

**Discussion**

# *The Pros and Cons of Immunisation*

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## **Paper One: Immunisation and Its Discontents: An Examination of Dissent from the UK Mass Childhood Immunisation Programme**

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Arguments for and against a mass childhood immunisation (MCI) programme highlight two salient features of modern health care policy which may be in conflict. The first relates to the increasing popularity of health promotion and illness prevention policies and the second is the emerging concern about informed consent and individual versus community rights. In health care systems such as the British National Health Service (NHS), which are being subjected to increasing marketisation, such a conflict is intensifying because medical practitioners are being financially penalised for failing to meet immunisation targets prescribed by central government. This pressurises them to override any concerns they may have had in the past for the rights of parents not to comply with MCI. A contradiction apparent here is that marketisation

has also brought with it the ideology of consumerism, with its attendant assumptions of individual rights. In the UK these are now enshrined in the 'Patient's Charter'.

This paper examines the conflict between an official bio-medical position and a dissenting view on mass childhood immunisation and some of the associated political and ethical dilemmas this gives rise to. In doing so, the results of a recent qualitative study by the authors of 'rational non-compliance' with MCI will be used. In outlining the components of this dissenting position the purpose is not to assess the scientific validity of alternative claims about immunisation. This would be an impossible task within this space, given the competing and shifting knowledge claims within epidemiology about the impact of immunisation and the natural history of diseases. Rather the purpose is to outline the rationale for becoming 'refusers' in the context of the official policy, knowledge and practices of primary health care workers in relation to MCI.

### **The Official View**

Mass childhood vaccination against infectious diseases is provided in the form of a 'triple vaccine' for diphtheria, pertussis (whooping cough) and tetanus, and an oral vaccine for poliomyelitis which are given in three doses between 2 and 6 months of age. A combined measles, mumps and rubella vaccine (MMR) is given as a single dose at 14 months. Mass vaccination against *Haemophilus Influenzae* B

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(Hib) has recently been introduced in the UK and is currently provided routinely to children below the age of 24 months. This immunisation programme is viewed as one of the most effective health promotion initiatives. The World Health Organisation set a target of 90% uptake of childhood immunisation by 1990, which in the UK has been achieved for all the infectious diseases except pertussis, which has reached 88%.<sup>1</sup>

According to the official bio-medical viewpoint, immunisation is considered to offer protection in two ways. The first is by directly protecting the vaccinated individual from infectious disease. By stimulating a reaction to a pathogen in response to oral or injected vaccines, artificial immunity is achieved. Secondly, there is a claimed indirect effect of MCI. It is deemed to reduce the spread of infectious diseases by limiting the circulation of relevant micro-organisms. The notion of 'herd immunity' or population-level immunity applies potentially to all infectious diseases (except tetanus) and, according to the World Health Organisation and most government health agencies internationally, implies the need for immunisation coverage of between 90% and 100%. Within this dominant view there is a recognition that there is 'no such thing as a perfect vaccine'. Texts on immunisation urge health workers to be aware of contraindications and the potential harmful effects of vaccines.<sup>2</sup> Similarly, the UK Department of Health, when providing guidance to primary health care workers, invokes clinical research evidence to support MCI and to stipulate the rare contraindications for its application.<sup>3</sup>

Notwithstanding a passing wave to the rare harmful effects of vaccines, currently the official position about MCI is that the vaccines used are generally both safe and effective and the advantages MCI offers, in terms of disease prevention, far outweigh the scarce iatrogenic effects that vaccines may induce. With regard to evidence to support this second claim, advocates point to the declining incidence of communicable diseases mirroring the improvement in national immunisation uptake rates. For example, government statistics show that as the percentage uptake of measles and pertussis vaccine has increased significantly in the past

10 years so there has been over the same period a gradual decrease in notifications of pertussis and measles.<sup>4,5</sup>

These assumptions then provide the moral mandate for government funded agencies (such as the Health Education Authority in Britain) to pursue a multi-media advertising campaign to persuade parents to comply with a programme, which is deemed to do no harm to individuals, but which serves to protect the collective. Thus MCI is viewed within official health care circles as a highly effective and legitimate strategy. Certainly the policy, if sound, appears to offer tangible benefits in a field where the pay-offs of health promotion strategies are often elusive. The impact of health promotion is largely invisible and diffuse, and there is often uncertainty about the effectiveness of long-term measures.<sup>6</sup> In this regard, the general public's perceptions of immunisation policies are likely to be favourable. This is indicated by the large uptake rates, which in the UK are now above the World Health Organisation Expanded Programme on immunisation target of 90% by 1990 for all 2-year-old children in Europe.

