# PREVENTABLE ILLNESS IN CHILDREN*

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In the first few years of the lives of children, their chances of survival increase as they grow older. The most dangerous period is the first day or two, then the first week, then the first month, then the first year, and so on until they are about 5 years old.

The greatest toll is taken during the first year of life. This death rate is known as the infantile mortality rate and is the record of the number of infants who, out of every 1,000 live births during any particular year, die in the first year of their lives.

Throughout the whole civilized world a great deal has been done to bring this rate down, as can be seen from the following comparative table, which gives the infantile mortality rate for some countries over the last 22 years. I have chosen these countries because conditions in them are comparable with those pertaining to the White population of South Africa:

| | *1935* | *1942* | *1957* |
|---|---|---|---|
| Australia | 102 | 40 | 21·7 |
| England and Wales | 57 | 49 | 24·7 |
| Holland | 40 | 40 | 18·8 |
| United States of America | 52 | 37 | 26·2 |
| South Africa (Europeans) | 63 | 48 | 27·7 |

From these statistics it will be noted that the European infantile mortality rate in South Africa compares reasonably well with those of other countries. These figures do not include non-Whites, for whom the infantile mortality rates are very high.

While we can be satisfied with the progress which has been made in saving the lives of so many infants, there are still a number of deaths which are preventable and should be prevented.

In dealing with preventable illnesses and deaths in children, I am confining myself to Europeans, because the non-European problem is one which should be tackled on its own.

It is, however, important for us to look at some Bantu rates as well for the sake of comparison. As an example I have taken Pretoria figures because accurate statistics for the whole Bantu population of South Africa are not available, and I think Pretoria's figures are typical of our larger urban areas. Even the Pretoria figures are not quite correct, and should probably be somewhat lower. For the sake of comparison I have taken figures for the same years as those shown in the previous table:

INFANTILE MORTALITY RATES FOR PRETORIA

| | *1935* | *1942* | *1957* |
|---|---|---|---|
| European | 51 | 47·34 | 27·56 |
| Bantu | 347 | 329 | 116 |

From these figures we see that there has been a great improvement in the Bantu rates as well. They are, however, still very high and indicate unsatisfactory health conditions.

When we look at the overall picture we find that the average infantile mortality rate for all races in Pretoria for 1959 is 82·08, and if we really want to compare the health of our population as a whole with that of any other place, we must judge and be judged by this total rate.

On the other hand, we must assess the Bantu infantile mortality rate in its correct perspective. There are very many countries in the world which still have an infantile mortality rate much higher than our Bantu, and if we analyse statistics for socio-economic groups of White people living under similar conditions to our Bantu, even in the most civilized countries in the world, we find that their infantile mortality rates approximate those of our Bantu.

However, no country can be satisfied if only one section of its population is healthy. It is more than a moral obligation to make sure that every child — irrespective of creed, colour or race — has as good a start in life as possible, and is protected against preventable illness, starvation and death.

If a large number of infants die in the first year of their lives, there must also be a large number who, although they survive, must receive some setback which is likely to impair their physical or mental health temporarily or permanently, and this holds good for White and Black.

It is an indisputable fact that most infantile deaths are preventable; it has also been proved that the rates vary according to the socio-economic position of the different sections of the community. Among wealthy people infantile mortality rates are low; as the economic position deteriorates so the infantile mortality rate rises.

*Preventive Measures*

The lives of many babies have been saved by preventive medicine pure and simple. Antenatal, child-welfare and similar clinics have done much to reduce infantile mortality.

We cannot, however, be satisfied with the extent of our preventive and other medical measures. A great deal more can be done in South Africa and, where these services are still inadequate, as much as possible must be done to extend them. But there is a limit to what can be done by such measures alone, and in spite of the best possible preventive medical services we still lose hundreds of babies unnecessarily every year. When the socio-economic level becomes such that there are inadequate nutrition, housing and other social amenities, pure medical science can prevent only a certain number of deaths.

