

Special Article

Health Problems in Chinese Children Are Different

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Abstract

Literature review and author's personal observations have shown that Chinese children are uniquely different, not only in their look but also in many medical and health conditions. Genetic make-up accounts for some of the differences. Traditions and environment exert significant influences also. Many traditional practices produce clinical problems which are not encountered in the west. Infections are different in Chinese; there are much fewer E.coli sepsis in the neonates, and invasive Haemophilus influenzae type-b (Hib) infections in early childhood and infectious mononucleosis syndrome in the adolescents are uncommon. These findings, together with differences in the pattern of many other infectious conditions are highly suggestive of an enhanced herd immunity from a multitude of early antigenic stimulations. As significant number of Chinese people have emigrated to settle in many overseas places in recent years, child care workers should be alerted to some of these unique health features to ensure they can provide the optimal management for these Chinese children.

Key words

Childhood diseases; Chinese child health; Chinese traditions; Herd immunity

Introduction

"Different race has different face",¹ this saying obviously applies to Chinese children, as they do look different from children of other ethnic origins. In fact, many health problems are different in Chinese children also.²⁻⁶ Genetic conditions account for some of the differences. Well-known examples can be found in the thalassaemia syndromes which are highly prevalent in southern Chinese,^{7,8} or cystic fibrosis which is very rare in Chinese,² although it is the most common chronic lung problem in Caucasians.⁹

Traditions usually exert major influences on all kinds of child-care practices in the Chinese culture.^{2-6,10-13} Many medical and health problems demonstrate strong cultural characteristics. As improvement in socio-economic conditions and changes in life-style together with trends towards westernization have occurred in many Chinese

communities^{2,4,5,10,12,13} in recent years, there are associated significant changes of disease pattern in the children also.^{2,4,10,12,13} Such changes appear to occur in children who have migrated to take up residence in overseas places as well.

This paper reviews some of the documentations and the author's personal observations on the differences commonly identified in children of Chinese origin.

Background

Chinese people comprise of five major ethnic groups,¹⁴ viz. Han (漢), Man (Manchurians 滿), Mong (Mongolians 蒙), Hwei (Islamics 回), Zhuang (Tibetans 藏). Han is the majority. There are many other "ethnic minority groups" whose features sometimes draw some similarities to the people of the bordering countries. For example, a small group in south-western China has some Persian features; a few people in the North-west look Russian. Most of the Manchurians, Mongolians and Hweis have integrated into the Han society and have become indistinguishable from the Hans, from whom most of the reports regarded as Chinese are based.

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External Features

At birth, the Chinese infant has a broader face, often with depressed nasal bridge (Table 1).^{1,2,5,10,15-24} He does not look "yellow", as his skin pigmentation usually takes days, often weeks to establish. More than one in ten infants have up-slanting eyes. One in four has "low-set ears" by Western standard. The head is usually not as elongated as the Caucasians. This could be due to the supine-sleeping position^{2,12,25,26} resulting in flattening of the occiput rather than an oblong shape assumed by the head lying on its sides from the prone-sleeping posture.

Of the many external features as listed in Table 1, particularly note-worthy are the "Mongolian blue spots" which are present in nearly all newborns.¹⁵ These skin patches, many of them can be quite large around the buttocks, persist till 5-6 years old; and such features should not to be mistaken for "child abuse" by the inexperienced. It is interesting also to note that Chinese children born or raised in temperate regions such as North America are generally less pigmented and not as "yellow" as their cousins who live in China.

Child Growth

"Chinese are born small and remain small all through childhood",²⁷⁻²⁹ this is a common misconception. Such belief was apparently based on observations made in days when the nutritional status and health care facilities were

poor.^{2, 4,10,28,29} Recent studies conducted in more developed Chinese communities, like Hong Kong, have indicated that both the intra-uterine³⁰ and childhood growth grids³¹ are similar if not identical to the National Council of Health Standards (NCHS) curves of U.S.A. These secular changes appear not influenced by previously presumed genetic and ethnic factors as some workers have suggested.³²

Already Chinese teenagers of Hong Kong in the late 1980s were 4.2 - 6.7 cm taller than those in the late 1960s.³¹ Similar secular growth trends are occurring in various big cities in Mainland China^{29,33-35} and Taiwan.³⁶ One study showed that the femur length was shorter,³⁷ and several surveys have shown that Chinese children in certain big cities of North America are shorter and lighter^{26,38} than the Caucasian-Americans. These findings could be the result of certain traditional feeding practices which have been found to provide less than optimal dietary intake for the growing Chinese children rather than because of their ethnic endowment.^{24,27,39}

Psycho-social Features

Up-bringing of children are culturally more regimented and disciplinary,^{2,4,40,41} unlike the permissive attitude of the West. Young children are usually well-behaved and more subdued. Like most Orientals, Chinese parents are usually more over-protective.^{2,4,40,41} Children are not encouraged to be physically venturesome and exploratory. That may explain the much lower incidence of deaths from various accidents including car accidents, despite of a much higher density of both people and motor vehicles in a Chinese community (Hong Kong) as exemplified in Table 2.⁴³

Many reports have indicated more superior cognitive, mathematics and other academic attainments among Chinese immigrant children,⁴⁴⁻⁴⁶ compared with indigenous children. These findings could be due to the parental attitude

Table 1 External features of Chinese children^{1,2,5,10,15-24}

Face:	Maxillary prognathism
Eyes:	Up slanting eyes (10%) Longer palpebral fissure Longer distance between pupils Sclera melanosis (4% at birth--- >45% by 6 yr)
Ears:	Low set in 25% ; More creases in the Lobes
Mouth:	Smaller (<1.5 x width of nose) in 72% [Vs 40% Caucasians] Upper lip protrusion & tented
Nose:	Wider (>1/4 face) in 52% [Vs 37%] Depressed nasal bridge
Skin:	Mongolian blue spots (skin patches): in 95+%
Head:	Less elongated shape, frontal bossing
Body:	Shorter femur/lower segment Shorter stretched penile length

Table 2 Child-deaths due to accidents (5-14 years old)

Country	Boys/Girls	Country	Boys/Girls
Hong Kong	6.0	Canada	10.3/5.3
Sweden	4.9/3.7	Spain	11.0/5.6
Japan	5.9/2.9	Portugal	12.5/6.2
France	7.9/4.7	U.S.A.	13.6/6.7
U.K.	7.2/3.4	Ukraine	28.6/13.0
Italy	9.0/3.4	Russia	39.6/16.4

Figures taken from UNICEF 1996 and expressed in number per 100,000.

and pressure for their children to be high achievers. Such attribute might also be related to the need for survival as the less-privileged ethnic minority in new societies. Of course, a more favorable developmental endowment cannot be excluded.

Housing development in most Chinese urban areas has put much emphasis on nuclear family units in recent years.¹¹ This tends to erode into the traditional "extended-big family structure" in the Chinese culture. Young couples who encounter problems do not have ready access to advice or intervention from their seniors. As emotion or tension escalates, little buffering mechanism is available within the household. This could be an important reason for the increasing frequency of abused children reported nowadays,⁴⁷ although still lower compared with other industrialized countries of the West.

Congenital Abnormalities

Congenital anomalies as listed in Table 3 are some examples quite unique in Chinese.⁴⁸⁻⁵⁴ Uncommon occurrences of neural-tube defects⁵⁰⁻⁵² appear to be due to the plentiful vegetables with folic acid in the southern Chinese diet.⁵¹ In a study of supplementing women with folic acid in several northern provinces in China, significant reduction of neural tube disorders has resulted.⁵³ Other conditions like meconium ileus and meconium-plug syndrome from cystic fibrosis^{2,5,6,9} are extremely rare occurrences,^{5,6} very different from the experience drawn from Europe and North America.