### The Dissenting View

Dissent in this field dates back to the introduction of vaccination in Europe in the early 19th century.<sup>7</sup> There were immediate objections on religious grounds, with the notion that to inoculate is to interfere with the will of God. However, at that time uncertainties about the efficacy of vaccines amongst certain sections of the community were also expressed, along with protests about the right of individuals to reject vaccination. This concern with civil liberties, at the inception of vaccination as a public health measure, formed a focus of popular resistance, as is indicated by this quote from the report to the annual meeting of the governors of the London Vaccine Institution in 1818:

'In some countries on the Continent, by no means so favourable for the extinction of the deleterious disease as in our insulated, our seagirt country, the inhabitants submit, without a

murmur, to the commands of their governments, and the small pox disappear but on the question what conduct the Englishman shall observe, in the affairs of his family, or on the subjects of his religious duties, if any authority off him more than precept and example, we well know that he will rather reject even the most obvious benefits rather than be constrained to adopt them...'. (London Vaccine Institution; For Inoculating and Supplying Matter, Free of Expense, 1818, pp. 1-2).

Current objections to MCI echo these early concerns and can be found in journalistic campaigns and alternative literature, which both reflect and reinforce parental dissent about MCI. For example, *What The Doctors Don't Tell You* (WTDDTY),<sup>8</sup> is a regular magazine summarising aspects of the clinical literature that challenge allopathic orthodoxy. WTDDTY has produced a vaccination handbook which contains a number of general and specific criticisms of vaccination based on selected scientific and other sources. The general claims criticise the pro-mass immunisation position on the following grounds:

- There is a false assumption that bacteria or viruses and not the host's health state are the primary variable in explaining the contraction of infectious diseases.
- Vaccinated populations still contract the diseases ('vaccine failures').
- Some individuals have diseases, but do not generate antibodies.
- The introduction into the body of 'artificial' immunity may make the vaccinated individual more prone to autoimmune disorders and cancer in later life.
- Vaccinations may facilitate more serious mutated forms of micro-organisms.
- The greatest rate of decline in communicable diseases took place before vaccination was introduced.

In addition to these general criticisms, the WTDDTY handbook also draws attention to aspects of the clinical literature that cast doubt on the efficacy or safety of specific commonly used vaccines (e.g. MMR and Hib). These claims are based partly on literature from

prestigious medical journals such as *The Lancet* and the *New England Journal of Medicine* and partly on summaries of critical findings from books by physicians who are opposed to immunisation.<sup>9</sup> Alternative literature on immunisation is accessible to people from local health food shops as well as from alternative practitioners and subscribers to alternative health magazines.

### A Recent Study of Parental Dissent

There is also a small but significant group of parents who refuse immunisation for 'rational reasons'. A recent literature review commissioned by the Health Education Authority identifies two main groups who are likely to fail to comply with mass childhood immunisation. The first are those in temporary accommodation and in a low socio-economic class. The second group are thought to be middle-class and well-educated and possibly influenced by homeopathic ideas.<sup>5</sup> We recently conducted a qualitative study focusing on this second group of parents and primary health care professionals' responses to them. Nineteen mothers and ten health professionals were interviewed between December 1992 and April 1993. Topics covered in the interviews with the mothers included the following: information about the (non) immunisation decision and reaction to it by others; sources of advice and knowledge about immunisation including those from alternative practitioners; past experience of immunisation (i.e. with other children); knowledge about and attitudes to relevant diseases (e.g. prevalence of and danger of tetanus, whooping cough and other infectious diseases) and attitude to the efficacy and safety of immunisation and views on child health, information and consent.

The sample was a purposive one and selected on the basis of parental opposition to immunisation. Some respondents were contacted through a pressure group called the 'informed parent', others were contacted through 'snowballing'. Parents interviewed were mainly from a middle-class 'professional' background with a high level of owner occupation and

occupations requiring graduate or postgraduate qualifications (e.g. journalism, social work, commercial artist, choreographer, special needs teacher) and over 30 years of age. The small number of respondents who did not fit into this profile, however, suggest caution is needed before stereotyping parents who fit into the category of rational refusers of immunisation.