Dr. Neudorfer-Redlich, Austria's representative on the United Nations Children's Fund, reported a short while ago (1960) that 'there are about 900 million children in the world, about 600 million of whom are hungry and sick, children for whom the world does not accept the simple responsibility of providing food and reasonable care'.

SOCIO-ECONOMIC FACTORS

If the population is divided into socio-economic groups the importance of money becomes evident.

To try and find out what part the economic factor plays, we investigated the circumstances of 2 groups of White people in Pretoria some years ago. In group I were people with an income of over £700 a year, that is, the 'better-off' class. Group II included the 'sub-economic' persons with an income under £200 a year.

The investigations in each group were, apart from incomes, made without any selection, and families were picked at random. In each group the histories of all children born alive were followed up for the years 1944, 1945 and 1946** to determine how many children died in each group within the first 3 years of their lives. A comparable investigation on a much bigger scale was also undertaken in Great Britain some years ago.

In the Pretoria survey 236 live births were investigated in group I (i.e. families with an income of over £700 per annum). The mortality rate was 30 per 1,000 (comparable rate for

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** The value of the pound sterling was of course greater in the years 1944, 1945 and 1946 than it is now.

England and Wales for 1931 for a somewhat similar group was also approximately 30). In group II (i.e. persons with an income under £200 per annum) the number surveyed was 429 and the rate was 91 per 1,000 (the rate for 1931 in England and Wales for this group was about 57).

The British figures show that in 1911 the infantile mortality rate in group I was about 77, in group II about 112 and in group III, which fell below our group II, it was about 152. In 1921 the relevant figures were about 38 for group I, about 77 for group II, and about 97 for group III. In 1931 they were about 30 for group I, about 57 for group II and about 77 for group III. From this it will be seen that, although by 1931 the infantile mortality rate in group III (i.e. the unskilled labour class) had been reduced to the level of what it was among the upper and middle classes in 1911, the economic factor still exercised the most important influence on the infantile mortality. We have no similar figures for South Africa, but I have no doubt that the relative figures are very much the same. From all these records it will be seen that the total infantile mortality rate has decreased considerably. This is indeed a happy achievement, but it is still true that in 1931 the rate for the lowest social group was more than twice that of the affluent group, and we have every reason to believe that this ratio is much the same today.

The British authorities deduce from their analyses that, if all poverty indices were removed, an infantile mortality rate of about 23 per 1,000 could be attained for all sections of the population. Of the preventable deaths, one-third are associated with overcrowding, one-quarter with low-paid occupations, one-fifth with unemployment, and one-eighth with industrial employment of women. In England and Wales, over 250,000 deaths in 11 years (about 63% of the total) can be attributed to adverse social conditions. A leading article in the *Lancet* commented on these findings as follows:

'The general validity of their conclusions is further shown by the fact that the rate of 23·1 which would prevail if all poverty indices were eliminated was in fact very nearly reached for social class I as long ago as 1930-32, when it was approximately 30 per 1,000. As a challenge to our social conscience, the findings are all the more impressive because the report is free from political or emotional bias.'

Although no comparable 'class' figures are available for the whole of South Africa, and although it is appreciated that our local Pretoria figures are small in number and concern only one city, the striking similarity of the rates for South African Europeans to the British figures is significant. There is every likelihood that, if similar investigations were made throughout the country, the findings would not vary much from those of Pretoria.

A study, for the year 1959, of the deaths in European children in South Africa, from birth up to the age of 10 years, shows that a total of 2,846 children died during that year, in the following age groups:

| Age group | No. | Rate per 1,000 for each age group |
|---|---|---|
| 0 - 1 year .. .. .. .. .. .. | 2,179 | 30 |
| 1 - 4 years .. .. .. .. .. .. | 461 | 1·71 |
| 5 - 9 years .. .. .. .. .. .. | 206 | 0·65 |
| Total .. .. .. .. .. | 2,846 | |

This table strikingly reflects the higher death rate in the first year of life and the remarkable decrease as the children grow older.

