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COMMUNITY CHILD HEALTH

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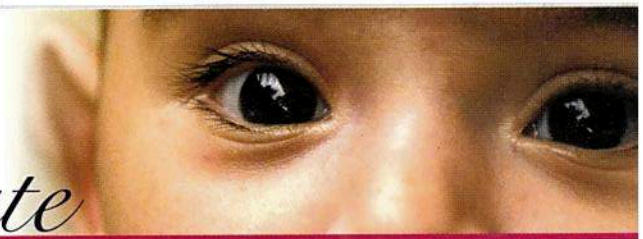
COMMUNITY CHILD HEALTH UPDATE

WINTER 2006

MALTA COLLEGE OF FAMILY DOCTORS

A COLLECTION OF PAPERS DELIVERED
AT THE MALTA COLLEGE OF FAMILY DOCTORS
CONTINUING PROFESSIONAL DEVELOPMENT
MEETING WINTER 2006



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Editorial

This publication marks a first for the Malta College of Family Doctors (MCFD). Since the MCFD started organising Continuing Professional Development (CPD) Meetings in 1991, the occasional presentation given during such meetings has been published as an article in the MCFD Journal 'The Family Physician / It-Tabib tal-Familja' (now renamed 'The Maltese Family Doctor').

However, such articles have been few and far between, mainly due to the fact that the speakers were often too busy for the extra effort needed to convert their presentations to papers. This time, through the generous support of Vivian Corporation Ltd and Plasmon Italia, the College has managed to go one better by publishing a book comprising all the presentations given during one single CPD Meeting!

The MCFD Winter 2006 CPD Meeting 'Update on Community Child Health' originated from an offer to the College by Vivian Corporation, on behalf of Plasmon Italia, to jointly organise a seminar on child nutrition for primary health care professionals. During a series of meetings held during 2005, this was gradually developed into a fully-fledged Update on Community Child Health.

The topics were proposed by members of the MCFD Council and, mindful of the College's commitment to providing teaching for family doctors by family doctors, it was agreed that the majority of the speakers (five from nine) should be specialists in family medicine. However, in line with the MCFD's belief that community health professionals should collaborate in the delivery of interdisciplinary care, the Maltese Paediatric Association and the Malta College of Pharmacy Practice were invited to

nominate three other speakers. To complete the picture, a specialist in child health and nutrition from Italy was kindly sponsored as a visiting speaker by Plasmon Italia.

At this point, we would like to thank all those who contributed to bring this meeting and publication to fruition, namely:

- All the speakers for their hard work in not only preparing their presentations, but also converting them to papers months before the meeting so that this publication could be ready in time;
- Malta College of Family Doctors: members of Council and the Education Subcommittee;
- Maltese Paediatric Association: Dr Paul Soler, President;
- Malta College of Pharmacy Practice: Dr Maria Cordina, President;
- Vivian Corporation Ltd: Ms. Joanna Cremona, Director Vivian Healthcare;
- Plasmon Italia: Ms. Sabrina Bove, CET Infant Feeding Category Manager; Ms. Stefania Bandi, Customer Service and Marketing Support;
- Outlook Coop: Mr Hilary Caruana.

Finally, the Malta College of Family Doctors augurs that this update will not be a one-off effort, but the first of a continuing series of updates in family practice. However, for this to take place, the necessary funding needs to be forthcoming. As was the case with this 'Update on Community Child Health', the College welcomes the collaboration of any organisations interested in supporting this endeavor!

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Update on Community Child Health
28th January 2006

Introduction: Continuing Medical Education

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It is indeed an honour for me to be invited to write an introduction for this paediatric update: an update, which in more than one way, as we shall see, is different from recent updates given to family doctors. Indeed the idea of this update was a welcome gesture by Vivian Corporation and Plasmon to hold a talk on advances in nutrition for children. As a college we are aware that we cannot any longer automatically accredit all talks which drug companies ask us to accredit. The reason for this being simple: family doctors now have the opportunity to specialize and register themselves on the specialist register - a register which not only is part of our legislative framework, but which also acts as a springboard to practice elsewhere in Europe. Being on the specialist register confers a special requirement on the Malta College of Family Doctors in accrediting Continuing Medical Education (CME). The prime reason is that the specialist register in itself is a guarantee of quality in professional development. The MCFD is the body responsible to accredit doctors on this register. It thus is responsible to see that all CME offered is of a good quality, enhances excellence in performance of doctors and last but not least, is directed toward the specialty of Family Medicine. Not all have recognized this specialty and indeed many still either frown or smile at its mere suggestion; but it is here to stay - witness the vast amount

of development in defining the definition and promulgating in at the level of National Council of Colleges and Academies, in collaboration with the World Health Organisation.

We are keen that our CME is delivered by GPs for GPs. This does not indeed mean that there are no valid talks in other specialities and others organized by drug companies which do not have their value. Indeed these are also accredited by the College. But it is only natural that we will give much importance and more weight as far as accreditation goes when we are directly involved in the choice of speakers and in the content of the talks as was the case for this conference. Vivian Corporation have been exemplary in this regard and I do indeed hope that other companies follow suit in developing high standard CME. We met no less than ten times to develop the talks and content of this day. Its choice did not focus merely on child nutrition but turned into a full blown update in child development and indeed focusing on some important presentations.

In conjunction with this CME, the MCFD had embarked on its first Diploma in Family Practice (DFP). This was an idea which developed following the delivery of external diplomas to our members and indeed with the encouragement of sister colleges. Most of this diploma is delivered in weekend modules and home-based learning. But we reserved the right to have some of our CME, which we have learned take considerable time to develop and which turned out to be quite advanced in their delivery, to be modules in themselves. The diploma has eighteen modules in all and this Paediatric update is one of them - such is our confidence in its excellent quality.

By no means does this update cover all aspects of what one would wish - a diploma would be needed in itself. Yet, as it is intended, it is an update on more important aspects of day-to-day delivery. At this point one need ask what CME is all about. Here I necessarily put on my ethics hat. CME is about Beneficence and Non-Maleficence. Doing no harm means keeping up to date on advances in standards of care. What is good delivery today need not be tomorrow and what good delivery today will not be standard of care tomorrow. This means that doing no harm entails a continued attention to what is the due standard of care of the day. For example, what holds as advancement in primary care need not be of the same relevance to hospital based medicine and vice-versa. The family doctor is responsible for the family and not for the child alone. In seeing the child, the family physician is now trained to see it in the context of the family and also to give advice according to the knowledge of the family which he has acquired over the months or years. This may not seem so relevant to our specialist colleagues - yet we know it well and it is certainly not our

intention to hold turf battles, but merely to deliver the standard of care we are held accountable for; certainly, according to the Bolam principle, a standard which would be different from other specialities.

There is no denying however that there is also much overlap and certainly that we can learn from each other. Whilst this learning curve, until recently was a one-way process, it will certainly reach an equilibrium of transfer of knowledge in the near future. Indeed we see a future in which primary care consultants will be replaced by specialized family doctors, much as is the case in other countries. Only this encourages teamwork.

When I was asked to take a leading role in the College I had no illusions of what I was facing - both in terms of human relations, and in terms of chairmanship, which I humbly can say I had no experience in. Yet if your colleagues have faith in you, it is a duty as well to act according to conscience and to expect allegiance in moments of tension. Leadership however, as stated very assuredly and correctly recently by our Prime Minister, irrespectively whether we agree with his ideals or not, is not only about being a messenger. It is also about vision and taking decisions at the right time. My vision certainly is that family doctors are a strong group, both politically and morally. They should act as patient advocates and they should be united in ideals. This has not always been forthcoming and sometimes we can be our worst enemies. I have always welcomed criticism as long as I felt that our intentions and goals are clear. Therefore many were concerned with a tentative suggestion of holding a separate meeting from our much esteemed colleagues. Some said it was merely a need to affirm ourselves. This is the sceptical view. The more proper view is that we can share with other specialties - such as the recent conference in paediatric dermatology. The way forward is symbiosis and not paternalism and walking around with our tails between our legs. We are the leaders of our speciality as respective specialists are leaders in their own specialty. We can learn from each other; primary care is certainly not solely the realm of the family physician but s/he is certainly a player and *the* leader in the field. Community paediatrics is shared by paediatricians who take a special interest in the community health of children and the family doctor who has a special interest in the same. They both probably share similar qualifications. The membership of the college - the MMCFD will certainly be a sign of this excellence and quality of practice. The hallmark will be its recognition by sister colleges who will award us, as we have recently signed in our memorandum of understanding with the Royal College of General Practitioners, their own memberships upon recognition of ours. Seeing that the MRCGP is as rigorous as its MRCP counterpart, this would

be a significant advancement in qualifications of the local family doctor. The award will be given also by an assessment of performance of established doctors.

This Winter update, therefore, falls within this larger scheme of events. We are implementing our vision. Each CME is not an end in itself but a means to a greater end. We are therefore thorough and sensitive of the content being delivered. This is the guarantee of the talks delivered today. It goes without saying that I must thank Plasmon, Vivian Corporation, and Dr. Mario R Sammut, our Education Secretary, with whom I met several times as mentioned to deliver this immensely rich package.

Childhood Problems Presenting in Maltese Family Practice

Jean Karl Soler MD
SPECIALIST IN FAMILY MEDICINE

Introduction

The author uses data from the Maltese Transition project to describe the distribution of morbidity in children presenting to Maltese private family doctors included in the study. The data collection methodology is explained, and the data is used to explore reasons for encounter, interventions and diagnoses presenting to participating doctors. Diagnostic accuracy is also explored using advanced statistical methodologies, and the contribution of family doctors to common diagnoses in the community outlined.

The Maltese Transition Project

Since early 1999, TRANSHIS, an electronic patient record developed at the Dept of Family Practice at the Academic Medical Centre/University of Amsterdam and used for international comparisons since 1995, has been offered by the Malta College of Family Doctors to its members to use for their day-to-day patient records: 23 doctors have been trained in its use, 17 use it regularly, and the data collected by 8 of them is a complete record of their practice over the four year period, and is used for collating this database.

TRANSHIS and ICPC (2nd version – electronic, ICPC-2-E) are used by participating

Maltese family doctors to record all patient contacts (encounters, home visits, telephone calls, letters from specialists, prescriptions, etc.). Reasons for encounter, interventions, and diagnoses are classified with ICPC-2-E, all prescriptions with the Anatomical Therapeutic and Chemical (ATC) classification including information on prescribed defined daily doses (DDDs), and these data are recorded in an episode-oriented model that allows analysis of episodes of care and encounters.

The analysis of a complete four-year dataset provided by 8 doctors in 5 practices in Malta is presented. The current Maltese dataset (2001-2004) contains data on all patient contacts by 8 Family Doctors (2 solo, one pair, one group of 4) with 12,227 patients (M – 5,673; 46.7%). Doctors recorded 55,359 encounters, and in the 73,907 sub-encounters (more than one episode of care possible during one patient contact) doctors recorded 54,625 episodes of care, of which 42,575 new. 104,154 reasons for encounter were presented by the patient, and doctors made 159,566 interventions, of which 44,353 prescriptions, and 3,519 referrals (of which 558 to primary care providers).

Key messages

The presentation will outline the presenting complaints and the distribution of morbidity in children presenting to participating Maltese family doctors, and the doctors' diagnostic and therapeutic interventions (Tables 1 and 2). An example of the use of this data to study inter-practice variation, diagnostic accuracy and the contribution family doctors make to the diagnostic labelling in the community will also be presented.

Table 1. Top 20 episodes of care in the 0-14 age group

		Top 20 of episodes NX 0-14 (n=14298)				
	Code	Label	N	p1000py	%	Cum. %
1	R74	Upper respiratory infection acute	3300	442.1	23.1	23.1
2	D73	Gastroenteritis presumed infection	1175	157.4	8.2	31.3
3	R78	Acute bronchitis/bronchiolitis	742	99.4	5.2	36.5
4	R76	Tonsillitis acute	617	82.7	4.3	40.8
5	R96	Asthma	544	72.9	3.8	44.6
6	R05	Cough	518	69.4	3.6	48.2
7	A98	Health maint/preventive medicine	423	56.7	3	51.2
8	R29	Respiratory symptom/complaint other	372	49.8	2.6	53.8
9	A97	No disease	313	41.9	2.2	56
10	R97	Allergic rhinitis	293	39.2	2	58
11	R80	Influenza	274	36.7	1.9	59.9
12	H71	Acute otitis media/myringitis	269	36	1.9	61.8
13	R77	Laryngitis/tracheitis acute	252	33.8	1.8	63.6
14	F70	Conjunctivitis infectious	233	31.2	1.6	65.2
15	R07	Sneezing/nasal congestion	171	22.9	1.2	66.4
16	R75	Sinusitis acute/chronic	169	22.6	1.2	67.6
17	A72	Chickenpox	128	17.1	0.9	68.5
18	S12	Insect bite/sting	118	15.8	0.8	69.3
19	H73	Eustachian salpingitis	114	15.3	0.8	70.1
20	S87	Dermatitis/atopic eczema	112	15	0.8	70.9
		Total	**14298**	**1915.3**	**100**	**100**

Table 2. Top 20 reasons for encounter and history in the 0-14 age group

		Top 20 of RFEs/history NXO 0-14				
	Code	Label	N	p1000py	%	Cum. %
1	R05	Cough	4771	639.1	17.6	17.6
2	A03	Fever	3365	450.8	12.4	30
3	R07	Sneezing/nasal congestion	3359	450	12.4	42.4
4	R21	Throat symptom/complaint	2283	305.8	8.4	50.8
5	*62	Administrative procedure	1380	184.9	5.1	55.9
6	D10	Vomiting	1036	138.8	3.8	59.7
7	H01	Ear pain/earache	676	90.6	2.5	62.2
8	D11	Diarrhoea	661	88.5	2.4	64.7
9	S06	Rash localized	492	65.9	1.8	66.5
10	D01	Abdominal pain/cramps general	490	65.6	1.8	68.3
11	S07	Rash generalized	430	57.6	1.6	69.9
12	*65	Enc/prob init by other than pt/prov	352	47.2	1.3	71.2
13	*64	Encounter/prob initiated by provider	315	42.2	1.2	72.3
14	D09	Nausea	276	37	1	73.4
15	R03	Wheezing	271	36.3	1	74.4
16	R25	Sputum/phlegm abnormal	266	35.6	1	75.3
17	*45	Observ/health educat/advice/diet	261	35	1	76.3
18	N01	Headache	256	34.3	0.9	77.2
19	D06	Abdominal pain localized other	247	33.1	0.9	78.2
20	*44	Preventive immunization/medication	239	32	0.9	79
		Total	**27110**	**3631.6**	**100**	**100**

Breastfeeding: A Formula for Overcoming Anxiety in Mothers

Alessandra Falzon Camilleri MD
SPECIALIST IN FAMILY MEDICINE

1. Introduction

Breastfeeding is the method of choice for infants and the view that 'breast is best' is held by many women. This paper aims to show that given appropriate education and support anxiety about breastfeeding can be allayed.

The breastfed infant is the reference or normative model against which all alternative feeding methods must be measured with regard to growth, health, development and all other short and long term outcomes[1].

Aims

- To recognise that breastfeeding is an important aspect of primary health care and that family doctors should have the knowledge to promote, protect and support breastfeeding, helping it to become the mainstay of infant nutrition in Malta.
- To provide an insight into issues related to breastfeeding and anxiety arising from this dynamic process, a better understanding of which is central to preventing and managing this source of anxiety.
- To emphasise that breastfeeding related anxiety in mothers can be effectively treated as well as prevented through concerted and collaborative efforts in promotion, education and support of breastfeeding.

Objectives

- To highlight the exclusive qualities of breast milk and the benefits derived from breast milk and breastfeeding to infants, mothers and the community.
- To encourage more women to experience one of nature's gifts by empowering mothers with knowledge and support.
- To elucidate the various factors that can impinge on choice of infant feeding.
- To recognise the critical 'time windows' in motivation, initiation of, and continuation with, breastfeeding.
- To understand the impact of education and breastfeeding promotion on achieving successful breastfeeding.
- To emphasise the importance of collaborative, educational and supportive efforts as well as key roles played individually by family doctors, paediatricians obstetricians, pharmacists and community nurses in ensuring the feasibility and success of breastfeeding.
- To affirm that health care professionals should be trained in the necessary skills to implement an action plan for breastfeeding based on education, training, awareness, support and research.

2. Breastfeeding: History and Current Policy

Breastfeeding has been, and continues to be, the physiological norm when it comes to baby feeding methods.

History

As can be evidenced by the survival and evolution of the human species, breastfeeding is an effective way of feeding the young. Breastfeeding has been the physiological norm throughout most of history, with only a small number of infants not breastfed for a variety of reasons. In the distant past, wet nurses were employed by the wealthy, but with the industrial revolution, this practice declined as wet nurses found better-paying jobs. By the late nineteenth century, infant mortality from unsafe artificial feeds became an acknowledged public health problem. The widespread use of formula as a breast milk substitute for healthy mothers and babies emerged in the first half of the twentieth century, supported in part by doctors themselves who considered formula feeding as a scientific approach to infant nutrition. For a long time after, most doctors did not advocate breastfeeding and most women opted for formula feeding. An entire generation of mothers came to have little knowledge and experience of breastfeeding. Despite the resurgence of breastfeeding in the late twentieth century, breastfeeding and formula feeding continued to be seen as virtually equivalent, representing no more than a choice parents may make without significant health sequelae.