Accounts from parents indicated that becoming a 'non-complier' with childhood immunisation tends to develop over time and is influenced by a number of intricate factors and processes. Only five parents decided at the outset not to have their children immunised. It was generally the case that dissenting parents began as compliers with the traditional medical regimens and became non-compliers over time. It may therefore be useful to distinguish between two groups of parents, those who have decided from the outset that immunisation is not for their child and those that comply and then change their minds. However, it was clear from the interview data that once a decision has been made not to comply with the immunisation programme it is unlikely that the decision will be changed.

These parents articulated a complex rationale, (sometimes held in the face of considerable pressure from primary health care agencies to comply with MCI) which was derived from a mixture of world views held about the environment, healing, holism and the roles and responsibilities of parenting and a critical reading of the scientific and alternative literature discussed above. The balance between these varied across accounts. For example, one mother, who was a research psychologist, focused her comments almost exclusively around methodological problems and uncertainties of research reports and the lack of knowledge she perceived her GP to have both about infectious diseases and vaccine side-effects. Another parent (a choreographer and artist) described her reasons for becoming a non-complier in relation to her views about fate. When faced with the rationalistic argument put forward by some health professionals that the risk of damage from vaccine was far less than crossing the road—she responded by saying that if her child was killed or injured by a car she could accept this as an inevitability—something

that she had no control over. She felt she could not 'forgive herself' if something happened to her child as the result of decision to deliberately introduce something she viewed as toxic into her child's body. Generally, however, the doubts about immunisation were initiated by a maternal 'instinct' or intuition, which were confirmed and solidified into a coherent anti-immunisation position by finding out more from the medical and alternative literature.

### *Themes in Dissenting*

From the accounts, a number of specific themes were identified in relation to the emergence of a dissenting rationale. First, there was the influence of alternative medicine, and in particular homeopathic ideas about natural immunity. The introduction of artificial immunity via vaccination was viewed with suspicion because it was seen as crude and inappropriate 'if you inject something into the blood stream it doesn't go through the normal sort of defence mechanisms of the body'. In opposition to the notion of 'herd immunity', catching some childhood diseases such as measles, mumps and rubella was seen as important in protecting a child's health. As one parent said, 'it is important to have children who catch these diseases naturally and get over them naturally'.

The threat to natural immunity posed by artificial immunity was often linked in parental accounts to susceptibility to autoimmune problems (such as cancer and HIV) later in life. Homeopaths were also seen to offer alternative preventative protection in the form of remedies which, unlike vaccines, were seen as having the added advantage of being free of side effects.

A second influencing factor was the commitment to a philosophy of 'healthism'. This presents something of a paradox in terms of preventive health strategies. Many of the respondents were paragons of virtue in terms of their attempts at positive health promotion. Most had adhered slavishly to long periods of breast-feeding and went out of their way to provide a healthy diet for their family. They believed strongly in the virtues of exercise and providing a loving environment to enable positive child development. Most held holistic

views of health and saw themselves as responsible for the promotion of health enhancing attitudes and behaviours.

It is perhaps not surprising that the passive acceptance of an invasive medical technique clashed with the adoption of self-initiated active health promoting behaviour. This raises the question as to whether life-style health promotion policies are incompatible with preventive policies which imply the passive acceptance of medical authority. Certainly there was scepticism from parents about the medical position on immunisation. Doubt was cast over the claims that orthodox medicine made about the efficacy of vaccines. This was illustrated by the dismissal of the theory of 'herd immunity', as illustrated by this response to the interviewers question:

Q What about the argument that immunisation is a collective issue and that by not having your child vaccinated you may be making other people's children vulnerable to disease?

A Well if they have been immunised they shouldn't be vulnerable to it should they? No I don't seen that we are putting everybody else at risk.

Ironically perhaps, familiarity with the ideas of social medicine (not only, or even, homeopathy) seems to be at least partly responsible for a distrust of the conventional medical position. For example, dissenting parents made reference to the works of McKeown and Dubos<sup>10,11</sup> in discussing their adherence to the idea that improved social conditions and public sanitation measures, rather than immunisation, having been primarily responsible for the reduction in mortality and morbidity associated with infectious diseases.

Concern about side effects was another factor when adopting a dissenting position. Parents reported side effects as going beyond the 'mild' symptoms they were warned about by professionals or health promotion literature. This was particularly the case where children were perceived (by parents but not official guidelines) as being vulnerable, as illustrated by this mother.