CAUSES OF DEATH UNDER 1 YEAR

In the 'under-1-year' group, the 4 main causes of death for the same year, i.e. 1959, were the following:

| | No. of deaths | Rate per 100,000 for this age group |
|---|---|---|
| Prematurity or immaturity .. .. .. | 602 | 830 |
| Pneumonia .. .. .. .. .. | 344 | 474 |
| Congenital malformations .. .. .. | 254 | 350 |
| Postnatal asphyxia and atelectasis .. .. | 202 | 278 |

**Prematurity or Immaturity**

There are many causes of prematurity. Prematurity by itself, once the child has reached viable age, is considered by many not to be a cause of death. They believe that where there are no obvious causes for premature labour — and there are many such cases — there are causes which are as yet unknown and that these may seriously impair health or even be fatal. Until we are able to discover what these unknown causes are, prematurity will continue to take its heavy toll. Some authorities hold that as many as 40% of the causes of prematurity are unknown. A great deal of research work is being carried out in this field.

The following, however, are known causes of premature labour:

1. *Eclampsia or Pre-eclamptic Toxaemia*

One of the main causes of prematurity is eclampsia. So far we have not really been able to discover its aetiology; until we are able to do this, premature births from this condition will remain unpreventable.

2. *Uterine Haemorrhage before the Foetus has Reached Full Term*

This is another important cause of prematurity. It may, by itself, often cause premature labour, or the haemorrhage may be so serious as to force the induction of premature labour. Medical care of the mother during pregnancy can prevent or stop many such uterine haemorrhages and allow the child to go on to full term. This shows the importance of antenatal care.

3. *Rh Incompatibility*

This occurs not infrequently, and its antenatal recognition by the doctor in charge of the patient is essential, so that steps may be taken to treat the baby at birth.

4. *Other Illnesses*

Maternal cardiac disease, tuberculosis, diabetes, chronic kidney disease, and syphilis are important factors in causing premature births. A great deal is known about all of these, and most of them can be treated in such a way as to allow the child to go to full term. Here, again, we see the importance of antenatal care.

5. *Nutritional Deficiencies*

Nutritional deficiencies in the mother can cause premature birth of the infant, and can also influence the development of the foetus. In many large centres in Europe and in the USA, where investigations were conducted and cases were carefully followed up, it has been shown that where the nutritional state of the mother is improved the incidence of prematurity, perinatal illness and stillbirth is considerably reduced.

In Oslo, for instance, where this aspect has been investigated, the authorities state that prematurity can be reduced by 50% with proper antenatal care and that these excellent results have been obtained largely through eliminating nutritional deficiencies. They also state that much of the mortality and morbidity in early infancy has, at its roots, nutritional deficiencies during the prenatal period.

To combat nutritional deficiency it is necessary to educate people in correct dietary habits, since it does sometimes happen that even people who can afford it may be malnourished because of ignorance of what a balanced and nutritional diet is. Others simply have not got the money to procure an adequately balanced diet, and here again we are faced with the problem of poverty. Poverty factors such as inadequate housing, clothing and excessive financial and other worries, also cause premature labour.

Whatever may be the cause of death of a premature infant, the most important one is that the child has had to leave its natural uterine environment at an age when it was not really sufficiently robust to cope with an extra-uterine existence. We have already seen how much higher the death rate is among infants in the first few days of their lives, and how their chances of survival increase as they grow older. It can well be understood, therefore, that a child who is a few months premature, starts its life not really at the age of one day, but at a much younger age, and is much more susceptible to illness and death.

During this period before the full-term date, the premature child is much more susceptible to 3 of the most important

causes of death which occur in early infancy, viz. respiratory infections, gastro-intestinal diseases, and haemorrhage.

6. *Respiratory Complications in the Premature Infant*

Some authorities say that these result from respiratory failure. This may probably be caused by underdevelopment of the respiratory centre in the brain or changes in the respiratory centre resulting from prematurity. Added to this is the factor of underdeveloped muscles of respiration.

So much for prematurity. We now come to deaths in infants who are not premature.

**Pneumonia**

The next highest cause of death is pneumonia or respiratory-tract diseases. This illness is, to some extent, preventable, and often has as an underlying factor malnutrition of the mother during the prenatal stage, but it can also occur in perfectly healthy children who become infected by any organism which may cause respiratory-tract disease. Staphylococcal and virus infections often cause pneumonia in the newborn and appear to be occurring much more frequently than before.