Despite growing evidence of the health risks of not breastfeeding[1], and extensive research documenting diverse and compelling advantages of breastfeeding to infants,[1,2] mothers and families, initiation of breastfeeding in Malta remains one of the lowest in Europe[3]. Family doctors can make a difference in increasing breastfeeding initiation and continuation rates by advocating breastfeeding, supporting breastfeeding patients and providing appropriate evidence-based care.

Current Policy

The Innocenti Declaration[4] was produced and adopted by participants at WHO/UNICEF policymakers meeting on 'Breastfeeding in the 1990s-A Global Initiative'. In 1991, at the International Paediatric Association Conference, WHO and UNICEF launched the Baby Friendly Hospital Initiative (BFHI)[5] with the following goals:

- to enable mothers to make an informed choice about how to feed their newborns
- to support exclusive breastfeeding for first 6 months of life
- to ensure cessation of free and low cost infant formula supplies to hospitals
- to include, possibly at a later stage and where needed, other mother and infant health care issues.

UNICEF's 'Ten Steps to Successful Breastfeeding'[6] provides the basis and minimum requirement for hospitals that wish to be designated as baby friendly. The World Conference on Nutrition (1992)[7] further strengthened this declaration.

The Health Division, Malta, issued, in April 2000, 'A Breastfeeding Policy for Malta'[3]. The rationale for the formulation and implementation of this policy takes into consideration the breastfeeding benefits to child, mother and society at large, as well as the mother's right to make an informed choice regarding the method of infant feeding. Regretably, Malta along with Ireland, has the lowest initiation rates in Europe[3].

Rate of breastfeeding mothers at time of discharge from hospital[3]:

1996	45%
1997	49%
1998	46%

Quite appropriately, increasing the percentage of mothers practising exclusive breastfeeding when leaving hospital remains one of the policy's objectives.

Issues for implementation include[3]:

- enactment of legislation controlling marketing of breast milk substitutes
- enforcement of breastfeeding policy in maternity hospitals based on principles of BFHI
- establishing of a breastfeeding policy at community level including role of mother to mother support groups
- training of health care professionals in promotion and management of breastfeeding
- development of strategies for promotion and support of breastfeeding in community
- set targets, implementation and monitoring of this policy

Currently, the World Health Organization (WHO) recommends that, with rare exceptions, all babies be breastfed and/or receive expressed human milk exclusively for about the first six months of life[8]. Breastfeeding should continue with the addition of complementary foods throughout the second half of first year[9]. Breastfeeding beyond the first year offers considerable benefits both to mother and child, and should continue as mutually desired[9]

Increasing the rates of breastfeeding initiation and duration is a national health objective and one of the goals of 'Healthy People 2010'[10]. The target is to 'increase to at least 75% the proportion of mothers who breastfeed their babies in their early postpartum to at least 50% the proportion who continue breastfeeding until their babies are 5-6 months old.'

Although breastfeeding is a natural act, it is also a learned skill. Many women initiating breastfeeding encounter difficulties in what they have assumed to be an easy, natural process. In addition, like the delivery of the baby, it is a unique experience for every mother where consideration for personal circumstances, will highlight the individual needs for support to make breastfeeding a successful experience.

Women who wish to breastfeed their babies, but do not do so because of inadequate support from family or health workers, constraints at the workplace, or misinformation, often feel guilty and anxious because of this failure. Mothers need access to accurate, practical and relevant information on breastfeeding along with skilled and knowledgeable support from families, community and health system. Through education and support, mothers can successfully breastfeed their babies in a manner that is not only healthy but also enjoyable. The final decision on the method of feeding the infant is, nevertheless, the mother's.

3. The Benefits of Breastfeeding

Epidemiological research shows that human milk and breastfeeding of infants provide advantages with regard to general health, growth and development while significantly decreasing risk for a large number of acute and chronic diseases[1]. It also provides for significant social and economic benefits. Decreased childhood illness reflects in decreased healthcare costs and reduced absenteeism for care attributable to child illness. This also translates itself into more time being available for attention to other siblings and family duties.

Nutritional Benefits

Breast milk contains the right amount of nutrients, in the right proportions, for the growing baby. A living, biological fluid, it contains many unique components, including living cells, hormones, active enzymes, immunoglobulins, all of which cannot be replicated in infant formula. The primary benefit of breast milk is nutritional, containing just the right amount of fatty acids, lactose, water and amino acids for human digestion, brain development, and growth. Special growth factors and hormones contribute to optimal growth and development, while among other constituents, lipases assist in the digestion of fats, and lactoferrin provides optimal absorption of iron and protects the gut from harmful bacteria. A mother's own milk changes from thirst-quenching to hunger-satisfying, and comes in a variety of flavours as her diet varies. The milk is always sterile and at the right temperature, and supply will normally meet the demand from baby in well established breastfeeding. No babies are allergic to their mother's milk, although they may have a reaction to something the mother eats. If this is eliminated from her diet, the problem resolves itself. Whilst most people are aware of the excellent nutrition provided by breast milk, many people are unaware of breastfeeding health benefits for babies, mothers and, consequently, the community.

Breastfeeding and Immunisation

Breast milk is a baby's first immunization. It provides antibodies which protect the baby from many common respiratory and intestinal diseases, and also contains living immune cells. Furthermore, mothers produce antibodies to whatever disease is present in the community, making breast milk custom-designed to fight diseases their babies are exposed to as well. Colostrum is packed with components which increase immunity and protect the newborn's intestines. Formula fed babies, in contrast, have higher rates of middle ear infections[11], pneumonia[12] and cases of gastroenteritis[13]. Breastfeeding an infant also provides protection from developing immune system

cancers such as lymphoma, bowel diseases, e.g. Crohn's disease, all of which are related to immune system function[14]. Breastfed babies generally mount a more effective response to childhood vaccinations. In all these cases, benefits begin immediately and increase with increasing duration of breastfeeding[15]. Exclusive breastfeeding, especially if it continues for at least six months, provides protection against allergies, asthma and eczema[12,16].

Infant Growth and Development

Growth charts from WHO confirm that breastfed infants have different growth patterns than formula fed babies[17]. Noticeably, breastfed babies grow faster in the first months, then slow down as the first birthday approaches. This 'dropping off the growth curve' really represents normal growth. Furthermore, several studies conducted in different countries and involving different age groups, have indicated that the incidence of obesity is significantly lower in those children who have been breastfed when compared to those who have not[18,19]. A recent British study found that breastfeeding seems to be associated with lower levels of damaging cholesterol in adulthood[20]. The authors concluded that breastfeeding may have long term benefits for cardiovascular health. Breast milk, moreover, enhances brain development and improves cognitive development[21]. Human milk has special ingredients such as docosohexanoic acid (DHA) and arachidonic acid (AA), which contribute to brain and retinal development.

Breastfeeding in Special Circumstances

Breastfeeding is particularly beneficial to preterm babies and can be life saving. Premature breast milk is different from term milk and suits the needs of premature babies. The immune protection, so more critical for premature babies, is known to reduce the risk of sepsis in these babies[22]. Suckling at the breast and digesting breast milk cause less stress for the premature than bottle-feeding does; and most premature babies can be put to breast as soon as they can suckle. If a baby has a problem which affects ability to suckle at the breast, expressed breast milk is still the best choice. Babies with Down's syndrome, cleft palate and congenital heart disease all stand to gain from the immunologic and developmental benefits conferred by breastfeeding[9]. The added demands of caring for premature or sick babies warrant the provision of greater support to these mothers by all healthcare professionals. Encouragement to persist in expressing milk until the baby can be put to the breast to feed can alleviate much of the accompanying anxiety.

Other Benefits

Studies have shown that breastfeeding reduces the risk or severity of a number of disease states including

- physiological reflux [23]
- pyloric stenosis [24]
- respiratory illness, particularly when both parents smoke [25]
- gastrointestinal tract disease [13]
- inflammatory bowel disease [26]
- some childhood cancers [27]
- otitis media [28]
- urinary tract infection [29]
- bacteraemia-meningitis [30]
- Sudden Infant Death Syndrome [31]
- A lower incidence of necrotizing enterocolitis in premature infants [32]

Breastfeeding contributes to optimum oral development with less risk of malocclusion. Bottle fed babies have a higher risk of baby bottle caries, a dental condition which occurs when babies are put to bed with a bottle containing formula milk, juice or other fluids high in carbohydrates[33]. Close skin-to-skin contact with the mother provides optimal nurturing and an almost automatic close emotional attachment. Suckling at breast optimises hand-to-eye coordination with breastfed infants being able to see and manipulate objects quicker then their bottle fed counterparts[34].

Breastfeeding Benefits for the Mother

Possibly not enough emphasis is put on the extent of benefits to mothers obtained through breastfeeding. Living in a bottle-feeding society, with little family and social support, and little understanding by many healthcare professionals, does little to convince mothers that breastfeeding, when practised optimally, can be an enjoyable experience which benefits mother and baby, and consequently families and community in general. Some mothers are left with the impression that breastfeeding is a time-consuming, difficult and even painful experience that women endure for their babies' sake.

What is good for babies is good for mothers. Healthier babies are less stressful to care for, with decreased medical costs an added bonus. In addition, there are several direct health benefits to breastfeeding mothers. Immediately after birth the oxytocin

released in response to babies suckling aids uterine involution protecting against postpartum haemorrage[35]. Continued exclusive breastfeeding tends to delay ovulation and menstruation. In addition to child-spacing advantage, the delayed menses also decrease the mother's iron losses, thus decreasing the risk of iron deficiency anaemia.

Another well documented benefit of breastfeeding is the mother's more rapid and sustained weight loss[36]. Milk production uses up to 200-500 calories a day. Mothers who have had gestational diabetes benefit particularly from the efficient use of calories during breastfeeding, since a return to optimal weight may prevent the subsequent development of diabetes. In addition, diabetic mothers who breastfeed tend to need less insulin or medication to control their blood glucose levels[37].

The prolonged suppression of ovulatory cycles appears to be related to significant long term health advantages. Mothers who breastfeed for at least six months have a decreased risk of premenopausal breast cancer and increased protection against ovarian cancer and osteoporosis[38]. Current medical literature demonstrates that not only is the loss in bone density during breastfeeding temporary, reverting to normal after weaning, but that bones may actually be stronger after prolonged breastfeeding [39].

Obstacles to initiation and maintenance of breastfeeding include:

- insufficient prenatal breastfeeding education [40]
- physician apathy and misinformation [41]
- disruptive hospital practices [42]
- inappropriate interruption of breastfeeding [41]
- early hospital discharge [43]
- lack of timely routine follow-up care and postpartum health visits [44]
- maternal employment (especially in the absence of workplace facilities and support for breastfeeding)
- lack of support from society in general
- media portrayal of bottle-feeding as normative [45]
- commercial promotion of infant formula through distribution of hospital discharge packs [46]

4. Anxiety

In the light of the broad range of benefits of breastfeeding the last thing that one may associate with it is anxiety. However, for many mothers this is patently not the case.

When does Breastfeeding Anxiety manifest itself?

A substantial number of difficulties can be considered as perceived rather than real problems, and the accompanying anxiety can potentially be very effectively managed through education and support. There are critical time windows in the events spanning through the pregnancy, delivery and early post-partum period, as well as in the first few weeks post delivery. These are potentially trying or difficult phases in the motivation, initiation, establishing and continuation of breastfeeding. Missing out on effective and timely educational, supportive or treatment interventions at these critical time windows sadly reflects as missed opportunities to breastfeed. Targeting such missed opportunities is crucial since these are the critical times when anxiety is most commonly expected to manifest itself. However, each case should be individually assessed and while sensitively educating the mother, consideration for, and understanding of, the specific financial, work and time obstacles to breastfeeding is essential for appropriate management

Why do Mothers become Anxious about Breastfeeding?

Most common concerns of breastfeeding mothers issue from three sources namely, the baby, the mother and society.

4.1 Concerns relating to the Baby

Perceived and Genuine Low Milk Supply

Perceived low milk supply is a cause of much anxiety to mothers and the most common cause of premature termination of breastfeeding. A mother can be reassured that breastfeeding is successful if all of the following conditions are met [47]:

- at least six wet nappies of pale inoffensive smelling urine in a 24 hour period
- soft pasty yellow bowel movement daily
- reasonably content for some time between feeds
- sleeping well, yet baby looks alert and healthy when awake
- steady weight gain after the first week of age
- baby is fed on demand rather than schedule, although some sleepy babies need reminding.

One common reason why mothers, and those around them, believe there is insufficient milk stems from the observation that the baby keeps turning its head and

opening its mouth as if wanting to suck. This is the rooting reflex, present from birth to three to four months. Babies do this when they are awake and alert and something touches their cheeks, whether or not they are hungry. Similarly, when infants start to suck their fists frequently, between 8-12 months, as part of their sensory-motor development, mothers may take this to be a sign of hunger. Another reason is that the 'let down' sensation fades or disappears.

Genuine insufficient breast milk has a number of possible causes. One of these is inadequate position or attachment. Another involves the infant not feeding frequently enough, or not long enough. In this instance, unless the unused milk is removed from the breast there follows a diminishing in milk supply. The use of dummies, which replaces time spent sucking at the breast, may reduce milk supply as a response to diminished stimulation. In addition, breast reduction and other breast surgery, while not precluding breastfeeding, may hinder full lactation.

Low breast milk supply is usually a temporary difficulty and only occasionally becomes an ongoing problem requiring supplementation of the breast milk supply. There are several ways of increasing the milk supply. First, it is important to check positioning and ensure that this is correct. Secondly, the frequency of feeding can be increased by offering the breast between feeds, offering it as a comforter instead of a dummy, allowing the baby to finish the first breast before offering the second, and always offering the second breast. Milk supply can also be increased by regularly expressing between feeds, establishing good nutrition and rest routines and, where it is warranted to do so, taking metoclopramide, which induces the release of prolactin and has been shown to increase milk supply[48].

Crying or Restless Babies

Our society encourages the perception that if a baby is loved, cared for and fed, it will not cry. Crying is a strong source of distress in mothers especially when there is no clear cause for the baby's crying. In attempting to rule out hunger as a cause for crying, mothers easily succumb to formula feeding in the hope that it will pacify the baby.

Additionally, mothers may form a number of misconceptions about the nature of breast milk and their ability to supply it. The translucent appearance of breast milk may be interpreted as evidence that it is 'weaker' than formula or cows' milk. A mother may interpret her inability to express much milk as a measure of how much milk the baby actually takes, when the quantity of expressed milk is not a reflection of the amount of milk supplied. Between 6-12 weeks after birth, mothers' breasts

become smaller and softer and stop leaking. Although such breast changes are normal and not a sign of insufficient milk supply, many mothers misinterpret them. Furthermore, mothers may construe the shortening duration of feeds as another sign of insufficient milk supply. Well meaning advice to the mother from an assortment of sources which suggest that her milk supply is not satisfying the baby constitutes another source of concern for the mother. Such comments sow doubts in the mother's mind about the quality and quantity of her milk supply. Equally, suggestions that the baby would be more content and sleep for longer periods if the milk was satisfying, and that the mother would have peace of mind if she could see how much milk the baby was actually getting, do nothing to allay such doubts.

Breast Refusal

Reasons for breast refusal are numerous and varied. They can be usefully categorised as either infant-, or mother-, related. Among infant-related causes are infectious illnesses, such as respiratory illness causing a blocked nose, gastro-oesophageal reflux with oesophagitis, thrush, and the degree to which the baby is distractible. Some babies are best fed in a quiet environment.

Mother-related causes are largely associated with changes to the taste and smell of the milk. Thus, while mastitis leads to salty tasting milk, medication may also alter the taste of the milk, and a change in perfume or talcum powder might interfere with the smell of the milk. Hormonal changes may affect both the taste and the supply of the milk, and illness may decrease supply or inhibit let down.

Appropriate management focuses on reassurance aimed at encouraging mothers to relax and not to perceive breast refusal as a personal rejection. When illness in both the mother and baby is ruled out, the mother needs to be reassured that this is usually a temporary situation.

Breastfeeding Multiples

Mothers of twins and higher order multiples should be encouraged to breastfeed. These mothers will need additional support to enable them to cope with their added demand.

4.2 Issues relating to the Mother

For many mothers the sources of breastfeeding anxiety may be physical, psycho-emotive or social in nature. Caring for a baby is a round the clock job the demands of which can put the fittest of mothers under check. When a mother is unwell, caring for

a very dependent baby, especially in early, postnatal days, puts her under a greater strain. While other family members can assist in caring for the baby, it will still rely on its mother when it comes to feeding. With acute illnesses like URTI, breastfeeding can be continued. Women with chronic noninfectious illnesses may be empowered by their ability to breastfeed. For most illnesses, medication issues need not prevent breastfeeding, since reasonable medication choices can always be made. However, exceptions include treatment of breast, or other, cancers with antimetabolites. With certain chronic illnesses, especially depression, one needs to try and establish what would be of most benefit to the mother. The potential risk of treatment has to be weighed against the emotional upset caused by inability to breastfeed. Women with severe trauma or acute life-threatening illness may be too ill to breastfeed or express milk. Should maternal illness or work demands require separation, familial and social support should be provided to enable women to maintain lactation.

