of this policy, allied with the development of effective surveillance of acute flaccid paralysis in children, with laboratory confirmation of diagnosis rapidly led to apparent interruption of wild poliovirus transmission throughout the Americas. The World Health Assembly in 1988 committed WHO to the global eradication of poliomyelitis. Based on experience in the Americas and building on the solid foundation established by the Expanded Programme on Immunization, WHO has defined the strategies through which the global target could be achieved. Progress is encouraging, and where the advocated strategies have been fully implemented, the incidence of polio-

myelitis has declined dramatically. Significant geographical areas in western Europe, the Maghreb, the Arabian peninsula, the Pacific basin and southern Africa, each incorporating several countries, are now thought to be free of the disease caused by wild poliovirus. The target of a world free of polio by the year 2000 can be achieved.

Progress toward global eradication of poliomyelitis, 1988–1993

MMWR Morbidity and Mortality Weekly Report, 1994, 43(27): 499–503

In May 1988, the World Health Organization adopted a resolution to eradicate poliomyelitis by the year 2000. Since then, all six WHO regions have made substantial progress toward this goal using three major control strategies: 1) maintaining high coverage of children with at least three doses of oral poliovirus vaccine (OPV3); 2) administering supplementary doses of OPV to all young children (generally those aged less than 5 years) during National Immunization Days (NIDs) and during door-to-door vaccination campaigns in areas where wild poliovirus circulation persists at low levels; and 3) developing sensitive systems of epidemiological and laboratory surveillance. This report summarizes progress of the global polio eradication initiative from 1988 through 1993.

Strategies for the certification of the eradication of wild poliovirus transmission in the Americas. Expanded Program on Immunization, Pan American Health Organization

Bulletin of the Pan American Health Organization, 1993, 27(3): 287–96

Because it appears that the last case of poliomyelitis caused by transmission of indigenous wild poliovirus occurred 2 years ago on 23 August 1991 in Peru, the challenge for the Pan American Health Organi-

zation is to develop a methodology of certification that will convince the rest of the world that the eradication of poliomyelitis in the Americas has been achieved. To that end, the guidelines set forth here allow for a rigorous and standardized evaluation of the certification process by objective experts. As it was during the campaign to eradicate smallpox, epidemiological surveillance (of acute flaccid paralysis [AFP] in the case of polio) will be the most important component of the certification process. It must be demonstrated that when cases of AFP occur, they will be identified, reported and investigated in a timely manner to insure that if wild poliovirus is present, it will be identified.

Progress toward poliomyelitis eradication—Egypt, 1993

MMWR Morbidity and Mortality Weekly Report, 1994, 43(12): 223–6

Since 1990, the Ministry of Health in Egypt has directed efforts toward achieving poliomyelitis eradication by the end of 1994. To achieve this goal, the Egyptian Expanded Programme on Immunization (EPI) has progressively implemented each of four World Health Organization (WHO)-recommended strategies: 1) increasing and sustaining routine coverage with oral poliovirus vaccine (OPV); 2) conducting National Immunization Days (NIDs); 3) developing surveillance for acute flaccid paralysis (AFP), including laboratory confirmation of cases; and 4) instituting "mopping-up" vaccination (i.e., house-to-house administration of two doses of OPV at an interval of 4–6 weeks to all children aged more than 3 years who reside in areas where risk for wild poliovirus transmission is highest). This report summarizes the poliomyelitis eradication effort in Egypt based on a programme review conducted during 20–30 November 1993, by the

Egyptian Ministry of Health; Cairo University; the High Institute for Public Health in Alexandria, Egypt; WHO; Rotary International; and Centers for Disease Control.

Maintenance and distribution of transgenic mice susceptible to human viruses: memorandum from a WHO meeting

Bulletin of the World Health Organization, 1993, 71(5): 497–502

This Memorandum discusses the use of transgenic mice in poliovirus research and the potential risks to public health. General and specific recommendations are given concerning the maintenance, containment and transport of transgenic animals which are susceptible to pathogenic human viruses, with special attention to transgenic mice susceptible to polioviruses.