Inadequate housing and poverty also play a part. Lack of knowledge of child care is another important factor. Here, again, proper child-welfare clinics and knowledge of postnatal care can do much to prevent pneumonia or respiratory-tract infections. Early diagnosis and modern methods of treatment can prevent many deaths, and postnatal care to detect respiratory infections in good time is very important.

**Congenital Malformations**

All the factors which may cause congenital malformations are as yet not known. Some authorities hold that heredity plays a part, but this is doubtful. Congenital malformations are due to an error of development or an interruption in the growth of the foetus. In animal experiments it has been proved that maternal dietary deficiencies can produce congenital malformation in the offspring. It has been found that by deliberately depleting riboflavine in female pregnant rats, malformations such as cleft palate, syndactylism of the fingers and toes, as well as other skeletal changes, can be produced in the offspring. Whether we can deduce from such animal experiments that similar natural nutritional deficiencies in human beings would cause congenital abnormalities is not known, but some authorities hold that vitamin-B-complex deficiency, especially riboflavine deficiency, may be responsible for some foetal abnormalities in human beings. There is no conclusive proof of this assertion, but it is important to note that malformations in animals can be produced by an inadequate diet and the importance of antenatal care and adequate diet must be borne in mind.

Rubella is another important cause of malformation of the foetus. If a woman develops rubella during the first 3 months of pregnancy, the possibility that she might have a child who suffers from some congenital malformation is great. These malformations include affections of the heart and kidneys, deafness, mental aberrations, blindness and other conditions. If the infection of rubella occurs after the third or fourth month of pregnancy, then the likelihood is that it will not affect the child. Congenital malformations from this infection can be avoided by preventing pregnant women from coming into contact with cases of rubella or by administering the specific gamma-globulin immunization on contact. The best preventive measure, however, is to ensure as far as possible that all girls contract rubella while they are young or at least before they are married. Parents should allow their little girls to become infected with rubella whenever the opportunity presents. It would help if we were to remove rubella from the diseases on the schedule which requires children suffering from it to be excluded from schools.

Congenital malformations can also be caused by neoplasms in the foetus. The cause and prevention of these are unknown.

**Atelectasis**

This is an important cause of death in mature infants as well as in premature infants. It is a developmental defect of the lungs or the whole respiratory mechanism. We do not know how to prevent it in mature infants, but the prevention of prematurity will certainly lessen the incidence.

CAUSES OF DEATH BETWEEN 1 AND 9 YEARS

The four main causes of deaths in South Africa in the age groups 1 - 4 years and 5 - 9 years, for the year 1959 were as follows:

| | *No. of deaths* | *Rate per 100,000 for this age group* |
|---|---|---|
| 1—4 years | | |
| Accidents | 107 | 40 |
| Pneumonia | 82 | 30 |
| Gastritis, duodenitis, enteritis, colitis | 56 | 21 |
| Tuberculosis | 14 | 5 |
| 5 - 9 years: | | |
| Accidents | 78 | 25 |
| Malignant neoplasms | 29 | 9 |
| Pneumonia | 14 | 4 |
| Gastritis, duodenitis, enteritis and colitis | 9 | 3 |

These 2 age groups show similar trends and can be discussed together.

*Accidents*

Accidents account for most deaths in both groups. The nature of the accidents and the frequency of their occurrence are reflected in the following table:

| *Nature of accident* | *1 - 4 years* | *5 - 9 years* | *Total* |
|---|---|---|---|
| Motor-vehicle accidents | 41 | 36 | 77 |
| Accidental drowning and submersion | 26 | 20 | 46 |
| Other accidents (not described) | 5 | 13 | 18 |
| Accidental poisoning | 12 | 1 | 13 |
| Accidental burns | 8 | — | 8 |
| Inhalation and ingestion of food or other object causing obstruction or suffocation | 6 | 1 | 7 |
| Accidental mechanical suffocation | 5 | — | 5 |
| Accidental falls | 1 | 4 | 5 |
| Accident caused by electric current | 2 | 1 | 3 |
| Railway accidents | 1 | 2 | 3 |
| Total | 107 | 78 | 185 |

In theory, almost all these accidents are preventable.