Immunisation for some children is perhaps not the best thing, especially if you have got

catarrhy, eczema prone, highly allergic children'.

Immunisation was often seen as a triggering factor in the development of these types of childhood ailments. Reported side effects from other parents were also important in the formulation of a view about immunisation, as were concerns about the long-term side effects, which included the consequences of contracting disease in adulthood once artificial immunity declines.

The experience of working with children and/or the medical profession was sometimes important in developing reservations. Working closely with the medical profession seemed to affect parents in terms of trusting their judgement. One mother mentioned that she did not trust doctors' opinions over vaccines, because they tended to express certainty in areas which were fraught with uncertainty.

A history of non-compliance was at times transmitted from generation to generation. Other respondents reported reacting against parents whom they perceived as over-reliant on medicine and indulging in health denying behaviour. Memories of childhood episodes of recovering successfully from measles also tended to engender a disbelief about the depiction of the infection as a life or long-term, health-threatening disease. Recent changes in the immunisation schedule towards immunising babies at younger ages seemed to cause concern in terms of the perceived vulnerability of tiny babies. Additional worries were expressed about post-natal psychological vulnerability, i.e. recently confined mothers being pressurised by health professionals to gain compliance.

These concerns about immunisation are as yet a minority trend in Britain. It is difficult to estimate the size of this dissenting group. A recent survey has estimated the numbers of 'rational non-compliers' to be low but this only included those who held anti-immunisation beliefs and did not take into account those who refused immunisation on the basis of concerns about side effects.<sup>12</sup>

Within the 90% of those complying we do not know the extent of anxieties which are outweighed by a desire to comply with medical authority, nor the numbers that might fail to comply if they received more information about

the pros and cons of MCI. Even in the absence of accurate data of this type, we do know that what is currently a minority group of educated dissenters may have a disproportionate influence. The social class position and occupations of this group means that they are well placed to promote an anti-vaccination philosophy.

### Ethical and Policy Implications

The two competing views of immunisation outlined here raise some policy and ethical questions about MCI in terms of its implementation generally, and specifically in relation to the practices of health care professionals. First, there is the failure of the official view to engage with or acknowledge the existence of a rational position on the refusal of immunisation. According to official accounts, only a narrow set of contraindications are legitimate reasons for refusing immunisation. Immunisation is seen as a civil right which should not be denied to any member of the community whether or not they actively want it. Dissent is not viewed as a legitimate right. Non-uptake is generally viewed as an irrational stance, which is adopted by the feckless, members of weird religious groups, and those who do not have good access to services, such as travellers and ethnic minority groups. The latter are targeted for special attention, in the battle to increase uptake rates for those who 'fall through the net'. Those resisting MCI in the surgery are sometimes deemed to be suffering from neurotic anxiety. In studies on reasons for low uptake, parental concern about the safety of vaccines are discussed in terms of 'mythical', 'parentally perceived' and 'false' contraindications.<sup>13</sup> However, a reading of the scientific literature on vaccination suggests that the doubts about childhood immunisation are not necessarily mythical, neurotic or unfounded. Such a reading provides fewer assurances about MCI than those offered zealously by public health doctors. The latter, and medical scientists, can be viewed as different stakeholders within the medical community, whose views do not always converge. Whilst both medical groups tend to support MCI, the scientists are more open about iatrogenesis and poor vaccine

efficacy than the public health promoters in their campaigns.

There is a recognition within the medical literature of the uncertainties and failings of vaccination, which do not appear in publicly available literature about vaccination. 'Herd immunity' is taken as being beneficial for all the infectious disease for which vaccination is recommended by MCI advocates. However, the scientific literature casts doubt on the reliability of the notion, as indicated by this quote:

'There is increasing evidence that this concept of "herd immunity" may not be applicable to measles transmission. Human, and in particular urban, populations are not homogeneous herds (rather) they consist of sub-groups whose members associate in a non-random way...'.<sup>14</sup>

In another paper by epidemiological researchers who support MCI we find the following clear concession:

'Ultimately if an infectious disease has been nearly eradicated, the risks associated with the vaccine are expected to exceed those associated with the infection. Hence, there is a conflict of interests between the individual (risk associated with vaccine) and the group (benefits of herd immunity)...'.<sup>15</sup>

These authors also make it clear that of the variants of mumps vaccine currently being produced, the version with the highest rate of iatrogenic complications is also the most effective. They offer a mathematical model to support the use of this effective but dirty vaccine to secure herd immunity.