Changes in muscle morphology, strength and enzymes in a 4–5-year follow-up of subjects with poliomyelitis sequelae

Grimby G, Hedberg M, Henning GB.
Scandinavian Journal of Rehabilitative Medicine, 1994, 26(3): 121–30

Twenty subjects with polio sequelae were studied on two occasions 4–5 years apart by means of dynamometer measurements of knee-extension and flexion strength and muscle biopsy for histochemical and enzymatic analyses. The subjects were divided into those who reported (unstable, $n = 12$) and did not report (stable, $n = 8$) new or increased muscle weakness in the tested leg between the two examinations. Muscle strength decreased significantly in the unstable subjects, but only for knee-flexion in the stable subjects. However, the endurance test comprising 50 consecutive knee-extensions at 180 degrees/sec showed increased fatigability at the second examination only in the stable subjects. Most

subjects had markedly increased muscle fibre areas, which in some subjects increased further, but in those already with very extreme hypertrophy the fibre size decreased. Capillarization and activity of citrate-synthase were decreased at the initial examination, but no significant further reduction was observed at the second examination. The results demonstrate individual patterns in the compensatory process for the presumed loss of motor units.

Lack of evidence for wild poliovirus circulation—United States, 1993

MMWR Morbidity and Mortality Weekly Report, 1995, 43(51–52): 957–9

Following the isolation of wild poliovirus type 3 during January–February 1993 among members of a religious community objecting to vaccination in Alberta, Canada, surveillance for poliomyelitis was enhanced among related communities in the United States. In addition, during May–July 1993, a series of surveys was conducted in seven states (Iowa, Missouri, New York, Ohio, Pennsylvania, Washington and Wisconsin) to determine whether wild poliovirus was circulating or had circulated recently among members of these religious communities residing in the states. This report summarizes the results of these surveys.

Paralytic poliomyelitis in Romania, 1984–1992. Evidence for a high risk of vaccine-associated disease and reintroduction of wild-virus infection

Strebel PM et al.
American Journal of Epidemiology, 1994, 140(12): 1111–24

Although poliomyelitis due to wild-virus infection has virtually disappeared from Romania, with no cases having been documented between 1984 and 1989, vac-

cine-associated paralytic poliomyelitis has been reported at very high rates for over two decades. In November 1990, to decrease the risk of vaccine-associated paralytic poliomyelitis, oral poliovirus vaccine produced in Romania was replaced by imported oral vaccine made by a Western European manufacturer. To better quantify the risk of vaccine-associated paralytic poliomyelitis and the impact of the change in vaccine manufacturer, the authors reviewed clinical, epidemiological and laboratory data on poliomyelitis cases that occurred in Romania from 1984 to 1992. Poliovirus isolates were characterized at the US Centers for Disease Control and Prevention. During the period 1984–1992, 132 confirmed cases of paralytic poliomyelitis were reported in Romania, of which 13 were classified as wild-virus-associated, 93 as vaccine-associated, and 26 as "of unknown origin". Wild type 1 poliovirus was isolated during 1990–1992 from nine of 13 (69%) cases in an outbreak that occurred primarily among undervaccinated gypsy children. Vaccine-associated cases were epidemiologically and virologically distinct from wild-virus cases. Of the 93 vaccine-associated cases, 45 children were recipients and 48 were contacts. The overall risk of vaccine-associated paralytic poliomyelitis in Romania (1 case per 183 000 doses of oral poliovirus vaccine distributed) was 14 times higher than the risk in the United States. The risks of recipient vaccine-associated paralytic poliomyelitis related to the first dose of oral vaccine were similar for Romanian and imported vaccine (1 case per 95 000 doses and 1 case per 65 000 doses, respectively), as were the total risks of vaccine-associated paralytic poliomyelitis. These findings definitively demonstrate a substantially elevated risk of vaccine-associated paralytic

poliomyelitis in Romania which was not affected by a change in oral poliovirus vaccine manufacturer.

Cell culture and PCR determination of poliovirus inactivation by disinfectants Ma JF et al.

Applied Environmental Microbiology, 1994, 60(11): 4203–6

Inactivation of poliovirus type 1 by 1 N HCl, 1 N NaOH, 0.5 and 1.0 mg of free chlorine per litre and UV light was compared by using cell culture and seminested PCR (30 cycles of reverse transcriptase-PCR plus 30 cycles of seminested PCR). A minimum contact time of 45 min with HCl, 3 min with NaOH, 3 and 6 min with 1.0 and 0.5 mg of free chlorine per litre, respectively, was required to render 1.64×10^2 PFU of poliovirus type 1 per ml undetectable by seminested PCR. In cell culture, a minimum contact time of 5 min to HCl, 30 s to NaOH and 1 min to either chlorine concentration was needed to make the viruses undetectable by the plaque assay method. No correlation was observed between results by PCR and cell culture when viruses were exposed to UV light. These data suggest that inactivated virus with intact nucleic acid sequences can be detected by PCR.