*Motor accidents.* The most disturbing factor is the high incidence of death from motor-vehicle accidents. In the WHO Epidemiological and Statistical Report, volume 13, no. 10, of 1960, figures are given for motor accidents throughout the whole world. The South African European motor accident death rate is 27 per 100,000 population, which is the highest rate recorded in the world for the year 1960. Motor accidents are, in most cases, preventable and are nearly always the result of driving at excessively high speeds and taking unnecessary risks. Most of these deaths could have been prevented if there was just a little more thought, courtesy and care on the roads. Very often careful and innocent people are killed because of the carelessness of others. There are, of course, some accidents which are unavoidable.

*Drowning* is the next highest cause of accidental deaths in both groups. It is understandable that in a country like South Africa, where there is so much free play in the open, and where there are so many swimming pools, drowning should be so frequent. We can, however, prevent this to a large extent by teaching children to swim at the earliest possible age and by making it compulsory for people who have swimming baths to have them properly fenced in to prevent small children from getting into the baths. The Pretoria Municipality, some years ago, passed a by-law which makes it compulsory for owners of swimming baths to fence them in adequately. Very often children get drowned in fish ponds, too, and this same by-law holds good for fish ponds. It would be good if such legislation became general throughout South Africa.

*Poisoning.* The next highest cause of death is poisoning. In the majority of cases this occurs because insufficient care is exercised in storing medicines or other poisonous substances at home. To this extent it is preventable.

*Accidental burns.* This cause of death is also, to a great extent, avoidable.

*Inhalation and ingestion of foods or other objects causing obstruction.* This also takes toll of a certain number of children in this age group, but it is even higher in children under 1 year of age. It is mostly caused by children putting objects into their mouths and inhaling them into the lungs. It is quite understandable how difficult it is to prevent this

happening, but it should serve to remind us of how careful we should be about objects with which children play.

*Pneumonia*

Pneumonia is the second highest cause of death in the age group 1 - 4 years, and the third highest in the age group 5 - 9 years. It is preventable to the same extent as for children in the age group 0 - 1 years.

*Gastritis, Duodenitis, Enteritis and Colitis*

These illnesses are also often preventable, since they may be caused by unclean handling of foodstuffs or exposing them to infection, or by incorrect feeding. In South Africa, with our warm climate, it is imperative that food should be handled as hygienically as possible and stored in a cool place or in a refrigerator if necessary. Rehashed food is a very common cause of gastro-intestinal infections. Many of these can be prevented by educating housewives in the handling and storage of foodstuffs, and through child-health clinics and doctors educating mothers in the feeding of children. A large number of gastro-intestinal diseases are due to malnutrition. This we have already discussed.

*Tuberculosis*

Tuberculosis also takes its toll, particularly in the age group 1 - 4 years. This illness is so easily diagnosable and can be so effectively treated, that many of these deaths should and could have been prevented.

*Malignant Growths*

In the age group 5 - 9 years, malignancy is the third highest cause of death. Unfortunately, in this field we have not made the same advances as in others and we know nothing about prevention. We have, however, made advances in the treatment of cancer generally.

*Deaths from Infectious Diseases*

Infectious diseases cause quite a number of deaths among children. Apart from this, they very often cause permanent disabilities, such as partial or complete deafness or varying degrees of paralysis.

Even mild illnesses like measles, scarlet fever and chicken-pox can sometimes have quite serious complications, and children who are suffering from infectious diseases should be carefully looked after until the danger period is over.

Some infectious diseases are to a greater or lesser extent preventable by immunization, and it is the duty of parents to ensure that their children receive such protection.

Whooping cough, which can be a very serious illness and which takes quite a heavy toll, can be prevented to some extent, or modified so as to become a mild attack, by immunization.