4.2.1 Physical Problems

Engorgement

Engorgement is a relatively common problem that occurs in the early days of breastfeeding, and is the result of ineffective removal of milk from breasts. This can be resolved by allowing unrestricted access to the breast as well as appropriate positioning and attachment. Relief of discomfort can be afforded with simple analgesia (e.g. paracetamol).

Inflammatory conditions of the breast

Non-infective mastitis

Non-infective mastitis can result from a blocked milk duct. Usually, one segment becomes tender, reddish and hard. Predisposing causes include poor drainage of the breast, sudden engorgement due to missed feed and pressure from a range of sources such as tight fitting clothing, lying on one side for long periods, or holding of the breast too tightly during feeds. Blocked ducts should be treated to prevent infective mastitis.

Infective mastitis

The most common cause of infective mastitis is cellulitis resulting from infection with Staph aureus or less commonly Strep. The breast is tender, red and swollen with the mother feeling unwell and feverish. Prevention is crucial and nipple trauma can be avoided through the correct positioning of the baby at the breast and gentle handling of the breasts.

Early detection is crucial to effective treatment and breast feeding should continue as this is not the time to wean because abrupt weaning may increase the risk of developing a breast abscess. Feeds should be frequent and feeding should be from the affected breast first to avoid engorgement in the other breast. Drainage of affected area is facilitated by changing feeding position and by expressing after feeds.

If the above measures prove unsuccessful, antibiotic treatment should start early and continue for ten days. Suitable antibiotics include cephalexin, erythromycin and flucloxacillin. Reassessment after treatment is necessary to ensure complete resolution of the problem. In cases of severe cellulites hospitalisation and intravenous antibiotics may be required.

Breast abscess

This is a serious and painful condition which is usually the result of untreated, or inadequately treated, mastitis, and requires urgent medical attention. It should be managed by surgical incision, or needle aspiration. Breastfeeding can be continued unless the position of the incision makes it impossible.

Infectious Diseases

For most maternal infections breastfeeding helps to protect the infant against the disease, or, at least, decreases the severity of the illness, because of anti-infective components of breast milk. Only few maternal infections preclude breastfeeding. These are HIV positive states; active untreated TB and TB in the first two weeks of treatment (once on treatment the mother can safely feed expressed milk, and the baby treated for TB as well); active herpes simplex outbreak affecting the mother's breasts; Brucellosis; and chickenpox contracted five days antepartum or within two days postpartum[9]. Babies born to mothers who develop chickenpox within 5 days antepartum, or within 2 days postpartum, are at a risk of more serious chickenpox infections[9]. It is recommended that the mother and the baby be separated. However, expressed milk is safe for feeding unless it comes in contact with active lesions. In the case of Hepatitis B infection, the baby can breastfed once immunised.

Breast Surgery

With cosmetic surgery becoming commoner over recent years, adequate guidance needs to be provided to women contemplating such surgery with regard to consequences for breastfeeding. Both breast augmentation and reduction can lead to problems of insufficient milk supply. Similarly, breast biopsies with circumoral incision can interfere with milk supply. Women having undergone any of these

procedures should be advised to continue breastfeeding. Both mother and baby should be followed up to ensure adequate feeding.

For the purpose of evaluation, women who develop a suspicious breast lesion should not wean. Mammograms and breast biopsies can be done without interfering with lactation.

4.2.2 Psycho-emotive Issues

Embarking on motherhood is a stage in a woman's life which brings about major changes in her and her family's life. Although it can be a happy and positive experience, it is not uncommon for the mother to experience mood changes, probably owing to several factors including hormonal changes, sleep deprivation, lack of support at home and coming to terms with her new role while adjusting her lifestyle. Various degrees of anxiety can be experienced in a number of recognised conditions.

The Blues

This is a mild and transient disorder occurring in the first week after delivery with a peak on the third to fifth days. It affects up to 70 percent of all mothers[49]. Symptoms include mood swings from tearfulness to elation with irritability or increased sensitivity. Empathy, support and encouragement comprise all the treatment that is required.

Postnatal Depression (PND)

This is an episode of major depression arising within three to six months after birth. It is important to distinguish between PND and the common mood changes experienced by postnatal women, known medically as 'adjustment disorder with depressed or anxious mood'. These women need counselling, support and encouragement from their families and health professionals.

Depression as an illness is distinguished from an adjustment disorder by a persistence of the depressed mood and the presence of other symptoms, especially the disturbance of sleep and appetite, and the loss of self-esteem, lethargy and poor concentration. Anxiety and irritability are also common. Recent Australian studies show that PND was associated with lack of support (being single, divorced or separated), not breastfeeding, and/or having a caesarean or forceps delivery[50,51]. With marked symptoms, medication and, on occasion, hospitalisation may be required. Antidepressant medication is not always required, but can help reduce anxiety.

Doctors are often concerned about prescribing for a breastfeeding mother. A tricyclic antidepressant with minimal sedation should be chosen, allowing breastfeeding to continue. The small, potential risk of the medication to the baby has to be weighed against the emotional devastation to an already depressed mother of having to wean her baby, as well as the known detrimental effects on infant emotional development when the mother suffers from persistent depression.

Medication and Substance Abuse

Almost all prescription and over the counter medications taken by the mother are safe during breastfeeding. Resources, such as the BNF[52], are available to help estimate the degree of drug exposure, and it is always best to choose a medicine that has the least passage into breast milk, has fewer active metabolites, and/or is used locally rather than systematically. Doctors must weigh the risk of replacing breastfeeding with artificial feeding against the risk of medication exposure through breast milk. Even a temporary interruption in breastfeeding can precipitate premature weaning. Generally, it is recommended that the mother does not breastfeed if she is on anticancer drugs or drugs of abuse. Women who breastfeed are advised not to smoke, but if they cannot quit, it is still more valuable to breastfeed. They should be advised to smoke as little as possible, preferably after, rather then before, a feed in order to minimise the nicotine levels in their milk, and not to smoke in their baby's environment. Alcohol passes easily into breast milk. While it is safest for breastfeeding mothers not to drink alcohol, they may be assured that having an occasional drink need not preclude breastfeeding.

4.2.3 Personal Concerns

Previous Unsuccessful Breastfeeding Experience

Previous unsuccessful breastfeeding experience can diminish a mother's confidence and can result in the mother being reluctant to attempt breastfeeding in a successive pregnancy. If this is the mother's only reason for doubting the feasibility of breastfeeding, attempts to help in motivation to breastfeed should begin early on in pregnancy. Mother-to-mother support group involvement can be of great help as can discussions held in antenatal classes. Airing of such concerns can reveal any anxiety including that which may be associated with choice of feeding.

Fear of Commitment

Lack of motivation very often stems from lack of education and/or inadequate

support. Ensuring an informed choice, as well as clarifying misconceptions, mean the mother is more likely to be comfortable with the feeding option she chooses.

Contraception and Fear of Repeat Pregnancy

Sometimes mothers opt not to breastfeed because of their erroneous view that oral contraception is incompatible with breastfeeding. They can be very confused about the effectiveness of breastfeeding in family planning. Advice about choice, effectiveness and safety of contraceptive methods can allay considerable anxiety arising out of the misperception that contraception can adversely affect breastfeeding.

Body Image and Sexuality

Following the considerable body changes witnessed throughout pregnancy, resuming prepregnancy weight and shape (or, preferably, better than prepregnancy weight and shape!) is highly desirable. It is not uncommon to come across women who refuse to breastfeed on the mistaken perception that their breasts will sag and that their feminine assets will consequently dwindle. Explaining that women are endowed with breasts primarily to fulfill a feeding function, and highlighting, among the many benefits of breastfeeding, the potential for earlier return to prepregnancy size, may convince such mothers to breastfeed with diminished anxiety. These concerns can also be addressed by providing positive images of breastfeeding. In a loving relationship, sexuality should not be affected because the mother is breastfeeding. The portrayal of women in the media has a strong direct, as well subliminal, effect on how many women perceive themselves. Unfortunately, breastfeeding still does not enjoy the frequency of advertising that it deserves. There is a need for media to portray breastfeeding as the desirable norm, with role model figures publicly encouraging and promoting breastfeeding.

Teens and Breastfeeding

While teenage mothers share issues with their adult peers, they also face many unique pressures. Breastfeeding teens often have significant concerns regarding their body image, sexuality and contraception. It is important to proactively share information about proper nutrition, diet, exercise and weight loss with teenage mothers and their support system. Milk production in teens can still be sufficient to provide exclusive breastfeeding even when breast tissue might not be fully developed. In such cases, guidance and support are particularly necessary.

4.3 Social Issues

Breastfeeding in Public Places

Some women feel that breastfeeding is both a personal and a private activity. It is understandable that breastfeeding in public, especially when no designated feeding areas are accessible or available, can cause anxiety in mothers. Pressure on mothers to refrain from breastfeeding, or to rely on formula feeding, when in public is greater than normal. In the light of such considerations, mothers can feel anxious about their inability to cope with the demands of breastfeeding when outside the comfort and privacy of their home. Other breastfeeding mothers can be helpful with tips or suggestions for coping strategies. These concerns can be addressed by providing positive images of discreet breastfeeding as well as campaigning for more baby-friendly environments in public places.

Family and Friends

Some families have a strong pro-formula mentality. In the face of inappropriate education, this way of thinking is very likely to pass on from one family member to the other. Husbands and maternal grandmothers are known to be critical decision makers in choice of infant feeding. Taking our cultural beliefs and customs into consideration, one cannot but register the importance of the education. Friends and immediate family, are joined by neighbours and a long list of well meaning but poorly informed people who come forward with unsolicited and confusing advice about infant feeding. Appropriate guidance and support can be offered accordingly. Where it has been effective, and families and extended families live close to each other, it is much easier to harness support for the breastfeeding mother. At times when the family does not support breastfeeding, health care professionals' encouragement and praise can go a long way in keeping the mother motivated to continue breastfeeding. As family doctors, we understand the advantages of family-centred care and are well positioned to provide breastfeeding support in that context.

Career and Motherhood

As a result of radical lifestyle changes witnessed over the last few decades, a high percentage of the workforce is female. For working women and professionals, embarking on motherhood can be a highly emotive issue, especially when the needs of their child, including breastfeeding, conflict with the demands of their career. Unlike most other aspects of child care breastfeeding cannot be delegated to other carers. Consequently, the fear of missing out on opportunities of progressing along the career

ladder, or other career related constraints, put mothers under pressure when it comes to choosing a feeding method. If a career break is not considered feasible, then feeding expressed breast milk while the mother is at work can be advised. The mother can catch up with breastfeeding when at home.

Breastfeeding and Demands on Working Mothers

Working mothers fall into two categories: those who are required, or are under financial pressure, to return to work before their infant has been weaned; and those who are able to complete the weaning process before they are required, or constrained by financial demands, to return to work. The latter group tend to be employed in the public sector, which currently leads the private sector in the provision of extended periods of parental leave. In this regard, it is hoped that the private sector will soon follow suit and that appropriate legislation ensuring such provision will soon be enacted. In addition, there is a need for the introduction of flexible working hours to cater for the maternal needs arising during the first three months of breastfeeding when the process is still being established. Although it has advantages for both groups of mothers, the fact that breastfeeding is the less expensive option makes it particularly attractive to those experiencing financial pressures. Ironically, should this particular group of mothers opt to breastfeed, early return to work can be a source of anxiety because it throws up a whole host of problems in relation to support and facilities both at home and at work. At home support may involve recruitment of the father and/or other family members, where they be available, to feed the baby in the mother's absence. At the mother's place of work both time and facilities to allow for the expressing and adequate storage of expressed milk are needed.

In essence, two options are open to working mothers who wish to breastfeed but are required to return to work prior to weaning. Where support and facilities allow it, they may either have their substitutes feed the child expressed milk from a cup or bottle while they are at work and resume breastfeeding when at home. Alternatively, where support and facilities are lacking, they may resort to the less favourable option of supplementing breastfeeding with formula milk, although this will undermine the savings associated with breastfeeding in families where financial pressures are an issue. Campaigning for the adoption of breastfeeding friendly policies at work, is one of the issues we need to focus on if we want to be more supportive towards working mothers who wish to breastfeed.

5. The Role of Health Care Providers in allaying Breastfeeding Anxiety

Discussing feeding options during the pregnancy with family doctors, breastfeeding counsellors, and other mothers will ensure that a mother can make an informed choice. Once her feeding option is determined, this can be noted in her antenatal records. Other health care providers will be aware of her wish and if she opts to breastfeed, will assist her in its implementation should this be necessary. If a mother is still undecided, every effort should be made to help her initiate breastfeeding soon after the birth of the baby. A mother's anxiety arising from lack of confidence about her ability to breastfeed can thus be kept to a minimum.

The short postnatal stay at hospital is a crucial time for the initiation of breastfeeding. Observation of the mother breastfeeding whilst still in hospital, provides an opportunity to sort out the common problems of poor latching and position of baby at breast. Assistance with breastfeeding at this stage minimises the chances of a mother being discharged home in a state of discouragement about breastfeeding. Simple and clear instructions should be provided on how to express breast milk, both for storage purposes and to relieve engorgement.

Early follow up by the community midwife and the family doctor can detect, among other things, any anxiety related to breastfeeding problems, such as painful breasts from engorgement. Such complaints can be readily treated, thus allowing the mother to continue feeding with confidence.

Routine assessments of the baby by paediatricians at well baby clinics can allay any anxiety that breastfeeding mothers may have about milk sufficiency. Being told that her baby is growing well, as objectively confirmed from velocity growth charts, is an enormous confidence booster for the mother. When mothers consult because of breast milk jaundice, explaining the link of breastfeeding and jaundice can cause further anxiety by leading the mother to the mistaken conclusion that there is something wrong with her breast milk. It is crucial that the mother is not allowed to go away under the false impression that she is to blame. In addition, she is to be reassured about the benign nature of this condition.

Routine postnatal assessment can be useful to highlight the benefits the mother has gained from breastfeeding. Any anxiety expressed, particularly with regard to the compatibility of breastfeeding and contraception, should be addressed.

Breast feeding counsellors provide assistance to breastfeeding mothers as the need arises. The details of these trained counsellors should be made available at antenatal visits and classes, prior to discharge from hospital, and at visits to family doctors and paediatricians.

Mothers sometimes seek advice about infant feeding from community pharmacists. This is especially so with mothers of crying or fussy babies who are very anxious to discover a cure for their baby's crying, possibly in the form of formula feeds. It would be very reassuring for the mother to be told that breast milk is best for babies and no less important to emphasise that this fact is to be taken into account prior to any consideration of switching to formula. Other opportune interventions by pharmacists include ensuring the safety of both over the counter and prescribed medications to breastfeeding mothers. Reassuring the mother that prescribed medications are safe to use during breastfeeding improves compliance with treatment and lessens anxiety in the mother.

By virtue of their unique role of providing comprehensive care to mothers and their whole family, family doctors are instrumental in providing ongoing care spanning from preconception to postpartum. The rapport built with the mother over this time allows the family doctor to be knowledgeable and sensitive to issues that can be of concern to the breastfeeding mother. Tactfully and with sensitivity the family doctor can treat and manage the source of breastfeeding anxiety effectively.

All members of the healthcare provision team have a role to play in encouraging the breastfeeding mother. Their involvement in the implementing of the National Breastfeeding Policy can assist mothers overcome breastfeeding related anxiety and, therefore, breastfeed successfully. To this end, collaboration and co-operation between all is crucial for successful breastfeeding and improving of the local breastfeeding initiation rates.

6. Conclusion

Breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants, and this forms a unique biological and emotional basis for both maternal and infant health.

Anxiety commonly stems from the inability to breastfeed, or problematic feeding, rather than breastfeeding itself. This is more evident when the mother's motivation and wish to breastfeed are not complemented with adequate information and support for her to achieve successful breastfeeding. Once the source/s of anxiety is/are diagnosed, with appropriate and timely intervention, this anxiety can be effectively resolved.

Knowledge cures helplessness, helping mothers to make a well informed choice and providing preemptive advice regarding potential difficulties, especially in the early stages of breastfeeding. In addition, knowledge allows mothers to feel confident that they can master the womanly art of breastfeeding. The knowledge that these initial difficulties are common and, consequently, only to be expected, removes a further potential source of anxiety. The provision of details of support groups and healthcare professionals who can help when feeding problems arise, helps to further dampen breastfeeding related anxiety.

It is ultimately a matter for the mother to decide on a method to feed her baby. The decision to breastfeed, therefore, should be the mother's choice. It is, as this paper has sought to show, an important health decision, rather than another one in a series of lifestyle choices, and has positive lifelong consequences that extend beyond the mother-baby dyad to society itself. In common with similar decisions, it requires significant maternal commitment.

Enthusiastic support and involvement of all healthcare providers, especially family doctors, midwives, paediatricians, community nurses and pharmacists, in the promotion and practice of breastfeeding is essential in ensuring that more mothers choose to breastfeed and discover its unique contribution to both the baby's and the mother's well being.