Detection of enterovirus RNA in clinical samples by nested polymerase chain reaction for rapid diagnosis of enterovirus infection

Nicholson F et al.

Journal of Virological Methods, 1994, 48(2–3): 155–66

Employing a nested polymerase chain reaction with primers from the 5' non-translated region of the enterovirus genome, we detected enteroviral RNA from patients with a variety of enterovirus-associated clinical syndromes. This technique was

found to be sensitive (detecting enteroviral RNA extracted from 0.1 50% tissue culture infectious dose) and specific; no specific PCR product was detected from RNA extracts of a variety of non-enterovirus isolates. Although the technique is of comparable sensitivity to single round polymerase chain reaction followed by Southern blot hybridization, it was more rapid, since it enabled a diagnosis to be made within 1 day. Thus, using nested polymerase chain reaction we were able to detect enteroviral RNA in 31 of 46 clinical specimens from 17 of 23 patients with suspected enterovirus infections. The samples included cerebrospinal fluid, throat swabs, stool, vesicle fluid, peripheral blood lymphocytes, whole blood and pericardial effusion. In contrast virus was isolated in only 17 of 42 clinical specimens from 12 of 22 these patients. In preliminary studies, restriction endonuclease analysis of polymerase chain reaction products enabled us to distinguish between non-polio enteroviruses and poliovirus types 1, 2, and 3. This additional technique may be useful in distinguishing between such infections in polio-endemic countries where rapid public health measures may be required.

Sleep and nocturnal mouthpiece IPPV efficiency in postpoliomyelitis ventilator users

Bach JR, Alba AS.

Chest, 1994, 106(6): 1705-10

Study objective: intermittent positive pressure ventilation (IPPV) can be delivered via various oral, nasal or oronasal interfaces as an alternative to tracheostomy for up to 24 hours of ventilatory support. Nocturnal nasal IPPV is often associated with frequent transient but at times severe oxyhaemoglobin desaturations ($dSaO_2s$) and sleep fragmentation. The purpose of this

study was to determine if nocturnal mouthpiece IPPV is also associated with $dSaO_2s$ and sleep disruption. Design: 27 postpolio ventilator-assisted individuals (VAIs) using mouthpiece IPPV with little or no ventilator-free breathing time (VFBT) underwent nocturnal oxyhaemoglobin saturation (SaO_2) monitoring. In addition, 15 underwent nocturnal capnography and 13 underwent polysomnography. Results: mean nocturnal SaO_2 was normal in 22 of 27 and maximum end-tidal PCO_2 was normal in 12 of 15 VAIs. Use of lipseal retention for nocturnal mouthpiece IPPV significantly improved blood gas values during sleep. The polysomnography results demonstrated relatively normal sleep efficiency. Conclusions: nocturnal mouthpiece IPPV is most effective with lipseal retention. It can provide normal alveolar ventilation and SaO_2 during sleep for VAIs with little or no measurable vital capacity or VFBT. Because transient $dSaO_2s$ can be eliminated with lipseal retention, it may disrupt sleep less than nasal IPPV.

Progress toward poliomyelitis eradication—People's Republic of China, 1990-1994

MMWR Morbidity and Mortality Weekly Report, 1994, 43(46): 857-9

In 1988, the Western Pacific Region of the World Health Organization adopted a resolution to eradicate poliomyelitis from the region by the end of 1995. Since then, the People's Republic of China (1993 population: 1.2 thousand million) has made substantial progress toward the eradication of polio by initiating supplementary vaccination activities with oral poliovirus vaccine (OPV) in 1990. This report updates these efforts and describes the impact of China's first National Immunization Days (NIDS) during 1993-1994.

High diversity of poliovirus strains isolated from the central nervous system from patients with vaccine-associated paralytic poliomyelitis
Georgescu MM et al.