Congenital conditions which are much less common in Chinese also include congenital dislocation of hips (CDH) which was found to be ten times less common compared with the Caucasians,⁵⁴ pulmonary hypoplasia from renal agenesis and congenital hypertrophic pyloric stenosis.^{55,56} Strictly speaking, pyloric stenosis is an acquired condition, as most infants only develop symptoms days, sometimes even weeks, after birth. Local experience has indicated its occurrence is on the rise in recent years. If such observation holds true, it may suggest an etiologic relationship to many recently introduced perinatal interventional therapies which may be stressful to the infants, resulting in increased vagal discharges and smooth muscle hypertrophy as a response around the pylorus.

The incidence of congenital heart defects is similar to Caucasians, but the pattern of heart defects is different.^{57, 58} There are more right heart obstructive lesions and less

hypoplastic left heart syndrome (Table 4). Cardiovascular defects associated with Chinese children with Down syndrome are also different (Table 4);⁵⁹ the commonest problem is not atrio-ventricular cushion defect as noted in the western literature but ventricular septal defect. Although the frequency of congenital heart block has not been clearly documented, one might suspect that it would be higher, as there are many more young Chinese women with systemic lupus erythematosus.^{60,61}

Hydrops fetalis due to α -thalassaemia is common.⁷ 4.5% and 4% of a southern Chinese school-age population have been found to be carriers of the α & β thalassaemia genes respectively.⁸ While infants with hydrops fetalis due to α -thalassaemia either die in-utero or soon after birth, children with β -thalassaemia major usually require monthly blood-transfusions and daily chelation therapy to sustain life. 4.42% boys and 0.45% girls⁶² were found to be severely deficient in glucose-6-phosphate dehydrogenase (G-6-P D). Such enzyme defect had accounted for a very high

Table 3 Congenital/genetic disorders in Chinese children

Less prevalent	More prevalent
Neural tube defects	Mongolian blue spots
Cystic fibrosis – Meconium ileus	Thalassaemia syndromes Hydrops fetalis – α -thalassaemia
Rh-D isoimmunisation	G6PD deficiency
Congenital dislocation of hips	G6PD deficiency – Neonatal jaundice, kernicterus
Hypertrophic pyloric stenosis	? Congenital heart block
Renal agenesis – Pulmonary hypoplasia	(Maternal SLE)
? Inborn errors of metabolism	Childhood hyperthyroidism

Table 4 Congenital heart disease

In Chinese	Vs Caucasians
Incidence: 7/1000 live births	Same
Pattern of disorder:	Different
Pulmonary outflow obstruction (34.4%) (T.O.F.; Pulm stenosis)	More
Hypoplastic left heart (0.5%)	Less
Among Down children	
Ventricular septal defect (43.6%)	More
A-V septal defect (15.4%)	Much less
Rt subclavian anomalies (16.5%)	More
Abnormal radial arteries (19%)	More

incidence of neonatal jaundice and kernicterus (Figure 1) in the past;⁶³⁻⁶⁶ even in older children haemolytic anaemia often occurs in association with an infection, in particular with hepatitis and typhoid fever, or precipitated by an oxidizing agent. Hare-lips and cleft palate which were noted to be more prevalent in Chinese previously^{49,67} have recently been found to be similar in incidence⁶⁷ as in other reports.

The Chinese Neonates

Conditions which are more prevalent in Chinese neonates are shown in Table 5. Many neonatal conditions commonly encountered in Caucasian infants are infrequent occurrences in Chinese (Table 6).^{2,5,6} The infant of the diabetic mother (IDM) is one example;^{68,69} it is apparently because of the incidence of young diabetics in China which has been found to be the lowest among all population surveys reported so far.^{70,71} In the better-developed and westernized communities,^{69,71} the incidence of young diabetics however is increasing.

Respiratory distress syndrome (RDS) was an infrequent occurrence in Chinese.^{4,5,12,13,72,73} This observation had intrigued most of the visiting American-physicians in the Vietnam-war-years in the latter part of 60s and early 70s, who thought that the rarity of RDS in the immature infants

Table 5 More prevalent conditions in Chinese neonates

Condition	Remarks
Mongolian blue spots	95+% at births
Hydrops fetalis	α-thalassaemia (5%)
G6PD deficiency	4.42% boys; 0.45% in girls
Neonatal jaundice	Non-specific; Kernicterus in term infants
Umbilical sepsis	Tradition of covering umbilicus
Vertical transmission HBV	High carrier (HBsAg) rate
Transient hypothyroidism	Low iodine intake in mothers

Table 6 Less prevalent conditions in Chinese neonates

Condition	Remarks
Neural tube defects	Folate in diet
Renal agenesis – hypoplastic lung	? Vitamin A
Cystic fibrosis – meconium ileus	Genetic
Congenital dislocation of hips	?
Rh-Isoimmunisation	99.6% Rh-D+
Pyloric stenosis	?
Preterm births	?Sexual habits
Respiratory distress syndrome	Intra-uterine stress
Infant of diabetic mother	Less IDDM
Pyogenic meningitis (esp E. Coli)	Immunologic maturity
Sudden Infant Deaths (SIDs)	Immunologic maturity

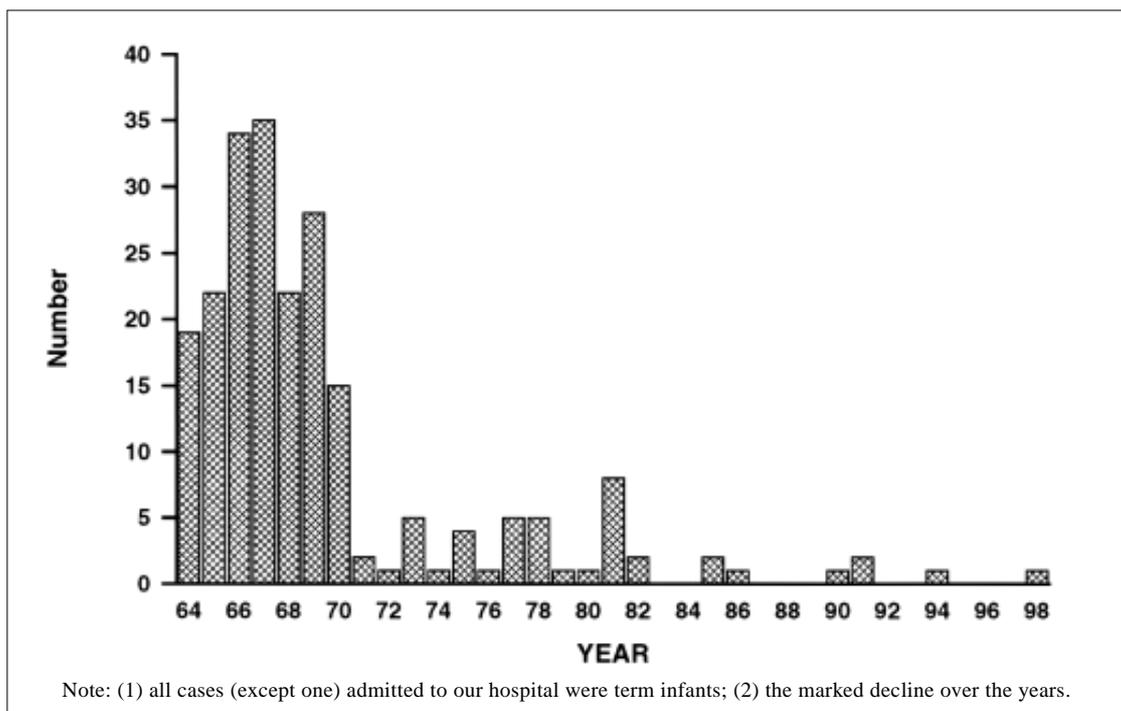


Figure 1 Kernicterus in Chinese infants.

in Vietnam and in vacation-places like Hong Kong must be due to genetic reasons. Upsurges of infants with RDS in recent years in Hong Kong (Figure 2)^{72,73} and other developed Chinese communities have now been noted in many Chinese communities. There is an obvious association with improvement in socio-economic conditions and living standards although increased survival of the immaturely born might have also contributed. Alleviation of many intra-uterine stressful conditions has been proposed as a probable reason for the recent increase of RDS.^{12,13,72,73} Many of these conditions would induce fetal adrenal responses enhancing the maturation of the surfactant system.