As a mother myself, there is no doubt in my mind that breastfeeding is a truly fulfilling experience. Indeed, apart from the associated sleep deprivation, my only regret now is that it is all over. While weaning evoked the severing the umbilical cord at birth, in that it took away a special physical bond, breastfeeding has given me a healthy child with a good start in life and good prospects for continued well being. What else could a mother wish for? In no small part thanks to the encouragement and support of family, friends and health professionals, I have no hesitation in recommending breastfeeding to all mothers.

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Nutrition during the first year of life

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Energy and nutrient intake during the first year of life has to satisfy the requests for all biological activities needed for life maintenance, health, and growth.

Energy requirement expressed per kg body weight is very high in the first days of life (first month: 125 kcal/kg) but it decreases rapidly (third month: 85 kcal/kg) and is maintained pretty constant till the end of the first year.

Basal energy expenditure, very high in young infants when expressed per unit body weight, covers most of energy requirement. This is mainly due to the organs with high metabolic activity (brain, heart, liver, kidney) characterized by a much higher energy expenditure for unit of weight than skeletal muscle. Growth is accompanied by a progressive decrease in the ratio between organs with high metabolic activity and skeletal muscle and this process is accompanied by a progressive reduction of basal energy expenditure per kg body weight and, by implication, by a reduction of energy requirements per unit of body weight.

In the first months of life, characterized by a dramatically high speed of growth (approximately 30 g per day) in which infants increase of about 1% their body weight every day, the energy content of the new tissues (120 kcal/day) is the second component of total energy requirement (approximately 22% of daily energy requirement). Then,

infants rapidly reduce their speed of storing energy into new tissues: at six months the speed of growth is approximately 20 g per day, i.e., 45 kcal per day and infants increase their body weight by 0.25% per day. The big difference of the energy content of each gram of neo-synthesized tissue in the first and in the second trimester is due to the higher ratio between fat and lean tissues synthesized immediately after birth than in the second trimester of life. This rapid changes of growth speed is due to the progressive increase of body weight and, by implication, of basal metabolic request, by progressive increase of energy expenditure for skeletal muscle activity (11% of total energy requirement at 3 months and 22% at 12 months) and, finally, by the progressive inadequacy of human milk to provide energy and nutrients for the growing organism.

The protein requirement of infants has been recently revised and it has been proposed to provide a substantial reduction of protein intake at weaning. Consistent evidence has been accumulated to support this suggestion. The immediate implication of this finding is the need to reduce the extremely high protein intake in respect to requirement reported in older infants and toddlers.

Protein intake with formula feeding is higher than with human milk. Therefore, protein provided at weaning with solid food should be differentiated in breast fed and formula fed infants, respectively.

Increased intestinal permeability of young infants increases the risk of sensitisation and allergy, when exposed to high protein intake. Moreover, the difficulty of the organism to store protein in excess of requirement promotes protein oxidation. Nutrient fluxes and oxidation rates changes affect hormones (insulin, IGF-1, etc.) secretion and, potentially, long term regulation of pre-adipocites recruitment, differentiation and maturation into adipocells. Long term influences on metabolic regulation and adipose tissue size development by early infancy nutrition is a fascinating hypothesis. At present, further data are necessary to quantify the precise role of high protein intake in infancy, independent from other pro-obesity co-factors, in affecting the risk of overweight and obesity later in childhood. Another obesogenic factor is precocious introduction of complementary food, which was associated with a faster weight gain, especially if breast feeding is not prolonged. The results of several studies reported that fast growth in the first months of life is associated with obesity risk in childhood and young adulthood.

The rising incidence in allergy during the first year of life may justify the attempts to modulate the infant's flora for its role in immune response. An interaction between probiotics and breastfeeding has been recently demonstrated: probiotics administered during breastfeeding were reported to affect the number of Ig-secreting cells, positively influencing gut immunity. A bifidogenic effect, implying advantages of a 'breast-fed-like' flora, may be induced by prebiotics added to infant formulae. So far, the bifidogenic effect of oligofructose and inulin has been demonstrated in animals and in adults, of oligofructose in infants and toddlers and of a long-chain inulin (10 %) and galactooligosaccharide (90 %) mixture in term and preterm infants. Infants fed a long-chain inulin/galactooligosaccharide mixture (0.8 g/dl) in formula grow normally and have no side-effects. The addition of prebiotics to infant formula softens stools but other putative effects remain to be demonstrated.

In conclusion, some progress in the knowledge of infants energy and nutrient requirements has been recently made. The new research challenge is to explore the long term effects of early nutrition on the development of metabolic disorders, especially obesity, in adulthood as well as allergy and auto-immune diseases. The continuous adaptation of formulas and complementary foods to new scientific evidences is mandatory.

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The Child Development Assessment Unit

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The Child Development Assessment Unit, better known as the CDAU, is a specialised unit at St. Luke's Hospital. In this unit a multidisciplinary team provides, under one roof, a service of assessment and care to children with developmental problems.

The team, led by the Consultant Paediatrician, Dr. Nadette Spiteri, is made up of a multidisciplinary team of professionals, including:-

- Nurses
- Psychologists
- Physiotherapists
- Occupational therapists
- Speech therapists
- Early intervention teachers

Co-ordination

- All children have their vision and hearing assessed. These assessments are carried out in the outpatients block at St. Luke's Hospital.
- There is full co-ordination between the CDAU and the school medical officers.

- The early intervention teachers within the CDAU multidisciplinary team co-ordinate the Educational Services in the schools.

Case conferences are held mainly for children under 5 years of age. During these case conferences, the multidisciplinary team discusses the patient's assessment and formulates the best management plan for these patients.

Detailed reports are prepared by all the members of the multidisciplinary team about each patient attending the CDAU. The Consultant of the Unit, personally gives and discusses these reports with the parents of the children attending the unit.

Parents can discuss these reports with the Education authorities, with their family doctor and with whatever agency they wish.

Medical Services at the CDAU

Children are referred to the CDAU by the family doctor, by paediatricians, by the School Medical Officers or any medical consultant.

All children referred to the CDAU, initially undergo a detailed physical and developmental assessment by the Consultant Paediatrician responsible for the unit.

All necessary investigations are carried out and a diagnosis is established.

The patient is then referred to the individual members of the multidisciplinary team for assessment and subsequent management.

At the CDAU assessments are carried out on children with any problem relating to their physical and/or mental development. A specific clinic has been set up for children with Downs Syndrome, one for children with autistic spectrum disorders, and one for children with learning difficulties.

All necessary medical certificates are issued by the Consultant to the parents of children with special needs to enable them to claim the relevant social benefits.

Vaccine Safety - Separating Fact from Fiction

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Public health professionals in the USA were recently asked to draw up a top-ten list of the achievements of the 20th Century. Vaccination was not surprisingly put first on the list.[1] Immunizations have been described as the most effective health interventions after clean water and sewage disposal.[2] The birth defects caused by rubella; the distinctive sounds of whooping cough; the iron lungs and braces designed for children paralysed with polio: to most Maltese these diseases represent obscure diseases of years past.[3] Yet only a few decades ago, infectious diseases such as measles, diphtheria, smallpox and pertussis topped the list of childhood killers.[3] Fortunately many of these devastating diseases have been contained especially in industrialised countries because of the development and widespread distribution of safe effective and affordable vaccines. Millions of lives have indeed been saved.[3]

Even as existing vaccines continue to exert their immunological power and new vaccines offer similar hopes, reemerging and newly emerging infectious diseases threaten all the progress that has been made. Furthermore during the past fifty years the number of pharmaceutical companies making vaccines has decreased dramatically and those that still make vaccines have reduced resources to make new ones.[4] Pharmaceutical companies are gradually abandoning vaccines because the market to

sell vaccines is much smaller than the market for other medicines; besides the research development testing and manufacture of vaccines is very expensive.[4]

However in this age of mass communication where the world is truly a 'global village'; as described by Canadian philosopher Herbert Marshall McLuhan in his seminal 1962 classic 'The Gutenberg Galaxy: The Making of Typographic Man'; the most scathing attack to vaccines are anecdotal reports and uncontrolled observational studies in the medical literature and stories in the news media and on the internet, alleging that vaccines cause chronic diseases such as multiple sclerosis, diabetes, chronic arthritis, hay fever and asthma.[5] Other stories allege that vaccines contain harmful preservatives, adjuvants, additives or residuals.[6] Other parents are concerned that infant's receive too many vaccines. Implicit in this concern is that the infant's immune system is inadequately developed to handle multiple vaccines safely.[7]

Because of these reports some parents are choosing to delay or withhold vaccines for their children. A case in point is the Measles, mumps rubella vaccine (MMR). Suggested links between the triple vaccine and autism and bowel disease have cast a cloud over this vaccine.[8] Coverage levels for MMR in Malta have decreased considerably: from 80% in 1990 to 74% in 2000.[9]

The increased number of vaccines given to children and the increased percentage of children receiving vaccination has resulted in a dramatic decrease in the number of vaccine-preventable diseases. Many parents today have never seen many of the diseases that vaccines prevent. Most parents receive information and recommendations about vaccines from doctors and because these recommendations carry substantial weight with parents, health professionals must know all the facts when addressing parents concerns. Health professionals are finding it difficult to give parents clear committed advice; not wanting to feel that they have influenced a parent if something goes wrong. Instead of giving robust scientifically valid advice health professionals are leaving it to parents to make choices instead. This is very dangerous because parents are interpreting this lack of positive advice as an opportunity to choose which vaccines their child could have. People may recall having measles as a child and believe it is not dangerous or may think that boys do not need to have the rubella vaccine not appreciating the fact that boys can infect pregnant women. When there is no fear of the disease the fear of the vaccine may become paramount.[8]

This paper aims to use the purported link between MMR and autism to clarify such matters and help the health professional separate fact from fiction.

MMR and autism

Today's doubts regarding the MMR is in various ways similar to the 1970s and 1980s scare over the whooping cough vaccine after a report was published suggesting a link be tween the vaccine and a group of children with brain damage. Parents were given the choice whether to have diphtheria/tetanus/pertussis vaccine or just diphtheria and tetanus. Many parents thought that by choosing not to administer the pertussis vaccine they were choosing the safer option. However in the UK there were at least 200,000 extra cases of pertussis recorded and 100 deaths from the infection in the 1970s and 1980s. It took five or six years to discover that the original link between pertussis vaccine and brain damage was wrong but it took 20 years to restore confidence in the vaccine.[8]

Two studies have been cited by those claiming that the MMR vaccines cause autism. In 1998 Andrew Wakefield and 13 colleagues published a paper in *The Lancet* entitled 'Ileal-lymphoid–nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children'.[10] The hypothesis proposed is that the MMR vaccine causes a series of events that include intestinal inflammation, loss of intestinal barrier function entrance into the bloodstream of encephalopathic proteins and consequent development of autism. To support this hypothesis 12 children with neorodevelopmental delay of which 8 had autism were described. All of these children had gastrointestinal complaints and developed autism within 1 month of receiving MMR.[10]

Critical flaws in the first Wakefield study include the fact that at the time of the study approximately 90% of children in England received MMR. MMR is administered at a time when many children are diagnosed with autism; thus the observation that children diagnosed with autism recently received MMR is expected. Determination of whether MMR causes autism should be done by studying the incidence of autism in both vaccinated and unvaccinated children. This wasn't done in the study. Besides although the authors claim that the autism is a consequence of gastrointestinal inflammation, gastrointestinal symptoms were observed after and not before symptoms of autism in all 8 cases described.[10]

In 2002 Wakefield and other co-workers published a second paper examining the relationship between the measles virus and autism. The authors tested intestinal biopsy samples for the presence of measles virus genome from children with and without autism. Measles virus was detected by reverse-transcriptase polymerase chain reaction (RT-PCR) and in situ hybridization. 75 of 90 children with autism were found to have measles virus genome in intestinal biopsy tissue as compared with only 5 of 70

control patients. These results appear concerning were it not for critical flaws also in this study which will be elucidated below. [11]

There is no mention whether the study was blind or not. Because no statement is made in the method section it is unclear whether the blinding of samples occurred.[10]

RT-PCR is an extremely sensitive assay. Laboratories that work with natural measles virus such as the lab where this experiment was performed are at high risk of false-positive results. The paper does not mention any precaution taken to minimize this occurrence.[11]

Natural measles virus is still in circulation in England. It would have been important to determine whether the measles virus genome detected in the biopsy samples was natural measles or vaccine virus. Primers are available to distinguish the two types of virus but the authors chose not to use them.[11]

Measles virus is live and attenuated. After inoculation the virus replicated 15-20 times. The measles virus would be expected to be taken up by antigen-presenting cells) such as macrophages, B cells and dendritic cells). All antigen-presenting cells are mobile; therefore it is possible that a child immunized with MMR would have measles virus genome detected in intestinal tissue using a very sensitive assay such as RT-PCR. To determine whether MMR is associated with autism one must determine whether the finding is specific for children with autism. Children with or without autism must be matched in two ways. Children with or without autism must be matched for receipt of the MMR vaccine and also for the length of time between the receipt of MMR and collection of the biopsy specimen. This information was omitted from the paper. [11-12]

Five studies have been performed refuting a causal association between the receipt of MMR vaccine and autism.

In 1998 Taylor and co-workers examined the relationship between receipt of MMR and development of autism in an excellent well-controlled study of 498 children with autism or autism-like disorder. It was concluded that the percentage of children vaccinated was the same in children with autism as in other children; there was no difference in the age of diagnosis of autism in vaccinated and unvaccinated children and the onset of regressive symptoms did not occur within 2, 4 or 6 months of receiving the MMR vaccine. A second study by Taylor examines the relationship between MMR vaccine and 'new variant autism' (as per Wakefield claim that autism is associated with small intestine inflammation). Children with autism diagnosed between 1979 and 1998 were examined. The authors compared

the numbers of children with autism and intestinal symptoms before 1988 (the year when MMR was introduced in England). There was no difference. They thus concluded that there is no evidence for 'new variant autism'.[13,14]

Another two studies examined the relationship between the increase in the number of cases of autism and receipt of MMR vaccines in California and in England. In both studies although the incidence of autism increased MMR immunization rates remain the same.[15,16]

Perhaps the best study was the one performed by Madsen and colleagues in Denmark between 1991 and 1998. The study included 537,303 children. Approximately 82% of children had received the MMR vaccine. The risk of autism in the group of vaccinated children was the same as that in unvaccinated children. There was also no association between the age at the time of vaccination, the time since vaccination or the date of vaccination and the development of autism.[17]

Other studies on the causes of autism indicate that autism has a genetic basis. Using a strict definition of autism, when one twin has autism 60% of monozygotic twins and 0% of dizygotic twins have autism. [18]

Various studies indicate that autism symptoms are present before 1 year of age (before the children have received the MMR vaccine). These studies termed 'home-movies studies' found that subtle symptoms of autism are present earlier than some parents have suspected and receipt of MMR vaccine did not precede the first symptoms of autism. Other studies using sophisticated movement analysis examining home videos of children 2-3 months old also support the hypothesis that very subtle symptoms of autism are present in early infancy and argue strongly against vaccines as a cause of autism.[19-21]

There is also evidence that autism occurs in utero. Children with congenital rubella syndrome are at an increased risk for development of autism; risk being associated with exposure to rubella prenatally and not postnatally.[22] Children with tuberous sclerosis and Fragile X sundrome are also at an increased risk of developing autism.[11] Children exposed to thalidomide before 24 days gestation were found to have an increased incidence of autism [23-24]. Rodier and colleagues have in fact found evidence for structural brainstem abnormalities in children with autism which could only have occurred in utero.[25]

All this evidence clearly demonstrates that MMR vaccine is not in any way linked with the development of autism. The controversy surrounding vaccines has in fact diverted attention and resources from the real causes of autism.

Other vaccine safety issues

Preservatives, adjuvants and additives

Many parents alerted by stories in the media and information contained on the internet are also concerned that substances contained in vaccines such as preservatives, adjuvants, additives or residuals might be harmful especially to children. However on examining data on thiomersal, aluminium, gelatin, human serum albumin formaldehyde, antibiotics, egg proteins and yeast proteins it is evident that both gelatin and egg proteins are present in sufficient quantity to induce rare instances of severe, immediate-type hypersensitivity reactions. However quantities of mercury, aluminium, formaldehyde, human serum albumin, antibiotics and yeast proteins have not been found to be harmful in experimental animals and in humans.[6]

Vaccines and allergic or autoimmune disease

Case reports and uncontrolled observational studies in the medical literature have linked vaccines with development of asthma and allergic disease, chronic arthritis, Type 1 diabetes and multiple sclerosis. Because of these reports some parents may choose to postpone or withhold vaccines for their children.[26-32] However many well-controlled epidemiological studies fail to show any causal relationships between vaccines and afore-mentioned diseases.[33-41]

Conclusion

In this day and age there is a growing demand for vaccine safety. As disease recedes, the need to vaccinate becomes always less and less evident to the general public. There may be the temptation to opt out of the social contract to vaccinate and depend on herd immunity of surrounding persons which of course will fail if too many refuse to be vaccinated. Real safety problems with vaccines do exist, such as disseminated infection after Bacille Calmette-Guerin and paralysis after oral polio vaccines (Sabin vaccines as utilized in Malta).[42,43] For that reason older vaccines must be continuously re-evaluated for possible safety improvements; such as the case with the replacement of rabies vaccine made in brain by vaccine made in cell culture or the replacement of the whole-cell pertussis vaccine by acellular vaccine or the change-over from the live oral polio vaccine (Sabin) to the inactivated polio vaccine (Salk) in most industrialized countries (but not Malta). Molecular technology should indeed be of help in developing safer vaccines necessary because risk-benefit ratios become more controversial when disease presence declines.[44]

We as health-professionals must also realize that one-quarter of the world's children still have no protection from common preventable diseases. Nearly 3 million people (almost 2 million of them children) die every year from these same diseases. Children in developing countries are dying from other diseases, such as meningitis and pneumonia, while vaccines for these are widely used in the industrialized world. We must begin to address gaps in immunization services in both rich and poor countries. The right to protection from preventable diseases is the right of every child and it is well within our collective capacity to realize that right.[9]

We must ensure that every child benefits from one of the most cost-effective health interventions available, and that all children are vaccinated safely, effectively and equitably. Epidemics spread faster and further than ever before. Our health interdependence has deepened. Immunization in one country is the key to reduction of disease in others. We thus all have a role to play as guardians of health: as health professionals; as parents once children ourselves. In public health terms we are compelled to act.