Much more important is diphtheria, which is always a very serious illness. In South Africa we had no less than 2,737 cases of diphtheria in 1959 (the latest available figures). There were 516 Europeans with 36 deaths; 1,745 Bantu, number of deaths not known; 402 Coloured persons, with 82 deaths; and 74 Asians, with 14 deaths. Here is an illness against which we have an excellent protective immunization. It is true that occasionally immunized children may develop diphtheria, but such cases are always extremely mild, without complications and without any deaths.

In countries like the USA, Canada and Great Britain, where there has been adequate immunization, diphtheria has almost disappeared. In Montreal, for instance, which has a population of over a million people, they have not had a single case of diphtheria over the past 2 years. In South Africa, with our vast stretches of land and inadequate medical services, it would not be easy to attain such an ideal. In most large towns, however, it could be done, and we could do much more to prevent so many unnecessary deaths from diphtheria.

*Poliomyelitis.* This has been on the increase in South Africa since 1920. Until that date we never used to have more than a few dozen cases at most in any particular year. The incidence rose, however, until it reached a peak epidemic stage in 1956, when nearly 3,000 persons contracted the disease with varying degrees of paralysis and a large number of deaths. Salk vaccine has helped to reduce the incidence, but many of us realized from the beginning that it was not the complete answer, and in many overseas countries there has again been a rise in incidence. There is also every likelihood that there might be a rise in the number of cases in South Africa in time to come unless children are adequately protected.

However, within the last few years, the development of a different type of immunization against poliomyelitis, consisting of live attenuated orally administered virus, has made great strides forward and has replaced the Salk vaccine in many countries, where it is considered to be far superior. Some claim that, if correctly administered, it could protect over 95% of those immunized. I believe that we have an excellent weapon in our fight against poliomyelitis in this live attenuated virus, and that with it we are in a position to bring poliomyelitis completely under control if a large enough number of people are immunized. It is encumbent upon us to do whatever we can to ensure that at least all those who are in the susceptible age groups receive this immunization.

There is, however, one important factor which goes with mass immunization against poliomyelitis with the live attenuated virus — it will eliminate or reduce to a minimum the virulent viruses of poliomyelitis from the general population. This is all to the good, because by so doing it will eliminate poliomyelitis. But it will also reduce the number of people who would normally develop natural immunity, because of the normal presence of the virus in the general population. And so, in a few years time, in a properly immunized population we will have very little natural immunity. This makes it encumbent on us to ensure that all newborn children are immunized when they are about 3 months old. If this is not done, we might find ourselves with a new young highly susceptible population, and this might lead to disastrous results if there were to be an outbreak of poliomyelitis. If we are going to use this immunizing agent, and I say we must, then it also becomes our duty to ensure that all newborn children are similarly protected.

## THE ROLE OF THE NURSERY SCHOOL

I started off by saying that we have done a great deal to bring down our infantile mortality rates and much has been done to save the lives of children at an early age. Much more can, however, be done, through all our various health agencies.

I regard a properly conducted nursery school as one such agency. A trained nursery-school teacher knows a great deal about the prevention of ill-health among children, and keeps abreast of new developments. A properly conducted nursery school establishes a close link-up with parents through parent-teacher associations. Indeed, one of the most important functions of the nursery school is this link-up between the home, the school and the child through the agency of the teacher. In this way, important health information can be given to parents by nursery-school teachers. I sometimes wonder whether teaching of parents is perhaps not as important as the other activities of the nursery school. In a nursery-school child's life, the nursery school should really function as an extension of its life at home. In such a relationship, and in such an atmosphere, the scope for health education of parents is very wide and the soil very fertile.

Apart from education of parents, there are more positive health activities at the nursery school itself. There are regular medical and dental examinations, immunization programmes, feeding to ensure adequate nutrition, and a constant watch by teachers for any mental or physical abnormalities. In a good nursery school there is constant contact with the local health department, and the teacher has a knowledge of the services available for safeguarding maternal and child health.

Yes, there is much more to be done in the field of child health, and the nursery school can play an ever-increasing part in the prevention of illness and the promotion of good health among children.

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