Many factors have also been suggested to be associated with enhancement of the functions of various fetal and neonatal systems.^{2,4,5,12,74} One illustration can be noted in the traditional feeding and eating habit, when personal chopsticks and table-spoons are dugged into common food dishes. Such practice would promote cross-contamination of both commensals and potential pathogens. It could also increase the chances of sub-clinical or even overt infections in the pregnant mothers; which in turn might induce stress-

responses from the fetuses.^{4,40} Over-crowded living conditions especially among the less-privileged communities could further re-enforce these stressors. Such stressor-responses would exert some effects on the various fetal systems not only in enhancing surfactant production,^{4,12,13,72,73} but also in advancing other systems including the immune functions.

It is very interesting to note a totally different pattern of etiologies of neonatal sepsis and meningitis recorded in a rapidly developing Chinese community of Hong Kong (Table 7), suggesting differences in certain environmental factors and herd immunity. Earlier experience from a tertiary perinatal centre^{74,75} has already showed a scarcity of E.Coli infections; much less than the expected 25% of infants with sepsis (only 7%) developed meningitis. Only <8% of early Group-B Streptococcal sepsis failed to survive.⁷⁴⁻⁷⁶ Such favorable outcome (compared to results of other centers in that period) was postulated to be due to a more mature defense mechanism. Indeed, in a study conducted in Hong Kong, the cord blood levels of IgG and complements of the Chinese newborn infants were noted to be higher compared to Caucasian reports, they were especially prominent among

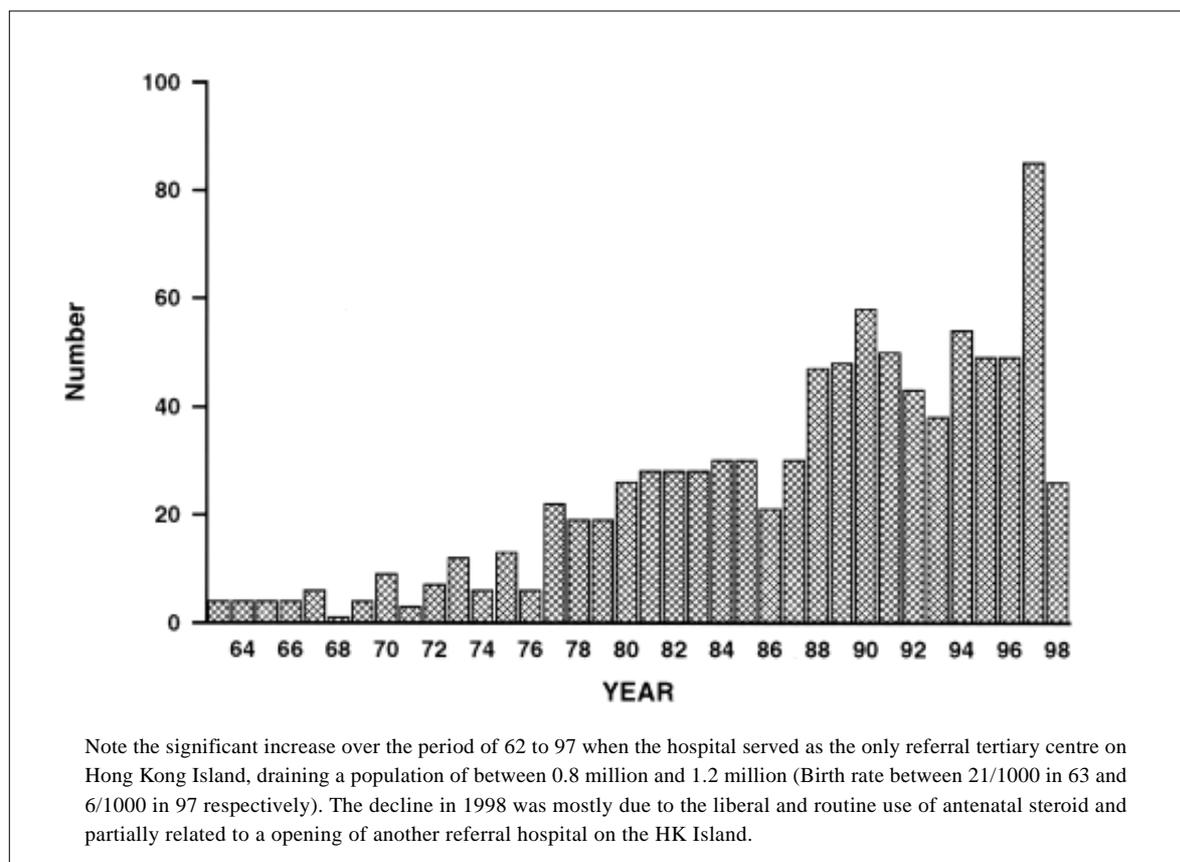


Figure 2 RDS in Chinese preterm infants.

the immaturely born.⁷⁷ The leucocytes from the Chinese neonates, even among those born early, were found to have more mature (using indigenous adults as standards) phagocytic and candidacidal functions although they are equally immature in their chemotactic activities.⁷⁸ These 'favorable' factors are apparently features of a more mature defense-mechanism than those reported from Caucasians.

A fairly high number of Salmonella meningitis was noted in Chinese (Table 7).⁷⁹ This is probably a reflection of the over-crowded living condition and sub-hygienic environment in the earlier years. Very high prevalence rate of sclerema neonatorum^{81,82} has also been reported from many parts of China. Nearly all such reports were from under-developed communities where poor hygiene and inadequate sanitary facilities would have invited a lot of serious infections, in addition to subjecting the infants to cold-exposure due to inappropriate thermal environment. In better-developed communities, like Hong Kong, the condition has practically totally disappeared.

Influences of Traditional Practices

Most childcare practices passed on from generations to generations are based on traditional beliefs, frequently

mixed with an element of superstition. "Respect and obey the elders" is regarded as the top virtue in the Chinese culture. Their teachings and practices are usually observed as "biblical truth". Seniors or grannies often dictate the kind of care and treatment for the children, even though sometimes these do not conform to common sense to the parents.

There is a strong traditional belief that the body can go off-balance easily. Many foods, weather changes or disease-states can tip the balance between "Yin and Yang (陰陽)" ;^{2,4,74,83,85} many untoward bodily reactions may be induced. By carefully choosing the right kind of practices as described below, homeostasis can be restored and the body can be maintained at its "neutral" or healthy position.^{2,4,74,83-86}

(A) Infant Feeding Practices

Many foods are believed to provoke undesirable "Hot (熱)", "Cold (寒)" or sometimes "Toxic (毒)" (Tables 8 & 9) reactions.^{2,4,74,83-86} When the body is off-balanced, many ailments or illnesses would occur. Nursing mothers are therefore very careful in their eating habits,⁸⁶ and in the weaning period the kind of foods offered to the infants are also rather restrictive.^{2,4,24,74,83,84} Certain vegetables and fruits would be avoided because of their potential "cooling effects

Table 7 Neonatal meningitis

Organism	U.K. (75-83)	U.K. (85-87)	U.S. (83)	Holland (76-82)	H.K. (85-95)
E. Coli	307 (33)	78 (25)	87 (37)	132 (47)	3 (6)
GBS	271 (29)	118 (38)	69 (30)	68 (24)	12 (24.5)
Listeria	62 (6.7)	23 (7)	19 (8)	12 (43)	1 (0.2)
Staphylococcus species	34 (3.7)	15 (5)	7 (3)	20 (7.1)	6 (12.2)
Salmonella	8 (0.9)	19 (6)	6 (2.6)	3 (1)	21 (42.9)
Other G –	71 (7.7)	28 (9)	14 (6)	24 (8.6)	5 (9)