Immunization remains one of the best investments in health that is within our grasp. We have a responsibility that we cannot ignore.

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Developmental Milestones

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Developmental and behavioral problems are commonly seen by family doctors and paediatricians. According to a study done on American children, 12% to 16% of children have developmental or behavioural disorders.[1] Identifying and addressing these concerns is of great importance so that appropriate intervention can be instituted. The family doctor plays an important role in developmental and behavioral screening.

Early developmental intervention and education helps to influence a young, malleable and responsive brain. It helps to maximize a child's developmental potential, and his functional abilities such as social communication, mobility and adaptive skills. It also helps to limit maladaptive functioning. Early intervention will provide preventive strategies for environmentally, and possibly biologically, at-risk children. In some cases early diagnosis of a genetic disorder, metabolic or infectious disease can prevent further damage, or another child being born with the same disability.

On the other hand, parents can learn how their child is developing in relation to other children, tailor their expectations to what the child can achieve, and provide stimulation, and toys to match the child's readiness for the different milestones. This allows family members to think that they are doing all they can to assist the child, and to bolster the child's sense of being appreciated for who he or she is - an important

preventative measure against further emotional disability.[2]

What are the risk factors for developmental delay?

The risk factors can be divided into the following categories[2]:

(a) Prenatal maternal factors

- Previous miscarriage or stillbirth
- Acute or chronic illness (for example HIV positive mothers)
- Poor nutrition
- Hyperthermia
- Use of drugs or alcohol
- Toxaemia

(b) Perinatal factors

- Obstetric complications
- Prematurity (less than 33 weeks)
- Low birth weight (less than 1500g)
- Multiple birth

(c) Neonatal factors

- Neurological events (for example seizures)
- Sepsis or meningitis
- Severe jaundice
- Hypoxia due to breathing difficulties
- Neonatal intensive care unit admission of more than 5 days

(d) Postnatal factors

- Seizures
- Sepsis or meningitis
- Recurrent ear infections
- Poor feeding
- Poor growth
- Exposure to lead or other toxins

(e) Factors in the family history

- Consanguinity
- Developmental delay (difficulty walking, talking, learning)
- Neurological disease (muscle weakness, seizures, migraines)
- Deafness/Blindness
- Cardiomyopathy
- Known chromosomal abnormalities

(f) Factors in the social history

- History of abuse or neglect
- Limited financial or social support
- Teenage/Single parent
- Mentally retarded parent
- Stressful life events (e.g. separation of parents, death or unemployment of parent)
- Substance abuse in the home
- Parental chronic illness limiting care giving ability

Obstacles to identifying at risk children

Clinical evaluation by doctors only identifies about half the children in need. There are several reasons for this lack of identification.

The natural wide variation among children makes it easy to ignore a subtle finding. Normal developmental spurts and lags are present and may confuse the picture. Gender differences may also be a confounding factor. Girls usually develop earlier than boys as regards social and communication skills. In girls, the peak spurt of speech and language is around 18 to 24 months whilst, in boys, it is between 2 to 3 years. Boys usually develop some motor skills earlier than girls. These would include the onset of walking and visuo-spatial skills (like sorting jigsaw puzzles).

One must take care not to overlook one area of development. All streams of development need to be assessed. The best predictors of development are skills relating to brain functioning, rather than reaching specific movement milestones within the expected timeframe. Motor milestones are excellent indicators of movement skills, but correlate poorly with intellectual functioning. Language and problem solving milestones in infancy provide the best insights into intellectual potential, and their evolution is independent of motor skills which may be obscured by physical disability. Psychosocial abilities are critical to understand the whole child and in making a meaningful assessment about behaviour, but they do little in assessing motor and intellectual skills.

In cases of prematurity, it is important to adjust the milestones according to the prematurity. This would be more relevant for motor development rather than language skills up to the age of 18 to 24 months.

Parents and doctors may find it difficult to discuss their fears and be unwilling to confront the painful reality that the child may have a developmental problem. Doctors need to use the phrase: "The child will grow out of it" with caution.

Developmental Milestones

Developmental milestones are a set of functional skills or age-specific tasks that most children can do at a certain age range. Although each milestone has an age level, the actual age when a normally developing child reaches that milestone can vary quite a bit. Every child is unique.[3]

During each visit the child is checked for his growth by means of growth charts (see Figures 1 and 2).[4] His general appearance, eyes, cardiovascular and genitourinary systems are also examined. The hips are also checked for congenital dislocation.

Intellectually handicapped children may show some unusual physical signs indicative of mental retardation. These may include a small or large head circumference, a short stature, obesity (Prader-Willi Syndrome), excessive height, limb deformities, unusually shaped ears or placement, and skeletal abnormalities.

The developmental milestones are classified according to age. The booklet "Your Child's Guide to Health" which is given to all mothers in Malta, gives a very good outline of developmental milestones to be checked at each visit. The parents are paramount in helping the doctor assess the child's development since they are all the time with the child. In fact most screening tools use information gathered from parents (like the Ages & Stages Questionnaires®[5] to assess the child's development. Tables 1 and 2 give a summary of the expected developmental milestones.

Figure 1: Growth Chart (Girls): pre-term - 2 years

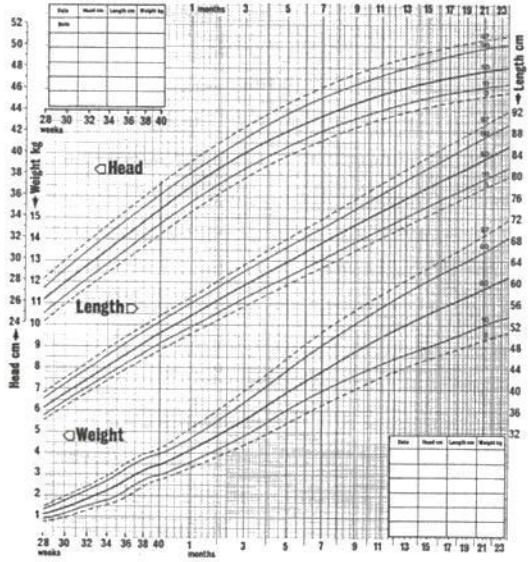
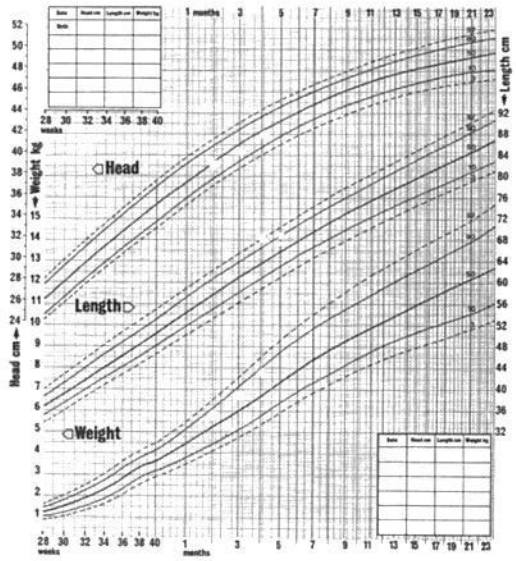


Figure 2: Growth Chart (Boys): pre-term - 2 years



Vision Assessment

Impaired vision may affect a child's general development and the whole family if the early intervention does not start really early.

In vision screening we have two goals:

1. to find children who are visually impaired (<1 - 2%), and
2. children with strabismus and/or amblyopia, or at risk of developing them (2-4%).[6]

In the detection and assessment of impaired vision we need to be aware of the fact that more than 60% of children with vision problems have at least one other impairment or chronic illness that affects their functioning.[6]

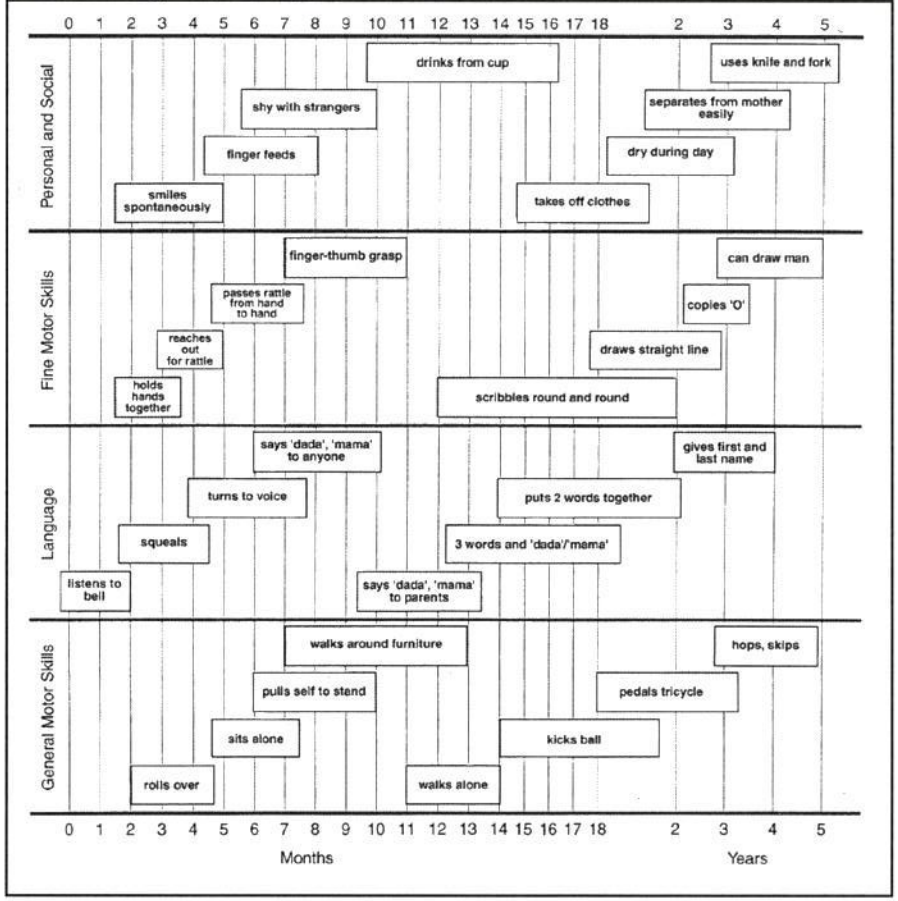
Red Reflex

Shadows in the red reflex may be caused by cloudiness of the cornea, opacities in the lens, dislocation of the lens, vitreous floaters, or remaining foetal structures in the vitreous. Infants with a large shadow in the red reflex need to be referred without delay.

Table 1 - Developmental Milestones Table to use in your Clinic

Age	Gross	Fine Motor	Vision	Hearing and Speech	Psychosocial
2 months	Improving general control of body	Starts to open hands	Follows objects along 90° arc	Settles to mother's voice	Smiles
6 months	Sits with help Good head control	Transfers objects from hand to hand	Follows objects along 180° arc	Responds to sounds around him Babbles	Enjoys social play
12 months	Crawls Cruises around furniture	Pokes with index finger Pincer grasp	Follows objects at end of room	Distraction test Says "da-da" & "ma-ma"	Tests parental response to his behaviour
2 years	Walks up and down stairs with support Stands on tiptoe	Scribbles Uses spoon Builds tower of 4 blocks		Simple phrases (4 word sentences)	Sorts shapes and colours Recognizes body parts
3 years	Walks up and down stairs, alternating feet	Makes up-and-down, side-to-side, and circular lines with crayon Tower of more than six blocks		Uses pronouns and some plurals	Sorts objects by shape and color Completes puzzles with three or four pieces
4 years	Hops and stands on one foot up to five seconds	Copies square shapes Draws a person with two to four body parts		Basic rules of grammar Tells stories	Dresses and undresses Understands the concept of counting and may know a few numbers

Table 2: Stages of Development[8]



Eye Contact

Eye contact is an emotionally important function that may be present during the first day of life. Some newborn infants may copy even the basic expressions.

At the age of 8-12 weeks, social smile and affective interaction between infants and their parents is expected (as discussed earlier). One must also look for eye-hand coordination.

Previously, we had seen that towards the end of the first year, infants start to recognize family members by their faces and by their voices. If an infant does not respond to family members differently from how he responds to strangers but does recognize their voices, vision needs to be carefully assessed (the infant may have large refractive errors or other causes that decrease image quality).

Large Eyes

Large, "beautiful" eyes that are growing faster than usual should raise an alarm. Increased pressure may cause photophobia, tearing, and sometimes rubbing of the eyes. This may be misdiagnosed as allergic conjunctivitis. The diagnostic feature is the abnormally increasing size of the diameter of the iris.

Ptosis

Drooping lid or ptosis may disturb development of binocularity and lead to amblyopia of the eye with ptosis. Therefore, ptosis needs to be evaluated early in infancy. If the drooping lid does not cover the centre of the pupil, the optical axis, the risk of amblyopia is small during the first few months of life before the infant learns to sit.

When the child starts to be upright, it is worth while to test now and then that the infant/child uses eyes equally, i.e. that covering the eye that does not have ptosis does not disturb the infant more than covering of the eye with ptosis. The cover should only block the gaze, not touch the infant's face.

Strabismus

Until the age of three months, most children have eyes turning in or out for brief periods, which is normal. A constant turn of an eye or restricted movements of an eye are always an abnormal finding and the infant needs to be examined by an ophthalmologist.

After the age of six months strabismus should not occur more than briefly when the child is tired. A normal occurrence known as Bell's phenomenon involves eyes

turning out and up during sleep, preventing corneal drying if the lids are slightly open.

In many cases the cause of an inward turn of an eye is hyperopia (long sightedness). Proper corrective glasses straighten the eyes and development of vision can continue normally. Early detection of strabismus and support of normal development by glasses and follow-up of the development have decreased the need for surgery.

Pseudostrabismus - If there are nasal folds covering the inner part of the sclera in both eyes, the child may seem to have esotropia (inward squint). Especially, when the head is slightly turned, the eye seems to be squinting inward. This obviously does not need any ophthalmological referral.

The Cover test is used to detect small angle strabismus and differences in the central vision between the eyes. When an eye is covered, the tester observes what happens to the uncovered eye. If the other eye was not looking at the same object, there will be a corrective movement to fixate the target. When the strabismic eye is covered, there is no movement in the leading eye.

If the strabismic eye has developed an eccentric fixation, it may not move during cover test, but there will be a slight difference in the position of the light reflexes (Hirschberg test). These small angle squints are so difficult to detect that often the condition is diagnosed first when visual acuity can be carefully measured.

Visual acuity

Quantification of visual acuity is possible in infancy using a preferential looking test in which the baby is presented a striped and a uniformly grey target simultaneously. Targets with narrower stripes are presented until the baby no longer gives them preferential attention compared with the uniformly grey target.

In preschool years, general vision screening based on measurement of visual acuity is most usual at the age of four years because at that age nearly all normally developing children can be tested during the first examination. Children who do not co-operate or have short attention span should be tested twice and if their testability does not become normal, they need to be referred.

Children with intellectual, motor or hearing disabilities are likely to fail the screening examination and need to be examined by an ophthalmologist.

Vision screening at the age of four years is designed for detection of amblyopia. Visual acuity can be measured with single symbols quite early, the earliest at the age of 13-14 months. In vision screening at school age, number or letter charts are used (see Figures 3 and 4).