In relation to rubella, the evidence of vaccine efficacy is cast in doubt in the scientific literature. In the USA for example, in a 100% compulsorily vaccinated group, a quarter blood tested were found not to be protected by the vaccination.<sup>16</sup> Thus, there seem to be medical scientific grounds to support the parental intuition that girls are protected more if they catch the disease naturally. Vaccination programmes are potentially more threatening than catching the disease 'naturally' because of reduced longevity of artificial immunity and the failure, in a significant minority of cases, for immunisation to provide any immunity at all. Moreover, the

consequences of pursuing a 'herd immunity' policy may actually be more threatening to certain individuals than if there was no such policy, as acknowledged by these immunisation experts:

'A corollary of this indirectly diminished probability of infection is that those fewer individuals who *do* experience infection are infected at an older average age. If the risk associated with infection increases with age, such a programme of immunisation at levels below eradication can therefore have perverse consequences...a less than 100% vaccination rate carries with it the risk of pushing up the average age of those who do become infected with rubella towards those of child bearing age'.<sup>17</sup>

Where the scientific literature and the dissident lobby part company is over the solution to the problems thrown up by the inefficiency in MCI generating 'herd immunity'. The answer put forward by medical scientists is generally of intensifying MCI, even at the cost of further eroding the civil liberty of refusers (for example by suggesting linking entry to school with immunisation uptake). In the case of the 'herd immunity' for rubella, attaining 100% immunisation rates amongst successive cohorts of 2-year-olds is offered as a solution.<sup>17</sup> In relation to measles, a two dose immunisation policy is recommended to pre-empt vaccine failures.<sup>14</sup>

There is also the question as to whether iatrogenic effects are accurately recorded. There must be an *a priori*, *prima facie* recognition by those (GPs) recording side effects, such as fits and anaphylaxis, that immunisation may be iatrogenic. And yet the official view is that vaccination cannot be responsible for certain effects. Consequently many GPs will not give credence to parental beliefs that vaccination is a cause of a particular effect, and so they do not put these on record. There is also a limited time period in which effects are deemed to be the result of vaccine damage. Thus, the long-term effects on the immune system, which are the concern of dissenting parents, would certainly not be taken into consideration.

All medications have possible harmful as well as potential beneficial effects. However, immunisation is a physical intrusion into a

*healthy* rather than a sick body. Thus, side effects are not balanced against the alleviation of the symptoms of illness, but are targeted on the hypothetical situation in which an individual *might* be vulnerable to diseases and its morbid sequelae. This in turn raises a further dilemma.

Whereas vaccination *always* carries exposure to the risk of side effects, diseases such as measles, mumps, rubella and whooping cough, only pose a danger if the person contracts the disease. (In the case of rubella the adverse consequences in childhood are non-existent. It is only dangerous to the immature foetus of an infected mother.) The ethical question then begged is this: is it right to expose every child to the risk of vaccine iatrogenesis when the probability of an individual catching the disease is so small? The pro-MCI argument goes that without widespread coverage then these diseases will return. Yet the notion of when a disease is no longer a threat is a speculative and arguably over-conservative one. Does the current prevalence of diphtheria really warrant the effort and resources put into mass vaccination?

A further ethical issue is that of informed consent. Those responsible for implementing MCI see their responsibilities in relation to consent but not informed consent (at least in the UK). There are cultural differences here. An American text on immunisation includes a chapter on *informed* consent,<sup>18</sup> whilst a recent mainstream British text devotes just one paragraph to consent.<sup>2</sup> The latter (along with the DoH (1993))<sup>3</sup> presumes that the 'presentation of a child for immunisation by the family may be seen as consent'. However, this is not without ambiguity. Parents make visits to baby clinics for a variety of reasons—for general health and weight checks, advice about feeding and child rearing. Moreover, parents in the study conducted by the authors reported practices on the part of health visitors and others which beg questions over whether or not consent is freely given.