Note the difference between Chinese (author's unpublished series from Hong Kong, 85/95) and Europeans/Americans (data modified from Robertson⁸⁰)
Number in () = % of total number of cases

Table 8 Traditional beliefs on undersirable body reactions

Dry hot (燥熱)	Wet hot (濕熱)	Cool (寒)	Toxic (毒)
Sore throat	Dull "tummy ache"	Productive night cough	Boils and carbuncles
Red/cracked lips	Diarrhoea	Cold intolerance	Eczema and other skin eruptions
Herpetic lesions	Mucousy stools	Cold sweat	Exacerbation of symptoms of sepsis
Deep colored urine	Tenesmus	Retching	
Bad breath	Pain on defecation	Nausea and vomiting	
Red/sticky eyes	Heart – burnt	Pallor	
Constipation	Cloudy urine	Fatigability and weakness	
Dry irritating cough	Dysuria		
Fever	Rash		

Table 9 Food items believed to provoke undesirable body reactions

Hot reactions (熱氣)	Cool reactions (寒涼)	Toxic reactions (毒)
Fried food – esp deep fried	Fruits – banana, peach, melon...	Shell fish – Shrimp, crab, lobster
Milk powder	Vegetables – cabbage, mustard green, turnip	Goose, ducks
Beef, mutton	Beans – esp green bean	Carp, eggs
Pigeon	Roots – gingers	Bamboo shoots
Game meats	Ice cream, pops	
Fondu food		

(寒涼)", many food items are not given to avoid provoking "hot (熱)" or "toxic (毒)" body reactions.

Studies have shown a low caloric and low protein content besides demonstrating certain other inadequacies in the traditional Chinese weaning diet.^{13,24,31,32,39,41,83-85} Such findings have offered explanation to the frequently quoted "growth faltering" of the child around 4-5 month old,²⁴ when weaning would commence. It has also been mis-interpreted as a genetic or racial characteristics.^{24,31,32} As infant feeding^{33,34} habits have changed in the more developed communities, such "growth faltering" has disappeared now.^{29,31,32}

(B) Child Rearing Practices

The nursing mother⁸⁶ consumes a lot of ginger, which is believed to "do away with the gases" (Kui-Fung 驅風) in the post-partum period. Apart from its effect on seasoning the foods, ginger is known to possess bacterio-static activities. It is usually taken together with hard boiled pork-knuckles and vinegar, which is believed to be bacteriostatic and able to leach the calcium from the bones. She also eats quite a bit of chicken cooked in rice-wine with ginger as well. Apparently such "high-calorie" foods would help to "replenish" her nutritional deprivation from the pregnancy; but their effects on the breast-feeding infant are not well understood.

The newborn infant is often given certain herbal tea to nullify the "undesirable effects of pregnancy (清胎毒)". Some of these herbs (like Chuen-Lien 川蓮, Ngau-huang 牛黃 & Yin-chen 茵陳) have been found to be highly potent in displacing bilirubin from its protein-binding.⁸⁷⁻⁸⁹ When given to the jaundiced infant, they would generate increased amount of unbound bilirubin enhancing the risk of brain damage (Figure 3).⁶³⁻⁶⁶ In fact, many jaundiced term infants who developed kernicterus had history of such herbal consumption, suggestive of a causal relationship.^{64,65} Some herbs, in particular "Chuen-Lien" (Coptis Sinensis), have also been frequently noted to precipitate acute haemolytic jaundice and have been associated with the development

of kernicterus in the G-6-P D deficient infants as well.^{90,91}

Covering the umbilical stump to avoid exposure to the open air (露風) is another very popular traditional practice.^{2,4,5,74} Materials used have ranged from unhygienic cloths or herbal powder by the less-privileged to sterile-gauze covering in the more elite. Such practice could enhance bacterial overgrowth even if it does not invite infection.^{4,5,13,24,32,41,66,74} In in-vitro studies, even trace amount of certain pro-inflammatory cytokines such as TNF- α has been shown to enhance bilirubin cytotoxicity.^{92,93} Infants in sub-hygienic environment or those with their umbilicus

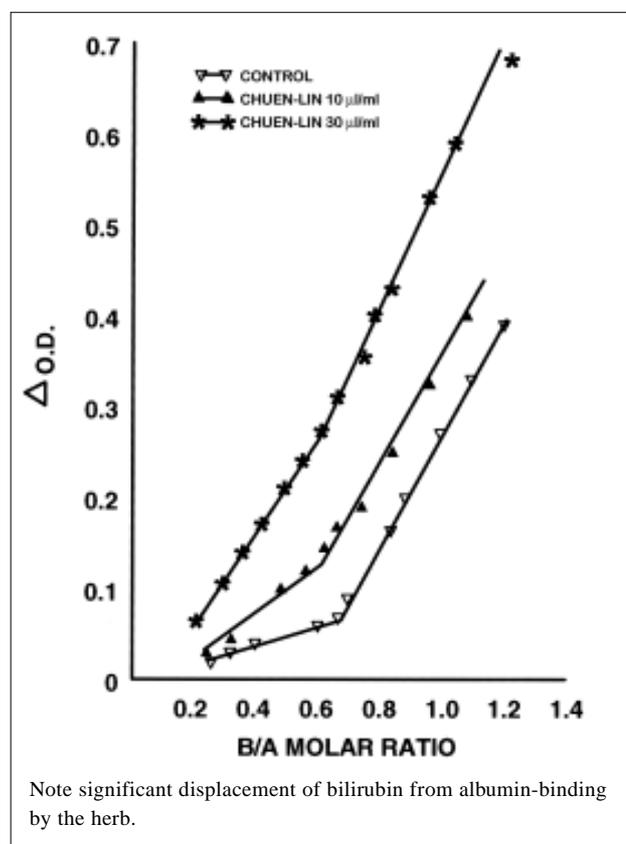


Figure 3 Effects of a Chinese herb (Chuen-Lien) on bilirubin protein binding.

covered, encouraging bacterial overgrowth and potential cytokine response, would therefore be particularly at risk of bilirubin toxicity. It is gratifying to note the drastic disappearance of kernicterus in Chinese term infants over the past 3 decades in many places, like Hong Kong (Figure 1).^{12,13,65,66} This is probably related to an aggressive health education program to discourage the incriminate use of herbs and to keep the umbilicus uncovered and properly clean.

(C) Herbal Consumption

Documentation of herbal therapies in China dates back more than 5,000 years.^{2,4,12,13,74,94,95} Usage of herbal medicine is so deep-rooted in Chinese societies that it is impossible to find modern cities with Chinese immigrants without herbal stores in their "China-Towns". Besides therapeutic usage, herbs are often consumed for "body-building" purposes, aiming at restoring or balancing various body functions.