Figure 3 - Single Symbols Test

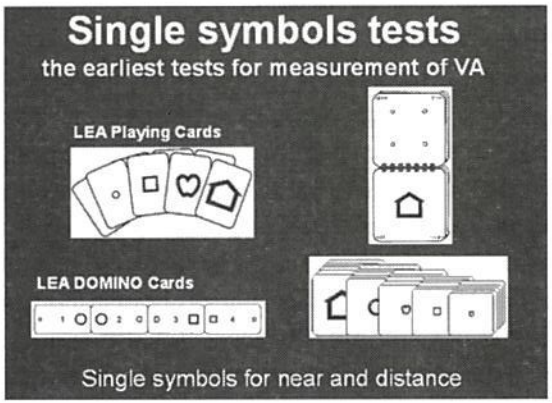
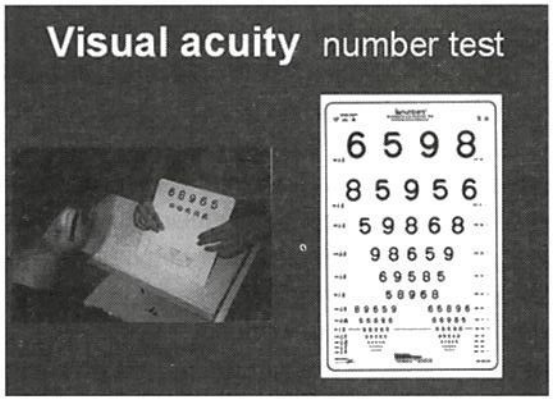


Figure 4 - Visual Acuity Number Test



Hearing Assessment

"Failure to detect children with congenital or acquired hearing loss may result in lifelong deficits in speech and language acquisition, poor academic performance, person-social maladjustments, and emotional difficulties."[7]

Hearing refers to the reception of sounds, their transduction to nerve impulses and transmission to the relevant areas of the cerebral cortex. Listening implies an attention to the sounds and their interpretation and is a prerequisite for language development. The fetus is sensitive to noise and from the moment of birth there is an important sound interplay between mother and infant. Hearing provides for emotional contact, language development, identity with the environment, and assists in the awareness

of posture and body orientation. All children should be screened for deafness by tests which are appropriate for their age, and usually are performed at six to nine months of age, and again at the preschool examination. Babies up to 6 months show an inconsistent response to noises and reliable testing can only be done with sophisticated apparatus like brainstem evoked response audiometry.

Causes of Childhood Deafness[8]

Conductive deafness (middle ear dysfunction) affects 4% of school children. Almost all cases are due to glue ear following otitis media.

Sensorineural deafness (cochlear or auditory nerve problems) occurs in 0.3% of school children. The causes may be

- Genetic (50%) - for example Down's Syndrome
- Intrauterine (8%) - due to congenital infections (like rubella), or maternal drugs (like gentamicin)
- Perinatal (12%) - for example birth asphyxia, severe hyperbilirubinaemia
- Postnatal (30%) - for example meningitis, encephalitis, head injury

Testing for hearing loss

Whereas hearing loss of less than 20 dB normally has no effect on the child's development, a loss of over 40 dB creates problems in the development of ordinary speech.

(a) Examination of eardrum - As outlined earlier, the most common type is due to middle ear dysfunction. Therefore, examining for otitis media is very important, since this type of hearing impairment is treatable. More careful management and follow-up of children susceptible to otitis media may reduce the incidence of glue ear. Once it is diagnosed, it is important to follow up the child and, if it does not clear with appropriate treatment, surgical referral is needed (for grommet insertion and adenoidectomy).

(b) Distraction responses - Infants will turn their head towards the source of a quiet sound. It is essential to have a contented child in a quiet room. The examiner stands on one side of the child and just outside his range of vision. The sound stimulus should be given at ear level. One can use a high pitched rattle, spoon in a cup, hand bell and selected speech sounds like "oo". A free field pure tone audiometer may be used.

(c) Performance responses - From 3 years, a child will play a game of putting a toy in a box whenever he hears the sound.

(d) Speech Audiometry - From 4 years the child is asked in a quiet voice to show the examiner a certain picture or toy from an array in front of him.
(e) Pure tone audiograms - Most children of 5 years and over will tolerate wearing headphones and give reliable pure tone audiograms showing both air and bone conduction thresholds. Testing over a range of frequencies may show a widespread loss, or a loss purely in the high frequency zone. In the sensorineural type, there is equal impairment of bone and air conduction of sound. In the conductive type, there is an air-bone gap, with bone conduction hearing better than air conduction.

However, the final proof of adequate hearing is the comprehension and imitation of normal speech.

Conclusion

Developmental milestones are a set of functional skills or age-specific tasks that most children can do at a certain age range. Although each milestone has an age level, the actual age when a normally developing child reaches that milestone can vary quite a bit. Identifying and addressing these concerns is of great importance so that appropriate intervention can be instituted.

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Febrile Seizures - An update

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This review discusses the current understanding of febrile seizures and the important issues in managing a child presenting with a febrile seizure. It presents some of the important evidence based themes about febrile seizures and some of the controversial issues.

Febrile seizures (FS) are the most common convulsive event in humans. Overall, 4-5 % of the population will have at least one febrile seizure[1]. A massive literature (1853) articles in Medline since 1960 has been published for this common benign disorder. Yet some controversies remain unsettled while others are now settled and have formed the basis for evidence based practice guidelines. Settled issues that include subsequent epilepsy occurs in only 2-5% and the risk of a recurrent febrile seizure after the first is about 30-40%. They do not cause brain damage or intellectual decline and the long term outcome for children with FS is the same as control children from the perspective of school performance and behaviour.[2] Much of the remaining controversies centre around the differing perspectives of the primary care physicians who clearly see the benign outcome of FS and the paediatric neurologists who have focused on rare major problems.

Definition

There are two published operational definitions of febrile seizures. The National Institute of Health (NIH) consensus statement defines FS as "'an event in infancy or childhood usually occurring between 3 months and 5 years of age, associated with fever but without evidence of intracranial infection or defined cause for the seizure".[3] This definition excludes seizures with fever in children who have previous afebrile seizures. The International League Against Epilepsy (ILAE) defines FS as "a seizure occurring in childhood from 1 month of age, associated with a febrile illness not caused by an infection of the central nervous system, without previous neonatal seizures or a previous unprovoked seizure, and not meeting the criteria for other acute symptomatic seizures'[4]. Both definitions do not exclude children with prior neurological impairment and neither provides a specific temperature criterion. The three critical elements in the definition are age, fever, and a seizure.

Since most FS are witnessed only by frantic parents, other events that occur with fever must be carefully excluded. Rigors, febrile myoclonus and syncope triggered by illness seem most important [5].

Aetiology

The biological basis of FS remains unknown. There is an important genetic predisposition leading authors to suggest that the disorder is inherited as an autosomal dominant trait while others have suggested a polygenic pattern [6]. When a child has a first degree relative with febrile seizures, the risk of FS is about 10-15%[7]. A study of a family with 21 affected individuals over 4 generations suggested the febrile seizure tendency is mapped to chromosome 2q23-24. [8]

A recently described syndrome is Generalized Epilepsy with Febrile Seizure Plus (GEFS +).[8] This disorder consists of FS that often continue beyond the usual age range and are followed in adolescence by generalized tonic-clonic seizures and several other generalized epilepsy types. While this disorder have more features than straightforward FS, nevertheless it is interesting in that it appears to be inherited as an autosomal dominant defect in the sodium channel.

Factors that predict a first febrile seizure are: delayed neonatal hospital discharge, slow neurological development as judged by parents, a parent or a sib with FS, an uncle or aunt with FS and attendance to day care.[9] Studies on risk factors show the complex interactions that lead up to FS. The child is born with an apparent genetic predisposition, which may be enhanced by other brain problems (delayed neonatal discharge, slow development). Fever must occur at a critical age and day care likely increases the risk of infection.

Distinction between Simple and Complex Febrile seizures

An arbitrary division of FS into simple and complex is pragmatic but distinction may be less clinically precise. About 60-70% of FS are simple and 30-40% are complex [10]. Simple FS are generalized and brief with a single seizure per illness while complex FS are focal, prolonged and repeated within the same illness. Simple FS are followed by epilepsy in only about 2%, while complex FS have 4-12% subsequent epilepsy. The epilepsy tends to be generalized after simple FS and focal onset after complex FS [11].

Predicting the future - Recurrent Febrile Seizures and Subsequent Epilepsy

Since 40% of children with a first FS will have at least one recurrence, it would be useful to be able to predict recurrences. Four risk factors stand out. The most consistently noted are young age at the time of the first FS (<15-18 months) and a family history of FS. Two additional predictive factors are low temperature at the time of the seizure and short duration of illness prior to the seizure. Berg and Shinnar followed 428 children who presented to an emergency room with first FS. Over the next 2 years, 32% recurred. The recurrence risk for those with none of the four risk factors was 14%, with one factor 23%, with two 32%, with three 62% and with all four 76%.[12] It is to be noted that complex FS and neurological dysfunction have not been consistent predictors of recurrent FS.

The risk factors for subsequent epilepsy after a first FS have been replicated in several studies. The most important are the factors that define a complex FS - focal seizure, prolonged seizure, repeated seizures within a single illness. Developmental delay or neurological dysfunction increases the risk of epilepsy. The number of FS is not a predictor of epilepsy. Children with no risk factor have only a 2% chance of developing epilepsy. Each of the risk factors increases the chance to about 5%. Children with two or more risk factors have about 15% risk of subsequent epilepsy.

The value of identifying predictive factors for subsequent epilepsy or recurrent FS has not been studied well. Does it matter to a family if the risk of recurrent seizure increased from 15 to 45%? Knowledge of risk factors may not lead to an alteration in management. The bottom line is that the majority of children with FS do not develop epilepsy.

Prolonged Febrile Seizures and Mesial Temporal Sclerosis

The pioneering observations of Falconer based on 100 children who had surgery for intractable temporal lobe seizures suggest two main ideas. First, the cause of

temporal lobe epilepsy often appeared to be mesial temporal sclerosis (MTS) and secondly a significant proportion of those with mesial temporal sclerosis had preceding prolonged febrile seizures (30% in the MTS only group compared to 6% in the group with other pathology).This sequence is a rare occurrence - about once in 150,000 children[13] and the association is not a simple cause and effect one.

Evaluation of the child with Febrile Seizures

A detailed history including family history of FS, epilepsy and sudden deaths in the family is mandatory. Examination looking for meningitis, underlying neurological deficit, and asymmetry, stigmata of neurocutaneous or metabolic disorder and measuring the head circumference is important and informative. During assessment of a child with first or subsequent FS a number of questions need to be answered.

Was it a seizure and not a rigor, reflex anoxic seizure or other non-epileptic event?

Very often this could be clinched from the history given by witnesses or carers. However, it can be difficult especially were carers are frightened by the episode or in the situation were seizure was triggered by fever in a child with known epilepsy or suspected to have epilepsy.

Was it febrile - and if so where is the source of infection?

This may be difficult as temperature can go up after an afebrile tonic clonic seizure. Ear, nose, throat, urine and a CNS infection should be looked for when the temperature rises to 38°C. The American Academy of Paediatrics has prepared a practice guideline for simple febrile seizures[15]. The evidence from reviewed publications supports very little investigations. Routine blood work has not been shown to be of value unless clinically indicated. Several studies have suggested that low serum sodium after a first FS is associated with significant risk of recurrent febrile seizure within that illness[14].Each child must therefore be evaluated individually and carefully.

Could there be possible meningitis, encephalitis or an encephalopathy?

Understandably, it is very important that an underlying meningitis or encephalitis is excluded in a child presenting with a FS. One must decide whether a lumbar puncture is indicated. This remains a controversial issue. Haemophilus Influenzae vaccine has decreased the number of bacterial meningitis markedly, although other organisms such as streptococcus pneumonia still exist. The estimated incidence of meningitis in children who present with an apparent FS is 2-5%[15,16]. The yield of positive findings from lumbar puncture is generally low in the absence of risk factors including focal seizures and suspicious clinical findings. Yet in convulsive status epilepticus with fever the population risk of acute bacterial meningitis is much higher than that of short febrile seizure (15-18% vs. 0.4-1.2%) [17]. Deciding whether a child has meningitis will be easier in the older child > 2 years where there may be meningism or photophobia. In children < 2 years of age this may be more difficult and there should be a low threshold for considering meningitis or encephalitis (specifically herpes simplex) particularly in the following situations:

- Where there is a history or irritability, decreased feeding, or lethargy
- Where the seizure is prolonged, focal or multiple FS occur in the same febrile illness
- Any physical signs of meningitis / encephalitis
- Prolonged post-ictal altered consciousness or neurological deficit
- Pretreatment with antibiotics

In this situation an LP with simultaneous blood and CSF glucose level should be undertaken unless there are specific contraindications. Practice guidelines recommend a LP should be performed in children < 12 months and considered in children 12-18 months[15,16].

Could there be an underlying static or progressive neurological disorder ?

The history and the examination will help and further investigations are indicated in rare situations where the child has an unexplained encephalopathy presenting as prolonged altered consciousness or regression. It is only in this case that an early EEG may be indicated. Routine EEG after a febrile seizure does not seem justified. There is no consistent evidence that routine EEG predicts febrile seizure recurrence or subsequent epilepsy even after recurrent simple or complex seizures[19]. Neuroimaging is not indicated in children with simple or complex FS. One study of CT scans in 44 admitted febrile seizure patients found no significant abnormailities.[18] Neuroimaging should be considered in children with FS who are also found to have the following:

- Micro / Macrocephaly, a neurocutaneous syndrome or pre-existing neurological deficit
- Post-ictal neurological deficit persisting for more than a

few hours following the FS

- Recurrent complex febrile seizures where there is doubt whether the seizures were febrile in origin.

MRI is superior in those cases where a suspicion of herpes encephalitis or a structural abnormality like cerebral dysgeneis, tumour or a vascular malformation is suspected.

Treatment of Febrile Seizures

Should diazepam be used for further febrile seizures or febrile episode?

Diazepam during the seizure

Most FS last only a few minutes and are over before the child presents to the health care system. If a child presents during a seizure it will typically have been going on for at least 20-30 minutes. Diazepam 0.5mg/kg can be given rectally at the time of a febrile seizure. The potential benefit of this treatment is to limit the duration of the febrile seizure and give frightened parents a sense of being in control. This is indicated for certain families although this has not been subject to a randomized trial.

Diazepam whenever the child is febrile and before the child starts seizing

There is conflicting evidence on the effectiveness of intermittent diazepam in preventing recurrent seizures. Benzodiazepines given at the time of the illness / fever do reduce the incidence of recurrent FS. Rectal liquid diazepam 0.5mg/kg every 12 hours when the child is ill appears equally effective to phenobaritone.[21]. However, the use of intermittent oral diazepam is not recommended as studies have not shown any convincing reduction in recurrences of FS. Moreover, no study has demonstrated that any form of treatment of FS alters the rate of subsequent epilepsy The decision to use rectal diazepam should be based on a number of factors: the balance between the potential benefits and risks, the wishes and abilities of the child's carers and the child's frequency and pattern of febrile illnesses and the type of FS.

Is prophylaxis indicated?

There is no convincing evidence and therefore no justification that the regular use of prophylactic antiepileptic medication with phenobaritone, phenytoin, sodium valproate or carbamazepine significantly reduced the risk of either further FS or the development of late epilepsy. Both the Royal College of Paediatrics and Child Health[22] and the American Academy of Paediatrics[15] do not recommend the use of prophylactic antiepileptic medication in children with either simple or complex FS.

Antipyretics

There is a growing literature to show that the fanatical use of antipyretics does not reduce the rate of recurrent febrile seizures [23-24]. Antipyretics may render a febrile child more comfortable but that is their only role in the treatment of FS.

Long Term Outcome

Two large febrile seizure cohorts have proven that febrile seizures are benign[25, 26]. In the National Perinatal Collaborative Study in the USA, more than 50,000 babies were identified prenatally and followed to age of 7 years. There were 1706 with at least one febrile seizure. At age 7, the intelligence and school performance of those with FS was the same as their unaffected sibs. The British Child Health and Education Study followed a cohort of 16,163 infants. Testing showed that children with febrile seizures has the same academic progress, intellect and behaviour as other children.

What information should be given to the family?

Facts and advice should be both verbal and written explaining what a FS is, that they are common and can recur: It is important to reassure parents that there is no evidence that any child has ever died as a result of an FS. Parents should be told what to do if their child has a febrile illness and has a further FS. If indicated, they should be shown how to give rectal diazepam. It is important to inform them that an ambulance should be called if the tonic-clonic seizure lasts more than 5-10min and shows no signs of stopping[27].

Conclusion

Febrile seizures are very common. The aetiology is still unknown but there is evidence for an important genetic influence. Only rarely are they followed by epilepsy. Usually clinical assessment is sufficient, without any laboratory, EEG or imaging studies. It is possible to predict recurrent FS and subsequent epilepsy but not accurately enough to be of major clinical use. Fortunately it is rare for prolonged febrile seizures to be followed by intractable temporal lobe epilepsy. Drug treatment is not usually indicated to attempt to prevent recurrence and antipyretic treatment is ineffective.

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Managing the Crying Baby

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Crying - what is it?

Crying is a normal behaviour in infants (Brazelton 1962). It is a means of communication aimed at increasing the attachment between the infant and carer. It can also be an expression of distress.

Konner describes that crying follows an n-shaped curve in the first three months of life (Barr RG 1998). It tends to increase in the first few weeks of life peaking in the second month. It slowly decreases to more stable levels by the fourth month of life, with little crying by 5-6 months.

Excessive crying

Medically, crying is defined as excessive when it lasts more than three hours a day, for more than three days a week, for more than three weeks, in an otherwise well-fed, healthy baby (Wessel et al 1954). This is termed Colic. No identifiable medical problem is usually present.