Journal of Virology, 1994, 68(12): 8089-101

To establish the etiology of vaccine-associated paralytic poliomyelitis (VAPP), isolates from the central nervous system (CNS) from eight patients with VAPP were compared with stool isolates from the same patients. The vaccine (Sabin) origin was checked for all of the available isolates. Unique and similar strains were recovered from paired stool and CNS samples for five of the eight VAPP cases and the three wild-type cases included in the study. In the remaining three VAPP cases, the stool samples and, in one case, the CNS samples contained mixtures of strains. In two of these cases an equivalent of the CNS isolate was found among the strains separated by plaque purification from stool mixtures, and in one case different strains were isolated from CNS and stool. This shows that the stool isolate in VAPP might not be always representative of the etiologic agent of the neurological disease. A wide variety of poliovirus vaccine genomic structures appeared to be implicated in the etiology of VAPP. Of nine CNS vaccine-derived strains, four were nonrecombinant and five were recombinant (vaccine/vaccine or even vaccine/nonvaccine). The neuropathogenic potential of the isolates was evaluated in transgenic mice sensitive to poliovirus. All of the CNS-isolated strains lost the attenuated phenotype of the Sabin strains. However, for half of them, the neurovirulence was lower than expected, suggesting that the degree of neurovirulence for transgenic mice is not necessarily correlated with the neuropathogenicity in humans.

A predominant viral epitope recognized by T cells from the periphery and demyelinating lesions of SJL/J mice infected with Theiler's virus is located within VP1(233-244)

Yauch RL, Kim BS.

Journal of Immunology, 1994, 153(10): 4508-19

The intracerebral inoculation of Theiler's murine encephalomyelitis virus (TMEV) into susceptible strains of mice results in a chronic, immune-mediated demyelinating disease that shares many features with human multiple sclerosis. As with human multiple sclerosis, T lymphocytes seem to be critically important for the pathogenesis of this virally induced, demyelinating disease. Therefore, determining the fine specificity of the T cell response may be essential for elucidating the mechanism(s) involved in demyelination. By using fusion proteins and synthetic peptides, we have initially identified a region within the amino acid residues 233 to 250 of the VP1 capsid protein of Theiler's virus that is recognized by T cells from either TMEV-immunized or TMEV-infected, demyelination-susceptible SJL/J mice. A T lymphocyte precursor frequency analysis indicates that a major TMEV-reactive T cell population in the periphery of virus-infected mice recognizes this VP1 region. The fine epitope specificity has been further determined to be within VP1(233-244) using additional synthetic peptides. VP1(233-244)-specific T cells seem to represent a significant population of TMEV-reactive T lymphocytes within the demyelinating lesions, because such T cells have been cloned from the spinal cords of infected mice. Interestingly, all TMEV-specific T cell clones derived from the demyelinating lesions, regardless of epitope specificity, produce IFN-gamma on stimulation and thus may play a critical role

in the recruitment and activation of inflammatory cells leading to demyelination. Taken together, these data suggest that a T cell response against VP1(233-244) is involved in the pathogenesis of TMEV-induced demyelinating disease.

Etiological agents of acute poliomyelitis in south India

Deivanayagam N et al.

Indian Journal of Pediatrics, 1994, 61(3): 257-62

This study was done to identify the specific etiological agents that cause acute poliomyelitis (APM). All the children newly diagnosed clinically as APM at the Institute of Child Health, Madras, during the period May 1988 to May 1989 were recruited. Stool specimen collection, transportation and identification of viruses by culture were done by standard procedures. The total number of children recruited was 312. Specimens were contaminated/insufficient in 10. Analysis was done for 302 cases. Polio virus type II was identified in 25.5% children, type I in 18.5%, type III in 15.9%, multiple polioviruses in 6.3% and non-polio enteroviruses (NPEV) in 20.2% cases. No virus was identified in 13.6%. Among the APM cases clinically diagnosed, the proportion of NPEV has increased considerably from 5% in 1984 to 20.2% in 1988-89. The age distribution was not significantly different between polio viruses and NPEV. The distribution of polio viruses and NPEV

did not differ significantly in relation to immunization status, source of water supply, method of excreta disposal and the clinical types. For surveillance and control/eradication programme of poliomyelitis, laboratory confirmation is essential.

Asymmetrical osteoarthritis in a patient with Ehlers-Danlos syndrome and poliomyelitis

Tait TJ, Bird HA.

Clin Exp Rheumatol, 1994, 12(4): 425-7

The case is reported of a 71 year old man diagnosed as having Type I Ehlers-Danlos syndrome, a condition associated with the premature development of osteoarthritis, who contracted poliomyelitis as a young man as a result of which he has developed asymmetrical osteoarthritis involving the limbs unaffected by the poliomyelitis. This observation lends further support to the hypothesis that an intact neural pathway may be necessary for the development of arthritis.

A role for the private sector in poliomyelitis surveillance?

Kirsch TD, Harvey M.

World Health Forum, 1994, 15(3): 240-3

In order to identify all cases of acute flaccid paralysis as quickly as possible, most countries need to include private health providers in their poliomyelitis surveillance systems. Ways of achieving this are considered.