Many beneficial therapeutic effects have been observed with herbs,⁹⁴⁻⁹⁸ regrettably not many of these observations are scientifically confirmed. Many acclaimed therapeutic effects are often blown out of proportions by the media, generating unnecessary excitements. Many herbs have become suddenly popular "over-night" despite of absence of proper pharmacologic and toxicologic studies. Such folklore beliefs, easy access, off-the-counter availability and scarcity of scientific studies have rendered herbal medicines rather unacceptable to the western-trained doctors. Apparently more research is needed to dig into herbal medicines, which would probably turn out to be a therapeutic "Gold Mine". Indeed of the very small number of laboratory-based studies conducted, we have found some herbs to be therapeutically beneficial.⁹⁷

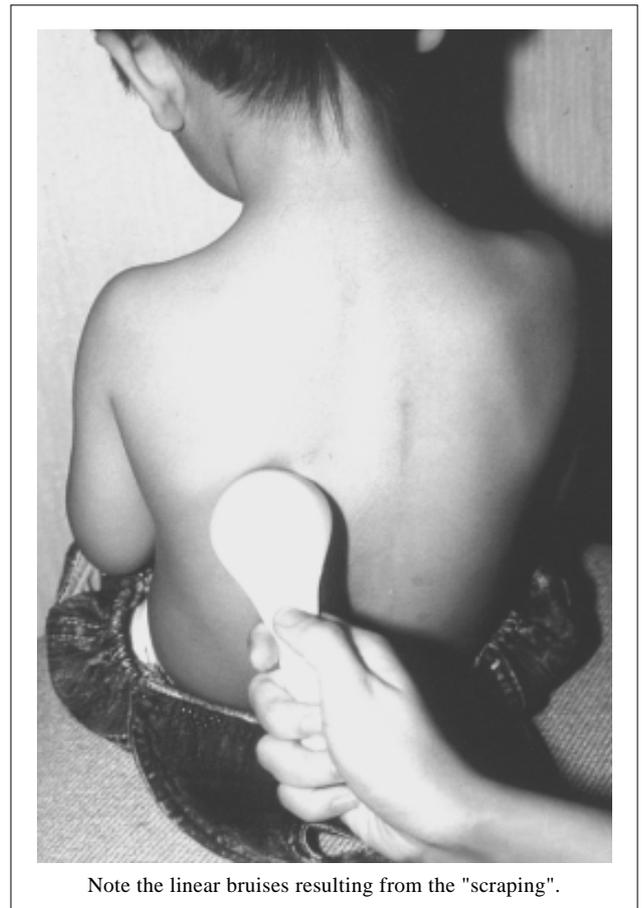
(D) Acupoint Therapies

The presence of acupoints can be easily confirmed by an electronic "acupoint-finder", although the clinical significance is open to questions. This system is however totally alien to western medicine although many beneficial effects have been reported.⁹⁹⁻¹⁰³ Besides the better-known anaesthetic effects, we have found that acupuncture could significantly alleviate the effect of exercise-induced asthma in children with bronchial hyper-reactivities.¹⁰² However, we would not recommend its use for treatment of asthmatic attacks because of its short-lived effects. The National Institute of Health (NIH) of U.S.A. has identified four areas of health problems where acupuncture has been approved to be of use, viz. pain-control, anti-emetic especially during

chemotherapy, emotional instability problem, and as adjunct for anaesthetics. Apparently more work needs to be done to improve our understanding of this system of "Meridians" with their various topographic acupoints where their electrical potentials would change with disease-conditions.¹⁰⁴

(E) Counter-Irritant Therapies

Rubbing lotions and liniments onto the temple-regions are often traditionally done to counter-act fainting spells or motion sickness. Counter-irritants, like moxibustions or mentholatum ointments, are often applied to the abdomen to combat abdominal pains. Scraping the skin with a porcelain spoon to "get rid of undesirable Qi" (scraping "the wind (刮風)" out of the body) is also a common practice. The child with fever may have his back, his nape and his forehead scraped resulting in clusters of linearly arranged bruises (Figure 4), which could be mis-interpreted for "child abuses" to the un-aware.



Note the linear bruises resulting from the "scraping".

Figure 4 "Scraping wind" in a child with a porcelain spoon.

(F) Other Practices

Being particularly conscious of maintaining the body in homeostasis, regular consumption of certain hard-boiled soups is believed to be able to do away the undesirable body-reactions, like "hot-air accumulations". Some Chinese may regularly take to herbal tea to do so. To resist various ill-effects of the severe winter, many "tonics" are consumed. Popular 'winter tonics' often include "snake-soup or other hard-broiled game meats" to keep warm. To boost the child's resistance to infections, bird's nest soups are often given. Theoretically such prolonged and high temperature treatment could alter most of the potential pathogens, if any. Such pathogens as 'bird flu' or other viruses and bacteriae which may have contaminated the "bird's nest" (which is the gelatinous saliva from the swallow) or the meats of the wild animals could be killed but certain antigenic properties might still be preserved. The presumed "tonic" effects could well be due to the immunizing and boosting properties of these heat-treated antigens. Of course this hypothesis needs to be confirmed or refuted by more research.

Changing Pattern of Childhood Diseases

It is encouraging to note that with advances in socio-economic conditions and health care facilities, the Infant Mortality Rate (IMR) and the Under-5-Mortality Rate have both shown dramatic decline among most developed Chinese communities (Figure 5 & Table 10). Take Hong Kong as an illustration,^{11-13,105} the IMR has decreased from around 100 / 1000 live births in the immediate post-World War II years to only 2.9 / 1000 in 2001. The most important contribution to such decline must have been the highly effective immunization programs, as exemplified by the effective eradication of poliomyelitis (Figure 6) and the marked decline in tuberculosis deaths with B.C.G. vaccinations (Figure 7). Together with an efficient sanitary water supply system, most of the potentially fatal and disabling childhood infectious diseases have become nearly eradicated. Deaths from diphtheria, poliomyelitis, pertussis, measles, or diarrhoeal syndromes have nearly disappeared from these places like Hong Kong.

Similarly, bacterial pneumonia which used to cause over

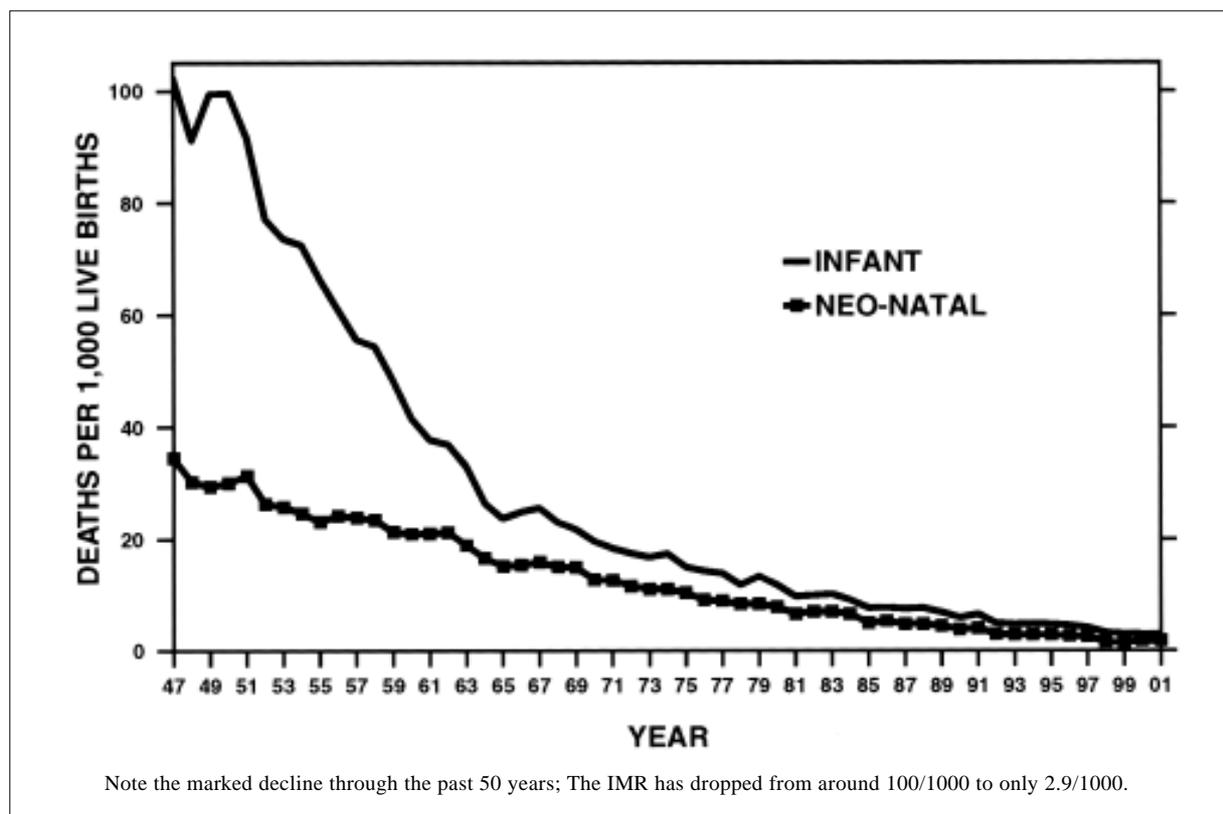


Figure 5 Infant & neonatal mortality rate in Hong Kong.