Colic is commoner in the late afternoon and evening. There is usually a sudden onset of crying for no apparent reason. These bouts are often associated with motor behaviours such as flushed face, furrowed brow, and clenched fists. The legs are pulled up to the abdomen, and the infants emit a piercing, high-pitched scream. The

child is difficult and at times impossible to console.

Incidence and implications of excessive crying

Parents who think their infant cries excessively may seek a doctor's help. Crying presents as a problem in 12 - 20% of infants. It distresses many parents, who view crying as a sign that something is wrong with their child (St James-Roberts I 1999). This distress affects the mother - child relationship (Papousek M, von Hofacker N 1998). Rarely exasperated parents may shake or otherwise harm their crying baby sometimes resulting in infant brain damage or death - shaken baby syndrome (Barr RG 2003).

Aetiology

The cause of infantile colic remains unclear. Organic causes are present in less than 5 % of infants who present with crying (Armstrong K et al 2000). However underlying organic cause must be considered in the evaluation of the crying child. Table 1 illustrates these problems.

Gastrointestinal, psychosocial and neurodevelopment disorders have been suggested as causes of colic.

Gastrointestinal causes have been implied because of the positioning of the infant during episodes of colic. However increased gas production in the colonic lumen and aerophagia do not seem to be the cause of colic as radiological studies during episodes of colic show normal gastric and intestinal outline (Roberts DM et al 2004).

Crying in infants is related to the dynamics of the mother-infant relationship, including anxiety and depression. Mothers who have gone through stress prior to, in and after pregnancy are more likely to have infants who cry excessively (Hiscock H, Jordan B 2004). Poor family dynamics and lack of support are also associated with infant colic (Raiha H et al 1996).

Infants with colic have been found to have increased reactions to sensory stimuli and are harder to soothe than those who cry less (Blum NJ et al 2002). Studies have shown that these children may be at the upper end of the normal distribution of crying in infants. Babies may not have yet learnt to 'self-soothe' and regulate their own crying, becoming persistent criers (Armstrong K et al 2000). The fact that most babies outgrow colic by four months lends support to a neuro-developemental cause. (Barr RG 1998).

Crying may be a response to tiredness, hunger or over stimulation. Breast feeding does not protect against colic (Clifford TJ et al 2002). Colic is also increased when the mother smokes during pregnancy (Shenassa ED, Brown MJ 2004).

Table 1

Organic Causes of Excessive Crying in Infants

CNS	CNS abnormality (Chiari type I malformation)
	Infantile migraine
	Subdural haematoma
Gastrointestinal	Constipation
	* Cow's milk protein intolerance
	* Gastroesophageal reflux
	* Lactose intolerance
	Rectal fissure
Infection	* Meningitis
	* Otitis media
	* Urinary tract infection
	* Viral illness
Trauma	* Abuse, Shaken baby syndrome
	Corneal abrasions
	Foreign body in the eye
	Fractured bone
	Hair tourniquet syndrome

* Most common organic causes

Adapted from - Infantile Colic - Roberts DM, Ostapchuk M, O'Brien JG : American Family Physician 2004, Vol 70 No 4, 735-740

Management

The parent presenting with a crying child is usually worried and anxious. Many parents feel they are losing control and that the child is unsoothable (St James - Roberts 2004). It is important to recognise that both parent and child components of this problem have to be assessed and to distinguish between them.

The parent needs to be made at ease and told that the crying is not a problem during the consultation. Many times mothers are frantically trying to stop the child crying both out of concern for the child and for concern that the doctor cannot continue the interview. In my experience, affirming that it is alright for the baby to cry while the consultation proceeds helps by allaying this unease.

History

The parent should be encouraged to talk about what concerns her and what she thinks the problem is. Many a time parents have been receiving various contrasting information which cause anxiety and distrust. Unless these health beliefs and anxieties are shared and understood a positive outcome to the consultation is unlikely.

Attention should be given to whether the parent is enjoying time with the child. This opens the way for assessing how the parent is coping with the child and the level of exhaustion. The latter can be linked to mood disorder. Depression in the post natal period is common and should be actively looked for and treated. Family dynamics and parental support have to be assessed as these may affect management (Gatard AR 2004).

It is important to determine the ability of the mother to differentiate between normal crying and problematic crying and her previous experience. Medical professionals should however not underestimate parents' complaints as 'parents are more effective than professionals in the early diagnosis of a wide range of child health problems' (Hall 1989, Polnay 1989).

The pattern of crying should be sought. Bouts of crying in the evening for no apparent cause may be colic. Crying relieved by feeding may indicate hunger. Crying brought on after feeds may indicate food allergy.

A careful feeding history will throw light into possible overfeeding / underfeeding, early weaning or the use of inappropriate foods. Cultural feedings myths may be the cause of crying. Swallowing air during feeds is another cause. Breast feeding frequency and breast fullness between feeds will help to determine if there is enough milk for the child.

Difficulty in feeding may indicate a blocked nose. Breathing difficulties, cough, apnoea or cyanosis could indicate infection, cardiac problems or allergy. Spitting or vomiting may point to a gastrointestinal problem (e.g. reflux). Associated bowel symptoms and stool characteristics are important. Constipation with excessive straining may be due to inappropriate feeding. Diarrhoea and mucus in stool may indicate a food allergy or enteritis. Perianal excoriation may indicate eczema.

A sleep history will help in evaluating if the child is being deprived of sleep. Some parents over stimulate a child in attempting to console the crying. Crying may be caused by tiredness.

History of illness, hospitalization, surgery and allergies are important in forming diagnosis. Pregnancy complications and birth events may throw light on neurological causes for crying. They may also indicate causes of maternal stress and anxiety which do affect increased reporting of crying (Raiha H et al 1996)

A history of medications recently used is beneficial as some over the counter medications can cause irritability and crying. This is also the case with some prescribed medication.

In practice I have found it beneficial to take over handling of the child at an early stage of the consultation. This approach allows the mother relief as she hands care over to the doctor, and for assessment of the consolability of the child.

The child who is easily distracted and stops crying to note the distraction rarely has an organic problem. Simply turning on the water tap usually does the trick. Over stimulation of the child or cuddling the child does not in my experience aid the consultation.

Examination

The aim of examination is to exclude organic causes for crying. Organic causes are serious and can be life threatening.

Systemic examination of all systems is essential.

The child should be fully exposed and the overall appearance noted. Eczema or nappy rash may be what is causing the irritation. Areas of bruising may point to the possibility of shaken baby syndrome.

The stability of vital signs indicates the seriousness of the situation. A high temperature suggests infection or inflammation.

The head, ear, eyes, nose and throat should be examined for otitis, corneal abrasions, haemorrhages, pharyngitis, foreign bodies and evidence of finger marks and bruising on the neck. Fractures should be excluded and fontanelles checked for intracranial pressure, Children who have long finger nails and scratches in the face should have their eyes examined with fluorescein staining (Simon HK 2004). Examination of the mouth may reveal eruption of new teeth or thrush.

Chest examination to rule out pulmonary infections, asthma, cardiac murmurs, tachycardia and arrhythmia is important.

Abdominal examination for tenderness, bowel sounds, masses and lymph nodes

may indicate acute conditions such as intussuspection and appendicitis or the presence of childhood pathology of renal or haematological origin.

The genitourinary area is examined for hernia, torsion, anal fissure, phimosis and strangulation by hair tourniquets.

Hair tourniquets are also sometimes found around limbs or digits. The extremities should be examined for focal tenderness, crepitus and bruising which will necessitate radiological investigation to confirm or exclude fracture.

A full neurological examination will indicate possibility of meningitis, CNS abnormality or the possibility of head injury from abuse. Neurological developmental delay may indicate genetic problems.

Weight and growth charts will indicate feeding, gastrointestinal or metabolic problems.

The examination alone may reassure parents.

Investigations

No investigations are usually necessary in managing crying babies if the history is typical.

Urine microscopy and culture, stool examination and fluorescein staining of the eyes may be considered if examination indicates need (Clinical Practice Guidelines - RCH)

Diagnosis and treatment

Identification of an organic cause, parental problem or no cause for crying will determine further management.

In some cases where the parent repeatedly presents with a crying infant it is wise to see the home environment. A child's room which is too hot or too cold may be the problem. Facilities for the proper sterilisation and mixing of feeds should be assessed. Family interactions and dynamics are better assessed in the home environment.

As crying in most babies has no underlying cause, the task of the family doctor (after eliminating organic causes) is to explain babies' normal crying and sleep patterns, to assist parents to help their baby deal with discomfort and distress and to assess the mother's emotional state and the mother-baby relationship (Hiscock H, Jordan B 2004).

Sleep requirements: Babies differ in their Sleep requirements. On average, babies sleep for 16 out of every 24 hours at birth, falling to 14 hours by 2-3 months of age. If babies are awake and happy during the day, they are unlikely to need more sleep.

Generally a 6 week old baby becomes tired after 1.5 hours, while a 3 month old becomes tired after being awake for 2 hours.

Parents should be encouraged to recognise tiredness and put the baby to sleep. Some parents over stimulate babies in an effort to prevent crying. Reducing stimulation to the infant has been found to reduce colic (Wade S, Kilgour T 2001). Parents 'must go with the flow' allowing the baby to play if not tired or taking the baby out if unable to sleep after 20 minutes of attempt. A warm bath may relax the baby and the mother may try to settle the baby to sleep when s/he looks tired.

Dealing with discomfort and distress: Some babies find difficulty in coping with normal sensations such as digestion, bowel movements, tiredness etc. Babies who are easily startled and cannot calm themselves down during the consultation require a quiet and gentle approach to normal caring tasks such as nappy changing, feeding and other day to day events. Babies who look around frantically when distressed may need to 'look into' the mother's face and be engaged in looking at different things in the room.

Carrying and cuddling the baby have not been found to be of benefit in reducing colic (Wade S. Kilgour T 2001).

Establishing routine: Colicky babies benefit from setting a routine for feeding, sleeping, bathing and play time. The routine will benefit the parent and family too.

Partnership: The doctor should engage in forming a partnership with parents. Follow up is important as reassurance that no medical problem exists may not be enough. Parents also need to be empowered to come back if the need arises.

Mother's emotional state and the mother baby relationship: It is important that the mother rests while the baby is asleep and not focus on housework. The stress of caring for a young child needs to be emphasised. The mother's views and worries about depression are relevant. The relationship between tiredness and depression need to be explained and if present, depression should be treated adequately and effectively. The support of the family needs to be sought. At times extended families bring more pressure and not support. The doctor must understand the family dynamics and be the parents' advocate for the benefit of the child, mother and family.

Medication:

This is rarely indicated in colic.

Anticholinergic drugs (dicyclomine, dicycloverine): These significantly reduce colic but are associated with frequent minor adverse effects such as drowsiness, loose stool or constipation. Harmful events such as breathing difficulties, seizures, syncope,

asphyxia, muscular hypotonia and coma have been reported. Anticholinergics are thus not recommended for colic.

Simethicone: There is no evidence that simethicone reduces infantile colic (Wade S, Kilgour T 2001)

Replacement of cow's milk with soya: Only one small random controlled study showed reduced crying time when soya replaced standard formula milk (Wade S, Kilgour T 2001).

Replacement of cow's milk with casein and whey hydrolysate: There is insufficient and limited evidence that these reduce infantile colic (Wade S, Kilgour T 2001). Whey hydrolysate formulas compared to standard formula decreased the time babies cried each day measured by parental diaries in one random controlled trial (Lucassen LB et al 2000).

Low lactose milk: There is no evidence that this decreases the severity, duration or frequency of infantile colic as recorded by parents (Wade S, Kilgour T 2001).

Hypoallergenic diet for a breast feeding mother: this involves a diet free from artificial colourings, preservatives and low in common allergens (milk, eggs, wheat, nuts etc). Studies have not found sufficient evidence that this improves infantile colic.

Herbal teas: One small RCT found limited evidence that herbal tea is effective for infantile colic. Herbal teas in the trial contained camomile, vervain, licorice, fennel and balm mint in a sucrose solution (Wade S, Kilgour T 2001).

Conclusion

- Management of the crying baby must assess and distinguish between cases in which infants have an organic cause, cases in which infants are healthy and cases in which parents are vulnerable.
- Most infants who cry are healthy and stop crying spontaneously.
- Parents' views and difficulties need to be acknowledged.
- Organic cause needs to be managed accordingly.
- Parents need to be reassured when there is no medical cause for crying. Most parents cannot deal with uncertainty.

- Education and detailed instructions are necessary.
- Follow up is essential in infantile colic. Parents have to be empowered to come again if the need arises.
- Referral to a paediatrician should be considered if the baby:
  - avoids gaze
  - withdraws emotionally and does not respond to parents when not crying
  - does not enjoy play
  - remains distressed after 3 months of age
  - continues to have feeding and sleep problems
- Prolonged crying after 4 months is rare and these infants are likely to have more serious problems. These cases are associated with adverse long term child development and parental psychosocial risk.
- Mothers who are severely depressed, have ideas of harming the baby or themselves and/or have persecutory thoughts should be referred.

It is important to consider crying with other problems and risks in the infant and family, rather than focusing on the crying infant alone (St James- Roberts 2004).

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Paediatric Emergencies - The right way to deal with them

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'To live through an impossible situation, you don't need the reflexes of a Grand Prix driver, the muscles of Hercules, the mind of an Einstein. You simply need to know what to do.'

The Book of Survival
Anthony Greenbank

Paediatric emergencies are probably amongst the most challenging situations that can face a family doctor in the course of his or her professional duties. Knowing what to do at the right time may make all the difference to the outcome of such an encounter. Yet, understandably, many of us feel lacking in confidence or competence when tackling such a situation, because to acquire these qualities requires a good background of training and knowledge and regular exposure to have the necessary information at one's fingertips.

The algorithms and tables which I will be discussing are taken from Resuscitation Council guidelines and accredited pre-hospital care courses and, while definitely not intended to replace formal training, may help to bridge that confidence gap at the crucial moment.

Initial assessment of the sick child

It is important to adopt a system of assessing an acutely sick child which, with practice, could be performed within the first couple of minutes (Figure 1). Such a system will allow life-threatening problems to be identified and treated at the appropriate stage, as well as obtaining the necessary information vital for continued management. One very important but generally overlooked step when dealing with any emergency situation is scene safety. It is very easy to get caught up in the emotion of the situation and jump in to the rescue, but the first few crucial seconds should be taken to assess whether the scene, the patient and the rescuer are safe from physical, chemical, electrical or other hazards.

There is a useful formula for determining a child's weight by age, which information would be crucial in calculating emergency medication dosages at the bedside:

- Infants double their birth weight at 5 months
- Infants treble their birth weight in 1 year
- At one year, average weight is about 10 kg
- Add 2 kg per year up to 4 years (weight at 4 years = 16 kg). Then add 3 kg per year up to age 10 years.

It is also important to have an idea of normal paediatric physiological values (Table 1), since important parameters vary with age and what is, e.g. a normal respiratory rate for a 1 year-old infant would be pathologically significant in a 6 year-old child.

Table 1 - Paediatric normal values

Age (years)	Respiratory rate (breaths/min)	Heart rate (beats/min)	Bp systolic (mm Hg)	Blood volume (ml/kg)
<1	30 - 40	110 - 160	<90	85 - 90
2 - 5	20 - 30	95 - 140	<100	75 - 80
5 - 12	20 - 25	80 - 120	<110	65 - 70
> 12	15 - 20	60 - 100	<120	65 - 70

To calculate the systolic blood pressure, the formula is: **80 + (age in years x 2)**

Figure 1 - Initial assessment of the sick child

1. Assess the scene - scene safety.

2. Primary survey.

2.1 Airway
- *obstruction?*

2.2 Breathing
- respiratory rate
- signs of respiratory distress: grunting, nasal flaring, intercostal and sternal recession
- auscultation
- cyanosis?

2.3 Circulation
- heart rate
- pulse volume
- capillary refill
- skin temperature

2.4 Disability
- posture and tone
- pupils
- mental status: use the AVPU scale

(A - alert, V - response to verbal stimuli, P - response to pain, U - unresponsive)

2.5 Exposure
- of the child for further examination

If the child is very sick, call for help early. If a life-threatening problem is identified during the primary survey, manage immediately.