Parents reported being pressurised by health professionals in a number of ways. This ranged from presumptuous attitudes that vaccination *would* occur on visits to child health clinics, to health professionals using moralistic arguments and scare tactics about what would happen if immunisation were refused. For example, two

respondents from the study mentioned GPs saying that it would be their responsibility if their children caught whooping cough (though one did not know how to respond when the mother asked who would be responsible if a vaccinated child got whooping cough). Health promotion literature about immunisation is also at times economical with the truth, tending to emphasise the benefits of immunisation and minimise negative effects or ineffectiveness. An example here is where promotional material proclaims that immunisation is 'the safest way to protect your child'. Yet, in Britain, the safest form of vaccine was not always used. The whole cell whooping cough vaccine was abandoned by some other countries:

'The West German, Swedish and Japanese governments have long since stopped recommending this type of vaccine, and the French, Japanese and Swedes now have new vaccines, made from only those parts of the whooping cough cell which give immunity from the disease without the other "dirty" toxic bits'.<sup>19</sup>

How many British parents are aware of this picture? It could of course be argued that parents should only have a right to dissent when a particular vaccine carries proven risks but not at other times.

However, from the accounts given by our parent respondents they do not themselves have a blanket anti-vaccination policy but are discriminating in its use based on the evaluation of the risk and benefits of the particular vaccine under consideration. For example, whilst tetanus vaccine was not thought appropriate for 3-month-old immobile babies confined to the home, it was thought appropriate if a deep wound was sustained in the countryside. Moreover, there is no superordinate disinterested party who can arbitrate on which vaccines are of undisputed merit and which are not. According to British government policy and vaccine producers' information all vaccines are safe. They are all deemed to be an essential part of the immunisation programme. Why should governments and vaccine producers be believed when they are concerned with population level targets, not individual risks, and profits respectively?

During the 1980s the Department of Health altered its advice about contraindications in vulnerable children. By 1993 it endorsed hardly any contradictions compared with 10 years ago. And yet during that period they have paid out money to vaccine damaged children. Also, the evidence from epidemiology suggests that good nutrition and proper sanitation are the most important factors in protecting against death from infections and their morbid sequelae (not immunisation).<sup>20</sup> By concentrating almost exclusively on vaccination these other factors are given little consideration in infectious disease prevention. Literature on immunisation is often presented in an emotive way, which suggests that fine lines exist between information, reasonable moral pressure and coercive propaganda. This raises doubts over how informed the average parents are when entering their child for a course of immunisation.

The acceptance of a monolithic policy about MCI by primary health care workers may encourage a narrow view in professionals about their role in relation to the prevention of infectious diseases. Other options could be considered by primary health care workers when dealing with parents who express doubt about immunisation (and those who do not). For instance, existing medical knowledge about maternally transmitted immunity could be the focus of programmes to increase rates of breast feeding. Similarly, targeting strategies could be the basis of advice to parents about relative risk. Ill-nourished children are at greater risk of becoming symptomatic when infected and of developing morbid sequelae. Primary health care workers could focus their attention on this relationship when discussing risk with parents. In the case of Hib, the risk is higher in infants placed in collective child care. Parents could be made aware of this.

To conclude, those who oppose MCI may not hold 'the truth' about the safety, efficacy and administration of vaccines, but they certainly have reasonable grounds for bringing these into question. For their part, government health promotion agencies and primary health care workers demanding a populations' blind compliance with MCI could demonstrate more self-doubt than they have done to date.

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## Paper Two: The Importance of Immunisation

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It is extraordinary that, while childhood immunisation has been the most cost-effective health intervention of the twentieth century, its value and necessity are still challenged. The impact of current vaccines, and the virtual disappearance of previously common childhood diseases in many developed countries, has bred a dangerous complacency in some sections of the community. In recent years, the role of doctors as providers of advice and health care has been shared by other groups, some of whom lack appropriate training to assess the scientific evidence which is available. The views of such groups, which are frequently based on selected data and lack critical analysis, are presented by sections of the press as though they were of equal value to policies based on a rigorous scientific process. In developed countries, a generation has emerged which lacks first-hand experience of diphtheria, whooping cough or measles, and has never seen a child in callipers. Not surprisingly, many have become confused about the need for immunisation; and this has resulted in a decline in vaccine coverage. Tragically, in most communities where immunisation rates have fallen, there has been a resurgence of vaccine-preventable diseases, with much unnecessary illness, many deaths and huge costs to society.

To those born before or shortly after World War II, it is hardly credible that a technology which has allowed the eradication of smallpox and the control of tetanus, diphtheria, whooping cough, poliomyelitis, measles, mumps and rubella, can have fallen from favour.

When I was a resident medical officer I worked in an infectious diseases hospital which had a ward full of patients with paralytic polio, each