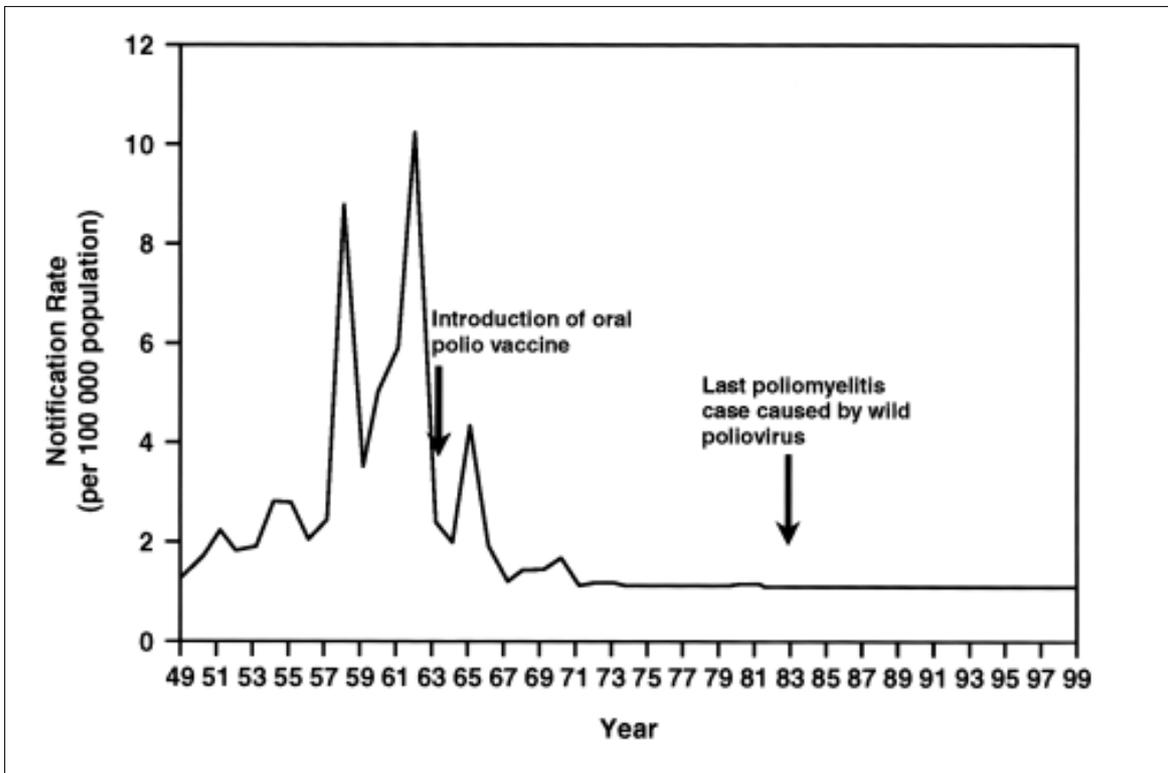


Figure 6 Effect of immunization on poliomyelitis.

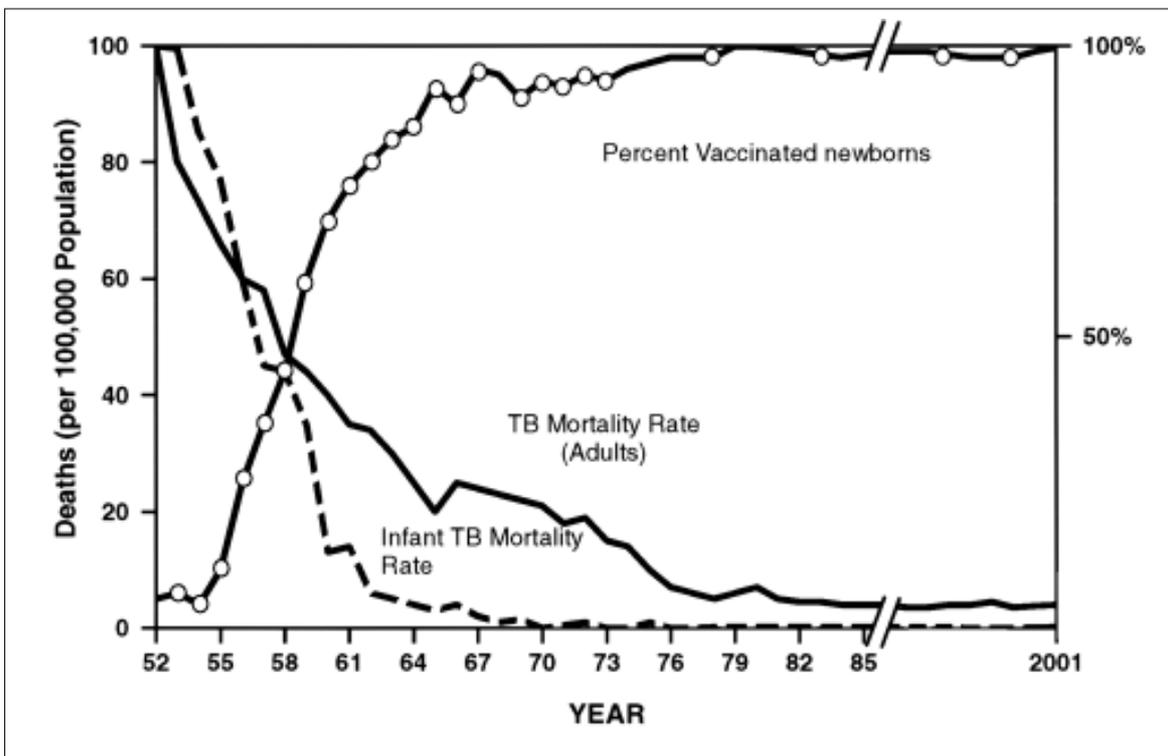


Figure 7 Effect of BCG at birth on infant deaths from tuberculosis.

10% fatality among infants born in Hong Kong 50 years ago, only accounted for less than 20 deaths during infancy per 100,000 live-births in recent years (Table 11).^{2,73,105} There have also been marked decrease in bacterial and related diseases (Figures 8 & 9)¹⁰⁶ which is mirrored by an increase of viral and non-bacterial disorders (Figure 10). Intestinal worm infestations, though uncommon in the cities, are still highly prevalent in 70+% of the children coming from certain rural districts of China,¹⁰⁷ apparently due to unhygienic farming habits, inadequate health education and poverty.

Both the extent and the rate of improvements in the child health statistics in the better-developed Chinese communities have surpassed many highly developed western countries (Tables 10 & 11). The reasons for these achievements are still not fully understood. A slightly lower incidence of low birth weight infants and much less neural tube defects in Chinese infants cannot account for the extent of these improvements. Rarity of sudden infant death syndrome (SIDS),^{25,26} which is still the leading 'cause' of post-neonatal deaths in the Western world, appears to be a most intriguing phenomenon Whether herd-immunity or liberal use of anti-microbials may play some role needs further clarification.