3. Secondary survey

3.1 Medical history
- use AMPLE acronym:

A - allergies?
M - medications being taken
P - past medical history (including hospitalizations)
L - last ate or drank?
E - events leading to the present condition (i.e. HOPC)

3.2 Record
- initial formal observations (pulse, respiratory rate, temperature, BM sticks, oxygen saturation, weight)
- initial management

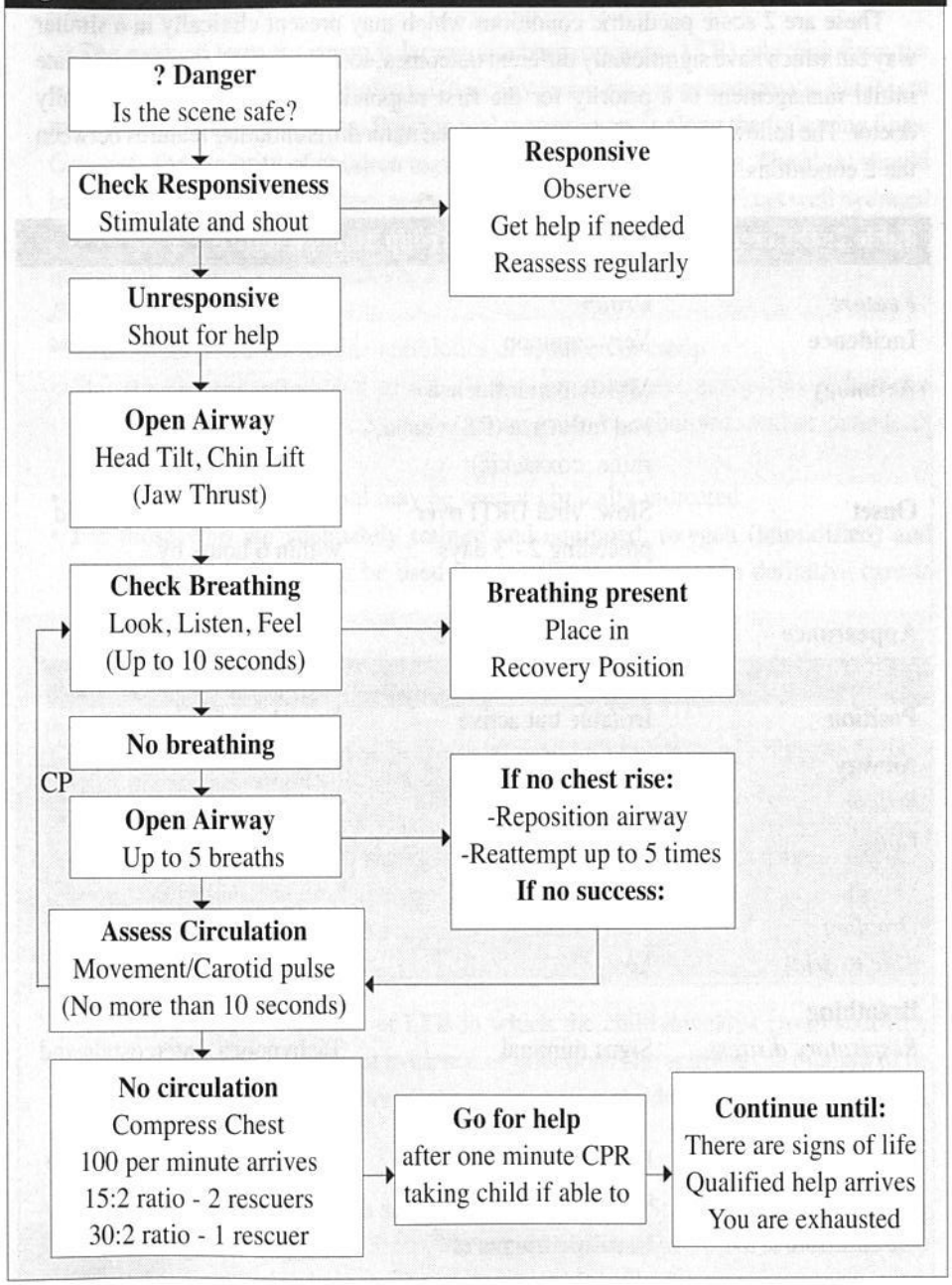
Paediatric basic life support

The algorithm for paediatric basic life support as recommended by the European Resuscitation Council 2005 Guidelines is depicted in Figure 2 below. The fundamental difference between paediatric and adult basic life support centres around the fact that, while in adults the most common cause of cardiorespiratory arrest is heart disease (notably ventricular fibrillation), in children the great majority of cardiac arrests are usually secondary to respiratory failure as can result from lung or airway disease, foreign body inhalation or prolonged convulsions. The heart is still a healthy organ in these children at time of collapse, so CPR should be administered for 1 minute prior to seeking help as delivery of oxygen is the vital step. By contrast, in adults immediate call for access to emergency services should be the priority before starting CPR as early defibrillation is the only effective management.

The following points should be emphasized:

- Scene safety should always take priority before attempting CPR.
- When delivering breaths, the guidelines specify that out of the 5 initial breaths, at least 2 have to be effective respirations as indicated by the chest rising and falling.
- When assessing circulation, in addition to a pulse check, the guidelines specify looking for any movement, swallowing, coughing or regular breathing (not agonal gasps which are irregular and infrequent). In the absence of these signs, chest compressions should be started. Compression should also be started in children of all ages till puberty if the pulse is less than 60 beats/min with poor perfusion.
- The 2005 guidelines have simplified the algorithm by standardizing compression: ventilation ratios and compression positions for all age groups including infants. Thus, the compression: ventilation ratio at all age groups is now 15:2 for two rescuers or 30:2 for one rescuer. The location for compression at all ages is the lower third of the sternum, one finger breadth above the xiphisternum. For children over one year, using one or two hands for compression is left to the rescuer - the importance being that of achieving adequate depth of compression (one-third the depth of the chest wall).
- In the case of a lone single rescuer, CPR should always be performed for one minute before seeking help. The only exception to this is a witnessed sudden collapse of the child if the rescuer is alone; collapse is most likely due to arrhythmia and will require defibrillation.

Figure 2 - Paediatric Basic Life Support



CP = CIRCULATION PRESENT

Croup or epiglottitis?

These are 2 acute paediatric conditions which may present clinically in a similar way but which have significantly different outcomes, so differentiation and appropriate initial management is a priority for the first responder who is usually the family doctor. The following table (Table 2) sets out the main differentiating features between the 2 conditions.

Table 2: Differentiating features between croup and epiglottitis

Feature	*Croup*	*Epiglottitis*
Incidence	Very common	Rare and becoming more so
Aetiology	Mostly parainfluenza and influenza (RSV, echo, rhino, coxsackie)	H. influenzae type B
Onset	Slow: viral URTI over preceding 2 - 3 days	Rapid; sore throat followed within 6 hours by respiratory distress
Appearance	Unwell: temperature < 38.5°C	Toxic and very ill; temperature > 40 °C
Position	Irritable but active	Tripod position
Airway		
Stridor	Harsh, rasping	Soft
Cough	Severe, barking ('seal-like')	Minimal
Drooling	No	Yes (severe disphagia)
Able to drink	Yes	No
Breathing		
Respiratory distress	Signs minimal	Tachypnoea, intercostals and sternal recession. Ala nasae and sternamastoids used
Wheezing	Inspiratory wheeze often present	Absent (decreased air entry)
Circulation	Usually no signs of clinical hypoxia	Tachycardia, cyanosis and exhaustion

Management of croup

The medical term for croup is laryngotracheobronchitis (LTB) which defines the subglottic location of the pathology. Clinically croup may appear dramatic but it is at most times a benign condition. Pre-hospital management is along the following lines:
General: the majority of children may be managed safely at home. The child should be nursed in the upright position, in a warm humidified room and be kept well hydrated by drinking frequent small volumes of clear fluid. There is no evidence that steam inhalations are any more effective.
Pharmacological:

- There is no place for routine antibiotics or sedation in croup
- Steroids: have been shown to aid clinical improvement as well as reduce the frequency of hospital stay. Steroids can be given in nebulised, oral or parenteral form (Figure 3)
- Paracetamol and salbutamol may be used if clinically indicated
- For those who are adequately trained and equipped, oxygen (humidified) and adrenaline (nebulised) can be used in severe cases if access to definitive care is going to be delayed.

Figure 3 - Dosage of steroids and adrenaline

- Budesonide - nebulised 2mg as single dose, or two 1ml doses 30 minutes apart
- Dexametasone - oral/IM/IV 0.6mg/kg
- Prednisone - 1 - 2 mg/kg orally
- Adrenaline - nebulised 0.5 mg/kg of 1:1000 (diluted to 5ml with saline). Rapid onset, duration 2 hours but there is a risk of rebound effect greatest after 6 hours. Stop nebuliser if pulse rate is ≥ 120 bpm.

Spasmodic croup: is a variant of LTB in which the child develops croup suddenly and repeatedly at night, without evidence of infection. The aetiology is thought to be allergic - the condition is more common in atopic children, and is self-limiting, resolving within hours.

Bacterial croup: is caused by a secondary infection with Staph. aureus, or a primary infection with Haemophilus or Strep. It is uncommon but much more severe clinically with copious sputum. Management is primarily urgent referral to hospital with or without adjunctive antibiotics (flucloxacillin, co-amoxyclav).

Management of epiglottitis

This acute, life-threatening condition is thankfully becoming increasingly rare due to successful vaccination programmes against Haemophilus. The severity of the condition is due to rapid and severe airway obstruction by a swollen epiglottis and pharynx and also to septicaemia. Pre-hospital management is as follows:

- Once the diagnosis is made, CALL FOR HELP. It is crucial to alert the emergency paediatric services at the outset.
- DO NOT attempt to examine the child's throat. Depressing the tongue may provoke total obstruction by displacing the swollen epiglottis.
- The child should be nursed upright, calmed and reassured.
- ALWAYS ACCOMPANY to hospital. Total airway obstruction is the GP's ultimate nightmare but emergency cricothyrotomy is a life-saving practical skill that can be learnt, and in every case the GP's reassuring presence will be determinant in a most desperate situation.

Chemoprophylaxis: with rifampicin for household contacts should be considered. Consult the local infectious disease protocols.

Meningitis

Meningitis describes an inflammation of the meninges and as such can be infective or non-infective (figure 4). Here we are concerned with bacteria meningitis which is a significant cause of morbidity and mortality in children and young adults.

Clinical features relevant to the GP

- In the early stages of the illness, there are no features which can distinguish reliably between viral and bacterial meningitis. Moreover, symptoms and signs may appear very suddenly with rapid clinical deterioration.

Figure 4 - Meningitis causes

Infective	• viral (entero-, mumps, polio, H. simplex) • bacterial (N. meningitides, Strep.pneumoniae, H.influenzae, E. coli, Strep group B, Listeria, M. tuberculosis, Leptospira) • fungi and protozoa
Non-infective	• sterile meningitis of acute leukaemic infiltration.

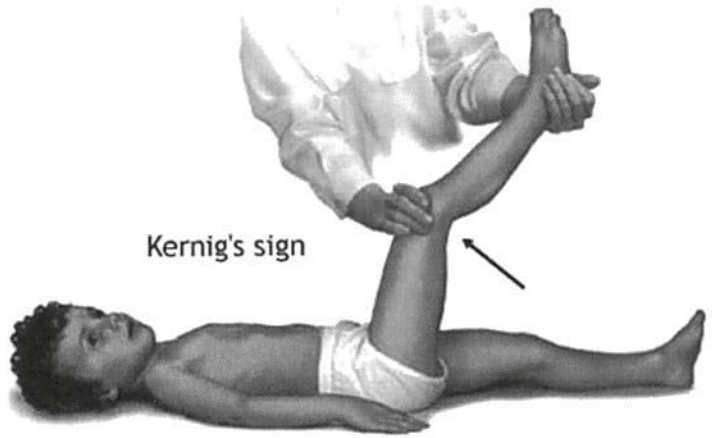
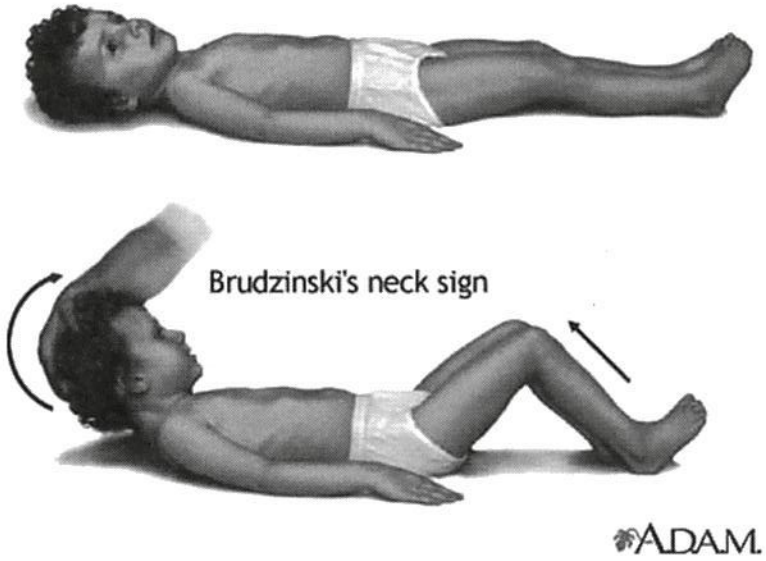


Figure 5 - Kernig's and Brudzinski's signs

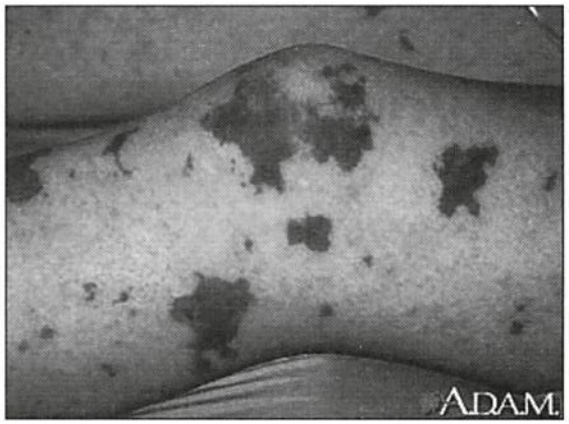


- The signs of meningitis are often non-specific in infants and different to those in older children. Infants may present with drowsiness and irritability, vomiting and/or diarrhoea, or simply having 'gone off feeds'. A fever not responding to antipyretics or antibiotics in a young infant should also elicit a suspicion. Febrile convulsions in very young infants are other presentations. Specific signs of meningeal irritation (neck stiffness/rigidity) are often absent in young infants.
- Older children may present with more typical headache, vomiting and photophobia, but also with confusion or back and joint pains in the presence of a fever. Kernig's and Brudzinski's signs (figure 5) are more often elicited than in infants.
- Signs of increased intracranial pressure (ICP) as a result of meningitis include depressed consciousness, unequal/dilated or poorly responding pupils, focal neurological signs, abnormal posturing ,seizures and bulging fontanelles.
- Septicaemia with decompensated shock is manifested by tachycardia, cool peripheries, pallor, a capillary refill time of more than 4 seconds and tachypnoea. Hypotension is a late sign. The petechial/purpuric rash (Fig. 6) is pathognomonic of meningococcal infection; mostly seen in septicaemia, but sometimes also with meningitis.

Management of bacterial meningitis /septicaemia

The role of the family doctor in the pre-hospital care of meningitis is centred around the following areas:

Figure 6 - Meningococcal rash



- Evaluating and treating the patient for shock/hypovolaemia
- Considering seizure precautions
- Airway protection in patients with altered mental status
- In patients who are alert, stable with normal neurological signs, urgent transfer to hospital. Oxygen and IV access may be secured prior to transfer.

The following algorithm (Figure 7) summarises the management of meningitis and septicaemia:

Figure 7 - Prehospital management of meningitis/ICP and septicaemia

Meningitis No septicaemia	**Meningitis + Septicaemia**	**Septicaemia No meningitis**
-O^2: 10 l/min	-O^2: 10 l/min	O^2: 10 l/min
-Early I.V. access	-Early I.V. access	-Early I.V. access
-Early I.V. steroid[1]	-I.V. antibiotics[2]	-I.V. antibiotics[2]
-(I.V. antibiotics)[2]	-(I.V. colloid) 20ml/kg	-(I.V. colloid)

-ADMIT IMMEDIATELY
-ALWAYS ACCOMPANY

[1] Dexametasone 0.4mg/kg
[2] Ceftriaxone 80mg/kg i.v./i.m.

Pre-hospital antibiotics and steroids - to give or not to give?

Antibiotics

- Early high dose antibiotics have been shown to reduce mortality in meningococcal disease by up to 50%, BUT there is a theoretical risk that in meningococcal meningitis, giving such a dose will precipitate massive endotoxin release and development of an overwhelming and fatal toxic shock.
- Moreover, pre-hospital administration of antibiotics may interfere with or prevent identification of the causative organisms, making later treatment more difficult.

Steroids

- Early administration of steroids in bacterial meningitis has been shown to decrease meningeal and cerebral inflammation, probably by limiting cytokine release, and thus reduce the incidence of neurological and audiological sequelae, BUT
- In meningococcal septicaemia, early administration of steroids has shown no benefit and may in fact make matters worse.

Who gets prophylaxis?

- The Disease Surveillance Unit Working Protocol defines those at risk as anyone who was in close contact with the index case for at least 4 hours during the week before onset. These include:
  (a) Household contacts
  (b) Boy/girlfriend
  (c) Child minders at home
  (d) Possibly classmates and teachers

- Health care workers need prophylaxis only if exposed to patients' nasopharyngeal secretions (mouth - to - mouth resuscitation, intubation, nasotracheal suctioning).

- The following antibiotics may be used:
  (a) Rifampicin - 12 hourly for 2 days 1 hour before meals : adults 600mg; children 1 - 12 years 10mg/kg; infants < 1 year 5mg/kg.
  (b) Ciprofloxacin (adults) 500mg single dose.
  (c) Ceftriaxone - adults 250mg IM stat; children < 12 years 125mg IM stat.

References

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