Herd Immunity

Classical infectious mononucleosis syndrome^{108,109} among the teenagers and invasive Haemophilus influenzae type b (Hib) diseases¹¹⁰ in young children are uncommon, even rarer in the past. These are probably due to an early exposure to these pathogens and to a large number of other potential pathogens¹¹¹⁻¹¹⁶ resulting in multi-potent anti-bodies formation and an enhanced herd immunity (Table 12).¹¹¹⁻¹¹⁵ Such early antigenic exposures and sustained herd immunity may also explain the relatively uncommon findings of hypertrophic tonsils and acute/serous otitis media all through childhood.¹¹⁶ Similarly many young infants who contracted pulmonary tuberculosis tend to develop the post-primary and sputum-positive clinical entity.^{2,72,73} This is probably because of repeated early exposures to various organisms due to traditional feeding habits or to the over-crowded living conditions, although having received BCG at birth may also contribute. With improvement in socio-economic conditions, changes in the manifestation of these diseases would probably occur in future also.

Such repeated and early exposures to a multitude of antigens or potential pathogens could be important factors for sustaining a pleuro-potent herd immunity in Chinese

Table 10 Under-5-mortality and children education

Country	GNP	U5M	U5↓Wt	%Gr5
Nigeria	280	191	36	56
S. Africa	3010	68	9	76
Israel	14410	9	-	96
China	530	43	16	88
India	310	119	53	62
Hong Kong	21650	6	0	99
Philippines	960	57	30	67
U.S.A.	25860	10	-	94
U.K.	18410	7	-	-
Portugal	9370	11	-	-

Figures taken from UNICEF 1996 statistics

U5M=under 5 mortality; U5↓Wt=under 5 with under weight; %Gr5=percentage with grade 5 education

Table 11 Infant mortality rate (UNICEF 1996)

Country/Territory	Infant mortality rate (No. of deaths per 1,000 live birth)
Hong Kong	3.2
U.S.A.	7.1
U.K.	5.8
Singapore	3.2
Japan	3.4

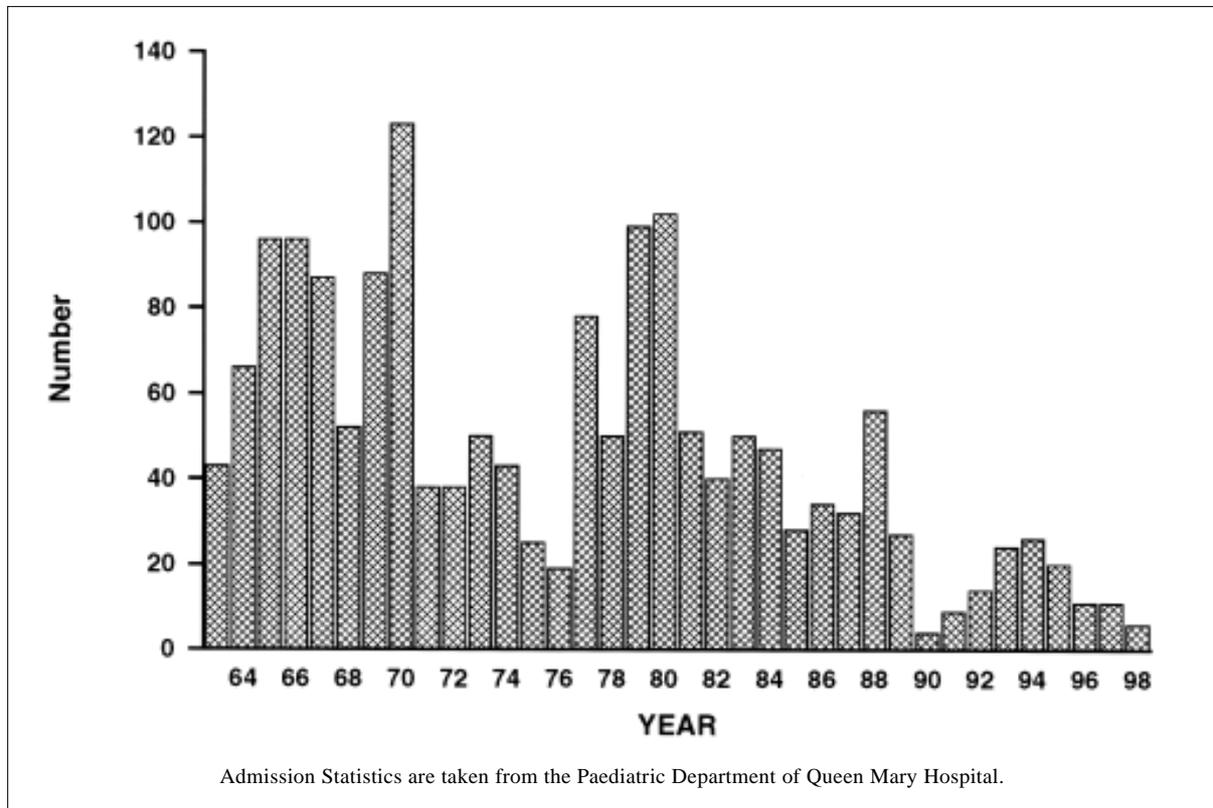


Figure 8 Child deaths from pneumonia among admissions.

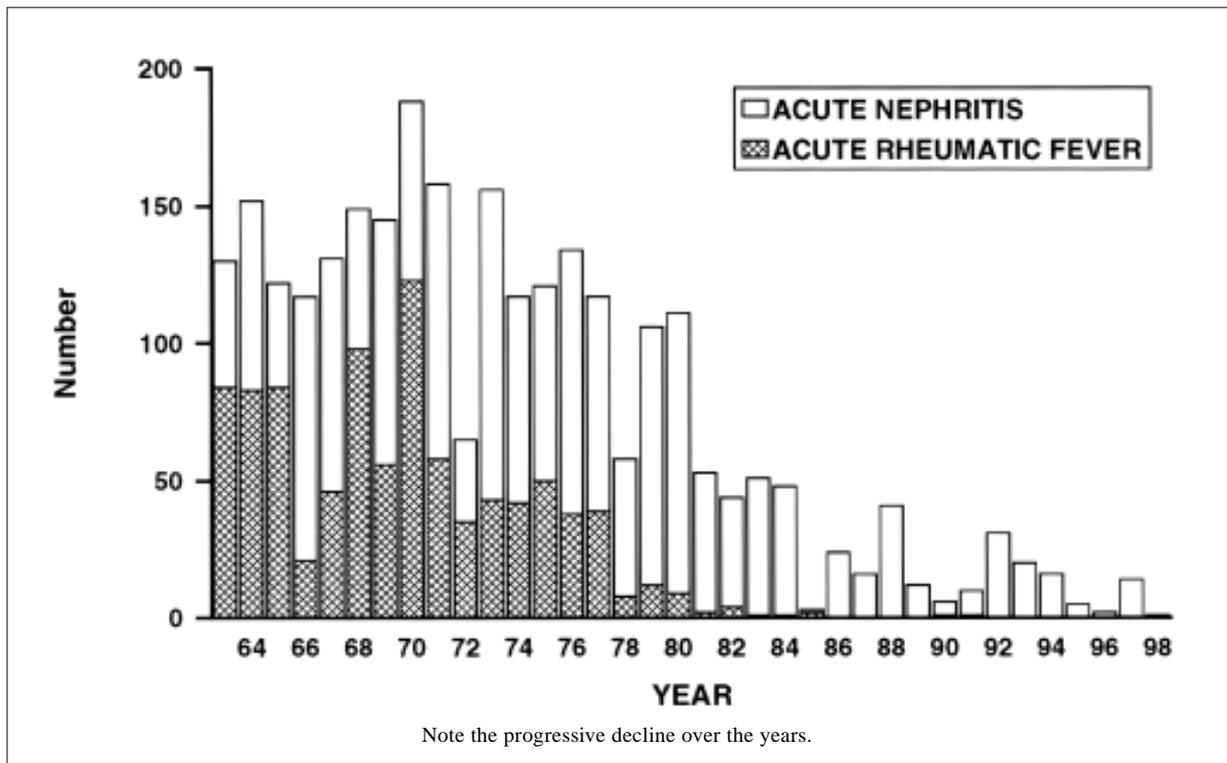


Figure 9 Children admitted for streptococcal diseases.

children. These antigenic stimuli might have been even more intense in years past, when over-crowded living conditions were common and sanitary conditions were often sub-standard. This concept draws some similarities to the "Hygiene hypothesis"¹¹⁷⁻¹²⁰ for the development of allergies in later life. The hypothesis has suggested that early antigen exposures to a host of antigens and infections could account for an altered immune response resulting in much less allergic diseases in later childhood.

Various improvements and advances in the society

through the years would have reduced these early potential antigenic stimulations, which could have altered the herd immunity and accounted for the changes in disease pattern as described above. It may also explain the significant increase in allergic diseases^{12,13,72,73,118,120} such as children with allergic rhinitis and severe asthma necessitating admissions to the hospital in recent years^{121,122} as shown in Figure 11. Interestingly, other altered immune conditions, like coeliac disease and chronic inflammatory bowel conditions have remained rare as before.¹²³

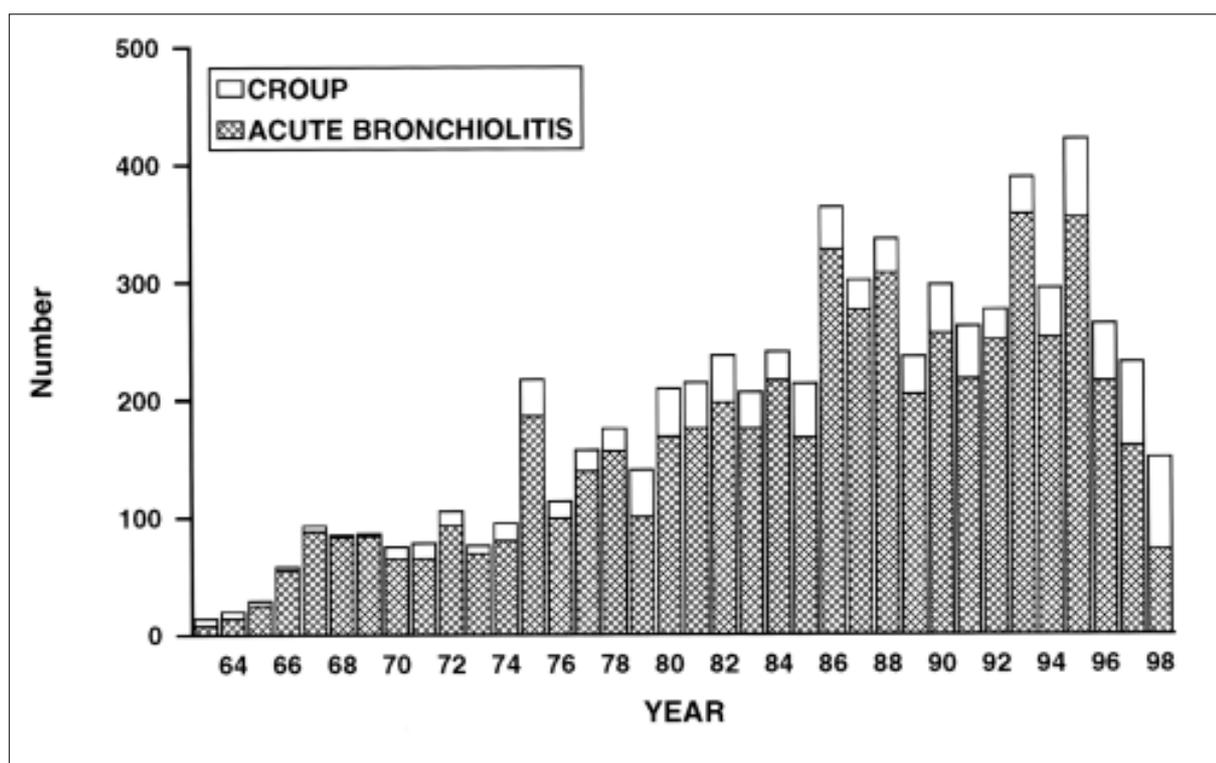


Figure 10 Children admitted for croup & acute bronchiolitis.

Table 12 Herd immunity in Chinese

Maternal		Infant	
EBV antibodies	100%	High cord IgG & complements	
CMV / HSV antibodies	96-98%	Mature leucocyte functions	
Hepatitis A antibodies	20-68%	Immunization complete	99%
Hepatitis B - HBsAg	0-30%	Infection before 24 months	
BCG / Tuberculin +	99%	EBV antibodies	60%
Rota Virus antibodies	99%	CMV / HSV antibodies	40%
Hib antibodies	100%	Hib antibodies (at 12 months)	25%
		(at 6 years)	90%
		Diarrhoeal syndrome	0.6/year

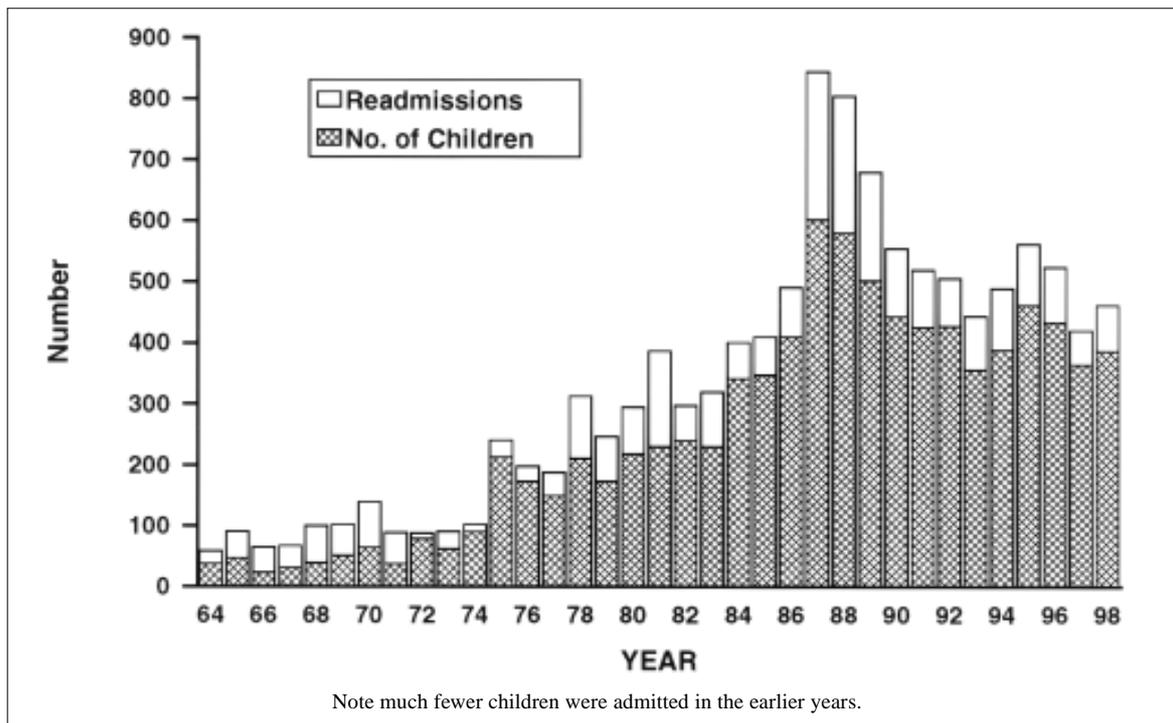


Figure 11 Children admitted for asthma.

Conclusion

Chinese children are different from other ethnic people, not only in their look but also in many medical and health conditions. Genetic disorders account for some differences, most of the other conditions appear to be affected by environmental factors and traditional practices. As there are much movements of Chinese people to take up residence in overseas places in recent years, it is important for child care workers to be alerted to some of the unique features of Chinese children to avoid misunderstanding and even possible mis-management.

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